Simulate ONTAP™ 9.3

Installation and Setup Guide

Contents

Introduction to Simulate ONTAP

Simulate ONTAP is a simulator for running ONTAP software. It enables you to test the features of ONTAP without having to buy new hardware or disturb your production environment.

Simulate ONTAP is a VMware virtual machine that runs on a hypervisor. You can run Simulate ONTAP on a Windows or a Mac system, or directly on a VMware ESXi server.

Supported VMware applications

You can install Simulate ONTAP only on certain VMware applications.

You need to install one of the following VMware applications on the host system to use Simulate ONTAP:

- VMware Workstation

- VMware Player

- VMware vSphere

- VMware Fusion

Limitations and unsupported features

Simulate ONTAP supports most ONTAP functionality and most of its features. However, Simulate ONTAP has some functional limitations and does not support some ONTAP features because of the virtualization architecture.

Simulate ONTAP has the following limitations:

- Non-Volatile RAM (NVRAM) is simulated and is not persistent.

  Data loss might occur after power cycles. You must shut down the simulator properly to avoid data loss.

- You can have a maximum of four simulated disk shelves with 14 disk drives per shelf, for a total of 56 drives per simulator.

- Each simulated drive is limited to 9 GB.

> **Note**: The simulator image comes pre-configured with 28 1 GB disks; 14 each on simulated disk shelves 0 and 1. Simulated disk shelves 2 and 3 are not populated. You can configure up to a maximum of 220 GB total space for each Simulate ONTAP node.

- You can create 64-bit aggregates, but they are limited to a maximum of 9 GB per simulated disk drive.

- Simulate ONTAP is not suitable for applications that require high performance or heavy I/O.

- No more than two instances of the simulator can be booted simultaneously.

Simulate ONTAP does not support the following features:

- High Availability (CFO/SFO)

- Fibre channel and SAN connectivity

- RLM (Remote LAN Module)

- CFE, BIOS, shelf FW, and so on

- Multipathing

Downloading Simulate ONTAP software

The Simulate ONTAP software is a set of VMware files that have been packaged in an `.ova` file. You need to download the appropriate software and license files from the NetApp Support Site.

About this task

Different `.ova` files are available depending on whether you plan to run the simulator on a VMware ESXi server, or on one of the supported VMware desktop applications.

Steps

1. Log in to the NetApp Support Site at *mysupport.netapp.com*

2. Type your user name and password, and then click **Login**.

3. In the **Downloads** section, select **Tools and Add-Ons for Purchased Products**.

   The ToolChest page displays.

4. Scroll down the list of tools and click **Simulate ONTAP for ONTAP 8.x and 9.x**.

   The Simulate ONTAP Description page displays.

5. Click **Continue** to go to the Download page.

6. In the row that corresponds to the version of Simulate ONTAP you want to use (for example, 9.3), download the ONTAP simulator software by selecting the ***vsim-esx-DOT9.3-cm.ova*** link for VMware ESXi or for running on a hypervisor.

   The File Download popup window displays.

7. Click the **Save** button to save the .ova file to the applicable location:

If you are downloading to...	Then...
A Windows system	Save the file to the C:\Virtual Machines folder.
A Mac system	Save the file to the download folder.
An ESXi server	Save the file to a location that is accessible to your VMware vSphere Client.

8. After the download is complete, click the **VSIM Licenses** link to display the list of ONTAP licenses that you need to unlock certain ONTAP features, and then save this information to your computer.

Installing Simulate ONTAP on a Windows system

You can install Simulate ONTAP on a Windows system and test the features of ONTAP software.

In a Windows system, you need to have one of the following VMware applications installed before you can run Simulate ONTAP:

- VMware Workstation
- VMware Player

Windows system requirements

You must ensure that the hardware and software prerequisites are met before installing Simulate ONTAP on a Windows system. Also ensure that you have administrative privileges.

Hardware requirements
- Dual core 64-bit Intel or AMD system
- 5.1 GB of RAM for one instance of the simulator
- 10.2 GB of RAM for two instances of the simulator
- 40 GB of free disk space for each instance of the simulator
- VT support for Intel system

Software requirements
- Microsoft Windows 7 or Microsoft Windows 10
- VMware Workstation (11.1.0) or VMware Player (7.1.0)

Enabling the VT feature

To install Simulate ONTAP on a Windows system, you must enable the VT feature. The VT can be referred to as Vanderpool Technology, Virtualization Technology, or Virtual Machine Extensions. The VT setting can be found under a Security or CPU screen in the BIOS.

About this task

By default, VT is disabled on an Intel-based system.

Steps

1. Access the system BIOS while booting your laptop or desktop.

2. In the BIOS, enable VT if it is not already enabled.

3. Save the changes to the BIOS settings and then *turn off* the system.

4. Turn on the system again.

   Note: If you reboot the system without turning it off, VT is not enabled.

Installing Simulate ONTAP on VMware Workstation

You can download and install VMware Workstation on a Windows laptop or desktop, configure the VMware Workstation for Simulate ONTAP, start Simulate ONTAP Guest OS on the VMware Workstation, and configure the network adapters on the VMware Workstation.

Note: You cannot install multiple versions of VMware Workstation on the same host.

For information about installing VMware Workstation software, and for VMware Workstation documentation, see the VMware Web site.

Related information

VMware Workstation software

Workstation User's Manual

## Configuring VMware Workstation for Simulate ONTAP

Using the Preferences menu, you can change the default location for virtual machines. You can also set the preferences for the virtual machines and software updates.

Steps

1. Click **Start** > **All Programs** > **VMware** > **VMware Workstation**.

2. In the **VMware Workstation** window, click **Edit > Preferences**.

By default, the Workspace tab is selected in the Preferences window.

3. Click **Browse** to select the default location for Simulate ONTAP virtual machines.

4. Select the Preferences for the following:

    a. Default location for virtual machines

    b. Virtual machines

    c. Privacy
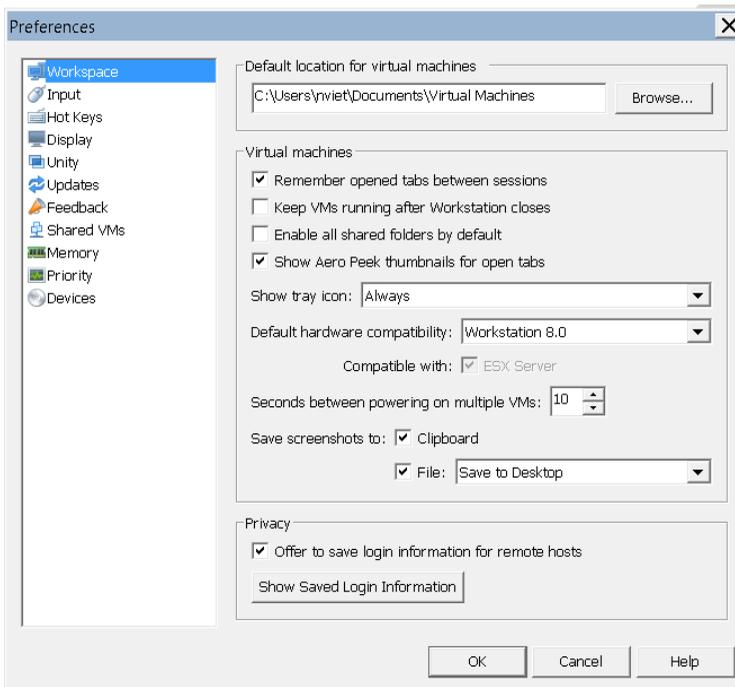
5. Click **OK**.

Configuring network adapters on VMware Workstation

You must configure network adapters on VMware Workstation to support Simulate ONTAP on your laptop or desktop.

About this task

There are two virtual network configurations that you can use on your laptop or desktop:

- Host-Only and Custom

  All virtual interfaces used by Simulate ONTAP are set to host-only and custom.

- Bridged and Custom

  Virtual network interface vmnet0 is set to bridged and all other interfaces used by Simulate ONTAP are set to either host-only or custom.

If the virtual network interface vmnet0 is set as bridged, then you can use the physical Ethernet port of your laptop to access all volumes created and mounted by using ONTAP. This works only if the IP addresses and subnet are static.

Steps

1. Click **Start** > **All Programs** > **VMware** > **Virtual Network Editor**.

2. In the **Virtual Network Editor** window, select the virtual network interface as per your requirements.

3. Click **OK**.

Starting Simulate ONTAP on VMware Workstation

You must start Simulate ONTAP on VMware Workstation to access the Simulate ONTAP console.

Steps

1. Click **Start** > **All Programs** > **VMware** > **VMware Workstation**.

2. In the **VMware Workstation** window, click **File** > **Open**.

3. In the **Open** window, select the .ova file described in *Downloading Simulate ONTAP software* on page 6, and then click **Open**.

4. In the **Import Virtual Machine** window, provide a name and local storage path for the new virtual machine, and then click **Import**.
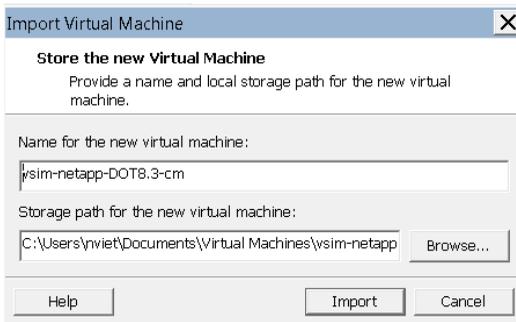
5. In the virtual machine tab, click the **Power on this virtual machine** icon.
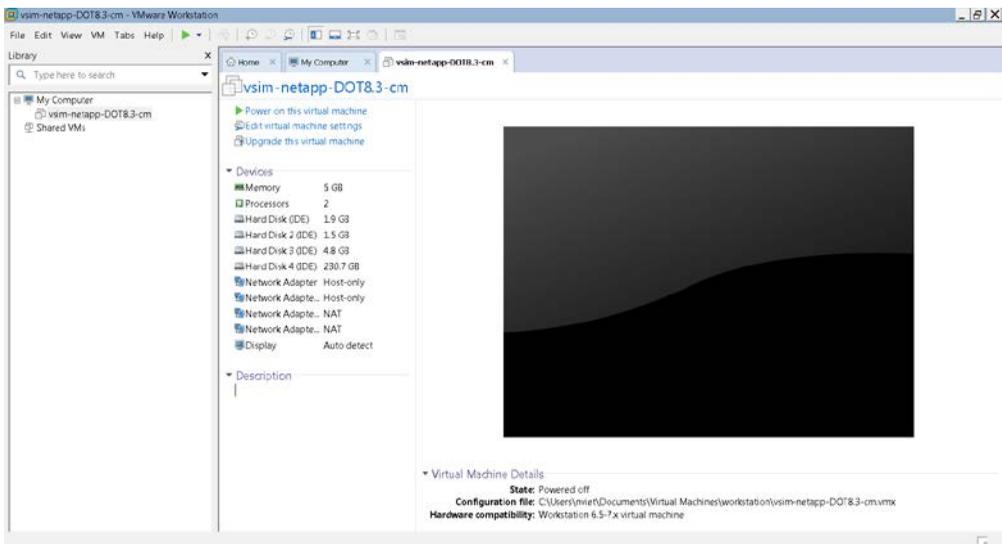
After you finish

To configure ONTAP, see *ONTAP setup on page 29* and the *ONTAP Software Setup Guide* on the NetApp Support Site at *mysupport.netapp.com*

Installing Simulate ONTAP on VMware Player

You can download and install the VMware Player on a Windows laptop or desktop, start Simulate ONTAP, set preferences for the Simulate ONTAP virtual machine, and configure network adapters on the VMware Player.

For information about installing VMware Player software and VMware Player documentation, see the VMware Web site.

Related information

VMware Player software

VMware Player Getting Started Guide

Starting Simulate ONTAP on VMware Player

You must start the Simulate ONTAP virtual machine to configure ONTAP in the VMware Player console.

Steps

1. Click **Start** > **All Programs** > **VMware** > **VMware Player**.

2. In the **VMware Player** window, click **Open a Virtual Machine**.

3. In the **Open Virtual Machine** window, select the `.ova` file described in *Downloading Simulate ONTAP software* on page 6, and then click **Open**.

4. In the **Import Virtual Machine** window, provide a name and local storage path for the new virtual machine and then click **Import**.
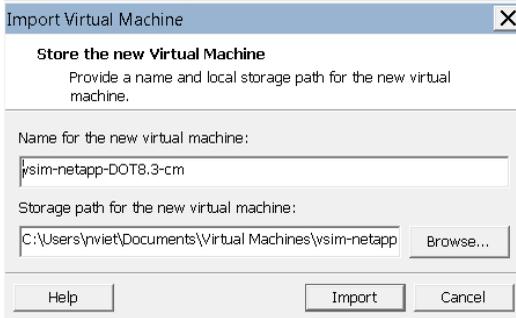
Result

Simulate ONTAP opens in the VMware Player console.

Setting preferences for the Simulate ONTAP virtual machine

In the Simulate ONTAP virtual machine, you can set preferences to select the mode of exit and to check the web for updates on startup.

Steps

1. In the **VMware Player** window, click **Player > File** > **Preferences**.

2. In the **Preferences** window, select the mode of exit from one of the following options:

   - Suspend the virtual machine
   - Power off the virtual machine
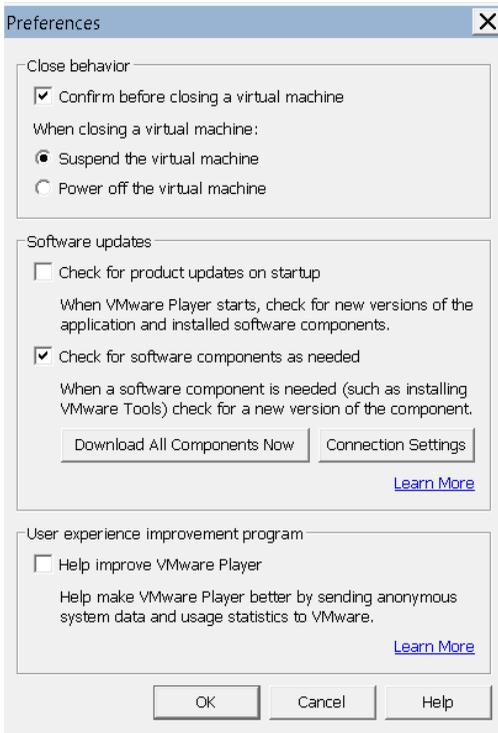
You can also select "Confirm before exiting the application" to receive a confirmation prompt when exiting the virtual machine.

3. Click **OK**.

Configuring network adapters on VMware Player

You must configure network adapters on VMware Player to support Simulate ONTAP on your laptop or desktop.

Steps

1. In the VMware Player Simulate ONTAP console, click **Edit virtual machine settings**.
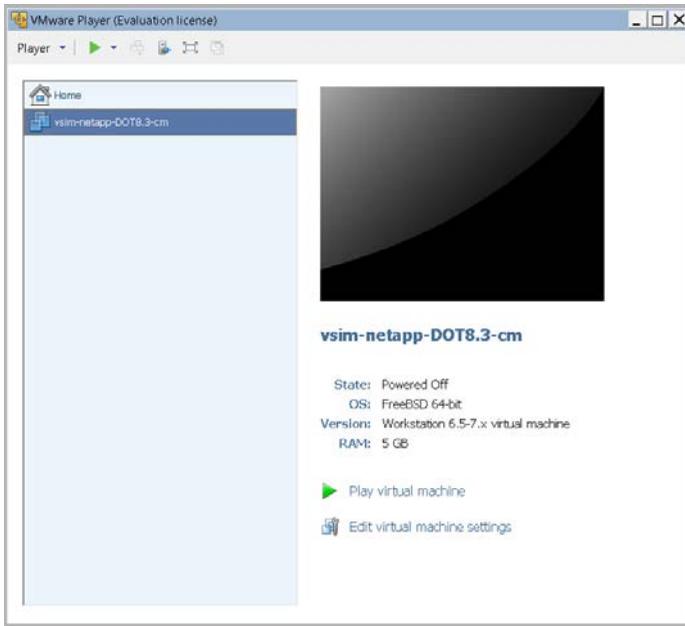
2. Set the appropriate network type depending on the network adapters:

If you are using...	Then set the network type as...
Network Adapter and Network Adapter 2	Host-only
Network Adapter 3	Bridged

After you finish

To configure clustered ONTAP, see *ONTAP setup on page 29* and the *ONTAP Software Setup Guide* on the NetApp Support Site at *mysupport.netapp.com*

Installing Simulate ONTAP on a Mac system

You can install Simulate ONTAP on a Mac operating system to test the features of ONTAP.

Mac system requirements

You must ensure that the hardware and software prerequisites are met before installing Simulate ONTAP on a Mac (Apple) operating system. Also ensure that you have administrative privileges.

Hardware requirements

- Intel Core 2 Duo processor

- 5.1 GB of RAM for one instance of the simulator

- 10.2 GB of RAM for two instances of the simulator

- 40 GB of free disk space for each instance of the simulator

- Physical Address Extension (PAE) support

Software requirements

- Mac OS X 10.6.8

- VMware Fusion 7.1.1

Installing Simulate ONTAP on VMware Fusion

You can download and install VMware Fusion on a Mac (Apple) system, configure VMware Fusion to run Simulate ONTAP, add Simulate ONTAP on VMware Fusion, start Simulate ONTAP, and configure the network adapters on VMware Fusion.

For information about installing VMware Fusion software and VMware Fusion documentation, see the VMware Web site.

Related information

VMware Fusion software

VMware Fusion documentation

Configuring VMware Fusion to run Simulate ONTAP

To run Simulate ONTAP on a Mac operating system, you must configure VMware Fusion software by setting the preferences on a Mac laptop or desktop.

Steps

1. On your Mac laptop or desktop, click **Applications**.

2. In the **Applications** window, click **VMware Fusion**.

3. Select **VMware Fusion** > **Preferences**.

4. In the **General** window, you can set one of the following preferences for the action to take when closing the virtual machine.

   - Suspend the virtual machine

   - Power off the virtual machine

   You can also select "Confirm before closing" to receive a confirmation message when closing the virtual machine.

Adding Simulate ONTAP on VMware Fusion

To install Simulate ONTAP on VMware Fusion, you must add Simulate ONTAP to the virtual machine library by using the VMware Fusion software.

Steps

1. On the desktop, click **Applications**.

2. In the **Applications** window, click **VMware Fusion**.

3. Click **File > Import**.

4. In the **Choose an Existing Virtual Machine** window, choose the `.ova` file described in *Downloading Simulate ONTAP software* on page 6, and click **Continue**.
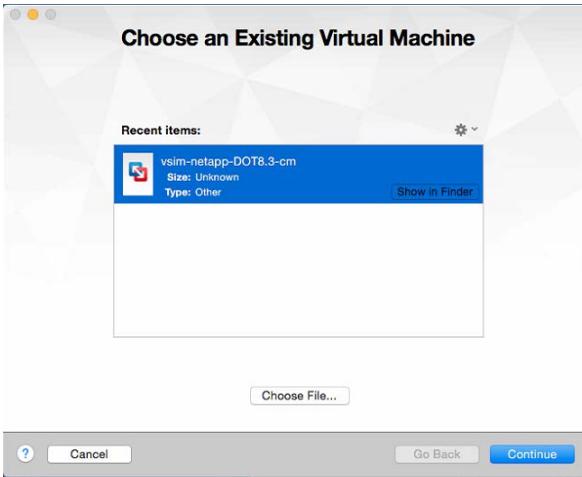
5. Provide a name for the new virtual machine in the **Save As** text box and then click **Save**.

6. In the Finished window, click **Finish** to run the virtual machine or click **Customize Settings** to change the default virtual machine settings.

Result

The added Simulate ONTAP virtual appear in the Virtual Machine Library.
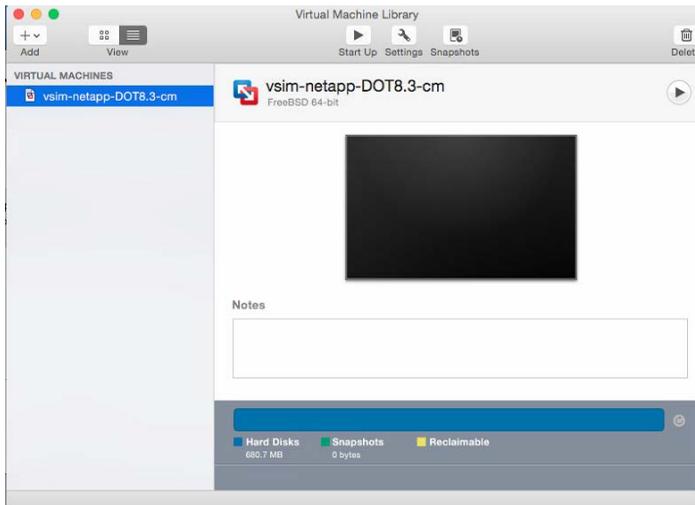
Configuring network adapters on VMware Fusion

You must configure network adapters on VMware Fusion to support Simulate ONTAP on your computer.

You can configure the network adapters on VMware Fusion to the following types of network configuration:

- Host-Only network adapters

- Bridged network adapters

Configuring host-only network adapters on VMware Fusion

You can configure network adapters on VMware Fusion to change to the host-only network configuration.

Steps

1. Select a Simulate ONTAP virtual machine from the **Virtual Machine Library**.

2. Click **Virtual Machine** > **Network Adapter 3** > **Host-only**.

   By default, the Network Adapter 3 is set to NAT.

   Click **Virtual Machine** > **Settings**.

   Select **Network**.

   Host-Only Network configurations can use any IP subnet class. In the configuration tested, 172.16.0.0 subnet 255.255.0.0 is used for cluster traffic, and 10.97.105.0 subnet 255.255.255.0 is used for management and data traffic.

Result

The virtual network dialog box appears with the summary of active network adapters.
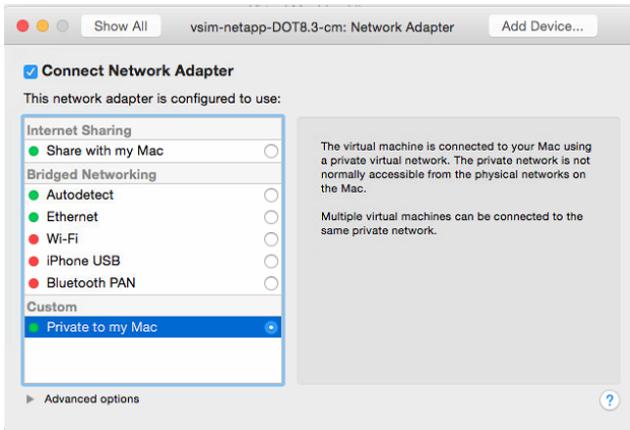
Configuring bridged network adapters on VMware Fusion

You can configure the network adapters on VMware Fusion to the bridged network configuration. When configured using bridged mode, you can export volumes and manage simulator guests by using static IP addresses.

Steps

1. Select a Simulate ONTAP virtual machine from the **Virtual Machine Library**.

2. Click **Virtual Machine** > **Network Adapter 3** > **Bridged**.

   By default, the Network Adapter 3 is set to NAT.

   Click **Virtual Machine** > **Settings**.

3. Select **Network**.

   Changes are automatically saved when you close the virtual network editor dialog box.

Result

The virtual network dialog box appears with the summary of active network adapters.

After you finish

Consult with your local IT support group for static IP address allocation for ONTAP simulators.

Starting Simulate ONTAP on VMware Fusion

You must start the Simulate ONTAP virtual machine to configure ONTAP in the VMware Fusion console.

Steps

1. On the desktop, click **Applications**.

2. In the **Applications** window, click **VMware Fusion**.

3. Select **Window** > **Virtual Machine Library**.

4. Select a Simulate ONTAP virtual machine from the **Virtual Machine Library**.

5. Click **Start up**.

After you finish

To configure clustered ONTAP, see *ONTAP setup on page 29* and the *ONTAP Software Setup Guide* on the NetApp Support Site at *mysupport.netapp.com*

Installing Simulate ONTAP on VMware vSphere

You can install Simulate ONTAP on a VMware vSphere system and test the features of ONTAP software.

VMware vSphere system requirements

You must ensure that the hardware and software prerequisites are met before installing Simulate ONTAP on a VMware ESXi system.

Minimum ESXi server hardware requirements

- 8 GB of RAM for one instance of the simulator
- 16 GB of RAM for two instances of the simulator
- 230 GB of free disk space for each instance of the simulator
- VT support for Intel systems

Software requirements

- VMware vSphere 5.5, including VMware ESXi and VMware vSphere Client, and optionally vCenter Server

Additional requirements

There are additional networking requirements when installing Simulate ONTAP on an ESXi host. There are also requirements for the computer on which the vSphere Client software is installed. The instructions provided in this manual reference the vSphere Client software instead of the vSphere Web Client.

For more information, see the "System Requirements" chapter of the *VMware ESXi and vCenter Server Installation Guide* for complete hardware and software requirements.

Installing Simulate ONTAP on VMware ESXi

You can download and install VMware ESXi on a server, and then install and start Simulate ONTAP on that server.

VMware ESXi is different from the other VMware virtualization software described in this manual because it cannot be installed on a laptop—it must be installed on a server. Additionally, you must install the VMware vSphere Client on a separate computer to install and manage the Simulate ONTAP virtual machine on the ESXi host. For this reason, it is recommended that you install Simulate ONTAP on ESXi only if you are familiar with VMware ESXi, or if someone at your site has this knowledge.

For information about installing VMware ESXi and VMware vSphere Client software, and for VMware ESXi documentation, see the VMware web site.

Installing Simulate ONTAP on VMware ESXi involves the following tasks:

- Create a cluster network

- Create a NAS network (required only when deploying Simulate ONTAP to a NAS datastore)

- Register the Simulate ONTAP virtual machine

- Start the Simulate ONTAP virtual machine

Related information

VMware ESXi 5.5 software

VMware vSphere 5.5 Documentation Center

vSphere Installation and Setup

Creating a cluster network

When running ONTAP, you must create a network for the cluster traffic that is separate from the network for data traffic. This effectively creates a virtual machine port group.

About this task

Both Simulate ONTAP instances in the cluster must be running on the same ESXi server.

Steps

1. Log in to the vSphere Client and select the ESXi host from the inventory panel.

2. Select the **Configuration** tab, and then click **Networking** (under the **Hardware** list).

3. In the **vSphere Standard Switch** view, click **Add Networking**.

   The Add Network Wizard is launched.

4. In the **Connection Type** page, select **Virtual Machine**, and then click **Next**.

5. In the **Virtual Machines – Network Access** page:

   a. Select the **vSwitch** to use, or select **Create a vSphere standard switch** to create a new vSwitch.

   b. Click **Next**.

6. In the **Virtual Machines – Connection Settings** page:

   a. In the **Network Label** field, enter a name that identifies the network you are creating, for example, "Cluster Network".

   b. Click **Next**.

7. In the **Ready to Complete** page, verify the details about the Virtual Machine port group you are adding, and then click **Finish**.

   You can click **Back** if you need to make any corrections.

Creating a network to access the NAS datastore

If you are planning to deploy the Simulate ONTAP files to a NAS datastore, then you need to create a network on the ESXi server that will enable communication with the remote datastore. This step creates a VMkernel port group (network) where the NAS can be mounted on the ESXi server.

About this task

See the *VMware ESXi Configuration Guide* if you need more details about creating a new network.

If you are accessing Simulate ONTAP files on a local datastore, skip this section.

Steps

1. Log in to the vSphere Client and select the ESXi host from the inventory panel.

2. Select the **Configuration** tab and click **Networking** (under the **Hardware** list).

3. In the **vSphere Standard Switch** view, click **Add Networking**.

    The Add Network Wizard is launched.

4. In the **Connection Type** page, select **VMkernel** and click **Next**.

5. In the **VMkernel - Network Access** page, perform the following steps:

    a) Select the **vSwitch** to use and the check box(es) for the virtual network adapter(s)
        your vSwitch will use, if available, to provide access to the datastore.

        or

        Select **Create a vSphere standard switch** to create a new vSwitch.

    b) Click **Next**.

6. In the **VMkernel - Connection Settings** page, perform the following steps:

    a) In the **Network Label** field, enter a name that identifies the network you are
        creating, for example, "Datastore Network".

    b) Click **Next**.

7. In the **VMkernel - IP Connection Settings** page, perform the following steps:

    a) Enter the IP connection details manually, or select **Obtain IP settings automatically**
        to use DHCP to obtain the IP settings.

    b) Click **Next**.

8. In the **Ready to Complete** page, verify the details about the VMkernel port group you are
    adding and click **Finish**. Note that you can click **Back** if you need to make any corrections.

    If you receive a message about the gateway not being specified, enter the Default gateway
    details and click **Finish**.

9. Mount the datastore as a NAS datastore on the ESXi server.

Result

The VMkernel network that will be used to access the NAS datastore is created successfully
and the datastore is mounted.

Registering Simulate ONTAP on an ESXi server

To register Simulate ONTAP on an ESXi server, you must deploy the Simulate ONTAP `.ova` file using the vSphere Client.

Steps

1. Log in to the vSphere Client and select the ESXi host from the inventory panel.

2. Click **File > Deploy OVF Template**.

   The Deploy OVF Template Wizard is launched.

3. In the **Source** page, browse to the `.ova` file described in *Downloading Simulate ONTAP software* on page 6 and click **Next**.

4. In the **OVF Template Details** page, verify the details about the `ova` selected and then click **Finish**.

5. In the **Name and Location** page, specify a name and location for the deployed template and then click **Next**.

6. In the **Storage** page, select where you want to store the virtual machine files and then click **Next**.

7. In the **Disk Format** page, click **Next**.

8. In the **Network Mapping** page, map the network used in the `ova` files to the networks in your inventory and then click **Next**.

9. In the **Ready to Complete** page, verify the details about the Virtual Machine you are creating, and then click **Finish**.

   You can click **Back** if you need to make any corrections.

Starting Simulate ONTAP on a VMware ESXi server

You must start the Simulate ONTAP virtual machine to access ONTAP through the VMware ESXi console.

Steps

1. In the left pane of the vSphere Client, select the Simulate ONTAP virtual machine that you created.

2. Click the **Summary** tab to view the details about this virtual machine.

3. Click the **Power On** button to start the virtual machine.

4. After the virtual machine is running, open the console to the ONTAP interface:

   - Open the console in a separate window by right-clicking the virtual machine, and then selecting **Open Console**.

   - Open the console within the vSphere Client window by clicking the **Console** tab.

   You must press **Ctrl-Alt** to free the cursor from the console window to perform other tasks.

After you finish

To configure ONTAP, see *ONTAP setup on page 29* and the *ONTAP Software Setup Guide* on the NetApp Support Site at *mysupport.netapp.com*

ONTAP setup

You can set up ONTAP software on Simulate ONTAP virtual machines to test ONTAP features.

You will need to collect information about the network, such as IP addresses, network mask, default gateway, and so on, before setting up the Simulate ONTAP virtual machine.

For complete information about configuring ONTAP, see the *ONTAP Software Setup Guide* and the ONTAP 9.0 Documentation page on the NetApp Support Site at *mysupport.netapp.com*

Configuring your ONTAP simulators

Configuring a cluster of ONTAP simulators involves setting up ONTAP software on one or more simulators. You create the cluster while setting up the first node, and then you join the second node to the cluster while setting up the second node.

You must initialize the simulator to run it for the first time.

Note: The simulator might hang and reboot repeatedly if the initialization steps are not performed correctly.

Booting the first node

You should use the Cluster Setup wizard to create the cluster on the first node. The wizard helps you to configure the cluster network that connects the nodes, create the cluster admin Storage Virtual Machine (SVM, formerly known as Vserver), add feature license keys, and create the node management interface for the first node. You must boot the first node to create the cluster.

Steps

1. Click inside the vSphere Client Console window for the simulator virtual machine, and when the `Press Ctrl-C for Boot Menu` message is displayed, press **Ctrl-C**.

```
NetApp Data ONTAP 8.x.x Cluster-Mode
Copyright (C) 1992-2015 NetApp.
All rights reserved.
running fsck_msdosfs on /cfcard
```

```
md1.uzip: 39168 x 16384 blocks
md2.uzip: 5760 x 16384 blocks
*******************************
*                             *
* Press Ctrl-C for Boot Menu. *
*                             *
*******************************
^C
Boot Menu will be available.
```

Note: You might see disk status messages before the menu appears; ignore such
messages.

When the Boot Menu is displayed, enter **4** and press **Enter**.

```
Please choose one of the following:
(1) Normal Boot.
(2) Boot without /etc/rc.
(3) Change password.
(4) Clean configuration and initialize all disks.
(5) Maintenance mode boot.
(6) Update flash from backup config.
(7) Install new software first.
(8) Reboot node.
Selection (1-8)? 4
```

At the `Zero disk, reset config and install a new file system?` prompt, enter
y and press **Enter**.

```
Zero disks, reset config and install a new file system?: y
```

At the confirmation prompt, enter **y** and press **Enter**.

The VM restarts automatically and begins the reset process.

```
This will erase all the data on the disks, are you sure?: y
Rebooting to finish wipeconfig request.
Skipped backing up /var file system to CF.
```

Note: You must wait until the reset process is completely finished. If you stop the
process, you might corrupt the simulator files (simulator disks) and might be required to
extract them again. After the VM resets, the node setup wizard will start.

Creating the cluster

Creating a cluster enables you to pool the resources and distribute work across the members (nodes) of the cluster, while presenting administrators with a single entity to manage.

Before you begin

You should have obtained a base cluster license and ONTAP feature licenses from the Simulate ONTAP download page.

Steps

1. After the node boots, the Node Setup wizard starts on the console, informing you that AutoSupport will be enabled automatically.

```
Welcome to node setup.

You can enter the following commands at any time:
  "help" or "?" - if you want to have a question clarified,
  "back" - if you want to change previously answered questions, and
  "exit" or "quit" - if you want to quit the setup wizard.
     Any changes you made before quitting will be saved.

To accept a default or omit a question, do not enter a value.

This system will send event messages and weekly reports to NetApp Technical
Support. To disable this feature, enter "autosupport modify -support disable"
within 24 hours. Enabling AutoSupport can significantly speed problem
determination and resolution should a problem occur on your system.
For further information on AutoSupport, see:
http://support.netapp.com/autosupport/

Type yes to confirm and continue {yes}:
```

2. Exit the Node Setup wizard:

   exit

   The Node Setup wizard enables you to configure the node's node management interface for use with System Setup. You do not need to use the Node Setup wizard if you are setting up the cluster in the CLI.

   The Node Setup wizard exits and a login prompt appears, warning that you have not completed the setup tasks:

```
Exiting the node setup wizard. Any changes you made have been saved.

Warning: You have exited the node setup wizard before completing all
of the tasks. The node is not configured. You can complete node setup by
typing "node setup" in the command line interface.

login:
```

3. Log in to the admin account by using the `admin` user name.

4. Start the Cluster Setup wizard:

    cluster setup

```
::> cluster setup

Welcome to the cluster setup wizard.

You can enter the following commands at any time:
  "help" or "?" - if you want to have a question clarified,
  "back" - if you want to change previously answered questions, and
  "exit" or "quit" - if you want to quit the cluster setup wizard.
     Any changes you made before quitting will be saved.

You can return to cluster setup at any time by typing "cluster setup".
To accept a default or omit a question, do not enter a value.

Do you want to create a new cluster or join an existing cluster? {create,
join}:
```

5. When prompted whether you want to create a new cluster or join an existing cluster, enter
    create and press **Enter**.

    ### Example

```
Welcome to the cluster setup wizard.

You can enter the following commands at any time:
"help" or "?" - if you want to have a question clarified,
"back" - if you want to change previously answered questions, and
"exit" or "quit" - if you want to quit the cluster setup wizard.
Any changes you made before quitting will be saved.

You can return to cluster setup at any time by typing "cluster setup".
To accept a default or omit a question, do not enter a value.

Do you want to create a new cluster or join an existing cluster?
{create}:
```

```
create
```

6. When prompted whether you want to use the system default values, press **Enter** to accept the default answer **yes**.

   The default answer, when available, is shown in brackets.

   Example

   ```
   System Defaults:
   Private cluster network ports [e0a].
   Cluster port MTU values will be set to 1500.
   Cluster interface IP addresses will be automatically generated.

   Do you want to use these defaults? {yes, no} [yes]: <Enter>
   ```

   When prompted for an "admin" password, enter a strong password with numbers and letters and confirm.

   Write your password in the space provided and do not lose it.

   Password: _____

   After the cluster interfaces are created, enter a name for your cluster.

   Example

   ```
   It can take several minutes to create cluster interfaces...
   Step 1 of 5: Create a Cluster
   You can type "back", "exit", or "help" at any question.

   Enter the cluster name: cluster1
   ```

   When prompted for the cluster base license key, enter the base license you downloaded (**do not** enter the characters in the example).

   Example

   ```
   Enter the cluster base license key: A2A4A6A8AB2AAAAAAAAAAAAA
   ```

When prompted to enter feature licenses, press **Enter** to continue.

You can add ONTAP feature licenses later. You must temporarily exit the configuration steps to locate the VMware IP addresses that were created during the virtual machine installation.

    a)   Press **Ctrl+Alt** to exit the Console window and return to the Windows operating system.

    b)   Open a Windows command prompt and enter `ipconfig`.

    c)   Find and record the VMnet1 (Host-only) IPv4 address and subnet mask.

        You must assign IP addresses to the simulator ports in the VMnet1 subnet (for example 192.168.65.20).

        VMnet1 IPv4 Address: _____

        VMnet1 Subnet Mask: _____

Example

The following example is specific to the VMware Player environment. You should configure IP addresses for the e0c and e0d ports based on your network settings.

```
Ethernet adapter VMware Network Adapter VMnet1:
Connection-specific DNS Suffix.:
Link-local IPv6 Address........: fe80::e95e:d77a:1b5b:a70dz22
IPv4 Address...................: 192.168.x.20
Subnet Mask....................: 255.255.255.0
Default Gateway................:
```

Return to the vSphere Console window for the simulator, and then enter the following values to define the cluster management port using the information you gathered in the previous step:

- Enter the cluster management interface port [e0d]: e0c

- Enter the cluster management interface IP address: 192.168.x.20 (x =your subnet)

- Enter the cluster management interface netmask: 255.255.255.0

- Enter the cluster management interface default gateway: (leave blank)

```
Enter the cluster management interface port [e0d]: e0c
```

```
Enter the cluster management interface IP address: 192.168.x.20
Enter the cluster management interface netmask: 255.255.255.0
Enter the cluster management interface default gateway: <Enter>

A cluster management interface on port e0c with IP address 192.168.x.
20 has been created.
You can use this address to connect to and manager the cluster.

Enter the DNS domain names: <Enter>
```

You connect to and manage the cluster using the cluster management interface IP address. Enter that IP address in the space provided below:

Cluster Management Interface: _____

Note: The preceding example is specific to the VMware Player environment. You should configure IP addresses for the e0c and e0d ports based on your network settings.

Press **Enter** when prompted for the DNS domain names to continue to the next step.

When prompted for a location of the controller, enter the type of location; for example, the name of the building or the lab, and press **Enter** to continue.

Example

```
Where is the controller located []: lab2
```

Enter the following values to define the node management port using the information you gathered in the previous steps:

- Enter the node management interface port [e0c]: e0c

- Enter the node management interface IP address: 192.168.x.21 (x is your subnet)

- Enter the node management interface netmask: 255.255.255.0

- Enter the node management interface default gateway: <Enter>

Example

The following example is specific to the VMware Player environment. You should configure IP addresses for the e0c and e0d ports based on your network settings.

```
Enter the node management interface port [e0c]: <Enter>
Enter the node management interface IP address: 192.168.x.21
Enter the node management interface netmask: 255.255.255.0
Enter the node management interface default gateway: <Enter>
A node management interface on port e0c with IP address 192.168.x.21
has been created.
```

The setup wizard continues to create the node management interface. Press **Enter** to continue.

Cluster setup is now complete.

To test the cluster, enter the `cluster show` command.

```
login: admin
Password: <password you defined>

cluster1::> cluster show
Node                 Health  Eligibility
-------------------- ------- ------------
cluster1-01          true    true
1 entry is displayed.
```

Add the unassigned disks to the node:

storage disk assign –all true –node cluster1-01

The simulator should not be shut down at this time. The console window can be minimized while you set up the second node in the cluster (if required).

Configuring serial number and system ID for the second node

You must perform an additional step on the second node because the storage system ID is hardcoded in the provided Simulate ONTAP image. Each Simulate ONTAP node in a cluster must have a unique System ID.

Steps

1. Register the second virtual machine from the `.ova` file described in *Downloading Simulate ONTAP software* on page 6.

   Change the System ID and serial number of the second node before joining the cluster.

   Press the space bar when the `Hit [Enter] to boot immediately, or any other key for command prompt. Booting in 10 seconds...` message is displayed.

You should see a VLOADER> prompt.

Change the Serial Number and System ID for this node:

```
VLOADER> setenv SYS_SERIAL_NUM 4034389-06-2
VLOADER> setenv bootarg.nvram.sysid 4034389062
```

Verify that the information was saved correctly:

```
VLOADER> printenv SYS_SERIAL_NUM
VLOADER> printenv bootarg.nvram.sysid
```

Enter the boot command to boot the node:

```
VLOADER> boot
```

The simulator begins the boot process with the new system ID and serial number.

Booting the second node

You must reboot the node to configure it and to connect it to the cluster.

Steps

1. When the Press Ctrl-C for Boot Menu message is displayed, press **Ctrl-C** to display the Boot Menu.

```
NetApp Data ONTAP 8.x.x Cluster-Mode
Copyright (C) 1992-2015 NetApp.
All rights reserved.
******************************
*                            *
* Press Ctrl-C for Boot Menu. *
*                            *
******************************
^C
Boot Menu will be available.
```

When the Boot Menu is displayed, enter **4** (to initialize all disks) and press **Enter**.

```
Please choose one of the following:

(1) Normal Boot.
(2) Boot without /etc/rc.
(3) Change password.
(4) Clean configuration and initialize all disks.
(5) Maintenance mode boot.
```

```
(6) Update flash from backup config.
(7) Install new software first.
(8) Reboot node.
Selection (1-8)? 4
```

Enter **y** and press **Enter** at the prompt `Zero disk, reset config and install a new file system?`

```
Zero disks, reset config and install a new file system?: y
```

At the confirmation prompt, enter y and press **Enter**.

```
This will erase all the data on the disks, are you sure?: y
Rebooting to finish wipeconfig request.
```

Result

The virtual machine restarts automatically and begins the reset process. You must wait until the reset process is complete. If you interrupt the process, you might corrupt the simulator files (simulator disks) and you might have to register them again.

Joining the node to the cluster

After creating a cluster, for each remaining node, you use the Cluster Setup wizard to join the node to the cluster and create the node's management interface.

Steps

1. Join the cluster you created earlier by entering the **join** command and pressing **Enter**.

   The cluster setup wizard is displayed.

```
Welcome to the cluster setup wizard.

You can enter the following commands at any time:
"help" or "?" - if you want to have a question clarified,
"back" - if you want to change previously answered questions, and
"exit" or "quit" - if you want to quit the cluster setup wizard.
Any changes you made before quitting will be saved.

You can return to cluster setup at any time by typing "cluster setup".
To accept a default or omit a question, do not enter a value.
```

```
Do you want to create a new cluster or join an existing cluster?
{join}:
join
```

When asked to use the system default values, press **Enter** to accept the default answer, which
is **yes.**

```
System Defaults:
Private cluster network ports [e0a].
Cluster port MTU values will be set to 1500.
Cluster interface IP addresses will be automatically generated.

Do you want to use these defaults? {yes, no} [yes]: <Enter>
```

After the cluster interfaces are created, enter the name of the cluster you want to join. Press
Enter to join "cluster1".

```
It can take several minutes to create cluster interfaces...
Step 1 of 3: Join an Existing Cluster
You can type "back", "exit", or "help" at any question.

Enter the name of the cluster you would like to join [cluster1]:
<Enter>
```

Wait while node 2 joins the cluster.

Enter the following values to define the node interface using the information you gathered
when setting up the first node:

You must ensure that you enter a unique IP for node management interface (22, as shown
below).

- Enter the node management interface port [e0c]: e0c

- Enter the node management interface IP address: 192.168.x.22 (x=your subnet)

- Enter the node management interface netmask: 255.255.255.0

- Enter the node management default gateway: (leave blank)

```
Step 3 of 3: Set Up the Node
You can type "back", "exit", or "help" at any question.

Enter the node management interface port [e0c]: <Enter>
Enter the node management interface IP address: 192.168.x.22
```

```
Enter the node management interface netmask [255.255.255.0]: <Enter>
Enter the node management interface default gateway: <Enter>
```

Note: You should configure IP addresses for the e0c and e0d ports based on your network settings.

The setup wizard will continue to create the node management interface. Press **Enter** to continue.

The cluster setup is now complete.

To test the cluster, enter the cluster show command.

There will now be two nodes in the cluster.

```
cluster1::> cluster show
Node          Health Eligibility
------------- ------ -----------
cluster1-01   true   true
cluster1-02   true   true
2 entries were displayed.
```

To assign ownership of unowned disks to a specific node, enter the following command:

```
> storage disk assign –all true –node cluster1-02
```

You have completed a two-node cluster setup. The console window can be minimized, but the simulator should not be shut down at this time.

Disabling root snapshots

Root snapshots consume a large amount of space on the root volume with snapshots of log files. If you are concerned about running out of space on your root volume, you should disable root snapshots before creating aggregates and volumes.

Steps

1. From the command line, enter **run local**.
   This takes you into the nodeshell.

2. Delete all existing snapshots on the root volume and suppress confirmation request.

   snap delete –a –f vol0

3. Disable the automatic snapshot schedule.

   ```
   snap sched vol0 0 0 0
   ```

4. Enable snapshot autodelete.

   ```
   snap autodelete vol0 on
   ```

5. Set the snapshot autodelete threshold to 35% for the volume free space.
   This guarantees the volume has a minimum of free space equal to 35% of its overall size.

   ```
   snap autodelete vol0 target_free_space 35
   ```

6. Confirm the autodelete has been configured correctly.

   ```
   snap autodelete vol0
   ```

Expanding the root volume size

If your root volume is too small, you can expand it. Your root aggregate must have enough free space to accommodate an increase in the size of your root volume.

Steps

1. If necessary, add more disks to your root aggregate to increase its size and accommodate the additional space needed in your root volume.

   ```
   storage aggregate add-disks -aggregate aggr0 -diskcount <n>
   ```

2. Set the root volume to a new size.

   ```
   volume size -vserver <vserver_name> -volume vol0 -new-size <new_size>
   ```

3. View the root volume size details to verify the new size.

   ```
   volume show -volume vol0
   ```

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