HOL-2210-91-SDC

Lightning Lab

vmware®

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Lab Overview - HOL-2210-91-SDC - vSphere Distributed Switch - Lightning Lab

Lab Guidance

[2]

Note: It may take more than 30 minutes to complete this lab. However, you may take this lab as many times as you want. The modules are independent of each other so you can start at the beginning of any module and proceed from there. Use the Table of Contents to access any module in the lab. The Table of Contents can be accessed in the upper right-hand corner of the Lab Manual.

Welcome to the Working with the vSphere Distributed Switch Lightning Lab.

We have developed Lightning Labs, to help you learn about VMware products in small segments of time.

In this lab, you will get an introduction to the vSphere Distributed Switch. It covers a comparison with the vSphere Standard Switch, creating a vSphere Distributed Switch and migrating a virtual machine from a vSphere Standard Switch to the new vSphere Distributed Switch.

Lab Module List:

- Module 1 - Working with the vSphere Distributed Switch (30 minutes) (Basic) Explore an existing Virtual Distributed switch, then build a new one and migrate a virtual machine to it.

Lab Captains:

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This lab manual can be downloaded from the Hands-on Labs document site found here:

http://docs.hol.vmware.com

This lab may be available in other languages. To set your language preference and view a localized manual deployed with your lab, utilize this document to guide you through the process:

http://docs.hol.vmware.com/announcements/nee-default-language.pdf

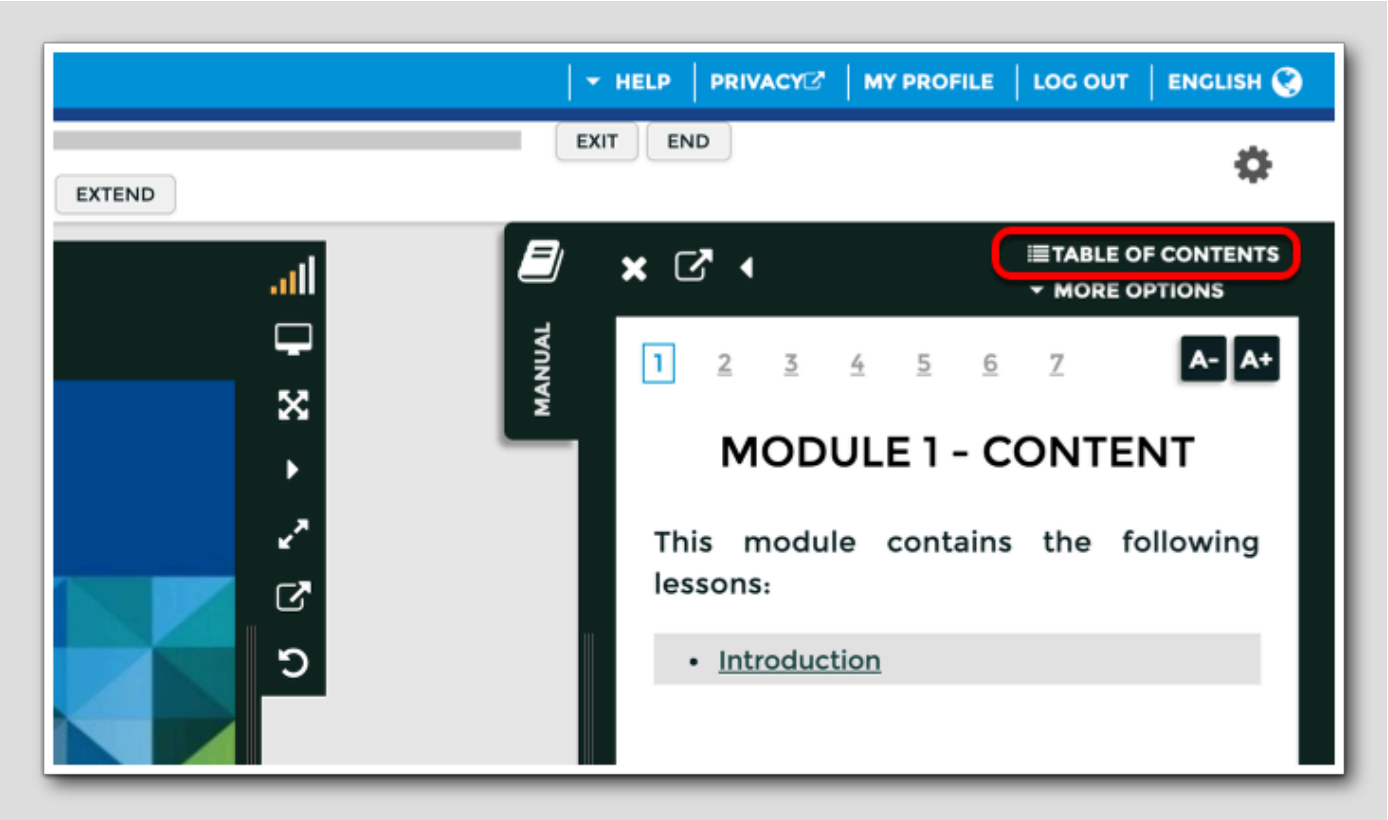
Below are the lab modules included in the complete Virtualization 101: Getting Started with vSphere:

- Module 1 - Introduction to Management with vCenter Server
- Module 2 - Introduction to vSphere Networking and Security
- Module 3 - Introduction to vSphere Storage

If you have never taken a lab, view the *Appendix - Lab Guidance* to see best practices and tips on how to use the lab environment console.

First time using Hands-on Labs?

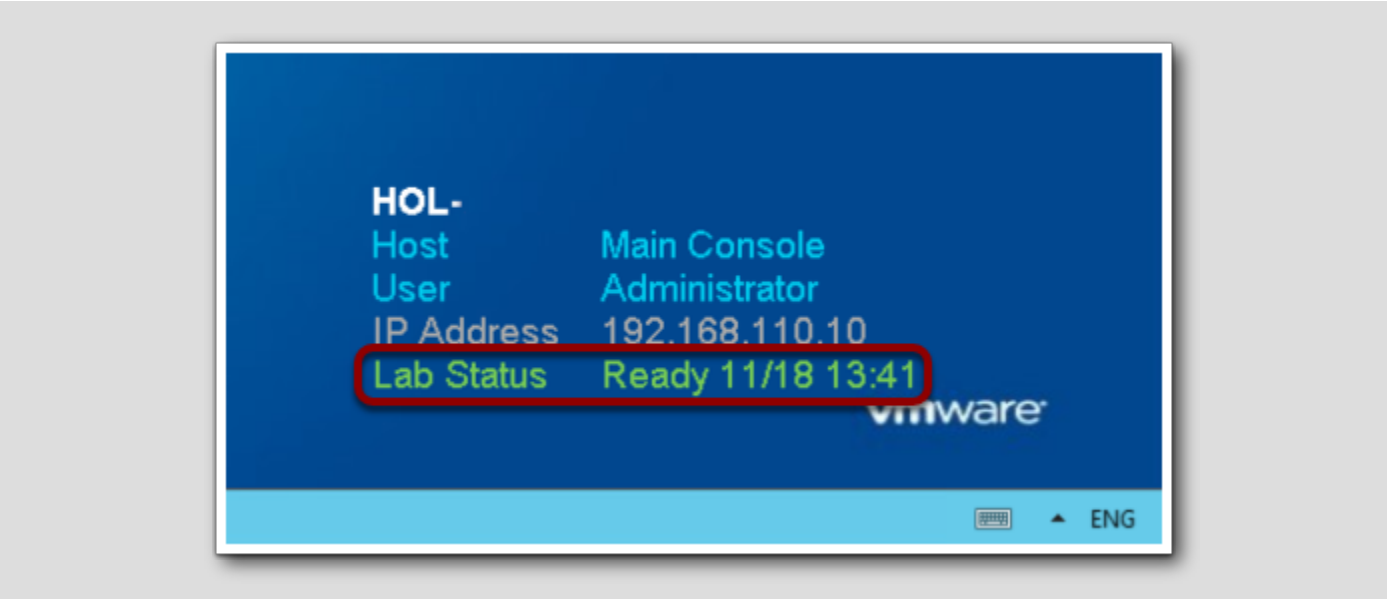
[3]



Welcome! If this is your first time taking a lab navigate to the Appendix in the Table of Contents to review the interface and features before proceeding.

For returning users, feel free to start your lab by clicking next in the manual.

You are ready....is your lab? [4]



Please verify that your lab has finished all the startup routines and is ready for you to start. If you see anything other than "Ready", please wait a few minutes. If after 5 minutes your lab has not changed to "Ready", please ask for assistance.

Module 1 - vSphere Distributed Switch

Introduction to the Distributed vSwitch [6]

The ability to connect virtual machines through a logical switch that is part of the vSphere hypervisor is a necessity for operating systems and applications to communicate on the physical network. Traditionally this was done through a Standard vSwitch, configured individually at each ESXi host in the datacenter.

Since its introduction, the vSphere Distributed Switch quickly became the recommended type of virtual switch to use for most if not all types of network traffic in and out of the ESXi host. This is due mostly in part to its ability to be created and managed centrally through vCenter, as well as the advanced networking features it provides.

Let's spend some time reviewing the similarities and differences between the two types of switches.

Types of virtual switches [7]

There are two types of virtual switches in ESXi/ESX 4.x, ESXi 5.x, and ESXi 6.x, vNetwork Standard Switch and vNetwork Distributed Switch (vDS).

vNetwork Standard Switch (vSwitch, vSS) [8]

As in VMware Infrastructure 3, the configuration of each vSwitch resides on the specific ESXi/ESX host. The VI administrators have to manually maintain consistency of the vSwitch configuration across all ESXi/ESX hosts to ensure that they can perform operations such as vMotion.

vSwitches are configured on each ESXi/ESX host.

vNetwork Distributed Switch (dvSwitch, vDS) [9]

The configuration of vDS is centralized to the vCenter Server. The ESXi/ESX 4.x, ESXi 5.x, and ESXi 6.x hosts that belong to a dvSwitch do not need further configuration to be compliant.

Distributed switches (vDS) provide similar functionality to the vNetwork Standard Switch (vSS). dvPortgroups are made up of a set of dvPorts. The vDS equivalent of portgroups is a set of ports in a vSS. The configuration is inherited from dvSwitch to dvPortgroup, just as from vSS to Portgroup.

Virtual machines, Service Console interfaces (vswif), and VMKernel interfaces can be connected to dvPortgroups just as they could be connected to portgroups in vSwitches.

Comparing vNetwork Standard Switch with vNetwork Distributed Switch

[10]

These features are available with both types of virtual switches:

- Can forward L2 frames
- Can segment traffic into VLANs
- Can use and understand 802.1q VLAN encapsulation
- Can have more than one uplink (NIC Teaming)
- Can have traffic shaping for the outbound (TX) traffic

These features are available only with a Distributed Switch:

- Can shape inbound (RX) traffic
- Has a central unified management interface through vCenter Server
- Supports Private VLANs (PVLANs)
- Provides potential customization of Data and Control Planes

vSphere 5.x provides these improvements to Distributed Switch functionality:

- Increased visibility of inter-virtual machine traffic through Netflow.
- Improved monitoring through port mirroring (dvMirror).
- Support for LLDP (Link Layer Discovery Protocol), a vendor-neutral protocol.
- The enhanced link aggregation feature provides choice in hashing algorithms and also increases the limit on the number of link aggregation groups.
- Additional port security is enabled through traffic filtering support.
- Improved single-root I/O virtualization (SR-IOV) support and 40GB NIC support.

vSphere 6.x provides these improvements to Distributed Switch functionality:

- Network IO Control New support for per virtual machine Distributed vSwitch bandwidth reservations to guarantee isolation and enforce limits on bandwidth.
- Multicast Snooping - Supports IGMP snooping for IPv4 packet and MLD snooping for IPv6 packets in VDS. Improves performance and scale with multicast traffic.
- Multiple TCP/IP Stack for vMotion - Allows vMotion traffic a dedicated networking stack. Simplifies IP address management with a dedicated default gateway for vMotion traffic.

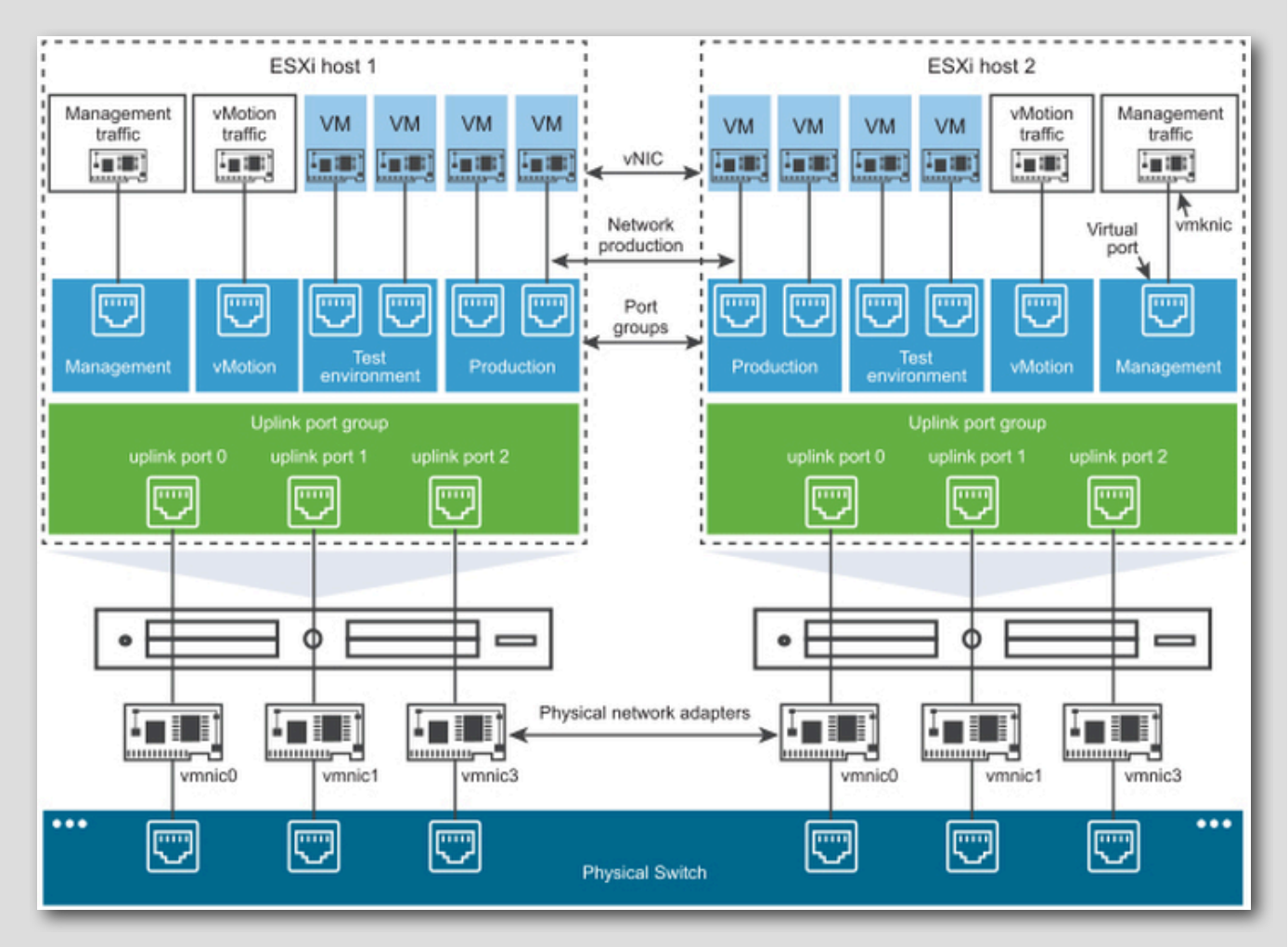
vSS vs vDS architecture

[11]

Spend a few minutes reviewing the differences between the Standard vSwitch and Distributed vSwitch architectures.

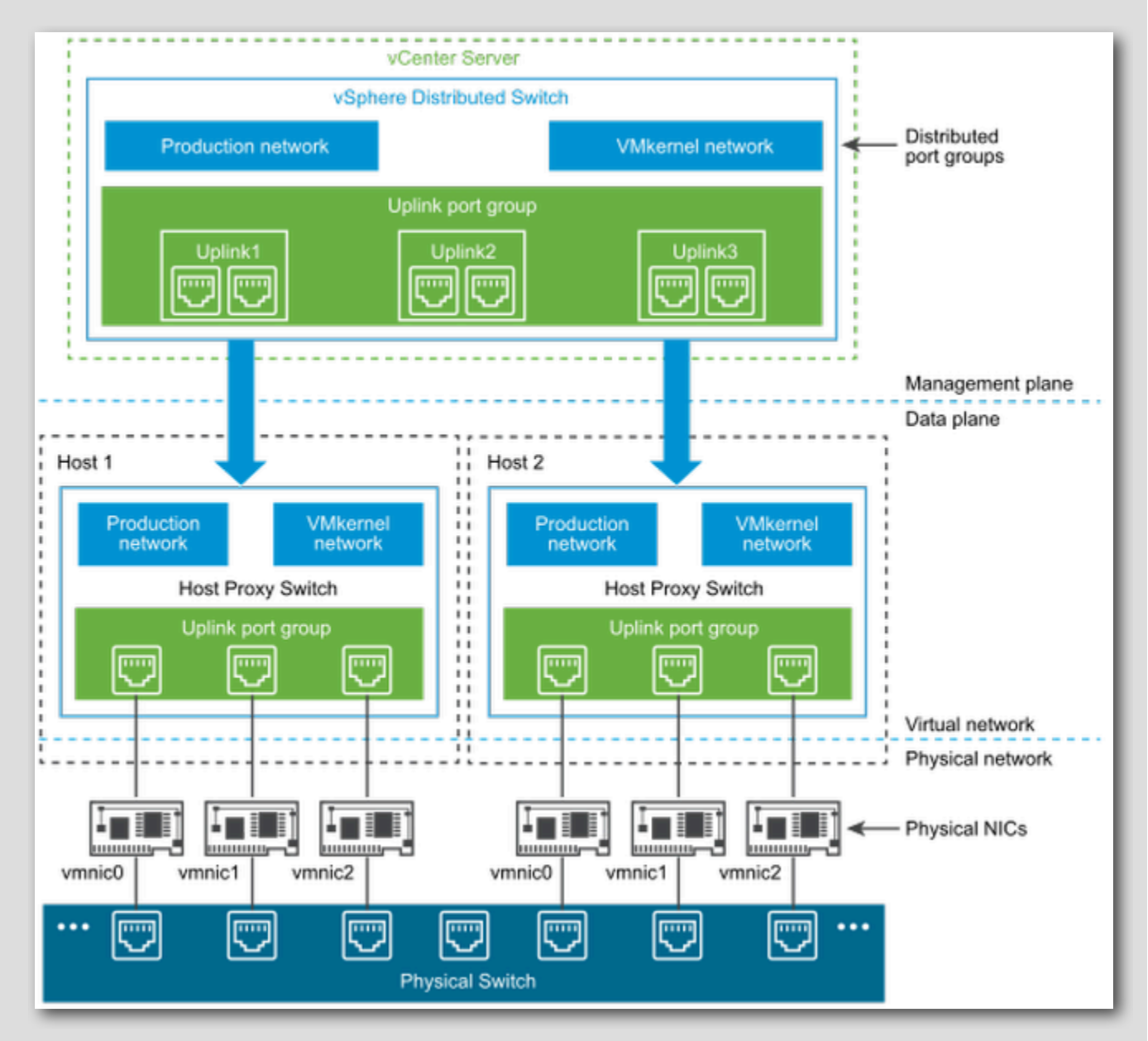
Pay special attention to how the port groups and uplinks are designed.

vSphere Standard Switch Architecture [12]



vSphere Distributed Switch Architecture

[13]



Let's get started!

[14]

Now that we have a better understanding of what a Distributed vSwitch is and why we would want to use it, let's spend a little time exploring an example of one.

Explore a vDS

[15]

Before we walk through the process of building our own Distributed vSwitch, let's take a minute to explore an existing vDS.

In this lab, we will see how a Distributed vSwitch compares to a Standard vSwitch, how it is configured, and how it is connected to a running virtual machine.

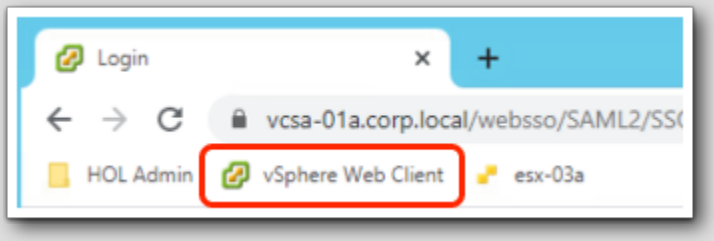
Open Chrome Browser from Windows Quick Launch Task Bar

[16]

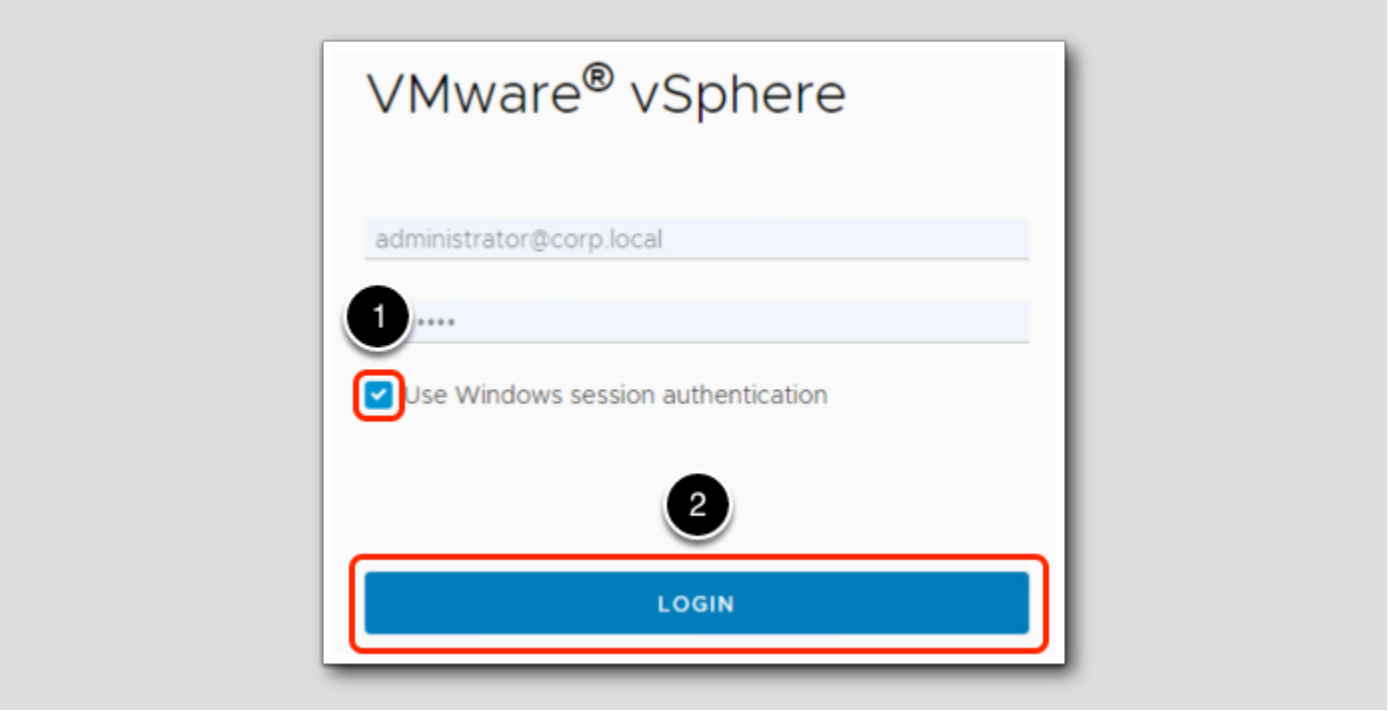
1. Click on the **Chrome Icon** on the Windows Quick Launch Task Bar.

Log in to vSphere Client

[17]



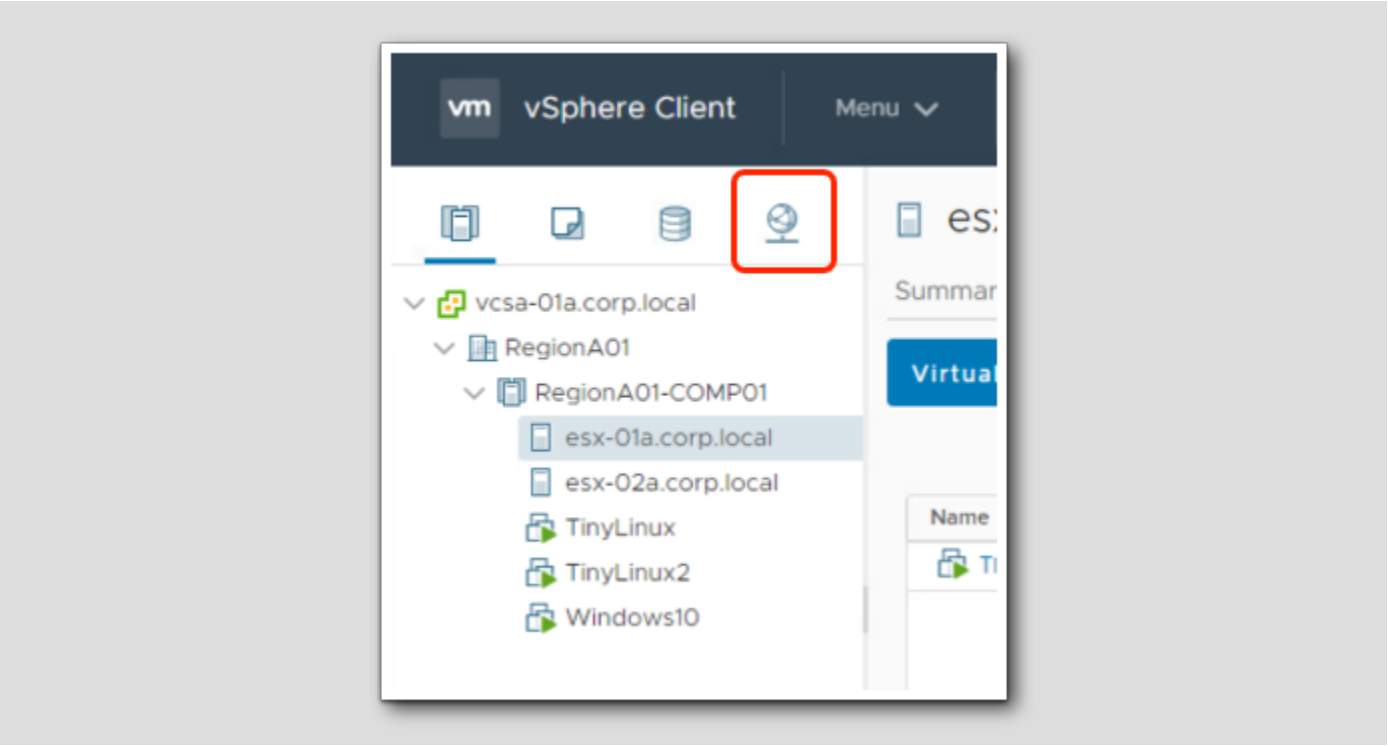
1. Click on the **vSphere Web Client** bookmark.



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

Navigate to networking

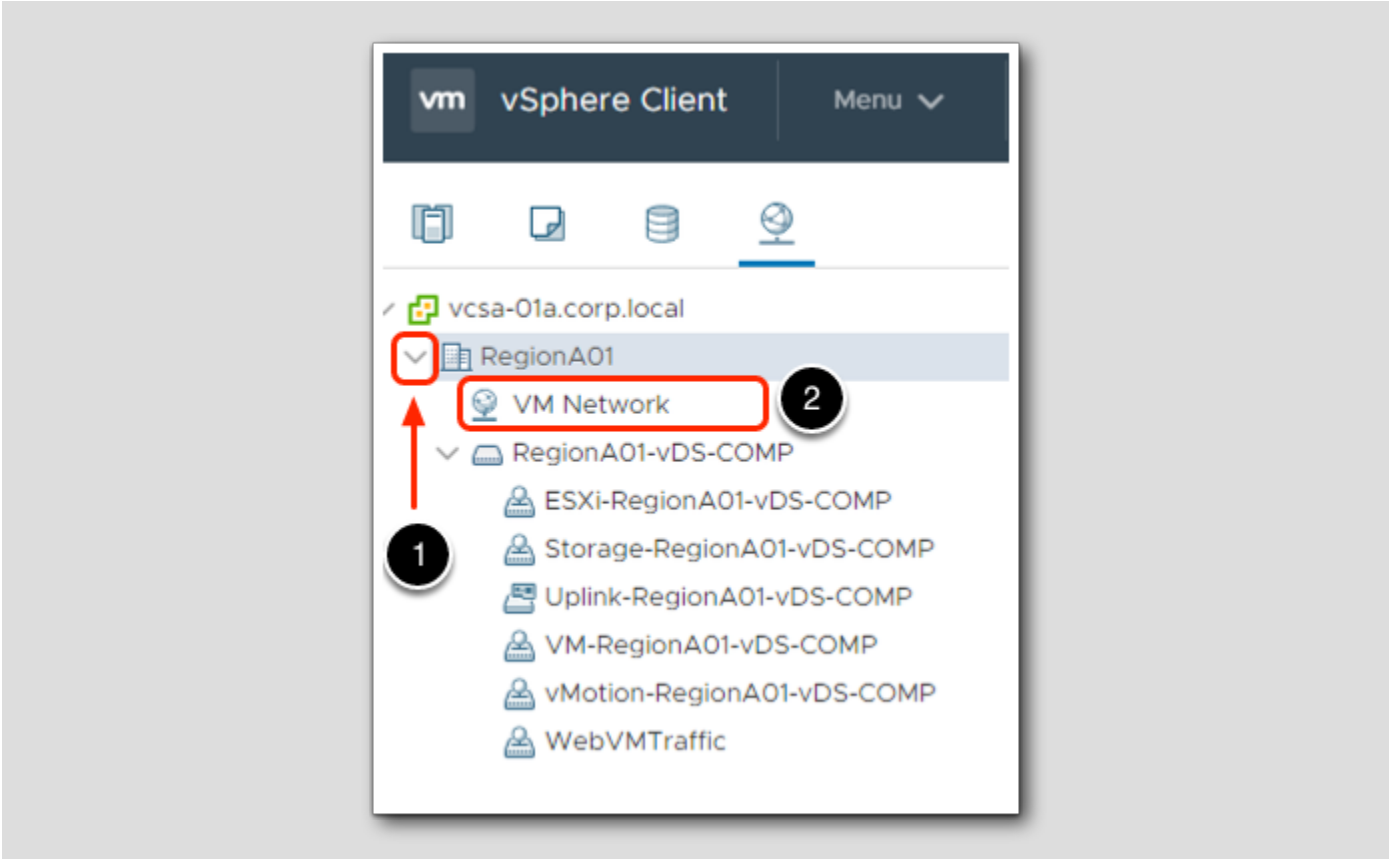
[18]



1. Click on the **Networking** icon.

View Standard vSwitch

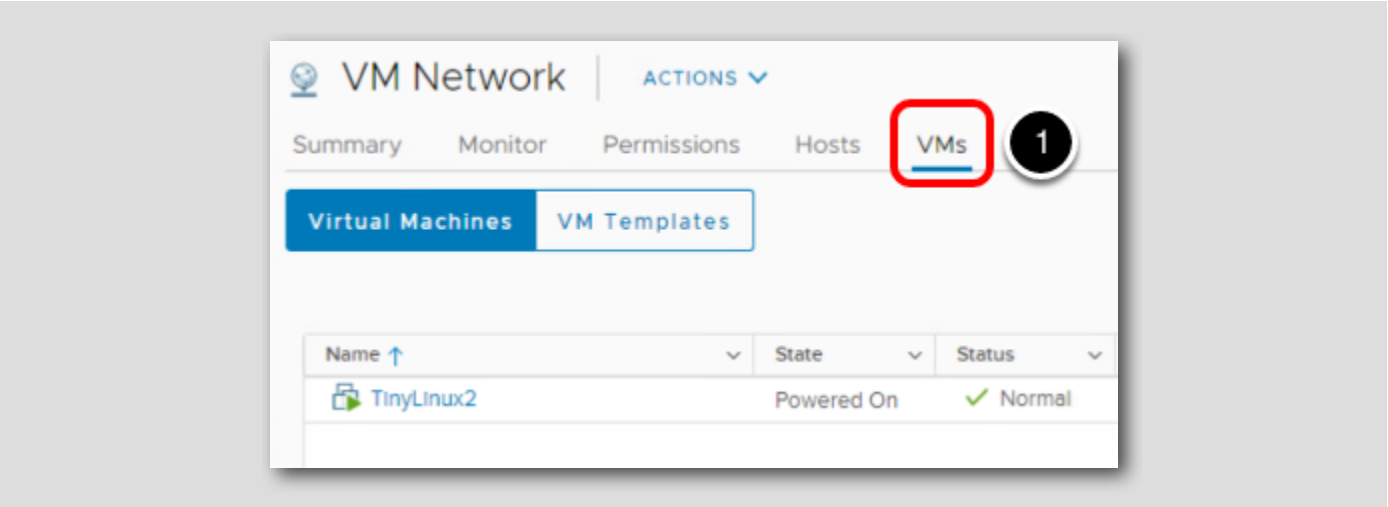
[19]



1. Expand **RegionA01**.
2. Select **VM Network**.

VM Network

[20]

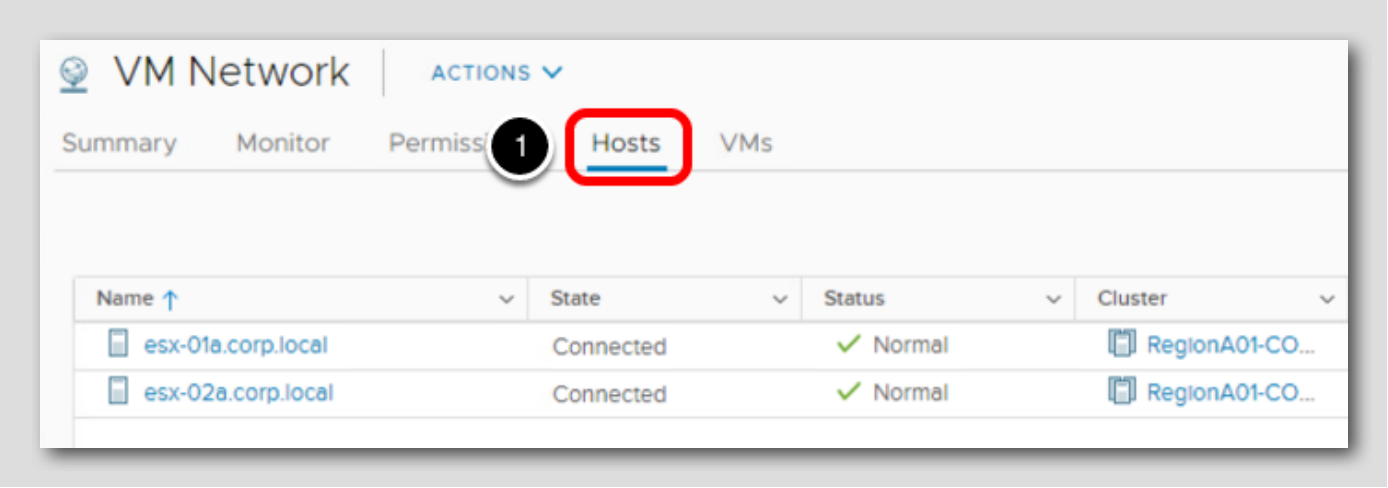


1. Click on the **VMs** tab.

Take note of the virtual machines that are connected to this vSwitch. You should see a VM called **TinyLinux2**.

Hosts

[21]

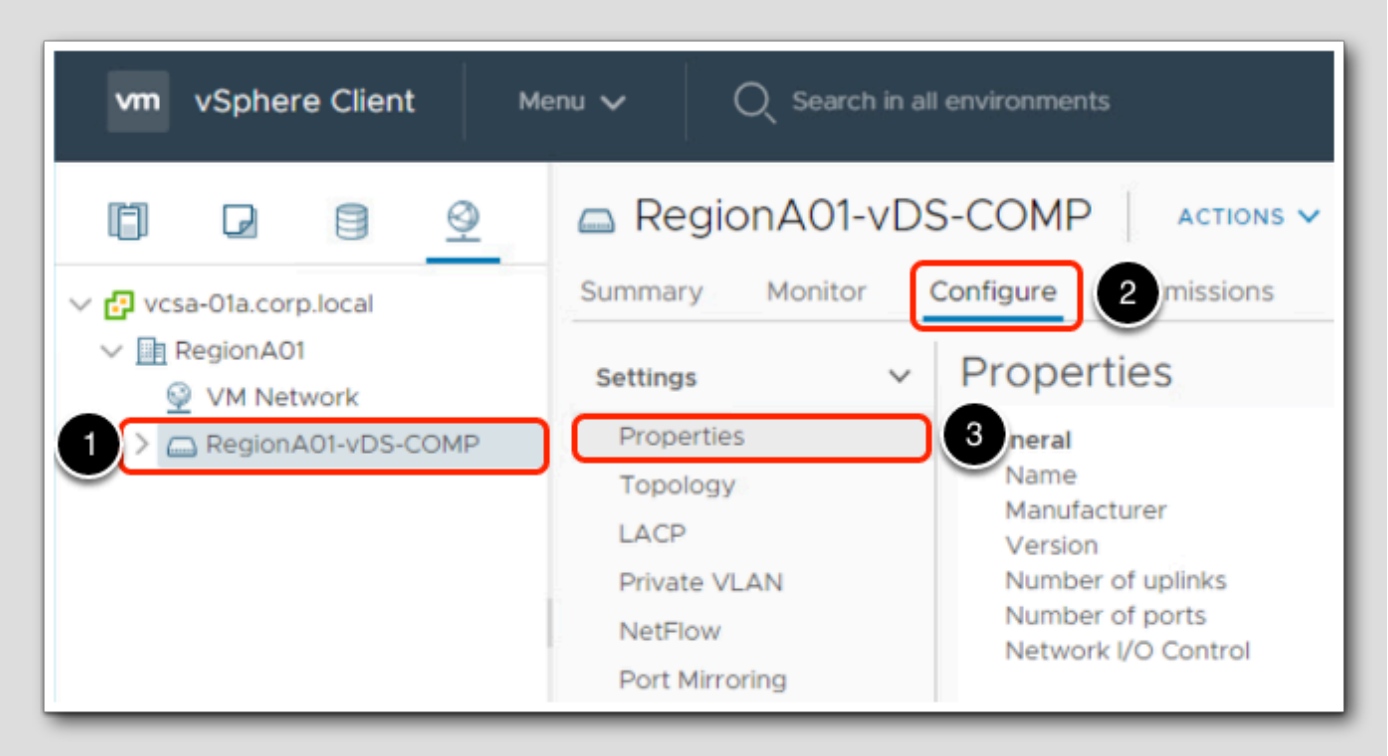


1. Click on the **Hosts** tab.

Take note of the hosts connected to the **VM Network** vSwitch. You should see **esx-01a.corp.local** and **esx-02a.corp.local**.

View Distributed Switch

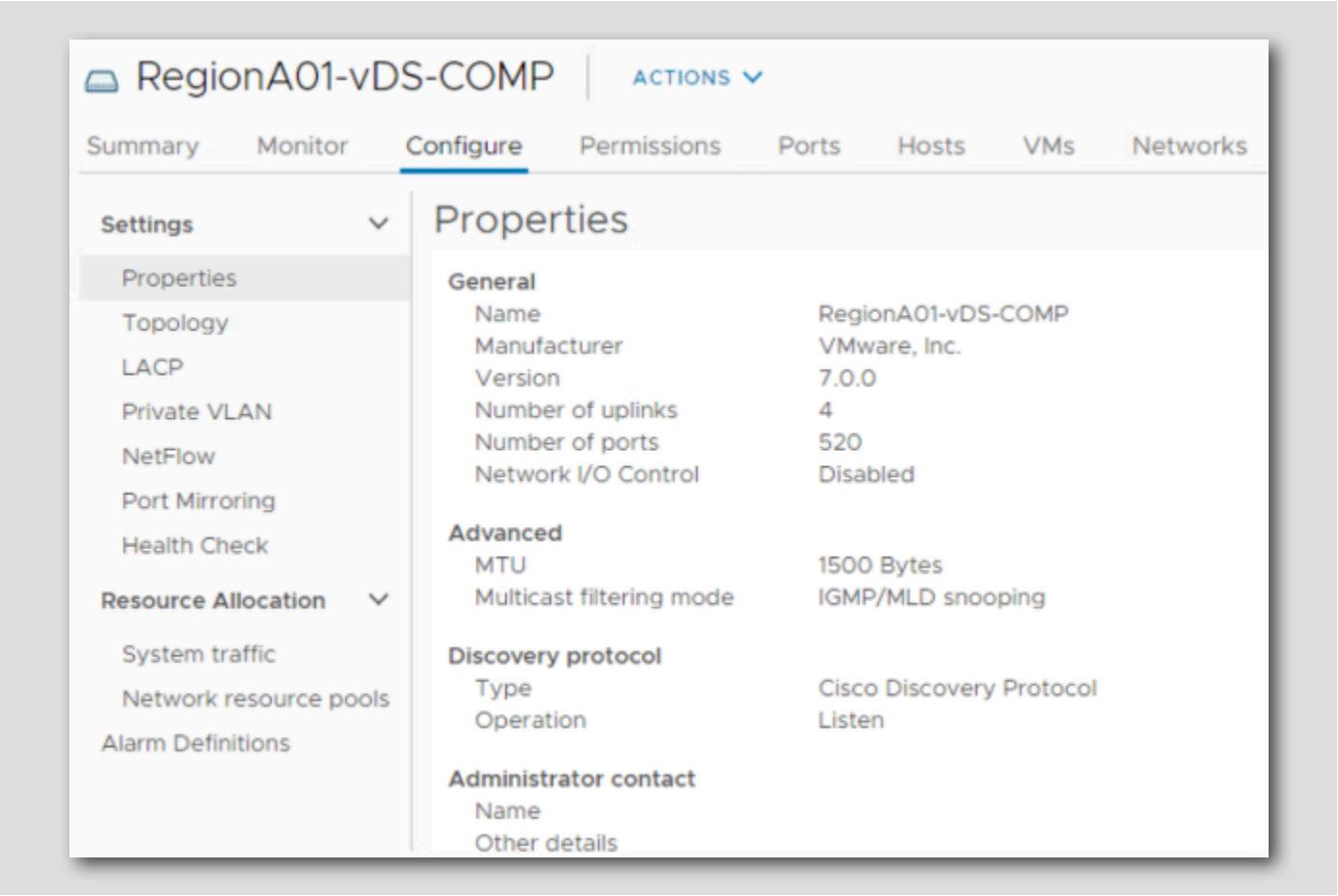
[22]



1. Click on **RegionA01-vDS-COMP**.
2. Select the **Configure** tab.
3. Select **Properties**.

Review vDS configuration

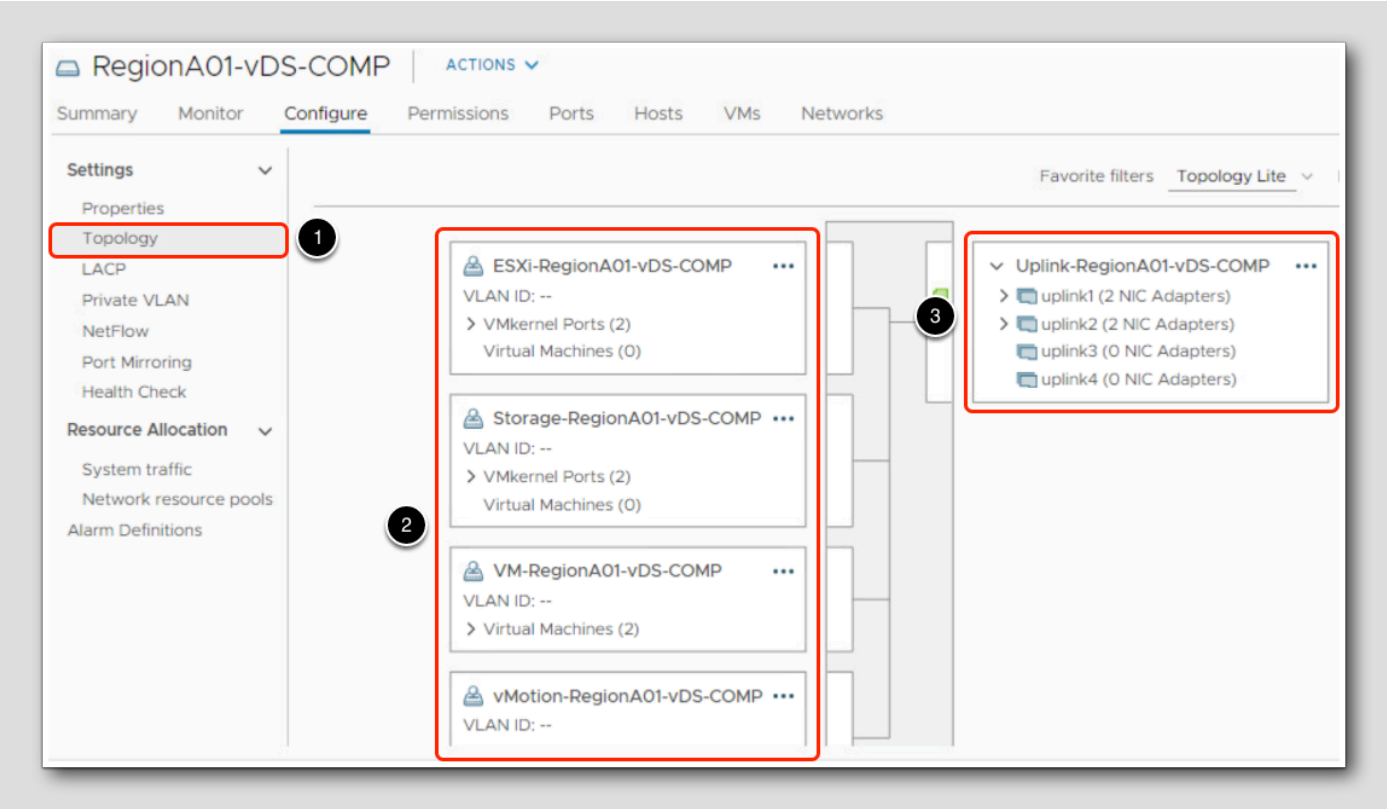
[23]



Basic settings of Distributed Switch are displayed. Such as MTU settings, the version of the switch, and the discovery protocol being used.

Topology

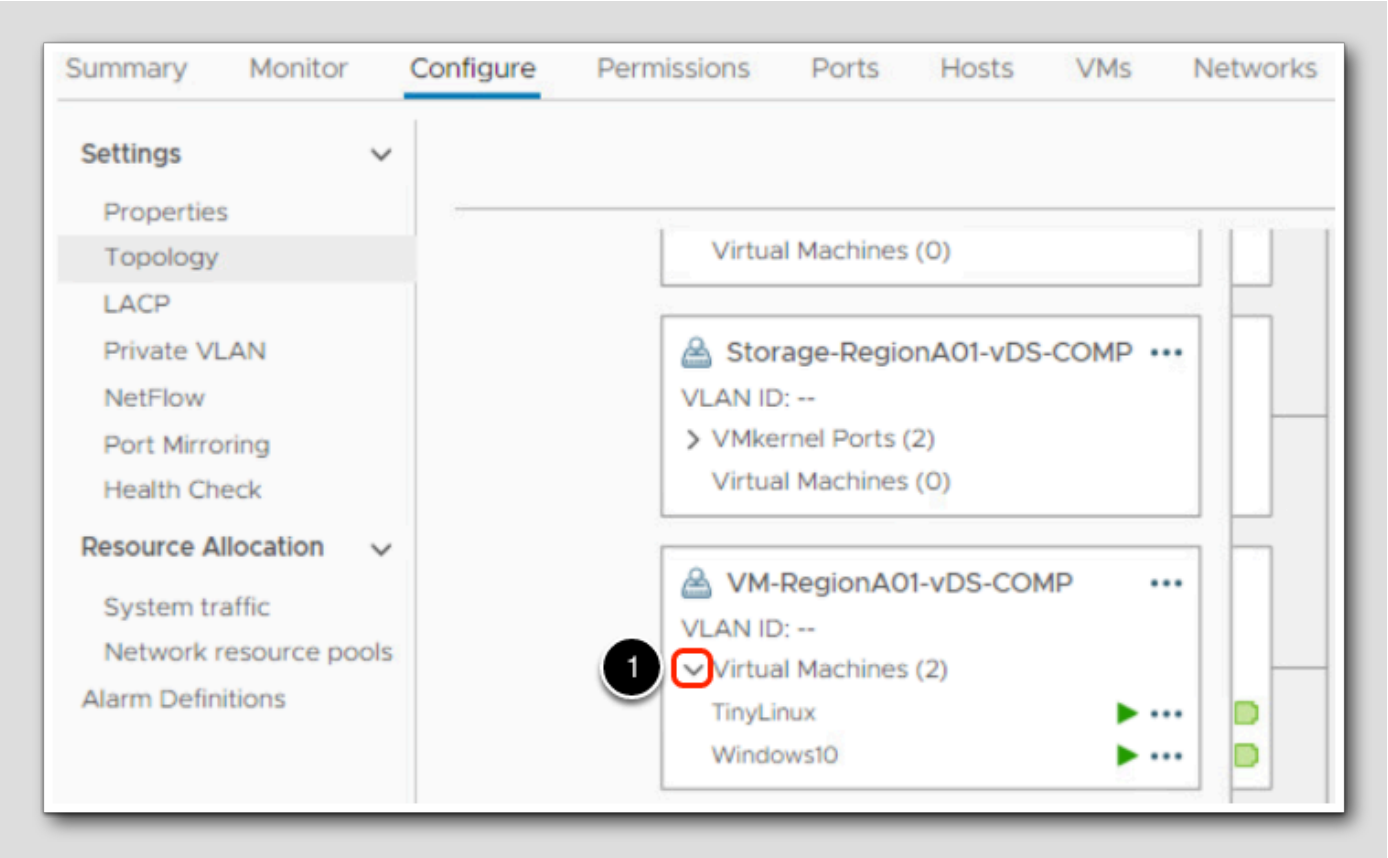
[24]



1. Click on **Topology**.
2. On the left side of the diagram, you will see the port groups associated with the distributed switch **RegionA01-vDS-COMP**. These port groups are how the virtual machines and kernel ports are connected to the vDS. Note how there are VMkernel ports for Management, Storage, and vMotion. This is very similar to the configuration you would see on a Standard vSwitch, except that these are defined and configured in one central location instead of individually at each host.
3. On the right, you will see the uplinks associated with this vDS. These are used to connect the vDS directly to the physical NICs on the hosts that are tied to this Distributed vSwitch.

VM Port Group

[25]

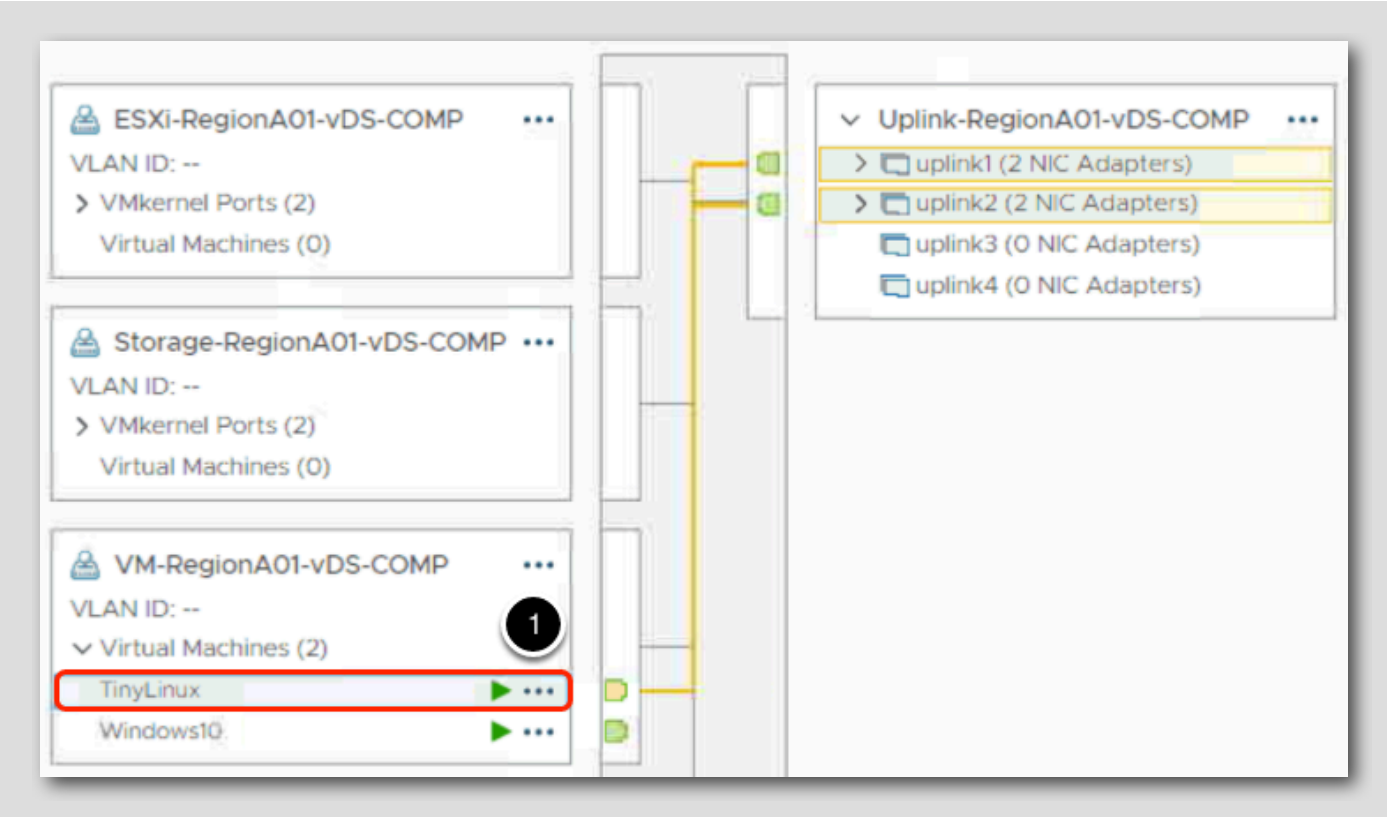


1. Expand **Virtual Machines** on the **VM-RegionA01-vDS-COMP** port group.

Again, note how there are virtual machines tied to this distributed port group just like you would see in a port group on a standard vSwitch.

Path to Uplinks

[26]



1. Click on **TinyLinux**.

Note that a path to an uplink is drawn out and highlighted in orange to show the uplinks, hosts, and vmnics it is associated with.

Build a new vDS

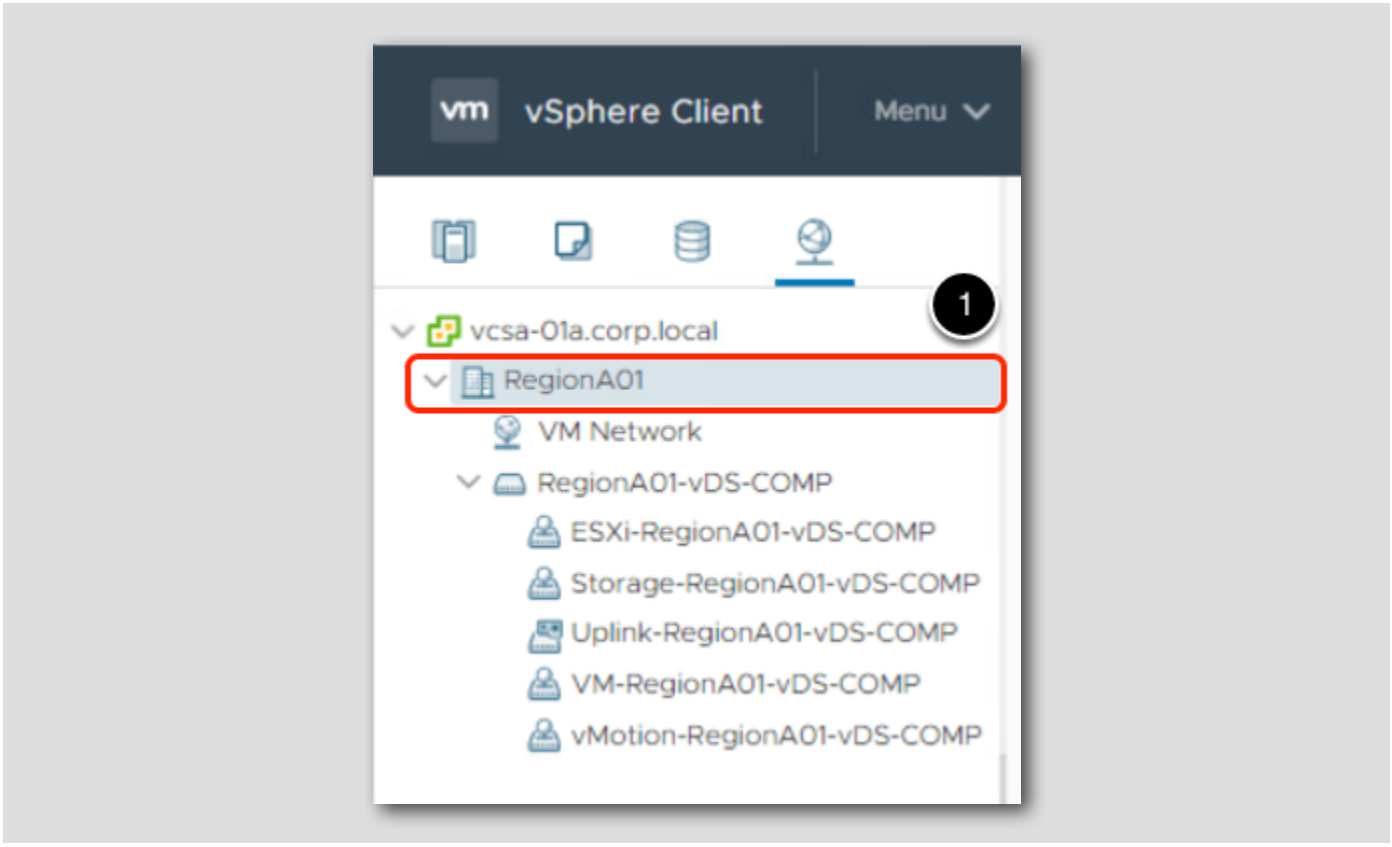
[27]

Now that we have had a chance to explore an existing vDS, let's build one of our own.

In this lab, we will create a new Distributed vSwitch, add ESXi hosts to it, build port groups and connect them to uplinks so that we can use it to forward virtual machine traffic onto the physical network.

Navigate to Site A Datacenter

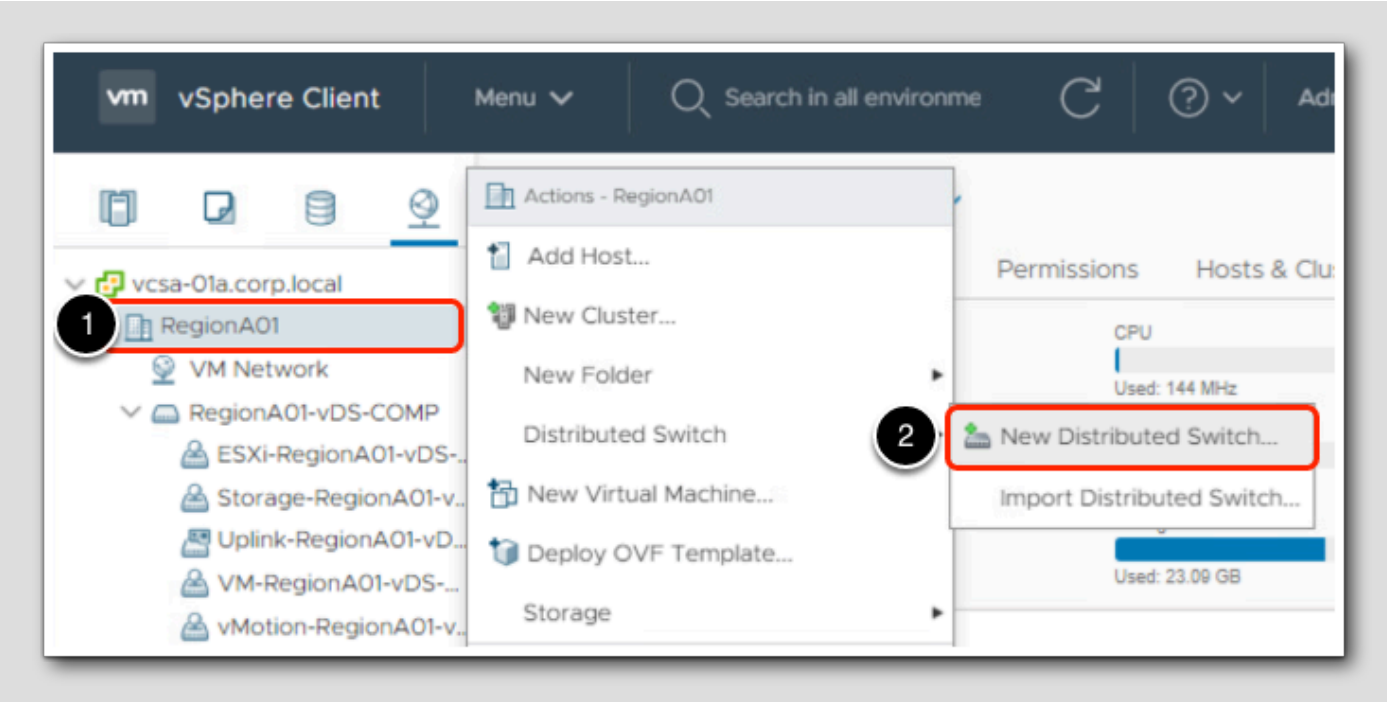
[28]



1. In the vSphere Web Client, click on **RegionA1** Datacenter.

Create a new Distributed Switch

[29]

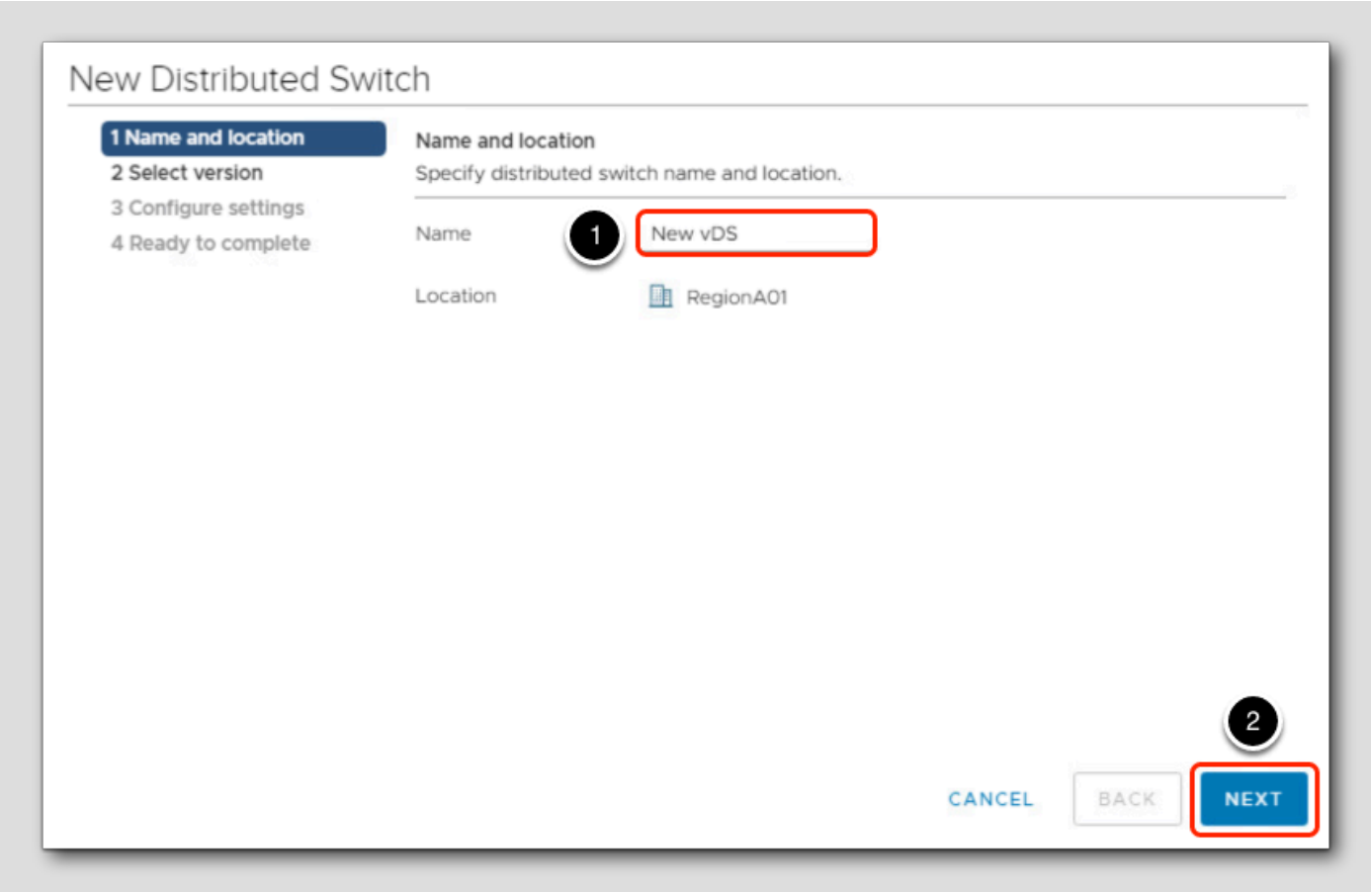


1. In the navigator, right-click the **RegionA01** Datacenter.
2. Select **Distributed Switch** > **New Distributed Switch**.

This will open the New Distributed Switch wizard.

Name the Distributed Switch

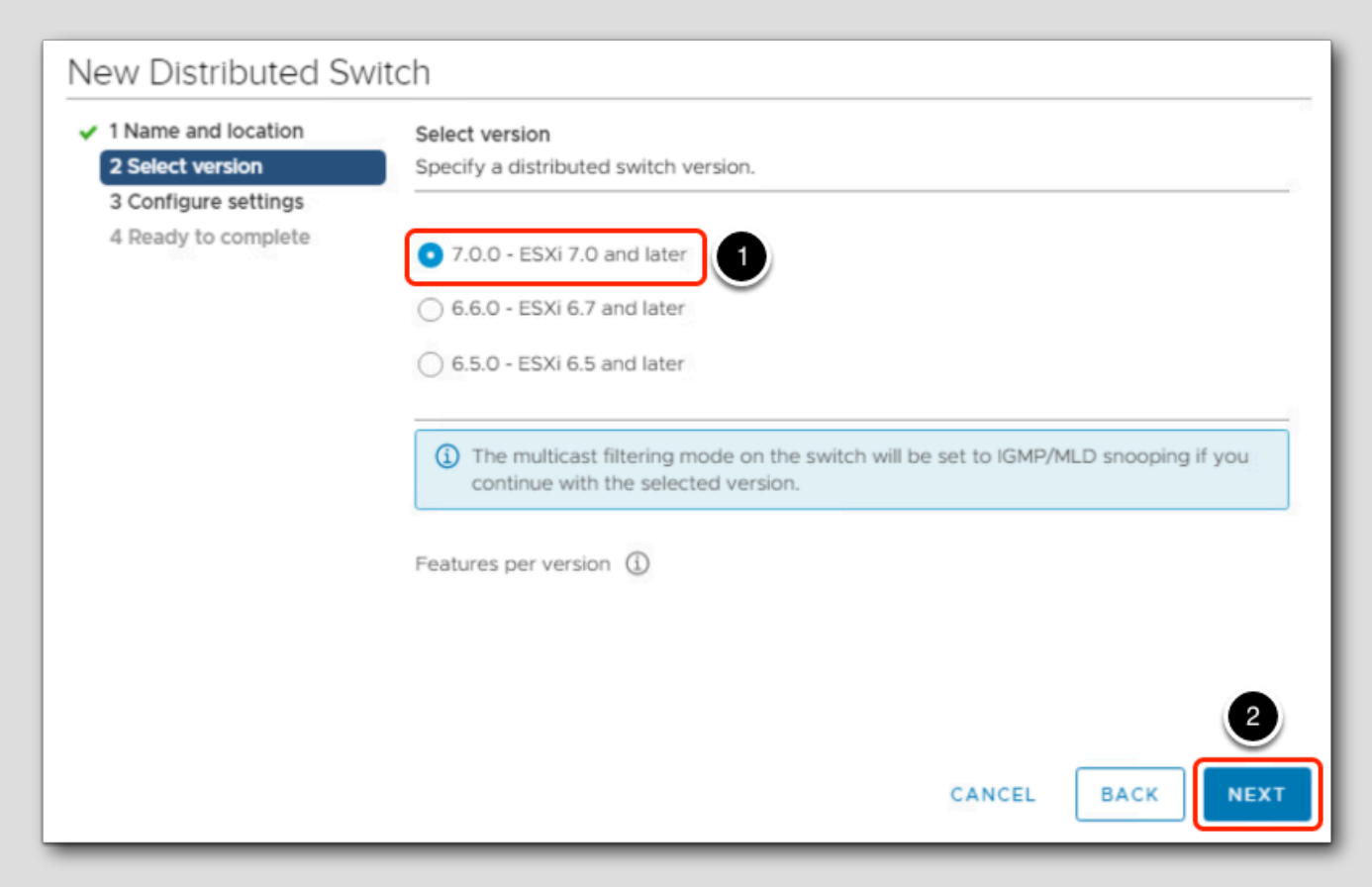
[30]



1. Type **New vDS** in the Name field.
2. Click **Next**.

Select the version

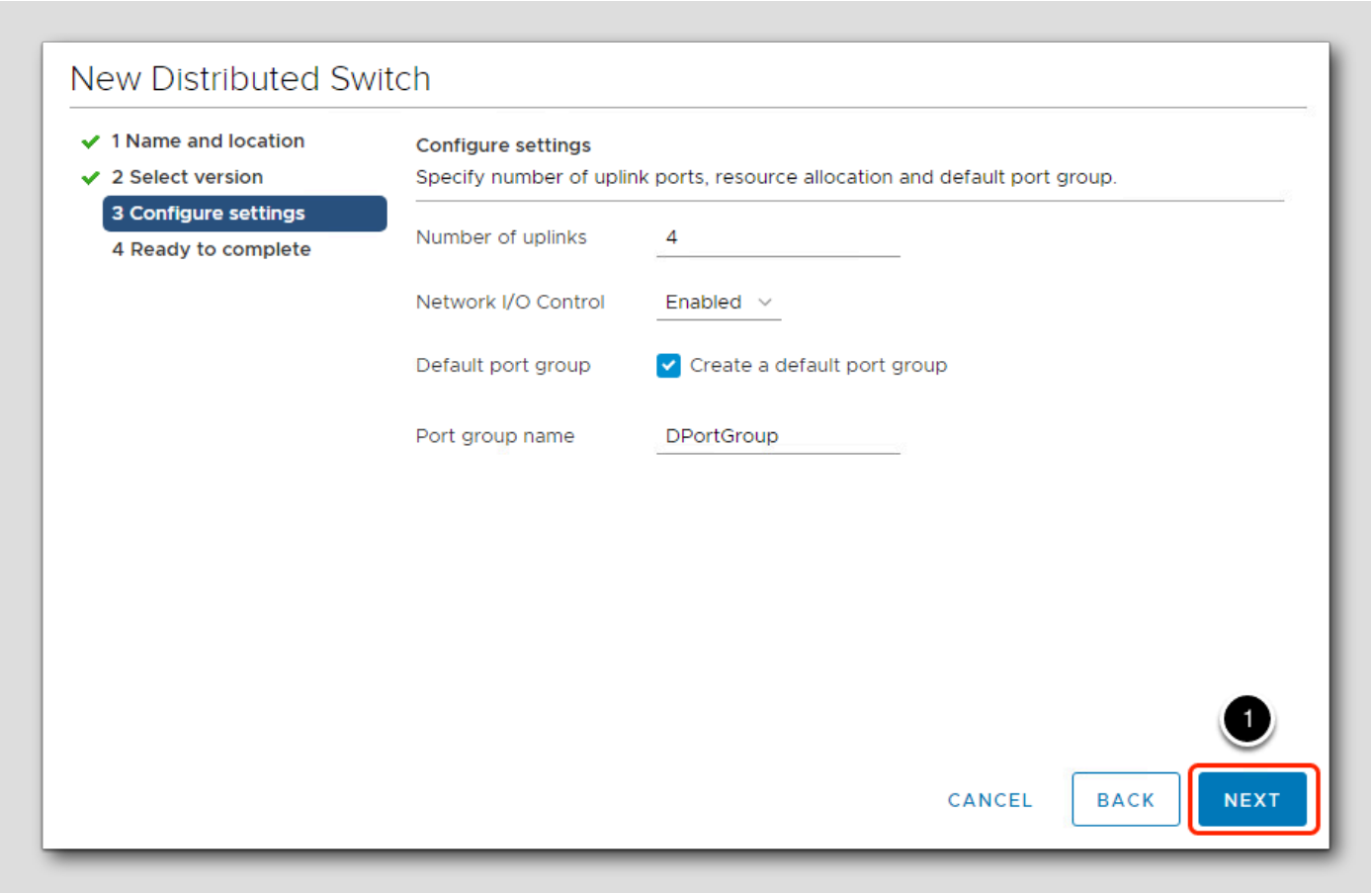
[31]



1. Leave the default setting of **7.0.0 - ESXi 7.0 and later**.
2. Click **Next**.

Configure settings

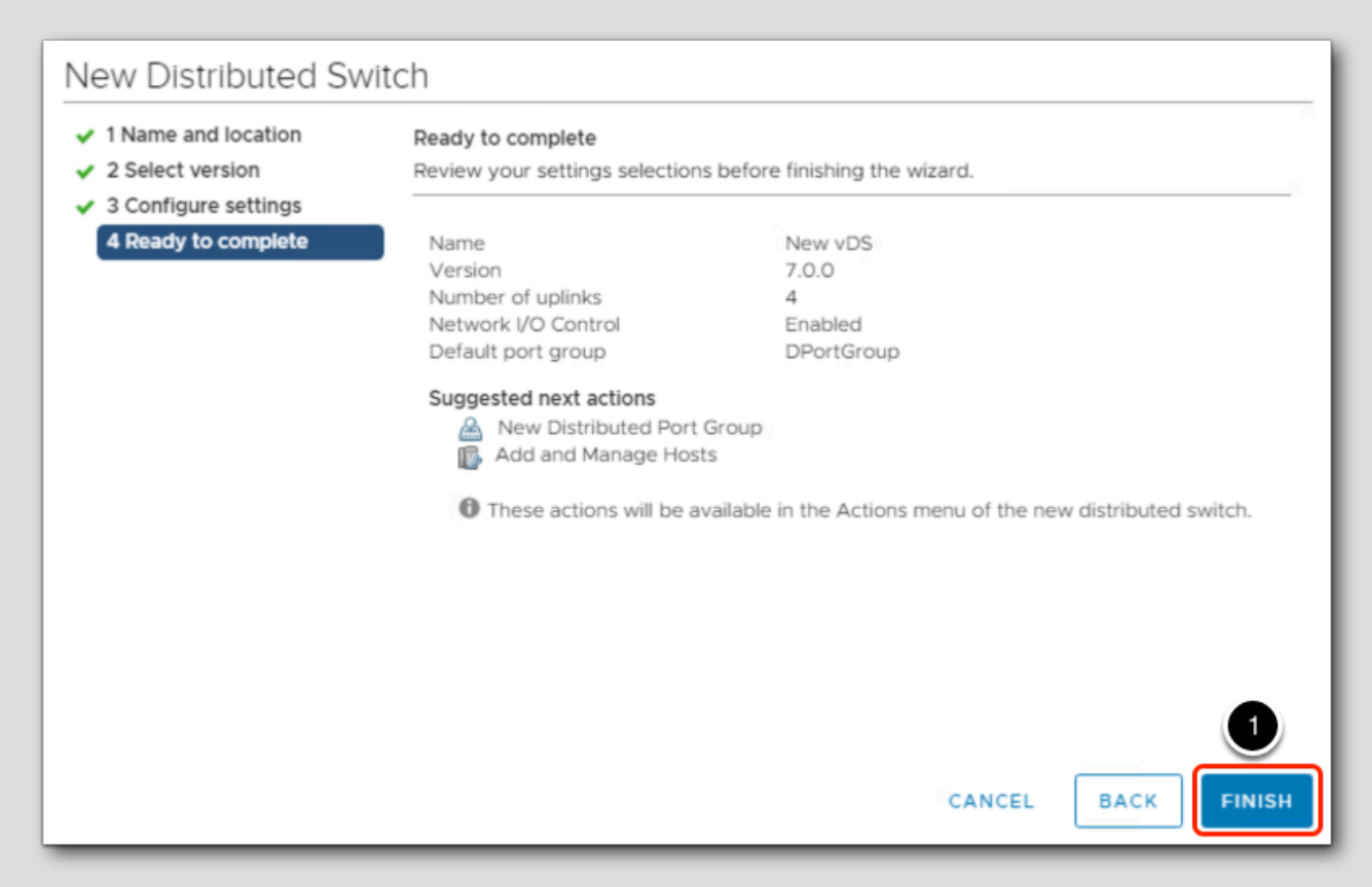
[32]



1. On the Configure Settings page, leave the default options and click **Next**.

Complete the build

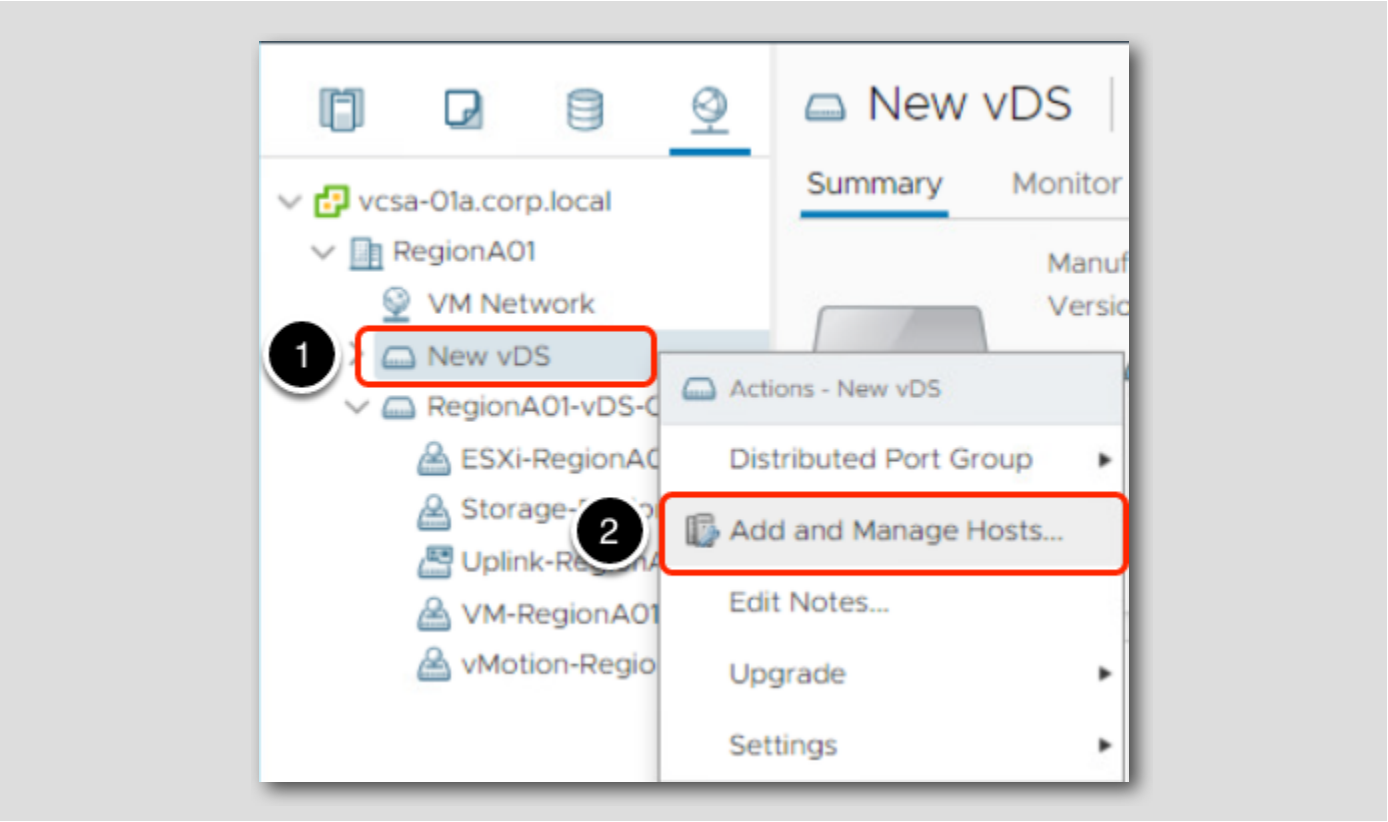
[33]



1. Review your settings on the Ready to Complete page and click **Finish** if everything looks good.

Add hosts to new Distributed Switch

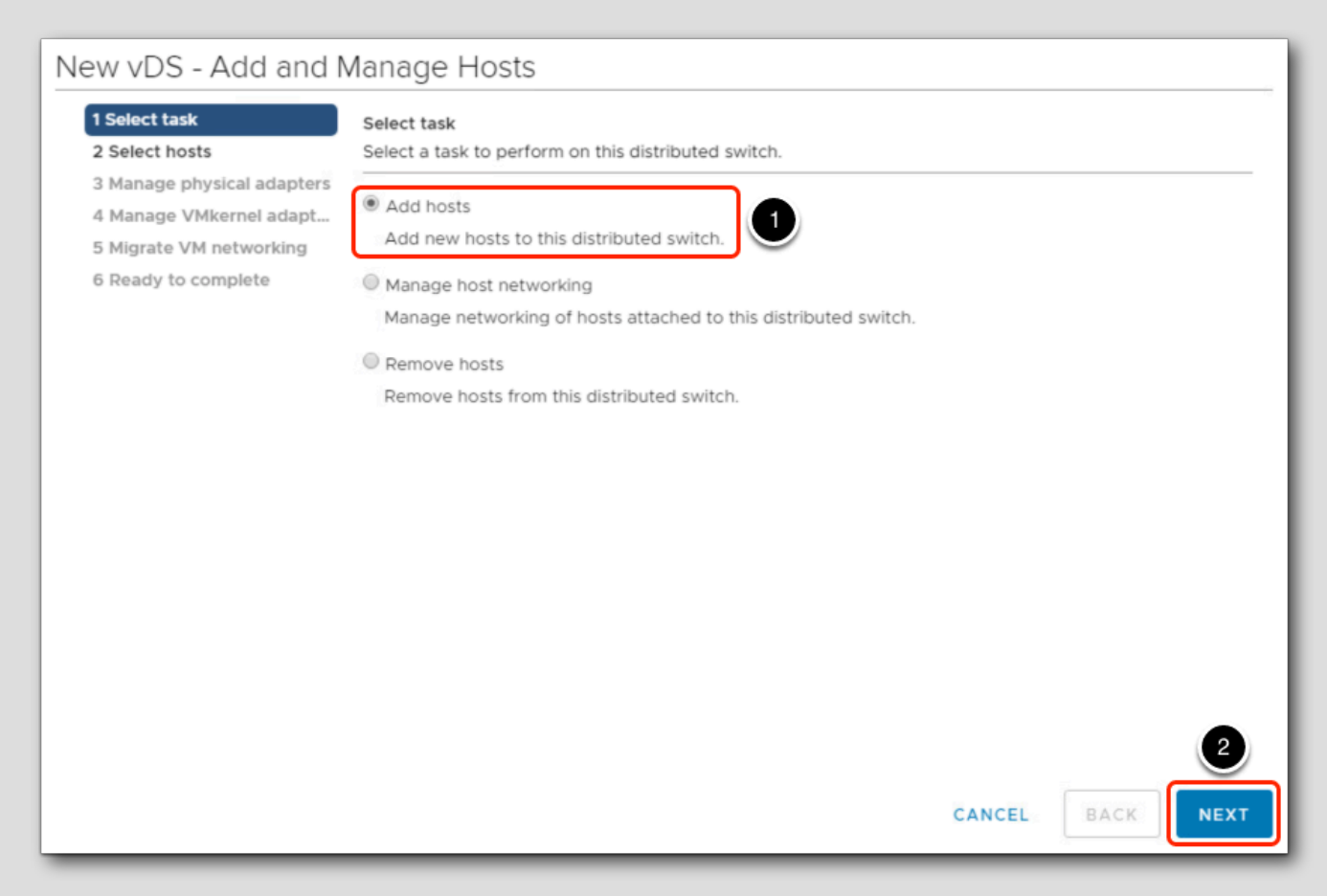
[34]



1. Right-click on the newly created switch, **New vDS**.
2. Select **Add and Manage Hosts...**

Select task

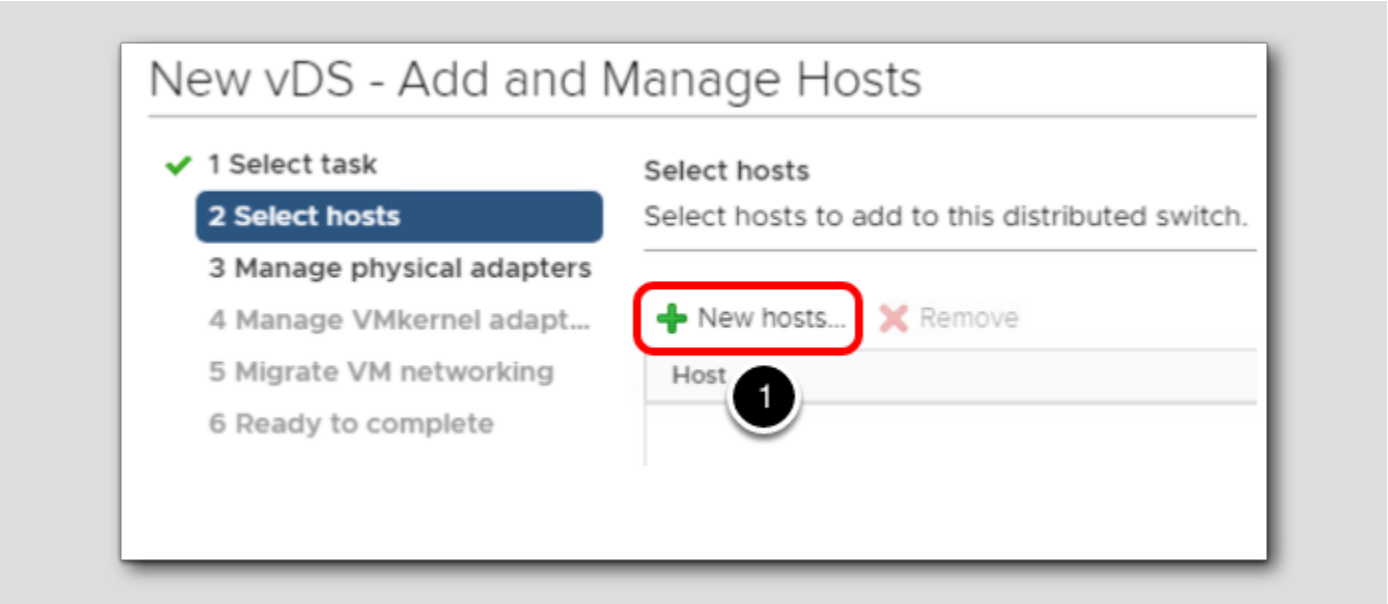
[35]



1. On the Select task page, select **Add hosts**.
2. Click **Next**.

Select hosts

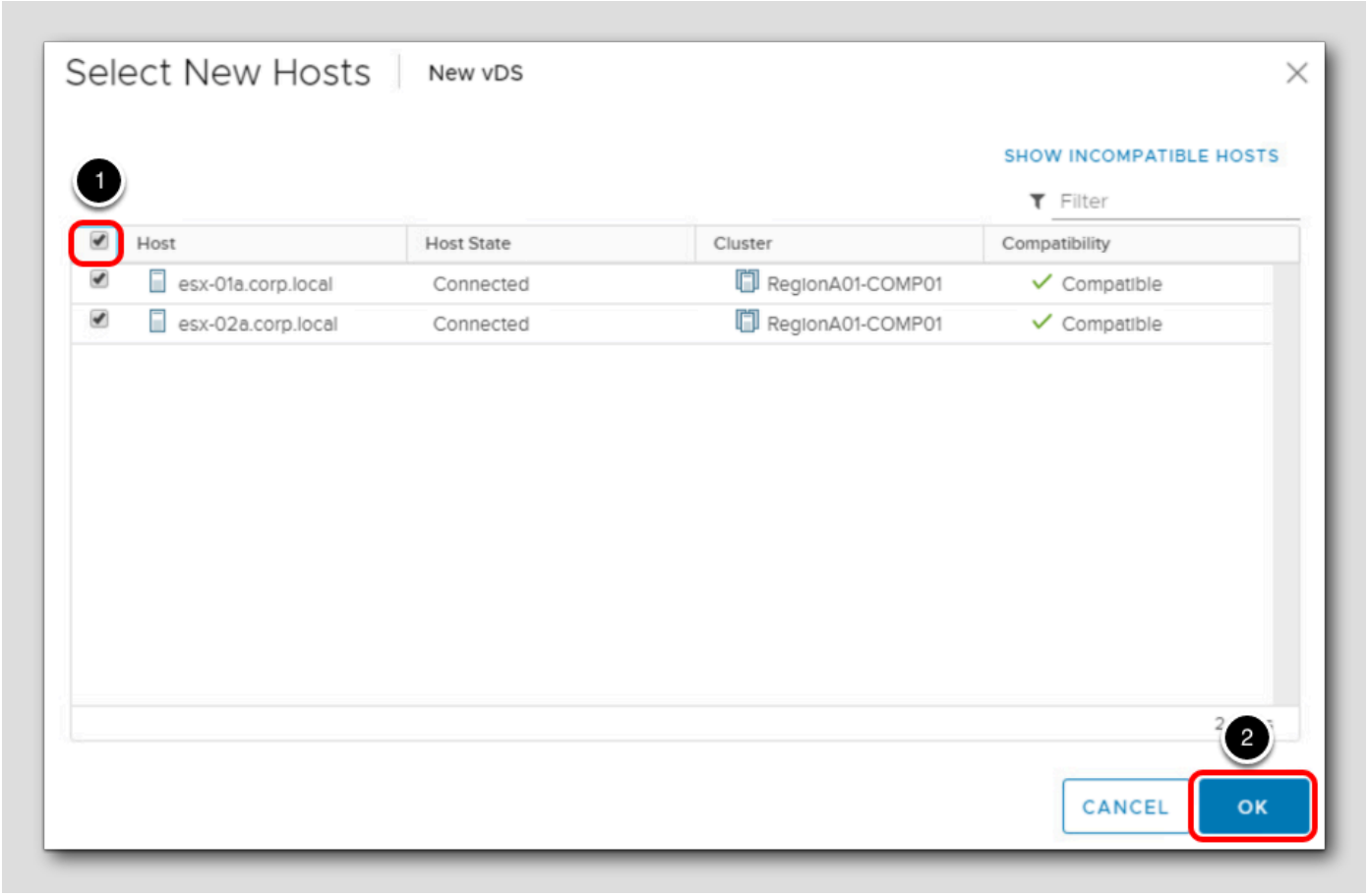
[36]



1. On the Select hosts page, click **New hosts**.

Select New Hosts

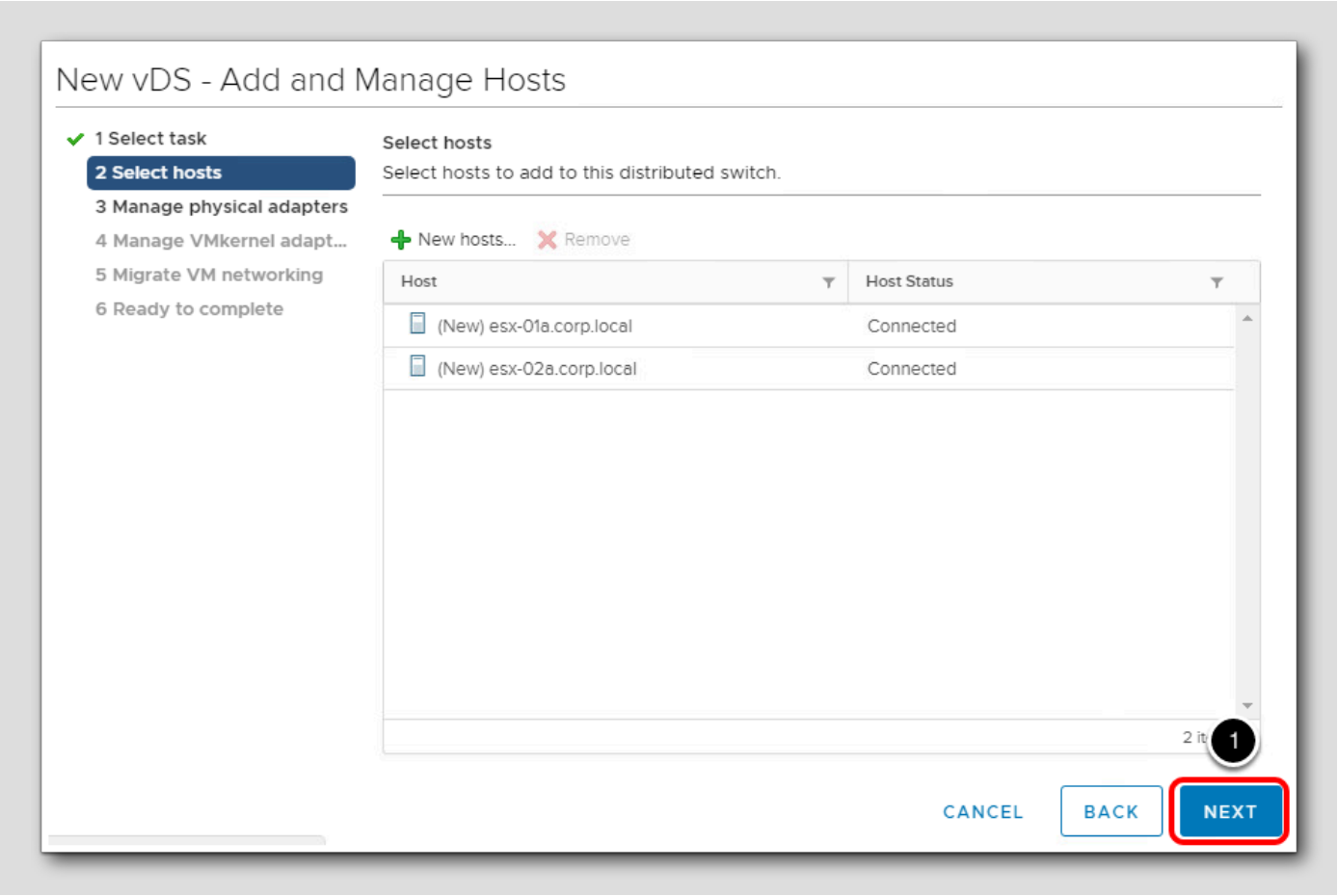
[37]



1. Click the **check box** next to **Host** to select both hosts in the datacenter.
2. Click **OK**.

Manage Hosts

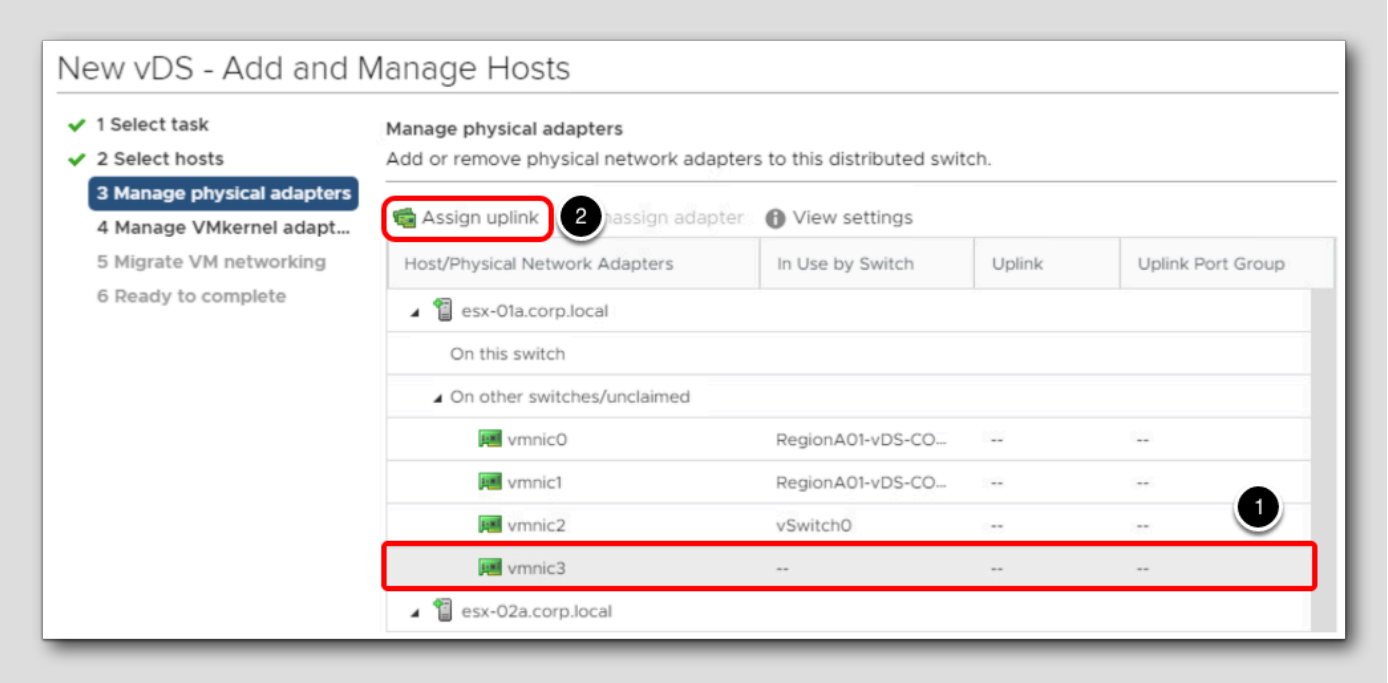
[38]



1. Verify the two hosts are listed, then click **Next**.

Assign physical adapters

[39]

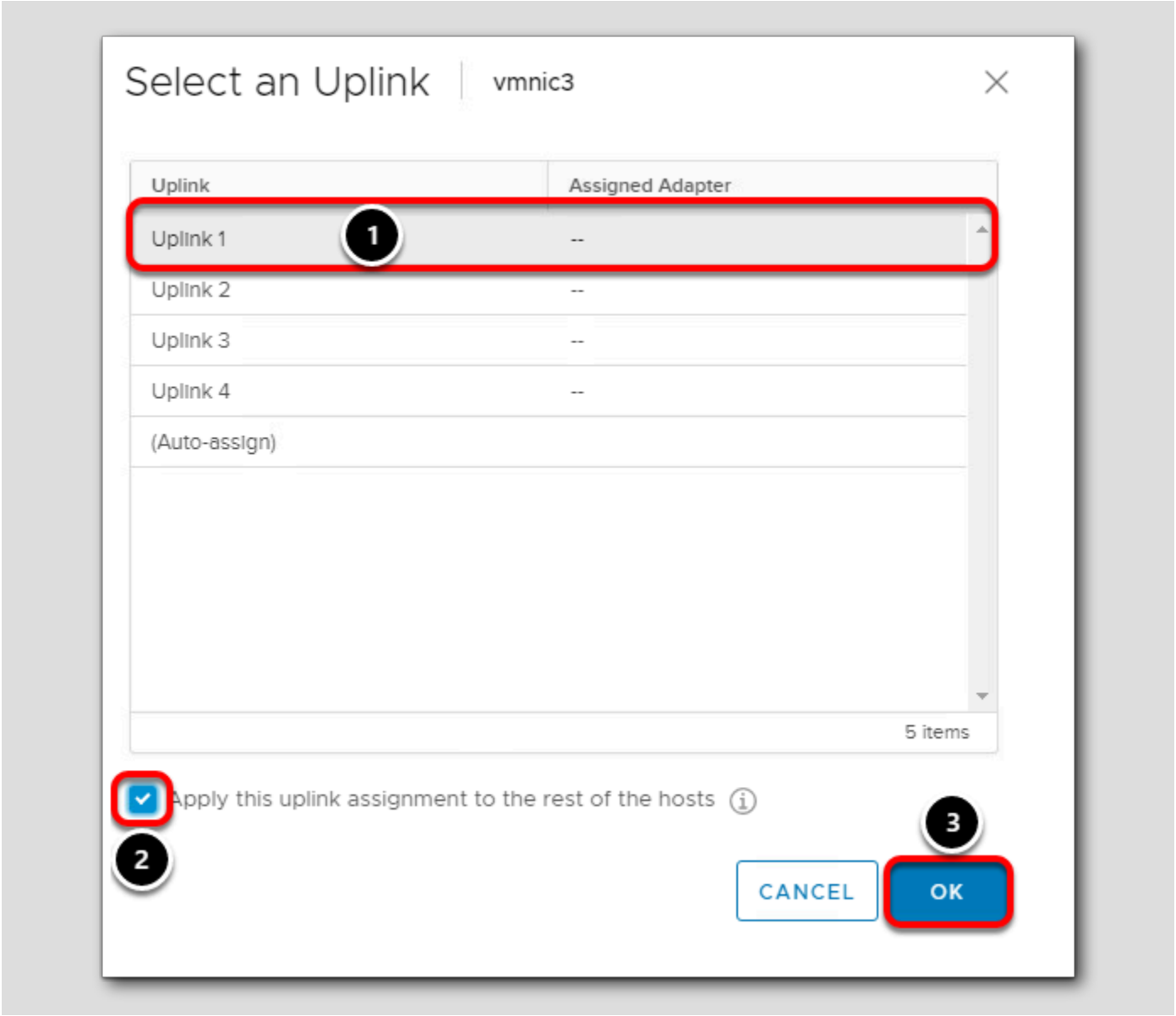


On the Manage physical adapters page, we want to configure which physical NICs will be used on the distributed switch.

1. From the **On other switches/unclaimed** list, highlight **vmnic3**.
2. Click **Assign uplink**.

Assign uplinks to hosts

[40]



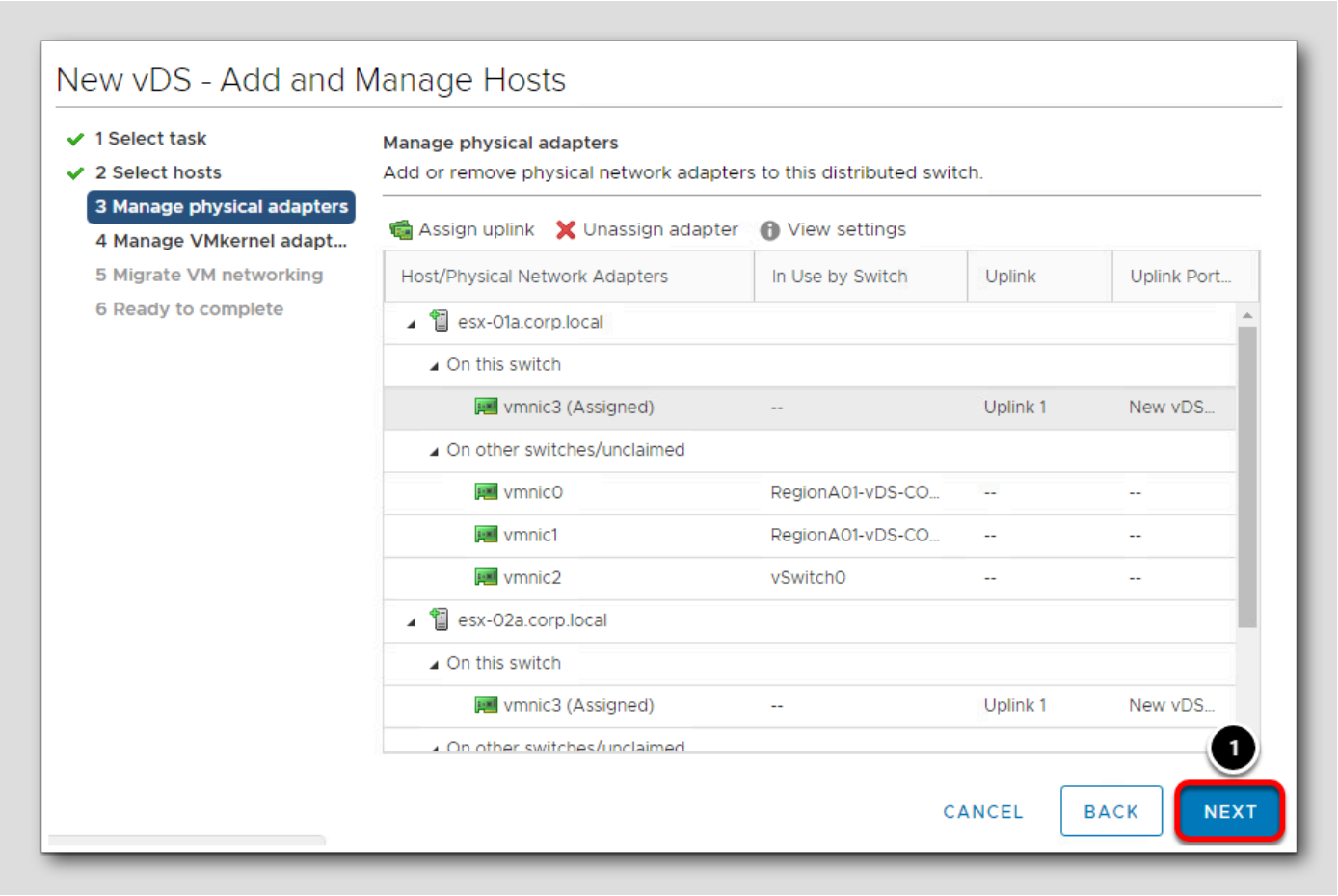
1. From the Select an Uplink page, select **Uplink 1**.
2. Check the box next to **Apply this uplink assignment to the rest of the hosts**.

This will automatically configure any other hosts that you are adding to this distributed switch with the same vmnic and uplink settings.

3. Click **OK**.

Review settings

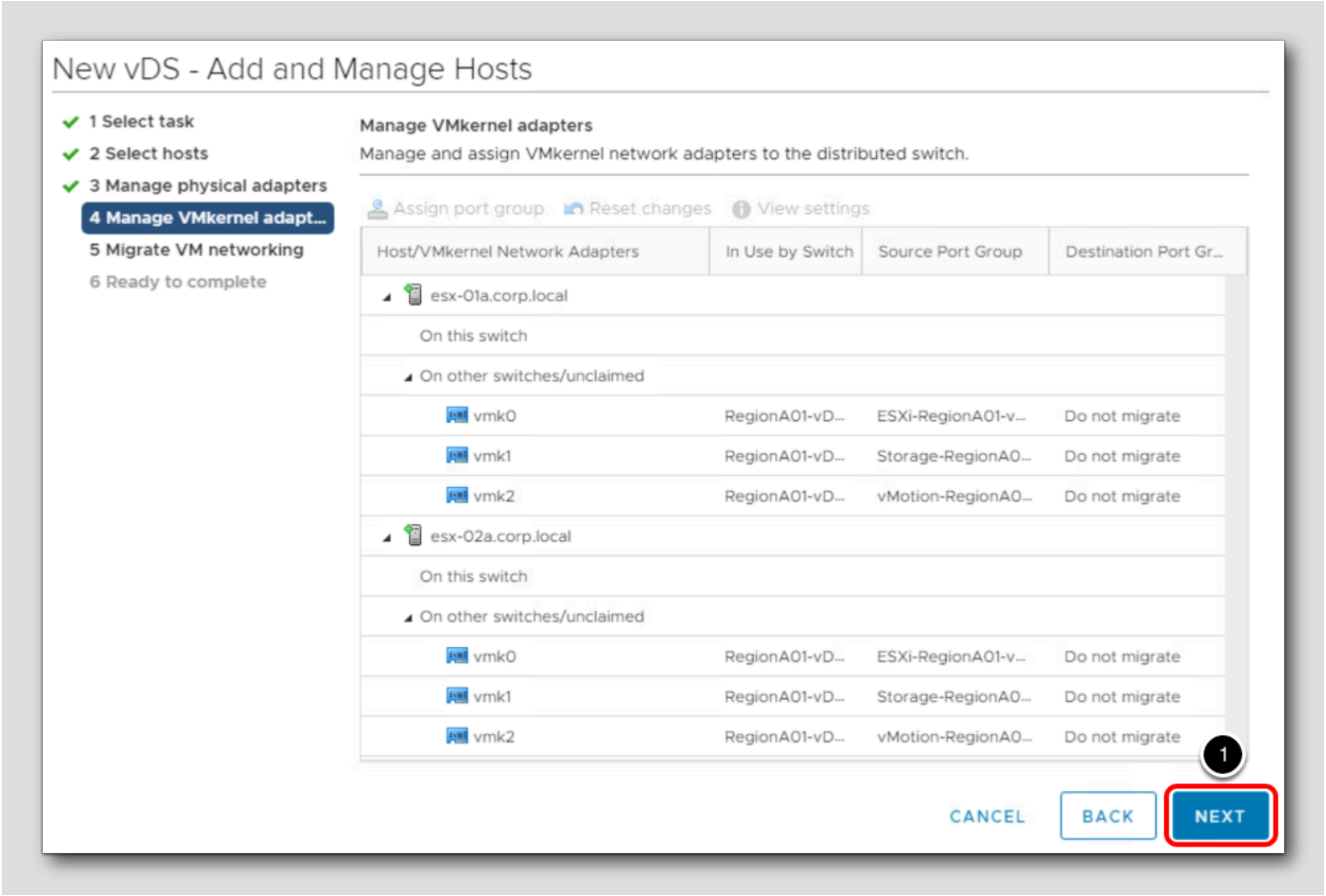
[41]



1. Review vmnic and uplink settings for the hosts you are adding and click **Next** if everything is correct.

Manage VMkernal adapters

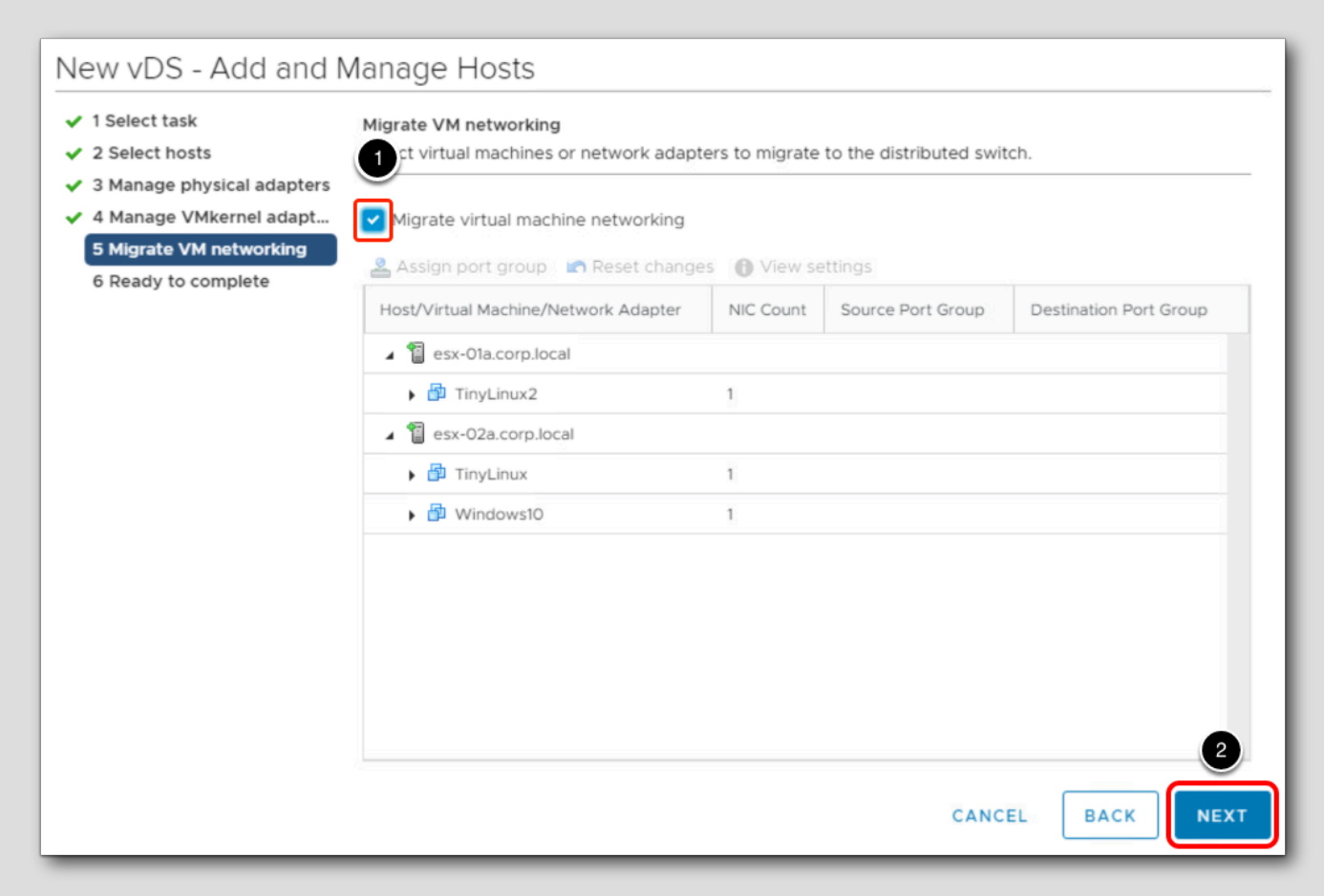
[42]



1. Since we will not be using this distributed switch for any VMkernel functions, just click **Next** here.

Migrate VM networking

[43]



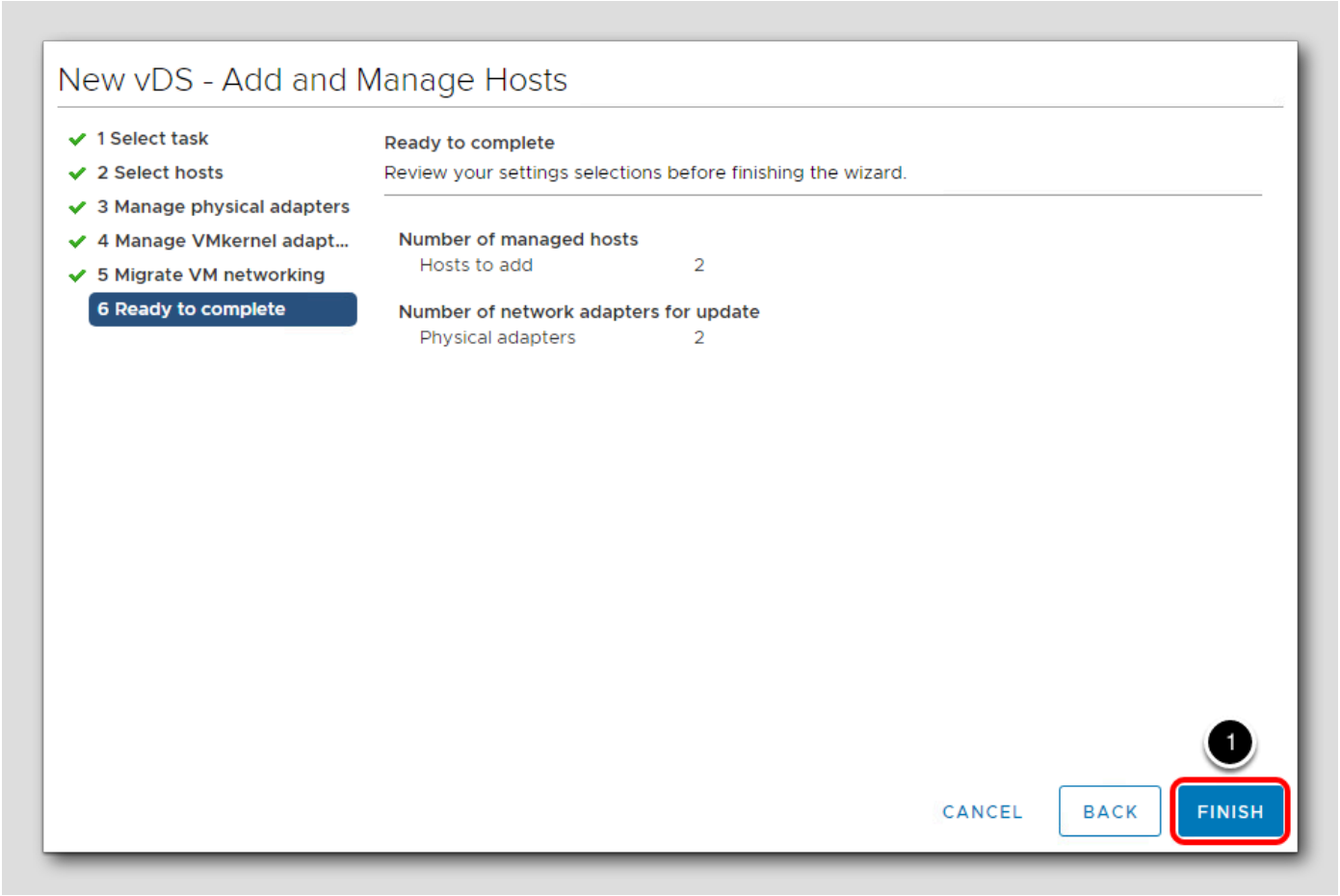
The Add and Manage Hosts wizard also gives us the ability to migrate VMs from one distributed switch to another. While this action can be done here, we will be doing this in the next lesson.

1. Select the **Migrate virtual machine networking** checkbox.
2. Click **Next**.

Also, note that this wizard is not the typical place where you would migrate VMs from one virtual switch to another. The process we will be using later is the recommended method.

Complete the host add wizard

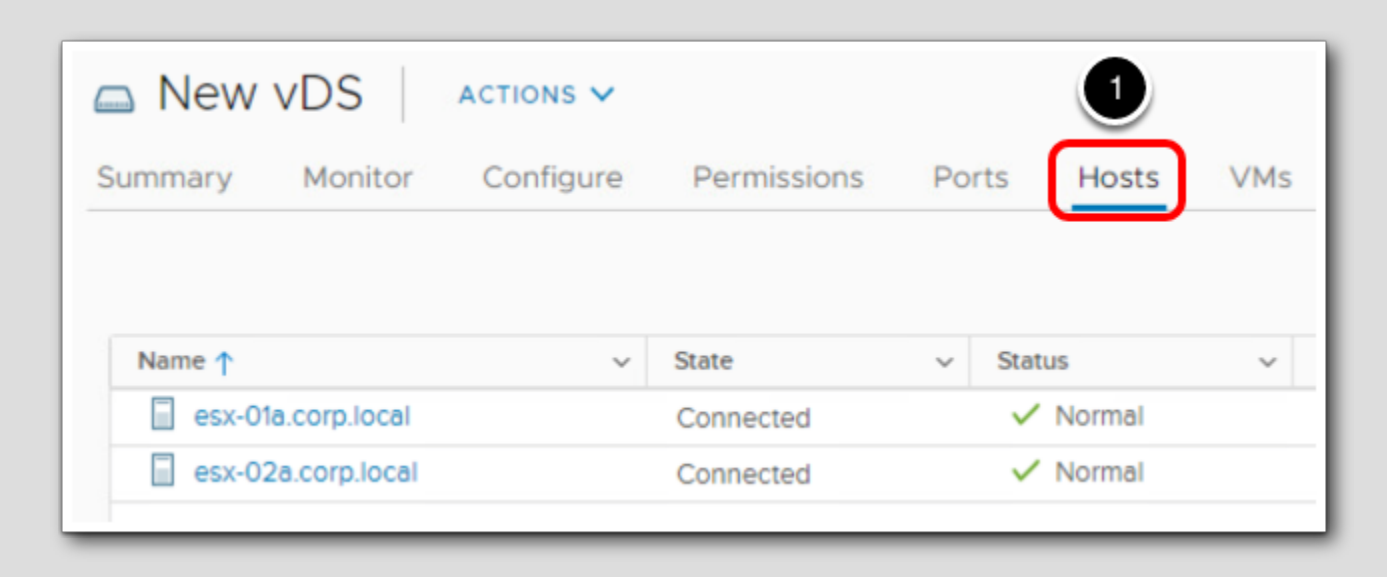
[44]



1. On the Ready to complete page, click **Finish**.

Explore your new vDS

[45]

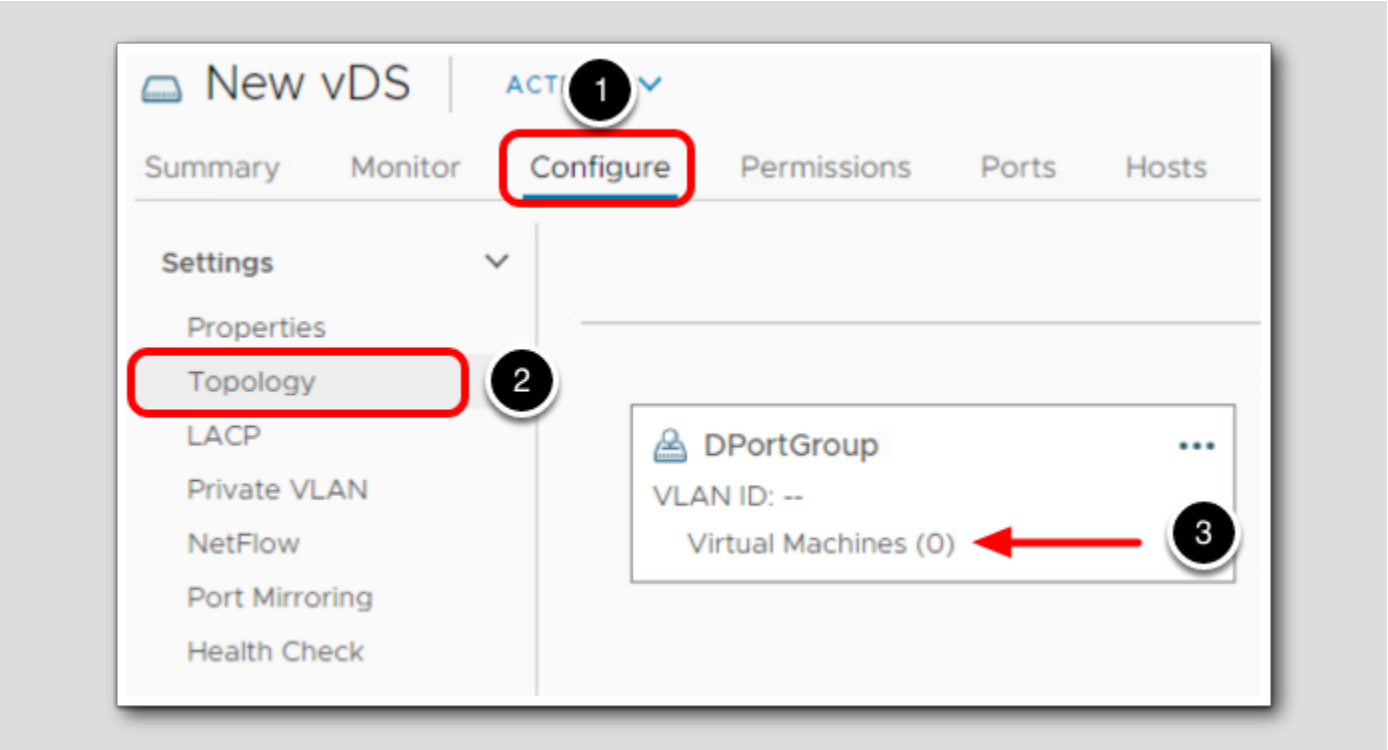


With your new Distributed Switch highlighted, feel free to explore the associated tabs to get a feel for the setup and configuration.

1. Click on the **Hosts** tab to see the newly connected hosts.

Topology

[46]



1. Click **Configure**.
2. Click **Topology**.
3. Note that your distributed port group DPortGroup does not have any VMs connected to it.

The next lesson will walk you through the process of migrating VMs to the new vDS.

Migrate a VM from a vSS to a vDS

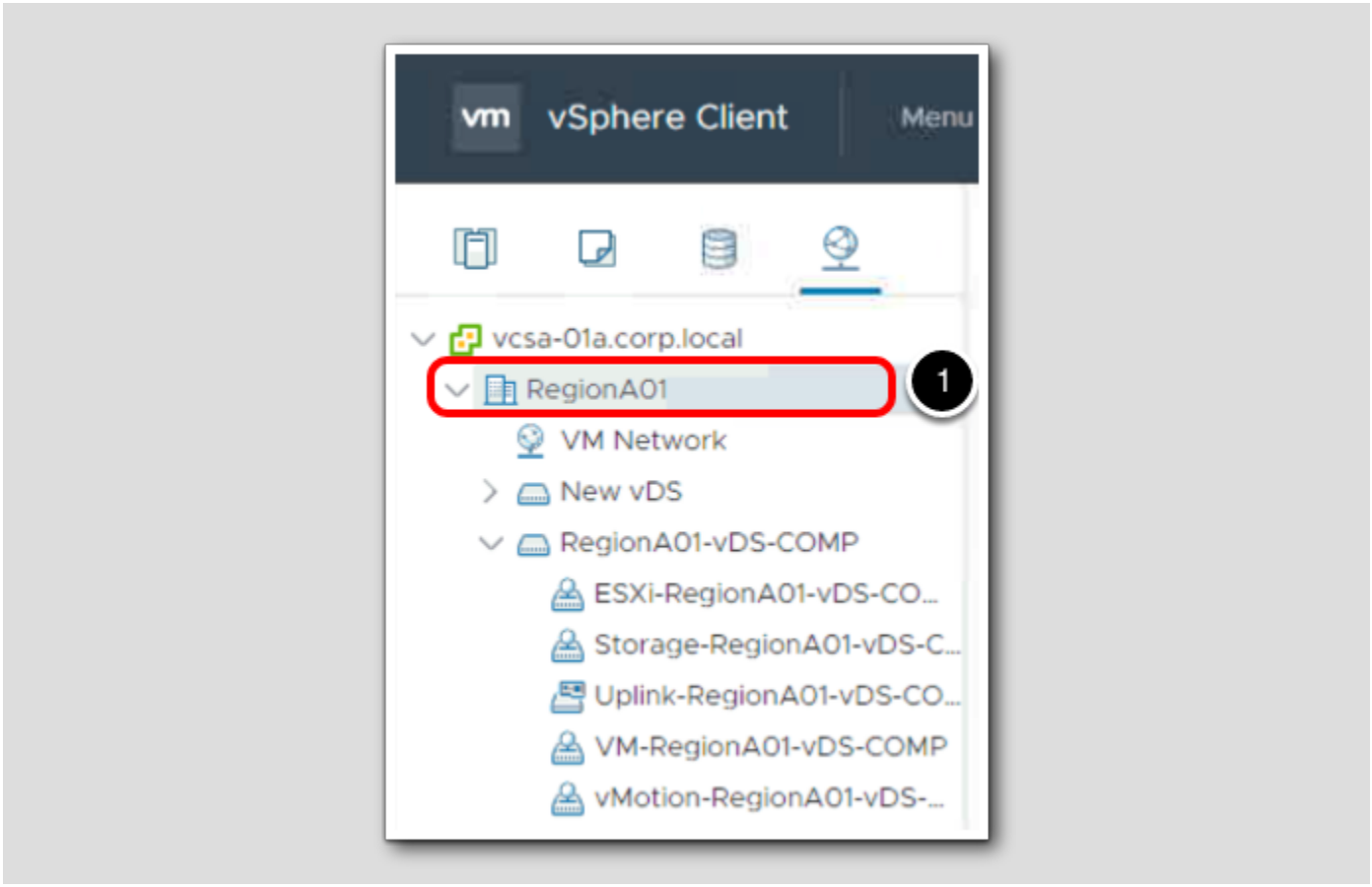
[47]

Now that we have created a new vDS, we want to take advantage of its capabilities. In this lab, we will migrate a running virtual machine from a virtual standard switch to the newly created distributed virtual switch.

In the vSphere Client, there are numerous ways to accomplish the task of VM network migration. However, we will be walking through the procedures specifically outlined in the vSphere product documentation.

Navigate to your datacenter

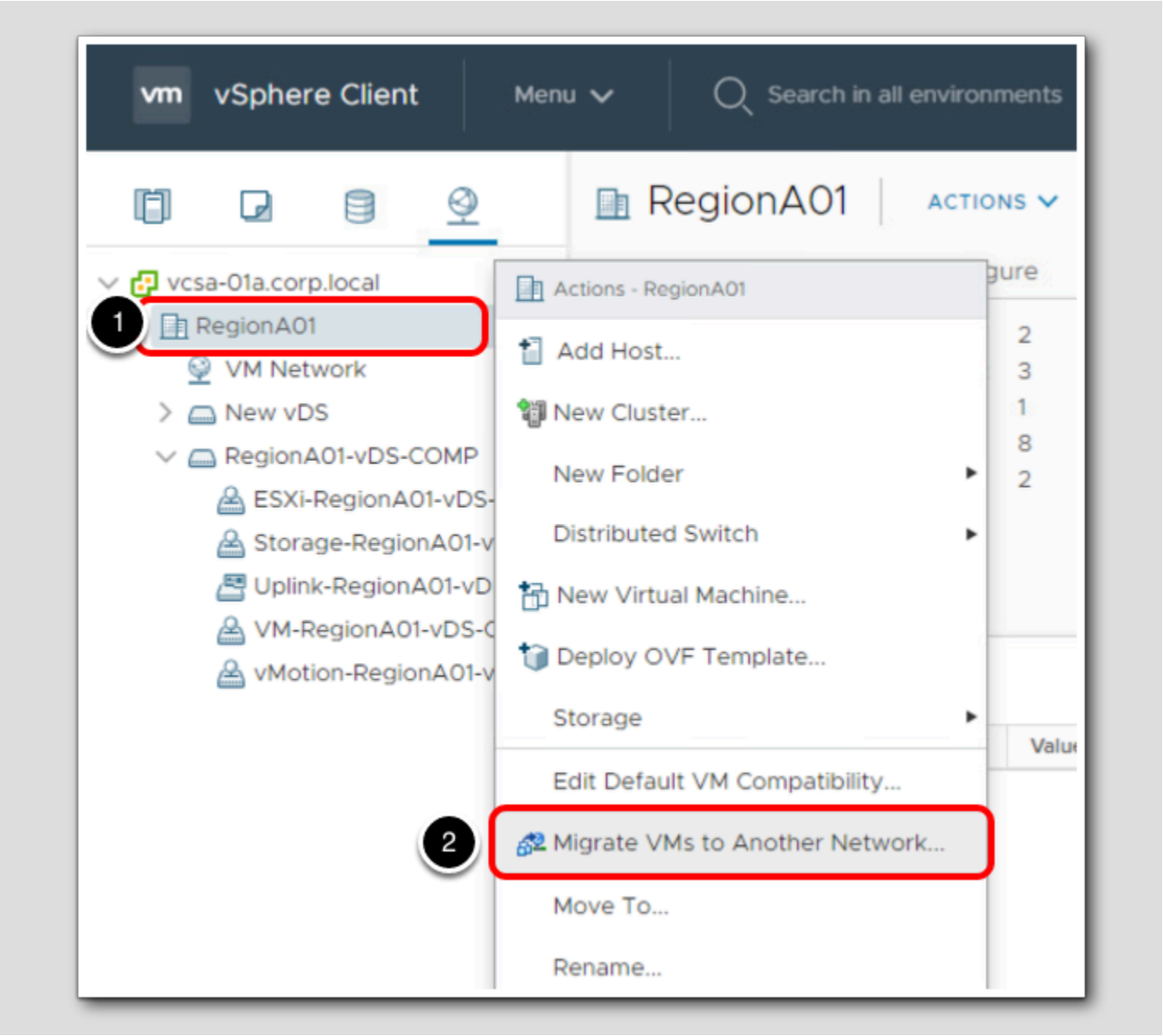
[48]



1. To get started, click on **RegionA01** Datacenter.

Migrate VMs

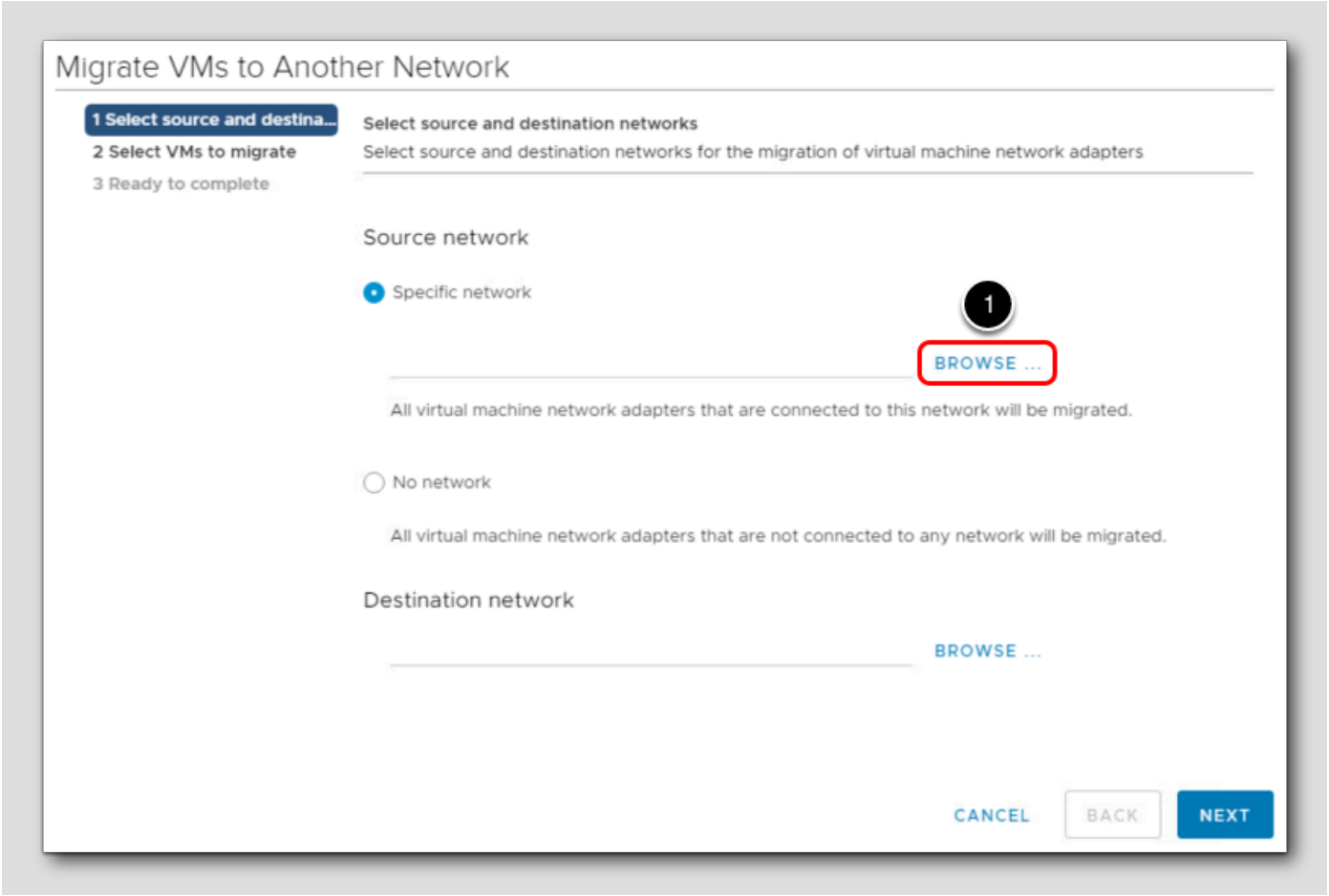
[49]



1. Right-click on **RegionA01** Datacenter.
2. Select **Migrate VMs to Another Network**.

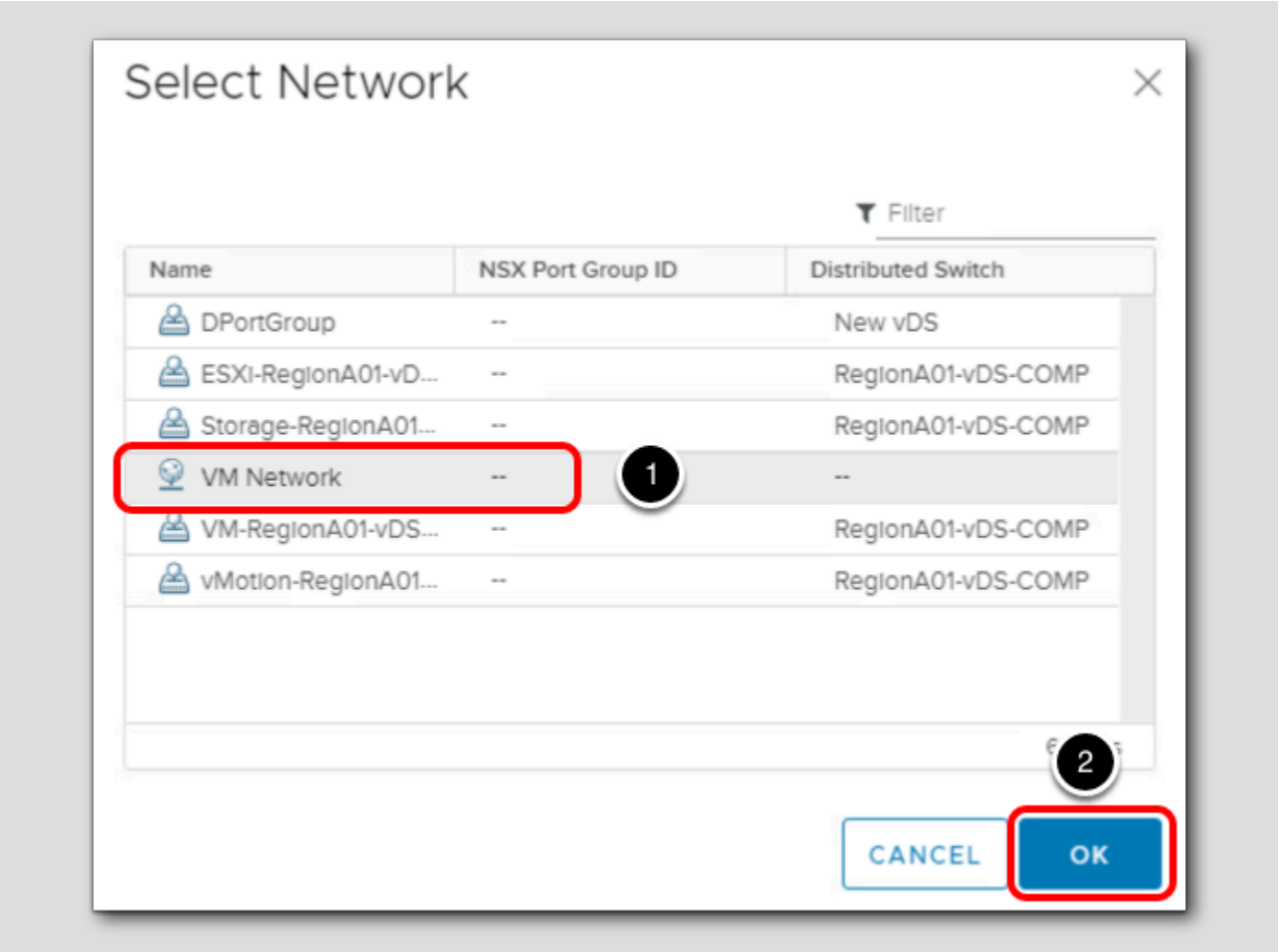
Select source network

[50]



1. In the Select source and destination networks section, click on **Browse** under **Source network**.

VM Network [51]

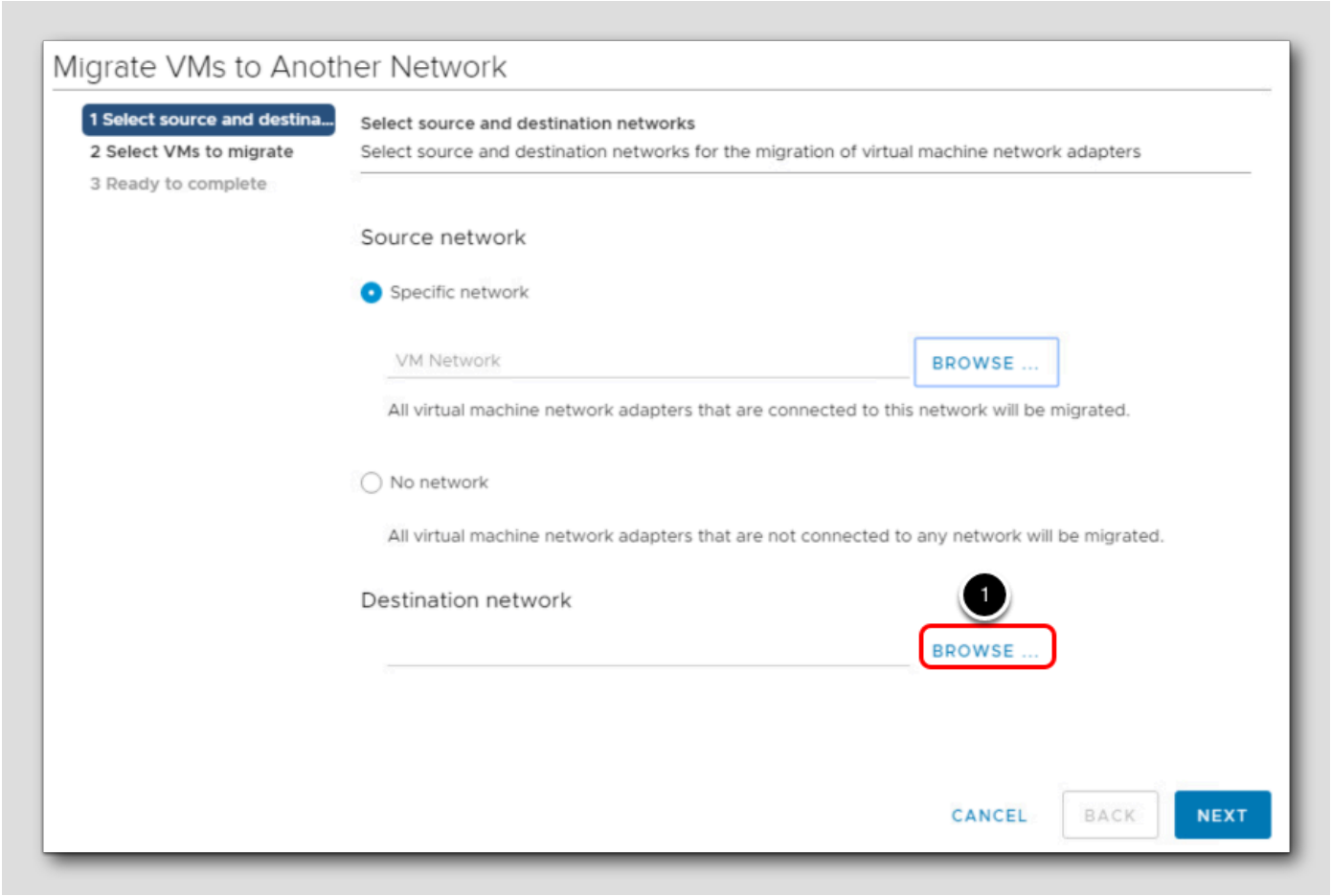


1. Select **VM Network**.
2. Click **OK**.

This is the network associated with the virtual standard switch where our VM is currently connected that we want to migrate.

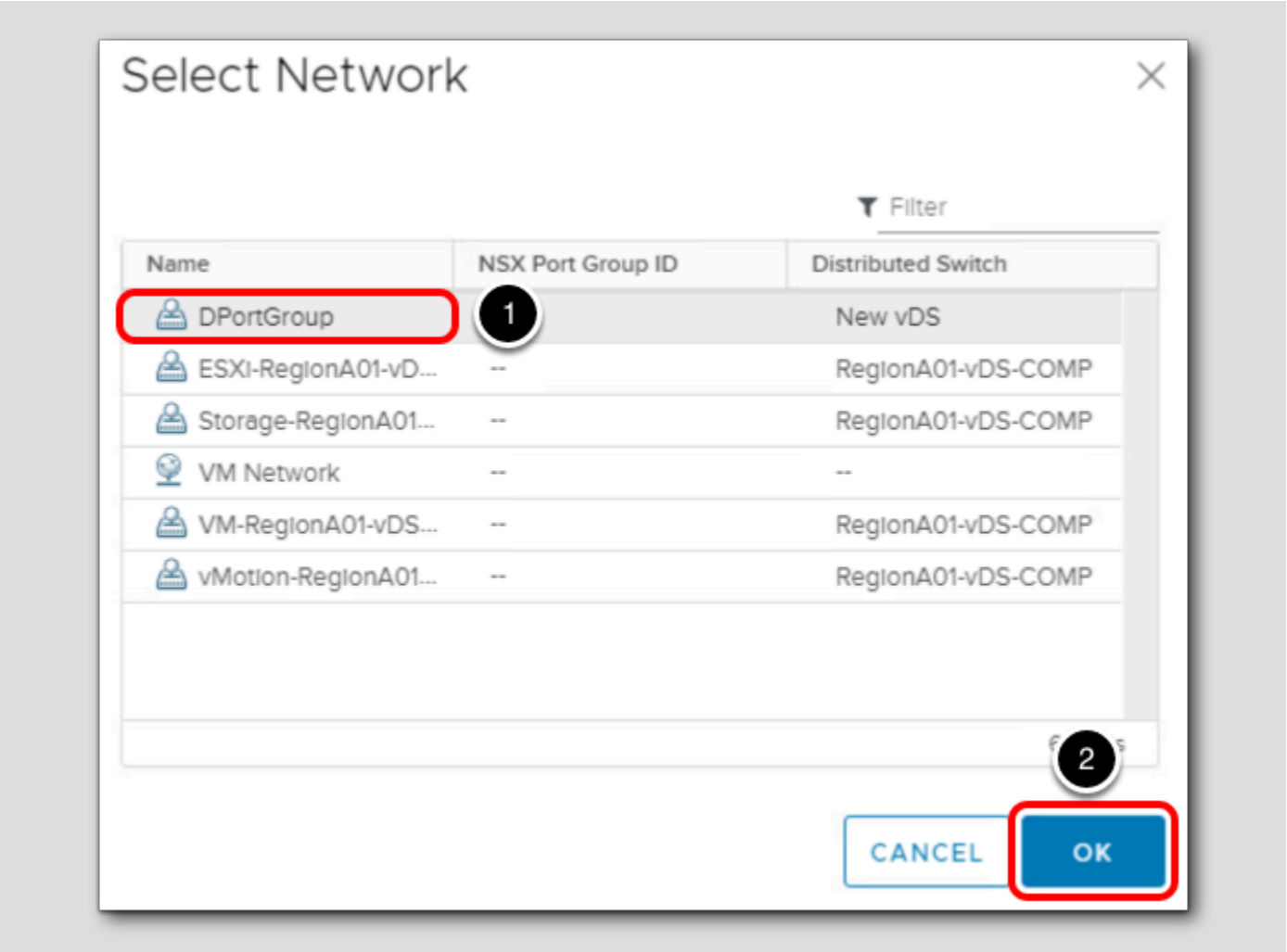
Select destination network

[52]



1. Under Destination network select **Browse**.

DPortGroup [53]

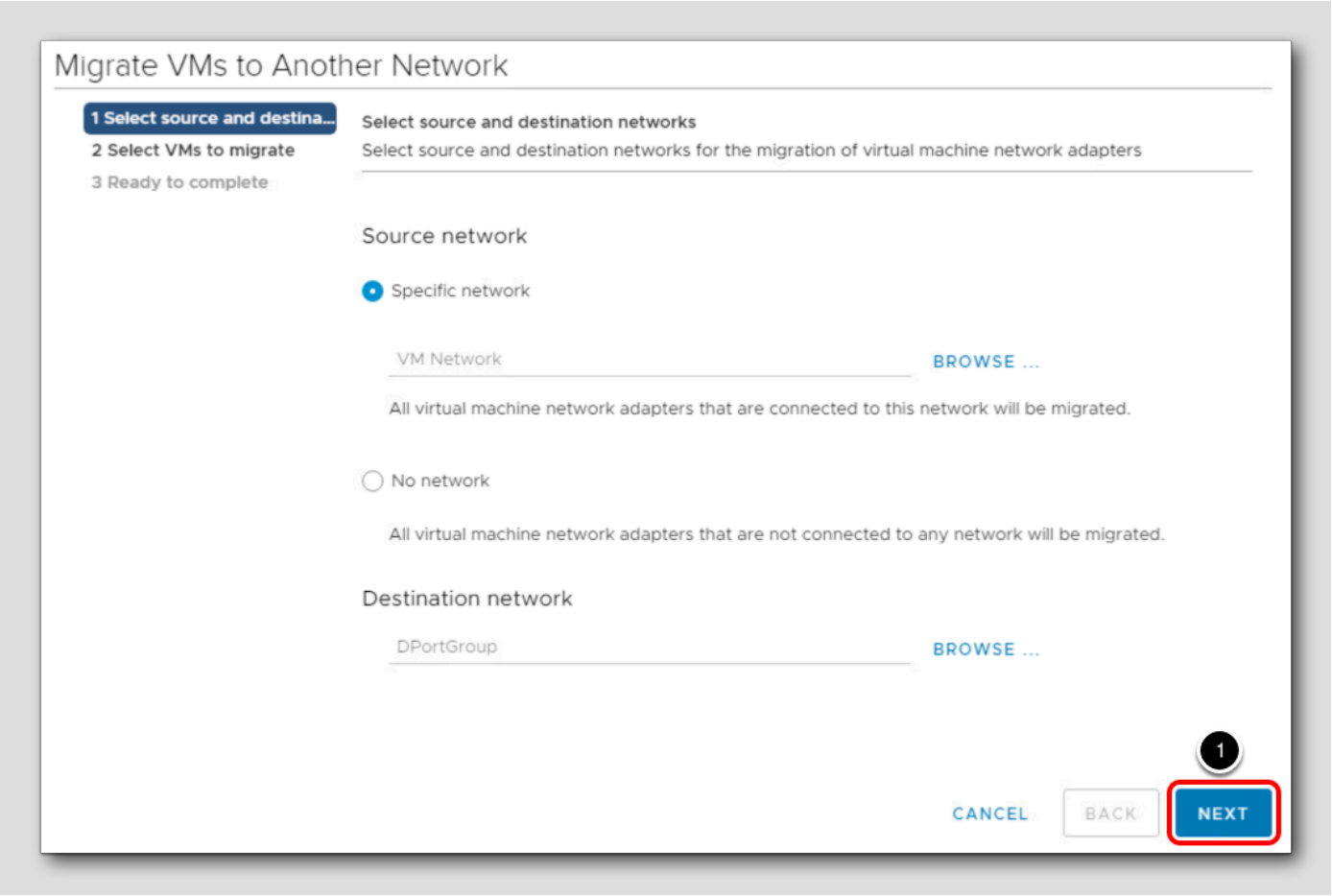


1. Select **DPortGroup**.
2. Click **OK**.

This is the port group on the new Distributed Switch that you created. This is the new port group that will be used to connect the VM being migrated to the network.

Migrate VMs

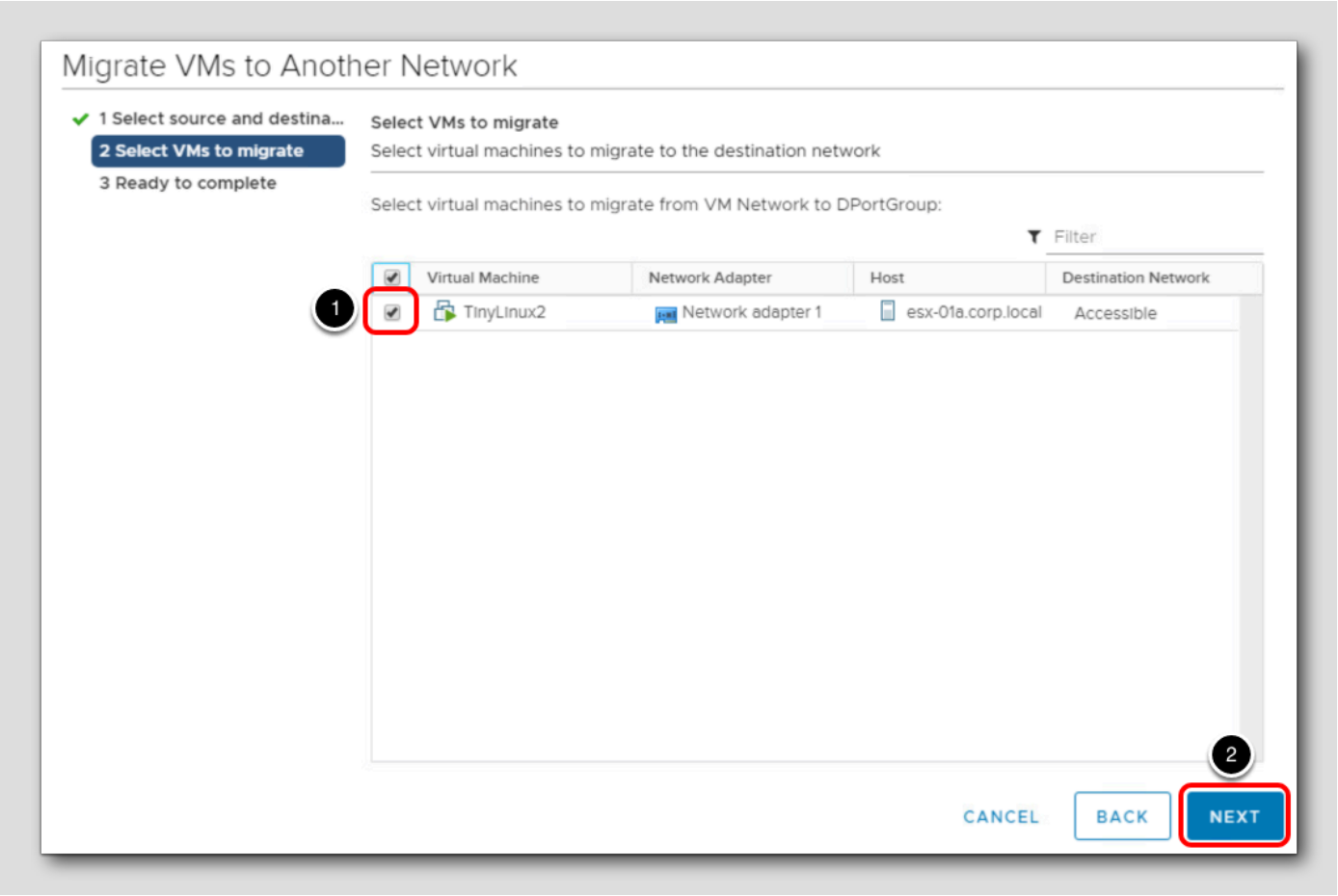
[54]



1. Click **Next.**

Select VM to migrate

[55]



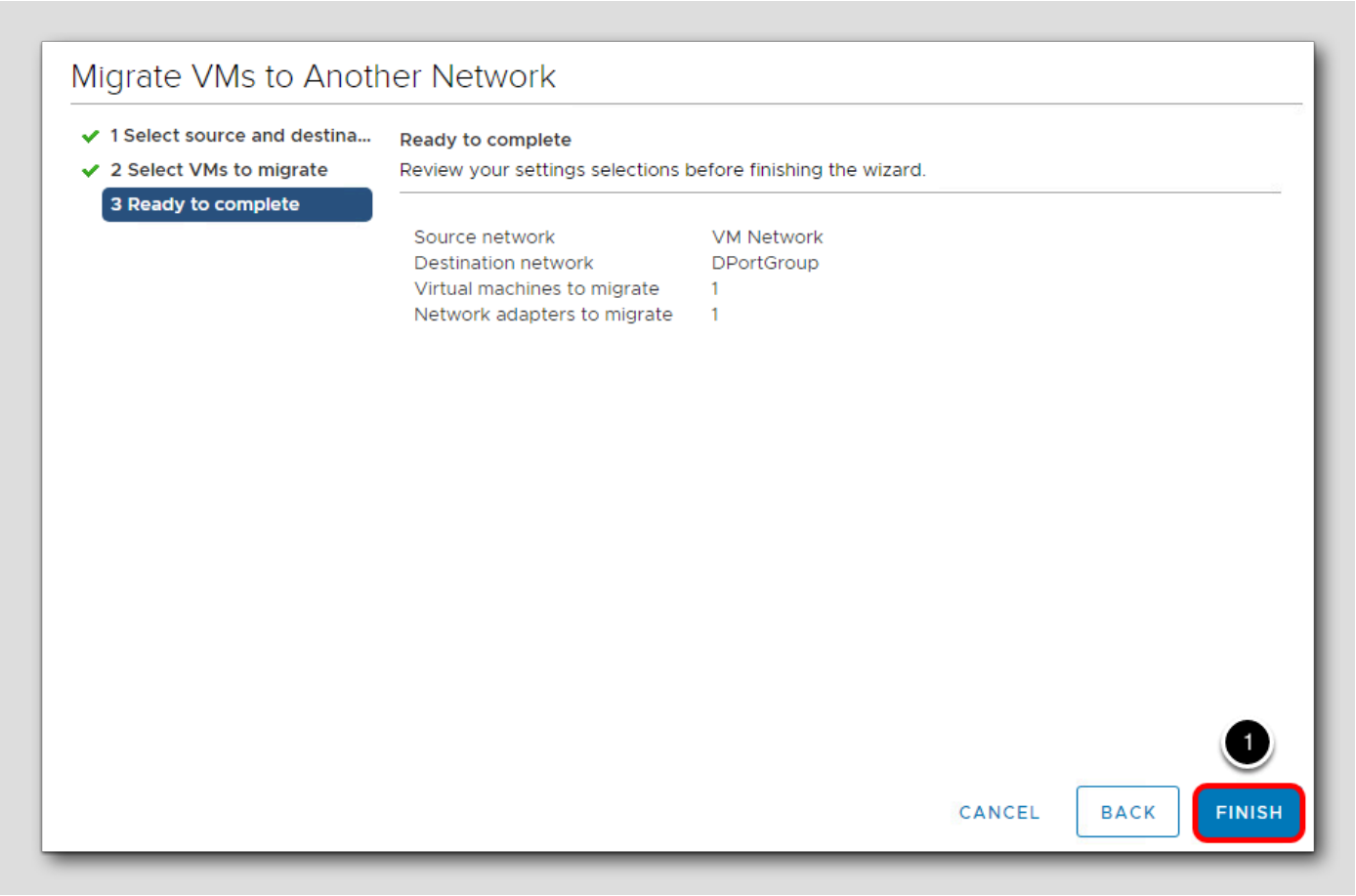
1. Select the checkbox for **TinyLinux2**.

Note that there is only one adapter associated with this VM. If there was more than one, you would have the option of choosing which one you would want to connect to the new vDS.

2. Click **Next**.

Ready to Complete

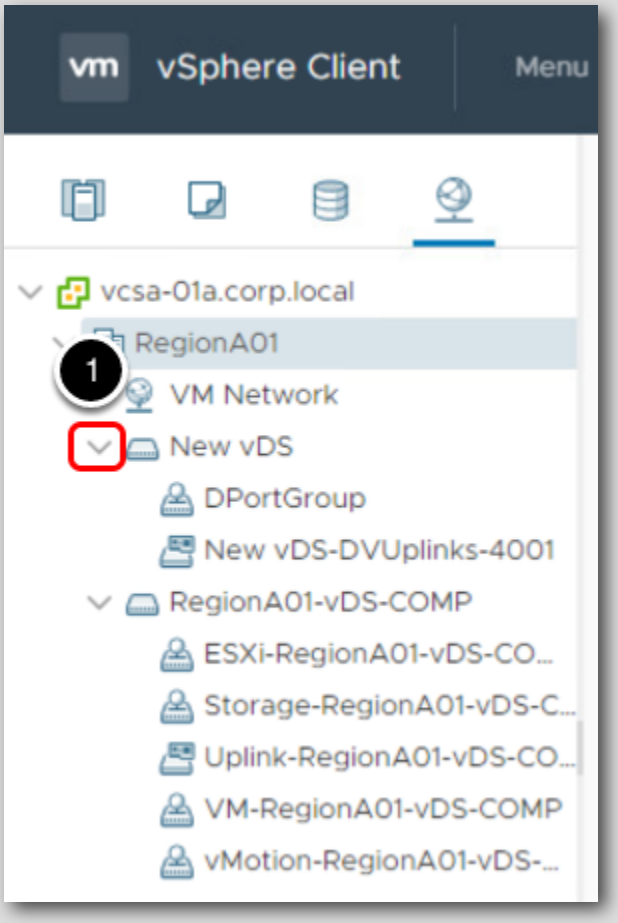
[56]



1. Click **Finish** to migrate the VM from a Standard Switch to the new Distributed Switch.

Explore your changes

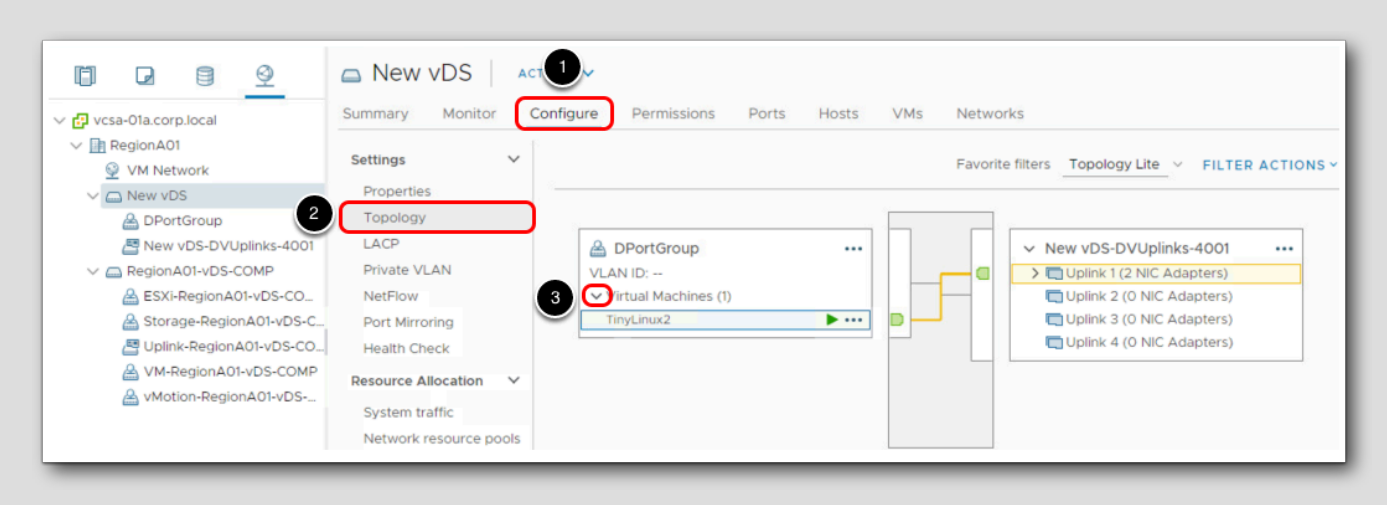
[57]



1. Click on the new **Distributed Switch** and expand it to see all associated port groups and uplinks.

Topology Map

[58]



1. Click **Configure**.
2. Click **Topology**.
3. Under DPortGroup, click on the **drop-down arrow** to expand the view.

Select the **TinyLinux2** VM and note the highlighted path through the new vDS and Uplink.

Lightning Lab Conclusion

[59]

You have taken the Lightning Lab!

Thank you for taking the Working with the vSphere Distributed Switch Lightning Lab HOL-2210-91-SDC

New to virtualization or vSphere and want to learn more? Explore the full Virtualization 101: Getting Started with vSphere lab:

- HOL-2210-01 Virtualization 101:Getting Started with vSphere

Below are the lab modules included in the complete Virtualization 101: Getting Started with vSphere:

- **Module 1 - Introduction to Management with vCenter Server**
- **Module 2 - Introduction to vSphere Networking and Security**
- **Module 3 - Introduction to vSphere Storage**

For more information about our labs:

- Try VMware Hands-on Labs

How to End Lab

[60]

To end your lab click on the **END** button.

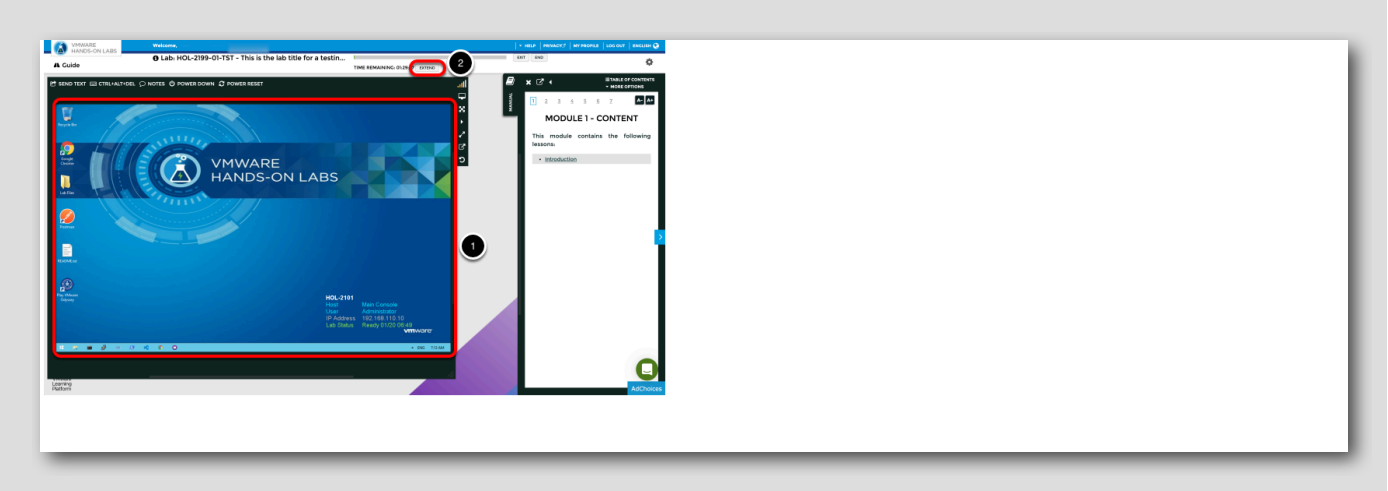
Appendix - Hands-on Labs Interface

[61]

Welcome to Hands-on Labs! This overview of the interface and features will help you to get started quickly. Click next in the manual to explore the Main Console or use the Table of Contents to return to the Lab Overview page or another module.

Location of the Main Console

[62]



1. The area in the large RED box contains the Main Console. The Lab Manual is on the tab to the right of the Main Console.
2. Your lab starts with 90 minutes on the timer. The lab can not be saved. Your lab will end when the timer expires. Click the **EXTEND** button to increase the time allowed. If you are at a VMware event, you can extend your lab time twice up to 30 minutes. Each click gives you an additional 15 minutes. Outside of VMware events, you can extend your lab time up to 9 hours and 30 minutes. Each click gives you an additional hour.

Alternate Methods of Keyboard Data Entry

[63]

In this lab, you will input text into the Main Console. Besides directly typing it in, there are two very helpful methods of entering data which make it easier to enter complex data.

Click and Drag Lab Manual Content Into Console Active Window

[64]

https://www.youtube.com/watch?v=xS07n6GzGuo

You can also click and drag text and Command Line Interface (CLI) commands directly from the Lab Manual into the active window in the Main Console.

Accessing the Online International Keyboard

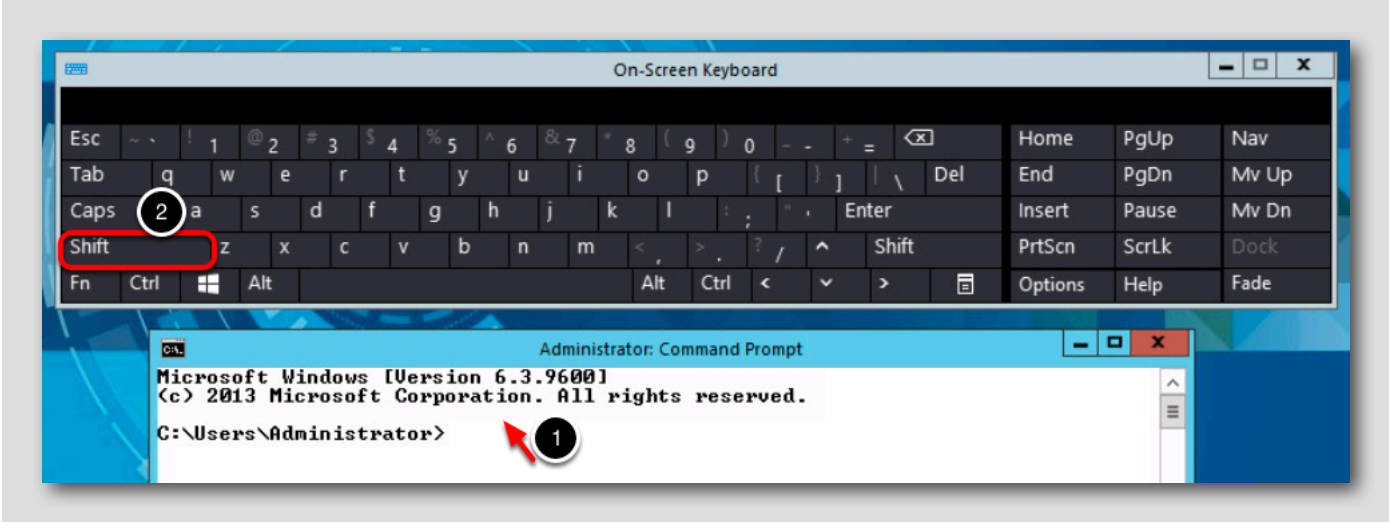
[65]

You can also use the Online International Keyboard found in the Main Console.

1. Click on the keyboard icon found on the Windows Quick Launch Task Bar.

Click once in active console window

[66]

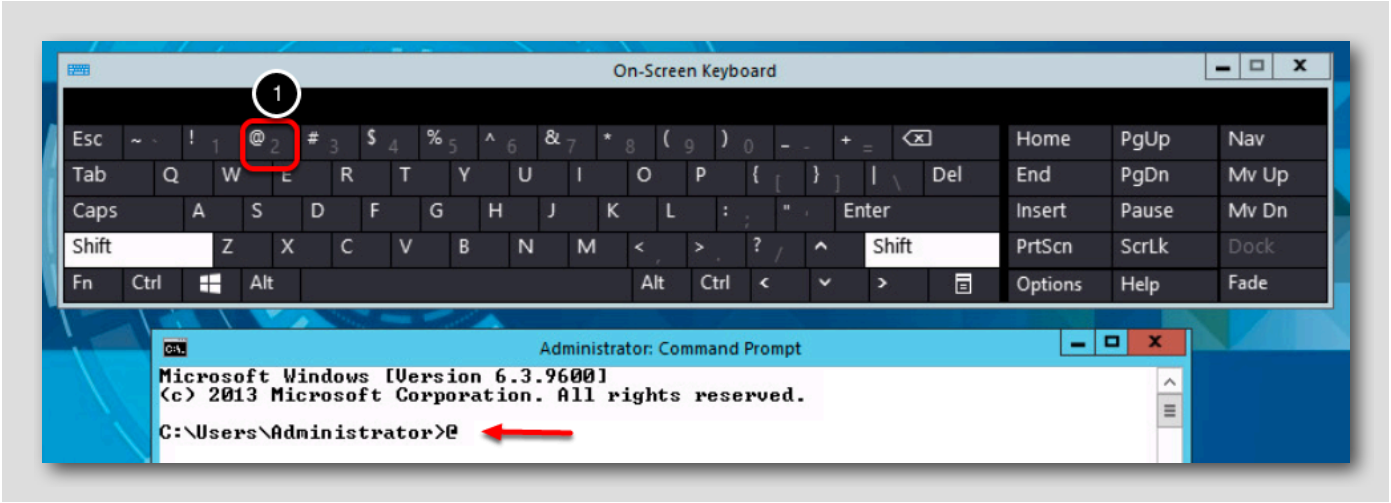


In this example, you will use the Online Keyboard to enter the "@" sign used in email addresses. The "@" sign is Shift-2 on US keyboard layouts.

1. Click once in the active console window.
2. Click on the Shift key.

Click on the @ key

[67]



1. Click on the "@" key.

Notice the @ sign entered in the active console window.

Activation Prompt or Watermark

[68]

When you first start your lab you may notice a watermark on the desktop indicating that Windows is not activated.

A major benefit of virtualization allows virtual machines to be moved and run on any platform. Hands-on Labs utilizes this benefit and hosts labs from multiple datacenters. However, these datacenters may not have identical processors which triggers a Microsoft activation check through the Internet.

Rest assured VMware and Hands-on Labs are in full compliance with Microsoft licensing requirements. The lab that you are using is a self-contained pod and does not have full access to the Internet. Without this, the Microsoft activation process fails and you see this watermark.

This cosmetic issue has no effect on your lab.

Return to Lab Guidance

[69]

Use the Table of Contents to return to the Lab Overview page or another module.

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