



Logical Devices for the Firepower 4100/9300

The Firepower 4100/9300 is a flexible security platform on which you can install one or more *logical devices*. This chapter describes basic interface configuration and how to add a standalone or High Availability logical device using the Firepower Chassis Manager. To add a clustered logical device, see [ASA Cluster for the Firepower 4100/9300 Chassis](#). To use the FXOS CLI, see the FXOS CLI configuration guide. For more advanced FXOS procedures and troubleshooting, see the FXOS configuration guide.

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About Firepower Interfaces

The Firepower 4100/9300 chassis supports physical interfaces and EtherChannel (port-channel) interfaces. EtherChannel interfaces can include up to 16 member interfaces of the same type.

Chassis Management Interface

The chassis management interface is used for management of the FXOS Chassis by SSH or Firepower Chassis Manager. This interface appears at the top of the **Interfaces** tab as **MGMT**, and you can only enable or disable this interface on the **Interfaces** tab. This interface is separate from the mgmt-type interface that you assign to the logical devices for application management.

To configure parameters for this interface, you must configure them from the CLI. To view information about this interface in the FXOS CLI, connect to local management and show the management port:

```
Firepower # connect local-mgmt
```

```
Firepower(local-mgmt) # show mgmt-port
```

Note that the chassis management interface remains up even if the physical cable or SFP module are unplugged, or if the **mgmt-port shut** command is performed.



Note The chassis management interface does not support jumbo frames.

Interface Types

Each interface can be one of the following types:

- **Data**—Use for regular data. Data interfaces cannot be shared between logical devices, and logical devices cannot communicate over the backplane to other logical devices. For traffic on Data interfaces, all traffic must exit the chassis on one interface and return on another interface to reach another logical device.
- **Mgmt**—Use to manage application instances. These interfaces can be shared by one or more logical devices to access external hosts; logical devices cannot communicate over this interface with other logical devices that share the interface. You can only assign one management interface per logical device. For ASA: You can later enable management from a data interface; but you must assign a Management interface to the logical device even if you don't intend to use it after you enable data management. For information about the separate chassis management interface, see [Chassis Management Interface, on page 1](#).
- **Firepower-eventing**—Use as a secondary management interface for FTD devices.
- **Cluster**—Use as the cluster control link for a clustered logical device. By default, the cluster control link is automatically created on Port-channel 48. The Cluster type is only supported on EtherChannel interfaces.

FXOS Interfaces vs. Application Interfaces

The Firepower 4100/9300 manages the basic Ethernet settings of physical interfaces and EtherChannel (port-channel) interfaces. Within the application, you configure higher level settings. For example, you can only create EtherChannels in FXOS; but you can assign an IP address to the EtherChannel within the application.

The following sections describe the interaction between FXOS and the application for interfaces.

VLAN Subinterfaces

For all logical devices, you can create VLAN subinterfaces within the application.

Independent Interface States in the Chassis and in the Application

You can administratively enable and disable interfaces in both the chassis and in the application. For an interface to be operational, the interface must be enabled in both operating systems. Because the interface state is controlled independently, you may have a mismatch between the chassis and application.

About Logical Devices

A logical device lets you run one application instance (either ASA or Firepower Threat Defense) and also one optional decorator application (Radware DefensePro) to form a service chain.

When you add a logical device, you also define the application instance type and version, assign interfaces, and configure bootstrap settings that are pushed to the application configuration.



Note For the Firepower 9300, you must install the same application instance type (ASA or FTD) on all modules in the chassis; different types are not supported at this time. Note that modules can run different versions of an application instance type.

Standalone and Clustered Logical Devices

You can add the following logical device types:

- **Standalone**—A standalone logical device operates as a standalone unit or as a unit in a High Availability pair.
- **Cluster**—A clustered logical device lets you group multiple units together, providing all the convenience of a single device (management, integration into a network) while achieving the increased throughput and redundancy of multiple devices. Multiple module devices, like the Firepower 9300, support intra-chassis clustering. For the Firepower 9300, all three modules must participate in the cluster.

Requirements and Prerequisites for Hardware and Software Combinations

The Firepower 4100/9300 supports multiple models, security modules, application types, and high availability and scalability features. See the following requirements for allowed combinations.

Firepower 9300 Requirements

The Firepower 9300 includes 3 security module slots and multiple types of security modules. See the following requirements:

- **Security Module Types**—All modules in the Firepower 9300 must be the same type.
- **Clustering**—All security modules in the cluster, whether it is intra-chassis or inter-chassis, must be the same type. You can have different quantities of installed security modules in each chassis, although all modules present in the chassis must belong to the cluster including any empty slots. For example, you can install 2 SM-36s in chassis 1, and 3 SM-36s in chassis 2.
- **High Availability**—High Availability is only supported between same-type modules on the Firepower 9300.
- **ASA and FTD application types**—You can only install one application type on the chassis, ASA or FTD.
- **ASA or FTD versions**—You can run different versions of an application instance type on separate modules. For example, you can install FTD 6.3 on module 1, FTD 6.4 on module 2, and FTD 6.5 on module 3.

Firepower 4100 Requirements

The Firepower 4100 comes in multiple models. See the following requirements:

- **Clustering**—All chassis in the cluster must be the same model.

- High Availability—High Availability is only supported between same-type models.
- ASA and FTD application types—The Firepower 4100 can only run a single application type.

Guidelines and Limitations for Logical Devices

See the following sections for guidelines and limitations.

Guidelines and Limitations for Firepower Interfaces

Default MAC Addresses

Default MAC address assignments depend on the type of interface.

- Physical interfaces—The physical interface uses the burned-in MAC address.
- EtherChannels—For an EtherChannel, all interfaces that are part of the channel group share the same MAC address. This feature makes the EtherChannel transparent to network applications and users, because they only see the one logical connection; they have no knowledge of the individual links. The port-channel interface uses a unique MAC address from a pool; interface membership does not affect the MAC address.

General Guidelines and Limitations

Firewall Mode

You can set the firewall mode to routed or transparent in the bootstrap configuration for the FTD. For the ASA, you can change the firewall mode to transparent after you deploy. See [Change the ASA to Transparent Firewall Mode, on page 11](#).

High Availability

- Configure high availability within the application configuration.
- You can use any data interfaces as the failover and state links.

Context Mode

- Enable multiple context mode in the ASA after you deploy.

Requirements and Prerequisites for High Availability

- The two units in a High Availability Failover configuration must:
 - Be on a separate chassis; intra-chassis High Availability for the Firepower 9300 is not supported.
 - Be the same model.
 - Have the same interfaces assigned to the High Availability logical devices.

- Have the same number and types of interfaces. All interfaces must be preconfigured in FXOS identically before you enable High Availability.
- For High Availability system requirements, see [Failover System Requirements](#).

Configure Interfaces

By default, physical interfaces are disabled. You can enable interfaces, add EtherChannels, and edit interface properties.







Note If you remove an interface in FXOS (for example, if you remove a network module, remove an EtherChannel, or reassign an interface to an EtherChannel), then the ASA configuration retains the original commands so that you can make any necessary adjustments; removing an interface from the configuration can have wide effects. You can manually remove the old interface configuration in the ASA OS.

Enable or Disable an Interface

You can change the **Admin State** of each interface to be enabled or disabled. By default, physical interfaces are disabled.

Procedure

- Step 1** Choose **Interfaces** to open the Interfaces page.
The Interfaces page shows a visual representation of the currently installed interfaces at the top of the page and provides a listing of the installed interfaces in the table below.
- Step 2** To enable the interface, click the disabled **Slider disabled** () so that it changes to the enabled **Slider enabled** ().
Click **Yes** to confirm the change. The corresponding interface in the visual representation changes from gray to green.
- Step 3** To disable the interface, click the enabled **Slider enabled** () so that it changes to the disabled **Slider disabled** ().
Click **Yes** to confirm the change. The corresponding interface in the visual representation changes from green to gray.

Configure a Physical Interface

You can physically enable and disable interfaces, as well as set the interface speed and duplex. To use an interface, it must be physically enabled in FXOS and logically enabled in the application.

Before you begin

- Interfaces that are already a member of an EtherChannel cannot be modified individually. Be sure to configure settings before you add it to the EtherChannel.

Procedure

-
- Step 1** Choose **Interfaces** to open the Interfaces page.
- The **All Interfaces** page shows a visual representation of the currently installed interfaces at the top of the page and provides a listing of the installed interfaces in the table below.
- Step 2** Click **Edit** in the row for the interface you want to edit to open the **Edit Interface** dialog box.
- Step 3** To enable the interface, check the **Enable** check box. To disable the interface, uncheck the **Enable** check box.
- Step 4** Choose the interface **Type**:
- See [Interface Types, on page 2](#) for details about interface type usage.
- **Data**
 - **Mgmt**
 - **Cluster**—Do not choose the **Cluster** type; by default, the cluster control link is automatically created on Port-channel 48.
- Step 5** (Optional) Choose the speed of the interface from the **Speed** drop-down list.
- Step 6** (Optional) If your interface supports **Auto Negotiation**, click the **Yes** or **No** radio button.
- Step 7** (Optional) Choose the duplex of the interface from the **Duplex** drop-down list.
- Step 8** Click **OK**.
-

Add an EtherChannel (Port Channel)

An EtherChannel (also known as a port channel) can include up to 16 member interfaces of the same media type and capacity, and must be set to the same speed and duplex. The media type can be either RJ-45 or SFP; SFPs of different types (copper and fiber) can be mixed. You cannot mix interface capacities (for example 1GB and 10GB interfaces) by setting the speed to be lower on the larger-capacity interface. The Link Aggregation Control Protocol (LACP) aggregates interfaces by exchanging the Link Aggregation Control Protocol Data Units (LACPDU)s between two network devices.

The Firepower 4100/9300 chassis only supports EtherChannels in Active LACP mode so that each member interface sends and receives LACP updates. An active EtherChannel can establish connectivity with either an active or a passive EtherChannel. You should use the active mode unless you need to minimize the amount of LACP traffic.

LACP coordinates the automatic addition and deletion of links to the EtherChannel without user intervention. It also handles misconfigurations and checks that both ends of member interfaces are connected to the correct channel group.

When the Firepower 4100/9300 chassis creates an EtherChannel, the EtherChannel stays in a **Suspended** state until you assign it to a logical device, even if the physical link is up. The EtherChannel will be brought out of this **Suspended** state in the following situations:

- The EtherChannel is added as a data or management interface for a standalone logical device
- The EtherChannel is added as a management interface or cluster control link for a logical device that is part of a cluster
- The EtherChannel is added as a data interface for a logical device that is part of a cluster and at least one unit has joined the cluster

Note that the EtherChannel does not come up until you assign it to a logical device. If the EtherChannel is removed from the logical device or the logical device is deleted, the EtherChannel will revert to a **Suspended** state.

Procedure

- Step 1** Choose **Interfaces** to open the Interfaces page.
- The **All Interfaces** page shows a visual representation of the currently installed interfaces at the top of the page and provides a listing of the installed interfaces in the table below.
- Step 2** Click **Add Port Channel** above the interfaces table to open the **Add Port Channel** dialog box.
- Step 3** Enter an ID for the port channel in the **Port Channel ID** field. Valid values are between 1 and 47.
- Port-channel 48 is reserved for the cluster control link when you deploy a clustered logical device. If you do not want to use Port-channel 48 for the cluster control link, you can delete it and configure a Cluster type EtherChannel with a different ID. You can only add one Cluster type EtherChannel. For intra-chassis clustering, do not assign any interfaces to the Cluster EtherChannel.
- Step 4** To enable the port channel, check the **Enable** check box. To disable the port channel, uncheck the **Enable** check box.
- Step 5** Choose the interface **Type**:
- See [Interface Types, on page 2](#) for details about interface type usage.
- **Data**
 - **Mgmt**
 - **Cluster**
- Step 6** Set the required **Admin Speed** for the member interfaces from the drop-down list.
- If you add a member interface that is not at the specified speed, it will not successfully join the port channel.
- Step 7** Set the required **Admin Duplex** for the member interfaces, **Full Duplex** or **Half Duplex**.
- If you add a member interface that is configured with the specified duplex, it will not successfully join the port channel.
- Step 8** To add an interface to the port channel, select the interface in the **Available Interface** list and click **Add Interface** to move the interface to the Member ID list.

You can add up to 16 member interfaces of the same media type and capacity. The member interfaces must be set to the same speed and duplex, and must match the speed and duplex that you configured for this port channel. The media type can be either RJ-45 or SFP; SFPs of different types (copper and fiber) can be mixed. You cannot mix interface capacities (for example 1GB and 10GB interfaces) by setting the speed to be lower on the larger-capacity interface.

Tip You can add multiple interfaces at one time. To select multiple individual interfaces, click on the desired interfaces while holding down the **Ctrl** key. To select a range of interfaces, select the first interface in the range, and then, while holding down the **Shift** key, click to select the last interface in the range.

- Step 9** To remove an interface from the port channel, click the **Delete** button to the right of the interface in the Member ID list.
- Step 10** Click **OK**.
-

Configure Logical Devices

Add a standalone logical device or a High Availability pair on the Firepower 4100/9300 chassis.

For clustering, see [#unique_287](#).

Add a Standalone ASA

Standalone logical devices work either alone or in a High Availability pair. On the Firepower 9300 with multiple security modules, you can deploy either a cluster or standalone devices. The cluster must use all modules, so you cannot mix and match a 2-module cluster plus a single standalone device, for example.

You can deploy a routed firewall mode ASA from the Firepower 4100/9300 chassis. To change the ASA to transparent firewall mode, complete this procedure, and then see [Change the ASA to Transparent Firewall Mode, on page 11](#).

For multiple context mode, you must first deploy the logical device, and then enable multiple context mode in the ASA application.

Before you begin

- Download the application image you want to use for the logical device from Cisco.com, and then upload that image to the Firepower 4100/9300 chassis.



Note For the Firepower 9300, you must install the same application instance type (ASA or FTD) on all modules in the chassis; different types are not supported at this time. Note that modules can run different versions of an application instance type.

- Configure a management interface to use with the logical device. The management interface is required. Note that this management interface is not the same as the chassis management port that is used only for chassis management (and that appears at the top of the **Interfaces** tab as **MGMT**).
- Gather the following information:

- Interface IDs for this device
- Management interface IP address and network mask
- Gateway IP address

Procedure

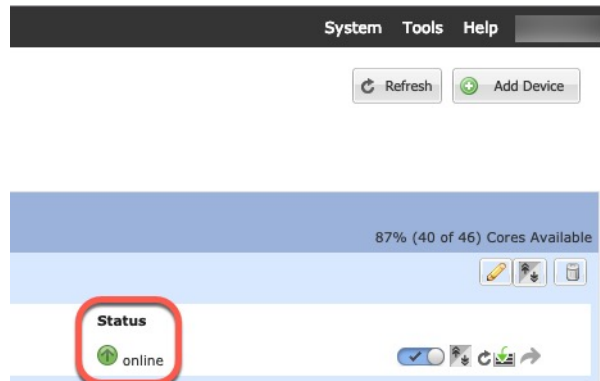
- Step 1** Choose **Logical Devices**.
- Step 2** Click **Add Device**, and set the following parameters:
- Provide a **Device Name**.
This name is used by the chassis supervisor to configure management settings and to assign interfaces; it is not the device name used in the application configuration.
 - For the **Template**, choose **Cisco: Adaptive Security Appliance**.
 - Choose the **Image Version**.
 - For the **Usage**, click the **Standalone** radio button.
 - Click **OK**.
You see the Provisioning - *device name* window.
- Step 3** Expand the **Data Ports** area, and click each port that you want to assign to the device.
You can only assign data interfaces that you previously enabled on the **Interfaces** page. You will later enable and configure these interfaces on the ASA, including setting the IP addresses.
- Step 4** Click the device icon in the center of the screen.
A dialog box appears where you can configure initial bootstrap settings. These settings are meant for initial deployment only, or for disaster recovery. For normal operation, you can later change most values in the application CLI configuration.
- Step 5** On the **General Information** page, complete the following:
- (For the Firepower 9300) Under **Security Module Selection** click the security module that you want to use for this logical device.
 - Choose the **Management Interface**.
This interface is used to manage the logical device. This interface is separate from the chassis management port.
 - Choose the management interface **Address Type**: **IPv4 only**, **IPv6 only**, or **IPv4 and IPv6**.
 - Configure the **Management IP** address.
Set a unique IP address for this interface.
 - Enter a **Network Mask** or **Prefix Length**.
 - Enter a **Network Gateway** address.
- Step 6** Click the **Settings** tab.
- Step 7** Enter and confirm a **Password** for the admin user and for the enable password.

The pre-configured ASA admin user/password and enable password is useful for password recovery; if you have FXOS access, you can reset the admin user password/enable password if you forget it.

Step 8 Click **OK** to close the configuration dialog box.

Step 9 Click **Save**.

The chassis deploys the logical device by downloading the specified software version and pushing the bootstrap configuration and management interface settings to the application instance. Check the **Logical Devices** page for the status of the new logical device. When the logical device shows its **Status** as **online**, you can start configuring the security policy in the application.



Step 10 See the ASA configuration guide to start configuring your security policy.

Add a High Availability Pair

ASA High Availability (also known as failover) is configured within the application, not in FXOS. However, to prepare your chassis for high availability, see the following steps.

Before you begin

See [Failover System Requirements](#).

Procedure

Step 1 Allocate the same interfaces to each logical device.

Step 2 Allocate 1 or 2 data interfaces for the failover and state link(s).

These interfaces exchange high availability traffic between the 2 chassis. We recommend that you use a 10 GB data interface for a combined failover and state link. If you have available interfaces, you can use separate failover and state links; the state link requires the most bandwidth. You cannot use the management-type interface for the failover or state link. We recommend that you use a switch between the chassis, with no other device on the same network segment as the failover interfaces.

Step 3 Enable High Availability on the logical devices. See [Failover for High Availability](#).

Step 4 If you need to make interface changes after you enable High Availability, perform the changes on the standby unit first, and then perform the changes on the active unit.

Note For the ASA, if you remove an interface in FXOS (for example, if you remove a network module, remove an EtherChannel, or reassign an interface to an EtherChannel), then the ASA configuration retains the original commands so that you can make any necessary adjustments; removing an interface from the configuration can have wide effects. You can manually remove the old interface configuration in the ASA OS.

Change the ASA to Transparent Firewall Mode

You can only deploy a routed firewall mode ASA from the Firepower 4100/9300 chassis. To change the ASA to transparent firewall mode, complete the initial deployment, and then change the firewall mode within the ASA CLI. For standalone ASAs, because changing the firewall mode erases the configuration, you must then redeploy the configuration from the Firepower 4100/9300 chassis to regain the bootstrap configuration. The ASA then remains in transparent mode with a working bootstrap configuration. For clustered ASAs, the configuration is not erased, so you do not need to redeploy the bootstrap configuration from FXOS.

Procedure

Step 1 Connect to the ASA console according to [Connect to the Console of the Application, on page 13](#). For a cluster, connect to the primary unit. For a failover pair, connect to the active unit.

Step 2 Enter configuration mode:

enable

configure terminal

By default, the enable password is blank.

Step 3 Set the firewall mode to transparent:

firewall transparent

Step 4 Save the configuration:

write memory

For a cluster or failover pair, this configuration is replicated to secondary units:

```
asa(config)# firewall transparent
asa(config)# write memory
Building configuration...
Cryptochecksum: 9f831dfb 60dffa8c 1d939884 74735b69

3791 bytes copied in 0.160 secs
[OK]
asa(config)#
Beginning configuration replication to unit-1-2
End Configuration Replication to data unit.

asa(config)#
```

Step 5 On the Firepower Chassis Manager **Logical Devices** page, click the **Edit** icon to edit the ASA.

The **Provisioning** page appears.

Step 6 Click the device icon to edit the bootstrap configuration. Change any value in your configuration, and click **OK**.

You must change the value of at least one field, for example, the **Password** field.

You see a warning about changing the bootstrap configuration; click **Yes**.

Step 7 Click **Restart Now** to redeploy the configuration to the ASA. For an inter-chassis cluster or for a failover pair, repeat steps 5 through 7 to redeploy the bootstrap configuration on each chassis.

Wait several minutes for the chassis/security modules to reload, and for the ASA to become operational again. The ASA now has an operational bootstrap configuration, but remains in transparent mode.

Change an Interface on an ASA Logical Device

You can allocate, unallocate, or replace a management interface on an ASA logical device. ASDM discovers the new interfaces automatically.

Adding a new interface, or deleting an unused interface has minimal impact on the ASA configuration. However, if you remove an allocated interface in FXOS (for example, if you remove a network module, remove an EtherChannel, or reassign an allocated interface to an EtherChannel), and the interface is used in your security policy, removal will impact the ASA configuration. In this case, the ASA configuration retains the original commands so that you can make any necessary adjustments. You can manually remove the old interface configuration in the ASA OS.



Note You can edit the membership of an allocated EtherChannel without impacting the logical device.

Before you begin

- Configure your interfaces and add any EtherChannels according to [Configure a Physical Interface, on page 5](#) and [Add an EtherChannel \(Port Channel\), on page 6](#).
- If you want to add an already-allocated interface to an EtherChannel (for example, all interfaces are allocated by default to a cluster), you need to unallocate the interface from the logical device first, then add the interface to the EtherChannel. For a new EtherChannel, you can then allocate the EtherChannel to the device.
- If you want to replace the management interface with a management EtherChannel, then you need to create the EtherChannel with at least 1 unallocated data member interface, and then replace the current management interface with the EtherChannel. After the ASA reloads (management interface changes cause a reload), you can add the (now unallocated) management interface to the EtherChannel as well.
- For clustering or failover, make sure you add or remove the interface on all units. We recommend that you make the interface changes on the data/standby unit(s) first, and then on the control/active unit. New interfaces are added in an administratively down state, so they do not affect interface monitoring.

Procedure

- Step 1** In the Firepower Chassis Manager, choose **Logical Devices**.
- Step 2** Click the **Edit** icon at the top right to edit the logical device.
- Step 3** Unallocate a data interface by de-selecting the interface in the **Data Ports** area.
- Step 4** Allocate a new data interface by selecting the interface in the **Data Ports** area.
- Step 5** Replace the management interface:
- For this type of interface, the device reloads after you save your changes.
- a) Click the device icon in the center of the page.
 - b) On the **General/Cluster Information** tab, choose the new **Management Interface** from the drop-down list.
 - c) Click **OK**.
- Step 6** Click **Save**.
-

Connect to the Console of the Application

Use the following procedure to connect to the console of the application.

Procedure

- Step 1** Connect to the module CLI.
- connect module *slot_number* console**
- To connect to the security engine of a device that does not support multiple security modules, always use **1** as the *slot_number*.

Example:

```
Firepower# connect module 1 console
Telnet escape character is '~'.
Trying 127.5.1.1...
Connected to 127.5.1.1.
Escape character is '~'.
```

```
CISCO Serial Over LAN:
Close Network Connection to Exit
```

```
Firepower-module1>
```

- Step 2** Connect to the application console.

connect asa

Example:

```
Firepower-module1> connect asa
Connecting to asa(asal) console... hit Ctrl + A + D to return to bootCLI
```

```
[...]  
asa>
```

Step 3 Exit the application console to the FXOS module CLI.

- ASA—Enter **Ctrl-a, d**

Step 4 Return to the supervisor level of the FXOS CLI.

a) Enter ~

You exit to the Telnet application.

b) To exit the Telnet application, enter:

```
telnet>quit
```

History for Logical Devices

Feature	Version	Details
Inter-site clustering improvement for the ASA on the Firepower 4100/9300 chassis	9.7(1)	<p>You can now configure the site ID for each Firepower 4100/9300 chassis when you deploy the ASA cluster. Previously, you had to configure the site ID within the ASA application; this new feature eases initial deployment. Note that you can no longer set the site ID within the ASA configuration. Also, for best compatibility with inter-site clustering, we recommend that you upgrade to ASA 9.7(1) and FXOS 2.1.1, which includes several improvements to stability and performance.</p> <p>We modified the following screen: Configuration > Device Management > High Availability and Scalability > ASA Cluster > Cluster Configuration</p>
Support for the Firepower 4100 series	9.6(1)	<p>With FXOS 1.1.4, the ASA supports inter-chassis clustering on the Firepower 4100 series.</p> <p>We did not modify any screens.</p>
Inter-chassis clustering for 6 modules, and inter-site clustering for the Firepower 9300 ASA application	9.5(2.1)	<p>With FXOS 1.1.3, you can now enable inter-chassis, and by extension inter-site clustering. You can include up to 6 modules in up to 6 chassis.</p> <p>We did not modify any screens.</p>

Feature	Version	Details
Intra-chassis ASA Clustering for the Firepower 9300	9.4(1.150)	<p>You can cluster up to 3 security modules within the Firepower 9300 chassis. All modules in the chassis must belong to the cluster.</p> <p>We introduced the following screen: Configuration > Device Management > High Availability and Scalability > ASA Cluster Replication</p>

