Deploy the ASAv Using VMware

You can deploy the ASAv using VMware.

- VMware Feature Support for the ASAv, page 11
- Prerequisites for the ASAv and VMware, page 12
- Guidelines for the ASAv and VMware, page 12
- Unpack the ASAv Software and Create a Day 0 Configuration File for VMware, page 14
- Deploy the ASAv Using the VMware vSphere Web Client, page 17
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- Access the ASAv Console, page 23
- Upgrade the vCPU or Throughput License, page 25
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- Increasing Performance on ESXi Configurations, page 30

VMware Feature Support for the ASAv

Table 1 on page 11 lists the VMware feature support for the ASAv.

Table 1 VMware Feature Support for the ASAv

Feature	Description	Support (Yes/No)	Comment
Cold clone	The VM is powered off during cloning.	Yes	–
DRS	Used for dynamic resource scheduling and distributed power management.	Yes	See VMware guidelines.
Hot add	The VM is running during an addition.	No	–
Hot clone	The VM is running during cloning.	No	–
Hot removal	The VM is running during removal.	No	–
Snapshot	The VM freezes for a few seconds.	Yes	Use with care. You may lose traffic. Failover may occur.
Suspend and resume	The VM is suspended, then resumed.	Yes	–
vCloud Director	Allows automated deployment of VMs.	No	–
VM migration	The VM is powered off during migration.	Yes	–
vMotion	Used for live migration of VMs.	Yes	Use shared storage. See vMotion Guidelines, page 13.
VMware FT	Used for HA on VMs.	No	Use ASAv failover for ASAv VM failures.

Table 1 VMware Feature Support for the ASAv (continued)

Feature	Description	Support (Yes/No)	Comment
VMware HA	Used for ESX and server failures.	Yes	Use ASAv failover for ASAv VM failures.
VMware HA with VM heartbeats	Used for VM failures.	No	Use ASAv failover for ASAv VM failures.
VMware vSphere Standalone Windows Client	Used to deploy VMs.	Yes	—
VMware vSphere Web Client	Used to deploy VMs.	Yes	—

Prerequisites for the ASAv and VMware

You can deploy the ASAv using the VMware vSphere Web Client, vSphere standalone client, or the OVF tool. See Cisco ASA Compatibility for system requirements.

Security Policy for a vSphere Standard Switch

For a vSphere switch, you can edit Layer 2 security policies and apply security policy exceptions for port groups used by the ASAv interfaces. See the following default settings:

- Promiscuous Mode: **Reject**
- MAC Address Changes: **Accept**
- Forged Transmits: **Accept**

You may need to modify these settings for the following ASAv configurations. See the vSphere documentation for more information.

Table 2 Port Group Security Policy Exceptions

Security Exception	Routed Firewall Mode		Transparent Firewall Mode	
	No Failover	Failover	No Failover	Failover
Promiscuous Mode	<Any>	<Any>	Accept	Accept
MAC Address Changes	<Any>	Accept	<Any>	Accept
Forged Transmits	<Any>	Accept	Accept	Accept

Guidelines for the ASAv and VMware

OVF File Guidelines

The selection of the asav-vi.ovf or asav-esxi.ovf file is based on the deployment target:

- asav-vi—For deployment on vCenter
- asav-esxi—For deployment on ESXi (no vCenter)
- The ASAv OVF deployment does not support localization (installing the components in non-English mode). Be sure that the VMware vCenter and the LDAP servers in your environment are installed in an ASCII-compatible mode.
- You must set your keyboard to United States English before installing the ASAv and for using the VM console.

Failover Guidelines

- For failover deployments, make sure that the standby unit has the same model license; for example, both units should be ASAv30s.

Memory and vCPU Allocation for Throughput and Licensing

- The memory allocated to the ASAv is sized specifically for the Throughput Level. Do not change the memory setting or any vCPU hardware settings in the **Edit Settings** dialog box unless you are requesting a license for a different Throughput Level. Under-provisioning can affect performance, and over-provisioning causes the ASAv to warn you that it will reload; after a waiting period (24 hours for 100-125% over-provisioning; 1 hour for 125% and up), the ASAv will reload.

  Note: If you need to change the memory or vCPU hardware settings, use only the values documented in Smart Software Licensing for the ASAv, page 6. Do not use the VMware-recommended memory configuration minimum, default, and maximum values.

  In some situations, the ASAv5 may experience memory exhaustion. This can occur during certain resource heavy applications, such as enabling AnyConnect or downloading files. Console messages related to spontaneous reboots or critical syslogs related to memory usage are symptoms of memory exhaustion. In these cases, you can enable the ASAv5 to be deployed in a VM with 1.5 GB of memory. To change from 1GB to 1.5GB, power down your VM, modify the memory, and power the VM back on.

CPU Reservation

- By default the CPU reservation for the ASAv is 1000 MHz. You can change the amount of CPU resources allocated to the ASAv by using the shares, reservations, and limits settings (**Edit Settings > Resources > CPU**). Lowering the CPU Reservation setting from 1000 Mhz can be done if the ASAv can perform its required purpose while under the required traffic load with the lower setting. The amount of CPU used by an ASAv depends on the hardware platform it is running on as well as the type and amount of work it is doing.

  You can view the host’s perspective of CPU usage for all of your virtual machines from the **CPU Usage (MHz)** chart, located in the **Home** view of the Virtual Machine **Performance** tab. Once you establish a benchmark for CPU usage when the ASAv is handling typical traffic volume, you can use that information as input when adjusting the CPU reservation.

  See the CPU Performance Enhancement Advice published by VMware for more information.

- You can use the ASAv **show vm** and **show cpu** commands or the ASDM **Home > Device Dashboard > Device Information > Virtual Resources** tab or the **Monitoring > Properties > System Resources Graphs > CPU** pane to view the resource allocation and any resources that are over- or under-provisioned.

IPv6 Guidelines

- You cannot specify IPv6 addresses for the management interface when you first deploy the ASAv OVF file using the VMware vSphere Web Client; you can later add IPv6 addressing using ASDM or the CLI.

vMotion Guidelines

- We recommend that you only use shared storage if you plan to use vMotion. During ASAv deployment, if you have a host cluster you can either provision storage locally (on a specific host) or on a shared host. However, if you try to vMotion the ASAv to another host, using local storage will produce an error.

Transparent Mode on UCS B Series Hardware Guidelines

MAC flaps have been observed in some ASAv configurations running in transparent mode on Cisco UCS B Series hardware. When MAC addresses appear from different locations you will get dropped packets.

The following guidelines help prevent MAC flaps when you deploy the ASAv in transparent mode in VMware environments:

- VMware NIC teaming—If deploying the ASAv in transparent mode on UCS B Series, the Port Groups used for the Inside and Outside interfaces must have only 1 Active Uplink, and that uplink must be the same. You configure VMware NIC teaming in vCenter.

  See the VMware documentation for complete information on how to configure NIC teaming.

- ARP inspection—Enable ARP inspection on the ASAv and statically configure the MAC and ARP entry on the interface you expect to receive it on.

  See the Cisco ASA Series General Operations Configuration Guide for information about ARP inspection and how to enable it.

Unpack the ASAv Software and Create a Day 0 Configuration File for VMware

You can prepare a Day 0 configuration file before you launch the ASAv. This file is a text file that contains the ASAv configuration that will be applied when the ASAv is launched. This initial configuration is placed into a text file named “day0-config” in a working directory you chose, and is manipulated into a day0.iso file that is mounted and read on first boot. At the minimum, the Day 0 configuration file must contain commands that will activate the management interface and set up the SSH server for public key authentication, but it can also contain a complete ASA configuration. A default day0.iso containing an empty day0-config is provided with the release.

The day0.iso file (either your custom day0.iso or the default day0.iso) must be available during first boot:

- To automatically license the ASAv during initial deployment, place the Smart Licensing Identity (ID) Token that you downloaded from the Cisco Smart Software Manager in a text file named ‘idtoken’ in the same directory as the Day 0 configuration file.
- If you want to access and configure the ASAv from the serial port on the hypervisor instead of the virtual VGA console, you should include the **console serial** setting in the Day 0 configuration file to use the serial port on first boot.
- If you want to deploy the ASAv in transparent mode, you must use a known running ASA config file in transparent mode as the Day 0 configuration file. This does not apply to a Day 0 configuration file for a routed firewall.

Note: We are using Linux in this example, but there are similar utilities for Windows.

Procedure

1. Download the ZIP file from Cisco.com, and save it to your local disk:

   http://www.cisco.com/go/asa-software

   Note: A Cisco.com login and Cisco service contract are required.

2. Unzip the file into a working directory. Do not remove any files from the directory. The following files are included:

   – asav-vi.ovf—For vCenter deployments.

   – asav-esxi.ovf—For non-vCenter deployments.

   – boot.vmdk—Boot disk image.

   – disk0.vmdk—ASAv disk image.

   – day0.iso—An ISO containing a day0-config file and optionally an idtoken file.

   – asav-vi.mf—Manifest file for vCenter deployments.

   – asav-esxi.mf—Manifest file for non-vCenter deployments.

3. Enter the CLI configuration for the ASAv in a text file called “day0-config”. Add interface configurations for the three interfaces and any other configuration you want.

The fist line should begin with the ASA version. The day0-config should be a valid ASA configuration. The best way to generate the day0-config is to copy the desired parts of a running config from an existing ASA or ASAv. The order of the lines in the day0-config is important and should match the order seen in an existing **show run** command output.

We provide two examples of the day0-config file. The first example shows a day0-config when deploying an ASAv with Gigabit Ethernet interfaces. The second example shows a day0-config when deploying an ASAv with 10 Gigabit Ethernet interfaces. You would use this day0-config to deploy an ASAv50 with SR-IOV interfaces; see SR-IOV Interface Provisioning, page 26.

Example 1–ASAv day0-config with Gigabit Ethernet interfaces:

```
ASA Version 9.9.1
!
console serial
interface management0/0
nameif management
security-level 100
ip address 192.168.1.1 255.255.255.0
no shutdown
!
interface gigabitethernet0/0
nameif inside
security-level 100
ip address 10.1.1.2 255.255.255.0
no shutdown
!
interface gigabitethernet0/1
nameif outside
security-level 0
ip address 198.51.100.2 255.255.255.0
no shutdown
!
http server enable
http 192.168.1.0 255.255.255.0 management
crypto key generate rsa modulus 1024
username AdminUser password paSSw0rd
ssh 192.168.1.0 255.255.255.0 management
aaa authentication ssh console LOCAL
call-home
http-proxy 10.1.1.1 port 443
license smart
feature tier standard
throughput level 2G
```

Example 2–ASAv day0-config with 10 Gigabit Ethernet interfaces:

```
ASA Version 9.9.1
!
console serial
interface management 0/0
management-only
nameif management
security-level 0
ip address 192.168.0.230 255.255.255.0
!
interface TenGigabitEthernet0/0
nameif inside
security-level 100
ip address 10.10.10.10 255.255.255.0
ipv6 address 2001:10::1/64
!
interface TenGigabitEthernet0/1
```

```
nameif outside
security-level 0
ip address 10.10.20.10 255.255.255.0
ipv6 address 2001:20::1/64
!
route management 0.0.0.0 0.0.0.0 192.168.0.254
!
username cisco password cisco123 privilege 15
!
aaa authentication ssh console LOCAL
ssh 0.0.0.0 0.0.0.0 management
ssh timeout 60
ssh version 2
!
http 0.0.0.0 0.0.0.0 management
!
logging enable
logging timestamp
logging buffer-size 99999
logging buffered debugging
logging trap debugging
!
dns domain-lookup management
DNS server-group DefaultDNS
    name-server 64.102.6.247
!
license smart
feature tier standard
throughput level 10G
!
crypto key generate rsa modulus 2048
```

4. (Optional) Download the Smart License identity token file issued by the Cisco Smart Software Manager to your PC.

5. (Optional) Copy the ID token from the download file and put it in a text file named ‘idtoken’ that only contains the ID token.

   The Identity Token automatically registers the ASAv with the Smart Licensing server, and needs to be placed in the same working directory with the day0.iso file; see step 2. on page 14.

6. Generate the virtual CD-ROM by converting the text file to an ISO file:

```
stack@user-ubuntu:-/KvmAsa$ sudo genisoimage -r -o day0.iso day0-config idtoken
I: input-charset not specified, using utf-8 (detected in locale settings)
Total translation table size: 0
Total rockridge attributes bytes: 252
Total directory bytes: 0
Path table size (byptes): 10
Max brk space used 0
176 extents written (0 MB)
stack@user-ubuntu:-/KvmAsa$
```

7. Compute a new SHA1 value on Linux for the day0.iso:

```
openssl dgst -sha1 day0.iso
SHA1(day0.iso)= e5bee36e1eb1a2b109311c59e2f1ec9f731ecb66 day0.iso
```

8. Include the new checksum in the asav-vi.mf file in the working directory and replace the day0.iso SHA1 value with the newly generated one.

   Example.mf file

```
SHA1(asav-vi.ovf)= de0f1878b8f1260e379ef853db4e790c8e92f2b2
SHA1(disk0.vmdk)= 898b26891cc68fa0c94ebd91532fc450da418b02
SHA1(boot.vmdk)= 6b0000ddebfc38ccc99ac2d4d5dbfb8abfb3d9c4
```

```
SHA1(day0.iso)= e5bee36e1eb1a2b109311c59e2f1ec9f731ecb66
```

9. Copy the day0.iso file into the directory where you unzipped the ZIP file. You will overwrite the default (empty) day0.iso file.

   When any VM is deployed from this directory, the configuration inside the newly generated day0.iso is applied.

Deploy the ASAv Using the VMware vSphere Web Client

This section describes how to deploy the ASAv using the VMware vSphere Web Client. The Web Client requires vCenter. If you do not have vCenter, see Deploy the ASAv Using the VMware vSphere Standalone Client and a Day 0 Configuration, page 21 or Deploy the ASAv Using the OVF Tool and Day 0 Configuration, page 22.

- Access the vSphere Web Client and Install the Client Integration Plug-In, page 17
- Deploy the ASAv Using the VMware vSphere Web Client, page 18

Access the vSphere Web Client and Install the Client Integration Plug-In

This section describes how to access the vSphere Web Client. This section also describes how to install the Client Integration Plug-In, which is required for ASAv console access. Some Web Client features (including the plug-in) are not supported on the Macintosh. See the VMware website for complete client support information.

Procedure

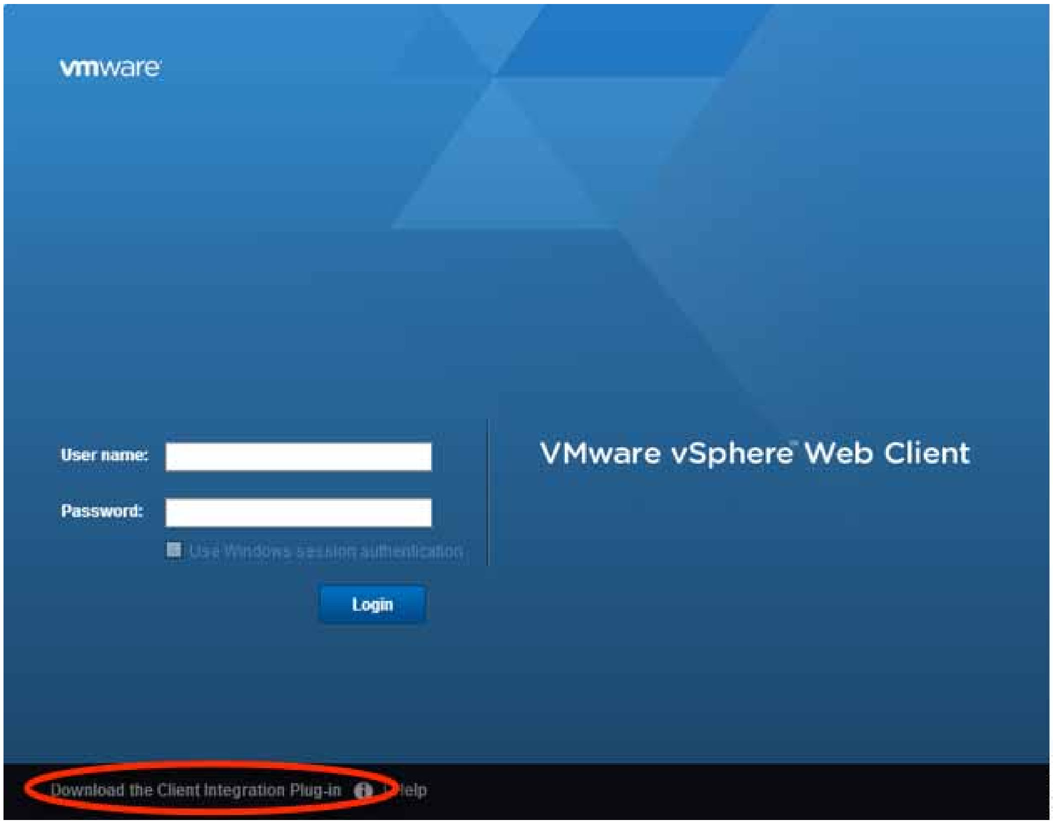
1. Launch the VMware vSphere Web Client from your browser:

   https://*vCenter_server***:***port***/vsphere-client/**

   By default, the port is 9443.

2. (One time only) Install the Client Integration Plug-in so that you can access the ASAv console.

   a. In the login screen, download the plug-in by clicking **Download the Client Integration Plug-in**.


vmware
User name:
Password:
Use Windows session authentication
Login
VMware vSphere Web Client
Download the Client Integration Plug-in
Help
371290

b. Close your browser and then install the plug-in using the installer.

c. After the plug-in installs, reconnect to the vSphere Web Client.

3. Enter your username and password, and click **Login**, or check the **Use Windows session authentication** check box (Windows only).

Deploy the ASAv Using the VMware vSphere Web Client

To deploy the ASAv, use the VMware vSphere Web Client (or the vSphere Client) and a template file in the open virtualization format (OVF). You use the Deploy OVF Template wizard in the vSphere Web Client to deploy the Cisco package for the ASAv. The wizard parses the ASAv OVF file, creates the virtual machine on which you will run the ASAv, and installs the package.

Most of the wizard steps are standard for VMware. For additional information about the Deploy OVF Template, see the VMware vSphere Web Client online help.

Before You Begin

You must have at least one network configured in vSphere (for management) before you deploy the ASAv.

Procedure

1. Download the ASAv ZIP file from Cisco.com, and save it to your PC:

   http://www.cisco.com/go/asa-software

   Note: A Cisco.com login and Cisco service contract are required.

2. In the vSphere Web Client **Navigator** pane, click **vCenter**.

3. Click **Hosts and Clusters**.

4. Right-click the data center, cluster, or host where you want to deploy the ASAv, and choose **Deploy OVF Template**.

   The **Deploy OVF Template** wizard appears.

5. Follow the wizard screens as directed.

6. In the **Setup networks** screen, map a network to each ASAv interface that you want to use.

   The networks may not be in alphabetical order. If it is too difficult to find your networks, you can change the networks later from the Edit Settings dialog box. After you deploy, right-click the ASAv instance, and choose **Edit Settings** to access the **Edit Settings** dialog box. However that screen does not show the ASAv interface IDs (only Network Adapter IDs). See the following concordance of Network Adapter IDs and ASAv interface IDs:

Network Adapter ID	ASAv Interface ID
Network Adapter 1	Management0/0
Network Adapter 2	GigabitEthernet0/0
Network Adapter 3	GigabitEthernet0/1
Network Adapter 4	GigabitEthernet0/2
Network Adapter 5	GigabitEthernet0/3
Network Adapter 6	GigabitEthernet0/4
Network Adapter 7	GigabitEthernet0/5
Network Adapter 8	GigabitEthernet0/6
Network Adapter 9	GigabitEthernet0/7
Network Adapter 10	GigabitEthernet0/8

   You do not need to use all ASAv interfaces; however, the vSphere Web Client requires you to assign a network to all interfaces. For interfaces you do not intend to use, you can simply leave the interface disabled within the ASAv configuration. After you deploy the ASAv, you can optionally return to the vSphere Web Client to delete the extra interfaces from the Edit Settings dialog box. For more information, see the vSphere Web Client online help.

   Note: For failover/HA deployments, GigabitEthernet 0/8 is pre-configured as the failover interface.

7. If your network uses an HTTP proxy for Internet access, you must configure the proxy address for smart licensing in the **Smart Call Home Settings** area. This proxy is also used for Smart Call Home in general.

8. For failover/HA deployments, in the **Customize template** screen:

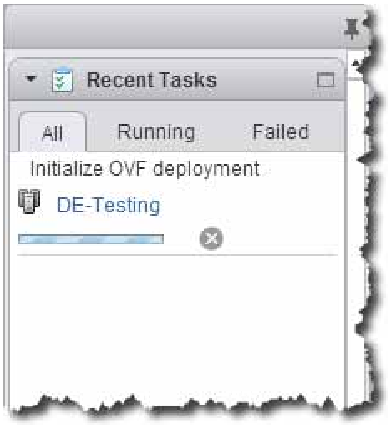
   – Specify the standby management IP address.

     When you configure your interfaces, you must specify an active IP address and a standby IP address on the same network. When the primary unit fails over, the secondary unit assumes the IP addresses and MAC addresses of the primary unit and begins passing traffic. The unit that is now in a standby state takes over the standby IP addresses and MAC addresses. Because network devices see no change in the MAC to IP address pairing, no ARP entries change or time out anywhere on the network.

   – Configure the failover link settings in the **HA Connection Settings** area.

     The two units in a failover pair constantly communicate over a failover link to determine the operating status of each unit. GigabitEthernet 0/8 is pre-configured as the failover link. Enter the active and standby IP addresses for the link on the same network.

9. After you complete the wizard, the vSphere Web Client processes the VM; you can see the “Initialize OVF deployment” status in the **Global Information** area **Recent Tasks** pane.

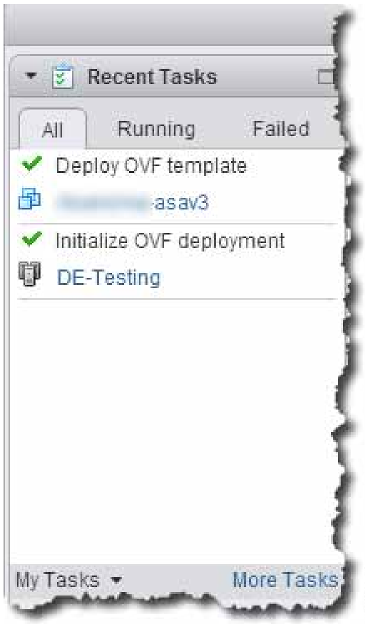


Initialize OVF deployment

DE-Testing

371279

When it is finished, you see the Deploy OVF Template completion status.



✓ Deploy OVF template

[redacted]-asav3

✓ Initialize OVF deployment

DE-Testing

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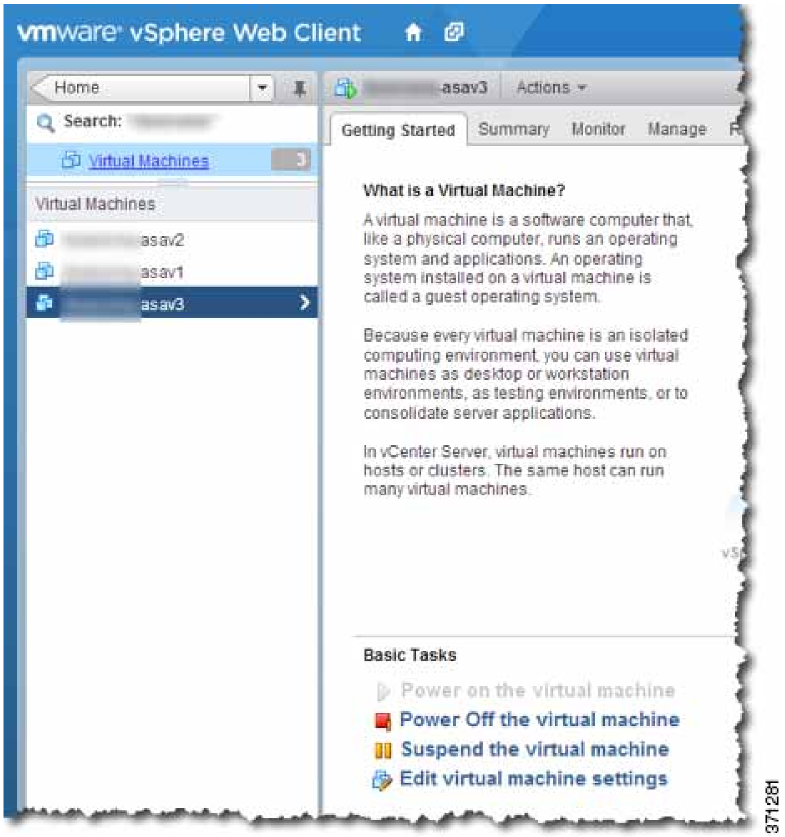
The ASAv VM instance then appears under the specified data center in the Inventory.



What is a Virtual Machine?

A virtual machine is a software computer that, like a physical computer, runs an operating system and applications. An operating system installed on a virtual machine is called a guest operating system.

Because every virtual machine is an isolated computing environment, you can use virtual machines as desktop or workstation environments, as testing environments, or to consolidate server applications.

In vCenter Server, virtual machines run on hosts or clusters. The same host can run many virtual machines.

Basic Tasks

- Power on the virtual machine
- Power Off the virtual machine
- Suspend the virtual machine
- Edit virtual machine settings

10. If the ASAv VM is not yet running, click **Power On the virtual machine**.

    Wait for the ASAv to boot up before you try to connect with ASDM or to the console. When the ASAv starts up for the first time, it reads parameters provided through the OVF file and adds them to the ASAv system configuration. It then automatically restarts the boot process until it is up and running. This double boot process only occurs when you first deploy the ASAv. To view bootup messages, access the ASAv console by clicking the **Console** tab.

11. For failover/HA deployments, repeat this procedure to add the secondary unit. See the following guidelines:

    – Set the same throughput level as the primary unit.

    – Enter the *exact same IP address settings* as for the primary unit. The bootstrap configurations on both units are identical except for the parameter identifying a unit as primary or secondary.

Note: To successfully register the ASAv with the Cisco Licensing Authority, the ASAv requires Internet access. You might need to perform additional configuration after deployment to achieve Internet access and successful license registration.

Deploy the ASAv Using the VMware vSphere Standalone Client and a Day 0 Configuration

To deploy the ASAv, use the VMware vSphere Client and the open virtualization format (OVF) template file (asav-vi.ovf for a vCenter deployment or asav-esxi.ovf for a non-vCenter deployment). You use the Deploy OVF Template wizard in the vSphere Client to deploy the Cisco package for the ASAv. The wizard parses the ASAv OVF file, creates the virtual machine on which you will run the ASAv, and installs the package.

Most of the wizard steps are standard for VMware. For additional information about the Deploy OVF Template wizard, see the VMware vSphere Client online help.

Before You Begin

- You must have at least one network configured in vSphere (for management) before you deploy the ASAv.
- Follow the steps in Unpack the ASAv Software and Create a Day 0 Configuration File for VMware, page 14 to create the Day 0 configuration.

Procedure

1. Launch the VMware vSphere Client and choose **File > Deploy OVF Template**.

   The Deploy OVF Template wizard appears.

2. Browse to the working directory where you unzipped the asav-vi.ovf file and select it.

3. The OVF Template details are shown. Proceed through the following screens. You do not have to change any configuration if you choose to use the Day 0 configuration file.

4. A summary of the deployment settings is shown in the last screen. Click **Finish** to deploy the VM.

5. Power on the ASAv, open the VMware console, and wait for the second boot.

6. SSH to the ASAv and complete your desired configuration. If you didn’t have all the configuration that you wanted in the Day 0 configuration file, open a VMware console and complete the necessary configuration.

   The ASAv is now fully operational.

Deploy the ASAv Using the OVF Tool and Day 0 Configuration

Before You Begin

- The day0.iso file is required when you are deploying the ASAv using the OVF tool. You can use the default empty day0.iso file provided in the ZIP file, or you can use a customized Day 0 configuration file that you generate. See Unpack the ASAv Software and Create a Day 0 Configuration File for VMware, page 14 for creating a Day 0 configuration file.
- Make sure the OVF tool is installed on a Linux or Windows PC and that it has connectivity to your target ESXi or vCenter server.
- You cannot use the OVF tool when deploying an ASAv50 utilizing SR-IOV 10 Gbps interfaces due to a hardware version compatibility issue; see Upgrade of the Compatibility Level for Virtual Machines, page 29.

Procedure

1. Verify the OVF tool is installed:

   ```
   linuxprompt# which ovftool
   ```

2. Create a .cmd file with the desired deployment options:

   Example:

   ```
   linuxprompt# cat launch.cmd
   ovftool \
   --name="asav-941-demo" \
   --powerOn \
   --deploymentOption=ASAv30 \
   --diskMode=thin \
   --datastore=datastore1 \
   --acceptAllEulas \
   --net:Management0-0="Portgroup_Mgmt" \
   --net:GigabitEthernet0-1="Portgroup_Inside" \
   --net:GigabitEthernet0-0="Portgroup_Outside" \
   ```

```
--prop:HARole=Standalone \
asav-esxi.ovf \
vi://root@10.1.2.3/
```

3. Execute the cmd file:

   ```
   linuxprompt# ./launch.cmd
   ```

   The ASAv is powered on; wait for the second boot.

4. SSH to the ASAv to complete configuration as desired. If more configuration is required, open the VMware console to the ASAv and apply the necessary configuration.

   The ASAv is now fully operational.

Access the ASAv Console

In some cases with ASDM, you may need to use the CLI for troubleshooting. By default, you can access the built-in VMware vSphere console. Alternatively, you can configure a network serial console, which has better capabilities, including copy and paste.

- Use the VMware vSphere Console, page 23
- Configure a Network Serial Console Port, page 24

Use the VMware vSphere Console

For initial configuration or troubleshooting, access the CLI from the virtual console provided through the VMware vSphere Web Client. You can later configure CLI remote access for Telnet or SSH.

Before You Begin

For the vSphere Web Client, install the Client Integration Plug-In, which is required for ASAv console access.

Procedure

1. In the VMware vSphere Web Client, right-click the ASAv instance in the Inventory, and choose **Open Console**. Or you can click **Launch Console** on the **Summary** tab.

2. Click in the console and press **Enter**. Note: Press **Ctrl + Alt** to release the cursor.

   If the ASAv is still starting up, you see bootup messages.

   When the ASAv starts up for the first time, it reads parameters provided through the OVF file and adds them to the ASAv system configuration. It then automatically restarts the boot process until it is up and running. This double boot process only occurs when you first deploy the ASAv.

   Note: Until you install a license, throughput is limited to 100 Kbps so that you can perform preliminary connectivity tests. A license is required for regular operation. You also see the following messages repeated on the console until you install a license:

   ```
   Warning: ASAv platform license state is Unlicensed.
   Install ASAv platform license for full functionality.
   ```

   You see the following prompt:

   ```
   ciscoasa>
   ```

   This prompt indicates that you are in user EXEC mode. Only basic commands are available from user EXEC mode.

3. Access privileged EXEC mode:

```
ciscoasa> enable
```

The following prompt appears:

```
Password:
```

4. Press the **Enter** key to continue. By default, the password is blank. If you previously set an enable password, enter it instead of pressing Enter.

   The prompt changes to:

   ```
   ciscoasa#
   ```

   All non-configuration commands are available in privileged EXEC mode. You can also enter configuration mode from privileged EXEC mode.

   To exit privileged mode, enter the **disable**, **exit**, or **quit** command.

5. Access global configuration mode:

   ```
   ciscoasa# configure terminal
   ```

   The prompt changes to the following:

   ```
   ciscoasa(config)#
   ```

   You can begin to configure the ASAv from global configuration mode. To exit global configuration mode, enter the **exit**, **quit**, or **end** command.

Configure a Network Serial Console Port

For a better console experience, you can configure a network serial port singly or attached to a virtual serial port concentrator (vSPC) for console access. See the VMware vSphere documentation for details about each method. On the ASAv, you must send the console output to a serial port instead of to the virtual console. This section describes how to enable the serial port console.

Procedure

1. Configure a network serial port in VMware vSphere. See the VMware vSphere documentation.

2. On the ASAv, create a file called “use_ttyS0” in the root directory of disk0. This file does not need to have any contents; it just needs to exist at this location:

   disk0:/use_ttyS0

   - From ASDM, you can upload an empty text file by that name using the **Tools > File Management** dialog box.
   - At the vSphere console, you can copy an existing file (any file) in the file system to the new name. For example:

     ```
     ciscoasa(config)# cd coredumpinfo
     ciscoasa(config)# copy coredump.cfg disk0:/use_ttyS0
     ```

3. Reload the ASAv.

   - From ASDM, choose **Tools > System Reload**.
   - At the vSphere console, enter **reload**.

   The ASAv stops sending to the vSphere console, and instead sends to the serial console.

4. Telnet to the vSphere host IP address and the port number you specified when you added the serial port; or Telnet to the vSPC IP address and port.

Upgrade the vCPU or Throughput License

The ASAv uses a throughput license, which affects the number of vCPUs you can use.

If you want to increase (or decrease) the number of vCPUs for your ASAv, you can request a new license, apply the new license, and change the VM properties in VMware to match the new values.

Note: The assigned vCPUs must match the ASAv Virtual CPU license or Throughput license. The RAM must also be sized correctly for the vCPUs. When upgrading or downgrading, be sure to follow this procedure and reconcile the license and vCPUs immediately. The ASAv does not operate properly when there is a persistent mismatch.

Procedure

1. Request a new license.

2. Apply the new license. For failover pairs, apply new licenses to both units.

3. Do one of the following, depending on if you use failover or not:

   – Failover—In the vSphere Web Client, power off the *standby* ASAv. For example, click the ASAv and then click **Power Off the virtual machine**, or right-click the ASAv and choose **Shut Down Guest OS**.

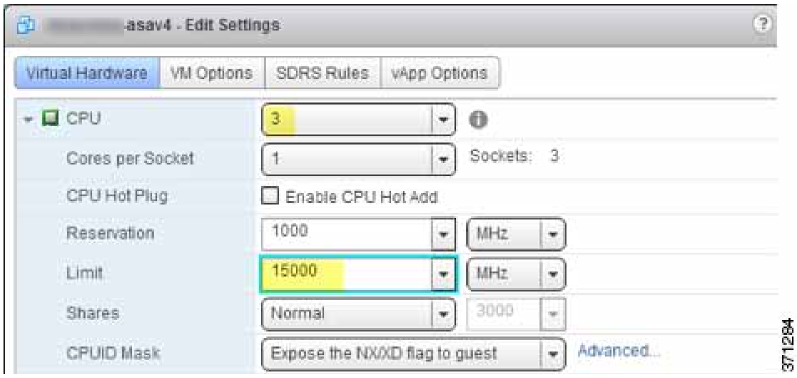
   – No Failover—In the vSphere Web Client, power off the ASAv. For example, click the ASAv and then click **Power Off the virtual machine**, or right-click the ASAv and choose **Shut Down Guest OS**.

4. Click the ASAv and then click **Edit Virtual machine settings** (or right-click the ASAv and choose **Edit Settings**).

   The **Edit Settings** dialog box appears.

5. Refer to the CPU memory requirement in Smart Software Licensing for the ASAv, page 6 to determine the correct values for the new vCPU license.

6. On the **Virtual Hardware** tab, for the **CPU**, choose the new value from the drop-down list.



[redacted]asav4 - Edit Settings

CPU: 3

Cores per Socket: 1 — Sockets: 3

CPU Hot Plug: ☐ Enable CPU Hot Add

Reservation: 1000 MHz

Limit: 15000 MHz

Shares: Normal 3000

CPUID Mask: Expose the NX/XD flag to guest — Advanced...

7. For the **Memory**, enter the new value for the RAM.

8. Click **OK**.

9. Power on the ASAv. For example, click **Power On the Virtual Machine**.

10. For failover pairs:

    a. Open a console to the active unit or Launch ASDM on the active unit.

    b. After the standby unit finishes starting up, failover to the standby unit:

       - ASDM: Choose **Monitoring > Properties > Failover > Status**, and clicking **Make Standby**.

- CLI: ciscoasa# **failover active**

c. Repeat Steps 3 through 9 for the active unit.

Related Topics

- Smart Software Licensing for the ASAv, page 6

SR-IOV Interface Provisioning

SR-IOV allows multiple VMs to share a single PCIe network adapter inside a host. SR-IOV defines these functions:

- Physical function (PF) - PFs are full PCIe functions that include the SR-IOV capabilities. These appear as regular static NICs on the host server.
- Virtual function (VF) - VFs are lightweight PCIe functions that help in data transfer. A VF is derived from, and managed through, a PF.

VFs are capable of providing up to 10 Gbps connectivity to ASAv virtual machines within a virtualized operating system framework. This section explains how to configure VFs in a VMware environment. SR-IOV support on the ASAv is explained in ASAv and SR-IOV Interface Provisioning, page 9.

Guidelines for SR-IOV Interface Provisioning

VMware vSphere 5.1 and later releases support SR-IOV in an environment with specific configurations only. Some features of vSphere are not functional when SR-IOV is enabled.

In addition to the System Requirements, page 4 for the ASAv and SR-IOV, you should review the Supported Configurations for Using SR-IOV in the VMware documentation for more information about requirements, supported NICs, availability of features, and upgrade requirements for VMware and SR-IOV.

This section shows various setup and configuration steps for provisioning SR-IOV interfaces on a VMware system. The information in this section was created from devices in a specific lab environment, using VMware ESXi 6.0 and vSphere Web Client, a Cisco UCS C Series server, and an Intel Ethernet Server Adapter X520 - DA2.

Checking the ESXi Host BIOS

To deploy the ASAv with SR-IOV interfaces on VMware, virtualization needs to be supported and enabled. VMware provides several methods of verifying virtualization support, including their online Compatibility Guide for SR-IOV support as well as a downloadable CPU identification utility that detects whether virtualization is enabled or disabled.

You can also determine if virtualization is enabled in the BIOS by logging into the ESXi host.

Procedure

1. Log in to the ESXi Shell using one of the following methods.
   - If you have direct access to the host, press Alt+F2 to open the login page on the machine's physical console.
   - If you are connecting to the host remotely, use SSH or another remote console connection to start a session on the host.
2. Enter a user name and password recognized by the host.
3. Run the following command:

   ```
   esxcfg-info|grep "\----\HV Support"
   ```

   The output of the HV Support command indicates the type of hypervisor support available. These are the descriptions for the possible values:

0 - VT/AMD-V indicates that support is not available for this hardware.

1 - VT/AMD-V indicates that VT or AMD-V might be available but it is not supported for this hardware.

2 - VT/AMD-V indicates that VT or AMD-V is available but is currently not enabled in the BIOS.

3 - VT/AMD-V indicates that VT or AMD-V is enabled in the BIOS and can be used.

For example:

```
~ # esxcfg-info|grep "\----\HV Support"
         |----HV Support...........................3
```

The value 3 indicates the virtualization is supported and enabled.

What to Do next

Enable SR-IOV on the host physical adapter.

Enable SR-IOV on the Host Physical Adapter

Before you can connect virtual machines to virtual functions, use the vSphere Web Client to enable SR-IOV and set the number of virtual functions on your host.

Before you begin

- Make sure you have an SR-IOV-compatible network interface card (NIC) installed; see Supported NICs for SR-IOV, page 5.

Procedure

1. In the vSphere Web Client, navigate to the ESXi host where you want to enable SR-IOV.
2. On the **Manage** tab, click **Networking** and choose **Physical adapters**.

   You can look at the SR-IOV property to see whether a physical adapter supports SR-IOV.
3. Select the physical adapter and click **Edit adapter settings**.
4. Under SR-IOV, select **Enabled** from the **Status** drop-down menu.
5. In the **Number of virtual functions** text box, type the number of virtual functions that you want to configure for the adapter.

   Note: For ASAv50, we recommend that you **DO NOT** use more than 1 VF per interface. Performance degradation is likely to occur if you share the physical interface with multiple virtual functions.
6. Click **OK**.
7. Restart the ESXi host.

   The virtual functions become active on the NIC port represented by the physical adapter entry. They appear in the PCI Devices list in the **Settings** tab for the host.

What to Do next

Create a standard vSwitch to manage the SR-IOV functions and configurations.

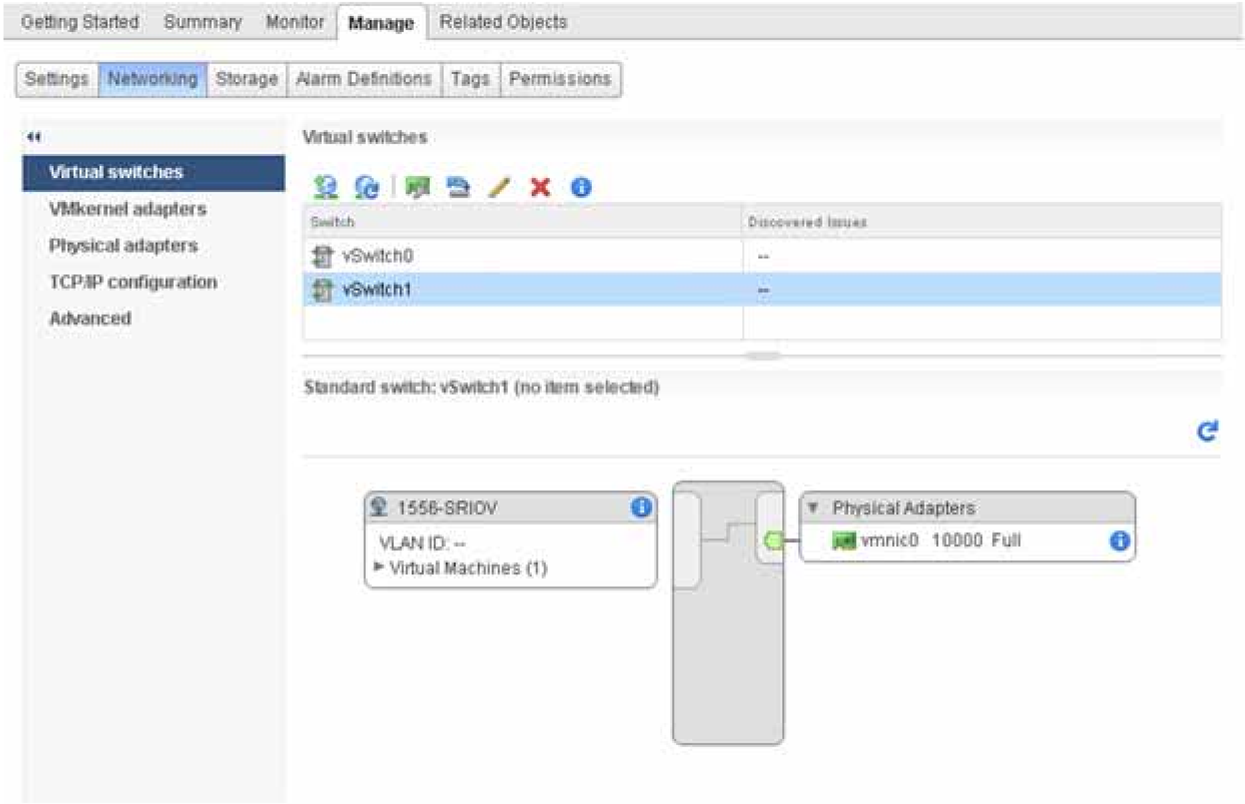
Create a vSphere Switch

Create a vSphere switch to manage the SR-IOV interfaces.

Procedure

1. In the vSphere Web Client, navigate to the ESXi host.
2. Under **Manage** select **Networking**, and then select **Virtual switches**.
3. Click the **Add host networking** icon, which is the green globe icon with the plus (+) sign.
4. Select a **Virtual Machine Port Group for a Standard Switch** connection type and click **Next**.
5. Choose **New standard switch** and click **Next**.
6. Add physical network adapters to the new standard switch.
    a. Under Assigned adapters, click the green plus (+) sign to **Add adapters**.
    b. Select the corresponding network interface for SR-IOV from the list. For example, Intel(R) 82599 10 Gigabit Dual Port Network Connection.
    c. From the **Failover order group** drop-down menu, select from the **Active adapters**.
    d. Click **OK**.
7. Enter a **Network label** for the SR-IOV vSwitch and click **Next**.
8. Review your selections on the **Ready to complete** page, then click **Finish**.

Figure 1 New vSwitch with an SR-IOV Interface attached



Switch	Discovered Issues
vSwitch0	--
vSwitch1	--

What to Do next

- Review the compatibility level of your virtual machine.

Upgrade of the Compatibility Level for Virtual Machines

The compatibility level determines the virtual hardware available to the virtual machine, which corresponds to the physical hardware available on the host machine. The ASAv virtual machine needs to be at Hardware Level 10 or higher. This will expose the SR-IOV passthough feature to the ASAv. This procedure upgrades the ASAv to the latest supported virtual hardware version immediately.

For information about virtual machine hardware versions and compatibility, see the vSphere Virtual Machine Administration documentation.

Procedure

1. Log in to the vCenter Server from the vSphere Web Client.
2. Locate the ASAv virtual machine you wish to modify.
    a. Select a datacenter, folder, cluster, resource pool, or host and click the **Related Objects** tab.
    b. Click **Virtual Machines** and select the ASAv virtual machine from the list.
3. Power off the selected virtual machine.
4. Right-click on the ASAv and select **Actions > All vCenter Actions > Compatibility > Upgrade VM Compatibility**.
5. Click **Yes** to confirm the upgrade.
6. Choose the **ESXi 5.5 and later** option for the virtual machines to be compatible with.
7. (Optional) Select Only upgrade after normal guest OS shutdown.

    The selected virtual machine is upgraded to the corresponding hardware version for the Compatibility setting that you chose, and the new hardware version is updated in the **Summary** tab of the virtual machine.

What to Do next

Associate the ASAv with a virtual function through an SR-IOV passthrough network adapter.

Assign the SR-IOV NIC to the ASAv

To ensure that the ASAv virtual machine and the physical NIC can exchange data, you must associate the ASAv with one or more virtual functions as SR-IOV passthrough network adapters. The following procedure explains how to assign the SR-IOV NIC to the ASAv virtual machine using the vSphere Web Client.

Procedure

1. Log in to the vCenter Server from the vSphere Web Client.
2. Locate the ASAv virtual machine you wish to modify.
    a. Select a datacenter, folder, cluster, resource pool, or host and click the **Related Objects** tab.
    b. Click **Virtual Machines** and select the ASAv virtual machine from the list.
3. On the **Manage** tab of the virtual machine, select **Settings > VM Hardware**.
4. Click **Edit** and choose the **Virtual Hardware** tab.
5. From the **New device** drop-down menu, select **Network** and click **Add**.

    A **New Network** interface appears.

6. Expand the **New Network** section and select an available SRIOV option.
7. From the **Adapter Type** drop-down menu, select **SR-IOV passthrough**.
8. From the **Physical function** drop-down menu, select the physical adapter that corresponds to the passthrough virtual machine adapter.
9. Power on the virtual machine.

   When you power on the virtual machine, the ESXi host selects a free virtual function from the physical adapter and maps it to the SR-IOV passthrough adapter. The host validates all properties of the virtual machine adapter and the underlying virtual function.

Increasing Performance on ESXi Configurations

You can increase the performance for an ASAv in the ESXi environment by tuning the ESXi host CPU configuration settings. The **Scheduling Affinity** option gives you control over how virtual machine CPUs are distributed across the host's physical cores (and hyperthreads if hyperthreading is enabled). By using this feature, you can assign each virtual machine to processors in the specified affinity set.

See the following VMware documents for more information:

- The *Administering CPU Resources* chapter of vSphere Resource Management.
- Performance Best Practices for VMware vSphere.
- The vSphere Client online help.