Cisco ASA with FirePOWER Services Local Management Configuration Guide, Version 6.4

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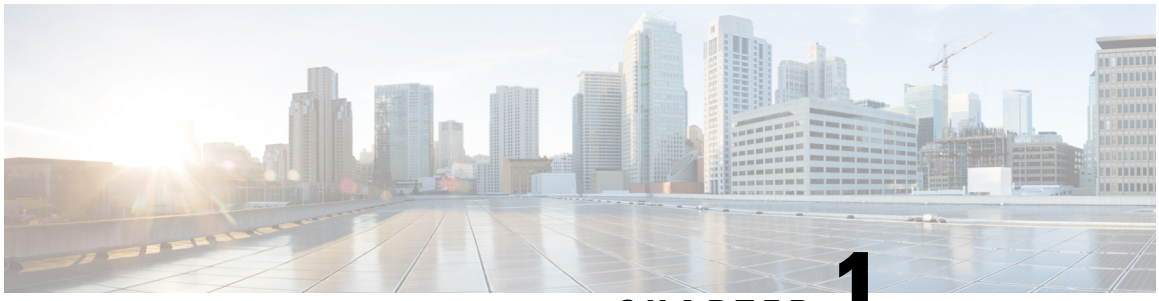
Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883



CHAPTER 1

Get Started Using ASA with FirePOWER Services

The Cisco ASA FirePOWER module can be deployed on select Cisco ASA 5500-X series appliances. For detailed information, see the *Cisco Firepower Compatibility Guide*. The module is designed to help you handle network traffic in a way that complies with your organization's security policy.

This guide provides information about configuration of the features and functionality of the ASA FirePOWER module, accessible using the Adaptive Security Device Manager (ASDM).

Alternatively, to manage an ASA with FirePOWER Services device using the Firepower Management Center, see the *Cisco Firepower Management Center Configuration Guide*.

Quick Start: Basic Setup

To get started setting up your ASA with FirePOWER Services device, see the Cisco ASA FirePOWER Module Quick Start Guide. The Quick Start Guide walks you through the entire setup process, including:

1. Deploy ASA with FirePOWER Services.

Note Skip the section on registering ASA with FirePOWER Services with Firepower Management Center to manage ASA with FirePOWER Services using ASDM.

Caution You can manage any particular appliance using either the Firepower Management Center or using ADSM but not both. *Switching management methods erases the existing appliance configuration.*

2. Start ASDM.
3. Configure ASA with FirePOWER Services.

Set Up Policy and Basic Configuration

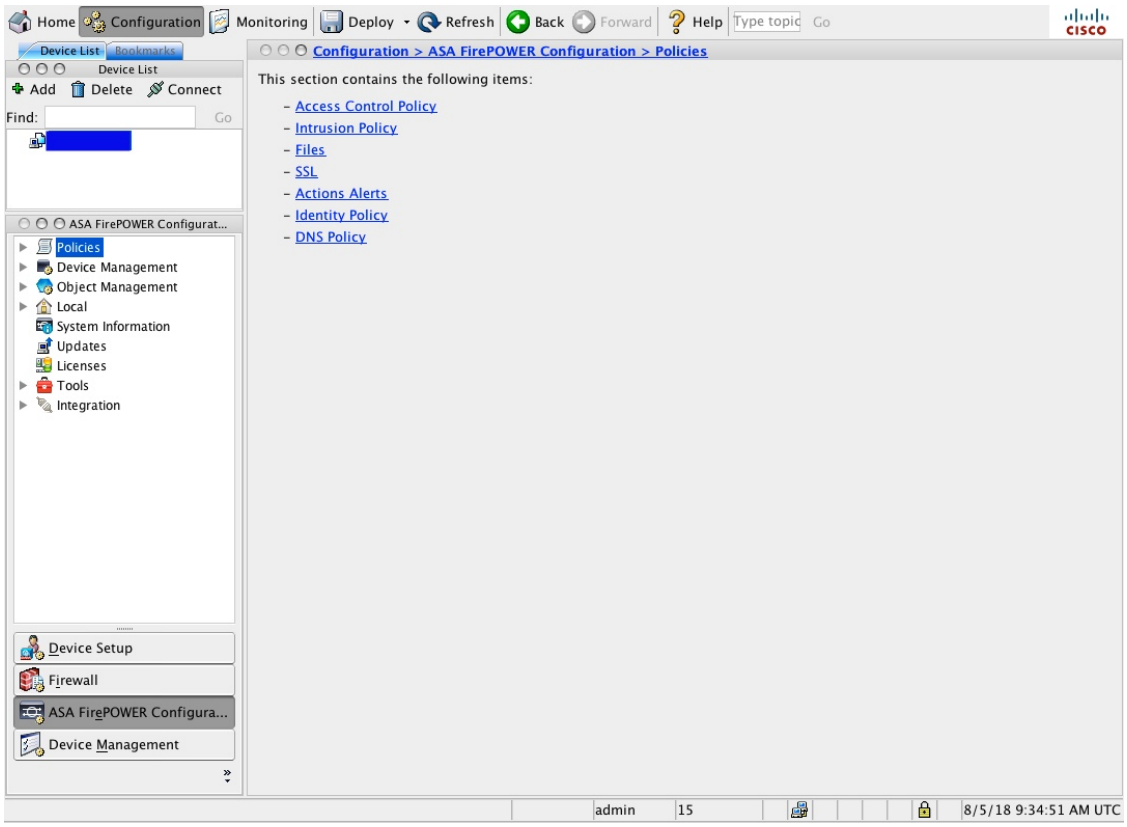
Before you begin

Initially configure the ASA with FirePOWER Services module as discussed in Quick Start: Basic Setup, on page 1.

Step 1 Start ASDM and log in to the ASA with FirePOWER Services module as discussed in its Quick Start Guide.

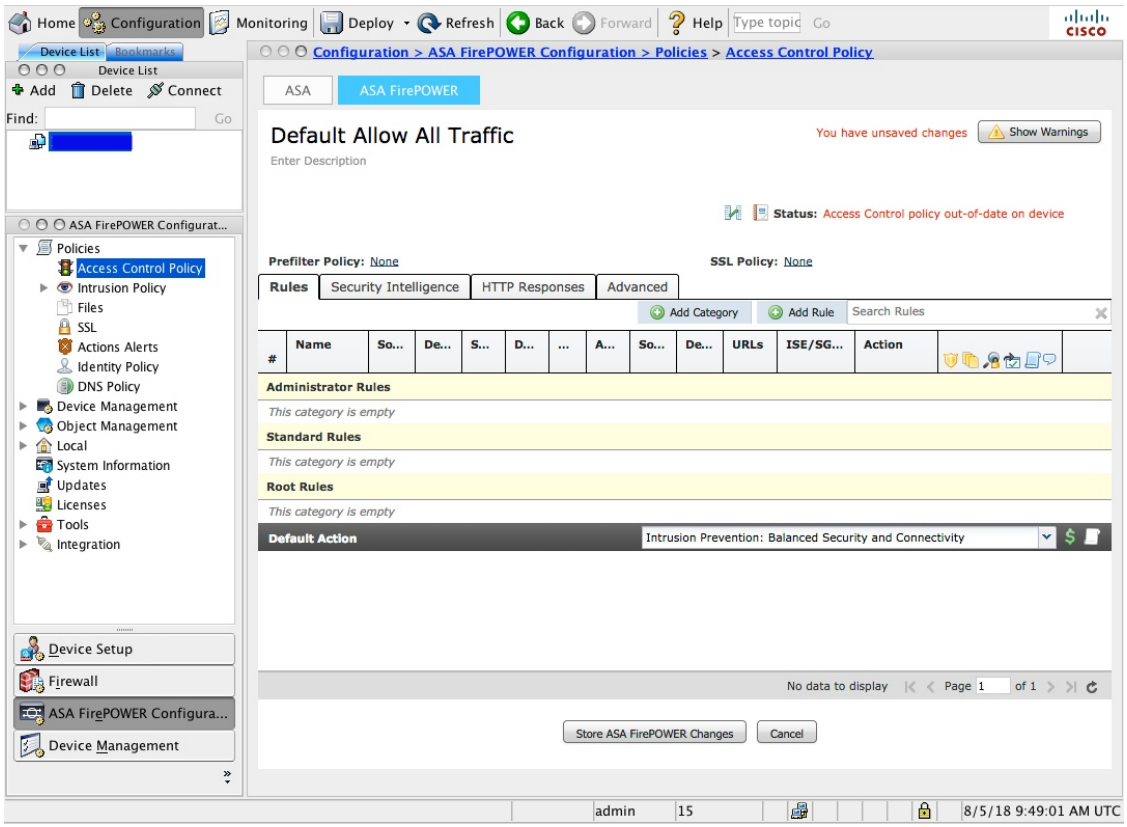
Step 2 In the top navigation bar, click **Configuration**.

Step 3 On the side navigation bar, click **ASA FirePOWER Configuration**.
The **configuration** page is displayed as follows.



Step 4 Create the access control policy as discussed in Creating a Basic Access Control Policy, on page 65.

a) Expand **Policies**.
b) Click **Access Control Policy**.
c) Click **ASA with FirePOWER**.
The **policy** page is displayed as follows.



d) In most cases, for **Default Action**, we recommend choosing **Intrusion Prevention: Balanced Security and Connectivity**.

Step 5 Customize other common settings:

a) Managing ASA FirePOWER Module Interfaces
b) Configuring the Access List for Your Appliance
c) Viewing and Modifying the Appliance Information
d) To use Advanced Malware Protection, Enabling Cloud Communications
e) Stream logs to a Creating a Syslog Alert Response or Creating an SNMP Alert Response using external alerts
f) Automating Backup Jobs
g) Automating Software Downloads
h) Automating Software Installs
i) Using Recurring Rule Updates
j) Automating URL Filtering Updates
k) Automating Geolocation Database Updates

What to do next

Configure ASA options as discussed in the Cisco Adaptive Security Device Manager Configuration Guides.

ASA With FirePOWER Services Devices

ASA with FirePOWER Services devices are also referred to as *Next Generation Intrusion Prevention (NGIPS)* devices. These devices run NGIPS software on an ASA device.

The ASA device provides the first-line system policy, then passes traffic to an ASA FirePOWER module for discovery and access control.

ASA FirePOWER has a user interface and a command line interface (CLI) unique to the ASA platform. You use these ASA-specific tools to install the system and to perform other platform-specific administrative tasks.

ASA FirePOWER does not support the following Firepower features:

- Features for Firepower hardware: Use the ASA CLI and ASDM to configure device high availability, stacking, switching, routing, VPN, NAT, and so on. See the ASA documentation for more information.
- Interface configuration: You *cannot* use the Firepower Management Center web interface to configure ASA FirePOWER interfaces. The Firepower Management Center does not display ASA interfaces when the ASA FirePOWER is deployed in SPAN port mode.
- Process management: You *cannot* use the Firepower Management Center to shut down, restart, or otherwise manage ASA FirePOWER processes.

ASA With FirePOWER Services Features

This section lists some commonly used ASA With FirePOWER Services features.

Appliance and System Management Features

To locate unfamiliar documents, see the documentation roadmap.

If you want to...	Configure...	As discussed in...
Back up data on your appliance	Backup and restore	Using Backup and Restore, on page 503
Upgrade to a new software version	Software updates	Updating ASA FirePOWER Module Software, on page 475
Baseline your appliance	Restore to factory defaults (reimage)	• Cisco ASA and Firepower Threat Defense Reimage Guide • Section on reimaging the FirePOWER module in the Cisco Adaptive Security Device Manager Configuration Guides
Ensure continuity of appliance operations	High availability	Cisco Adaptive Security Device Manager Configuration Guides

If you want to...	Configure...	As discussed in...
Update the VDB, intrusion rule updates, or GeoDB on your appliance	Vulnerability Database (VDB) updates, intrusion rule updates, or Geolocation Database (GeoDB) updates	Understanding Update Types, on page 475
Apply licenses in order to take advantage of license-controlled functionality	Licensing	Understanding Licensing, on page 469
Configure a device to route traffic between two or more interfaces	Routing	ASDM Configuration Guides
Translate private addresses into public addresses for internet connections	Network Address Translation (NAT)	Cisco Adaptive Security Device Manager Configuration Guides

Features for Detecting, Preventing, and Processing Potential Threats

To locate unfamiliar documents, see the documentation roadmap.

If you want to...	Configure...	As discussed in...
Inspect, log, and take action on network traffic	Access control policy, the parent of several other policies	Getting Started with Access Control Policies, on page 63
Block connections to or from IP addresses, URLs, and/or domain names	Security Intelligence in your access control policy	Choosing a Security Intelligence Strategy, on page 84
Monitor malicious traffic and intrusions on your network	Intrusion policy	About Intrusion Policies, on page 277
Block encrypted traffic without inspection Inspect encrypted or decrypted traffic	SSL policy	Understanding Traffic Decryption, on page 165
Allow or block files on your network	File policy	Controlling Traffic Using Intrusion and File Policies, on page 135
Configure passive or active user authentication to perform user awareness and user control	User awareness, user identity, identity policies	Introduction to Identity Data, on page 327

Integration with External Tools

To locate unfamiliar documents, see the documentation roadmap.

If you want to...	Configure...	As discussed in...
Stream event data to a custom-developed client application	eStreamer integration	Understanding Advanced Device Settings, on page 10

Firepower Online Help, How To, and Documentation

You can reach the online help from the web interface:

- By clicking the context-sensitive help link on each page
- By choosing **Help** > **Online**

How To is a widget that provides walkthroughs to navigate through tasks on Firepower Management Center. The walkthroughs guide you to perform the steps required to achieve a task by taking you through each step, one after the other irrespective of the various UI screens that you may have to navigate, to complete the task. The How To widget is enabled by default. To disable the widget, choose **User Preferences** from the drop-down list under your user name, and uncheck the **Enable How-Tos** check box in **How-To Settings**.

Note The walkthroughs are generally available for all UI pages, and are not user role sensitive. However, depending on the privileges of the user, some of the menu items will not appear on the Firepower Management Center interface. Thereby, the walkthroughs will not execute on such pages.

The following walkthroughs are available on Firepower Management Center:

- Register FMC with Cisco Smart Account: This walkthrough guides you to register Firepower Management Center with Cisco Smart Account.
- Set up a Device and add it to FMC: This walkthrough guides you to set up a device and to add the device to Firepower Management Center.
- Configure Date and Time: This walkthrough guides you to configure the date and time of the Firepower Threat Defense devices using a platform settings policy.
- Configure Interface Settings: This walkthrough guides you to configure the interfaces on the Firepower Threat Defense devices.
- Create an Access Control Policy: An access control policy consists of a set of ordered rules, which are evaluated from top to bottom. This walkthrough guides you to create an access control policy.
- Add an Access Control Rule - A Feature Walkthrough: This walkthrough describes the components of an access control rule, and how you can use them in Firepower Management Center.
- Configure Routing Settings: Various routing protocols are supported by Firepower Threat Defense. A static route defines where to send traffic for specific destination networks. This walkthrough guides you to configure static routing for the devices.
- Create a NAT Policy - A Feature Walkthrough: This walkthrough guides you to create a NAT policy and walks you through the various features of a NAT rule.

You can find additional documentation related to the Firepower system using the documentation roadmap: http://www.cisco.com/c/en/us/td/docs/security/firepower/roadmap/firepower-roadmap.html.

Related Documentation

The documents listed in this section might be helpful when configuring your ASA with FirePOWER Services appliance.

Hardware Guides and Data Sheets

The following guides provide more information about ASA with FirePOWER Services hardware.

- https://www.cisco.com/c/en/us/support/security/asa-firepower-services/tsd-products-support-series-home.html
- https://www.cisco.com/c/en/us/support/security/asa-5500-series-next-generation-firewalls/tsd-products-support-series-home.html
- https://www.cisco.com/c/en/us/td/docs/security/asa/quick_start/sfr/firepower-qsg.html

For More Details

Some topics are not included in this guide because they are covered in more detail in the Firepower Management Center Configuration Guide. The following table lists these topics; for additional information not covered in this guide, see also Related Documentation, on page 7

For more information about...	**See the FMC Configuration Guide *part* > *chapter***
Access control rules	**Access Control** > **Access Control Rules**
Intrusion policies	**Intrusion Detection and Prevention** > **Getting Started with Intrusion Policies**
Troubleshooting tools	**System Monitoring and Troubleshooting** > **Troubleshooting the System**
Realms for user control	**Discovery and Identity** > **Create and Manage Realms**
Identity policies	**Discovery and Identity** > **Create and Manage Identity Policies**
Internal Certificate Authorities (CAs)	**Deployment Management** > **Reusable Objects**
Trusted CAs	**Deployment Management** > **Reusable Objects**
Geolocation database updates	**Deployment Management** > **Reusable Objects**

Supported Devices Statements in the Documentation

The Supported Devices statement at the beginning of a chapter or topic indicates that a feature is supported only on the specified device series, family, or model. For example, many features are supported only on Firepower Threat Defense devices.

For more information on platforms supported by this release, see the release notes.

Access Statements in the Documentation

The Access statement at the beginning of each procedure in this documentation indicates the predefined user roles required to perform the procedure. Any of the listed roles can perform the procedure.

Users with custom roles may have permission sets that differ from those of the predefined roles. When a predefined role is used to indicate access requirements for a procedure, a custom role with similar permissions also has access. Some users with custom roles may use slightly different menu paths to reach configuration pages. For example, users who have a custom role with only intrusion policy privileges access the network analysis policy via the intrusion policy instead of the standard path through the access control policy.

Firepower System IP Address Conventions

You can use IPv4 Classless Inter-Domain Routing (CIDR) notation and the similar IPv6 prefix length notation to define address blocks in many places in the Firepower System.

When you use CIDR or prefix length notation to specify a block of IP addresses, the Firepower System uses **only** the portion of the network IP address specified by the mask or prefix length. For example, if you type 10.1.2.3/8, the Firepower System uses 10.0.0.0/8.

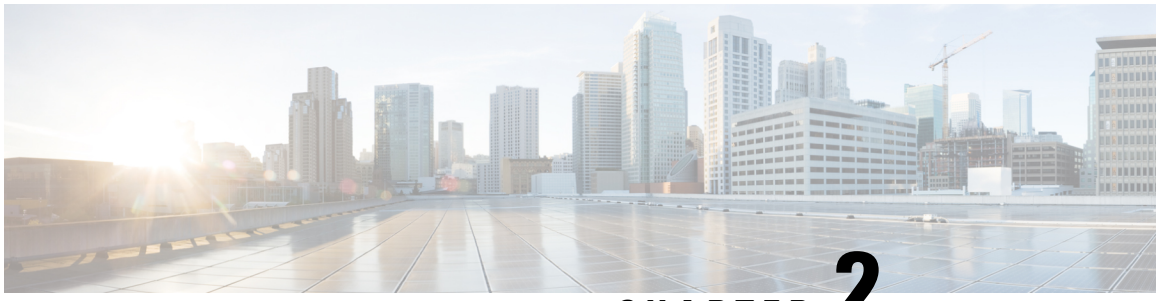
In other words, although Cisco recommends the standard method of using a network IP address on the bit boundary when using CIDR or prefix length notation, the Firepower System does not require it.

Additional Resources

The Firewalls Community is an exhaustive repository of reference material that complements our extensive documentation. This includes links to 3D models of our hardware, hardware configuration selector, product collateral, configuration examples, troubleshooting tech notes, training videos, lab and Cisco Live sessions, social media channels, Cisco Blogs and all the documentation published by the Technical Publications team.

Some of the individuals posting to community sites or video sharing sites, including the moderators, work for Cisco Systems. Opinions expressed on those sites and in any corresponding comments are the personal opinions of the original authors, not of Cisco. The content is provided for informational purposes only and is not meant to be an endorsement or representation by Cisco or any other party.

Note Some of the videos, technical notes, and reference material in the Firewalls Community points to older versions of the Firepower Management Center. Your version of the Firepower Management Center and the version referenced in the videos or technical notes might have differences in the user interface that cause the procedures not to be identical.



CHAPTER 2

Managing Device Configuration

The **Device Management** page allows you to manage the device and interface configurations for the ASA FirePOWER module.

Caution If you configure the ASA in a failover pair, the ASA FirePOWER configuration does not automatically synchronize with the ASA FirePOWER module on the secondary device. You must manually export the ASA FirePOWER configuration from the primary and import it into the secondary every time you make a change.

Editing Device Configuration

The **Device** tab of the **Device Management** page displays detailed device configuration and information, as it applies to the ASA FirePOWER module. It also allows you to make changes to some parts of device configuration, such as changing the displayed module name and modifying management settings.

Editing General Device Configuration

License: Any

The **General** section of the **Device** tab shows the module name, which you can change.

To edit general device configuration:

Step 1 Click **Configuration** > **ASA FirePOWER Configuration** > **Device Management** > **Device**.

The **Device** page is displayed.

Step 2 Next to the **General** section, click (edit).

Step 3 In the **Name** field, enter a new assigned name for the module. You can enter alphanumeric characters and special characters, with the exception of the following characters, which are invalid: +, (,), {, }, #, &, \, <, >, ?, ‘, and “.

Step 4 Click **Save**.

The changes are saved. Note that your changes do not take effect until you apply the device configuration; see Applying Changes to Device Configuration, on page 12 for more information.

Viewing Device System Settings

License: Any

The System section of the Device tab displays a read-only table of system information, as described in the following table.

Table 1: System Section Table Fields

Field	Description
Model	The model name and number for the device.
Serial	The serial number of the chassis of the device.
Time	The current system time of the device.
Version	The version of the software currently installed on the ASA FirePOWER module.
Policy	A link to the system policy currently applied to the ASA FirePOWER module.

Understanding Advanced Device Settings

The **Advanced** section of the **Device** tab displays advanced configuration settings, as described in the following table.

Table 2: Advanced Section Table Fields

Field	Description
Application Bypass	The state of Automatic Application Bypass on the module.
Bypass Threshold	The Automatic Application Bypass threshold, in milliseconds.

You can use the Advanced section to edit any of these settings. See the following sections for more information:

Automatic Application Bypass

License: Any

The Automatic Application Bypass (AAB) feature limits the time allowed to process packets through an interface and allows packets to bypass detection if the time is exceeded. The feature functions with any deployment; however, it is most valuable in inline deployments.

You balance packet processing delays with your network's tolerance for packet latency. When a malfunction within Snort or a device misconfiguration causes traffic processing time to exceed a specified threshold, AAB

causes Snort to restart within ten minutes of the failure, and generates troubleshoot data that can be analyzed to investigate the cause of the excessive processing time.

You can change the bypass threshold if the option is selected. The default setting is 3000 milliseconds (ms). The valid range is from 250 ms to 60,000 ms.

Note AAB is activated only when an excessive amount of time is spent processing a single packet. If AAB engages, the system kills all Snort processes.

For more information about enabling Automatic Application Bypass and setting the bypass threshold, see Editing Advanced Device Settings, on page 11.

Editing Advanced Device Settings

You can use the Advanced section of the Devices tab to modify the Automatic Application Bypass.

To modify advanced device settings:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Device Management** > **Device**.

The **Device** page appears.

Step 2 Next to the **Advanced** section, click the edit icon ( ) .

The **Advanced** pop-up window appears.

Step 3 Optionally, select **Automatic Application Bypass** if your network is sensitive to latency. Automatic Application Bypass is most useful in inline deployments. For more information, see Automatic Application Bypass, on page 10.

Step 4 When you select the **Automatic Application Bypass** option, you can type a **Bypass Threshold** in milliseconds (ms). The default setting is 3000 ms and the valid range is from 250 ms to 60,000 ms.

Step 5 Click **Save**.

Your changes are saved. Note that your changes do not take effect until you apply the device configuration; see Applying Changes to Device Configuration, on page 12 for more information.

Managing ASA FirePOWER Module Interfaces

License: Control, Protection

When editing an ASA FirePOWER interface, you can configure only the interface's security zone from the ASA FirePOWER module. See Working with Security Zones, on page 49 for more information.

You configure interfaces using ASDM and CLI.

To edit an ASA FirePOWER Interface:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Device Management** > **Interfaces** .

The **Interfaces** page appears.

Step 2 Next to the interface you want to edit, click the **edit** icon ( ).

The **Edit Interface** pop-up window appears.

Step 3 From the **Security Zone** drop-down list, select an existing security zone or select **New** to add a new security zone.

Step 4 Click **Store ASA FirePOWER Changes**.

The security zone is configured. Note that your changes do not take effect until you apply the device configuration; see Applying Changes to Device Configuration, on page 12 for more information.

Applying Changes to Device Configuration

License: Any

After you make changes to the ASA FirePOWER configuration of a device, you must apply the changes before they take effect throughout the module. Note that the device must have unapplied changes or this option remains disabled.

Note that if you edit interfaces and reapply a device policy, Snort restarts for all interface instances on the device, not just those that you edited.

To apply changes to the device:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Device Management** > **Device** or **Configuration** > **ASA FirePOWER Configuration** > **Device Management** > **Interfaces**.

The **Device Management** page appears.

Step 2 Click **Apply ASA FirePOWER Changes**.

Step 3 When prompted, click **Apply**.

The device changes are applied.

Tip Optionally, from the **Apply Device Changes** dialog box, click **View Changes**. The **Device Management Revision Comparison Report** page appears in a new window. For more information, see Using the Device Management Revision Comparison Report, on page 12.

Step 4 Click **OK**.

You are returned to the **Device Management** page.

Using the Device Management Revision Comparison Report

License: Any

A device management comparison report allows you to view the changes you have made to an appliance before you apply them. The report displays all differences between the current appliance configuration and

the proposed appliance configuration. This gives you an opportunity to discover any potential configuration errors.

To compare appliance changes before applying them:

Step 1 Select **Configuration**> **ASA FirePOWER Configuration** > **Device Management** > **Device** or **Configuration** > **ASA FirePOWER Configuration** > **Device Management** > **Interfaces** .

The **Device Management** page appears.

Step 2 Click **Apply Changes**.

The **Apply Device Changes** pop-up window appears. Note that the appliance must have unapplied changes or the **Apply Changes** button remains disabled.

Step 3 Click **View Changes**.

The **Device Management Revision Comparison Report** page appears in a new window.

Step 4 Click **Previous** and **Next** to scroll through the differences between the current appliance configuration and the proposed appliance configuration.

Step 5 Optionally, click **Comparison Report** to produce a PDF version of the report.

Configuring Remote Management

License: Any

Before you can manage one Firepower system appliance with another, you must set up a two-way, SSL-encrypted communication channel between the two appliances. The appliances use the channel to share configuration and event information. High availability peers also use the channel, which is by default on port 8305/tcp.

You must configure remote management on the appliance that will be managed; that is, on the device that you want to manage with a Firepower Management Center. After you configure remote management, you can use the managing appliance's web interface to add the managed appliance to your deployment.

Note After you establish remote management and register the Cisco ASA with FirePOWER Services with a Firepower Management Center, you **must** manage the ASA FirePOWER module from the Firepower Management Center instead of from ASDM. You cannot remotely manage the Cisco ASA with FirePOWER Services with the ASDM console after the appliance is registered to a Firepower Management Center.

To enable communications between two appliances, you must provide a way for the appliances to recognize each other. There are three criteria the Firepower system uses when allowing communications:

- the hostname or IP address of the appliance with which you are trying to establish communication

In NAT environments, even if the other appliance does not have a routable address, you must provide a hostname or an IP address either when you are configuring remote management, or when you are adding the managed appliance.

- a self-generated alphanumeric registration key up to 37 characters in length that identifies the connection
- an optional unique alphanumeric NAT ID that can help the Firepower system establish communications in a NAT environment

The NAT ID must be unique among all NAT IDs used to register managed appliances.

When you register a managed device to a Firepower Management Center, the access control policy you select applies to the device. However, if you do not enable licenses for the device required by features used in the access control policy you select, the access control policy apply fails.

To configure remote management of the local appliance:

Access: Admin

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Remote Management**.

The **Remote Management** page appears.

Step 2 Click **Add Manager**.

The **Add Remote Management** page appears.

Step 3 In the **Management Host** field, type the IP address or the hostname of the appliance that you want to use to manage this appliance.

The hostname is the fully qualified domain name or the name that resolves through the local DNS to a valid IP address.

In a NAT environment, you do not need to specify an IP address or hostname here if you plan to specify it when you add the managed appliance. In this case, the Firepower system uses the NAT ID you will provide later to identify the remote manager on the managed ASA FirePOWER module interface.

Caution Use a hostname rather than an IP address if your network uses DHCP to assign IP addresses.

Step 4 In the **Registration Key** field, type the registration key that you want to use to set up communications between appliances.

Step 5 For NAT environments, in the **Unique NAT ID** field, type a **unique** alphanumeric NAT ID that you want to use to set up communications between appliances.

Step 6 Click **Save**.

After the appliances confirm that they can communicate with each other, the Pending Registration status appears.

Step 7 Use the managing appliance's web user interface to add this appliance to your deployment.

Note When enabling remote management of a device, in some high availability deployments that use NAT, you may also need to add the secondary Firepower Management Center as a manager. For more information, contact Support.

Editing Remote Management

License: Any

Use the following procedure to edit the hostname or IP address of the managing appliance. You can also change the display name of the managing appliance, which is a name only used within the context of the

Firepower system. Although you can use the hostname as the display name of the appliance, entering a different display name does not change the hostname.

To edit remote management:

Access: Admin

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Remote Management**.

The **Remote Management** page appears.

Step 2 Click the **edit** icon () next to the manager for which you want to edit remote management settings.

The **Edit Remote Management** page appears.

Step 3 In the **Name** field, change the display name of the managing appliance.

Step 4 In the **Host** field, change the IP address or the hostname of the managing appliance.

The hostname is the fully qualified domain name or the name that resolves through the local DNS to a valid IP address.

Step 5 Click **Save**.

Your changes are saved.

Configuring eStreamer on the eStreamer Server

License: FireSIGHT + Protection

Before the appliance you want to use as an eStreamer server can begin streaming eStreamer events to an external client, you must configure the eStreamer server to send events to clients, provide information about the client, and generate a set of authentication credentials to use when establishing communication.

Configuring eStreamer Event Types

You can control which types of events the eStreamer server is able to transmit to clients that request them.

Available event types on either a managed device or a Firepower Management Center are:

- Intrusion events
- Intrusion event packet data
- Intrusion event extra data

To configure the types of events transmitted by eStreamer:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **eStreamer**.

The **eStreamer Event Configuration** page appears.

Step 2 Under eStreamer **Event Configuration**, select the check boxes next to the types of events you want eStreamer to forward to requesting clients.

You can select any or all of the following on a managed device or Firepower Management Center:

- **Intrusion Events** to transmit intrusion events.
- **Intrusion Event Packet Data** to transmit packets associated with intrusion events.
- **Intrusion Event Extra Data** to transmit additional data associated with an intrusion event such as the originating IP addresses of a client connecting to a web server through an HTTP proxy or load balancer.

Note Note that this controls which events the eStreamer server can transmit. Your client must still specifically request the types of events you want it to receive in the request message it sends to the eStreamer server. For more information, see the Firepower system eStreamer *Integration Guide* .

Step 3 Click **Save**.

Adding Authentication for eStreamer Clients

Before eStreamer can send eStreamer events to a client, you must add the client to the eStreamer server's peers database from the eStreamer page. You must also copy the authentication certificate generated by the eStreamer server to the client.

To add an eStreamer client:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Remote Management**.

The **Registration** page appears.

Step 2 Select the **eStreamer** tab.

The **eStreamer** page appears.

Step 3 Click **Create Client**.

The **Create Client** page appears.

Step 4 In the **Hostname** field, enter the host name or IP address of the host running the eStreamer client.

Note If you use a host name, the eStreamer server **must** be able to resolve the host to an IP address. If you have not configured DNS resolution, you should configure it first or use an IP address.

Step 5 If you want to encrypt the certificate file, enter a password in the **Password** field.

Step 6 Click **Save**.

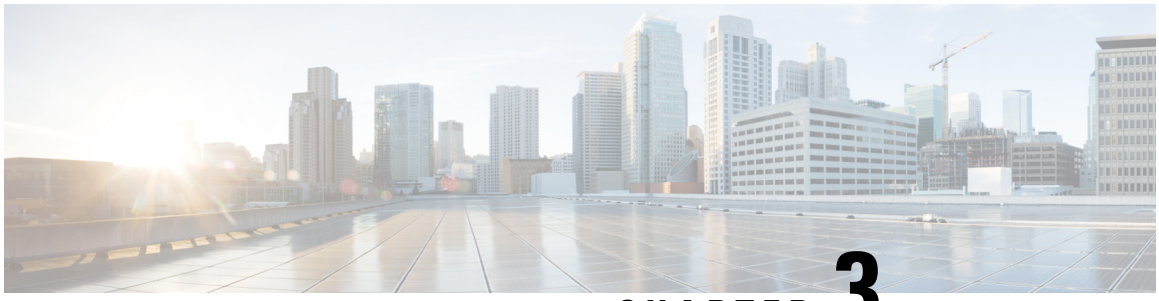
The eStreamer server now allows the host to access port 8302 on the eStreamer server and creates an authentication certificate to use during client-server authentication. **The eStreamer** page reappears, with the new client listed under **Hostname**.

Step 7 Click the **download** icon ( ) next to the client hostname to download the certificate file.

Step 8 Save the certificate file to the appropriate directory used by your client for SSL authentication.

The client can now connect to the eStreamer server. You do not need to restart the eStreamer service.

Tip To revoke access for a client, click the delete icon ( ) next to the host you want to remove. Note that you do not need to restart the eStreamer service; access is revoked immediately.



CHAPTER 3

Managing Reusable Objects

For increased flexibility and ease of use, the ASA FirePOWER module allows you to create named objects, which are reusable configurations that associate a name with a value so that when you want to use that value, you can use the named object instead.

You can create the following types of objects:

- Network based objects that represent IP addresses and networks, port/protocol pairs, security zones, and origin/destination country (geolocation)
- Objects that help you handle unencrypted and decrypted traffic, including Security Intelligence feeds and lists, application filters, URLs, file lists, and intrusion policy variable sets

You can use these objects in various places in the ASA FirePOWER module, including access control policies, network analysis policies, intrusion policies, reports, dashboards, and so on.

Grouping objects allows you to reference multiple objects with a single configuration. You can group network, port, and URL, and public key infrastructure (PKI) objects.

Note In most cases, editing an object used in a policy requires redeploying your configuration for your changes to take effect.

Using the Object Manager

License: Any

Create and manage objects, including application filters, variable sets, and security zones, using the object manager (**Configuration** > **ASA FirePOWER Configuration** > **Object Management**). You can group network, port, and URL and PKI objects; you can also sort, filter, and browse the list of objects and object groups.

Grouping Objects

License: Any

You can group network, port, PKI, and URL objects. The system allows you to use objects and object groups interchangeably. For example, anywhere you would use a port object, you can also use a port object group. Objects and object groups of the same type cannot have the same name.

When you edit an object group used in a policy (for example, a network object group used in an access control policy), you must redeploy the configuration for your changes to take effect; see Deploying Configuration Changes, on page 73.

Deleting a group does not delete the objects in the group, just their association with each other. Additionally, you cannot delete a group that is in use. For example, you cannot delete a URL group that you are using in a URL condition in a saved access control policy.

To group reusable objects:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under the type of **Network**, **Port**, **URL**, **PKI**, or **Distinguished Name** object you want to group, choose **Object Groups**.

Step 3 Click the **Add** button that corresponds with the object you want to group.

Step 4 Enter a **Name** for the group. You can use any printable standard ASCII characters except curly braces ({}).

Step 5 Choose one or more objects and click **Add**.

- Use Shift and Ctrl to choose multiple objects, or right click and Select All.
- Use the **filter** field ( ) to search for existing objects to include, which updates as you type to display matching items. Click the **reload** icon ( ) above the **search** field or click the **clear** icon ( ) in the **search** field to clear the search string.
- Click the **add** icon ( ) to create objects on the fly if no existing objects meet your needs.

Step 6 Click **Store ASA FirePOWER Changes**.

Browsing, Sorting, and Filtering Objects

License: Any

The object manager displays 20 objects or groups per page. If you have more than 20 of any type of object or group, use the navigation links at the bottom of the page to view additional pages. You can also go to a specific page or click the refresh icon ( ) to refresh your view.

By default, the page lists objects and groups alphabetically by name. However, you can sort each type of object or group by any column in the display. An up or down arrow next to a column heading indicates that the page is sorted by that column in that direction. You can also filter the objects on the page by name or value.

To sort objects or groups:

1. Click a column heading. To sort in the opposite direction, click the heading again.

To filter objects or groups:

1. Enter your filter criteria in the **Filter** field.

   The page updates as you type to display matching items. The field accepts one or more asterisks (*) as wild cards

Browsing, Sorting, and Filtering Objects

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To sort objects or groups:

Click a column heading. To sort in the opposite direction, click the heading again.

To filter objects or groups:

a) Enter your filter criteria in the **Filter** field.

   The page updates as you type to display matching items. The field accepts one or more asterisks (*) as wild cards.

Working with Network Objects

License: Any

A network object represents one or more IP addresses that you can specify either individually or as address blocks. You can use network objects and groups (see Grouping Objects, on page 18) in various places in the ASA FirePOWER module, including access control policies, network variables, reports, and so on.

You also cannot delete a network object that is in use. Additionally, after you edit a network object used in an access control or intrusion policy, you must redeploy policies for your changes to take effect.

To create a network object:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **Network**, choose **Individual Objects**.

Step 3 Click **Add Network**.

Step 4 Enter a **Name** for the network object. You can use any printable standard ASCII characters except curly braces ({}).

Step 5 For each IP address or address block you want to add to the network object, enter its value and click **Add**.

Step 6 Click **Store ASA FirePOWER Changes**.

If an active policy references your object, deploy configuration changes; see Deploying Configuration Changes, on page 73.

Working with Security Intelligence Lists and Feeds

License: Protection

The Security Intelligence feature allows you to, per access control policy, specify the traffic that can traverse your network based on the source or destination IP address. This is especially useful if you want to block - deny traffic to and from - specific IP addresses, before the traffic is subjected to analysis by access control rules. Similarly, you can add IP addresses to the whitelist to force the system to handle their connections using access control.

If you are not sure whether you want to block a particular IP address, you can use a "monitor only" setting, which allows the system to handle the connection using access control, but also logs the connection's match to the Security Intelligence block list.

A global whitelist and global blacklist are included by default in every access control policy, and apply to any zone. Additionally, within each access control policy, you can build a separate whitelist and blacklist using a combination of network objects and groups as well as Security Intelligence lists and feeds, all of which you can constrain by security zone.

Comparing Feeds and Lists

A Security Intelligence feed is a dynamic collection of IP addresses that the system downloads from an HTTP or HTTPS server at the interval you configure. Because feeds are regularly updated, the system can use up to date information to filter your network traffic. To help you build blacklists, the ASA FirePOWER module provides the Intelligence Feed, which represents IP addresses determined by the VRT to have a poor reputation.

Although it may take a few minutes for a feed update to take effect, you do not have to deploy policies after you create or modify a feed, or after a scheduled feed update.

Note If you want strict control over when the system downloads a feed from the Internet, you can disable automatic updates for that feed. However, Cisco recommends that you allow automatic updates. Although you can manually perform on demand updates, allowing the system to download feeds on a regular basis provides you with the most up to date, relevant data.

In contrast with a feed, a Security Intelligence list is a simple static list of IP addresses that you manually upload to the system. Use custom lists to augment and fine tune feeds and the global whitelist and blacklist. Note that editing custom lists (as well as editing network objects and removing IP addresses from the global whitelist or blacklist) require you to redeploy the configuration for your changes to take effect.

Formatting and Corrupt Feed Data

Feed and list source must be a simple text file no larger than 500MB, with one IP address or address block per line. Comment lines must start with the # character. List source files must use the.txt extension.

If the system downloads a corrupt feed or a feed with no recognizable IP addresses, the system continues using the old feed data (unless it is the first download). However, if the system can recognize even one IP address in the feed, it updates the addresses it can recognize.

Internet Access and High Availability

The system uses port 443/HTTPS to download the Intelligence Feed, and either 443/HTTP or 80/HTTP to download custom or third party feeds. To update feeds, you must open the appropriate port, both inbound and outbound, on the device. If your system does not have direct access to the feed site, it can use a proxy server.

The system does not perform peer SSL certificate verification when downloading custom feeds, nor does the system support the use of certificate bundles or self signed certificates to verify the remote peer.

Managing Feeds and Lists

You create and manage **Security Intelligence** lists and feeds, collectively called Security Intelligence objects, using the object manager's **Security Intelligence** page.

Note that you cannot delete a custom list or feed that is currently being used in a saved or applied access control policy. You also cannot delete a global list, although you can remove individual IP addresses. Similarly, although you cannot delete the Intelligence Feed, editing it allows you to disable or change the frequency of its updates.

Security Intelligence Object Quick Reference

The following table provides a quick reference to the objects you can use to perform Security Intelligence filtering.

Table 3: Security Intelligence

Capability	Global Whitelist or Blacklist	Intelligence Feed	Custom Feed	Custom List	Network Object
method of use	in access control policies by default	in any access control policy as either a whitelist or blacklist object			
can be constrained by security zone?	no	yes	yes	yes	yes
can be deleted?	no	no	yes, unless currently being used in a saved or applied access control policy		

Capability	Global Whitelist or Blacklist	Intelligence Feed	Custom Feed	Custom List	Network Object
object manager edit capabilities	delete IP addresses only	disable or change update frequency	fully modify	upload a modified list only	fully modify
requires configuration redeployment when modified?	yes when deleting (adding IP addresses does not require redeploy)	no	no	yes	yes

Working with the Global Whitelist and Blacklist

License: Protection

The system's global whitelist and blacklist are included by default in every access control policy, and apply to any zone. You can opt not to use these global lists on a per policy basis.

You do not have to redeploy your configuration after adding an IP address to a global list. Conversely, after you delete IP addresses from the global whitelist or blacklist, you must redeploy your configuration for your changes to take effect.

Note that although you can add network objects with a netmask of /0 to the whitelist or blacklist, address blocks using a /0 netmask in those objects are ignored and whitelist and blacklist filtering does not occur based on those addresses. Address blocks with a /0 netmask from security intelligence feeds is also ignored. If you want to monitor or block all traffic targeted by a policy, instead of security intelligence filtering, use an access control rule with the Monitor or Block rule action, respectively, and a default value of any for the Source Networks and Destination Networks.

To remove IP addresses from the global whitelist or blacklist:

Step 1 On the object manager's **Security Intelligence** page, next to the global whitelist or blacklist, click the edit icon ( ).

Step 2 Next to the IP addresses you ant to remove from the list, click the **delete** icon ( ).

To delete multiple IP addresses at once, use the Shift and Ctrl keys to choose them, then right click and choose **Delete**.

Step 3 Click **Store ASA FirePOWER Changes**.

If an active policy references your object, deploy configuration changes; see Deploying Configuration Changes, on page 73.

Working with the Intelligence Feed

License: Protection

To help you build blacklists, the ASA FirePOWER module provides the Intelligence Feed, which is comprised of several regularly updated lists of IP addresses determined by the VRT to have a poor reputation. Each list

in the feed represents a specific category: open relays, known attackers, bogus IP addresses (bogon), and so on. In an access control policy, you can block any or all of the categories.

Because the intelligence feed is regularly updated, the system can use up to date information to filter your network traffic. Malicious IP addresses that represent security threats such as malware, spam, botnets, and phishing may appear and disappear faster than you can update and deploy new policies.

Although you cannot delete the Intelligence Feed, editing it allows you to change the frequency of its updates. By default, the feed updates every two hours.

To modify the intelligence feed's update frequency:

Step 1 On the object manager's **Security Intelligence** page, next to the Intelligence Feed, click the **edit** icon ( ).

Step 2 Edit the **Update Frequency**.

You can choose various intervals from two hours to one week. You can also disable feed updates.

Step 3 Click **Store ASA FirePOWER Changes**.

Working with Custom Security Intelligence Feeds

License: Protection

Custom or third party Security Intelligence feeds allow you to augment the Intelligence Feed with other regularly updated reputable whitelists and blacklists on the Internet. You can also set up an internal feed.

When you configure a feed, you specify its location using a URL; the URL cannot be Punycode encoded. By default, the system downloads the entire feed source on the interval you configure.

Optionally, you can configure the system to use an md5 checksum to determine whether to download an updated feed. If the checksum has not changed since the last time the module downloaded the feed, the system does not need to re download it. You may want to use md5 checksums for internal feeds, especially if they are large. The md5 checksum must be stored in a simple text file with only the checksum. Comments are not supported.

To configure a Security Intelligence feed:

Step 1 On the object manager's **Security Intelligence** page, click **Add Security Intelligence**.

Step 2 Enter a **Name** for the feed. You can use any printable standard ASCII characters except curly braces ({}).

Step 3 From the **Type** drop down list, specify that you want to configure a Feed.

Step 4 Specify a **Feed URL** and optionally, an MD5 URL.

Step 5 Specify an **Update Frequency**.

You can choose various intervals from two hours to one week. You can also disable feed updates.

Step 6 Click **Store ASA FirePOWER Changes**.

The Security Intelligence feed object is created. Unless you disabled feed updates, the system attempts to download and verify the feed. You can now use the feed object in access control policies.

Manually Updating Security Intelligence Feeds

License: Protection

Manually updating Security Intelligence feeds updates all feeds, including the Intelligence Feed.

To update all Security Intelligence feeds:

Step 1 On the object manager's **Security Intelligence** page, click **Update Feeds**.

Step 2 Confirm that you want to update all feeds.

The system warns that it can take several minutes for the update to take effect.

Step 3 Click **OK**.

After the system downloads and verifies the feed updates, it begins filtering traffic using the updated feeds.

Working with Custom Security Intelligence Lists

License: Protection

A Security Intelligence list is a simple static list of IP addresses and address blocks that you manually upload. Custom lists are useful if you want to augment and fine tune feeds or one of the global lists.

Note that netmasks for address blocks can be integers from 0 to 32 or 0 to 128, for IPv4 and IPv6, respectively.

For example, if a reputable feed improperly blocks your access to vital resources but is overall useful to your organization, you can create a custom whitelist that contains only the improperly classified IP addresses, rather than removing the Security Intelligence feed object from the access control policy's blacklist.

Note that to modify a Security Intelligence list, you must make your changes to the source file and upload a new copy. For more information, see Updating a Security Intelligence List, on page 24.

To upload a new Security Intelligence list:

Step 1 On the object manager's **Security Intelligence** page, click **Add Security Intelligence**.

Step 2 Enter a **Name** for the list. You can use any printable standard ASCII characters except curly braces ({}).

Step 3 From the **Type** drop down list, specify that you want to upload a List.

Step 4 Click **Browse** to browse to the list.txt file, then click **Upload**.

The list is uploaded. The pop up window displays the total number of IP addresses and address blocks that the system found in the list.

If the number is not what you expected, check the formatting of the file and try again.

Step 5 Click **Store ASA FirePOWER Changes**.

Updating a Security Intelligence List

License: Protection

To edit a Security Intelligence list, you must make your changes to the source file and upload a new copy. You cannot modify the file's contents using ASDM. If you do not have access to the source file, you can download a copy using the ASDM interface.

To modify a Security Intelligence list:

Step 1 On the object manager's **Security Intelligence** page, next to the list you want to update, click the **edit** icon ( ).

Step 2 If you need a copy of the list to edit, click **Download**, then follow the prompts to save the list as a text file.

Make changes to the list as necessary.

Step 3 On the **Security Intelligence** pop up window, click **Browse** to browse to the modified list, then click **Upload**.

Step 4 Click **Store ASA FirePOWER Changes**.

If an active policy references your object, deploy configuration changes; see Deploying Configuration Changes, on page 73.

Working with Port Objects

License: Any

Port objects represent different protocols in slightly different ways:

- For TCP and UDP, a port object represents the transport layer protocol, with the protocol number in parentheses, plus an optional associated port or port range. For example: TCP(6)/22.
- For ICMP and ICMPv6 (IPv6 ICMP), the port object represents the internet layer protocol plus an optional type and code. For example: ICMP(1):3:3.
- A port object can also represent other protocols that do not use ports.

Note that the system provides default port objects for well-known ports. You can modify or delete these objects, but Cisco recommends that you create custom port objects instead.

You can use port objects and groups (see Grouping Objects, on page 18) in various places in the ASA FirePOWER module, including access control policies and port variables.

You cannot delete a port object that is in use. Additionally, after you edit or delete a port object, if an active policy references the object, you must redeploy your configuration for the changes to take effect; see Deploying Configuration Changes, on page 73.

Note that you cannot add any protocol other than TCP or UDP for source port conditions in access control rules. Also, you cannot mix transport protocols when setting both source and destination port conditions in a rule.

If you add an unsupported protocol to a port object group used in a source port condition, the rule where it is used does not apply on policy deploy. Additionally, if you create a port object containing both TCP and UDP ports, then add it as a source port condition in a rule, you cannot add a destination port, and vice versa.

To create a port object:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **Port**, choose **Individual Objects**.

Step 3 Click **Add Port**.

Step 4 Enter a **Name** for the port object. You can use any printable standard ASCII characters except curly braces ({}).

Step 5 Choose a Protocol.

You can quickly choose TCP, UDP, IP, ICMP, or IPv6 ICMP, or you can use the Other drop down list to choose either a different protocol or All protocols.

Step 6 Optionally, restrict a TCP or UDP port object using a Port or port range.

You can specify any port from 1 to 65535 or any to match all ports. Use a hyphen to specify a range of ports.

Step 7 Optionally, restrict an ICMP or IPV6 ICMP port object using a Type and, if appropriate, a related Code.

When you create an ICMP or IPv6 ICMP object, you can specify the type and, if applicable, the code. For more information on ICMP types and codes, see http://www.iana.org/assignments/icmp-parameters/icmp-parameters.xml and http://www.iana.org/assignments/icmpv6-parameters/icmpv6-parameters.xml. You can set the type to any to match any type or set the code to any to match any code for the specified type.

Step 8 Optionally, choose Other and a protocol from the drop-down list. If you choose All protocols, enter a port number in the **Port** field.

Step 9 Click **Store ASA FirePOWER Changes**.

Working with URL Objects

License: Any

Each URL object you configure represents a single URL or IP address. You can use URL objects and groups (see Grouping Objects, on page 18) in access control policies. For example, you could write an access control rule that blocks a specific URL.

Note that to block HTTPS traffic, you can enter the URL from the Secure Sockets Layer (SSL) certificate for the traffic. When entering a URL from a certificate, enter the domain name and omit subdomain information. (For example, type example.com rather than www.example.com.) If you block traffic based on the certificate URL, both HTTP and HTTPS traffic to that website are blocked.

You cannot delete a URL object that is in use. Additionally, after you edit or delete a URL object, if an active policy references the object, you must redeploy your configuration for the changes to take effect; see Deploying Configuration Changes, on page 73.

To create a URL object:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **URL**, choose **Individual Objects**.

Step 3 Click **Add URL**.

Step 4 Enter a **Name** for the URL object. You can use any printable standard ASCII characters except curly braces ({}).

Step 5 Enter the **URL** or IP address for the URL object.

Step 6 Click **Store ASA FirePOWER Changes**.

Working with Application Filters

License: Any

When the ASA FirePOWER module analyzes IP traffic, it attempts to identify the commonly used applications on your network. Application awareness is crucial to performing application based access control. The system is delivered with detectors for many applications, and Cisco frequently updates and adds additional detectors via system and vulnerability database (VDB) updates.

Application filters group applications according to criteria associated with the applications' risk, business relevance, type, categories, and tags. Using application filters allows you to quickly create application conditions for access control rules because you do not have to search for and add applications individually; for more information, see Matching Traffic with Application Filters, on page 113.

Another advantage to using application filters is that you do not have to update access control rules that use filters when you modify or add new applications. For example, if you configure your access control policy to block all social networking applications, and a VDB update includes a new social networking application detector, the policy is updated when you update the VDB. Although you must redeploy the changed configuration before the system can block the new application, you do not have to update the access control rule that blocks the application.

If the system-provided application filters do not group applications according to your needs, you can create your own filters. User defined filters can group and combine system provided filters. For example, you could create a filter that would allow you to block all very high risk, low business relevance applications. You can also create a filter by manually specifying individual applications, although you should keep in mind those filters do not automatically update when you update the module software or the VDB.

As with system provided application filters, you can use user defined application filters in access control rules.

You use the object manager (**Configuration** > **ASA FirePOWER Configuration** > **Object Management**) to create and manage application filters. Note that you can also create an application filter on the fly while adding an application condition to an access control rule.

The **Application Filters** list contains the system provided application filters that you can choose to build your own filter. You can constrain the filters that appear by using a search string; this is especially useful for categories and tags.

The **Available Applications** list contains the individual applications in the filters you select. You can also constrain the applications that appear by using a search string.

The system links multiple filters of the same filter type with an OR operation. Consider a scenario where the medium risk filter contains 100 applications and the high risk filter contains 50 applications. If you choose both filters, the system would display 150 available applications.

The system links different types of filters with an AND operation. For example, if you choose the medium and high risk filters and the medium and high business relevance filters, the system displays the applications that have medium or high risk, and also have medium or high business relevance.

Tip Click an **information** icon ( ) for more information about the associated application. To display additional information, click any of the Internet search links in the information pop up.

After you determine the applications you want to add to the filter, you can add them either individually, or, if you chose an application filter, All apps matching the filter. You can add multiple filters and multiple applications, in any combination, as long as the total number of items in the Selected Applications and Filters list does not exceed 50.

After you create the **application** filter, it is listed on the **Application Filters** page of the object manager. The page displays the total number of conditions that comprise each filter.

For information on sorting and filtering the application filters that appear, see Using the Object Manager, on page 18. Note that you cannot delete an application filter that is in use. Additionally, after you edit or delete an application filter object, if an active policy references the object, you must redeploy your configuration for the changes to take effect; see Deploying Configuration Changes, on page 73.

To create an application filter:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Click **Application Filters**.

Step 3 Click **Add Application Filter**.

Step 4 Enter a **Name**. You can use any printable standard ASCII characters except curly braces ({}).

Step 5 Optionally, use system provided filters in the Application Filters list to narrow the list of applications you want to add to the filter:

- Click the arrow next to each filter type to expand and collapse the list.
- Right click a filter type and click **Check All** or **Uncheck All.** Note that the list indicates how many filters you have selected of each type.
- To narrow the filters that appear, enter a search string in the Search by name field; this is especially useful for categories and tags. To clear the search, click the clear icon ( ) .
- To refresh the filters list and clear any selected filters, click the **reload** icon ( ).
- To clear all filters and **search** fields, click **Clear All Filters**.

The applications that match the filters you select appear in the **Available Applications** list. The list displays 100 applications at a time.

Step 6 Choose the applications that you want to add to the filter from the **Available Applications** list:

- Choose All apps matching the filter to add all the applications that meet the constraints you specified in the previous step.
- To narrow the individual applications that appear, enter a search string in the Search by name field. To clear the search, click the **clear** icon ( ).
- Use the **paging** icons at the bottom of the list to browse the list of individual available applications.
- Use **Shift** and **Ctrl** keys to choose multiple individual applications. Right click to Select All currently displayed individual applications.

- To refresh the applications list and clear any selected applications, click the reload icon ( ).

You cannot choose individual applications and All apps matching the filter at the same time.

Step 7 Add the selected applications to the filter. You can click and drag, or you can click Add to Rule.

The result is the combination of:

- the selected Application Filters
- either the selected individual Available Applications, or All apps matching the filter

You can add up to 50 applications and filters to the filter. To delete an application or filter from the selected applications, click the appropriate **delete** icon ( ). You can also select one or more applications and filters, or right click to Select All, then right click to Delete Selected.

Step 8 Click **Store ASA FirePOWER Changes**.

Working with Variable Sets

License: Protection

Variables represent values commonly used in intrusion rules to identify source and destination IP addresses and ports. You can also use variables in intrusion policies to represent IP addresses in rule suppressions, adaptive profiles, and dynamic rule states.

Tip Preprocessor rules can trigger events regardless of the hosts defined by network variables used in intrusion rules.

You use variable sets to manage, customize, and group your variables. You can use the default variable set provided by the ASA FirePOWER module or create your own custom sets. Within any set you can modify predefined default variables and add and modify user defined variables.

Most of the shared object rules and standard text rules that the ASA FirePOWER module provides use predefined default variables to define networks and port numbers. For example, the majority of the rules use the variable $HOME_NET to specify the protected network and the variable $EXTERNAL_NET to specify the unprotected (or outside) network. In addition, specialized rules often use other predefined variables. For example, rules that detect exploits against web servers use the $HTTP_SERVERS and $HTTP_PORTS variables.

Rules are more effective when variables more accurately reflect your network environment. At a minimum, you should modify default variables in the default set as described in Optimizing Predefined Default Variables, on page 30. By ensuring that a variable such as $HOME_NET correctly defines your network and $HTTP_SERVERS includes all web servers on your network, processing is optimized and all relevant systems are monitored for suspicious activity.

To use your variables, you link variable sets to intrusion policies associated with access control rules or with the default action of an access control policy. By default, the default variable set is linked to all intrusion policies used by access control policies.

Optimizing Predefined Default Variables

By default, the ASA FirePOWER module provides a single default variable set, which is comprised of predefined default variables. The Vulnerability Research Team (VRT) uses rule updates to provide new and updated intrusion rules and other intrusion policy elements, including default variables. See Importing Rule Updates and Local Rule Files, on page 483 for more information.

Because many intrusion rules provided by the ASA FirePOWER module use predefined default variables, you should set appropriate values for these variables. Depending on how you use variable sets to identify traffic on your network, you can modify the values for these default variables in any or all variable sets. See Adding and Editing Variables, on page 37 for more information.

Caution Importing an access control or an intrusion policy overwrites existing default variables in the default variable set with the imported default variables. If your existing default variable set contains a custom variable not present in the imported default variable set, the unique variable is preserved. For more information, see Importing Configurations, on page 513.

The following table describes the variables provided by the ASA FirePOWER module and indicates which variables you typically would modify. For assistance determining how to tailor variables to your network, contact Professional Services or Support.

Table 4: Variables Provided by the ASA FirePower Module (continued)

Variable Name	Description	Modify?
$AIM_SERVERS	Defines known AOL Instant Messenger (AIM) servers, and is used in chat-based rules and rules that look for AIM exploits.	Not required.
$DNS_SERVERS	Defines Domain Name Service (DNS) servers. If you create a rule that affects DNS servers specifically, you can use the $DNS_SERVERS variable as a destination or source IP address.	Not required in current rule set.
$EXTERNAL_NET	Defines the network that the ASA FirePOWER module views as the unprotected network, and is used in many rules to define the external network.	Yes, you should adequately define $HOME_NET and then exclude $HOME_NET as the value for $EXTERNAL_NET.
$FILE_DATA_PORTS	Defines non-encrypted ports used in intrusion rules that detect files in a network stream.	Not required.
$FTP_PORTS	Defines the ports of FTP servers on your network, and is used for FTP server exploit rules.	Yes, if your FTP servers use ports other than the default ports (you can view the default ports in the module interface).

Variable Name	Description	Modify?
$GTP_PORTS	Defines the data channel ports where the packet decoder extracts the payload inside a GTP (General Packet Radio Service [GPRS] Tunneling Protocol) PDU.	Not required.
$HOME_NET	Defines the network that the associated intrusion policy monitors, and is used in many rules to define the internal network.	Yes, to include the IP addresses for your internal network.
$HTTP_PORTS	Defines the ports of web servers on your network, and is used for web server exploit rules.	Yes, if your web servers use ports other than the default ports (you can view the default ports in the module interface).
$HTTP_SERVERS	Defines the web servers on your network. Used in web server exploit rules.	Yes, if you run HTTP servers.
$ORACLE_PORTS	Defines Oracle database server ports on your network, and is used in rules that scan for attacks on Oracle databases.	Yes, if you run Oracle servers.
$SHELLCODE_PORTS	Defines the ports you want the system to scan for shell code exploits, and is used in rules that detect exploits that use shell code.	Not required.
$SIP_PORTS	Defines the ports of SIP servers on your network, and is used for SIP exploit rules.	Not required.
$SIP_SERVERS	Defines SIP servers on your network, and is used in rules that address SIP-targeted exploits.	Yes, if you run SIP servers, you should adequately define $HOME_NET and then include $HOME_NET as the value for $SIP_SERVERS.
$SMTP_SERVERS	Defines SMTP servers on your network, and is used in rules that address exploits that target mail servers.	Yes, if you run SMTP servers.
$SNMP_SERVERS	Defines SNMP servers on your network, and is used in rules that scan for attacks on SNMP servers.	Yes, if you run SNMP servers.

Variable Name	Description	Modify?
$SNORT_BPF	Identifies a legacy advanced variable that appears only when it existed on your system in a ASA FirePOWER module software release before Version 5.3.0 that you subsequently upgraded to Version 5.3.0 or greater. See Understanding Advanced Variables, on page 44.	No, you can only view or delete this variable. You cannot edit it or recover it after deleting it.
$SQL_SERVERS	Defines database servers on your network, and is used in rules that address database-targeted exploits.	Yes, if you run SQL servers.
$SSH_PORTS	Defines the ports of SSH servers on your network, and is used for SSH server exploit rules.	Yes, if your SSH servers use ports other than the default port (you can view the default ports in the module interface).
$SSH_SERVERS	Defines SSH servers on your network, and is used in rules that address SSH-targeted exploits.	Yes, if you run SSH servers, you should adequately define $HOME_NET and then include $HOME_NET as the value for $SSH_SERVERS.
$TELNET_SERVERS	Defines known Telnet servers on your network, and is used in rules that address Telnet server-targeted exploits.	Yes, if you run Telnet servers.
$USER_CONF	Provides a general tool that allows you to configure one or more features not otherwise available via the module interface. See Understanding Advanced Variables, on page 44. **Caution** Conflicting or duplicate $USER_CONF configurations will halt the system. See Understanding Advanced Variables, on page 44.	No, only as instructed in a feature description or with the guidance of Support.

Understanding Variable Sets

License: Protection

Adding a variable to any set adds it to all sets; that is, each variable set is a collection of all variables currently configured on your system. Within any variable set, you can add user defined variables and customize the value of any variable.

Initially, the ASA FirePOWER module provides a single, default variable set comprised of predefined default values. Each variable in the default set is initially set to its default value, which for a predefined variable is the value set by the VRT and provided in rule updates.

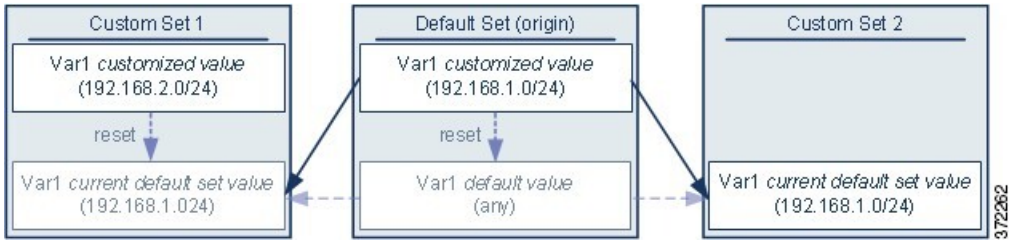
Although you can leave predefined default variables configured to their default values, Cisco recommends that you modify a subset of predefined variables as described in Optimizing Predefined Default Variables, on page 30.

You could work with variables only in the default set, but in many cases you can benefit most by adding one or more custom sets, configuring different variable values in different sets, and perhaps even adding new variables.

When using multiple sets, it is important to remember that the current value of any variable in the default set determines the default value of the variable in all other sets.

Example: Adding a User-Defined Variable to the Default Set

The following diagram illustrates set interactions when you add the user defined variable Var1 to the default set with the value 192.168.1.0/24.



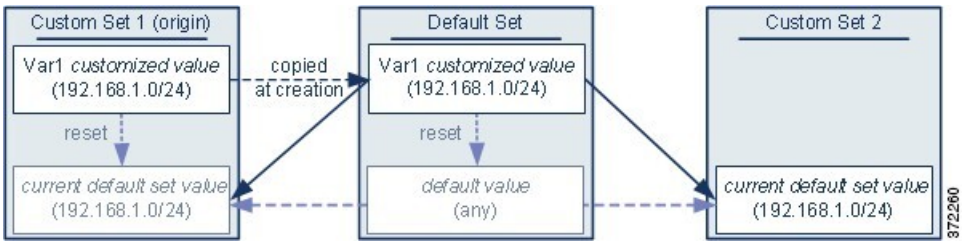
Optionally, you can customize the value of Var1 in any set. In Custom Set 2 where Var1 has not been customized, its value is 192.168.1.0/24. In Custom Set 1 the customized value 192.168.2.0/24 of Var1 overrides the default value. Resetting a user defined variable in the default set resets its default value to any in all sets.

It is important to note in this example that, if you do not update Var1 in Custom Set 2, further customizing or resetting Var1 in the default set consequently updates the current, default value of Var1 in Custom Set 2, thereby affecting any intrusion policy linked to the variable set.

Although not shown in the example, note that interactions between sets are the same for user defined variables and default variables except that resetting a default variable in the default set resets it to the value configured by the system in the current rule update.

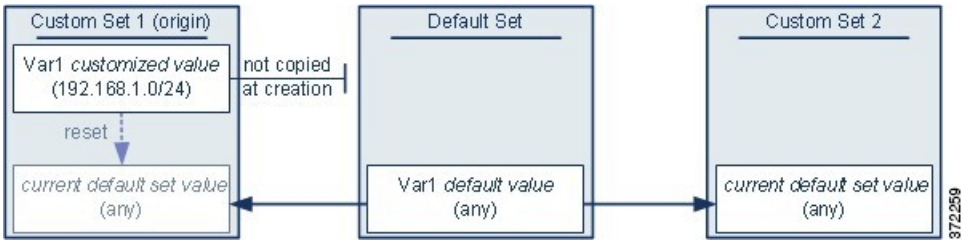
Examples: Adding a User-Defined Variable to a Custom Set

The next two examples illustrate variable set interactions when you add a user defined variable to a custom set. When you save the new variable, you are prompted whether to use the configured value as the default value for other sets. In the following example, you elect to use the configured value.



Note that, except for the origin of Var1 from Custom Set 1, this example is identical to the example above where you added Var1 to the default set. Adding the customized value 192.168.1.0/24 for Var1 to Custom Set 1 copies the value to the default set as a customized value with a default value of any. Thereafter, Var1 values and interactions are the same as if you had added Var1 to the default set. As with the previous example, keep in mind that further customizing or resetting Var1 in the default set consequently updates the current, default value of Var1 in Custom Set 2, thereby affecting any intrusion policy linked to the variable set.

In the next example, you add Var1 with the value 192.168.1.0/24 to Custom Set 1 as in the previous example, but you elect not to use the configured value of Var1 as the default value in other sets.



This approach adds Var1 to all sets with a default value of any. After adding Var1, you can customize its value in any set. An advantage of this approach is that, by not initially customizing Var1 in the default set, you decrease your risk of customizing the value in the default set and thus inadvertently changing the current value in a set such as Custom Set 2 where you have not customized Var1.

Managing Variable Sets

License: Protection

When you choose Variable Sets on the **Object Manager** page (**Configuration** > **ASA FirePOWER Configuration** > **Object Management** >), the object manager lists the default variable set and any custom sets you created.

On a freshly installed system, the default variable set is comprised only of the default system-provided variables.

Each variable set includes the system-provided default variables and all custom variables you have added from any variable set. Note that you can edit the default set, but you cannot rename or delete the default set.

The following table summarizes the actions you can take to manage your variable sets.

Table 5: Variable Set Management Actions

To...	You can...
display your variable sets	choose Configuration > ASA FirePOWER Configuration > Object Management, then choose Variable Set.
filter variable sets by name	begin entering a name; as you type, the page refreshes to display matching names.

clear name filtering	click the clear icon ( ) in the filter field.
add a custom variable set	click Add Variable Set. For your convenience, new variable sets contain all currently defined default and customized variables.
edit a variable set	click the edit icon ( ) next to the variable set you want to edit. You can also right-click within the row for a variable set, then choose Edit.
delete a custom variable set	click the delete icon ( ) next to the variable set, then click Yes. You cannot delete the default variable set. Note that variables created in a variable set you delete are not deleted or otherwise affected in other sets. You can also right-click within the row for a variable set, choose Delete, then click Yes. Use the Ctrl and Shift keys to choose multiple sets.

After you configure variable sets, you can link them to intrusion policies.

To create or edit a variable set:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Choose **Variable Set**.

Step 3 Create a variable set or edit an existing set:

- To create a variable set, click **Add Variable Set**.
- To create a variable set, click the **edit** icon ( ) next to the variable set.

See Adding and Editing Variables, on page 37 for information on adding and editing variables within a variable set.

If an active policy references your object, deploy configuration changes; see Deploying Configuration Changes, on page 73.

Managing Variables

License: Protection

You manage variables on the new or edit variables page within a variable set. The variables page for all variable sets separates variables into Customized Variables and Default Variables page areas.

A default variable is a variable provided by the ASA FirePOWER module. You can customize the value of a default variable. You cannot rename or delete a default variable, and you cannot change its default value.

A *customized variable* is one of the following:

- customized default variables

When you edit the value for a default variable, the system moves the variable from the **Default Variables** area to the **Customized Variables** area. Because variable values in the default set determine the default values of

variables in custom sets, customizing a default variable in the default set modifies the default value of the variable in all other sets.

- user defined variables

You can add and delete your own variables, customize their values within different variable sets, and reset customized variables to their default values. When you reset a user defined variable, it remains in the Customized Variables area.

The following table summarizes the actions you can take to create or edit variables.

Table 6: Variable Management Actions (continued)

To...	You can...
display the variables page	on the variable sets page, click **Add Variable Set** to create a new variable set, or click the **edit** icon ( ) next to the variable set you want to edit.
name and, optionally, describe your variable set	enter an alphanumeric string including spaces and special characters in the **Name** and **Description** fields.
add a variable	click **Add**. See Adding and Editing Variables, on page 37 for more information.
edit a variable	click the **edit** icon ( ) next to the variable you want to edit. See Adding and Editing Variables, on page 37 for more information.
reset a modified variable to its default value	click the **reset** icon ( ) next to a modified variable. A shaded reset icon indicates that the current value is already the default value.
delete a user-defined customized variable	click the **delete** icon ( ) next to the variable set; if you have saved the variable set since adding the variable, then click **Yes** to confirm that you want to delete the variable. You cannot delete default variables, and you cannot delete user-defined variables that are used by intrusion rules or other variables.
save changes to a variable set	click **Store ASA FirePOWER Changes**, then click **Yes** if the variable set is in use by an access control policy to confirm that you want to save your changes. Because the current value in the default set determines the default value in all other sets, modifying or resetting a variable in the default set changes the current value in other sets where you have not customized the default value.

To view the variables in a variable set:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Choose **Variable Set**.

Step 3 Create a variable set or edit an existing set:

- To create a variable set, click **Add Variable Set**.
- To create a variable set, click the edit icon ( ) next to the variable set.

Step 4 Create a variable or edit an existing variable:

- To create a variable, click **Add**.
- To edit a variable, click the edit icon ( ) next to the variable.

See Adding and Editing Variables, on page 37 for information on adding and editing variables within a variable set.

Adding and Editing Variables

License: Protection

You can modify variables in any custom set.

If you create custom standard text rules, you might also want to create your own user defined variables to more accurately reflect your traffic or as shortcuts to simplify the rule creation process. For example, if you create a rule that you want to inspect traffic in the "demilitarized zone" (or DMZ) only, you can create a variable named $DMZ whose value lists the server IP addresses that are exposed. You can then use the $DMZ variable in any rule written for this zone.

Adding a variable to a variable set adds it to all other sets. With one exception as explained below, the variable is added to other sets as the default value, which you can then customize.

When you add a variable from a custom set, you must choose whether to use the configured value as the customized value in the default set.

- If you do use the configured value (for example, 192.168.0.0/16), the variable is added to the default set using the configured value as a customized value with a default value of any. Because the current value in the default set determines the default value in other sets, the initial, default value in other custom sets is the configured value (which in the example is 192.168.0.0/16).
- If you do not use the configured value, the variable is added to the default set using only the default value any and, consequently, the initial, default value in other custom sets is any.

See Understanding Variable Sets, on page 33for more information.

You add variables within a variable set on the New Variable page and edit existing variables on the Edit Variable page. You use the two pages identically except that when you edit an existing variable you cannot change the variable name or variable type.

Each page consists mainly of three windows:

- available items, including existing network or port variables, objects, and network object groups
- networks or ports to include in the variable definition
- networks or ports to exclude from the variable definition

You can create or edit two types of variables:

- network variables specify the IP addresses of hosts in your network traffic. See Working with Network Variables, on page 40.
- port variables specify TCP or UDP ports in network traffic, including the value any for either type. See Working with Port Variables, on page 42.

When you specify whether you want to add a network or port variable type, the page refreshes to list available items. A search field above the list allows you to constrain the list, which updates as you type.

You can select and drag available items the list of items to include or exclude. You can also select items and click the Include or Exclude button. Use the Ctrl and Shift keys to choose multiple items. You can use the configuration field below the list of included or excluded items to specify literal IP addresses and address blocks for network variables, and ports and port ranges for port variables.

A list of items to include or exclude can be comprised of any combination of literal strings and existing variables, objects, and network object groups in the case of network variables.

The following table summarizes the actions you can take to create or edit your variables.

Table 7: Variable Edit Actions (continued)

To...	You can...
display the variables page	on the **variable sets** page, click **Add** to add a new variable, or click the **edit** icon ( ) next to an existing variable.
name your variable	in the **Name** field, enter a unique, case-sensitive alphanumeric string that includes no special characters other than the underscore character (_). Note that variable names are case-sensitive; for example, var and Var are each unique.
specify a network or port variable	choose **Network** or **Port** from the **Type** drop-down list. See Working with Network Variables, on page 40and Working with Port Variables, on page 42 for detailed information on how you can use and configure network and port variables.
add an individual network object so you can then choose it from the list of available networks	choose **Network** from the **Type** drop-down list, then click the **add** icon . See Working with Network Objects, on page 19 for information on adding network objects using the object manager.
add an individual port object so you can then choose it from the list of available ports	choose **Port** from the **Type** drop-down list, then click the **add** icon . Although you can add any port type, only TCP and UDP ports, including the value any for either type, are valid variable values, and the list of available ports only displays variables that use these value types. See Working with Port Objects, on page 25 for information on adding port objects using the object manager.
search for available port or network items by name	begin entering a name in the **search** field above the list of available items; as you type, the page refreshes to display matching names.
clear name searching	click the **reload** icon ( ) above the search field or the **clear** icon ( ) in the **search** field.
differentiate between available items	look for items next to the **variables** icon , **network object** icon , **port** icon and **object group** icon . Note that only network groups, not port groups, are available.
choose objects to include or exclude in the variable definition	click the object in the list of **available networks** or **ports**; use the Ctrl and Shift keys to choose multiple objects.

add selected items to the list of included or excluded networks or ports	drag and drop selected items. Alternately, click **Include** or **Exclude**. You can add network and port variables and objects from the list of available items. You can also add network object groups.
add a literal network or port to the list of networks or ports to include or exclude	click to remove the prompt from the **literal Network** or **Port** field, enter the literal IP address or address block for network variables, or the literal port or port range for port variables, then click **Add**. Note that you cannot enter domain names or lists; to add multiple items, add each individually.
add a variable with the value any	name the variable and specify the variable type, then click **Store ASA FirePOWER Changes** without configuring a value.
delete a variable or object from the included or excluded list	click the **delete** icon ( ) next to the variable.
save a new or modified variable	click **Store ASA FirePOWER Changes**; if you are adding a variable from custom set, then click Yes to use the configured value as the default value in other sets, or No to use a default value of any.

After you edit a variable, if an active policy references the object, you must redeploy your configuration for the changes to take effect; see Deploying Configuration Changes, on page 73.

To create or edit a variable:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Choose **Variable Set**.

Step 3 Create a variable set or edit an existing set:

- To create a variable set, click **Add Variable Set**.
- To edit an existing variable set, click the **edit** icon ( ) next to the variable set.

Step 4 Create a new variable or edit an existing variable:

- To create a new variable, click **Add**.
- To edit an existing variable, click the **edit** icon ( ) next to the variable.

Step 5 If you are creating a new variable:

- Enter a unique variable Name.

You can use alphanumeric characters and the underscore (_) character.

- Choose the **Network** or **Port variable** Type from the drop down list.

Step 6 Optionally, move items from the list of available networks or ports to the list of included or excluded items.

You can choose one or more items and then drag and drop, or click Include or Exclude. Use the Ctrl and Shift keys to choose multiple items.

Tip Tip If addresses or ports in the included and excluded lists for a network or port variable overlap, excluded addresses or ports take precedence.

Step 7 Optionally, enter a single literal value, then click **Add**.

For network variables, you can enter a single IP address or address block. For port variables you can add a single port or port range, separating the upper and lower values with a hyphen (-).

Repeat this step as needed to enter multiple literal values.

Step 8 Click **Store ASA FirePOWER Changes** to save the variable. If you are adding a new variable from a custom set, you have the following options:

- Click **Yes** to add the variable using the configured value as the customized value in the default set and, consequently, the default value in other custom sets.
- Click **No** to add the variable as the default value of any in the default set and, consequently, in other custom sets.

Step 9 When you have finished making changes, click **Store ASA FirePOWER Changes** to save the variable set, then click **Yes**.

If an active policy references your object, deploy configuration changes; see Deploying Configuration Changes, on page 73.

Working with Network Variables

License: Protection

Network variables represent IP addresses you can use in intrusion rules that you enable in an intrusion policy and in intrusion policy rule suppressions, dynamic rule states, and adaptive profiles. Network variables differ from network objects and network object groups in that network variables are specific to intrusion policies and intrusion rules, whereas you can use network objects and groups to represent IP addresses in various places in the ASA FirePOWER module, including access control policies, network variables, reports, and so on. See Working with Network Objects, on page 19 for more information.

You can use network variables in the following configurations to specify the IP addresses of hosts on your network:

- intrusion rules

Intrusion rule Source IPs and Destination IPs header fields allow you to restrict packet inspection to the packets originating from or destined to specific IP addresses.

- suppressions

The **Network** field in source or destination intrusion rule suppressions allows you to suppress intrusion event notifications when a specific IP address or range of IP addresses triggers an intrusion rule or preprocessor. See Configuring Suppression Per Intrusion Policy, on page 312.

- dynamic rule states

The Network field in source or destination dynamic rule states allows you to detect when too many matches for an intrusion rule or preprocessor rule occur in a given time period. See Adding Dynamic Rule States, on page 315.

- adaptive profiles

The adaptive profiles Networks field identifies hosts in the network where you want to improve reassembly of packet fragments and TCP streams in passive deployments. See Tuning Intrusion Policies Using Rules, on page 289.

When you use variables in the fields identified in this section, the variable set you link to an intrusion policy determines the variable values in the network traffic handled by an access control policy that uses the intrusion policy.

You can add any combination of the following network configurations to a variable:

- any combination of network variables, network objects, and network object groups that you select from the list of available networks

See Working with Network Objects, on page 19 for information on creating individual and group network objects using the object manager.

- individual network objects that you add from the **New Variable** or **Edit Variable** page, and can then add to your variable and to other existing and future variables
- literal, single IP addresses or address blocks

You can list multiple literal IP addresses and address blocks by adding each individually. You can list IPv4 and IPv6 addresses and address blocks alone or in any combination. When specifying IPv6 addresses, you can use any addressing convention defined in RFC 4291.

The default value for included networks in any variable you add is the word any, which indicates any IPv4 or IPv6 address. The default value for excluded networks is none, which indicates no network. You can also specify the address :: in a literal value to indicate any IPv6 address in the list of included networks, or no IPv6 addresses in the list of exclusions.

Adding networks to the excluded list negates the specified addresses and address blocks. That is, you can match any IP address with the exception of the excluded IP address or address blocks.

For example, excluding the literal address 192.168.1.1 specifies any IP address other than 192.168.1.1, and excluding 2001:db8:ca2e::fa4c specifies any IP address other than 2001:db8:ca2e::fa4c.

You can exclude any combination of networks using literal or available networks. For example, excluding the literal values 192.168.1.1 and 192.168.1.5 includes any IP address other than 192.168.1.1 or 192.168.1.5. That is, the system interprets this as "not 192.168.1.1 and not 192.168.1.5," which matches any IP address other than those listed between brackets.

Note the following points when adding or editing network variables:

- You cannot logically exclude the value any which, if excluded, would indicate no address. For example, you cannot add a variable with the value any to the list of excluded networks.
- Network variables identify traffic for the specified intrusion rule and intrusion policy features. Note that preprocessor rules can trigger events regardless of the hosts defined by network variables used in intrusion rules.
- Excluded values must resolve to a subset of included values. For example, you cannot include the address block 192.168.5.0/24 and exclude 192.168.6.0/24. An error message warns you and identifies the offending variable, and you cannot save your variable set when you exclude a value outside the range of included values.

For information on adding and editing network variables, see Adding and Editing Variables, on page 37.

Working with Port Variables

License: Protection

Port variables represent TCP and UDP ports you can use in the Source Port and Destination Port header fields in intrusion rules that you enable in an intrusion policy. Port variables differ from port objects and port object groups in that port variables are specific to intrusion rules. You can create port objects for protocols other than TCP and UDP, and you can use port objects in port variables and access control policies. See Working with Port Objects, on page 25 for more information.

You can use port variables in the intrusion rule Source Port and Destination Port header fields to restrict packet inspection to packets originating from or destined to specific TCP or UDP ports.

When you use variables in these fields, the variable set you link to the intrusion policy associated with an access control rule or policy determines the values for these variables in the network traffic where the system applies the access control policy.

You can add any combination of the following port configurations to a variable:

- any combination of port variables and port objects that you cboose from the list of available ports

Note that the list of available ports does not display port object groups, and you cannot add these to variables. See Working with Port Objects, on page 25 for information on creating port objects using the object manager.

- individual port objects that you add from the **New Variable** or **Edit Variable** page, and can then add to your variable and to other existing and future variables

Only TCP and UDP ports, including the value any for either type, are valid variable values. If you use the new or edit variables page to add a valid port object that is not a valid variable value, the object is added to the system but is not displayed in the list of available objects. When you use the object manager to edit a port object that is used in a variable, you can only change its value to a valid variable value.

- single, literal port values and port ranges

You must separate port ranges with a dash (-). Port ranges indicated with a colon (:) are supported for backward compatibility, but you cannot use a colon in port variables that you create.

You can list multiple literal port values and ranges by adding each individually in any combination.

Note the following points when adding or editing port variables:

- The default value for included ports in any variable you add is the word any, which indicates any port or port range. The default value for excluded ports is none, which indicates no ports.

Tip To create a variable with the value any, name and save the variable without adding a specific value.

- You cannot logically exclude the value any which, if excluded, would indicate no ports. For example, you cannot save a variable set when you add a variable with the value any to the list of excluded ports.
- Adding ports to the excluded list negates the specified ports and port ranges. That is, you can match any port with the exception of the excluded ports or port ranges.

- Excluded values must resolve to a subset of included values. For example, you cannot include the port range 10-50 and exclude port 60. An error message warns you and identifies the offending variable, and you cannot save your variable set when you exclude a value outside the range of included values

  .

For information on adding and editing port variables, see Adding and Editing Variables, on page 37.

Resetting Variables

License: Protection

You can reset a variable to its default value on the variable set new or edit variables page. The following table summarizes the basic principles of resetting variables.

Table 8: Variable Reset Values

Resetting this variable type...	In this set type...	Resets it to...
default	default	the rule update value
user-defined	default	any
default or user-defined	custom	the current default set value (modified or unmodified)

Resetting a variable in a custom set simply resets it to the current value for that variable in the default set.

Conversely, resetting or modifying the value of a variable in the default set always updates the default value of that variable in all custom sets. When the reset icon is grayed out, indicating that you cannot reset the variable, this means that the variable has no customized value in that set. Unless you have customized the value for a variable in a custom set, a change to the variable in the default set updates the value used in any intrusion policy where you have linked the variable set.

Note It is good practice when you modify a variable in the default set to assess how the change affects any intrusion policy that uses the variable in a linked custom set, especially when you have not customized the variable value in the custom set.

When the customized value and the reset value are the same, this indicates one of the following:

- you are in the custom or default set where you added the variable with the value any
- you are in the custom set where you added the variable with an explicit value and elected to use the configured value as the default value

Linking Variable Sets to Intrusion Policies

License: Control

By default, the ASA FirePOWER module links the default variable set to all intrusion policies used in an access control policy. When you deploy an access control policy that uses an intrusion policy, intrusion rules that you have enabled in the intrusion policy use the variable values in the linked variable set.

When you modify a custom variable set used by an intrusion policy in an access control policy, the system reflects the status for that policy as out of date on the **Access Control** page. You must deploy the configuration to implement changes in your variable set. When you modify the default set, the system reflects the status of all access control policies that use intrusion policies as out of date, and you must redeploy the configuration to implement your changes.

See the following sections for information:

- To link a variable set other than the default set to an access control rule, see the procedure in Configuring an Access Control Rule to Perform Intrusion Prevention, on page 138
- To link a variable set other than the default set to the default action of an access control policy, see Setting Default Handling and Inspection for Network Traffic, on page 66.
- To deploy access control policies, including policies that link variable sets to intrusion policies, see Deploying Configuration Changes, on page 73.

Understanding Advanced Variables

License: Protection

Advanced variables allow you to configure features that you cannot otherwise configure via the module interface. The ASA FirePOWER module currently provides only two advanced variables, and you can only edit the USER_CONF advanced variable.

USER_CONF

USER_CONF provides a general tool that allows you to configure one or more features not otherwise available via the module interface.

Caution Do not use the advanced variable USER_CONF to configure an intrusion policy feature unless you are instructed to do so in the feature description or by Support. Conflicting or duplicate configurations will halt the system.

When editing USER_CONF, you can type up to 4096 total characters on a single line; the line wraps automatically. You can include any number of valid instructions or lines until you reach the 8192 maximum character length for a variable or a physical limit such as disk space. Use the backslash (\) line continuation character after any complete argument in a command directive.

Resetting USER_CONF empties it.

Working with Sinkhole Objects

License: Protection

A sinkhole object represents either a DNS server that gives non-routeable addresses for all domain names within the sinkhole, or an IP address that does not resolve to a server. You can reference the sinkhole object within a DNS policy rule to redirect matching traffic to the sinkhole. You must assign the object both an IPv4 address and an IPv6 address.

You cannot delete a sinkhole object that is in use. Additionally, after you edit a sinkhole object used in a DNS policy, you must redeploy the configuration for your changes to take effect; see Deploying Configuration Changes, on page 73.

To create a sinkhole object:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management.**

Step 2 Choose **Sinkhole** from the list of object types.

Step 3 Click **Add Sinkhole**.

Step 4 Enter a **Name**.

Step 5 Enter the **IPv4 Address** and **IPv6 Address** of your sinkhole.

Step 6 You have the following options:

- If you want to redirect traffic to a sinkhole server, choose **Log Connections** to **Sinkhole**.
- If you want to redirect traffic to a non-resolving IP address, choose **Block** and **Log Connections** to **Sinkhole**.

Step 7 If you want to assign an **Indication of Compromise (IoC)** type to your sinkhole, choose one from the **Type** drop-down.

Step 8 Click **Store ASA FirePOWER Changes**.

Working with File List

License: Malware

If you use network-based advanced malware protection (AMP), and the Collective Security Intelligence Cloud incorrectly identifies a file's disposition, you can add the file to a file list using a SHA 256 hash value to better detect the file in the future. Depending on the type of file list, you can do the following:

- To treat a file as if the cloud assigned a clean disposition, add the file to the clean list.
- To treat a file as if the cloud assigned a malware disposition, add the file to the custom detection list.

Because you manually specify the blocking behavior for these files, the system does not perform malware cloud lookups, even if the files are otherwise identified as malware by the cloud. Note that you must configure a rule in the file policy with either a Malware Cloud Lookup or Block Malware action and a matching file type to calculate a file's SHA value. For more information, see Working with File Rules, on page 375.

The system's clean list and custom detection list are included by default in every file policy. You can opt not to use either or both lists on a per policy basis.

Caution Do not include files on this list that are actually malware. The system does not block them, even if the cloud assigned the file's a Malware disposition, or if you added the file to the custom detection list.

Each file list can contain up to 10000 unique SHA-256 values. To add files to the file list, you can:

- upload a file so the system calculates and adds the file's SHA 256 value.
- enter a file's **SHA-256** value directly.
- create and upload a comma-separated value (CSV) source file containing multiple SHA-256 values. All non-duplicate SHA-256 values are added to the file list.

When you add a file to a file list, edit a **SHA-256** value in the **file** list, or delete **SHA-256** values from the **file** list, you must redeploy the configuration for your changes to take effect; see Deploying Configuration Changes, on page 73.

Uploading Multiple SHA-256 Values to a File List

License: Malware

You can add multiple SHA-256 values to a file list by uploading a comma separated value (CSV) source file containing a list of SHA-256 values and descriptions. The system validates the contents and populates the file list with valid SHA-256 values.

The source file must be a simple text file with a .csv file name extension. Any header must start with a pound sign (#); it is treated as a comment and not uploaded. Each entry should contain a single SHA-256 value followed by a description of up to 256 alphanumeric or special characters and end with either the LF or CR+LF Newline character. The system ignores any additional information in the entry.

Note the following:

- Deleting a source file from the file list also removes all associated SHA-256 hashes from the file list.
- You cannot upload multiple files to a file list if the successful source file upload results in the file list containing more than 10000 distinct SHA-256 values.
- The system truncates descriptions exceeding 256 characters to the first 256 characters on upload. If the description contains commas, you must use an escape character (\,). If no description is included, the source file name is used instead.
- If a file list contains a SHA-256 value, and you upload a source file containing that value, the newly uploaded value does not modify the existing SHA 256 value. When viewing captured files, file events, or malware events related to the SHA-256 value, any threat name or description is derived from the individual SHA-256 value.
- The system does not upload invalid SHA-256 values in a source file.
- If multiple uploaded source files contain an entry for the same SHA 256 value, the system uses the most recent value.
- If a source file contains multiple entries for the same SHA-256 value, the system uses the last one.

- You cannot directly edit a source file within the object manager. To make changes, you must first modify your source file directly, delete the copy on the system, then upload the modified source file. See Downloading a Source File from a File List, on page 49 for more information.

To upload a source file to a file list:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Click **File List**.

Step 3 Click the **edit** icon ( ) next to the file list where you want to add values from a source file.

Step 4 Choose **List of SHAs** from the **Add by field**.

Step 5 Optionally, enter a description of the source file in the **Description** field.

If you do not enter a description, the system uses the file name.

Step 6 Click **Browse** to browse to the source file, then click Upload and Add List to add the list.

The source file is added to the file list. The **SHA-256** column lists how many SHA-256 values the file contains.

Step 7 Click **Store ASA FirePOWER Changes.**

If an active policy references your object, deploy configuration changes; see Deploying Configuration Changes, on page 73.

After configuration deployment, the system no longer performs malware cloud lookups on files in the **file** list.

Uploading an Individual File to a File List

License: Malware

If you have a copy of the file you want to add to a file list, you can upload the file to the system for analysis; the system calculates the file's SHA-256 value and adds the file to the list. The system does not enforce a limit on the size of files for SHA 256 calculation.

To add a file by having the system calculate its SHA-256 value:

Step 1 On the object manager's **File List** page, click the **edit** icon ( ) next to the clean list or custom detection list where you want to add a file.

Step 2 Choose **Calculate SHA** from the **Add by field**.

Step 3 Optionally, enter a description of the file in the **Description** field.

If you do not enter a description, the file name is used for the description on upload.

Step 4 Click **Browse** to browse to the source file, then click **Calculate** and **Add SHA** to add the list.

Step 5 Click **Store ASA FirePOWER Changes**.

If an active policy references your object, deploy configuration changes; see Deploying Configuration Changes, on page 73.

After configuration deployment, the system no longer performs malware cloud lookups on files in the **file** list.

Adding a SHA-256 Value to the File List

License: Malware

You can submit a file's **SHA-256** value to add it to a file list. You cannot add duplicate SHA 256 values.

To add a file by manually entering the file's SHA-256 value:

Step 1 On the object manager's **File List** page, click the **edit** icon ( ) next to the **clean** list or custom detection list where you want to add a file.

Step 2 Choose **Enter SHA Value** from the **Add by field**.

Step 3 Enter a description of the source file in the **Description** field.

Step 4 Enter or paste the file's entire **SHA-256** value. The system does not support matching partial values.

Step 5 Click **Add** to add the file.

Step 6 Click **Store ASA FirePOWER Changes**.

If an active policy references your object, deploy configuration changes; see Deploying Configuration Changes, on page 73.

After configuration deployment, the system no longer performs malware cloud lookups on files in the file list.

Modifying Files on a File List

License: Malware

You can edit or delete individual SHA 256 values on a file list. Note that you cannot directly edit a source file within the object manager. To make changes, you must first modify your source file directly, delete the copy on the system, then upload the modified source file. See Downloading a Source File from a File List, on page 49 for more information. To edit a file on a file list:

Step 1 On the object manager's **File List** page, click the **edit** icon ( ) next to the clean list or custom detection list where you want to modify a file.

Step 2 Next to the **SHA 256** value you want to edit, click the **edit** icon ( ).

Tip You can also delete files from the list. Next to the file you want to remove, click the delete icon ( ) .

Step 3 Update the **SHA 256 value** or **Description**.

Step 4 Click **Save**.

Step 5 Click **Store ASA FirePOWER Changes**.

If an active policy references your object, deploy configuration changes; see Deploying Configuration Changes, on page 73.

After configuration deployment, the system no longer performs malware cloud lookups on files in the file list.

Downloading a Source File from a File List

License: Malware

You can view, download, or delete existing source file entries on a file list. Note that you cannot edit a source file once uploaded. You must first delete the source file from the file list, then upload an updated file. For more information on uploading a source file, see Uploading Multiple SHA-256 Values to a File List, on page 46.

The number of entries associated with a source file refers to the number of distinct SHA-256 values. If you delete a source file from a file list, the total number of SHA-256 entries the file list contains decreases by the number of valid entries in the source file.

To download a source file:

Step 1 On the object manager's **File List** page, click the **edit** icon ( ) next to the clean list or custom detection list where you want to download a source file.

Step 2 Next to the source file you want to download, click the **view** icon ( ).

Step 3 Click **Download SHA List** and follow the prompts to save the source file.

Step 4 Click **Close**.

Working with Security Zones

License: Any

Supported Devices: Any

A security zone is a grouping of one or more ASA interfaces that you can use to manage and classify traffic flow in various policies and configurations. You can configure multiple zones on a single device. This allows you to divide the network into segments where the system can apply various policies. You must assign at least one interface to a security zone to match traffic against that security zone, and each interface can belong to only one zone.

In addition to using security zones to group interfaces, you can use zones in access control policies. For example, you could write an access control rule that applies only to a specific source or destination zone.

The Security Zones page of the object manager lists the zones configured on your ASA FirePOWER module.

You cannot delete a security zone that is in use. After you add or remove interfaces from a zone, if an active policy references your object, you must deploy the configuration to see your changes take effect; see Deploying Configuration Changes, on page 73.

To create a security zone:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Choose **Security Zones**.

Step 3 Click **Add Security Zone**.

Step 4 Enter a **Name** for the zone. You can use any printable standard ASCII characters except curly braces ({}) and pound signs (#).

Step 5 Choose an interface Type for the zone.

After you create a security zone, you cannot change its type.

Step 6 Choose one or more interfaces.

Use the Shift and Ctrl keys to choose multiple objects. If you have not yet configured interfaces, you can create an empty zone and add interfaces to it later; skip to step 9.

Step 7 Click **Add**.

Step 8 Repeat steps 6 through 8 to add interfaces on other devices to the zone.

Step 9 Click **Store ASA FirePOWER Changes**.

Working with Cipher Suite Lists

License: Any

A cipher suite list is an object comprised of several cipher suites. Each pre defined cipher suite value represents a cipher suite used to negotiate an SSL- or TLS encrypted session. You can use cipher suites and cipher suite lists in SSL rules to control encrypted traffic based on whether the client and server negotiated the SSL session using that cipher suite. If you add a cipher suite list to an SSL rule, SSL sessions negotiated with any of the cipher suites in the list match the rule.

Note Although you can use cipher suites in the ASDM interface in the same places as cipher suite lists, you cannot add, modify, or delete cipher suites.

You cannot delete a cipher suite list that is in use. Additionally, after you edit a cipher suite list, if an active policy references your object, you must redeploy the configuration for your changes to take effect; see Deploying Configuration Changes, on page 73.

To create a cipher suite list:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Choose **Cipher Suite List**.

Step 3 Click **Add Cipher Suites**.

Step 4 Enter a **Name** for the cipher suite list. You can use any printable standard ASCII characters except a pipe (|) or curly braces ({}).

Step 5 Choose one or more cipher suites and click **Add**.

- Use Shift and Ctrl to choose multiple cipher suites, or right click and **Select All**.

- Use the **filter** field ( ) to search for existing cipher suites to include, which updates as you type to display matching items. Click the **reload** icon ( ) above the search field or click the **clear** icon ( ) in the search field to clear the search string.

Step 6 Click **Store ASA FirePOWER Changes**.

Working with Distinguished Name Objects

License: Any

Each distinguished name object represents the distinguished name listed for a public key certificate's subject or issuer. You can use distinguished name objects and groups (see Grouping Objects, on page 18) in SSL rules to control encrypted traffic based on whether the client and server negotiated the SSL session using a server certificate with the distinguished name as subject or issuer.

Your distinguished name object can contain the common name attribute (CN). If you add a common name without "CN=" then the system prepends "CN=" before saving the object.

You can also add a distinguished name with one of each attribute listed in the following table, separated by commas.

Table 9: Distinguished Name Attributes

Attribute	Description	Allowed Values
C	Country Code	two alphabetic characters
CN	Common Name	up to 64 alphanumeric, backslash (/), hyphen (-), quotation ("), or asterisk (*) characters, or spaces
O	Organization	
OU	Organizational Unit	

You can define one or more asterisks (*) as wild cards in an attribute. In a common name attribute, you can define one or more asterisks per domain name label. Wild cards match only within that label, though you can define multiple labels with wild cards. See the following table for examples.

Table 10: Common Name Attribute Wild Card Examples

Attribute	Matches	Does Not Match
CN=”*ample.com”	example.com	mail.example.com example.text.com ampleexam.com

Attribute	Matches	Does Not Match
CN=”exam*.com”	example.com	mail.example.com example.text.com ampleexam.com
CN=”*xamp*.com”	example.com	mail.example.com example.text.com ampleexam.com
CN=”*.example.com”	mail.example.com	mail.example.com example.text.com ampleexam.com
CN=”*.com”	example.com ampleexam.com	mail.example.com example.text.com
CN=”*.*.com”	mail.example.com example.text.com	example.com ampleexam.com

You cannot delete a distinguished name object that is in use. Additionally, after you edit a distinguished name object, if an active policy references your object, you must deploy the configuration for your changes to take effect; see Deploying Configuration Changes, on page 73.

To create a distinguished name object:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **Distinguished Name**, choose **Individual Objects**.

Step 3 Click **Add Distinguished Name**.

Step 4 Enter a **Name** for the distinguished name object. You can use any printable standard ASCII characters except a pipe (|) or curly braces ({}).

Step 5 In the **DN** field, enter a value for the distinguished name or common name. You have the following options:

- If you add a distinguished name, you can include one of each attribute listed in **Distinguished Name Attributes** table separated by commas.
- If you add a common name, you can include multiple labels and wild cards.

Step 6 Click **Store ASA FirePOWER Changes**.

Working with PKI Objects

License: Any

PKI objects represent the public key certificates and paired private keys required to support your SSL inspection deployment. Internal and trusted CA objects consist of certificate authority (CA) certificates; internal CA objects also contain the private key paired with the certificate. Internal and external certificate objects consist of server certificates; internal certificate objects also contain the private key paired with the certificate. Using these objects in SSL rules, you can decrypt:

- outgoing traffic by re signing the server certificate with an internal CA object
- incoming traffic using the known private key in an internal certificate object

You can also create SSL rules and match traffic encrypted with:

- the certificate in an external certificate object
- a certificate either signed by the CA in a trusted CA object, or within the CA's chain of trust

You can manually input certificate and key information, upload a file containing that information, or in some cases, generate a new CA certificate and private key.

When you view a list of PKI objects in the object manager, the system displays the certificate's Subject distinguished name as the object value. Hover your pointer over the value to view the full certificate Subject distinguished name. To view other certificate details, edit the **PKI** object.

Note The ASA FirePOWER module encrypts all private keys stored in internal CA objects and internal certificate objects with a randomly generated key before saving them. If you upload private keys that are password protected, the appliance decrypts the key using the user supplied password, then reencrypts it with the randomly generated key before saving it.

Working with Internal Certificate Authority Objects

License: Any

Each internal certificate authority (CA) object you configure represents the CA public key certificate of a CA your organization controls. The object consists of the object name, CA certificate, and paired private key. You can use internal CA objects and groups (see Grouping Objects, on page 18) in SSL rules to decrypt outgoing encrypted traffic by re signing the server certificate with the internal CA.

Note If you reference an internal CA object in a Decrypt - Resign SSL rule and the rule matches an encrypted session, the user's browser may warn that the certificate is not trusted while negotiating the SSL handshake. To avoid this, add the internal CA object certificate to either the client or domain list of trusted root certificates.

You can create an internal CA object in the following ways:

- import an existing RSA based or elliptic curve based CA certificate and private key
- generate a new self-signed RSA based CA certificate and private key
- generate an unsigned RSA based CA certificate and private key. You must submit a certificate signing request (CSR) to another CA to sign the certificate before using the internal CA object.

After you create an internal CA object containing a signed certificate, you can download the CA certificate and private key. The system encrypts downloaded certificates and private keys with a user provided password.

Whether system generated or user created, you can modify the internal CA object name, but cannot modify other object properties.

You cannot delete an internal CA object that is in use. Additionally, after you edit an internal CA object, if an active policy references your object, you must deploy the configuration for your changes to take effect; see Deploying Configuration Changes, on page 73.

Importing a CA Certificate and Private Key

License: Any

You can configure an internal CA object by importing an X.509 v3 CA certificate and private key. You can upload files encoded in one of the following supported formats:

- Distinguished Encoding Rules (DER)
- Privacy-enhanced Electronic Mail (PEM)

If the private key file is password protected, you can supply the decryption password. If the certificate and key are encoded in the PEM format, you can also copy and paste the information.

You can upload only files that contain proper certificate or key information, and that are paired with each other. The system validates the pair before saving the object.

Note If you configure a rule with the Decrypt - Resign action, the rule matches traffic based on the referenced internal CA certificate's encryption algorithm type, in addition to any configured rule conditions. You must upload an elliptic curve based CA certificate to decrypt outgoing traffic encrypted with an elliptic curve based algorithm, for example. For more information, see Decrypt Actions: Decrypting Traffic for Further Inspection, on page 206.

To import an internal CA certificate and private key:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **PKI**, choose **Internal CAs**.

Step 3 Click **Import CA**.

Step 4 Enter a **Name** for the internal CA object. You can use any printable standard ASCII characters except a ipe (|) or curly braces ({}).

Step 5 Above the **Certificate Data** field, click **Browse** to upload a **DER** or **PEM-encoded X.509 v3 CA certificate file**.

Step 6 Above the **Key** field, click **Browse** to upload a **DER** or **PEM-encoded paired private key file**.

Step 7 If the uploaded file is password protected, check the Encrypted, and the password is: check box and enter the password.

Step 8 Click **Store ASA FirePOWER Changes**.

The internal CA object is added.

Generating a New CA Certificate and Private Key

License: Any

You can configure an internal CA object by providing identification information to generate a self signed RSA based CA certificate and private key. The following table describes the identification information you provide to generate the certificate.

Table 11: Generated Internal CA Attributes

Field	Allowed Values	Required
Country Name (two-letter code)	two alphabetic characters	two alphabetic characters
State or Province	up to 64 alphanumeric, backslash (/), hyphen (-), quotation ("), asterisk (*), period (.), or space characters	no
Locality or City		
Organization		
Organizational Unit		
Common Name		

The generated CA certificate is valid for ten years. The **Valid From date** is a week before generation.

To generate a self signed CA certificate:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **PKI**, choose **Internal CAs**.

Step 3 Click **Generate CA**.

Step 4 Enter a **Name** for the internal CA object. You can use any printable standard ASCII characters except a pipe (|) or curly braces ({}).

Step 5 Enter the **identification** attributes, as described in **Generated Internal CA Attributes** table.

Step 6 Click **Generate self signed CA**.

Obtaining and Uploading a New Signed Certificate

License: Any

You can configure an internal CA object by obtaining a signed certificate from a CA. This involves two steps:

- Provide identification information to configure the internal CA object. This generates an unsigned certificate and paired private key, and creates a certificate signing request (CSR) to a CA you specify.

- After the CA issues the signed certificate, upload it to the internal CA object, replacing the unsigned certificate.

You can only reference an internal CA object in an SSL rule if it contains a signed certificate.

To create an unsigned CA certificate and CSR:

Step 1 Provide identification to configure the internal CA object:

a) Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.
b) Under **PKI**, choose **Internal CAs**.
c) Click **Generate CA**.
d) Enter a **Name** for the internal CA object. You can use any printable standard ASCII characters except a pipe (|) or curly braces ({}).
e) Enter the **identification** attributes, as described in Generating a New CA Certificate and Private Key, on page 55.
f) Click **Generate CSR**.
g) Copy the CSR to submit to a CA.
h) Click **Store ASA FirePOWER Changes**.

Step 2 Upload the signed certificate from the CA:

a) Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.
b) Under **PKI**, choose **Internal CAs**.
c) Click the **edit** icon () next to the CA object containing the unsigned certificate awaiting the CSR.
d) Click **Install Certificate**.
e) Above the **Certificate Data** field, click **Browse** to upload a **DER** or **PEM-encoded X.509 v3 CA** certificate file.
f) If the uploaded file is password protected, check the **Encrypted**, and the **password is:** check box and enter the password.
g) Click **Store ASA FirePOWER Changes**.

The CA object contains a signed certificate, and can be referenced in SSL rules.

Downloading a CA Certificate and Private Key

License: Any

You can back up or transfer a CA certificate and paired private key by downloading a file containing the certificate and key information from an internal CA object.

Caution Always store downloaded key information in a secure location.

The system encrypts the private key stored in an internal CA object with a randomly generated key before saving it to disk. If you download a certificate and private key from an internal CA object, the system first decrypts the information before creating a file containing the certificate and private key information. You must then provide a password the system uses to encrypt the downloaded file.

Caution Private keys downloaded as part of a system backup are decrypted, then stored in the unencrypted backup file. For more information, see Creating Backup Files, on page 504.

To download an internal CA certificate and private key:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **PKI**, choose **Internal CAs**.

Step 3 Click the **edit** icon () next to the internal CA object whose certificate and private key you want to download.

Step 4 Click **Download**.

Step 5 Enter an encryption password in the **Password** and **Confirm Password** fields.

Step 6 Click **Store ASA FirePOWER Changes**.

The system prompts you to save the file.

Working with Trusted Certificate Authority Objects

License: Any

Each trusted certificate authority (CA) object you configure represents a CA public key certificate belonging to a trusted CA outside your organization. The object consists of the object name and CA public key certificate. You can use external CA objects and groups (see Grouping Objects, on page 18) in the SSL policy to control traffic encrypted with a certificate signed either by the trusted CA, or any CA within the chain of trust.

After you create the trusted CA object, you can modify the name and add certificate revocation lists (CRL), but cannot modify other object properties. There is no limit on the number of CRLs you can add to an object. If you want to modify a CRL you have uploaded to an object, you must delete the object and recreate it.

You cannot delete a trusted CA object that is in use. Additionally, after you edit a trusted CA object, if an active policy references your object, you must deploy the configuration for your changes to take effect; see Deploying Configuration Changes, on page 73.

Adding a Trusted CA Object

License: Any

You can configure an external CA object by uploading an X.509 v3 CA certificate. You can upload a file encoded in one of the following supported formats:

- Distinguished Encoding Rules (DER)
- Privacy-enhanced Electronic Mail (PEM)

If the file is password protected, you must supply the decryption password. If the certificate is encoded in the PEM format, you can also copy and paste the information.

You can upload a CA certificate only if the file contains proper certificate information; the system validates the certificate before saving the object.

To import a trusted CA certificate:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **PKI**, choose **Trusted CAs**.

Step 3 Click **Add Trusted CAs**.

Step 4 Enter a **Name** for the trusted CA object. You can use any printable standard ASCII characters except a pipe (|) or curly braces ({}).

Step 5 Above the **Certificate Data** field, click **Browse** to upload a DER or PEM encoded X.509 v3 CA certificate file.

Step 6 If the file is password protected, check the **Encrypted**, and the **password is**: check box and enter the password.

Step 7 Click **Store ASA FirePOWER Changes**.

Adding a Certificate Revocation List to a Trusted CA Object

License: Any

You can upload CRLs to a trusted CA object. If you reference that trusted CA object in an SSL policy, you can control encrypted traffic based on whether the CA that issued the session encryption certificate subsequently revoked the certificate. You can upload files encoded in one of the following supported formats:

- Distinguished Encoding Rules (DER)
- Privacy-enhanced Electronic Mail (PEM)

After you add the CRL, you can view the list of revoked certificates. If you want to modify a CRL you have uploaded to an object, you must delete the object and recreate it.

You can upload only files that contain a proper CRL. There is no limit to the number of CRLs you can add to a trusted CA object. However, you must save the object each time you upload a CRL, before adding another CRL.

To upload a CRL:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **PKI**, choose **Trusted CAs**.

Step 3 Click the **edit** icon (✎) next to a **trusted CA** object.

Step 4 Click **Add CRL** to upload a **DER** or **PEM encoded CRL** file.

Step 5 Click **Store ASA FirePOWER Changes**.

Working with External Certificate Objects

License: Any

Each external certificate object you configure represents a server public key certificate that does not belong to your organization. The object consists of the object name and certificate. You can use external certificate objects and groups (see Grouping Objects, on page 18) in SSL rules to control traffic encrypted with the server certificate. For example, you can upload a self signed server certificate that you trust, but cannot verify with a trusted CA certificate.

You can configure an external certificate object by uploading an X.509 v3 server certificate. You can upload a file in one of the following supported formats:

- Distinguished Encoding Rules (DER)
- Privacy-enhanced Electronic Mail (PEM)

You can upload only files that contains proper server certificate information; the system validates the file before saving the object. If the certificate is encoded in the PEM format, you can also copy and paste the information.

After you create the external certificate object, you can modify the name, but cannot modify other object properties.

You cannot delete an external certificate object that is in use. Additionally, after you edit an external certificate object, if an active policy references your object, you must deploy the configuration for your changes to take effect; see Deploying Configuration Changes, on page 73.

To create an external certificate object:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **PKI**, choose **External Certs**.

Step 3 Click **Add External Cert**.

Step 4 Enter a **Name** for the external certificate object. You can use any printable standard ASCII characters except a pipe (|) or curly braces ({}).

Step 5 Above the **Certificate Data** field, click **Browse** to upload a DER or PEM encoded X.509 v3 server certificate file.

Step 6 Click **Store ASA FirePOWER Changes**.

Working with Internal Certificate Objects

License: Any

Each internal certificate object you configure represents a server public key certificate belonging to your organization. The object consists of the object name, public key certificate, and paired private key. You can use internal certificate objects and groups (see Grouping Objects, on page 18) in SSL rules to decrypt traffic incoming to one of your organization's servers using the known private key.

You can configure an internal certificate object by uploading an X.509 v3 RSA based or elliptic curve based server certificate and paired private key. You can upload a file in one of the following supported formats:

- Distinguished Encoding Rules (DER)
- Privacy-enhanced Electronic Mail (PEM)

If the file is password protected, you must supply the decryption password. If the certificate and key are encoded in the PEM format, you can also copy and paste the information.

You can upload only files that contain proper certificate or key information, and that are paired with each other. The system validates the pair before saving the object.

After you create the internal certificate object, you can modify the name, but cannot modify other object properties.

You cannot delete an internal certificate object that is in use. Additionally, after you edit an internal certificate object, if an active policy references your object, you must deploy the configuration for your changes to take effect; see Deploying Configuration Changes, on page 73.

To create an internal certificate object:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Under **PKI**, choose **Internal Certs**.

Step 3 Click **Add Internal Cert**.

Step 4 Enter a **Name** for the internal certificate object. You can use any printable standard ASCII characters except a pipe (|) or curly braces ({}).

Step 5 Above the **Certificate Data** field, click **Browse** to upload a DER or PEM encoded X.509 v3 server certificate file.

Step 6 Above the **Key** field, or click **Browse** to upload a DER or PEM-encoded paired private key file.

Step 7 If the uploaded private key file is password protected, check the Encrypted, and the password is: check box and enter the password.

Step 8 Click **Store ASA FirePOWER Changes**.

What to do next

- Importing a CA Certificate and Private Key, on page 54

Generating a New CA Certificate and Private Key, on page 55

Obtaining and Uploading a New Signed Certificate, on page 55

Downloading a CA Certificate and Private Key, on page 56

Working with Geolocation Objects

License: Any

Each geolocation object you configure represents one or more countries or continents that the system has identified as the source or destination of traffic on your monitored network. You can use geolocation objects in access control policies or SSL policies. For example, you could write an access control rule that blocks traffic to or from certain countries. For information on filtering traffic by geographical location, see Controlling Traffic by Network or Geographical Location, on page 105.

To ensure that you are using up to date information to filter your network traffic, Cisco strongly recommends that you regularly update your Geolocation Database (GeoDB). For information on downloading and installing GeoDB updates, see Updating the Geolocation Database, on page 493.

You cannot delete a geolocation object that is in use. Additionally, after you edit a geolocation object used in an access control policy or SSL policy, you must redeploy policies for your changes to take effect.

To create a geolocation object:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Choose **Geolocation**.

Step 3 Click **Add Geolocation**.

Step 4 Enter a **Name** for the geolocation object. You can use any printable standard ASCII characters except curly braces ({}).

Step 5 Check the check boxes for the countries and continents you want to include in your geolocation object.

Selecting a continent selects all countries within that continent, as well as any countries that GeoDB updates may add under that continent in the future. Deselecting any country under a continent deselects the continent. You can select any combination of countries and continents.

Step 6 Click **Store ASA FirePOWER Changes**.

Working with Security Group Tag Objects

License: Any

A Security Group Tag (SGT) object specifies a single SGT value, which you can use as a custom SGT condition in access control rules. You cannot group SGT objects.

If you configure ISE/ISE-PIC as an identity source, the system automatically disables the Security Group Tag option in the Object Manager. You cannot add new SGT objects, edit existing SGT objects, or use SGT objects as rule conditions unless you disable the ISE/ISE-PIC connection. For more information on the difference between custom SGTs and ISE SGTs, see ISE SGT and Custom SGT Rule Conditions, on page 131.

If you edit or delete an SGT object, if an active policy references the object, you must redeploy your configuration for the changes to take effect; see Deploying Configuration Changes, on page 73.

To create an SGT object:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Object Management**.

Step 2 Choose **Security Group** Tag.

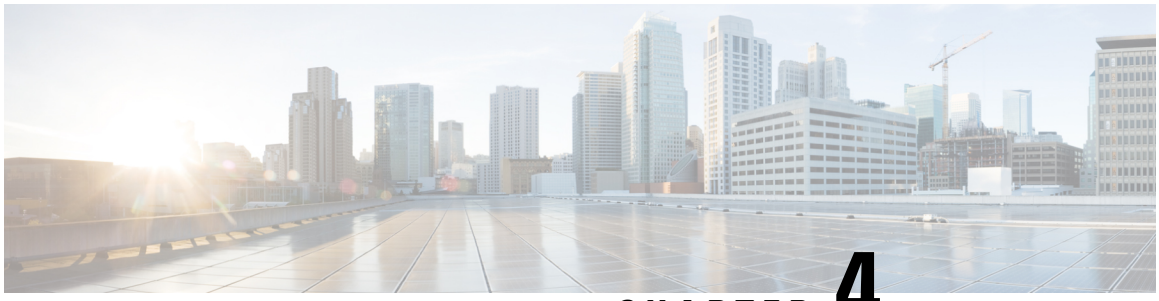
Step 3 Click **Add Security Group Tag**.

Step 4 Enter a **Name**.

Step 5 Optionally, enter a **Description**.

Step 6 In the **Tag** field, enter a **single SGT**.

Step 7 Click **Store ASA FirePOWER Changes**.



CHAPTER 4

Getting Started with Access Control Policies

An *access control policy* determines how the system handles traffic on your network. Each ASA FirePOWER module can have one currently applied policy.

This chapter explains how to create and apply a simple access control policy. It also contains basic information on managing access control policies: editing, updating, comparing, and so on.

About Access Control Policies

The simplest access control policy handles all traffic using its *default action* . You can set this default action to block or trust all traffic without further inspection, or to inspect traffic for intrusions.

Note that only ASA FirePOWER modules deployed inline can affect the flow of traffic. Applying an access control policy configured to block or alter traffic to passively deployed devices can have unexpected results.

In some cases, the system prevents you from applying inline configurations to passively deployed ASA FirePOWER modules.

A more complex access control policy can block traffic based on Security Intelligence data, as well as use *access control rules* to exert granular control over network traffic logging and handling. These rules can be simple or complex, matching and inspecting traffic using multiple criteria. Advanced access control policy options control decryption, preprocessing, performance, and other general preferences.

After you create a basic access control policy, see the following chapters for more information on tailoring it to your deployment:

- Blocking Traffic Using Security Intelligence IP Address Reputation, on page 83 explains how to immediately block connections based on the latest reputation intelligence.
- About Network Analysis and Intrusion Policies, on page 241 explains how network analysis and intrusion policies preprocess and examine packets, as part of the system's intrusion detection and prevention feature.
- Tuning Traffic Flow Using Access Control Rules, on page 89 explains how access control rules provide a granular method of handling network traffic across multiple ASA FirePOWER modules.
- Controlling Traffic Using Intrusion and File Policies, on page 135 explains how intrusion and file policies provide the last line of defense before traffic is allowed to its destination, by detecting and optionally blocking intrusions, prohibited files, and malware.

Access Control License and Role Requirements

License Requirements for Access Control

Although you can create access control policies regardless of the licenses on your ASA FirePOWER module, certain aspects of access control require that you enable specific licensed capabilities before you can apply the policy.

Warning icons and confirmation dialog boxes designate unsupported features for your deployment.

The following table explains the license requirements to apply access control policies.

Table 12: License Requirements for Access Control

To apply an access control policy that...	License
performs access control based on zone, network, or port performs URL filtering using literal URLs and URL objects	Any
performs access control using geolocation data (source or destination country or continent)	Any
performs intrusion detection and prevention, file control, or Security Intelligence filtering	Protection
performs advanced malware protection, that is, network-based malware detection and blocking	Malware
performs user or application control	Control

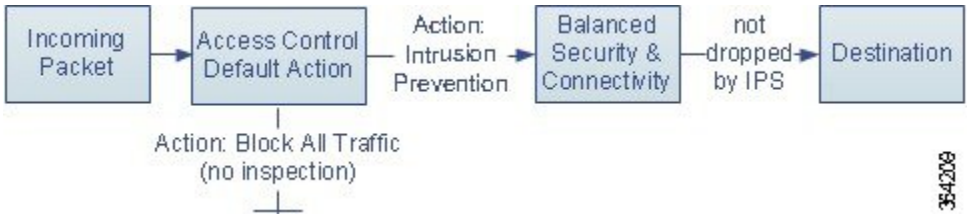
To apply an access control policy that...	License
performs URL filtering using category and reputation data	URL Filtering

Creating a Basic Access Control Policy

License: Any

Your access control policy must have a unique name and must specify a default action. At this point, the default action determines how the ASA FirePOWER module handles all unencrypted traffic; you will add other configurations that affect traffic flow later.

You can set the default policy action to block all traffic without further inspection, or to inspect traffic for intrusions, as shown in the following diagram.



Tip When you first create an access control policy, you cannot choose to trust traffic as the default action. If you want to trust all traffic by default, change the default action after you create the policy.

Use the **Access Control Policy** page (**Policies > Access Control**) to create new and manage existing access control policies.

Optionally, you can use and modify the initial system-provided policy named Default Trust All Traffic.

To create an access control policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Tip You can also copy an existing policy from this ASA FirePOWER module or import a policy from another ASA FirePOWER module. To copy a policy, click the **copy** icon. To import a policy, see Importing and Exporting Configurations, on page 511.

Step 2 Give the policy a unique **Name** and, optionally, a **Description**.

You can use all printable characters, including spaces and special characters, except for the pound sign (#), a semi-colon (;), or either brace ({}). The name must include at least one non-space character.

Step 3 Specify the initial **Default Action**:

- **Block all traffic** creates a policy with the **Access Control: Block All Traffic** default action.

- **Intrusion Prevention** creates a policy with the **Intrusion Prevention: Balanced Security and Connectivity** default action.

For guidance on choosing an initial default action, as well as how to change it later, see Setting Default Handling and Inspection for Network Traffic, on page 66.

Step 4 Click **Store ASA FirePOWER Changes**.

The access control policy editor appears. For information on configuring your new policy, see Editing Access Control Policies, on page 69. Note that you must apply the policy for it to take effect; see Deploying Configuration Changes, on page 73.

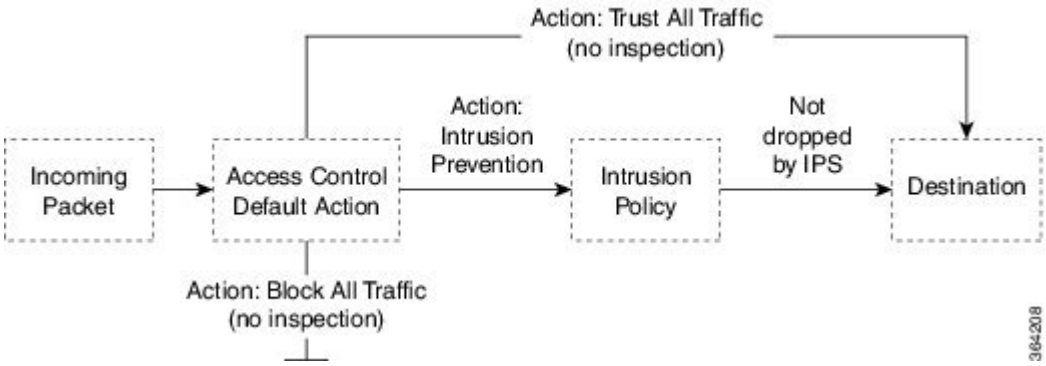
Setting Default Handling and Inspection for Network Traffic

License: Any

When you create an access control policy, you must select a default action. The default action for an access control policy determines how the system handles decrypted or unencrypted traffic that:

- is not blocked by Security Intelligence
- matches none of the rules in the policy (except Monitor rules, which match and log—but do not handle or inspect—traffic)

Therefore, when you apply an access control policy that does not contain any access control rules or Security Intelligence configurations, and that does not invoke an SSL policy to handle encrypted traffic, the default action determines how *all* traffic on your network is handled. You can block or trust all traffic without further inspection, or inspect traffic for intrusions. Your options are shown in the following diagram.

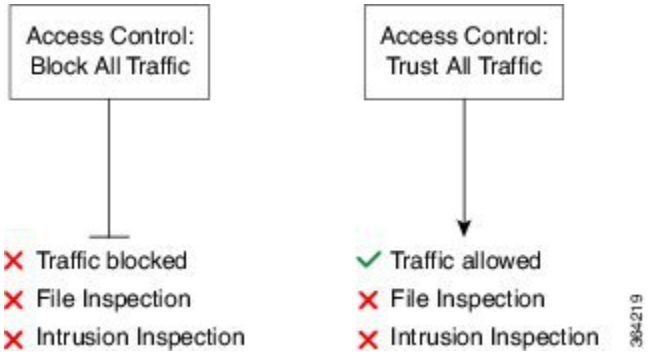


The following table describes how the different default actions handle traffic, and lists the types of inspection you can perform on traffic handled by each default action. Note that you **cannot** perform file or malware inspection on traffic handled by the default action. For more information, see Controlling Traffic Using Intrusion and File Policies, on page 135.

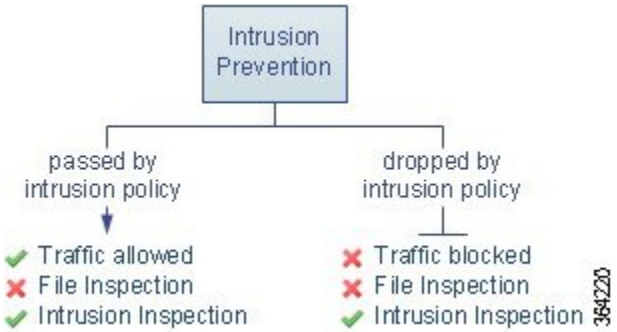
Table 13: Access Control Policy Default Action

Default Action	Effect on Traffic	Inspection Type and Policy
Access Control: Block All Traffic	block without further inspection	none
Access Control: Trust All Traffic	trust (allow to its final destination without further inspection)	none
Intrusion Prevention	allow, as long as it is passed by the intrusion policy you specify (requires a Protection license)	intrusion, using the specified intrusion policy and associated variable set

The diagram below illustrates the **Block All Traffic** and **Trust All Traffic** default actions.



The diagram below illustrates the **Intrusion Prevention** default actions.



When you first create an access control policy, logging connections that are handled by the default action is disabled by default. If you select a default action that performs intrusion inspection, the system automatically associates the default intrusion variable set with the intrusion policy you select. You can change either of these options, as well as the default action itself, after you create the policy.

To change an access control policy's default action and related options:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy** .

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon next to the access control policy you want to configure.

The **access control policy editor** appears.

Step 3 Select a **Default Action**.

- To block all traffic, select **Access Control: Block All Traffic**

  .
- To trust all traffic, select **Access Control: Trust All Traffic**

  .
- To inspect all traffic with an intrusion policy, select an intrusion policy, all of which begin with the label **Intrusion Prevention**. Keep in mind that an intrusion policy can block traffic

  .

Caution Do **not** use Experimental Policy 1 unless instructed to do so by a Cisco representative. Cisco uses this policy for testing.

Step 4 If you selected an **Intrusion Prevention** default action, click the **variables** icon to change the variable set associated with the intrusion policy you selected.

In the pop-up window that appears, select a new variable set and click **OK**. You can also edit the selected variable set in a new window by clicking the edit icon. If you do not change the variable set, the system uses a default set. For more information, see Working with Variable Sets, on page 29.

Step 5 Click the **logging** icon to change logging options for connections handled by the default action.

You can log a matching connection at its beginning and end. Note that the system cannot log the end of blocked traffic. You can log connections to the ASA FirePOWER module event viewer, external system log (syslog) or SNMP trap server. For more information, see Logging Connections Based on Access Control Handling, on page 389.

Managing Access Control Policies

License: Any

On the **Access Control Policy** page (**Configuration > ASA FirePOWER Configuration > Policies > Access Control**) you can view your current custom access control policies, along with information on whether a policy is applied.

In addition to custom policies that you create, the system provides a custom policy Default Allow All Traffic that you can edit and use.

Options on the **Access Control Policy** page allow you to take the actions in the following table.

Table 14: Access Control Policy Management Actions

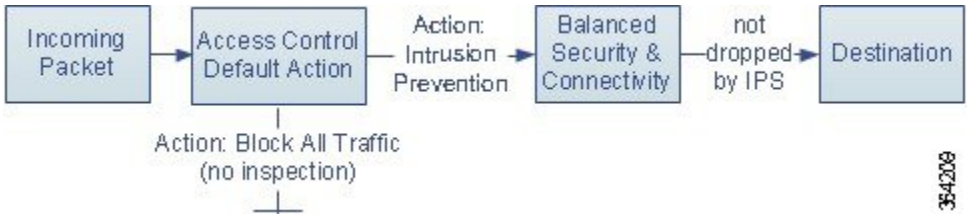
To...	You can...	See...
create a new access control policy	click **New Policy**.	Creating a Basic Access Control Policy, on page 65
edit an existing access control policy	click the **edit** icon.	Editing Access Control Policies, on page 69

To...	You can...	See...
reapply an access control policy	click the **apply** icon.	Deploying Configuration Changes, on page 73
export an access control policy to import on another ASA FirePOWER module	click the **export** icon.	Importing and Exporting Configurations, on page 511
view a PDF report that lists the current configuration settings in an access control policy	click the **report** icon.	Generating a Report of Current Access Control Settings, on page 77
compare access control policies	click **Compare Policies**.	Comparing Access Control Policies, on page 78
delete an access control policy	click the **delete** icon, then confirm that you want to delete the policy. You cannot delete an applied access control policy or one that is currently applying.	

Editing Access Control Policies

License: Any

When you first create a new access control policy, the access control policy editor appears, focused on the Rules tab. The following graphic shows a newly created policy. Because a new policy does not yet have rules or other configurations, the default action handles *all* unencrypted traffic. In this case, the default action inspects traffic with the system-provided Balanced Security and Connectivity intrusion policy before allowing it to its final destination.



Use the access control policy editor to add and organize rules, and so on. The following list provides information on the policy configurations you can change.

Name and Description

To change the policy's name and description, click the appropriate field and type the new name or description.

Security Intelligence

Security Intelligence is a first line of defense against malicious Internet content. This feature allows you to immediately block connections based on the latest reputation intelligence. To ensure continual access to vital resources, you can override blacklists with custom whitelists. This traffic filtering takes place **before** any other policy-based inspection, analysis, or traffic handling, including rules and the default action. For more information, see Controlling Traffic With Reputation-Based Rules, on page 111

Rules

Rules provide a granular method of handling network traffic. Rules in an access control policy are numbered, starting at 1. The system matches traffic to access control rules in top-down order by ascending rule number.

In most cases, the system handles network traffic according to the *first* access control rule where *all* the rule's conditions match the traffic. These conditions include security zone, network or geographical location, port, application, requested URL, or user. Conditions can be simple or complex; their use often depends on certain licenses.

Use the Rules tab to add, categorize, enable, disable, filter, and otherwise manage rules. For more information, see Tuning Traffic Flow Using Access Control Rules, on page 89.

Default Action

The default action determines how the system handles traffic that is not blocked by Security Intelligence and does not match any access control rules. Using the default action, you can block or trust all traffic without further inspection, or inspect traffic for intrusions. You can also enable or disable logging of connections handled by the default action.

For more information, see Setting Default Handling and Inspection for Network Traffic, on page 66 and Logging Connections Based on Access Control Handling, on page 389.

HTTP Responses

You can specify what the user sees in a browser when the system blocks that user's website request—either display a generic system-provided response page, or enter custom HTML. You can also display a page that warns users, but also allows them to click a button to continue or refresh the page to load the originally requested site. For more information, see Displaying a Custom Web Page for Blocked URLs, on page 124.

Advanced Access Control Options

Advanced access control policy settings typically require little or no modification. The default settings are appropriate for most deployments. Advanced settings you can modify include:

- the number of characters you store in the ASA FirePOWER module database for each URL requested by your users; see Logging URLs Detected in Connections, on page 392
- the length of time before you re-block a website after a user bypasses an initial block; see Setting the User Bypass Timeout for a Blocked Website, on page 123
- network analysis and intrusion policy settings that allow you to tailor many preprocessing options to networks and zones, as well as set default intrusion inspection behavior
- advanced transport and network preprocessor settings that apply globally to all networks and zones where you apply the access control policy
- adaptive profiles to improve reassembly of packet fragments and TCP streams in passive deployments, based on your network's host operating systems; see Tuning Intrusion Policies Using Rules, on page 289
- performance options for intrusion inspection, file control, and advanced malware protection; see Tuning Intrusion Prevention Performance, on page 140 and Tuning File and Malware Inspection Performance and Storage, on page 150

When you edit an access control policy, a message indicates that you have unsaved changes. To retain your changes, you must save the policy before exiting the policy editor. If you attempt to exit the policy editor without saving your changes, you are cautioned that you have unsaved changes; you can then discard your changes and exit the policy, or return to the policy editor.

To protect the privacy of your session, after sixty minutes of inactivity on the policy editor, changes to your policy are discarded and you are returned to the **Access Control Policy** page. After the first thirty minutes of inactivity, a message appears and updates periodically to provide the number of minutes remaining before changes are discarded. Any activity on the page cancels the timer.

To edit an access control policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon next to the access control policy you want to configure.

The **access control policy editor** appears.

Step 3 Edit your policy. Take any of the actions summarized above.

Step 4 Save or discard your configuration:

- To save your changes and continue editing, click **Store ASA FirePOWER Changes.**
- To save your changes and apply your policy, click **Apply ASA FirePOWER Changes**. See Deploying Configuration Changes, on page 73
- To discard your changes, click **Cancel** and, if prompted, click **OK**.

Associating Other Policies with Access Control

License: Any

Use an access control policy's advanced settings to associate one of each of the following subpolicies with the access control policy:

- SSL policy—Monitors, decrypts, blocks, or allows application layer protocol traffic encrypted with Secure Socket Layer (SSL) or Transport Layer Security (TLS).
- Identity policy—Performs user authentication based on the realm and authentication method associated with the traffic.

Caution Associating an SSL or identity policy, or subsequently dissociating the policy by choosing None, restarts the Snort process when you deploy configuration changes, temporarily interrupting traffic inspection. Whether traffic drops during this interruption or passes without further inspection depends on the model of the managed device and how it handles traffic.

To associate other policies with an access control policy:

Step 1 Choose **Configuration > ASA FirePOWER Configuration > Policies > Access Control Policy**.

Step 2 Click the **edit** icon next to the access control policy you want to configure.

Step 3 Click the **Advanced** tab.

Step 4 Click the **edit** icon in the appropriate **Policy Settings** area.

Step 5 Choose a policy from the drop-down list.

If you choose a user-created policy, you can edit the policy by clicking the **edit** icon.

Step 6 Click **OK**.

Step 7 Save or discard your configuration:

- To save your changes and continue editing, click **Store ASA FirePOWER Changes.**
- To save your changes and apply your policy, click **Apply ASA FirePOWER Changes**. See Deploying Configuration Changes, on page 73.
- To discard your changes, click **Cancel** and, if prompted, click **OK**.

Understanding Out-of-Date Policy Warnings

License: Any

On the **Access Control Policy** page (**Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control**), out-of-date policies are marked with red status text.

In almost every case, whenever you change an access control policy, you must reapply it for the change to take effect. If the access control policy invokes other policies or relies on other configurations, changing those also requires that you reapply the access control policy (or, for intrusion policy changes, you can reapply just the intrusion policy).

Configuration changes that require a policy reapply include:

- Modifying the access control policy itself: any changes to access control rules, the default action, Security Intelligence filtering, advanced options including NAP rules, and so on.
- Changing any of the intrusion and file policies that the access control policy invokes: the SSL policy, network analysis policies, intrusion policies, and file policies.
- Changing any reusable object or configuration used in the access control policy or the policies it invokes: network, port, URL, and geolocation objects; Security Intelligence lists and feeds; application filters or detectors; intrusion policy variable sets; file lists; decryption-related objects, security zones, and so on.
- Updating the system software, intrusion rules, or the vulnerability database (VDB).

Keep in mind that you can change some of these configurations from multiple places in the ASA FirePOWER module interface. For example, you can modify security zones using the object manager (**Configuration** > **ASA FirePOWER Configuration** > **Object Management**).

Note that the following updates do **not** require policy reapply:

- automatic updates to URL filtering data
- scheduled geolocation database (GeoDB) updates

To determine why an access control or intrusion policy is out of date, use the comparison viewer.

To determine why an access control policy is out of date:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears. Policies that are out of date are marked with red status text that indicates that the ASA FirePOWER module needs a policy update.

Step 2 Click the **policy status** for an **out-of-date** policy.

The **detailed Apply Access Control Policy** pop-up window appears.

Step 3 Click **Out-of-date** next to the changed component you are interested in.

A **policy comparison** report appears in a new window. For more information, see Comparing Access Control Policies, on page 78 and Comparing Two Intrusion Policies or Revisions, on page 285.

Step 4 Optionally, reapply the policy. See Deploying Configuration Changes, on page 73.

Deploying Configuration Changes

License: Any

After you use the ASA FirePOWER module to configure your deployment, and any time you make changes to that configuration, you must deploy the new configuration.

This deploy action distributes the following configuration components:

- Access control policies and all associated policies: DNS, file, identity, intrusion, network analysis, SSL
- Any associated rule configurations and objects associated with a policy to be deployed
- Intrusion rule updates
- Device and interface configurations

Caution In special cases, deploying configuration changes may cause a short pause in traffic flow and processing, and may also cause a few packets to pass uninspected. To minimize inconvenience, deploy during a change window.

To deploy configuration changes:

Step 1 Click **Deploy** and select **Deploy FirePOWER Changes**.

Step 2 Click **Deploy**.

Step 3 If the system identifies errors or warnings in the changes to be deployed, you have the following choices:

- Click **Proceed** to continue deploying without resolving error or warning conditions.

- Click **Cancel** to exit without deploying. Resolve the error and warning conditions, and attempt to deploy the configuration again.

Troubleshooting Access Control Policies and Rules

License: Any

Properly configuring access control policies, especially creating and ordering access control rules, is a complex task. However, it is a task that is essential to building an effective deployment. If you do not plan your policy carefully, rules can preempt other rules or contain invalid configurations. Both rules and other policy settings can require additional licenses.

To help ensure that the system handles traffic as you expect, the access control policy interface has a robust feedback system. Icons in the access control policy and rule editors mark warnings and errors, as described in the Access Control Error Icons table.

Tip In the access control policy editor, click **Show Warnings** to display a pop-up window that lists all the warnings for the policy.

Additionally, the system warns you at apply-time of any issues that could affect traffic analysis and flow.

Table 15: Access Control Error Icons

Icon	Description	Details
	error	If a rule or configuration has an error, you cannot apply the policy until you correct the issue, even if you disable any affected rules.
	warning	You can apply an access control policy that displays rule or other warnings. However, misconfigurations marked with warnings have no effect. For example, you can apply a policy that contains preempted rules or rules that cannot match traffic due to misconfiguration—conditions using empty object groups, application filters that match no applications, configuring URL conditions without having enabled cloud communications, and so on. These rules do not evaluate traffic. If you disable a rule with a warning, the warning icon disappears. It reappears if you enable the rule without correcting the underlying issue. As another example, many features require a specific license. An access control policy successfully applies only to an eligible device.
	information	**Information** icons convey helpful information about configurations that may affect the flow of traffic. These issues do not prevent you from applying the policy. For example, if you are performing application control or URL filtering, the system may skip matching the first few packets of a connection against some access control rules, until the system identifies the application or web traffic in that connection. This allows connections to be established so that applications and HTTP requests can be identified. For more information, see Limitations to Application Control, on page 116 and Guidelines and Limitations to URL Detection and Blocking, on page 121.

Properly configuring access control policies and rules can also reduce the resources required to process network traffic. Creating complex rules, invoking many different intrusion policies, and mis-ordering rules can all affect performance.

Simplifying Rules to Improve Performance

Complex access control policies and rules can command significant resources. When you apply an access control policy, the system evaluates all the rules together and creates an expanded set of criteria that the ASA FirePOWER module uses to evaluate network traffic. A pop-up window may warn that you have exceeded the maximum number of access control rules or intrusion policies supported.

Simplifying Access Control Rules

The following guidelines can help you simplify access control rules and improve performance:

- When constructing a rule, use as few individual elements in your conditions as possible. For example, in network conditions, use IP address blocks rather than individual IP addresses. In port conditions, use port ranges. Use application filters and URL categories and reputations to perform application control and URL filtering, and LDAP user groups to perform user control.

Note that combining elements into objects that you then use in access control rule conditions does not improve performance. For example, using a network object that contains 50 individual IP addresses gives you only an organizational—not a performance—benefit over including those IP addresses in the condition individually.

- Restrict rules by security zones whenever possible. If a device's interfaces are not in one of the zones in a zone-restricted rule, the rule does not affect performance on that device.
- Do not overconfigure rules. If one condition is enough to match the traffic you want to handle, do not use two.

Avoiding Intrusion Policy and Variable Set Proliferation

The number of unique intrusion policies you can use to inspect traffic in an access control policy depends on the complexity of your policies: you can associate one intrusion policy with each Allow and Interactive Block rule, as well as with the default action. Every unique **pair** of intrusion policy and variable set counts as one policy. You might be able to select as few as three intrusion policies across an entire access control policy.

If you exceed the number of intrusion policies supported, reevaluate your access control policy. You may want to consolidate intrusion policies or variable sets so you can associate a single intrusion policy-variable set pair with multiple access control rules.

Check to see how many policies you select and how many variable sets those policies use in each of the following locations in your access control policy: the **Intrusion Policy used before Access Control rule is determined** option in the **Advanced access control policy** settings, the default action for the access control policy, and the inspection settings for any access control rules in the policy.

Understanding Rule Preemption and Invalid Configuration Warnings

License: Any

Properly configuring and ordering access control rules (and, in advanced deployments, network analysis rules) is essential to building an effective deployment. Within an access control policy, access control rules can preempt other rules or contain invalid configurations. Similarly, network analysis rules, which you configure

using the access control policy's advanced settings, can have the same issues. The system uses warning and error icons to mark these.

Understanding Rule Preemption Warnings

The conditions of an access control rule may preempt a subsequent rule from matching traffic. For example:

```
Rule 1: allow Admin users
Rule 2: block Admin users
```

The second rule above will never block traffic because the first rule will have already allowed the traffic.

Note the following:

- Any type of rule condition can preempt a subsequent rule.
- A rule also preempts an identical subsequent rule where all configured conditions are the same.
- A subsequent rule would not be preempted if any condition is different.

Understanding Invalid Configuration Warnings

Because outside settings that the access control policy depends on may change, an access control policy setting that was valid may become invalid. Consider the following examples:

- If you add a port group to the source ports in a rule, then change the port group to include an ICMP port, the rule becomes invalid and a **warning** icon appears next to it. You can still apply the policy, but the rule will have no effect on network traffic.
- If you add a user to a rule, then change your LDAP user awareness settings to exclude that user, the rule will have no effect because the user is no longer an access controlled user.

Ordering Rules to Improve Performance and Avoid Preemption

License: Any

Rules in an access control policy are numbered, starting at 1. The system matches traffic to rules in top-down order by ascending rule number. With the exception of Monitor rules, the first rule that traffic matches is the rule that handles that traffic.

Proper access control rule order reduces the resources required to process network traffic, and prevents rule preemption. Although the rules you create are unique to every organization and deployment, there are a few general guidelines to follow when ordering rules that can optimize performance while still addressing your needs.

Order Rules from Most to Least Critical

First, you must order rules to suit your organization's needs. Place priority rules that must apply to all traffic near the top of the policy. For example, if you want to inspect traffic from a single user for intrusions (using an Allow rule), but trust all other users in the department (using a Trust rule), place two access control rules in that order.

Order Rules from Specific to General

You can improve performance by placing specific rules earlier, that is, rules that narrowly define the traffic they handle. This is also important because rules with broad conditions can match many different types of traffic, and can preempt later, more specific rules.

Consider a scenario where you want to block most social networking sites, but allow access to certain others. For example, you may want your graphic designers to be able to access Creative Commons Flickr and deviantART content, but not access other sites such as Facebook or Google+. You should order your rules as follows:

```
Rule 1: Allow Flickr, deviantART for the "Design" LDAP user group
Rule 2: Block social networking
```

If you reverse the rules:

```
Rule 1: Block social networking
Rule 2: Allow Flickr, deviantART for the "Design" LDAP user group
```

the first rule blocks all social networking traffic, including Flickr and deviantART. Because no traffic will ever match the second rule, your designers cannot access the content you wanted to make available.

Place Rules that Inspect Traffic Later

Because intrusion, file, and malware inspection require processing resources, placing rules that do not inspect traffic (Trust, Block) before rules that do (Allow, Interactive Block) can improve performance. This is because Trust and Block rules can divert traffic that the system might otherwise have inspected. All other factors being equal, that is, given a set of rules where none is more critical and preemption is not an issue, consider placing them in the following order:

- Monitor rules that log matching connections, but take no other action on traffic
- Trust and Block rules that handle traffic without further inspection
- Allow and Interactive Block rules that do not inspect traffic further
- Allow and Interactive Block rules that optionally inspect traffic for malware, intrusions, or both

Generating a Report of Current Access Control Settings

License: Any

An access control policy report is a record of the policy and rules configuration at a specific point in time. You can use the report, which contains the following information, for auditing purposes or to inspect the current configuration.

Table 16: AccessControl Policy Report Section

Section	Description
Policy Information	Provides the name and description of the policy, the name of the user who last modified the policy, and the date and time the policy was last modified.

Section	Description
HTTP Block Response HTTP Interactive Block Response	Provides details on the pages you display to users when you block a website using the policy.
Security Intelligence	Provides details on the policy's Security Intelligence whitelist and blacklist.
Default Action	Lists the default action and associated variable set, if any.
Rules	Lists each access control rule in the policy, and provides details about its configuration.
Advanced Settings	Detailed information on the policy's advanced settings, including: • network analysis policies used to preprocess traffic for the access control policy, as well as global preprocessing options • adaptive profile settings for passive deployments • performance settings for detecting files, malware, and intrusions • other policy-wide settings
Referenced Objects	Provides details on the reusable objects referenced by the access control policy, including intrusion policy variable sets and objects used by the SSL policy.

You can also generate an access control comparison report that compares a policy with the currently applied policy or with another policy. For more information, see Comparing Access Control Policies, on page 78.

To view an access control policy report:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **report** icon next to the policy for which you want to generate a report. Remember to save any changes before you generate an access control policy report; only saved changes appear in the report.

The system generates the report. You are prompted to save the report to your computer.

Comparing Access Control Policies

License: Any

To review policy changes for compliance with your organization's standards or to optimize system performance, you can examine the differences between two access control policies. You can compare any two policies or the currently applied policy with another policy. Optionally, after you compare, you can then generate a PDF report to record the differences between the two policies.

There are two tools you can use to compare policies:

- The comparison view displays only the differences between two policies in a side-by-side format. The name of each policy appears in the title bar on the left and right sides of the comparison view except when you select **Running Configuration**, in which case a blank bar represents the currently active policy.

You can use this to view and navigate both policies on the module interface, with their differences highlighted.

- The comparison report creates a record of only the differences between two policies in a format similar to the policy report, but in PDF format.

You can use this to save, copy, print, and share your policy comparisons for further examination.

Using the Access Control Policy Comparison View

License: Any

The comparison view displays both policies in a side-by-side format, with each policy identified by name in the title bar on the left and right sides of the comparison view. When comparing two policies other than the running configuration, the time of last modification and the last user to modify are displayed with the policy name.

Differences between the two policies are highlighted:

- Blue indicates that the highlighted setting is different in the two policies, and the difference is noted in red text.
- Green indicates that the highlighted setting appears in one policy but not the other.

You can perform any of the actions in the following table.

Table 17: Access Control Policy Comparison View Actions

To...	**You can...**
navigate individually through changes	click **Previous** or **Next** above the title bar. The **double-arrow** icon centered between the left and right sides moves, and the **Difference** number adjusts to identify which difference you are viewing.
generate a new **policy comparison view**	click **New Comparison.** The **Select Comparison** window appears. See Using the Access Control Policy Comparison Report, on page 79 for more information.
generate a **policy comparison report**	click **Comparison Report**. The **policy comparison report** creates a PDF document that lists only the differences between the two policies.

Using the Access Control Policy Comparison Report

License: Any

An access control policy comparison report is a record of all differences between two access control policies or a policy and the currently applied policy identified by the policy comparison view, presented in PDF format. You can use this report to further examine the differences between two policy configurations and to save and disseminate your findings.

You can generate an access control policy comparison report from the comparison view for any policies to which you have access. Remember to save any changes before you generate a policy report; only saved changes appear in the report.

The format of the policy comparison report is the same as the policy report with one exception: the policy report contains all configurations in the policy, and the policy comparison report lists only those configurations that differ between the policies. An access control policy comparison report contains the sections described in Generating a Report of Current Access Control Settings.

Tip You can use a similar procedure to compare SSL, network analysis, intrusion, file, or system policies.

To compare two access control policies:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click **Compare Policies**.

The **Select Comparison** window appears.

Step 3 From the **Compare Against** drop-down list, select the type of comparison you want to make:

- To compare two different policies, select **Other Policy**.

The page refreshes and the Policy A and Policy B drop-down lists appear.

- To compare another policy to the currently active policy, select **Running Configuration** .

The page refreshes and the **Target/Running Configuration A** and **Policy B** drop-down lists appear.

Step 4 Depending on the comparison type you selected, you have the following choices:

- If you are comparing two different policies, select the policies you want to compare from the **Policy A** and **Policy B** drop-down lists.
- If you are comparing the running configuration to another policy, select the second policy from the Policy B drop-down list.

Step 5 Click **OK** to display the **policy comparison view**.

The **comparison view** appears.

Step 6 Optionally, click **Comparison Report** to generate the **access control policy comparison** report.

The **access control policy comparison report** appears. You are prompted to save the report to your computer.

Using Advanced Settings in an Access Control Policy

Advanced access control policy settings typically require little or no modification. The default settings are appropriate for most deployments. Note that many of the advanced preprocessing and performance options in access control policies may be modified by rules updates.

General Settings

To customize the number of characters you store in the ASA FirePOWER module database for each URL requested by your users, see Logging URLs Detected in Connections, on page 392.

To customize the length of time before you re-block a website after a user bypasses an initial block, see Allowing Users to Bypass URL Blocks, on page 122.

Network Analysis and Intrusion Policies

Advanced network analysis and intrusion policy settings allow you to:

- Change the access control policy's default intrusion policy and associated variable set, which are used to initially inspect traffic before the system can determine exactly how to inspect that traffic.
- Change the access control policy's default network analysis policy, which governs many preprocessing options.
- Use custom network analysis rules and network analysis policies to tailor preprocessing options to specific security zones and networks.

File and Malware Settings

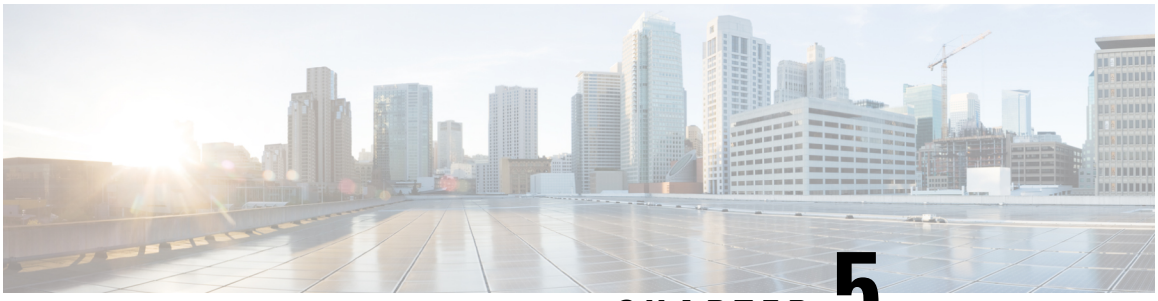
Advanced file and malware settings allow you to set performance options for file control and advanced malware protection. For more information, see Inspecting Allowed Traffic For Intrusions and Malware, on page 136.

Transport/Network Layer Preprocessor Settings

Advanced transport and network preprocessor settings apply globally to all networks, zones, and VLANs where you apply your access control policy. For more detail on advanced preprocessors, see the Advanced Network Analysis and Preprocessing in the *Firepower Management Center Configuration Guide* for your version.

Performance Settings and Latency-Based Performance Settings

Configuring Packet and Intrusion Rule Latency Thresholds, on page 143 provides information on improving the performance of your system as it analyzes traffic for attempted intrusions.



CHAPTER 5

Blocking Traffic Using Security Intelligence IP Address Reputation

As a first line of defense against malicious Internet content, the ASA FirePOWER module includes the Security Intelligence feature, which allows you to immediately block connections based on the latest reputation intelligence, removing the need for a more resource-intensive, in-depth analysis. Security Intelligence filtering requires a Protection license.

Security Intelligence works by blocking traffic to or from IP addresses that have a known bad reputation. This traffic filtering takes place before any other policy-based inspection, analysis, or traffic handling.

Note that you could create access control rules that perform a similar function to Security Intelligence filtering by manually restricting traffic by IP address. However, access control rules are wider in scope, more complex to configure, and cannot automatically update using dynamic feeds.

Traffic blocked by Security Intelligence is immediately blocked and therefore is not subject to any further inspection—not for intrusions, exploits, malware, and so on. Optionally, and recommended in passive deployments, you can use a "monitor-only" setting for Security Intelligence filtering. This allows the system to analyze connections that would have been blocked, but also logs the match to the blacklist and generates an end-of-connection security intelligence event.

For your convenience, Cisco provides the Intelligence Feed, which is comprised of several regularly updated collections of IP addresses determined by the VRT to have a poor reputation. The Intelligence Feed tracks open relays, known attackers, bogus IP addresses (bogon), and so on. You can also customize the feature to suit the unique needs of your organization, for example:

- Third-party feeds—you can supplement the Intelligence Feed with third-party reputation feeds, which the system can automatically update just as it does the Cisco feed
- Custom blacklist—the system allows you to manually block specific IP addresses in many ways depending on your needs
- Enforcing blocking by security zone—to improve performance, you may want to target enforcement, for example, restricting spam blocking to a zone that handles email traffic
- Monitoring instead of blocking—especially useful in passive deployments and for testing feeds before you implement them; you can merely monitor the violating sessions instead of blocking them, generating end-of-connection events
- Using a whitelist to eliminate false positives—when a blacklist is too broad in scope, or incorrectly blocks traffic that you want to allow (for example, to vital resources), you can override a blacklist with a custom whitelist.

Choosing a Security Intelligence Strategy

License: Protection

The easiest way to construct a blacklist is to use the Intelligence Feed, which tracks IP addresses known to be open relays, known attackers, bogus IP addresses (bogon), and so on. Because the Intelligence Feed is regularly updated, using it ensures that the system uses up-to-date information to filter your network traffic. Malicious IP addresses that represent security threats such as malware, spam, botnets, and phishing may appear and disappear faster than you can update and apply new policies.

To augment the Intelligence Feed, you can perform Security Intelligence filtering using custom or third-party IP address lists and feeds, where:

- a *list* is a static list of IP addresses that you upload to the ASA FirePOWER module
- a *feed* is a dynamic list of IP addresses that the ASA FirePOWER module downloads from the Internet on a regular basis; the Intelligence Feed is a special kind of feed

For detailed information on configuring Security Intelligence lists and feeds, including Internet access requirements, see Working with Security Intelligence Lists and Feeds, on page 20.

Using the Security Intelligence Global Blacklist

In the course of your analysis, you can build a *global blacklist*. For example, if you notice a set of routable IP addresses in intrusion events associated with exploit attempts, you can add those IP addresses to a blacklist. The ASA FirePOWER module uses this global blacklist (and a related *global whitelist*) to perform Security Intelligence filtering in all access control policies. For information on managing these global lists, see Working with the Global Whitelist and Blacklist, on page 22.

Note Although feed updates and additions to the global blacklist (or global whitelist; see below) automatically implement changes throughout your deployment, any other change to a Security Intelligence object requires you to reapply the access control policy.

Using Network Objects

Finally, a simple way to construct a blacklist is to use *network objects or network object groups* that represent an IP address, IP address block, or collection of IP addresses. For information on creating and modifying network objects, see Working with Network Objects, on page 19.

Using Security Intelligence Whitelists

In addition to a blacklist, each access control policy has an associated whitelist, which you can also populate with Security Intelligence objects. A policy's whitelist overrides its blacklist. That is, the system evaluates traffic with a whitelisted source or destination IP address using access control rules, even if the IP address is also on a blacklist. In general, use the whitelist if a blacklist is still useful, but is too broad in scope and incorrectly blocks traffic that you want to inspect.

For example, if a reputable feed improperly blocks your access to vital resources but is overall useful to your organization, you can add only the improperly classified IP addresses to a whitelist, rather than removing the whole feed from the blacklist.

Enforcing Security Intelligence Filtering by Security Zone

For added granularity, you can enforce Security Intelligence filtering based on whether the source or destination IP address in a connection resides in a particular security zone.

To extend the whitelist example above, you could add the improperly classified IP addresses to a whitelist, but then restrict the object using a security zone used by those in your organization who need to access those IP addresses. That way, only those with a business need can access those IP addresses. As another example, you could use a third-party spam feed to block traffic on an email server security zone.

Monitoring—Rather than Blocking—Connections

If you are not sure whether you want to block a particular IP address or set of addresses, you can use a "monitor-only" setting, which allows the system to pass the matching connection to access control rules, but also logs the match to the blacklist and generates an end-of-connection Security Intelligence event. Note that you cannot set the global blacklist to monitor-only.

Consider a scenario where you want to test a third-party feed before you implement blocking using that feed. When you set the feed to monitor-only, the system allows connections that would have been blocked to be further analyzed by the system, but also logs a record of each of those connections for your evaluation.

In passive deployments, to optimize performance, Cisco recommends that you always use monitor-only settings. Devices that are deployed passively cannot affect traffic flow; there is no advantage to configuring the system to block traffic. Additionally, because blocked connections are not actually blocked in passive deployments, the system may report multiple beginning-of-connection events for each blocked connection.

Building the Security Intelligence Blacklist and Whitelist

License: Protection

To build a blacklist and whitelist, you populate them with any combination of network objects and groups, as well as Security Intelligence feeds and lists, all of which you can constrain by security zone.

By default, access control policies use the ASA FirePOWER module's global whitelist and blacklist, which apply to any zone. These lists are populated by your analysts. You can opt not to use these global lists on a per-policy basis.

Note You cannot apply an access control policy that uses a populated global whitelist and blacklist to a device not licensed for Protection. If you added IP addresses to either global list, you **must** remove the non-empty list from the policy's Security Intelligence configuration before you can apply the policy. For more information, see Working with the Global Whitelist and Blacklist, on page 22.

After you build your whitelist and blacklist, you can log blocked connections. You can also set individual blocked objects, including feeds and lists, to monitor-only. This allows the system to handle connections involving blocked IP addresses using access control, but also logs the connection's match to the blacklist.

Use the Security Intelligence tab in the access control policy to configure the whitelist, blacklist, and logging options. The page lists the Available Objects you can use in either the whitelist or blacklist, as well as the Available Zones you can use to constrain objects on whitelists and blacklists. Each type of object or zone is distinguished with an different icon. The objects marked with the Cisco icon represent the different categories in the Intelligence Feed.

In the blacklist, objects set to block are marked with the block icon while monitor-only objects are marked with the monitor icon. Because the whitelist overrides the blacklist, if you add the same object to both lists, the system displays the blocked object with a strikethrough.

You can add up to a total of 255 objects to the whitelist and the blacklist. That is, the number of objects in the whitelist plus the number in the blacklist cannot exceed 255.

Note that although you can add network objects with a netmask of /0 to the whitelist or blacklist, address blocks using a /0 netmask in those objects will be ignored and whitelist and blacklist filtering will not occur based on those addresses. Address blocks with a /0 netmask from Security Intelligence feeds are also ignored. If you want to monitor or block all traffic targeted by a policy, use an access control rule with the **Monitor** or **Block** rule action, respectively, and a default value of **any** for the **Source Networks** and **Destination Networks**, instead of Security Intelligence filtering.

To build the Security Intelligence whitelist and blacklist for an access control policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon next to the access control policy you want to configure.

The **access control policy editor** appears.

Step 3 Select the **Security Intelligence** tab.

Security Intelligence settings for the access control policy appear.

Step 4 Optionally, click the **logging** icon to log blocked connections.

You must enable logging before you can set blocked objects to monitor-only. For details, see Logging Security Intelligence Decisions, on page 387.

Step 5 Begin building your whitelist and blacklist by selecting one or more **Available Objects**.

Use Shift and Ctrl to select multiple objects, or right-click and **Select All**.

Tip You can search for existing objects to include, or create objects on the fly if no existing objects meet the needs of your organization. For more information, see Searching for Objects to Whitelist or Blacklist, on page 87.

Step 6 Optionally, constrain the selected objects by zone by selecting an **Available Zone**.

By default, objects are not constrained, that is, they have a zone of Any . Note that other than using **Any**, you can constrain by only one zone. To enforce Security Intelligence filtering for an object on multiple zones, you must add the object to the whitelist or blacklist separately for each zone. Also, the global whitelist and blacklist cannot be constrained by zone.

Step 7 Click **Add to Whitelist** or **Add to Blacklist**.

You can also click and drag the selected objects to either list.

The objects you selected are added to the whitelist or blacklist .

Tip To remove an object from a list, click its delete icon. Use Shift and Ctrl to select multiple objects, or right-click and **Select All**, then right-click and select **Delete Selected**. If you are deleting a global list, you must confirm your choice. Note that removing an object from a whitelist or blacklist does not delete that object from the ASA FirePOWER module.

Step 8 Repeat steps Step 5 through Step 7 until you are finished adding objects to your whitelist and blacklist.

Step 9 Optionally, set blocked objects to monitor-only by right-clicking the object under **Blacklist**, then selecting **Monitor-only (do not block)**.

In passive deployments, Cisco recommends you set all blocked objects to monitor-only. Note, however, that you cannot set the global blacklist to monitor-only.

Step 10 Click **Store ASA FirePOWER Changes**.

You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Searching for Objects to Whitelist or Blacklist

License: Protection

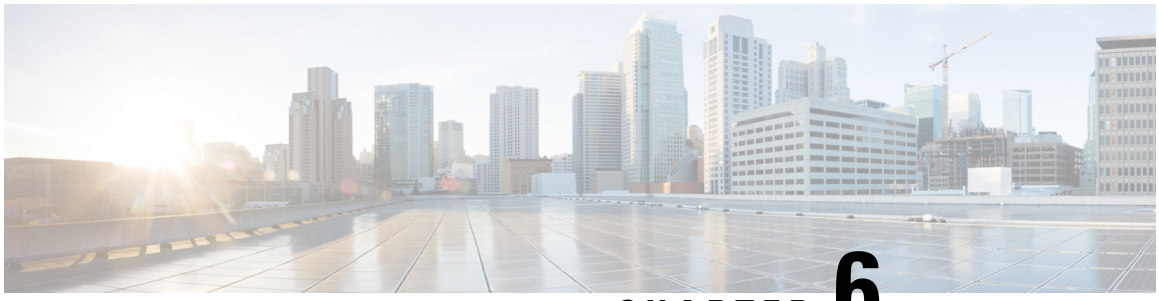
If you have multiple network objects, groups, feeds, and lists, use the search feature to narrow the objects you want to add to a whitelist or blacklist.

To search for objects to add to a list:

Type your query in the **Search by name or value** field.

The **Available Objects** list updates as you type to display matching items. To clear the search string, click the reload icon above the **search** field or click the **clear** icon in the **search** field.

You can search on network object names and on the values configured for those objects. For example, if you have an individual network object named Texas Office with the configured value 192.168.3.0/24 , and the object is included in the group object US Offices , you can display both objects by typing a partial or complete search string such as Tex , or by typing a value such as 3 .



CHAPTER 6

Tuning Traffic Flow Using Access Control Rules

In an access control policy, *access control rules* provide a granular method of handling network traffic.

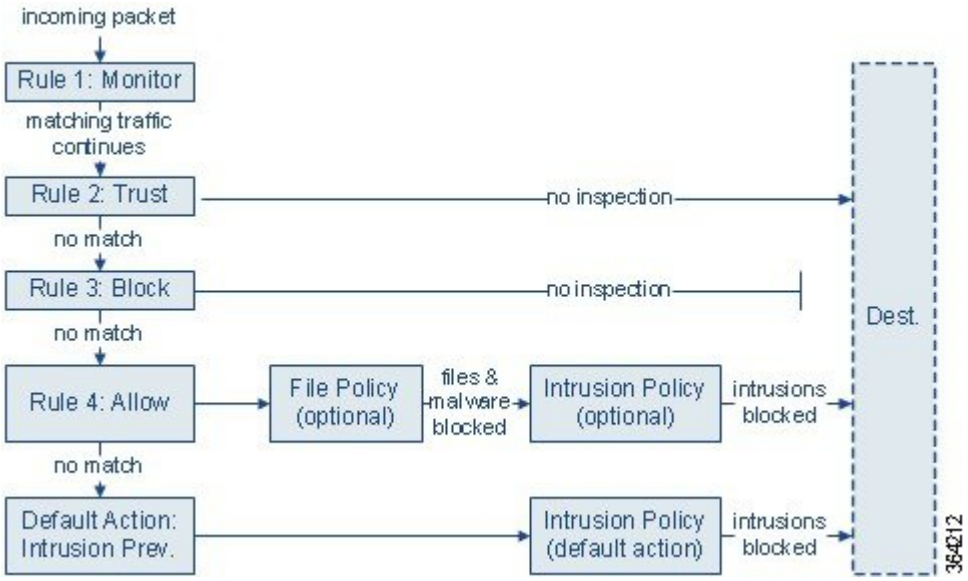
Note Security Intelligence-based traffic filtering, and some decoding and preprocessing occur *before* network traffic is evaluated by access control rules. You can also configure the *SSL inspection* feature to block or decrypt encrypted traffic before access control rules evaluate it.

Traffic Evaluation by Access Control Rules

The system matches traffic to access control rules in the order you specify. In most cases, the system handles network traffic according to the *first* access control rule where *all* the rule's conditions match the traffic. Conditions can be simple or complex; you can control traffic by security zone, network or geographical location, port, application, requested URL, and user.

Each rule also has an *action* , which determines whether you monitor, trust, block, or allow matching traffic. When you allow traffic, you can specify that the system first inspect it with intrusion or file policies to block any exploits, malware, or prohibited files before they reach your assets or exit your network. However, after the system trusts or blocks traffic, it does **not** perform further inspection.

The following scenario summarizes the ways that traffic can be evaluated by access control rules in an inline, intrusion prevention deployment.



In this scenario, traffic is evaluated as follows:

- **Rule 1: Monitor** evaluates traffic first. Monitor rules track and log network traffic but do not affect traffic flow. The system continues to match traffic against additional rules to determine whether to permit or deny it.
- **Rule 2: Trust** evaluates traffic next. Matching traffic is allowed to pass to its destination without further inspection. Traffic that does not match continues to the next rule.
- **Rule 3: Block** evaluates traffic third. Matching traffic is blocked without further inspection. Traffic that does not match continues to the final rule.
- **Rule 4: Allow** is the final rule. For this rule, matching traffic is allowed; however, prohibited files, malware, intrusions, and exploits within that traffic are detected and blocked. Remaining non-prohibited, non-malicious traffic is allowed to its destination. Note that you might have additional Allow rules that perform only file inspection, or only intrusion inspection, or neither.
- **Default Action** handles all traffic that does not match any of the rules. In this scenario, the default action performs intrusion prevention before allowing non-malicious traffic to pass. In a different deployment, you might have a default action that trusts or blocks all traffic, without further inspection. (You cannot perform file or malware inspection on traffic handled by the default action.)

Creating and Editing Access Control Rules

License: Any

Within an access control policy, access control rules provide a granular method of handling network traffic. In addition to its unique name, each access control rule has the following basic components:

State

By default, rules are enabled. If you disable a rule, the system does not use it to evaluate network traffic, and stops generating warnings and errors for that rule.

Position

Rules in an access control policy are numbered, starting at 1. The system matches traffic to rules in top-down order by ascending rule number. With the exception of Monitor rules, the first rule that traffic matches is the rule that handles that traffic.

Conditions

Conditions specify the specific traffic the rule handles. Conditions can match traffic by security zone, network or geographical location, port, application, requested URL, or user. Conditions can be simple or complex; their use often depends on license.

Action

A rule's action determines how the system handles matching traffic. You can monitor, trust, block, or allow (with or without further inspection) matching traffic. Note that the system does **not** perform inspection on trusted or blocked traffic.

Inspection

Inspection options for an access control rule govern how the system inspects and blocks malicious traffic you would otherwise allow. When you allow traffic with a rule, you can specify that the system first inspect it with intrusion or file policies to block any exploits, malware, or prohibited files before they reach your assets or exit your network.

Logging

A rule's logging settings govern the records the system keeps of the traffic it handles. You can keep a record of traffic that matches a rule. In general, you can log sessions at the beginning and end of a connection. You can log connections to the ASA FirePOWER module, as well as to the system log (syslog) or to an SNMP trap server.

Comments

Each time you save changes to an access control rule, you can add a comment.

Use the access control rule editor to add and edit access control rules; access the rule editor from the Rules tab of the access control policy editor. In the rule editor, you:

- Configure basic properties such as the rule's name, state, position, and action in the upper portion of the editor.
- Add conditions using the tabs on the left side of the lower portion of the editor.
- Use the tabs on the right side of the lower portion to configure inspection and logging options, and also to add comments to the rule. For your convenience, the editor lists the rule's inspection and logging options regardless of which tab you are viewing.

Note Properly creating and ordering access control rules is a complex task, but one that is essential to building an effective deployment. If you do not plan your policy carefully, rules can preempt other rules, require additional licenses, or contain invalid configurations. To help ensure that the system handles traffic as you expect, the access control policy interface has a robust warning and error feedback system for rules. For more information, see Troubleshooting Access Control Policies and Rules, on page 74

To create or modify an access control rule:

Step 1 Choose **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

Step 2 Click the **edit** icon ( ) next to the access control policy where you want to add a rule.

Step 3 You have the following options:

- To add a new rule, click **Add Rule**.
- To edit an existing rule, click the **edit** icon ( ) next to the rule you want to edit.

Step 4 Enter a **Name** for the rule.

Each rule must have a unique name. You can use up to thirty printable characters, including spaces and special characters, with the exception of the colon (:).

Step 5 Configure the rule components, as summarized above. You can configure the following, or accept the defaults:

- Specify whether the rule is **Enabled**.
- Specify the rule position; see Specifying a Rule's Order of Evaluation, on page 92
- Specify a rule **Action**; see Using Rule Actions to Determine Traffic Handling and Inspection, on page 95
- Configure the rule's conditions; see Using Conditions to Specify the Traffic a Rule Handles, on page 93
- For Allow and Interactive Block rules, configure the rule's **Inspection** options; see Controlling Traffic Using Intrusion and File Policies, on page 135
- Configure content restriction settings by clicking the **Safe Search** ( ) or **YouTube EDU** icon ( ) on the **Applications** tab. If the icons are dimmed, content restriction is disabled for the rule. For more information, see Using Access Control Rule to Enforce Content Restriction, on page 162
- Specify **Logging** options; see Logging Connections in Network Traffic, on page 381
- Add **Comments**; see Adding Comments to a Rule, on page 98

Step 6 Click **Store FirePOWER Changes** to save the rule

.

Your rule is saved. You can click the **delete** icon ( ) to delete the rule. You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Specifying a Rule's Order of Evaluation

License: Any

When you first create an access control rule, you specify its position using the **Insert** drop-down list in the rule editor. Rules in an access control policy are numbered, starting at 1. The system matches traffic to access control rules in top-down order by ascending rule number.

In most cases, the system handles network traffic according to the *first* access control rule where *all* the rule's conditions match the traffic. Except in the case of Monitor rules (which log traffic but do not affect traffic flow),

the system does **not** continue to evaluate traffic against additional, lower-priority rules after that traffic matches a rule.

Tip Proper access control rule order reduces the resources required to process network traffic, and prevents rule preemption. Although the rules you create are unique to every organization and deployment, there are a few general guidelines to follow when ordering rules that can optimize performance while still addressing your needs. For more information, see Ordering Rules to Improve Performance and Avoid Preemption, on page 76.

In addition to ordering rules by number, you can group rules by category. By default the system provides three categories: Administrator, Standard, and Root. You can add custom categories, but you cannot delete the Cisco-provided categories or change their order. For information on changing the position or category of an existing rule, see Changing a Rule's Position or Category, on page 101

To add a rule to a category while editing or creating a rule:

In the **access control rule editor,** from the **Insert** drop-down list, select **Into Category**, then select the category you want to use.

When you save the rule, it is placed last in that category.

Specifying a Rule's Order of Evaluation

To position a rule by number while editing or creating a rule:

In the **access control rule editor**, from the **Insert** drop-down list, select **above rule** or **below rule**, then type the appropriate rule number.

When you save the rule, it is placed where you specified.

Using Conditions to Specify the Traffic a Rule Handles

License: feature dependent

An access control rule's conditions identify the type of traffic that rule handles. Conditions can be simple or complex; you can control traffic by security zone, network or geographical location, port, application, requested URL, and user.

When adding conditions to access control rules, keep the following points in mind:

- You can configure multiple conditions per rule. Traffic must match **all** the conditions in the rule for the rule to apply to traffic. For example, you can use a single rule to perform URL filtering (URL condition) for specific hosts (zone or network condition).
- For each condition in a rule, you can add up to 50 criteria. Traffic that matches **any** of a condition's criteria satisfies the condition. For example, you can use a single rule to perform user control for up to 50 users and groups.

Note that you can constrain zone and network conditions by source and destination, using up to 50 source and up to 50 destination criteria. If you add both source and destination criteria to a zone or network condition, matching traffic must originate from one of the specified source zones/networks **and** egress through one of the destination zones/networks. In other words, the system links multiple condition criteria of the same type with an OR operation, and links multiple condition types with an AND operation. For example, if your rule conditions are:

```
Source Networks: 10.0.0.0/8, 192.168.0.0/16
Application Category: peer to peer
```

the rule would match peer-to-peer application traffic from a host on one of your private IPv4 networks—a packet must originate from either one **OR** the other source network, **AND** represent peer-to-peer application traffic. Both of the following connections trigger the rule:

```
10.42.0.105 to anywhere, using LimeWire
192.168.42.105 to anywhere, using Kazaa
```

If you do not configure a particular condition for a rule, the system does not match traffic based on that criterion. For example, a rule with a network condition but no application condition evaluates traffic based on its source or destination, regardless of the application used in the session.

Note When you apply an access control policy, the system evaluates all its rules and creates an expanded set of criteria that the ASA FirePOWER module uses to evaluate network traffic. Complex access control policies and rules can command significant resources. For tips on simplifying access control rules and other ways to improve performance, see Troubleshooting Access Control Policies and Rules, on page 74

When you add or edit an access control rule, use the tabs on the left side of the lower portion of the rule editor to add and edit rule conditions. The following table summarizes the types of conditions you can add. Table Title: Access Control Rule Condition Types

These Conditions...	Match Traffic...	Details
Zones	entering or leaving a device via an interface in a specific security zone	A security zone is a logical grouping of one or more interfaces according to your deployment and security policies. To build a zone condition, see Controlling Traffic by Security Zone, on page 103
Networks	by its source or destination IP address, country, or continent	You can explicitly specify IP addresses or address blocks. The geolocation feature also allows you to control traffic based on its source or destination country or continent. To build a network condition, see Controlling Traffic by Network or Geographical Location, on page 105
Ports	by its source or destination port	For TCP and UDP, you can control traffic based on the transport layer protocol. For ICMP and ICMPv6 (IPv6-ICMP), you can control traffic based on its Internet layer protocol plus an optional type and code. Using port conditions, you can also control traffic using other protocols that do not use ports. To build a port condition, see Controlling Traffic by Port and ICMP Codes, on page 107

These Conditions...	Match Traffic...	Details
Applications	by the application detected in a session	You can control access to individual applications, or filter access according to basic characteristics: type, risk, business relevance, categories, and tags. To build an application condition, see Controlling Application Traffic, on page 112
URLs	by the URL requested in the session	You can limit the websites that users on your network can access either individually or based on the URL's general classification and risk level. To build a URL condition, see Blocking URLs, on page 117
Users	by the user involved in the session	You can control traffic based on the LDAP user logged into a host involved in a monitored session. You can control traffic based on individual users or groups retrieved from a Microsoft Active Directory server. See Access Control Rules: Realms and Users, on page 127

Note that although you can create access control rules with any license, certain rule conditions require that you enable specific licensed capabilities before you can apply the policy. For more information, see License Requirements for Access Control, on page 64

Using Rule Actions to Determine Traffic Handling and Inspection

License: Any

Every access control rule has an *action* that determines the following for matching traffic:

- handling—foremost, the rule action governs whether the system will monitor, trust, block, or allow traffic that matches the rule's conditions
- inspection—certain rule actions allow you, when properly licensed, to further inspect matching traffic before allowing it to pass
- logging—the rule action determines when and how you can log details about matching traffic

The access control policy's *default action* handles traffic that does not meet the conditions of any non-Monitor access control rule; see Setting Default Handling and Inspection for Network Traffic, on page 66

Keep in mind that only devices deployed inline can block or modify traffic. Devices deployed passively can analyze and log, but not affect, the flow of traffic.

Monitor Action: Postponing Action and Ensuring Logging

License: Any

The **Monitor** action does not affect traffic flow; matching traffic is neither immediately permitted nor denied. Rather, traffic is matched against additional rules to determine whether to permit or deny it. The first non-Monitor rule matched determines traffic flow and any further inspection. If there are no additional matching rules, the system uses the default action.

Because the primary purpose of Monitor rules is to track network traffic, the system automatically logs end-of connection events for monitored traffic. That is, connections are logged even if the traffic matches no other

rules and you do not enable logging on the default action. For more information, see Understanding Logging for Monitored Connections, on page 384

Trust Action: Passing Traffic Without Inspection

License: Any

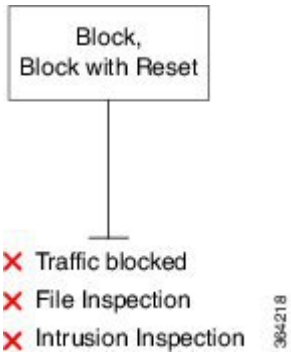
The **Trust** action allows traffic to pass without further inspection of any kind.

You can log trusted network traffic at both the beginning and end of connections. For more information, see Understanding Logging for Trusted Connections, on page 385

Blocking Actions: Blocking Traffic Without Inspection

License: Any

The **Block** and **Block with reset** actions deny traffic without further inspection of any kind. Block with reset rules also reset the connection.



For decrypted HTTP traffic, when the system blocks a web request, you can override the default browser or server page with a custom page that explains that the connection was denied. The system calls this custom page an *HTTP response page* ; see Displaying a Custom Web Page for Blocked URLs, on page 124

You can log blocked network traffic only at the beginning of connections. Note that only devices deployed inline can block traffic. Because blocked connections are not actually blocked in passive deployments, the system may report multiple beginning-of-connection events for each blocked connection. For more information, see Understanding Logging for Blocked and Interactively Blocked Connections, on page 385

Caution Logging blocked TCP connections during a Denial of Service (DoS) attack can affect system performance with multiple similar events. Before you enable logging for an Block rule, consider whether the rule monitors traffic on an Internet-facing interface or other interface vulnerable to DoS attack.

Interactive Blocking Actions: Allowing Users to Bypass Website Blocks

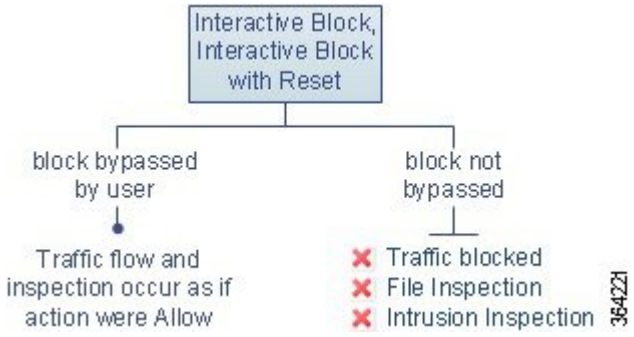
License: Any

For decrypted HTTP traffic, the **Interactive Block** and **Interactive Block with reset** actions give users a chance to bypass a website block by clicking through a customizable warning page, called an *HTTP response page* . Interactive Block with reset rules also reset the connection.

If you configure SSL inspection to decrypt web traffic and that traffic matches an Interactive Block rule, the system encrypts the response page and sends it at the end of the reencrypted SSL response stream.

For all interactively blocked traffic, the system's handling, inspection, and logging depend on whether the user bypasses the block:

- If a user does not (or cannot) bypass the block, the rule mimics a Block rule. Matching traffic is denied without further inspection and you can log only the beginning of the connection. These beginning-of-connection events have an Interactive Block or Interactive Block with Reset action.
- If a user bypasses the block, the rule mimics an Allow rule. Therefore, you can associate either type of Interactive Block rule with a file and intrusion policy to inspect this user-allowed traffic. The system can also log both beginning and end-of-connection events. These connection events have an action of Allow .



Allow Action: Allowing and Inspecting Traffic

License: Any

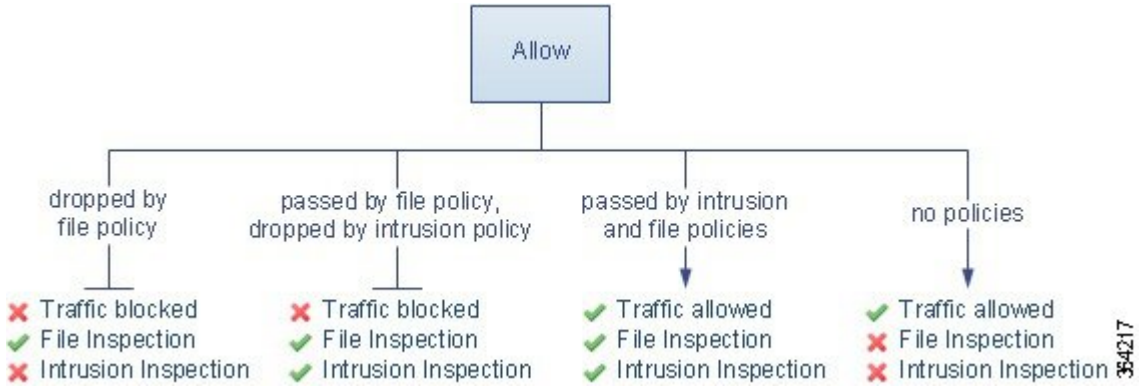
The **Allow** action allows matching traffic to pass. When you allow traffic, you can use an associated intrusion or file policy (or both) to further inspect and block unencrypted or decrypted network traffic:

- With a Protection license, you can use an intrusion policy to analyze network traffic according to intrusion detection and prevention configurations and, optionally, drop offending packets.
- Also with a Protection license, you can perform file control using a file policy. File control allows you to detect and block your users from uploading (sending) or downloading (receiving) files of specific types over specific application protocols.
- With a Malware license, you can perform network-based advanced malware protection (AMP), also using a file policy. Network-based AMP can inspect files for malware, and optionally block detected malware.

For instructions on how to associate an intrusion or file policy with an access control rule, see Controlling Traffic Using Intrusion and File Policies, on page 135

The diagram below illustrates the types of inspection performed on traffic that meets the conditions of an Allow rule (or a user-bypassed Interactive Block rule; see Interactive Blocking Actions: Allowing Users to Bypass Website Blocks, on page 97). Notice that file inspection occurs before intrusion inspection; blocked files are not inspected for intrusion-related exploits.

For simplicity, the diagram displays traffic flow for situations where both (or neither) an intrusion and a file policy are associated with an access control rule. You can, however, configure one without the other. Without a file policy, traffic flow is determined by the intrusion policy; without an intrusion policy, traffic flow is determined by the file policy.



You can log allowed network traffic at both the beginning and end of connections.

Adding Comments to a Rule

License: Any

When you create or edit an access control rule, you can add a comment. For example, you might summarize the overall configuration for the benefit of other users, or note when you change a rule and the reason for the change. You can display a list of all comments for a rule along with the user who added each comment and the date the comment was added.

When you save a rule, all comments made since the last save become read-only.

To add a comment to a rule:

Step 1 In the **access control rule editor**, select the **Comments** tab.

The **Comments** page appears.

Step 2 Click **New Comment**.

The **New Comment** pop-up window appears.

Step 3 Type your comment and click **OK**.

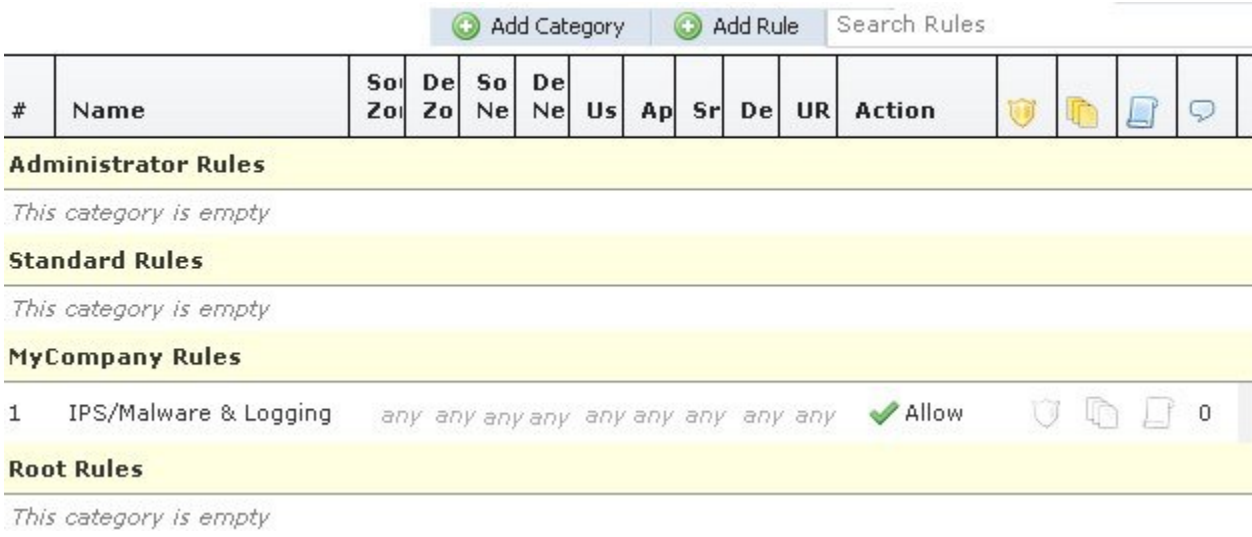
Your comment is saved. You can edit or delete this comment until you save the rule.

Step 4 Save or continue editing the rule.

Managing Access Control Rules in a Policy

License: Any

The Rules tab of the access control policy editor, shown in the following graphic, allows you to add, edit, search, move, enable, disable, delete, and otherwise manage access control rules within your policy.



For each rule, the policy editor displays its name, a summary of its conditions, the rule action, plus icons that communicate the rule's inspection and logging options. Other icons represent comments, warnings, errors, and other important information, as described in the following table. Disabled rules are grayed and marked (disabled) beneath the rule name.

Table 18: Understanding the Access Control Policy Editor

Icon	Description	You can...
	intrusion inspection	Click an active (yellow) inspection icon to edit the inspection options for the rule; see Controlling Traffic Using Intrusion and File Policies, on page 135 If the icon is inactive (white), no policy of that type is selected for the rule.
	file and malware inspection	
	logging	Click an active (blue) logging icon to edit the logging options for the rule; see Logging Connections Based on Access Control Handling, on page 389 If the icon is inactive (white), connection logging is disabled for the rule.
	comment	Click the number in the comment column to add a comment to a rule; see Adding Comments to a Rule, on page 98 The number indicates how many comments the rule already contains.
	warning	In the access control policy editor, click **Show Warnings** to display a pop-up window that lists all the warnings for the policy; see Troubleshooting Access Control Policies and Rules, on page 74
	error	
	information	

For information on managing access control rules, see:

- Creating and Editing Access Control Rules, on page 90
- Searching Access Control Rules, on page 100
- Enabling and Disabling Rules, on page 100
- Changing a Rule's Position or Category, on page 101

Searching Access Control Rules

License: Any

You can search the list of access control rules for matching values using an alphanumeric string, including spaces and printable, special characters. The search inspects the rule name and any rule condition you have added to the rule. For rule conditions, the search matches any name or value you can add for each condition type (zone, network, application, and so on). This includes individual object names or values, group object names, individual object names or values within a group, and literal values.

You can use complete or partial search strings. The column for matching values is highlighted for each matching rule. For example, if you search on all or part of the string 100Bao , at a minimum, the Applications column is highlighted for each rule where you have added the 100Bao application. If you also have a rule named 100Bao, both the Name and Applications columns are highlighted.

You can navigate to each previous or next matching rule. A status message displays the current match and the total number of matches.

Matches may occur on any page of a multi-page rule list. When the first match is not on the first page, the page where the first match occurs is displayed. Selecting the next match when you are at the last match takes you to the first match, and selecting the previous match when you are at the first match takes you to the last match.

To search for rules:

Step 1 In the **access control policy editor** for the policy you want to search, click the **Search Rules** prompt, type a search string, then press Enter. You can also use the Tab key or click a blank page area to initiate the search.

Columns for rules with matching values are highlighted, with differentiated highlighting for the indicated (first) match.

Step 2 Find the rules you are interested in:

- To navigate between matching rules, click the next-match or previous-match icon.
- To refresh the page and clear the search string and any highlighting, click the **clear** icon .

Enabling and Disabling Rules

License: Any

When you create an access control rule, it is enabled by default. If you disable a rule, the system does not use it to evaluate network traffic and stops generating warnings and errors for that rule. When viewing the list of

rules in an access control policy, disabled rules are grayed out, although you can still modify them. Note that you can also enable or disable an access control rule using the rule editor; see Creating and Editing Access Control Rules, on page 90

To change an access control rule's state:

Step 1 In the **access control policy editor** for the policy that contains the rule you want to enable or disable, right-click the rule and choose a rule state:

- To enable an inactive rule, select **State > Enable**.
- To disable an active rule, select **State > Disable**.

Step 2 Click **Store FirePOWER Changes** to save the policy.

You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Changing a Rule's Position or Category

License: Any

To help you organize access control rules, every access control policy has three system-provided rule categories: Administrator Rules, Standard Rules, and Root Rules. You cannot move, delete, or rename these categories, although you can create custom categories.

Moving a Rule

License: Any

Proper access control rule order reduces the resources required to process network traffic, and prevents rule preemption.

The following procedure explains how to move one or more rules at a time using the access control policy editor. You can also move individual access control rules using the rule editor; see Creating and Editing Access Control Rules, on page 90

To move a rule:

Step 1 In the **access control policy editor** for the policy that contains the rules you want to move, select the rules by clicking in a blank area for each rule. Use the Ctrl and Shift keys to select multiple rules.

The rules you selected are highlighted.

Step 2 Move the rules. You can cut and paste or drag and drop.

To cut and paste rules into a new location, right-click a selected rule and select **Cut**. Then, right-click a blank area for a rule next to where you want to paste the cut rules and select **Paste above** or **Paste below**. Note that you cannot copy and paste access control rules between two different access control policies.

Step 3 Click **Store FirePOWER Changes** to save the policy.

You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Adding a New Rule Category

License: Any

To help you organize access control rules, every access control policy has three system-provided rule categories: Administrator Rules, Standard Rules, and Root Rules. You cannot move, delete, or rename these categories, although you can create custom categories between the Standard Rules and Root Rules.

Adding custom categories allows you to further organize your rules without having to create additional policies. You can rename and delete categories that you add. You cannot move these categories, but you can move rules into, within, and out of them.

To add a new category:

Step 1 In the **access control policy editor** for the policy where you want to add a rule category, click **Add Category**.

Tip If your policy already contains rules, you can click a blank area in the row for an existing rule to set the position of the new category before you add it. You can also right-click an existing rule and select **Insert new category**.

The **Add Category** pop-up window appears.

Step 2 Type a unique category **Name**.

You can enter an alphanumeric name, including spaces and special printable characters, with up to 30 characters.

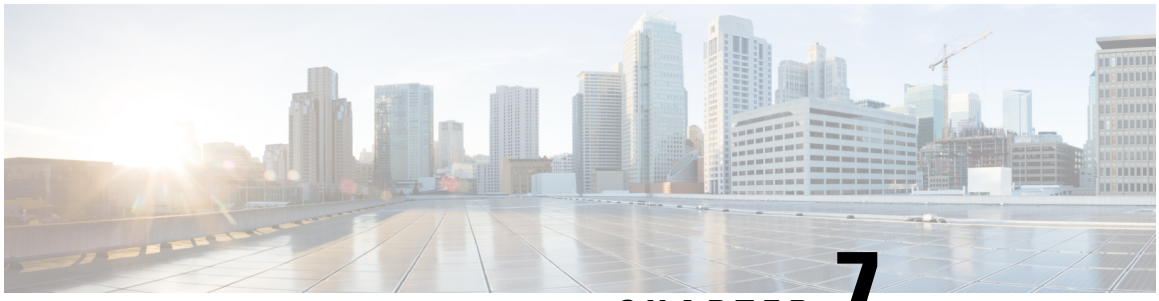
Step 3 You have the following choices:

- To position the new category immediately above an existing category, select **above Category** from the first **Insert** drop-down list, then select the category above which you want to position the rule from the second drop-down list.
- To position the new category rule below an existing rule, select **below rule** from the drop-down list, then enter an existing rule number. This option is valid only when at least one rule exists in the policy.
- To position the rule above an existing rule, select **above rule** from the drop-down list, then, enter an existing rule number. This option is valid only when at least one rule exists in the policy.

Step 4 Click **OK**.

Your category is added. You can click the **edit** icon ( ) next to a custom category to edit its name, or click the **delete** icon ( ) to delete the category. Rules in a category you delete are added to the category above.

Step 5 Click **Store FirePOWER Changes** to save the policy.



CHAPTER 7

Controlling Traffic with Network-Based Rules

Access control rules in *access control policies* exert granular control over network traffic logging and handling. Network-based conditions allow you to manage which traffic can traverse your network, using one or more of the following criteria:

- Source and destination security zones
- Source and destination IP addresses or geographical locations
- Source and destination port, which also includes transport layer protocol and ICMP code options

You can combine network-based conditions with each other and with other types of conditions to create an access control rule. These access control rules can be simple or complex, matching and inspecting traffic using multiple conditions. For detailed information on access control rules, see Tuning Traffic Flow Using Access Control Rules, on page 89.

Note Security Intelligence-based traffic filtering, and some decoding and preprocessing occur **before** network traffic is evaluated by access control rules. You can also configure the *SSL inspection* feature to block or decrypt encrypted traffic before access control rules evaluate it.

Table 19: License Requirements for Network-Based Access Control Rules

Requirement	Geolocation Control	All Other Network-Based Control
license	Any	Any

Controlling Traffic by Security Zone

License: Any

Zone conditions in access control rules allow you to control traffic by its source and destination security zones. A *security zone* is a grouping of one or more interfaces.

As a simple example, you could create two zones: Internal and External, and assign the first pair of interfaces on the device to those zones. Hosts connected to the network on the Internal side represent your protected assets.

To extend this scenario, you could deploy additional identically configured devices to protect similar resources in several different locations. Each of these devices protects the assets in its Internal security zone.

Tip You are not required to group all internal (or external) interfaces into a single zone. Choose the grouping that makes sense for your deployment and security policies. For more information on creating zones, see Working with Security Zones, on page 49.

In this deployment, you may decide that although you want these hosts to have unrestricted access to the Internet, you nevertheless want to protect them by inspecting incoming traffic for intrusions and malware.

To accomplish this using access control, configure an access control rule with a zone condition where the **Destination Zone** is set to **Internal**. This simple access control rule matches traffic that leaves the device from any interface in the Internal zone.

To ensure that the system inspects matching traffic for intrusions and malware, choose a rule action of **Allow**, then associate this rule with an intrusion and a file policy.

If you want to build a more complex rule, you can add a maximum of 50 zones to each of the **Source Zones** and **Destination Zones** in a single zone condition:

- To match traffic *leaving* the device from an interface in the zone, add that zone to the **Destination Zones**.

Because devices deployed passively do not transmit traffic, you cannot use a zone comprised of passive interfaces in a **Destination Zone** condition.

- To match traffic *entering* the device from an interface in the zone, add that zone to the **Source Zones**.
- If you add both source and destination zone conditions to a rule, matching traffic must originate from one of the specified source zones **and** egress through one of the destination zones.

When building a zone condition, warning icons indicate invalid configurations. For details, Troubleshooting Access Control Policies and Rules, on page 74.

To control traffic by zone:

Step 1 In the access control policy where you want to control traffic by zone, create a new access control rule or edit an existing rule.

For detailed instructions, see Creating and Editing Access Control Rules, on page 90.

Step 2 In the **rule editor**, select the **Zones** tab.

The **Zones** tab appears.

Step 3 Find and select the zones you want to add from the **Available Zones**.

To search for zones to add, click the **Search by name** prompt above the **Available Zones** list, then type a zone name. The list updates as you type to display matching zones.

Click to select a zone. To select multiple zones, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 4 Click **Add to Source** or **Add to Destination** to add the selected zones to the appropriate list.

You can also drag and drop selected zones.

Step 5 Save or continue editing the rule.

You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Controlling Traffic by Network or Geographical Location

License: feature dependent

Network conditions in access control rules allow you to control traffic by its source and destination IP address. You can either:

- explicitly specify the source and destination IP addresses for the traffic you want to control, or
- use the geolocation feature, which associates IP addresses with geographical locations, to control traffic based on its source or destination country or continent

When you build a network-based access control rule condition, you can manually specify IP address and geographical locations. Alternately, you can configure network conditions with network and geolocation *objects* , which are reusable and associate a name with one or more IP addresses, address blocks, countries, continents, and so on.

Tip After you create a network or geolocation object, you can use it not only to build access control rules, but also to represent IP addresses in various other places in the system's module interface. For more information, see Managing Reusable Objects, on page 17.

Note that if you want to write rules to control traffic by geographical location, to ensure you are using up-to-date geolocation data to filter your traffic, Cisco **strongly** recommends you regularly update the geolocation database (GeoDB) on your ASA FirePOWER module; see Updating the Geolocation Database, on page 493.

Table 20: License Requirements for Network Conditions

Requirement	Geolocation Control	IP Address Control
license	Any	Any

You can add a maximum of 50 items to each of the **Source Networks** and **Destination Networks** in a single network condition, and you can mix network and geolocation-based configurations:

- To match traffic *from* an IP address or geographical location, configure the **Source Networks**.
- To match traffic *to* an IP address or geographical location, configure the **Destination Networks**.

If you add both source and destination network conditions to a rule, matching traffic must originate from one of the specified IP addresses **and** be destined for one of the destination IP addresses.

When building a network condition, warning icons indicate invalid configurations. For details, see Troubleshooting Access Control Policies and Rules, on page 74.

Network conditions also allow you to handle proxied traffic based on the originating client. Use a source network condition to specify proxy servers, then add an original client constraint to specify original client IP addresses. The systems uses a packet's X-Forwarded-For (XFF), True-Client-IP, or custom-defined HTTP header field to determine original client IP.

Traffic matches the rule if the proxy's IP addresss matches the rule's source network constraint, and the original client's IP address matches the rule's original client constraint. For example, to allow traffic from a specific original client address, but only if it uses a specific proxy, create three rules:

Rule 1: Blocks non-proxied traffic from a specific IP address (209.165.201.1)

Source Networks: 209.165.201.1

Original Client Networks: none/any

Action: Block

Rule 2: Allows proxied traffic from the same IP address, but only if the proxy server for that traffic is one you choose (209.165.200.225 or 209.165.200.238)

Source Networks: 209.165.200.225 and 209.165.200.238

Original Client Networks: 209.165.201.1

Action: Allow

Rule 3: Blocks proxied traffic from the same IP address if it uses any other proxy server.

Source Networks: any

Original Client Networks: 209.165.201.1

Action: Block

To control traffic by network or geographical location:

Step 1 In the access control policy where you want to control traffic by network, create a new access control rule or edit an existing rule; see Creating and Editing Access Control Rules, on page 90.

Step 2 In the rule editor, select the **Networks** tab.

Step 3 Find and select the networks you want to add from the **Available Networks**, as follows:

- Click the **Networks** tab to display network objects and groups to add; click the Geolocation tab to display geolocation objects.
- To add a network object on the fly, which you can then add to the condition, click the **add** icon ( ) above the **Available Networks** list; see Working with Network Objects, on page 19.
- To search for network or geolocation objects to add, select the appropriate tab, click the **Search by name or value** prompt above the **Available Networks** list, then type an object name or the value of one of the object's components. The list updates as you type to display matching objects.

To select an object, click it. To select multiple objects, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 4 If you want to filter proxied traffic:

- Click the **Source** sub-tab to specify a source network constraint.
- Click the **Original Client** sub-tab to specify an original client network constraint. In proxied connections, the original client's IP address must match one of these networks to match the rule.

Step 5 Click **Add to Source**, **Add to Original Client**, or **Add to Destination** to add the selected objects to the appropriate list.

You can also drag and drop selected objects.

Step 6 Add any source or destination IP addresses or address blocks that you want to specify manually.

Click the **Enter an IP address** prompt below the **Source Networks** or **Destination Networks** list; then type an IP address or address block and click **Add**.

Step 7 Save or continue editing the rule.

You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Controlling Traffic by Port and ICMP Codes

License: Any

Network conditions in access control rules allow you to control traffic by its source and destination port. In this context, "port" refers to one of the following:

- For TCP and UDP, you can control traffic based on the transport layer protocol. The system represents this configuration using the protocol number in parentheses, plus an optional associated port or port range. For example: TCP(6)/22.
- For ICMP and ICMPv6 (IPv6-ICMP), you can control traffic based on its Internet layer protocol plus an optional type and code. For example: ICMP(1):3:3.
- You can control traffic using other protocols that do not use ports.

When you build a port-based access control rule condition, you can manually specify ports. Alternately, you can configure port conditions with port *objects* , which are reusable and associate a name with one or more ports.

Tip After you create a port object, you can use it not only to build access control rules, but also to represent ports in various other places in the system's module interface. You can create port objects either using the object manager or on-the-fly while you are configuring access control rules. For more information, see the procedure later in this section.

You can add a maximum of 50 items to each of the **Selected Source Ports** and **Selected Destination Ports** lists in a single network condition:

- To match traffic *from* a port, configure the **Selected Source Ports**.

If you add only source ports to a condition, you can add ports that use different transport protocols. For example, you can add both DNS over TCP and DNS over UDP as source port conditions in a single access control rule.

- To match traffic *to* a port, configure the **Selected Destination Ports**.

If you add only destination ports to a condition, you can add ports that use different transport protocols.

- To match traffic both originating from specific **Selected Source Ports** *and* destined for specific **Selected Destination Ports**, configure both.

If you add both source and destination ports to a condition, you can only add ports that share a single transport protocol (TCP or UDP). For example, if you add DNS over TCP as a source port, you can add Yahoo Messenger Voice Chat (TCP) as a destination port but not Yahoo Messenger Voice Chat (UDP).

Keep the following points in mind when building a port condition:

- When you add a destination ICMP port with the type set to 0 or a destination ICMPv6 port with the type set to 129, the access control rule only matches unsolicited echo replies. ICMP echo replies sent in response to ICMP echo requests are ignored. For a rule to match on any ICMP echo, use ICMP type 8 or ICMPv6 type 128.
- When you use the GRE (47) protocol as a destination port condition, you can only add other network-based conditions to the access control rule, that is, zone, and network conditions. You cannot save the rule if you add reputation or user-based conditions.

When building a port condition, warning icons indicate invalid configurations. For example, you can use the object manager to edit in-use port objects so that the rules that use those object groups become invalid. For details, see Working with Port Objects, on page 25.

To control traffic by port:

Step 1 In the access control policy where you want to control traffic by port, create a new access control rule or edit an existing rule.

For detailed instructions, see Tuning Traffic Flow Using Access Control Rules, on page 89.

Step 2 In the **rule editor**, select the **Ports** tab.

The **Ports** tab appears.

Step 3 Find and select the ports you want to add from the **Available Ports**, as follows:

- To add a port object on the fly, which you can then add to the condition, click the add icon above the Available Ports list; see Working with Port Objects, on page 25.
- To search for port objects and groups to add, click the **Search by name or value** prompt above the **Available Ports** list, then type either the name of the object, or the value of a port in the object. The list updates as you type to display matching objects. For example, if you type 80, the ASA FirePOWER module displays the Cisco-provided HTTP port object.

To select an object, click it. To select multiple objects, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 4 Click **Add to Source** or **Add to Destination** to add the selected objects to the appropriate list.

You can also drag and drop selected objects.

Step 5 Add any source or destination ports that you want to specify manually.

- For source ports, select either **TCP** or **UDP** from the **Protocol** drop-down list under the **Selected Source Ports** list. Then, enter a **Port**. You can specify a single port with a value from 0 to 65535.
- For destination ports, select a protocol (including **All** for all protocols) from the **Protocol** drop down list under the **Selected Destination Ports** list. You can also type the number of an unassigned protocol that does not appear in the list.

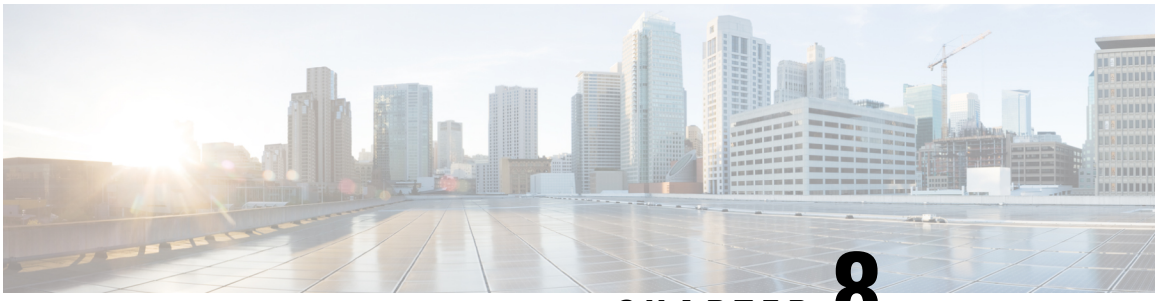
If you select **ICMP** or **IPv6-ICMP**, a pop-up window appears where you can select a type and a related code. For more information, see the IANA site for ICMP types and codes or ICMP v6 types and codes.

If you do not want to specify a protocol, or optionally if you specified TCP or UDP, enter a **Port**. You can specify a single port with a value from 0 to 65535.

Click **Add**. Note that the ASA FirePOWER module will not add a port to a rule condition that results in an invalid configuration.

Step 6 Save or continue editing the rule.

You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.



CHAPTER 8

Controlling Traffic With Reputation-Based Rules

Access control rules in *access control policies* exert granular control over network traffic logging and handling. Reputation-based conditions in access control rules allow you to manage which traffic can traverse your network, by contextualizing your network traffic and limiting it where appropriate. Access control rules govern the following types of reputation-based control:

- Application conditions allow you to perform *application control* , which controls application traffic based on not only individual applications, but also applications' basic characteristics: type, risk, business relevance, categories, and tags.
- URL conditions allow you to perform *URL filtering* , which controls web traffic based on individual websites, as well as websites' system-assigned category and reputation.

You can combine reputation-based conditions with each other and with other types of conditions to create an access control rule. These access control rules can be simple or complex, matching and inspecting traffic using multiple conditions. For detailed information on access control rules, see Tuning Traffic Flow Using Access Control Rules, on page 89.

Note Security Intelligence-based traffic filtering, and some decoding and preprocessing occur **before** network traffic is evaluated by access control rules. You can also configure the *SSL inspection* feature to block or decrypt encrypted traffic before access control rules evaluate it.

Reputation-based access control requires the following licenses.

Table 21: License Requirements for Reputation-Based Access Control Rules

Requirement	Application Control	URL Filtering (cat. & rep.)	URL Filtering (manual)
license	Control	URL Filtering	Any

The ASA FirePOWER module can perform other types of reputation-based control, but you do not configure these using access control rules. For more information, see: Blocking Traffic Using Security Intelligence IP Address Reputation, on page 83 explains how to limit traffic based on the reputation of a connection's origin or destination as a first line of defense. Tuning Intrusion Prevention Performance, on page 140 explains how to detect, track, store, analyze, and block the transmission of malware and other types of prohibited files.

- Controlling Application Traffic, on page 112

• Blocking URLs, on page 117

Controlling Application Traffic

License: Control

When the ASA FirePOWER module analyzes IP traffic, it can identify and classify the commonly used applications on your network.

Understanding Application Control

Application conditions in access control rules allow you to perform this *application control* . Within a single access control rule, there are a few ways you can specify applications whose traffic you want to control:

- You can select individual applications, including custom applications.
- You can use system-provided *application filters* , which are named sets of applications organized according to the applications' basic characteristics: type, risk, business relevance, categories, and tags.
- You can create and use custom application filters, which group applications (including custom applications) in any way you choose.

Application filters allow you to quickly create application conditions for access control rules. They simplify policy creation and administration, and grant you assurance that the system will control web traffic as expected. For example, you could create an access control rule that identifies and blocks all high risk, low business relevance applications. If a user attempts to use one of those applications, the session is blocked.

In addition, Cisco frequently updates and adds additional detectors via system and vulnerability database (VDB) updates. By using filters based on application characteristics, you can ensure that the system uses the most up-to-date detectors to monitor application traffic.

Building Application Conditions

For traffic to match an access control rule with an application condition, the traffic must match one of the filters or applications that you add to a **Selected Applications and Filters** list.

In a single application condition, you can add a maximum of 50 items to the **Selected Applications and Filters** list. Each of the following counts as an item:

- One or more filters from the **Application Filters** list, individually or in custom combination. This item represents set of applications, grouped by characteristic.
- A filter created by saving an application search in the **Available Applications** list. This item represents a set of applications, grouped by substring match.
- An individual application from the **Available Applications** list.

In the module interface, filters added to a condition are listed above and separately from individually added applications.

Note that when you deploy an access control policy, for each rule with an application condition, the system generates a list of unique applications to match. In other words, you may use overlapping filters and individually specified applications to ensure complete coverage.

Note For encrypted traffic, the system can identify and filter traffic using only the applications tagged **SSL Protocol**. Applications without this tag can only be detected in unencrypted or decrypted traffic.

Matching Traffic with Application Filters

License: Control

When building an application condition in an access control rule, use the **Application Filters** list to create a set of applications, grouped by characteristic, whose traffic you want to match.

Note that the mechanism for filtering applications within an access control rule is the same as that for creating reusable, custom application filters using the object manager; see Working with Application Filters, on page 27. You can also save many filters you create on-the-fly in access control rules as new, reusable filters. You cannot save a filter that includes another user-created filter because you cannot nest user-created filters.

Understanding How Filters Are Combined

When you select filters, singly or in combination, the **Available Applications** list updates to display only the applications that meet your criteria. You can select system-provided filters in combination, but not custom filters.

The system links multiple filters of the same filter type with an OR operation. For example, if you select the Medium and High filters under the Risks type, the resulting filter is:

```
Risk: Medium OR High
```

If the Medium filter contains 110 applications and the High filter contains 82 applications, the system displays all 192 applications in the **Available Applications** list.

The system links different types of filters with an AND operation. For example, if you select the Medium and High filters under the Risks type, and the Medium and High filters under the Business Relevance type, the resulting filter is:

```
Risk: Medium OR HighANDBusiness Relevance: Medium OR High
```

In this case, the system displays only those applications that are included in both the Medium or High Risk type AND the Medium or High Business Relevance type.

Finding and Selecting Filters

To select filters, click the arrow next to a filter type to expand it, then select or clear the check box next to each filter whose applications you want to display or hide. You can also right-click a system-provided filter type (**Risks**, **Business Relevance**, **Types**, **Categories**, or **Tags**) and select **Check All** or **Uncheck All**.

To search for filters, click the **Search by name** prompt above the **Available Filters** list, then type a name. The list updates as you type to display matching filters.

After you are done selecting filters, use the **Available Applications** list to add those filters to the rule; see Matching Traffic from Individual Applications, on page 114.

Matching Traffic from Individual Applications

License: Control

When building an application condition in an access control rule, use the **Available Applications** list to select the applications whose traffic you want to match.

Browsing the List of Applications

When you first start to build the condition the list is unconstrained, and displays every application the system detects, 100 at a time:

- To page through the applications, click the arrows underneath the list.
- To display a pop-up window with summary information about the application's characteristics, as well as Internet search links that you can follow, click the information icon next to an application.

Finding Applications to Match

To help you find the applications you want to match, you can constrain the **Available Applications** list in the following ways:

- To search for applications, click the **Search by name** prompt above the list, then type a name. The list updates as you type to display matching applications.
- To constrain the applications by applying a filter, use the **Application Filters** list (see Matching Traffic with Application Filters, on page 113). The **Available Applications** list updates as you apply filters.

Once constrained, an **All apps matching the filter** option appears at the top of the **Available Applications** list. This option allows you to add all the applications in the constrained list to the **Selected Applications and Filters** list, all at once.

Note If you select one or more filters in the Application Filters list and also search the **Available Applications** list, your selections and the search-filtered **Available Applications** list are combined using an AND operation. That is, the **All apps matching the filter** condition includes all the individual conditions currently displayed in the **Available Applications** list as well as the search string entered above the **Available Applications** list.

Selecting Single Applications to Match in a Condition

After you find an application you want to match, click to select it. To select multiple applications, use the Shift and Ctrl keys, or right-click and select **Select All** to select all applications in the current constrained view.

In a single application condition, you can match a maximum of 50 applications by selecting them individually; to add more than 50 you must either create multiple access control rules or use filters to group applications.

Selecting All Applications Matching a Filter for a Condition

Once constrained by either searching or using the filters in the **Application Filters** list, the **All apps matching the filter** option appears at the top of the **Available Applications** list.

This option allows you to add the entire set of applications in the constrained **Available Applications** list to the **Selected Applications and Filters** list, at once. In contrast to adding applications individually, adding this

set of applications counts as only one item against the maximum of 50, regardless of the number of individual applications that comprise it.

When you build an application condition this way, the name of the filter you add to the **Selected Applications and Filters** list is a concatenation of the filter types represented in the filter plus the names of up to three filters for each type. More than three filters of the same type are followed by an ellipsis (...). For example, the following filter name includes two filters under the Risks type and four under Business Relevance:

```
Risks: Medium, High Business Relevance: Low, Medium, High,...
```

Filter types that are not represented in a filter you add with **All apps matching the filter** are not included in the name of the filter you add. These filter types are set to *any*; that is, these filter types do not constrain the filter, so any value is allowed for these.

You can add multiple instances of **All apps matching the filter** to an application condition, with each instance counting as a separate item in the **Selected Applications and Filters** list. For example, you could add all high risk applications as one item, clear your selections, then add all low business relevance applications as another item. This application condition matches applications that are high risk OR have low business relevance.

Adding an Application Condition to an Access Control Rule

License: Control

For traffic to match an access control rule with an application condition, the traffic must match one of the filters or applications that you add to a **Selected Applications and Filters** list.

You can add a maximum of 50 items per condition, and filters added to a condition are listed above and separately from individually added applications. When building an application condition, warning icons indicate invalid configurations. For details, see Troubleshooting Access Control Policies and Rules, on page 74.

To control application traffic:

Step 1 In the access control policy where you want to control traffic by application, create a new access control rule or edit an existing rule.

For detailed instructions, see Creating and Editing Access Control Rules, on page 90.

Step 2 In the **rule editor**, click the **Applications** tab.

Step 3 Optionally, enable content restriction features by clicking the **dimmed** icons for Safe Search or YouTube EDU and setting related options; for additional configuration requirements, see Using Access Control Rule to Enforce Content Restriction, on page 162.

In most cases, enabling content restriction populates the condition's **Selected Applications and Filters** list with the appropriate values. The system does not automatically populate the list if applications or filters related to content restriction are already present in the list when you enable content restriction.

Continue with the procedure to refine your application and filter selections, or skip to saving the rule.

Step 4 Optionally, use filters to constrain the list of applications displayed in the **Available Applications** list.

Select one or more filters in the **Application Filters** list. For more information, see Matching Traffic with Application Filters, on page 113.

Step 5 Find and select the applications you want to add from the **Available Applications** list.

You can search for and select individual applications, or, when the list is constrained, **All apps matching the filter**. For more information, see Matching Traffic from Individual Applications, on page 114.

Step 6 Click **Add to Rule** to add the selected applications to the **Selected Applications and Filters** list.

You can also drag and drop selected applications and filters. Filters appear under the heading *Filters* , and applications appear under the heading *Applications* .

Tip Before you add another filter to this application condition, click **Clear All Filters** to clear your existing selections.

Step 7 Optionally, click the **add** icon above the **Selected Applications and Filters** list to save a custom filter comprised of all the individual applications and filters currently in the list.

Use the object manager to manage this on-the-fly-created filter; see Working with Application Filters, on page 27. Note that you cannot save a filter that includes another user-created filter; you cannot nest user-created filters.

Step 8 Save or continue editing the rule.

You must deploy the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Limitations to Application Control

License: Control

Keep the following points in mind when performing application control.

Speed of Application Identification

The system cannot perform application control before:

- a monitored connection is established between a client and server, and
- the system identifies the application in the session

This identification should occur within 3 to 5 packets, or after the server certificate exchange in the SSL handshake if the traffic is encrypted. If one of these first packets matches all other conditions in an access control rule containing an application condition but the identification is not complete, the access control policy allows the packet to pass. This behavior allows the connection to be established so that applications can be identified. For your convenience, affected rules are marked with an information icon .

The allowed packets are inspected by the access control policy's *default* intrusion policy (not the *default action* intrusion policy nor the almost-matched rule's intrusion policy).

After the system completes its identification, the system applies the access control rule action, as well as any associated intrusion and file policy, to the remaining session traffic that matches its application condition.

Handling Encrypted Traffic

The system can identify and filter unencrypted application traffic that becomes encrypted using StartTLS, such as SMTPS, POPS, FTPS, TelnetS, and IMAPS. In addition, it can identify certain encrypted applications based on the Server Name Indication in the TLS client hello message, or the server certificate subject distinguished name value.

These applications are tagged **SSL Protocol**. Applications without this tag can only be detected in unencrypted or decrypted traffic.

Handling Application Traffic Packets Without Payloads

The system applies the default policy action to packets that do not have a payload in a connection where an application is identified.

Handling Referred Traffic

To create a rule to act on traffic referred by a web server, such as advertisement traffic, add a condition for the referred application rather than the referring application.

Controlling Application Traffic That Uses Multiple Protocols (Skype)

The system can detect multiple types of Skype application traffic. When building an application condition to control Skype traffic, select the **Skype** tag from the **Application Filters** list rather than selecting individual applications. This ensures that the system can detect and control all Skype traffic the same way. For more information, see Matching Traffic with Application Filters, on page 113.

Blocking URLs

License: feature dependent

URL conditions in access control rules allow you to limit the websites that users on your network can access. This feature is called *URL filtering* . There are two ways you can use access control to specify URLs you want to block (or, conversely, allow):

- With any license, you can manually specify individual URLs or groups of URLs to achieve granular, custom control over web traffic.
- With a URL Filtering license, you can also control access to websites based on the URL's general classification, or *category* , and risk level, or *reputation* . The system displays this category and reputation data in connection logs, intrusion events, and application details.

Note To see URL category and reputation information in events, you must create at least one access control rule with a URL condition.

When you block a website, you can either allow the user's browser its default behavior, or you can display a generic system-provided or custom page. You can also give users a chance to bypass a website block by clicking through a warning page.

Table 22: License Requirements for URL Filtering

Requirement	Category & Reputation-Based	Manual
license	URL Filtering	Any

Blocking URLs Based on URL Category and Reputation

License: URL Filtering

With a URL Filtering license, you can control your users' access to websites based on the category and reputation of requested URLs, which the ASA FirePOWER module obtains from the Cisco cloud:

- The URL *category* is a general classification for the URL. For example, ebay.com belongs to the **Auctions** category, and monster.com belongs to the **Job Search** category. A URL can belong to more than one category.
- The URL *reputation* represents how likely the URL is to be malicious. A URL's risk can range from **High Risk** (level 1) to **Well known** (level 5).

Note Before access control rules with category and reputation-based URL conditions can take effect, you **must** enable communications with the Cisco cloud. This allows the ASA FirePOWER module to retrieve URL data. For more information, see Cloud Communications Options for URL Filtering and Malware Detection, on page 464.

Advantages to Reputation-Based URL Blocking

URL categories and reputations allow you to quickly create URL conditions for access control rules. For example, you could create an access control rule that identifies and blocks all **High Risk** URLs in the **Abused Drugs** category. If a user attempts to browse to any URL with that category and reputation combination, the session is blocked.

Using category and reputation data from the Cisco cloud also simplifies policy creation and administration. It grants you assurance that the system will control web traffic as expected. Finally, because the cloud is continually updated with new URLs, as well as new categories and risks for existing URLs, you can ensure that the system uses up-to-date information to filter requested URLs. Malicious sites that represent security threats such as malware, spam, botnets, and phishing may appear and disappear faster than you can update and deploy new policies.

Some examples include:

- If a rule blocks all gambling sites, as new domains get registered and classified as **Gambling**, the system can block those sites automatically.
- If a rule blocks all malware sites, and a blog page gets infected with malware, the cloud can recategorize the URL from **Personal Sites and Blogs** to **Malware** and the system can block that site.
- If a rule blocks high-risk social networking sites, and somebody posts a link on their profile page that contains links to malicious payloads, the cloud can change the reputation of that page from **Benign Sites** to **High Risk** so the system can block it.

Note that if the cloud does not know the category or reputation of a URL, or if the ASA FirePOWER module cannot contact the cloud, that URL does **not** trigger access control rules with category or reputation-based URL conditions. You cannot assign categories or reputations to URLs manually.

Building URL Conditions

You can add a maximum of 50 items to the **Selected URLs** to match in a single URL condition. Each URL category, optionally qualified by reputation, counts as a single item. Note that you can also use literal URLs and URL

objects in URL conditions, but you cannot qualify these items with a reputation. For more information, see Performing Manual URL Blocking, on page 120.

Note that you cannot qualify a literal URL or URL object with a reputation.

When building a URL condition, warning icons indicate invalid configurations. For details, see Troubleshooting Access Control Policies and Rules, on page 74.

To control traffic by requested URL using category and reputation data:

Step 1 Set up your appliance to obtain URL category and reputation data from the Cisco cloud.

See Enabling Cloud Communications, on page 466.

Step 2 In the access control policy where you want to control traffic by URL, create a new access control rule or edit an existing rule.

For detailed instructions, see Creating and Editing Access Control Rules, on page 90.

Step 3 In the **rule editor**, select the **URLs** tab.

The **URLs** tab appears.

Step 4 Find and select the categories of URL you want to add from the **Categories and URLs** list. To match web traffic regardless of category, select **Any** category.

To search for categories to add, click the **Search by name or value** prompt above the **Categories and URLs** list, then type the category name. The list updates as you type to display matching categories.

To select a category, click it. To select multiple categories, use the Shift and Ctrl keys.

Tip Although you can right-click and **Select All** categories, adding all categories this way exceeds the 50-item maximum for an access control rule. Instead, use **Any**.

There may be more than one page of categories. Be sure you have addressed all pages by clicking the arrows below the categories list.

Step 5 Optionally, qualify your category selections by clicking a reputation level from the **Reputations** list. If you do not specify a reputation level, the system defaults to **Any**, meaning all levels.

You can only select one reputation level. When you choose a reputation level, the access control rule behaves differently depending on its purpose:

- If the rule blocks or monitors web access (the rule action is **Block**, **Block with reset**, **Interactive Block**, **Interactive Block with reset**, or **Monitor**) selecting a reputation level also selects all reputations more severe than that level. For example, if you configure a rule to block or monitor **Suspicious sites** (level 2), it also automatically blocks or monitors **High Risk** (level 1) sites.
- If the rule allows web access, whether to trust or further inspect it (the rule action is **Allow** or **Trust**), selecting a reputation level also selects all reputations less severe than that level. For example, if you configure a rule to allow **Benign Sites** (level 4), it also automatically allows **Well known** (level 5) sites.

If you change the rule action for a rule, the system automatically changes the reputation levels in URL conditions according to the above points.

Step 6 Click **Add to Rule** or drag and drop the selected items to add them to the **Selected URLs** list.

Step 7 Save or continue editing the rule.

You must deploy the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Performing Manual URL Blocking

To supplement or selectively override URL filtering by category and reputation, you can manually specify URLs to block.

You can also use this procedure as an example to manually allow traffic to URLs that would otherwise be blocked by your configurations.

There are several ways to do manual URL filtering. Most of the methods match if your specified URL string matches anywhere in the URL. This means, for example, that if you allow traffic to "cisco.com" using these methods, you may also inadvertently allow traffic to other domains that have "cisco.com" anywhere in the URL.

For this reason, this procedure provides instructions for using Security Intelligence lists for this purpose, which anchor URL matching to the domain.

Notes on Manually Blocking Encrypted Web Traffic

URL conditions in access control rules:

- disregard the encryption protocol of web traffic (HTTP vs HTTPS)

For example, access control rules treat traffic to http://example.com/ the same as traffic to https://example.com/. To configure an access control rule that matches only HTTP or HTTPS traffic, add an application condition to the rule. For more information, see Blocking URLs, on page 117.

- match HTTPS traffic based on the subject common name in the public key certificate used to encrypt the traffic, and also disregard subdomains within the subject common name

Do not include subdomain information when manually filtering HTTPS traffic.

When building a URL condition, warning icons indicate invalid configurations. For more details, see Troubleshooting Access Control Policies and Rules, on page 74

Step 1 Create and add a custom Security Intelligence list containing URLs to block.

a) Create a new text file with a .txt filename extension.

We recommend including "Block" and "URLs" in the filename.

b) Add one or more URLs to the file, each on a separate line.

For detailed requirements and guidelines for your list, see the "Custom Security Intelligence Lists" topic in the *Firepower Management Center Configuration Guide* for version 6.6, available from https://www.cisco.com/c/en/us/support/security/defense-center/products-installation-and-configuration-guides-list.html

Step 2 Add your text file as a custom Security Intelligence list.

a) Navigate to **Object Management > Security Intelligence > URL Lists and Feeds**.

b) Add the list, following the steps in Working with Custom Security Intelligence Lists, on page 24.

Step 3 In your access control policy, specify your new list in a rule for which you have specified a Block action.

a) In the access control rule, click the **URLs** tab.

b) In the URLs tab, click the **URLs** sub-tab.
c) Select the new custom Security Intelligence list you created above.
d) Click **Add to Rule**.
e) Click **Add**.

Step 4 Save the policy.

What to do next

- (Optional) Using this procedure as an example, create a custom Security Intelligence list for URL traffic to manually allow.

  For example, you can use such a list if you block a category of websites that are not appropriate for your organization, but the category contains a website to which you need to provide access.

  For this list, we recommend using "Allow" and "URLs" in the filename. Add the list to an access control rule with an Allow action. Position the rule above any rules that would otherwise block URLs on the list.

- Deploy changes.

- To add URLs to your custom Security Intelligence list, see Updating a Security Intelligence List, on page 24.

Guidelines and Limitations to URL Detection and Blocking

License: Any

Keep the following points in mind when performing URL detection and blocking.

Some Packets Must Pass Before URL Identification

The system cannot filter URLs before:

- a monitored connection is established between a client and server
- the system identifies the HTTP or HTTPS application in the session
- the system identifies the requested URL (for encrypted sessions, from either the client hello message or the server certificate)

This identification should occur within 3 to 5 packets, or after the server certificate exchange in the SSL handshake if the traffic is encrypted. If one of these first packets matches all other conditions in an access control rule containing a URL condition but the identification is not complete, the access control policy allows the packet to pass. This behavior allows the connection to be established so that URLs can be identified. For your convenience, affected rules are marked with an information icon.

The allowed packets are inspected by the access control policy's *default* intrusion policy (not the *default action* intrusion policy nor the almost-matched rule's intrusion policy). **Important!** Make sure you have configured this intrusion policy.

After the system completes its identification, the system applies the access control rule action, as well as any associated intrusion and file policy, to the remaining session traffic that matches its URL condition.

Uncategorized/Reputationless URLs

When you build a URL rule, you first choose the category you want to match. If you explicitly choose **Uncategorized** URLs, you cannot further constrain by reputation.

If the system does not know the category and reputation of a URL, browsing to that website does not match rules with category and reputation-based URL conditions. You cannot manually assign categories and reputations to URLs, but you can manually block specific URLs. See Performing Manual URL Blocking, on page 120.

Handling Encrypted Web Traffic

When evaluating encrypted web traffic using access control rules with URL conditions, the system:

- disregards the encryption protocol; an access control rule matches both HTTPS and HTTP traffic if the rule has a URL condition but not an application condition that specifies the protocol
- matches HTTPS traffic based on the subject common name in the public key certificate used to encrypt the traffic, and disregards subdomains within the subject common name
- does not display an HTTP response page, even if you configured one

Search Query Parameters in URLs

The system does not use search query parameters in the URL to match URL conditions. For example, consider a scenario where you block all shopping traffic. In that case, using a web search to search for amazon.com is not blocked, but browsing to amazon.com is.

Manual URL Filtering Guidelines

When you specify URL filtering by manually entering URLs or using URL objects or groups, these URLs match traffic using a simple string match. This means, for example, that if you enter "cisco.com" into a rule allowing traffic to pass, this allows traffic for any domain with "cisco.com" anywhere in the URL. In contrast, using a custom Security Intelligence list or feed to specify individual URLs will anchor URL matching to the domain name.

Allowing Users to Bypass URL Blocks

License: Any

When you block a user's HTTP web request using an access control rule, setting the rule action to **Interactive Block** or **Interactive Block with reset** gives that user a chance to bypass the block by clicking through a warning *HTTP response page* . You can display a generic system-provided response page or you can enter custom HTML.

By default, the system allows users to bypass blocks for 10 minutes (600 seconds) without displaying the warning page on subsequent visits. You can set the duration to as long as a year, or you can force the user to bypass the block every time.

If the user does not bypass the block, matching traffic is denied without further inspection; you can also reset the connection. On the other hand, if a user bypasses the block, the system allows the traffic. Allowing this traffic means that you can continue to inspect unencrypted payloads for intrusions, malware and prohibited files. Note that users may have to refresh after bypassing the block to load page elements that did not load.

Note that you configure the interactive HTTP response page separately from the response page you configure for Block rules. For example, you could display the system-provided page to users whose sessions are blocked without interaction, but a custom page to users who can click to continue. For more information, see Displaying a Custom Web Page for Blocked URLs, on page 124.

If you block web traffic decrypted by the SSL inspection feature, the system encrypts the response page and sends it at the end of the reencrypted SSL stream.

Tip To quickly disable interactive blocking for all rules in an access control policy, display neither the system-provided page nor a custom page. This causes the system to block all connections that match an Interactive Block rule without interaction.

To allow users to bypass a website block:

Step 1 Create an access control rule that matches web traffic with a URL condition.

See Blocking URLs Based on URL Category and Reputation, on page 118 and Performing Manual URL Blocking, on page 120.

Step 2 Make sure the access control rule action is **Interactive Block** or **Interactive Block with reset.**

See Using Rule Actions to Determine Traffic Handling and Inspection, on page 95.

Step 3 Assume users will bypass the block and choose inspection and logging options for the rule accordingly. As with Allow rules:

- You can associate either type of Interactive Block rule with a file and intrusion policy. For more information, see Controlling Traffic Using Intrusion and File Policies, on page 135.
- Logging options for interactively blocked traffic are identical to those in allowed traffic, but keep in mind that if a user does not bypass the interactive block, the system can log only beginning-of-connection events.

Note that when the system initially warns the user, it marks any logged beginning-of-connection event with the Interactive Block or Interactive Block with reset action. If the user bypasses the block, additional connection events logged for the session have an action of Allow. For more information, see Logging Connections Based on Access Control Handling, on page 389.

Step 4 Optionally, set the amount of time that elapses after a user bypasses a block before the system displays the warning page again.

See Setting the User Bypass Timeout for a Blocked Website, on page 123.

Step 5 Optionally, create and use a custom page to display to allow users to bypass a block.

See Displaying a Custom Web Page for Blocked URLs, on page 124.

Setting the User Bypass Timeout for a Blocked Website

License: Any

By default, the system allows a user to bypass interactive blocks for 10 minutes (600 seconds) without displaying the warning page on subsequent visits. You can set the duration to as long as a year, or to zero to force the

user to bypass the block every time. This limit applies to every Interactive Block rule in the policy. You cannot set the limit per rule.

To customize the length of time before a user bypass expires:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon next to the access control policy you want to configure.

The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.

Advanced settings for the access control policy appear.

Step 4 Click the **edit** icon next to General Settings.

The **General Settings** pop-up window appears.

Step 5 In the **Allow an Interactive Block to bypass blocking for (seconds)** field, type the number of seconds that must elapse before the user bypass expires.

You can specify any number of seconds from zero to 31536000 (one year). Specifying zero forces your users to bypass the block every time.

Step 6 Click **OK**.

Advanced settings for the access control policy appear.

Step 7 Click **Store ASA FirePOWER Changes**.

You must deploy the access control policy for your changes to take effect. For more information, see Deploying Configuration Changes, on page 73.

Displaying a Custom Web Page for Blocked URLs

License: Any

When the system blocks a user's HTTP web request, what the user sees in a browser depends on how you block the session, using the access control rule's action. You should select:

- **Block** or **Block with reset** to deny the connection. A blocked session times out; the system resets Block with reset connections. However, for both blocking actions, you can override the default browser or server page with a custom page that explains that the connection was denied. The system calls this custom page an *HTTP response page* .
- **Interactive Block** or **Interactive Block with reset** if you want to display an *interactive HTTP response page* that warns users, but also allows them to click a button to continue or refresh the page to load the originally requested site. Users may have to refresh after bypassing the response page to load page elements that did not load.

You can either display a generic system-provided response page, or you can enter custom HTML. When you enter custom text, a counter shows how many characters you have used.

In each access control policy, you configure the interactive HTTP response page separately from the response page you use to block traffic without interaction, that is, using a Block rule. For example, you could display the system-provided page to users whose sessions are blocked without interaction, but a custom page to users who can click to continue.

Reliable display of HTTP response pages to your users depends on your network configuration, traffic loads, and size of the page. If you build a custom response page, keep in mind that a smaller page is more likely to display successfully.

To configure HTTP response pages:

Step 1 Edit the access control policy monitoring your web traffic; see Editing Access Control Policies, on page 69.

Step 2 Click the **HTTP Responses** tab.

Step 3 For the **Block Response Page** and the **Interactive Block Response Page**, choose responses from the drop-down lists. For each page, you have the following choices:

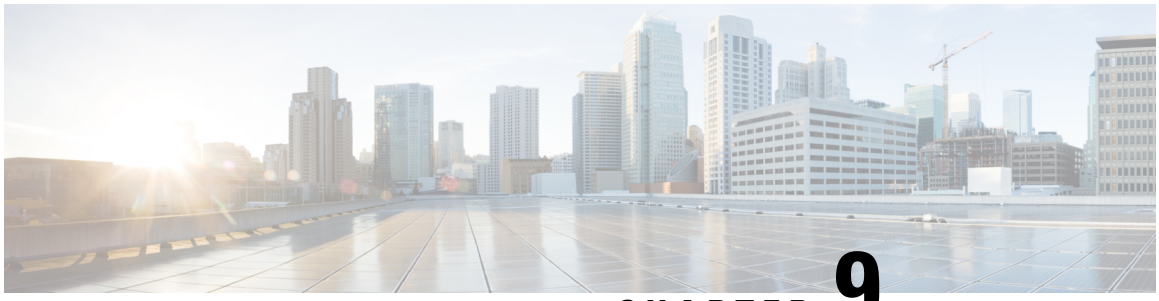
- **System-provided** — Displays a generic response. Click the **view** icon ( ) to view the code for this page.
- **Custom**—Create a custom response page.

A pop-up window appears, prepopulated with system-provided code that you can replace or modify. When you are done, save your changes. Note that you can edit a custom page by clicking the edit icon.

- **None**—Disables the response page and blocks sessions without interaction or explanation. Note that selecting this option for interactively blocked sessions prevents users from clicking to continue; the session is blocked without interaction.

Step 4 Click **Store ASA FirePOWER Changes**.

You must redeploy the configuration for your changes to take effect. For more information, see Deploying Configuration Changes, on page 73.



CHAPTER 9

Access Control Rules: Realms and Users

License: Control

Before you can perform user control (create access control rule conditions based on entire realms, individual users, user groups, or ISE attributes), you must:

- Configure a realm for each Microsoft Active Directory or LDAP server you want to monitor. If you enable user download for the realm, the Firepower Management Center regularly and automatically queries the server to download metadata for newly or already-reported authoritative users and user groups.

  Note Configuring a realm is optional if you plan to configure SGT ISE attribute conditions but not user, group, realm, Endpoint Location, or Endpoint Profile conditions.

- Create an identity policy to associate the realm with an authentication method.
- Configure one or more User Agents or ISE/ISE-PIC devices, or captive portal. If you want to use an ISE attribute condition, you must configure ISE.

User Agents, ISE/ISE-PIC, and captive portal collect authoritative user data that can be used for user control in access control rule conditions. The identity sources monitor specified users as they log in or out of hosts or authenticate using LDAP or AD credentials.

Note If you configure a User Agent or ISE/ISE-PIC device to monitor a large number of user groups, or if you have a very large number of users mapped to hosts on your network, the system might drop user mappings based on groups, due to your Firepower Management Center user limit. As a result, access control rules with realm, user, or user group conditions may not fire as expected.

You can add a maximum of 50 realms, users, and groups to the Selected Users in a single user condition. Conditions with user groups match traffic to or from any of the group's members, including members of any sub-groups, with the exception of individually excluded users and members of excluded sub-groups.

Including a user group automatically includes all of that group's members, including members of any secondary groups. However, if you want to use the secondary group in access control rules, you must explicitly include the secondary group.

Note Hardware-based fast-path rules, Security Intelligence-based traffic filtering, SSL inspection, user identification, and some decoding and preprocessing occur before access control rules evaluate network traffic.

- Troubleshooting Issues with User Access Control Rules, on page 128
- Adding a Realm, User, or User Group Condition to an Access Control Rule, on page 129
- Configuring ISE Attribute Conditions, on page 129

Troubleshooting Issues with User Access Control Rules

License: Control

If you notice unexpected user access control rule behavior, consider tuning your rule, identity source, or realm configurations.

Access control rules targeting realms, users, or user groups are not firing

If you configure a User Agent or ISE/ISE-PIC device to monitor a large number of user groups, or if you have a very large number of users mapped to hosts on your network, the system may drop user records due to your Firepower Management Center user limit. As a result, access control rules with realm or user conditions may not fire as expected.

Access control rules targeting user groups or users within user groups are not firing as expected

If you configure an access control rule with a user group condition, your LDAP or Active Directory server must have user groups configured. The Firepower Management Center cannot perform user group control if the server organizes the users in basic object hierarchy.

Access control rules targeting users in secondary groups are not firing as expected

If you configure an access control rule with a user group condition that includes or excludes users who are members of a secondary group on your Active Directory server, your server may be limiting the number of users it reports.

By default, Active Directory servers limit the number of users they report from secondary groups. You must customize this limit so that all of the users in your secondary groups are reported to the Firepower Management Center and eligible for use in access control rules with user conditions.

Access control rules are not matching users when seen for the first time

After the system detects activity from a previously-unseen user, the system retrieves information from the server. Until the system successfully retrieves this information, activity seen by this user is not handled by matching access control rules. Instead, the user session is handled by the next access control rule it matches (or the access control policy default action).

For example, this may explain when:

- Users who are members of user groups are not matching access control rules with user group conditions.
- Users who were reported by ISE/ISE-PIC or the User Agent are not matching access control rules, when the server used for user data retrieval is an Active Directory server.

Note that this may also cause the system to delay the display of user data in event views and analysis tools.

Adding a Realm, User, or User Group Condition to an Access Control Rule

License: Control

Before You Begin

- Configure one or more authoritative user identity sources as described in User Identity Sources, on page 351.
- Configure a realm as described in Creating a Realm, on page 334. A user download (automatic or on-demand) must be performed before you can configure realm, user, or user group conditions in an access control rule.

Step 1 In the access control rule editor, select the **Users** tab.

Step 2 Search by name or value above the **Available Realms** list and select a realm.

Step 3 Search by name or value above the **Available Users** list and select a user or group.

Step 4 Click **Add to Rule**, or drag and drop.

Step 5 Save or continue editing the rule.

Configuring ISE Attribute Conditions

License: Control

Before You Begin

- Configure a realm as described in Creating a Realm, on page 334. A user download (automatic or on-demand) must be performed before you can configure an ISE attribute condition in an access control rule.

Note Configuring a realm is optional if you plan to configure SGT ISE attribute conditions but not user, group, realm, Endpoint Location, or Endpoint Profile conditions.

- Configure ISE as described in Configuring an ISE/ISE-PIC Connection, on page 356 .

Note The ISE-PIC identity source does not provide ISE attribute data. You must configure ISE.

Step 1 In the access control rule editor, click the **SGT/ISE Attributes** tab.

Step 2 Search by name or value above the **Available Attributes** list and choose an attribute.

Step 3 Search by name or value above the **Available Metadata** list and choose metadata.

Step 4 Click **Add to Rule**, or drag and drop.

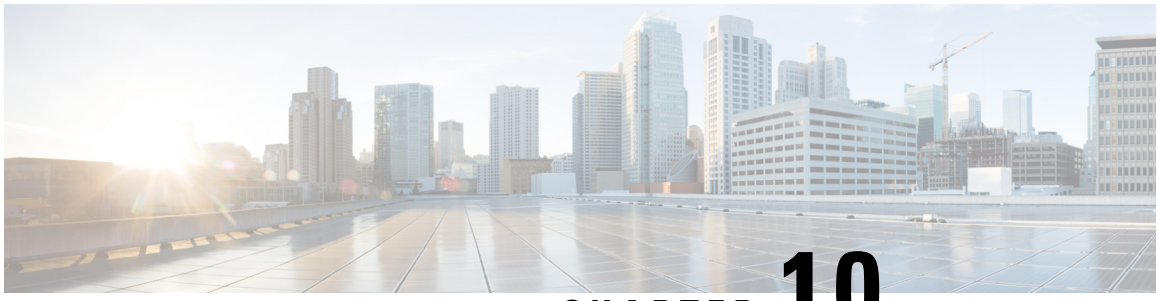
Step 5 Constrain the rule with an IP address in the **Add a Location IP Address** field.

Note You can use ISE-assigned Security Group Tags (SGTs) to constrain ISE attribute conditions. To use custom SGTs in access control rules, see ISE SGT and Custom SGT Rule Conditions, on page 131.

Step 6 Save or continue editing the rule.

What to do next

- Deploy configuration changes; see Deploying Configuration Changes, on page 73.



CHAPTER 10

Access Control Rules: Custom Security Group Tags

The Security Group Tag (SGT) specifies the privileges of a traffic source within a trusted network. Security Group Access (a feature of both Cisco TrustSec and Cisco ISE) automatically generates the SGT when a user adds a security group in TrustSec or ISE. SGA then applies the SGT attribute as packets enter the network. You can use SGTs for access control by configuring ISE as an identity source or creating custom SGT objects.

Custom SGT conditions allow you to configure access control rules based on custom SGT objects. You manually add custom SGT objects to the Firepower System, rather than obtaining SGTs via ISE.

You can only use custom SGT conditions if you disable ISE/ISE-PIC as an identity source.

ISE SGT and Custom SGT Rule Conditions

You can use SGTs for access control by either configuring ISE as an identity source (ISE SGT) or creating custom SGT objects (custom SGT). The system handles ISE SGT and custom SGT rule conditions differently:

ISE SGT: ISE connection configured

You can use ISE SGTs as ISE attribute conditions in access control rules. When you choose **Security Group Tag** from the **Available Attributes** list in the **SGT/ISE Attributes** tab, the system populates the **Available Metadata** list by querying ISE for available tags. The presence or absence of an SGT attribute in a packet determines the system's response:

- If an SGT attribute is present in the packet, the system extracts that value and compares it to ISE SGT conditions in access control rules.
- If the SGT attribute is absent from the packet, the system determines whether the SGT associated with the packet's source IP address is known in ISE and compares the SGT to the ISE SGT conditions in access control rules.

Custom SGT: No ISE connection configured

You can create custom SGT objects and use them as conditions in access control rules. When you choose **Security Group Tag** from the **Available Attributes** list in the **SGT/ISE Attributes** tab, the system populates the **Available Metadata** list with any SGT objects you have added. The presence or absence of an SGT attribute in a packet determines the system's response:

- If an SGT attribute is present in the packet, the system extracts that value and compares it to custom SGT conditions in access control rules.
- If the SGT attribute is absent from the packet, the system does not match the packet to custom SGT conditions in access control rules.

Automatic Transition from Custom SGT to ISE SGT Rule Conditions

If you create access control rules using custom SGT objects as conditions, then later configure ISE/ISE-PIC as an identity source, the system:

- Disables the **Security Group Tag** object option in the Object Manager. You cannot add new SGT objects, edit existing SGT objects, or add SGT objects as new conditions unless you disable the ISE/ISE-PIC connection.
- Retains existing SGT objects. You cannot modify these existing objects. You can view them only in the context of the existing access control rules that use them as conditions.
- Retains existing access control rules with custom SGT conditions. Because custom SGT objects can only be updated via manual editing, Cisco recommends that you delete or disable these rules. Instead, create rules using SGTs as ISE attribute conditions. The system automatically queries ISE to update SGT metadata for ISE attribute conditions, but you can only update custom SGT objects via manual editing.

Configuring Custom SGT Conditions

License: Any

To configure a custom Security Group Tag (SGT) condition:

Step 1 In the **access control rule editor**, click the **SGT/ISE Attributes** tab.

Step 2 Choose **Security Group Tag** from the **Available Attributes** list.

Step 3 In the **Available Metadata** list, find and choose a custom SGT object.

If you choose , the rule matches all traffic with an SGT attribute. For example, you might choose this value if you want the rule to block traffic from hosts that are not configured for TrustSec.

Step 4 Click **Add to Rule**, or drag and drop.

Step 5 Save or continue editing the rule.

What to do next

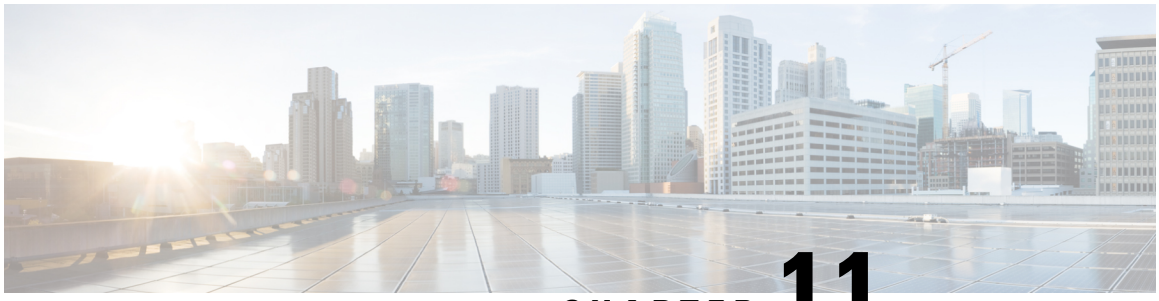
- Deploy configuration changes; see Deploying Configuration Changes, on page 73.

Troubleshooting Custom SGT Conditions

If you notice unexpected rule behavior, consider tuning your custom SGT object configuration.

Security Group Tag objects unavailable

Custom SGT objects are only available if you do not configure ISE/ISE-PIC as an identity source. For more information, see Automatic Transition from Custom SGT to ISE SGT Rule Conditions, on page 132.



CHAPTER 11

Controlling Traffic Using Intrusion and File Policies

Intrusion and file policies work together, as the last line of defense before traffic is allowed to its destination:

- **Intrusion policies** govern the system's intrusion prevention capabilities; see About Network Analysis and Intrusion Policies, on page 241.
- **File policies** govern the system's network-based file control and advanced malware protection (AMP) capabilities; see Understanding and Creating File Policies, on page 370.

Security Intelligence-based traffic filtering (blocking), SSL inspection-based decisions, and traffic decoding and preprocessing occur **before** network traffic is examined for intrusions, prohibited files, and malware. Access control rules and the access control default action determine which traffic is inspected by intrusion and file policies.

By associating an intrusion or file policy with an access control rule, you are telling the system that before it passes traffic that matches the access control rule's conditions, you first want to inspect the traffic with an intrusion policy, a file policy, or both.

Intrusion prevention and AMP require that you enable specific licensed capabilities as described in the following table.

Table 23: License Requirements for Intrusion and File Inspection

Feature	Description	License
intrusion prevention	detect and optionally block intrusions and exploits	Protection
file control	detect and optionally block the transmission of file types	Protection
advanced malware protection (AMP)	detect, track, and optionally block the transmission of malware	Malware

For more information on inspecting traffic for intrusions, prohibited files, and malware, see:

- Inspecting Allowed Traffic For Intrusions and Malware, on page 136
- Tuning Intrusion Prevention Performance, on page 140
- Tuning File and Malware Inspection Performance and Storage, on page 150

Inspecting Allowed Traffic For Intrusions and Malware

License: Protection or Malware

Intrusion and file policies govern the system's intrusion prevention, file control, and AMP capabilities as a last line of defense before traffic is allowed to its destination. Security Intelligence-based traffic filtering, SSL inspection decisions (including decryption), decoding and preprocessing, and access control rule selection occur **before** intrusion and file inspection.

By associating an intrusion or file policy with an access control rule, you are telling the system that before it passes traffic that matches the access control rule's conditions, you first want to inspect the traffic with an intrusion policy, a file policy, or both. Access control rule conditions can be simple or complex; you can control traffic by security zone, network or geographical location, port, application, requested URL, and user.

The system matches traffic to access control rules in the order you specify. In most cases, the system handles network traffic according to the *first* access control rule where *all* the rule's conditions match the traffic. An access control rule's *action* determines how the system handles matching traffic. You can monitor, trust, block, or allow (with or without further inspection) matching traffic; see Using Rule Actions to Determine Traffic Handling and Inspection, on page 95

Note that an Interactive Block rule has the same inspection options as an Allow rule. This is so you can inspect traffic for malicious content when a user bypasses a blocked website by clicking through a warning page. For more information, see Interactive Blocking Actions: Allowing Users to Bypass Website Blocks, on page 97

Traffic that does not match any of the non-Monitor access control rules in a policy is handled by the default action. Note that the system can inspect traffic allowed by the default action for intrusions, but not prohibited files or malware. You **cannot** associate a file policy with the access control default action.

Note Sometimes, when a connection is analyzed by an access control policy, the system must process the first few packets in that connection, **allowing them to pass**, before it can decide which access control rule (if any) will handle the traffic. However, so these packets do not reach their destination uninspected, you can use an intrusion policy—called the default intrusion policy—to inspect them and generate intrusion events.

For more information on the above scenario and instructions on associating file and intrusion policies with access control rules and the access control default action, see:

Understanding File and Intrusion Inspection Order

License: Protection or Malware

Note Traffic allowed by an Intrusion Prevention default action can be inspected for intrusions, but cannot be inspected for prohibited files or malware. You **cannot** associate a file policy with the access control default action.

You do not have to perform both file and intrusion inspection in the same rule. For a connection matching an Allow or Interactive Block rule:

- without a file policy, traffic flow is determined by the intrusion policy
- without an intrusion policy, traffic flow is determined by the file policy

Tip The system does not perform any kind of inspection on trusted traffic.

For any single connection handled by an access control rule, file inspection occurs before intrusion inspection. That is, the system does not inspect files blocked by a file policy for intrusions. Within file inspection, simple blocking by type takes precedence over malware inspection and blocking.

Note Until a file is detected and blocked in a session, packets from the session may be subject to intrusion inspection.

For example, consider a scenario where you normally want to allow certain network traffic as defined in an access control rule. However, as a precaution, you want to block the download of executable files, examine downloaded PDFs for malware and block any instances you find, and perform intrusion inspection on the traffic.

You create an access control policy with a rule that matches the characteristics of the traffic you want to provisionally allow, and associate it with both an intrusion policy and a file policy. The file policy blocks the download of all executables, and also inspects and blocks PDFs containing malware:

- First, the system blocks the download of all executables, based on simple type matching specified in the file policy. Because they are immediately blocked, these files are subject to neither malware cloud lookup nor intrusion inspection.
- Next, the system performs malware cloud lookups for PDFs downloaded to a host on your network. Any PDFs with a malware file disposition are blocked, and are not subject to intrusion inspection.
- Finally, the system uses the intrusion policy associated with the access control rule to inspect any remaining traffic, including files not blocked by the file policy.

Configuring an Access Control Rule to Perform AMP or File Control

License: Protection or Malware

An access control policy can have multiple access control rules associated with file policies. You can configure file inspection for any Allow or Interactive Block access control rule, which permits you to match different file and malware inspection profiles against different types of traffic on your network before it reaches its final destination.

When the system detects a prohibited file (including malware) according to the settings in the file policy, it automatically logs an event. If you do not want to log file or malware events, you can disable this logging on a per-access-control-rule basis. After you associate the file policy with the access control rule, clear the **Log Files** check box on the **Logging** tab of the access control rule editor. For more information, see Disabling File and Malware Event Logging for Allowed Connections, on page 386

The system also logs the end of the associated connection, regardless of the logging configuration of the invoking access control rule. SeeConnections Associated with File and Malware Events (Automatic)

To associate a file policy with an access control rule:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the access control policy where you want to configure AMP or file control using access control rules.

Step 3 Create a new rule or edit an existing rule; seeCreating and Editing Access Control Rules, on page 90

The **access control rule editor** appears.

Step 4 Ensure the rule action is set to **Allow**, **Interactive Block**, or **Interactive Block with reset**.

Step 5 Select the **Inspection** tab.

The **Inspection** tab appears.

Step 6 Select a **File Policy** to inspect traffic that matches the access control rule, or select **None** to disable file inspection for matching traffic.

You can click the **edit** ( ) icon that appears to edit the policy; see Creating a File Policy, on page 375

Step 7 Click **Add** to save the rule.

Your rule is saved. You must save and apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Configuring an Access Control Rule to Perform Intrusion Prevention

License: Protection

An access control policy can have multiple access control rules associated with intrusion policies. You can configure intrusion inspection for any Allow or Interactive Block access control rule, which permits you to match different intrusion inspection profiles against different types of traffic on your network before it reaches its final destination.

Whenever the system uses an intrusion policy to evaluate traffic, it uses an associated *variable set*. Variables in a set represent values commonly used in intrusion rules to identify source and destination IP addresses and ports. You can also use variables in intrusion policies to represent IP addresses in rule suppressions and dynamic rule states.

Tip Even if you use system-provided intrusion policies, Cisco **strongly** recommends you configure the system's intrusion variables to accurately reflect your network environment. At a minimum, modify default variables in the default set; see Optimizing Predefined Default Variables, on page 30

Although you can associate a different intrusion policy-variable set pair with each Allow and Interactive Block rule (as well as with the default action), you cannot apply an access control policy if the target devices have insufficient resources to perform inspection as configured. For more information, see Simplifying Rules to Improve Performance, on page 75

Understanding System-Provided and Custom Intrusion Policies

Cisco delivers several intrusion policies with the ASA FirePOWER module. By using system-provided intrusion policies, you can take advantage of the experience of the Cisco Vulnerability Research Team (VRT). For these policies, the VRT sets intrusion and preprocessor rule states, as well as provides the initial configurations for

advanced settings. You can use system-provided policies as-is, or you can use them as the base for custom policies. Building custom policies can improve the performance of the system in your environment and provide a focused view of the malicious traffic and policy violations occurring on your network.

In addition to custom policies that you create, the system provides two custom policies: Initial Inline Policy and Initial Passive Policy. These two intrusion policies use the Balanced Security and Connectivity intrusion policy as their base. The only difference between them is their **Drop When Inline** setting, which enables drop behavior in the inline policy and disables it in the passive policy. For more information, see Comparing System-Provided with Custom Policies, on page 247

Connection and Intrusion Event Logging

When an intrusion policy invoked by an access control rule detects an intrusion, it generates an intrusion event. The system also automatically logs the end of the connection where the intrusion occurred, regardless of the logging configuration of the access control rule. See Connections Associated with Intrusion (Automatic)

To associate an intrusion policy with an access control rule:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the access control policy where you want to configure intrusion inspection using access control rules.

Step 3 Create a new rule or edit an existing rule; see Creating and Editing Access Control Rules, on page 90

The **access control rule editor** appears.

Step 4 Ensure the rule action is set to **Allow**, **Interactive Block**, or **Interactive Block with reset**.

Step 5 Select the **Inspection** tab.

The **Inspection** tab appears.

Step 6 Select a system-provided or custom **Intrusion Policy**, or select **None** to disable intrusion inspection for traffic that matches the access control rule.

If you select a custom intrusion policy, you can click the **edit** icon (✎) that appears to edit the policy; see Editing Intrusion Policies, on page 280

Caution Do **not** select **Experimental Policy 1** unless instructed to by a Cisco representative. Cisco uses this policy for testing.

Step 7 Optionally, change the **Variable Set** associated with the intrusion policy.

You can click the **edit** icon (✎) that appears to edit the variable set; see Working with Variable Sets, on page 29.

Step 8 Click **Save** to save the rule.

Your rule is saved. You must save and apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Tuning Intrusion Prevention Performance

License: Protection

Cisco provides several features for improving the performance of your system as it analyzes traffic for attempted intrusions. You configure these performance settings on a per-access-control-policy basis, and they apply to all intrusion policies invoked by that parent access control policy.

Limiting Pattern Matching for Intrusions

License: Protection

You can specify the number of packets to allow in the event queue. You can also, before and after stream reassembly, enable or disable inspection of packets that will be rebuilt into larger streams.

To configure event queue settings:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** (✎) icon next to the access control policy you want to edit.

The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.

The **access control policy advanced settings** page appears.

Step 4 Click the **edit** icon (✎) next to **Performance Settings**, then select the **Pattern Matching Limits** tab in the pop-up window that appears.

Step 5 You can modify the following options:

- Type a value for the maximum number of events to queue in the **Maximum Pattern States to Analyze Per Packet** field.
- To inspect packets which will be rebuilt into larger streams of data before and after stream reassembly, select **Disable Content Checks on Traffic Subject to Future Reassembly**. Inspection before and after reassembly requires more processing overhead and may decrease performance.
- To disable inspection of packets which will be rebuilt into larger streams of data before and after stream reassembly, clear **Disable Content Checks on Traffic Subject to Future Reassembly**. Disabling inspection decreases the processing overhead for inspection of stream inserts and may boost performance.

Step 6 Click **OK**.

You must save and apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Overriding Regular Expression Limits for Intrusion Rules

License: Protection

You can override default match and recursion limits on PCRE that are used in intrusion rules to examine packet payload content. The default limits ensure a minimum level of performance. Overriding these limits could increase security, but could also significantly impact performance by permitting packet evaluation against inefficient regular expressions.

Caution Do not override default PCRE limits unless you are an experienced intrusion rule writer with knowledge of the impact of degenerative patterns.

The following table describes the options you can configure to override the default limits.

Table 24: Regular Expression Constraint Options

Option	Description
Match Limit State	Specifies whether to override **Match Limit**. You have the following options: • select **Default** to use the value configured for **Match Limit** • select **Unlimited** to permit an unlimited number of attempts • select **Custom** to specify either a limit of 1 or greater for **Match Limit**, or to specify 0 to completely disable PCRE match evaluations
Match Limit	Specifies the number of times to attempt to match a pattern defined in a PCRE regular expression.
Match Recursion Limit State	Specifies whether to override **Match Recursion Limit**. You have the following options: • select **Default** to use the value configured for **Match Recursion Limit** • select **Unlimited** to permit an unlimited number of recursions • select **Custom** to specify either a limit of 1 or greater for **Match Recursion Limit**, or to specify 0 to completely disable PCRE recursions Note that for **Match Recursion Limit** to be meaningful, it must be smaller than **Match Limit**.
Match Recursion Limit	Specifies the number of recursions when evaluating a PCRE regular expression against the packet payload.

To configure PCRE overrides:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the access control policy you want to edit.

The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.

The **access control policy advanced settings** page appears.

Step 4 Click the **edit** icon ( ) next to **Performance Settings**, then select the **Regular Expression Limits** tab in the pop-up window that appears.

Step 5 You can modify any of the options in the **Regular Expression Constraint Options** table.

Step 6 Click **OK**.

You must save and apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Limiting Intrusion Events Generated Per Packet

License: Protection

When the rules engine evaluates traffic against rules, it places the events generated for a given packet or packet stream in an event queue, then reports the top events in the queue to the user interface. You can elect to have the rules engine log more than one event per packet or packet stream when multiple events are generated. Logging these events allows you to collect information beyond the reported event. When configuring this option, you can specify how many events can be placed in the queue and how many are logged, and select the criteria for determining event order within the queue.

The following table describes the options you can configure to determine how many events are logged per packet or stream.

Table 25: Intrusion Event Logging Limits Options

Option	Description
Maximum Events Stored Per Packet	The maximum number of events that can be stored for a given packet or packet stream.
Maximum Events Logged Per Packet	The number of events logged for a given packet or packet stream. This cannot exceed the **Maximum Events Stored Per Packet** value.
Prioritize Event Logging By	The value used to determine event ordering within the event queue. The highest ordered event is reported through the user interface. You can select from: • priority , which orders events in the queue by the event priority. • content_length , which orders events by the longest identified content match. When events are ordered by content length, rule events always take precedence over decoder and preprocessor events.

To configure how many events are logged per packet or stream:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy.**

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the access control policy you want to edit.

The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.

The **access control policy advanced settings** page appears.

Step 4 Click the **edit** icon (✎) next to **Performance Settings**, then select the **Intrusion Event Logging Limits** tab in the pop-up window that appears.

Step 5 You can modify any of the options in the **Intrusion Event Logging Limits Options** table.

Step 6 Click **OK**.

You must save and apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Configuring Packet and Intrusion Rule Latency Thresholds

License: Protection

You can balance security with the need to maintain device latency at an acceptable level with packet and rule latency thresholding.

Understanding Packet Latency Thresholding

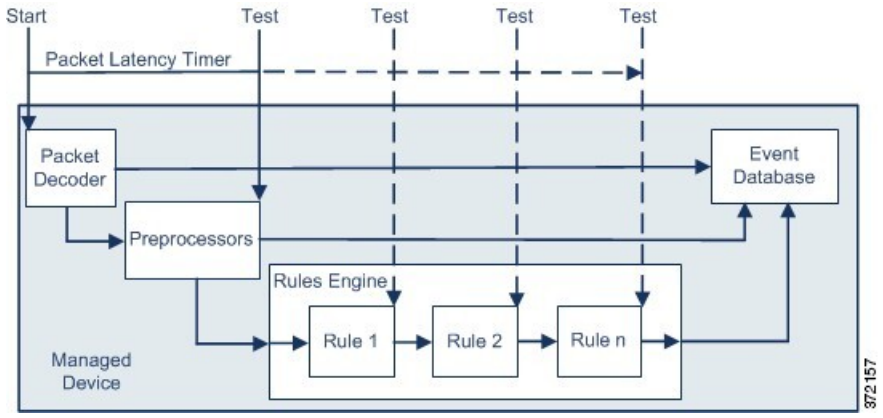
License: Protection

You can balance security with the need to maintain latency at an acceptable level by enabling packet latency thresholding. Packet latency thresholding measures the total elapsed time taken to process a packet by applicable decoders, preprocessors, and rules, and ceases inspection of the packet if the processing time exceeds a configurable threshold.

Packet latency thresholding measures elapsed time, not just processing time, in order to more accurately reflect the actual time required for the rule to process a packet. However, latency thresholding is a software-based latency implementation that does not enforce strict timing.

The trade-off for the performance and latency benefits derived from latency thresholding is that uninspected packets could contain attacks. However, packet latency thresholding gives you a tool you can use to balance security with connectivity.

A timer starts for each packet when decoder processing begins. Timing continues either until all processing ends for the packet or until the processing time exceeds the threshold at a timing test point.



As illustrated in the above figure, packet latency timing is tested at the following test points:

- after the completion of all decoder and preprocessor processing and before rule processing begins
- after processing by each rule

If the processing time exceeds the threshold at any test point, packet inspection ceases.

Tip Total packet processing time does not include routine TCP stream or IP fragment reassembly times.

Packet latency thresholding has no effect on events triggered by a decoder, preprocessor, or rule processing the packet. Any applicable decoder, preprocessor, or rule triggers normally until a packet is fully processed, or until packet processing ends because the latency threshold is exceeded, whichever comes first. If a drop rule detects an intrusion in an inline deployment, the drop rule triggers an event and the packet is dropped.

Note No packets are evaluated against rules after processing for that packet ceases because of a packet latency threshold violation. A rule that would have triggered an event cannot trigger that event, and for drop rules, cannot drop the packet.

For more information on drop rules, see Setting Rule States, on page 306

Packet latency thresholding can improve system performance in both passive and inline deployments, and can reduce latency in inline deployments, by stopping inspection of packets that require excessive processing time. These performance benefits might occur when, for example:

- for both passive and inline deployments, sequential inspection of a packet by multiple rules requires an excessive amount of time
- for inline deployments, a period of poor network performance, such as when someone downloads an extremely large file, slows packet processing

In a passive deployment, stopping the processing of packets might not contribute to restoring network performance because processing simply moves to the next packet.

Configuring Packet Latency Thresholding

License: Protection

The following table describes the options you can set to configure packet latency thresholding.

Table 26: Packet Latency Thresholding Options

Option	Description
Threshold (microseconds)	Specifies the time, in microseconds, when inspection of a packet ceases. See the **Minimum Packet Latency Threshold Settings** table for recommended minimum threshold settings.

You can enable rule 134:3 to generate an event when the system stops inspecting a packet because the packet latency threshold is exceeded. See Setting Rule States, on page 306 for more information.

Many factors affect measurements of system performance and packet latency, such as CPU speed, data rate, packet size, and protocol type. For this reason, Cisco recommends that you use the threshold settings in the following table until your own calculations provide you with settings tailored to your network environment.

Table 27: Minimum Packet Latency Threshold Settings

For this data rate...	Set threshold microseconds to at least...
1 Gbps	100
100 Mbps	250
5 Mbps	1000

Determine the following when calculating your settings:

- average packets per second
- average microseconds per packet

Multiply the average microseconds per packet for your network by a significant safety factor to ensure that you do not unnecessarily discontinue packet inspections.

For example, the Minimum Packet Latency Threshold Settings table recommends a minimum packet latency threshold of 100 microseconds in a one gigabit environment. This minimum recommendation is based on test data showing an average of 250,000 packets per second, which is 0.25 packets per microsecond, or 4 microseconds per packet. Multiplying by a factor of twenty-five results in a recommended minimum threshold of 100 microseconds.

To configure packet latency thresholding:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon () next to the access control policy you want to edit.

The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.

The **access control policy advanced settings** page appears.

Step 4 Click the **edit** icon (✎) next to **Latency-Based Performance Settings**, then select the **Packet Handling** tab in the pop-up window that appears.

Step 5 See the **Minimum Packet Latency Threshold Settings** table for recommended minimum **Threshold** settings.

Step 6 Click **OK**.

You must save and apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Understanding Rule Latency Thresholding

License: Protection

You can balance security with the need to maintain latency at an acceptable level by enabling rule latency thresholding. Rule latency thresholding measures the elapsed time each rule takes to process an individual packet, suspends the violating rule along with a group of related rules for a specified time if the processing time exceeds the rule latency threshold a configurable consecutive number of times, and restores the rules when the suspension expires.

Rule latency thresholding measures elapsed time, not just processing time, in order to more accurately reflect the actual time required for the rule to process a packet. However, latency thresholding is a software-based latency implementation that does not enforce strict timing.

The trade-off for the performance and latency benefits derived from latency thresholding is that uninspected packets could contain attacks. However, rule latency thresholding gives you a tool you can use to balance security with connectivity.

A timer measures the processing time each time a packet is processed against a group of rules. Any time the rule processing time exceeds a specified rule latency threshold, the system increments a counter. If the number of consecutive threshold violations reaches a specified number, the system takes the following actions:

- suspends the rules for the specified period
- triggers an event indicating the rules have been suspended
- re-enables the rules when the suspension expires
- triggers an event indicating the rules have been re-enabled

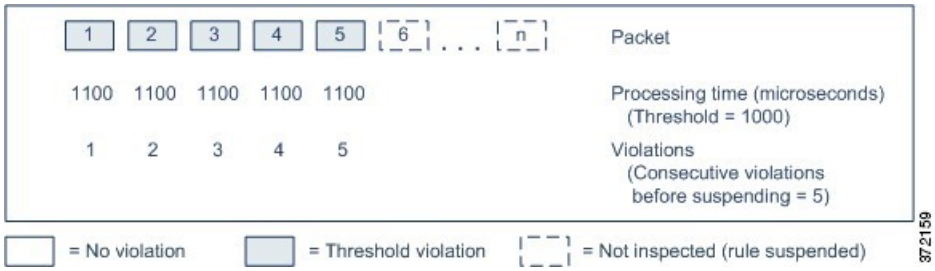
The system zeroes the counter when the group of rules has been suspended, or when rule violations are not consecutive. Permitting some consecutive violations before suspending rules lets you ignore occasional rule violations that might have negligible impact on performance and focus instead on the more significant impact of rules that repeatedly exceed the rule latency threshold.

The following example shows five consecutive rule processing times that do not result in rule suspension.

In the above example, the time required to process each of the first three packets violates the rule latency threshold of 1000 microseconds, and the violations counter increments with each violation. Processing of the

fourth packet does not violate the threshold, and the violations counter resets to zero. The fifth packet violates the threshold and the violations counter restarts at one.

The following example shows five consecutive rule processing times that do result in rule suspension.



In the second example, the time required to process each of the five packets violates the rule latency threshold of 1000 microseconds. The group of rules is suspended because the rule processing time of 1100 microseconds for each packet violates the threshold of 1000 microseconds for the specified five consecutive violations. Any subsequent packets, represented in the figure as packets 6 through n, are not examined against suspended rules until the suspension expires. If more packets occur after the rules are re-enabled, the violations counter begins again at zero.

Rule latency thresholding has no effect on intrusion events triggered by the rules processing the packet. A rule triggers an event for any intrusion detected in the packet, regardless of whether the rule processing time exceeds the threshold. If the rule detecting the intrusion is a drop rule in an inline deployment, the packet is dropped. When a drop rule detects an intrusion in a packet that results in the rule being suspended, the drop rule triggers an intrusion event, the packet is dropped, and that rule and all related rules are suspended. For more information on drop rules, see Setting Rule States, on page 306

Note Packets are not evaluated against suspended rules. A suspended rule that would have triggered an event cannot trigger that event and, for drop rules, cannot drop the packet.

Rule latency thresholding can improve system performance in both passive and inline deployments, and can reduce latency in inline deployments, by suspending rules that take the most time to process packets. Packets are not evaluated again against suspended rules until a configurable time expires, giving the overloaded device time to recover. These performance benefits might occur when, for example:

- hastily written, largely untested rules require an excessive amount of processing time
- a period of poor network performance, such as when someone downloads an extremely large file, causes slow packet inspection

Configuring Rule Latency Thresholding

License: Protection

You can modify the rule latency threshold, the suspension time for suspended rules, and the number of consecutive threshold violations that must occur before suspending rules.

Rule latency thresholding suspends rules for the time specified by **Suspension Time** when the time rules take to process a packet exceeds **Threshold** for the consecutive number of times specified by **Consecutive Threshold Violations Before Suspending Rule**.

You can enable rule 134:1 to generate an event when rules are suspended, and rule 134:2 to generate an event when suspended rules are enabled. See Setting Rule States, on page 306for more information.

The following table further describes the options you can set to configure rule latency thresholding.

Table 28: Rule Latency Thresholding Options

Option	Description
Threshold	Specifies the time in microseconds that rules should not exceed when examining a packet. See the Minimum Rule Latency Threshold Settings table for recommended minimum threshold settings.
Consecutive Threshold Violations Before Suspending Rule	Specifies the consecutive number of times rules can take longer than the time set for **Threshold** to inspect packets before rules are suspended.
Suspension Time	Specifies the number of seconds to suspend a group of rules.

Many factors affect measurements of system performance, such as CPU speed, data rate, packet size, and protocol type. For this reason, Cisco recommends that you use the threshold settings in the following table until your own calculations provide you with settings tailored to your network environment.

Table 29: Minimum Rule Latency Threshold Settings

For this data rate...	Set threshold microseconds to at least...
1 Gbps	500
100 Mbps	1250
5 Mbps	5000

Determine the following when calculating your settings:

- average packets per second
- average microseconds per packet

Multiply the average microseconds per packet for your network by a significant safety factor to ensure that you do not unnecessarily suspend rules.

To configure rule latency thresholding:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the access control policy you want to edit.

The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.

The **access control policy advanced settings** page appears.

Step 4 Click the **edit** icon (✎) next to **Latency-Based Performance Settings**, then select the **Rule Handling** tab in the pop-up window that appears.

Step 5 You can configure any of the options in the **Rule Latency Thresholding Options** table.

See the **Minimum Rule Latency Threshold Settings** table for recommended minimum **Threshold** settings.

Step 6 Click **OK**.

You must save and apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73

Configuring Intrusion Performance Statistic Logging

License: Protection

You can configure the basic parameters of how devices monitor and report their own performance. This allows you to specify the intervals at which the system updates performance statistics on your devices by configuring the following options.

Sample time (seconds) and Minimum number of packets

When the number of seconds specified elapses between performance statistics updates, the system verifies it has analyzed the specified number of packets. If it has, the system updates performance statistics. Otherwise, the system waits until it analyzes the specified number of packets.

Troubleshooting Options: Log Session/Protocol Distribution

Support might ask you during a troubleshooting call to log protocol distribution, packet length, and port statistics.

Caution Changing the setting for this troubleshooting option will affect performance and should be done only with Support guidance.

Troubleshooting Options: Summary

Support might ask you during a troubleshooting call to configure the system to calculate the performance statistics only when the Snort process is shut down or restarted. To enable this option, you must also enable the **Log Session/Protocol Distribution** troubleshooting option.

Caution Changing the setting for this troubleshooting option will affect performance and should be done only with Support guidance.

To configure basic performance statistics parameters:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon () next to the access control policy you want to edit.

The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.

The **access control policy advanced settings** page appears.

Step 4 Click the **edit** icon (✎) next to **Performance Settings**, then select the **Performance Statistics** tab in the pop-up window that appears.

Step 5 Modify the **Sample time** or **Minimum number of packets** as described above.

Step 6 Optionally, expand the **Troubleshoot Options** section and modify those options only if asked to do so by Support.

Step 7 Click **OK**.

You must save and apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Tuning File and Malware Inspection Performance and Storage

License: Protection or Malware

If you use file policies to perform file control or malware detection or blocking, you can set the options listed in the following table. Keep in mind that increasing the file sizes can affect the performance of the system.

Table 30: Advanced Access Control File and Malware Detection Options

Field	Description	Default Value	Range	Notes
Limit the number of bytes inspected when doing file type detection	Specify the number of bytes inspected when performing file type detection.	1460 bytes, or the maximum segment size of a TCP packet	0 - 4294967295 (4GB)	Set to 0 to remove the restriction. In most cases, the system can identify common file types using the first packet.
Do not calculate SHA-256 hash values for files larger than (in bytes)	Prevent the system from storing files larger than a certain size, performing a Collective Security Intelligence Cloud lookup on the files, or blocking the files if added to the custom detection list.	10485760 (10MB)	0 - 4294967295 (4GB)	Set to 0 to remove the restriction.
Allow file if cloud lookup for Block Malware takes longer than (seconds)	Specify how long the system will hold the last byte of a file that matches a **Block Malware** rule and that does not have a cached disposition, while malware cloud lookup occurs. If the time elapses without the system obtaining a disposition, the file passes. Dispositions of Unavailable are not cached.	2 seconds	0 - 30 seconds	Although this option accepts values of up to 30 seconds, Cisco recommends that you use the default value to avoid blocking traffic because of connection failures. Do **not** set this option to 0 without contacting Support.

To configure file and malware inspection performance and storage:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the access control policy you want to edit.

The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.

The **Access Control policy Advanced Settings** page appears.

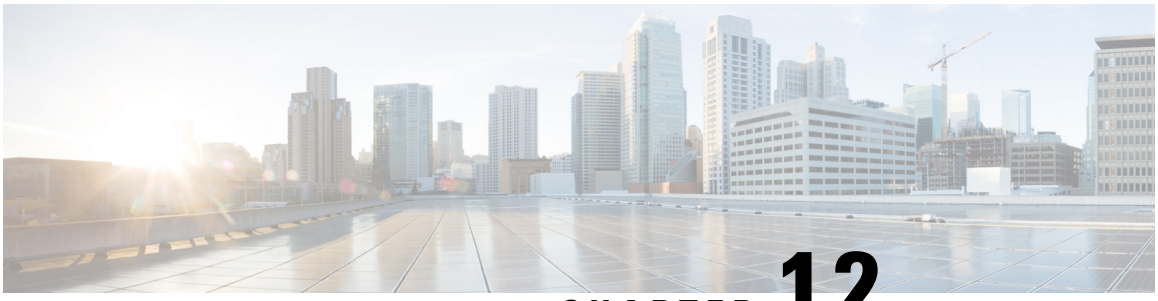
Step 4 Click the **edit** icon (✎) next to **Files and Malware Settings**.

The **Files and Malware Settings** pop-up window appears.

Step 5 You can set any of the options in the **Advanced Access Control File** and **Malware Detection Options** table.

Step 6 Click **OK**.

You must save and apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73



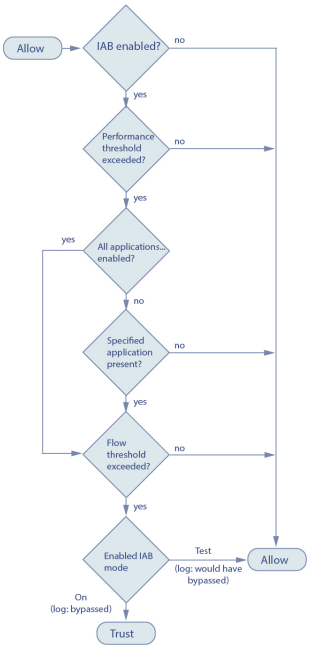
CHAPTER 12

Intelligent Application Bypass (IAB)

Intelligent Application Bypass (IAB) identifies applications that you trust to traverse your network without further inspection if performance and flow thresholds are exceeded. For example, if a nightly backup significantly impacts system performance, you can configure thresholds that, if exceeded, trust traffic generated by your backup application. Optionally, you can configure IAB so that, when an inspection performance threshold is exceeded, IAB trusts all traffic that exceeds any flow bypass threshold, regardless of the application type.

The system implements IAB on traffic allowed by access control rules or the access control policy's default action, before the traffic is subject to deep inspection. A test mode allows you to determine whether thresholds are exceeded and, if so, to identify the application flows that would have been bypassed if you enable IAB *bypass mode*.

The following figure shows the IAB decision-making process.



IAB Options

State

Enables or disables IAB.

Performance Sample Interval

Specifies the time in seconds between IAB performance sampling scans, during which the system collects system performance metrics for comparison to IAB performance thresholds. A value of 0 disables IAB.

Bypassable Applications and Filters

This feature provides two mutually exclusive options:

Applications/Filters

Provides an editor where you can specify bypassable applications and sets of applications (filters) in essentially the same ways you specify application conditions in access control rules. See Controlling Application Traffic, on page 112for more information.

All applications including unidentified application

When an inspection performance threshold is exceeded, trusts all traffic that exceeds any flow bypass threshold, regardless of the application type.

Inspection Performance Thresholds

Inspection performance thresholds provide intrusion inspection performance limits that, if exceeded, trigger inspection of flow thresholds. IAB does not use inspection performance thresholds set to 0.

Note Inspection performance and flow bypass thresholds are disabled by default. You must enable at least one of each, and one of each must be exceeded for IAB to trust traffic. If you enable more than one inspection performance or flow bypass threshold, only one of each must be exceeded for IAB to trust traffic.

Drop Percentage

Average packets dropped as a percentage of total packets, when packets are dropped because of performance overloads caused by expensive intrusion rules, file policies, decompression, and so on. This does not refer to packets dropped by normal configurations such as intrusion rules. Note that specifying an integer greater than 1 activates IAB when the specified percentage of packets is dropped. When you specify 1, any percentage from 0 through 1 activates IAB. This allows a small number of packets to activate IAB.

Processor Utilization Percentage

Average percentage of processor resources used.

Package Latency

Average packet latency in microseconds.

Flow Rate

The rate at which the system processes flows, measured as the number of flows per second. Note that this option configures IAB to measure flow *rate* , not flow *count* .

Flow Bypass Thresholds

Flow bypass thresholds provide flow limits that, if exceeded, trigger IAB to trust bypassable application traffic in bypass mode or allow application traffic subject to further inspection in test mode. IAB does not use flow bypass thresholds set to 0.

Note Inspection performance and flow bypass thresholds are disabled by default. You must enable at least one of each, and one of each must be exceeded for IAB to trust traffic. If you enable more than one inspection performance or flow bypass threshold, only one of each must be exceeded for IAB to trust traffic.

Bytes per Flow

The maximum number of kilobytes a flow can include.

Packets per Flow

The maximum number of packets a flow can include.

Flow Duration

The maximum number of seconds a flow can remain open.

Flow Velocity

The maximum transfer rate in kilobytes per second.

Configuring IAB

Caution Not all deployments require IAB, and those that do might use it in a limited fashion. Do not enable IAB unless you have expert knowledge of your network traffic, especially application traffic, and system performance, including the causes of predictable performance issues. Before you run IAB in bypass mode, make sure that trusting the specified traffic does not expose you to risk.

To identify applications that you trust to traverse your network when thresholds are exceeded:

Step 1 In the access control policy editor, click the **Advanced** tab, then click the **edit** icon next to **Intelligent Application Bypass Settings**.

If a **view** icon appears instead, settings are inherited from an ancestor policy, or you do not have permission to modify the settings. If the configuration is unlocked, uncheck Inherit from base policy to enable editing.

Step 2 Configure IAB options:

- State—Turn IAB **Off** or **On**, or enable IAB in **Test** mode.
- Performance Sample Interval—Enter the time in seconds between IAB performance-sampling scans. If you enable IAB, even in test mode, enter a non-zero value. Entering 0 disables IAB.

- Bypassable Applications and Filters—Choose from:
  - Click the number of bypassed applications and filters and specify the applications whose traffic you want to bypass; specify in essentially the same ways you specify application conditions in access control rules. See Controlling Application Traffic, on page 112 for more information.
  - Click **All applications including unidentified applications** so that, when an inspection performance threshold is exceeded, IAB trusts all traffic that exceeds any flow bypass threshold, regardless of the application type.
- Inspection Performance Thresholds—Click **Configure** and enter at least one threshold value.
- Flow Bypass Thresholds—Click **Configure** and enter at least one threshold value.

You must specify at least one inspection performance threshold and one flow bypass threshold; both must be exceeded for IAB to trust traffic. If you enter more than one threshold of each type, only one of each type must be exceeded. For detailed information, see IAB Options, on page 154.

Step 3 Click **OK** to save IAB settings.

Step 4 Click **Save** to save the policy.

What to Do Next

- Deploy configuration changes; see Deploying Configuration Changes, on page 73.

IAB Logging and Analysis

IAB forces an end-of-connection event that logs bypassed flows and flows that would have been bypassed, regardless of whether you have enabled connection logging. Connection events indicate flows that are bypassed in bypass mode or that would have been bypassed in test mode. Custom dashboard widgets and reports based on connection events can display long-term statistics for bypassed and would-have-bypassed flows.

IAB Connection Events

Action

When **Reason** includes Intelligent App Bypass :

Allow—indicates that the applied IAB configuration was in test mode and traffic for the application specified by **Application Protocol** remains available for inspection.

Trust - indicates that the applied IAB configuration was in bypass mode and traffic for the application specified by **Application Protocol** has been trusted to traverse the network without further inspection.

Reason

Intelligent App Bypass indicates that IAB triggered the event in bypass or test mode.

Application Protocol

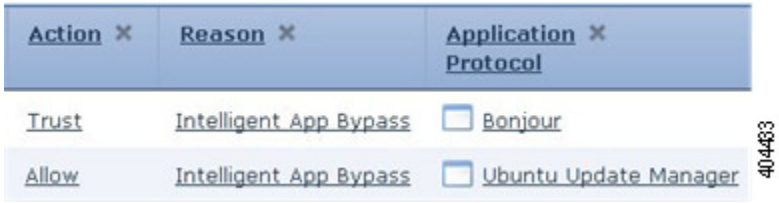
This field displays the application protocol that triggered the event.

Example

In the following truncated graphic, some fields are omitted. The graphic shows the **Action**, **Reason**, and **Application Protocol** fields for two connection events resulting from different IAB settings in two separate access control policies.

For the first event, the Trust action indicates that IAB was enabled in bypass mode and Bonjour protocol traffic was trusted to pass without further inspection.

For the second event, the Allow action indicates that IAB was enabled in test mode, so Ubuntu Update Manager traffic was subject to further inspection but would have been bypassed if IAB had been in bypass mode.



Example

In the following truncated graphic, some fields are omitted. The flow in the second event was both bypassed (**Action**: Trust ; **Reason**: Intelligent App Bypass) and inspected by an intrusion rule (**Reason**: Intrusion Monitor). The Intrusion Monitor reason indicates that an intrusion rule set to **Generate Events** detected but did not block an exploit during the connection. In the example, this happened before the application was detected. After the application was detected, IAB recognized the application as bypassable and trusted the flow.

IAB Custom Dashboard Widgets

You can create a Custom Analysis dashboard widget to display long-term IAB statistics based on connection events. Specify the following when creating the widget:

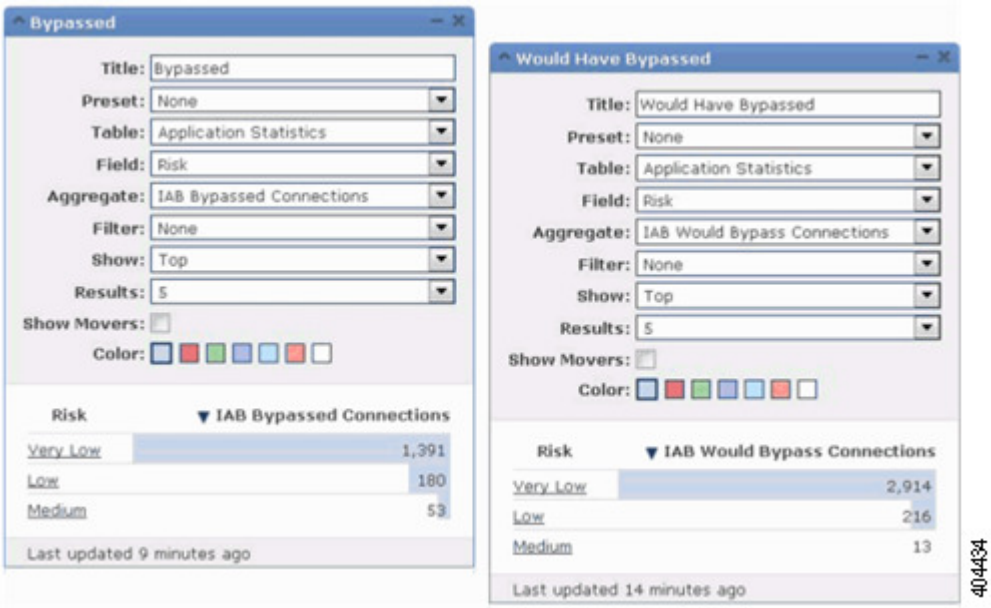
- **Preset**: None
- **Table**: Application Statistics
- **Field**: any
- **Aggregate**: either of:
  - IAB Bypassed Connections
  - IAB Would Bypass Connections
- Filter: any

Examples

In the following Custom Analysis dashboard widget examples:

- The *Bypassed* example shows statistics for application traffic bypassed because the applications were specified as bypassable and IAB was enabled in bypass mode in the deployed access control policy.

- The *Would Have Bypassed* example shows statistics for application traffic that would have been bypassed because the applications were specified as bypassable and IAB was enabled in test mode in the deployed access control policy.



IAB Custom Reports

You can create a custom report to display long-term IAB statistics based on connection events. Specify the following when creating the report:

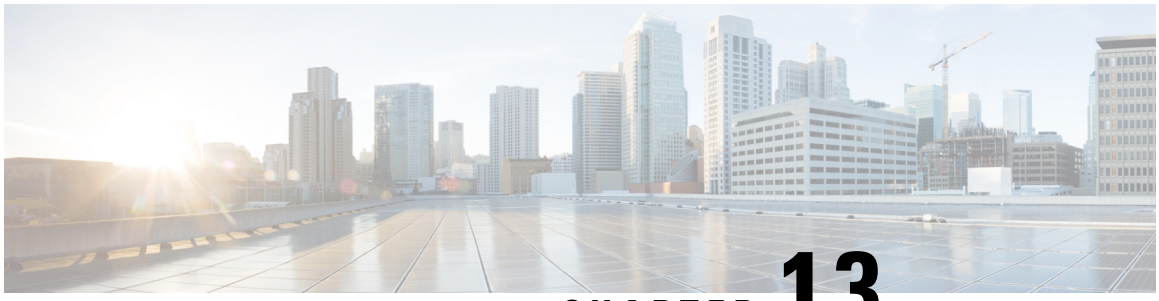
- **Table**: Application Statistics
- **Preset**: None
- **Filter**: any
- **X-Axis**: any
- **Y-Axis**: either of:
  - IAB Bypassed Connections
  - IAB Would Bypass Connections

Examples

The following graphic shows two abbreviated report examples:

- The *Bypassed* example shows statistics for application traffic bypassed because the applications were specified as bypassable and IAB was enabled in bypass mode in the deployed access control policy. The *Would Have Bypassed* example shows statistics for application traffic that would have been bypassed because the applications were specified as bypassable and IAB was enabled in test mode in the deployed access control policy.


Bypassed
Table
Application Statistics
Preset
None
Format
Search
Web Applications
X-Axis
Application
Y-Axis
IAB Bypassed Connections
Would Have Bypassed
Table
Application Statistics
Preset
None
Format
Filter
Web Applications
X-Axis
Application
Y-Axis
IAB Would Bypass Connections
404538



CHAPTER 13

Access Control Using Content Restriction

Major search engines and content delivery services provide features that allow you to restrict search results and website content. For example, schools use content restriction features to comply with the Children's Internet Protection Act (CIPA).

When implemented by search engines and content delivery services, you can enforce content restriction features only for individual browsers or users. The Firepower System allows you to extend these features to your entire network.

The system allows you to enforce:

- Safe Search—Supported in many major search engines, this service filters out explicit and adult-oriented content that particular environments (business, government, education, etc.) classify as objectionable. The system does not restrict a user's ability to access the home pages for supported search engines. Note that YouTube Restricted Mode is a subfeature of Safe Search.
- YouTube EDU—This service filters YouTube content for an educational environment. It allows schools to set access for educational content while limiting access to noneducational content. YouTube EDU is a different feature than YouTube Restricted Mode, which enforces restrictions on YouTube searches as part of Google's Safe Search feature. With YouTube EDU, users access the YouTube EDU home page, rather than the standard YouTube home page.

Content restriction features communicate the restricted status of a search or content query via an element in the request URI, an associated cookie, or a custom HTTP header element. You can configure access control rules to modify these elements as the system processes traffic.

Note that, to enforce content restriction, you must also enable an SSL policy, which impacts performance.

If you enable logging of connection events for these access control rules, the system logs related events with a **Reason** of Content Restriction.

Safe Search Options for Access Control Rules

The Firepower System supports Safe Search filtering for specific search engines only. For a list of supported search engines, see applications tagged safesearch supported in the **Applications** tab of the access control rule editor. For a list of unsupported search engines, see applications tagged safesearch unsupported .

When enabling Safe Search for an access control rule, set the following parameters:

Enable Safe Search

Enables Safe Search filtering for traffic that matches this rule.

Unsupported Search Traffic

Specifies the action you want the system to take when it processes traffic from unsupported search engines. If you choose **Block** or **Block with Reset**, you must also configure the HTTP response page that the system displays when it blocks restricted content; see Displaying a Custom Web Page for Blocked URLs, on page 124.

Using Access Control Rule to Enforce Content Restriction

License: Any

Caution To avoid rule preemption, position rules governing YouTube EDU above rules governing Safe Search in both SSL and access control policies. For more information, see Content Restriction Rule Order, on page 164.

To enforce content restriction using access control rules:

Step 1 Create an SSL policy; see Creating a Basic SSL Policy, on page 182.

Step 2 Add SSL rules for handling Safe Search and YouTube EDU traffic:

- Choose **Decrypt - Resign** as the **Action** for the rules. The system does not allow any other action for content restriction handling.
- In the **Applications** tab, add selections to the **Selected Applications and Filters** list:
  - Safe Search—Add the safesearch supported filter.
  - YouTube EDU—Search for "YouTube" in the **Available Applications** list, and add the resulting applications.

For more information, see Controlling Encrypted Traffic Based on Application, on page 222.

Step 3 Set rule positions for the SSL rules you added. Click and drag, or use the right-click menu to cut and paste.

Step 4 Create or edit an access control policy, and associate the SSL policy with the access control policy; see Associating Other Policies with Access Control, on page 71.

Step 5 In the access control policy, add rules for handling Safe Search and YouTube EDU traffic, placing the Safe Search rule after the YouTube EDU rule:

- Choose **Allow** as the **Action** for the rules. The system does not allow any other action for content restriction handling.

- In the **Applications** tab, click the **dimmed** icon for either Safe Search or YouTube EDU, and set related options. These icons are disabled, rather than dimmed, if you choose any **Action** other than **Allow** for the rule.

Note You cannot enable Safe Search and YouTube EDU restrictions for the same access control rule.

- In the **Applications** tab, refine application selections in the **Selected Applications and Filters** list.

In most cases, enabling Safe Search or YouTube EDU populates the **Selected Applications and Filters** list with the appropriate values. The system does not automatically populate the list if a Safe Search or YouTube application is already present in the list when you enable the feature. If applications do not populate as expected, manually add them as follows:

- Safe Search—Add the search engines filter.
- YouTube EDU—Search for "YouTube" in the **Available Applications** list, and add the resulting applications.

For more information, see Adding an Application Condition to an Access Control Rule, on page 115.

Step 6 Set rule positions for the access control rules you added. Click and drag, or use the right-click menu to cut and paste.

Step 7 Configure the **Block Response Page** that the system displays when it blocks restricted content; see Displaying a Custom Web Page for Blocked URLs, on page 124.

What to do next

What to Do Next

Deploy configuration changes; see Deploying Configuration Changes, on page 73.

YouTube EDU Options for Access Control Rules

When enabling YouTube EDU for an access control rule, set the following parameters:

Enable YouTube EDU

Enables YouTube EDU filtering for traffic that matches this rule.

Custom ID

Specifies the value that uniquely identifies a school or district network in the YouTube EDU initiative. YouTube provides this ID when a school or district registers for a YouTube EDU account.

Note If you check **Enable YouTube EDU**, you must enter a **Custom ID**. This ID is defined externally by YouTube. The system does not validate what you enter against the YouTube system. If you enter an invalid ID, YouTube EDU restrictions may not perform as expected.

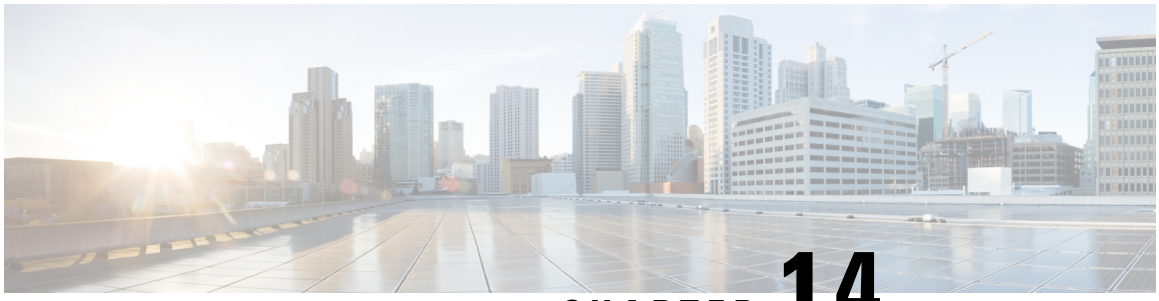
Content Restriction Rule Order

To avoid rule preemption in both SSL and access control policies, position rules governing YouTube restriction above rules governing Safe Search restriction.

When you enable Safe Search for an access control rule, the system adds the search engine category to the **Selected Applications and Filters** list. This application category includes YouTube. As a result, YouTube traffic matches to the Safe Search rule unless YouTube EDU is enabled in a rule with a higher evaluation priority.

A similar rule preemption occurs if you position an SSL rule with the safesearch supported filter higher in the evaluation order than an SSL rule with specific YouTube application conditions.

For more information, see Ordering Rules to Improve Performance and Avoid Preemption, on page 76.



CHAPTER 14

Understanding Traffic Decryption

By default, the ASA FirePOWER module cannot inspect traffic encrypted with the Secure Socket Layer (SSL) protocol or its successor, the Transport Layer Security (TLS) protocol. As part of access control, the *SSL inspection* feature allows you to either block encrypted traffic without inspecting it, or inspect encrypted or decrypted traffic with access control. As the module handles encrypted sessions, it logs details about the traffic. The combination of inspecting encrypted traffic and analyzing encrypted session data allows greater awareness and control of the encrypted applications and traffic in your network.

About Traffic Decryption

SSL inspection is a policy-based feature. In the Firepower System, an access control policy is a master configuration that invokes subpolicies and other configurations, including an SSL policy. If you associate an SSL policy with access control, the system uses that SSL policy to handle encrypted sessions before it evaluates them with access control rules. If you do not configure SSL inspection, or your devices do not support it, access control rules handle all encrypted traffic.

Note that access control rules also handle encrypted traffic when your SSL inspection configuration allows it to pass. However, some access control rule conditions require unencrypted traffic, so encrypted traffic may match fewer rules. Also, by default, the system disables intrusion and file inspection of encrypted payloads. This helps reduce false positives and improve performance when an encrypted connection matches an access control rule that has intrusion and file inspection configured. For more information, see Creating and Editing Access Control Rules, on page 90.

If the module detects an SSL or TLS handshake over a TCP connection, it determines whether it can decrypt the detected traffic. If it cannot, it applies a configured action:

- block the encrypted traffic, and optionally reset the TCP connection
- not decrypt the encrypted traffic

If the module can decrypt the traffic, it blocks the traffic without further inspection, evaluates undecrypted traffic with access control, or decrypts it using one of the following methods:

- Decrypt with a known private key. When an external host initiates an SSL handshake with a server on your network, the system matches the exchanged server certificate with a server certificate previously uploaded to the appliance. It then uses the uploaded private key to decrypt the traffic.
- Decrypt by re-signing the server certificate. When a host on your network initiates an SSL handshake with an external server, the system re-signs the exchanged server certificate with a previously uploaded certificate authority (CA) certificate. It then uses the uploaded private key to decrypt the traffic.

Decrypted traffic is subject to the same traffic handling and analysis as originally unencrypted traffic: network, reputation, and user-based access control; intrusion detection and prevention; and advanced malware protection. If the system does not block the decrypted traffic post-analysis, it reencrypts the traffic before passing it to the destination host.

Note Certain SSL inspection actions, such as blocking traffic and decrypting outgoing traffic, modify the flow of traffic. ASA FirePOWER modules deployed inline can perform these actions. ASA FirePOWER modules deployed passively cannot affect the flow of traffic. However, these devices can still decrypt incoming traffic; see Example: Decrypting Traffic in a Passive Deployment, on page 172 for more information.

SSL Handshake Processing

In this documentation, the term SSL handshake represents the two-way handshake that initiates encrypted sessions in both the SSL protocol and its successor protocol, TLS.

In a passive deployment, the Firepower System observes a copy of the handshake, but does not process the actual handshake. In an inline deployment, the Firepower System processes the SSL handshake, potentially modifying the ClientHello message and acting as a TCP proxy server for the session.

After the client establishes a TCP connection with the server (after it successfully completes the TCP three-way handshake), the managed device monitors the TCP session for any attempt to initiate an encrypted session. The SSL handshake establishes an encrypted session via the exchange of specialized packets between client and server. In the SSL and TLS protocols, these specialized packets are called handshake messages. The handshake messages communicate which encryption attributes both the client and server support:

- ClientHello—The client specifies multiple supported values for each encryption attribute.
- ServerHello—The server specifies a single supported value for each encryption attribute, which determines which encryption method the system uses during the secure session.

Although the data transmitted in the session is encrypted, the handshake messages are not.

After an SSL handshake completes, the managed device caches encrypted session data, which allows session resumption without requiring the full handshake. The managed device also caches server certificate data, which allows faster handshake processing in subsequent sessions.

ClientHello Message Handling

The client sends the ClientHello message to the server that acts as the packet destination if a secure connection can be established. The client sends the message to initiate the SSL handshake or in response to a Hello Request message from the destination server.

If you configure SSL inspection, when a managed device receives a ClientHello message, the system attempts to match the message to SSL rules that have the **Decrypt - Resign** action. The match relies on data from the ClientHello message and from cached server certificate data. Possible data includes:

Data Availability for SSL Rule Conditions

SSL Rule Condition	Data Present In
Zones	ClientHello
Networks	ClientHello
VLAN Tags	ClientHello
Ports	ClientHello
Users	ClientHello
Applications	ClientHello (Server Name Indicator extension)
Categories	ClientHello (Server Name Indicator extension)
Certificate	server Certificate (potentially cached)
Distinguished Names	server Certificate (potentially cached)
Certificate Status	server Certificate (potentially cached)
Cipher Suites	ServerHello
Versions	ServerHello

If the ClientHello message does not match a Decrypt - Resign rule, the system does not modify the message. It then determines whether the message passes access control evaluation (which can include deep inspection). If the message passes, the system transmits it to the destination server.

If the message matches a Decrypt - Resign rule, the system modifies the ClientHello message as follows:

- Compression methods—Strips the compression_methods element, which specifies the compression methods the client supports. The Firepower System cannot decrypt compressed sessions. This modification reduces the Compressed Session type of undecryptable traffic.
- Cipher suites—Strips cipher suites from the cipher_suites element if the Firepower System does not support them. If the Firepower System does not support any of the specified cipher suites, the system transmits the original, unmodified element. This modification reduces the Unknown Cipher Suite and Unsupported Cipher Suite types of undecryptable traffic.
- Session identifiers—Strips any value from the Session Identifier element and the SessionTicket extension that does not match cached session data. If a ClientHello value matches cached data, an interrupted session can resume without the client and server performing the full SSL handshake. This modification increases the chances of session resumption and reduces the Session Not Cached type of undecryptable traffic.
- Elliptic curves—Strips elliptic curves from the Supported Elliptic Curves extension if the Firepower System does not support them. If the Firepower System does not support any of the specified elliptic curves, the managed device removes the extension and strips any related cipher suites from the cipher_suites element.

- ALPN extensions—Strips any value from the Application-Layer Protocol Negotiation (ALPN) extension that is unsupported in the Firepower System (for example, the SPDY and HTTP/2 protocols). This modification only occurs if the message matches an SSL rule associated with content restriction features. For more information, see Access Control Using Content Restriction, on page 161.
- Other Extensions—Strips the Extended Master Secret, Next Protocol Negotiation (NPN), and TLS Channel IDs extensions.

Note The system performs these ClientHello modifications by default. If your SSL policy is configured correctly, this default behavior results in more frequent decryption of traffic. To tune the default behavior for your individual network, contact Support.

After the system modifies the ClientHello message, it determines whether the message passes access control evaluation (which can include deep inspection). If the message passes, the system transmits it to the destination server.

Direct communication between the client and server is no longer possible during the SSL handshake, because after message modification the Message Authentication Codes (MACs) computed by the client and server no longer match. For all subsequent handshake messages (and for the encrypted session once established), the managed device acts as a man-in-the-middle (MITM). It creates two SSL sessions, one between client and managed device, one between managed device and server. As a result, each session contains different cryptographic session details.

Note The cipher suites that the Firepower System can decrypt are frequently updated and do not correspond directly to the cipher suites you can use in SSL rule conditions. For the current list of decryptable cipher suites, contact Support.

ServerHello and Server Certificate Message Handling

The ServerHello message is the response to a ClientHello message in a successful SSL handshake.

After a managed device processes a ClientHello message and transmits it to the destination server, the server determines whether it supports the decryption attributes the client specified in the message. If it does not support those attributes, the server sends a handshake failure alert to the client. If it supports those attributes, the server sends the ServerHello message. If the agreed-upon key exchange method uses certificates for authentication, the server Certificate message immediately follows the ServerHello message.

When the managed device receives these messsages, it attempts to match them with SSL rules. These messages contain information that was absent from either the ClientHello message or the session data cache. Specifically, the system can potentially match these messages on Distinguished Names, Certificate Status, Cipher Suites, and Versions conditions.

If the messages do not match any SSL rules, the managed device performs the default action for the SSL policy. For more information, see Creating a Basic SSL Policy, on page 182.

If the messages match an SSL rule, the managed device continues as appropriate:

Action: Monitor

The SSL handshake continues to completion. The managed device tracks and logs but does not decrypt encrypted traffic.

Action: Block or Block with Reset

The managed device blocks the SSL session. If appropriate, it also resets the TCP connection.

Action: Do Not Decrypt

The SSL handshake contintues to completion. The managed device does not decrypt the application data exchanged during the SSL session.

In rare cases, the system matches a ClientHello message to a Decrypt - Resign rule and modifies the message, but matches the related ServerHello message to a Do Not Decrypt rule. In those cases, the system resets the TCP connection to trigger a refreshed handshake from the client. The refreshed ClientHello message no longer matches the Decrypt - Resign rule, and the SSL session proceeds without decryption.

Action: Decrypt - Known Key

The managed device attempts to match the server Certificate data to a previously uploaded server certificate.

If it matches the certificate to a previously generated certificate, the SSL handshake continues to completion. The managed device uses the uploaded private key to decrypt and reencrypt the application data exchanged during the SSL session.

In rare cases, the system cannot match the server Certificate message to a previously generated certificate. For example, a server might change its certificate between the initial connection with the client and subsequent connections. In this case, the system blocks the SSL connection, so that the client reconnects and the system processes the handshake with the new certificate data.

Action: Decrypt - Resign

The managed device processes the server Certificate message and re-signs the exchanged server certificate with a previously uploaded certificate authority (CA) certificate. The SSL handshake continues to completion. The managed device then uses the uploaded private key to decrypt and reencrypt the application data exchanged during the SSL session.

While processing the ServerHello and Certificate messages, the managed device caches distinguished names and certificate data to allow faster handshake processing in both reestablished and subsequent SSL sessions.

SSL Inspection Requirements

License: feature dependent

How you deploy devices on your network, in addition to your configuration settings and licenses, influences the actions you can take to control and decrypt encrypted traffic.

SSL inspection requires public key certificates and paired private keys for certain features. You must upload certificates and paired private keys to the ASA FirePOWER module to decrypt and control traffic based on encryption session characteristics.

Deploying ASA FirePOWER Modules that Support SSL Inspection

License: Any

ASA FirePOWER modules configured and deployed inline can modify the flow of traffic. These devices can monitor, block, allow, and decrypt incoming and outgoing traffic.

ASA FirePOWER modules configured and deployed passively cannot affect the flow of traffic. They can only monitor, allow, and decrypt incoming traffic. Note that passive deployments do not support decrypting traffic encrypted with the ephemeral Diffie-Hellman (DHE) or the elliptic curve Diffie-Hellman (ECDHE) cipher suites.

Review your list of mapped actions, existing network deployment, and overall requirements to determine whether one or the other type of deployment better suits your organization. See Analyzing SSL Inspection Appliance Deployments, on page 171 for more information.

License Requirements for SSL Inspection

License: feature dependent

Depending on your licenses, you can use a combination of criteria to determine how to handle encrypted traffic. The ASA FirePOWER module uses warning icons (⚠) and confirmation dialog boxes to designate unsupported features for your deployment. For details, hover your pointer over a **warning** icon.

You apply an SSL policy as part of an access control policy, and the access control policy inspects traffic decrypted by the SSL policy. See Access Control License and Role Requirements, on page 64 for more information on access control licensing.

The following table explains the license requirements to apply an SSL policy as part of an access control policy.

Table 31: License Requirements for SSL Inspection

To apply an SSL policy that...	Licenses
handles encrypted traffic on the basis of zone, network, port, or SSL-related criteria	Any
handles encrypted traffic using geolocation data	Any
handles encrypted traffic using application or user criteria	Control
filters encrypted traffic using URL category and reputation data	URL Filtering

Collecting Prerequisite Information to Configure SSL Rules

License: feature-dependent

SSL inspection relies on a significant amount of supporting public key infrastructure (PKI) information. Consider your organization's traffic patterns to determine the matching rule conditions you can configure. Collect the information listed in the following table:

Table 32: SSL Rule Condition Prerequisites

To match on...	Collect the...
detected server certificates, including self-signed server certificates	server certificate
trusted server certificates	CA certificate
detected server certificate subject or issuer	server certificate subject DN or issuer DN

For more information, see Tuning Traffic Decryption Using SSL Rules, on page 215.

Decide whether you want to not decrypt, block, monitor, or decrypt the encrypted traffic you match your rules against. Map these decisions to SSL rule actions, undecryptable traffic actions, and the SSL policy default action. If you want to decrypt traffic, see the following table:

Table 33: SSL Decryption Prerequisites

To decrypt...	Collect...
incoming traffic to a server you control	the server's certificate file and paired private key file
outgoing traffic to an external server	a CA certificate file and paired private key file You can also generate a CA certificate and private key.

For more information, see Using Rule Actions to Determine Encrypted Traffic Handling and Inspection, on page 202.

After you have collected this information, upload it to the system and configure reusable objects. See Managing Reusable Objects, on page 17 for more information.

Analyzing SSL Inspection Appliance Deployments

License: feature-dependent

This section presents several scenarios in which the Life Insurance Example, Inc. life insurance company (LifeIns) uses SSL inspection on encrypted traffic to help audit their processes. Based on their business processes, LifeIns plans to deploy:

- one ASA FirePOWER device in a passive deployment for the Customer Service department
- one ASA FirePOWER device in an inline deployment for the Underwriting Department

Customer Service Business Processes

LifeIns created a customer-facing website for their customers. LifeIns receives encrypted questions and requests regarding policies from prospective customers through their website and through e-mail. LifeIns's Customer Service department processes them and returns the requested information within 24 hours. Customer Service wants to expand its incoming contact metrics collection. LifeIns has an established internal audit review for Customer Service.

LifeIns also receives encrypted applications online. The Customer Service department processes the applications within 24 hours before sending the case file to the Underwriting department. Customer Service filters out any obvious false applications sent through the online form, which consumes a fair portion of their time.

Underwriting Business Processes

LifeIns's underwriters submit encrypted medical information requests online to the Medical Repository Example, LLC medical data repository (MedRepo). MedRepo reviews the requests and transmits the encrypted records to LifeIns within 72 hours. The underwriters subsequently underwrite an application and submit policy and rate decisions. Underwriting wants to expand its metrics collection.

Lately, an unknown source has been sending spoofed responses to LifeIns. Though LifeIns's underwriters receive training on proper Internet use, LifeIns's IT department first wants to analyze all encrypted traffic that takes the form of medical responses, then wants to block all spoof attempts.

LifeIns places junior underwriters on six-month training periods. Lately, these underwriters have been incorrectly submitting encrypted medical regulation requests to MedRepo's customer service department. MedRepo has submitted multiple complaints to LifeIns in response. LifeIns plans on extending their new underwriter training period to also audit underwriter requests to MedRepo.

Example: Decrypting Traffic in a Passive Deployment

License: feature-dependent

LifeIns's business requirements state that Customer Service must:

- process all requests and applications within 24 hours
- improve its incoming contact metrics collection process
- identify and discard incoming false applications

Customer Service does not require additional audit review.

LifeIns plans to passively deploy a Customer Service device.

Traffic from an external network goes to LifeIns's router. The router routes traffic to the Customer Service department, and mirrors a copy of the traffic to the ASA FirePOWER module for inspection.

On the ASA FirePOWER module, a user in the Access Control and SSL Editor custom role configures SSL inspection to:

- log all encrypted traffic sent to the Customer Service department
- decrypt encrypted traffic sent using the online application form to Customer Service
- not decrypt all other encrypted traffic sent to Customer service, including traffic sent using the online request form

The user also configures access control to inspect the decrypted application form traffic for fake application data and log when fake data is detected.

In the following scenarios, the user submits an online form to Customer Service. The user's browser establishes a TCP connection with the server, then initiates an SSL handshake. The ASA FirePOWER module receives a copy of this traffic. The client and server complete the SSL handshake, establishing the encrypted session.

Based on handshake and connection details, the system logs the connection and acts upon the copy of the encrypted traffic.

Monitoring Encrypted Traffic in a Passive Deployment

License: Any

For all SSL-encrypted traffic sent to Customer Service, the system logs the connection.

The following steps occur:

1. The user submits the plain text request (info). The client encrypts this (AaBb) and sends the encrypted traffic to Customer Service.
2. LifeIns's router receives the encrypted traffic and routes it to the Customer Service department server. It also mirrors a copy to the ASA FirePOWER module.
3. The Customer Service department server receives the encrypted information request (AaBb) and decrypts it to plain text (info).
4. The module does not decrypt the traffic.

The access control policy continues to process the encrypted traffic and allows it. The module generates a connection event after the session ends.

1. The ASA FirePOWER module receives the connection event.

Not Decrypting Encrypted Traffic in a Passive Deployment

License: Any

For all SSL-encrypted traffic that contains requests about policies, the system allows the traffic without decrypting it and logs the connection.

The following steps occur:

1. The user submits the plain text request (info). The client encrypts this (AaBb) and sends the encrypted traffic to Customer Service.
2. LifeIns's router receives the encrypted traffic and routes it to the Customer Service department server. It also mirrors a copy to the ASA FirePOWER module.
3. The Customer Service department server receives the encrypted information request (AaBb) and decrypts it to plain text (info).
4. The ASA FirePOWER module does not decrypt the traffic.

The access control policy continues to process the encrypted traffic and allows it. The module generates a connection event after the session ends.

1. The ASA FirePOWER module receives the connection event.

Inspecting Encrypted Traffic with a Private Key in a Passive Deployment

License: Any

For all SSL-encrypted traffic that contains application form data, the system decrypts the traffic and logs the connection.

Note In a passive deployment, if traffic is encrypted with either the DHE or ECDHE cipher suite, you cannot decrypt it with a known private key.

For traffic with legitimate application form information, the system logs the connection.

The following steps occur:

1. The user submits the plain text request (form). The client encrypts this (AaBb) and sends the encrypted traffic to Customer Service.
2. LifeIns's router receives the encrypted traffic and routes it to the Customer Service department server. It also mirrors a copy to the ASA FirePOWER module.
3. The Customer Service department server receives the encrypted information request (AaBb) and decrypts it to plain text (form).
4. The ASA FirePOWER module uses the session key obtained with the uploaded known private key to decrypt the encrypted traffic to plain text (form).

The access control policy continues to process the decrypted traffic and does not find fake application information. The module generates a connection event after the session ends.

1. The ASA FirePOWER module receives a connection event with information about the encrypted and decrypted traffic.

In contrast, if the decrypted traffic contains fake application data, the system logs the connection and the fake data.

The following steps occur:

1. The user submits the plain text request (fake). The client encrypts this (CcDd) and sends the encrypted traffic to Customer Service.
2. LifeIns's router receives the encrypted traffic and routes it to the Customer Service department server. It also mirrors a copy to the device.
3. The Customer Service department server receives the encrypted information request (CcDd) and decrypts it to plain text (fake).
4. The ASA FirePOWER module uses the session key obtained with the uploaded known private key to decrypt the encrypted traffic to plain text (fake).

The access control policy continues to process the decrypted traffic and finds fake application information. The module generates an intrusion event. After the session ends, it generates a connection event.

1. The ASA FirePOWER module receives a connection event with information about the encrypted and decrypted traffic, and an intrusion event for the fake application data.

Example: Decrypting Traffic in an Inline Deployment

License: feature-dependent

LifeIns's business requirements state that Underwriting must:

- audit new and junior underwriters, verifying that their information requests to MedRepo comply with all applicable regulations
- improve its underwriting metrics collection process
- examine all requests that appear to come from MedRepo, then drop any spoofing attempts
- drop all improper regulatory requests to MedRepo's Customer Service department from the Underwriting department
- not audit senior underwriters

LifeIns plans to deploy a device in an inline deployment for the Underwriting department.

Traffic from MedRepo's network goes to MedRepo's router. It routes traffic to LifeIns's network. The device receives the traffic, passes allowed traffic to LifeIns's router, and sends events to the ASA FirePOWER module. LifeIns's router routes traffic to the destination host.

On the ASA FirePOWER module, a user configures SSL inspection to:

- log all encrypted traffic sent to the Underwriting department
- block all encrypted traffic incorrectly sent from LifeIns's underwriting department to MedRepo's customer service department
- decrypt all encrypted traffic sent from MedRepo to LifeIns's underwriting department, and from LifeIns's junior underwriters to MedRepo's requests department
- not decrypt encrypted traffic sent from the senior underwriters

The user also configures access control to inspect decrypted traffic with a custom intrusion policy and:

- block decrypted traffic if it contains a spoof attempt, and log the spoof attempt
- block decrypted traffic that contains information not compliant with regulations, and log the improper information
- allow all other encrypted and decrypted traffic

The system reencrypts allowed decrypted traffic before sending it to the destination host.

In the following scenarios, the user submits information online to a remote server. The user's browser establishes a TCP connection with the server, then initiates an SSL handshake. The module receives this traffic; based on handshake and connection details, the system logs the connection and acts on the traffic. If the system blocks the traffic, it also closes the TCP connection. Otherwise, the client and server complete the SSL handshake, establishing the encrypted session.

Monitoring Encrypted Traffic in an Inline Deployment

License: Any

For all SSL-encrypted traffic sent to and from the Underwriting department, the system logs the connection.

The following steps occur:

1. The user submits the plain text request (help). The client encrypts this (AaBb) and sends the encrypted traffic to MedRepo's Requests department server.
2. LifeIns's router receives the encrypted traffic and routes it to the Requests department server.
3. The ASA FirePOWER module does not decrypt the traffic.

The access control policy continues to process the encrypted traffic and allows it, then generates a connection event after the session ends.

1. The external router receives the traffic and routes it to the Requests department server.
2. The Underwriting department server receives the encrypted information request (AaBb) and decrypts it to plain text (help).
3. The ASA FirePOWER module receives the connection event.

Allowing Specific Users' Encrypted Traffic in an Inline Deployment

License: Control

For all SSL-encrypted traffic originating from the senior underwriters, the system allows the traffic without decrypting it and logs the connection.

The following steps occur:

1. The user submits the plain text request (help). The client encrypts this (AaBb) and sends the encrypted traffic to MedRepo's Requests department server.
2. LifeIns's router receives the encrypted traffic and routes it to the Requests department server.
3. The ASA FirePOWER module does not decrypt this traffic.

The access control policy continues to process the encrypted traffic and allows it, then generates a connection event after the session ends.

1. The external router receives the traffic and routes it to the Requests department server.
2. The Requests department server receives the encrypted information request (AaBb) and decrypts it to plain text (help)

   .
3. The ASA FirePOWER module receives the connection event.

Blocking Encrypted Traffic in an Inline Deployment

License: Any

For all SMTPS email traffic improperly sent from LifeIns's underwriting department to MedRepo's Customer Service department, the system blocks the traffic during the SSL handshake without further inspection and logs the connection.

The following steps occur:

1. Having received the request to establish an SSL handshake from a client's browser, the Customer Service department server sends the server certificate (cert) as the next step in the SSL handshake to the LifeIns underwriter.
2. MedRepo's router receives the certificate and routes it to the LifeIns underwriter.
3. The ASA FirePOWER module blocks the traffic without further inspection and ends the TCP connection. It generates a connection event.
4. The internal router does not receive the blocked traffic.
5. The underwriter does not receive the blocked traffic.
6. The ASA FirePOWER module receives the connection event.

Inspecting Encrypted Traffic with a Private Key in an Inline Deployment

License: Any

For all SSL-encrypted traffic sent from MedRepo to LifeIns's underwriting department, the system uses an uploaded server private key to obtain session keys, then decrypts the traffic and logs the connection. Legitimate traffic is allowed and reencrypted before being sent to the Underwriting department.

The following steps occur:

1. The user submits the plain text request (stats). The client encrypts this (AaBbC) and sends the encrypted traffic to the Underwriting department server.
2. The external router receives the traffic and routes it to the Underwriting department server.
3. The ASA FirePOWER module uses the session key obtained with the uploaded known private key to decrypt this traffic to plain text (stats).

The access control policy continues to process the decrypted traffic with the custom intrusion policy and does not find a spoof attempt. The device passes the encrypted traffic (AaBbC), then generates a connection event after the session ends.

1. The internal router receives the traffic and routes it to the Underwriting department server.
2. The Underwriting department server receives the encrypted information (AaBbC) and decrypts it to plain text (stats).
3. The ASA FirePOWER module receives the connection event with information about the encrypted and decrypted traffic.

In contrast, any decrypted traffic that is a spoof attempt is dropped. The system logs the connection and the spoof attempt.

The following steps occur:

1. The user submits the plain text request (spoof), altering the traffic to appear to originate from MedRepo, LLC. The client encrypts this (FfGgH) and sends the encrypted traffic to the Underwriting department server.

2. The ASA FirePOWER module uses the session key obtained with the uploaded known private key to decrypt this traffic to plain text (spoof).

The access control policy continues to process the decrypted traffic with the custom intrusion policy and finds a spoof attempt. The ASA FirePOWER module blocks the traffic, then generates an intrusion event. It generates a connection event after the session ends.

1. The internal router does not receive the blocked traffic.
2. The Underwriting department server does not receive the blocked traffic.
3. The ASA FirePOWER module receives a connection event with information about the encrypted and decrypted traffic, and an intrusion event for the spoofing attempt.

Inspecting Specific Users' Encrypted Traffic with a Re-signed Certificate in an Inline Deployment

License: Control

For all SSL-encrypted traffic sent from the new and junior underwriters to MedRepo's requests department, the system uses a re-signed server certificate to obtain session keys, then decrypts the traffic and logs the connection. Legitimate traffic is allowed and reencrypted before being sent to MedRepo.

Note When decrypting traffic in an inline deployment by re-signing the server certificate, the ASA FirePOWER module acts as a man-in-the-middle. It creates two SSL sessions, one between client and ASA FirePOWER module, one between ASA FirePOWER module and server. As a result, each session contains different cryptographic session details.

The following steps occur:

1. The user submits the plain text request (help). The client encrypts this (AaBb) and sends the encrypted traffic to the Requests department server.
2. The internal router receives the traffic and routes it to the Requests department server.
3. The ASA FirePOWER module uses the session key obtained with a re-signed server certificate and private key to decrypt this traffic to plain text (help).

The access control policy continues to process the decrypted traffic with the custom intrusion policy and does not find an improper request. The module reencrypts the traffic (CcDd), allowing it to pass. It generates a connection event after the session ends.

1. The external router receives the traffic and routes it to the Requests department server.
2. The Requests department server receives the encrypted information (CcDd) and decrypts it to plain text (help).
3. The ASA FirePOWER module receives the connection event with information about the encrypted and decrypted traffic.

Note Traffic encrypted with a re-signed server certificate causes client browsers to warn that the certificate is not trusted. To avoid this, add the CA certificate to the organization's domain root trusted certificates store or the client trusted certificates store.

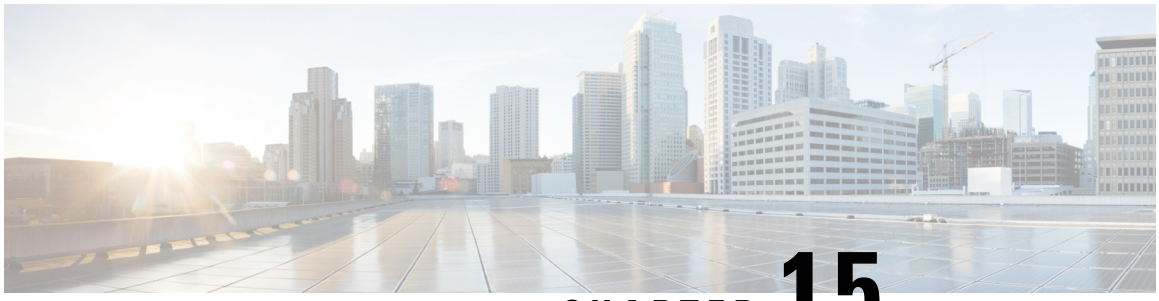
In contrast, any decrypted traffic that contains information that does not meet regulatory requirements is dropped. The system logs the connection and the non-conforming information.

The following steps occur:

1. The user submits the plain text request (regs), which does not comply with regulatory requirements. The client encrypts this (EeFf) and sends the encrypted traffic to the Requests department server.
2. The internal router receives the traffic and routes it to the Requests department server.
3. The ASA FirePOWER module uses the session key obtained with a re-signed server certificate and private key to decrypt this traffic to plain text (regs).

The access control policy continues to process the decrypted traffic with the custom intrusion policy and finds an improper request. The module blocks the traffic, then generates an intrusion event. It generates a connection event after the session ends.

1. The external router does not receive the blocked traffic.
2. The Requests department server does not receive the blocked traffic.
3. The ASA FirePOWER module receives a connection event with information about the encrypted and decrypted traffic, and an intrusion event for the improper request.



CHAPTER 15

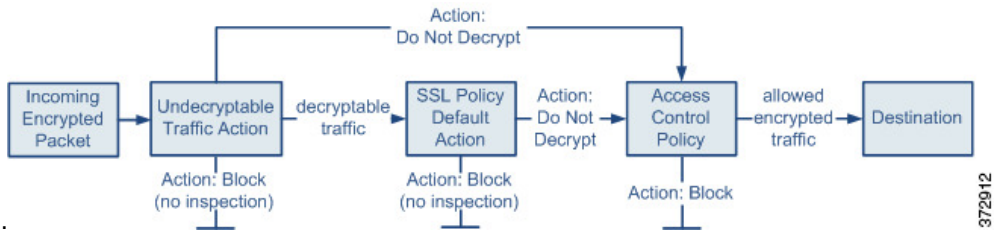
Getting Started with SSL Policies

This chapter explains how to create and apply a simple SSL policy. It also contains basic information on managing SSL policies: editing, updating, comparing, and so on.

About SSL Policies

An *SSL policy* determines how the system handles encrypted traffic on your network. You can configure one or more SSL policies. You associate an SSL policy with an access control policy, then apply the access control policy. When the ASA FirePOWER module detects a TCP handshake, the access control policy first handles and inspects the traffic. If it subsequently identifies an SSL-encrypted session over the TCP connection, the SSL policy takes over, handling and decrypting the encrypted traffic. You can have one currently applied SSL policy.

The simplest SSL policy, as shown in the following diagram, directs the device where it is applied to handle encrypted traffic with a single default action. You can set the default action to block decryptable traffic without further inspection, or inspect undecrypted decryptable traffic with access control. The system can then either allow or block the encrypted traffic. If the ASA FirePOWER module detects undecryptable traffic, it either blocks the traffic without further inspection or does not decrypt it, inspecting it with access control.



A more complex SSL policy can handle different types of undecryptable traffic with different actions, control traffic based on whether a certificate authority (CA) issued or trusts the encryption certificate, and use SSL rules to exert granular control over encrypted traffic logging and handling. These rules can be simple or complex, matching and inspecting encrypted traffic using multiple criteria. After you create a basic SSL policy, see the following chapters for more information on tailoring it to your deployment:

- Managing Reusable Objects, on page 17 describes how to configure reusable public key infrastructure (PKI) objects and other SSL inspection-related objects to enhance encrypted traffic control and decrypt traffic.
- Logging Connections in Network Traffic, on page 381 describes how to configure logging for encrypted traffic, whether decryptable or undecryptable.
- Applying Decryption Settings Using Access Control, on page 188 describes how to associate an SSL policy with an access control policy.
- Getting Started with Access Control Policies, on page 63 describes how to apply an access control policy to a device.
- Tuning Traffic Flow Using Access Control Rules, on page 89 describes how to configure access control rules to inspect decrypted traffic.
- Getting Started with SSL Rules, on page 195 describes how to configure SSL rules to handle and log encrypted traffic.
- Tuning Traffic Decryption Using SSL Rules, on page 215 describes how to configure SSL rule conditions to better match specific encrypted traffic.

Creating a Basic SSL Policy

License: Any

When you create a new SSL policy you must, at minimum, give it a unique name and specify a policy default action. You have the following options when selecting a default action for a new policy:

- **Do not decrypt** creates a policy with the Do not decrypt default action.
- **Block** creates a policy with the Block default action.
- **Block with reset** creates a policy with the Block with reset default action.

After you create the SSL policy, you can modify the default action. For guidance on choosing a default action, see Setting Default Handling and Inspection for Encrypted Traffic, on page 183.

The new SSL policy also contains default actions for traffic the system cannot decrypt: either it inherits the default action you just selected for undecryptable traffic, blocks it, or does not decrypt the traffic and inspects it with access control. You can modify the undecryptable traffic actions after you create the SSL policy. For guidance on selecting undecryptable traffic actions, see Setting Default Handling for Undecryptable Traffic, on page 184

On the SSL policy page (**Configuration > ASA FirePOWER Configuration > Policies > SSL**) you can view all your current SSL policies by name with optional description. Options on this page allow you to compare policies, create a new policy, copy a policy, view a report that lists all of the most recently saved settings in each policy, edit a policy, or delete a policy.

The following table describes the actions you can take to manage your policies on the SSL Policy page:

Table 34: SSL Policy Management Actions

To...	You can...
create a new SSL policy	click **New Policy**. See Creating a Basic SSL Policy, on page 182 for more information.
modify the settings in an existing SSL policy	click the edit icon ( ). See Editing an SSL Policy, on page 186 for more information.
compare SSL policies	click **Compare Policies**. See Comparing SSL Policies, on page 190 for more information.
copy an SSL policy	click the copy icon ( ). See Editing an SSL Policy, on page 186 for more information on editing a copied policy.
view a PDF report that lists the current configuration settings in an SSL policy	click the report icon ( ) . See Generating a Report of Current Traffic Decryption Settings, on page 189 for more information.
delete an SSL policy	click the delete icon ( ), then click **OK**. When prompted whether to continue, you are also informed if another user has unsaved changes in the policy.

To create an SSL policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **SSL**.

The **SSL Policy** page appears.

Step 2 Give the policy a unique **Name** and, optionally, a **Description**.

You can use all printable characters, including spaces and special characters

Step 3 Specify the **Default Action**.

Note that you can modify your selected default action after you create your SSL policy. See Setting Default Handling and Inspection for Encrypted Traffic, on page 183 for more information.

Step 4 Click **Store ASA FirePOWER Changes**.

The **SSL Policy Editor** page appears. See Editing an SSL Policy, on page 186 for more information.

Setting Default Handling and Inspection for Encrypted Traffic

License: Any

The default action for an SSL policy determines how the system handles decryptable encrypted traffic that does not match any non-Monitor rule in the policy. When you apply an SSL policy that does not contain any SSL rules, the default action determines how all decryptable traffic on your network is handled. SeeUnderstanding Traffic Decryption, on page 165 for more information on how the system handles undecryptable encrypted traffic.

The following table lists the default actions you can choose, as well as their effect on encrypted traffic. Note that the system does not perform any kind of inspection on encrypted traffic blocked by the default action.

:

Table 35: SSL Policy Default Actions

Default Action	Effect on Encrypted Traffic
Block	block the SSL session without further inspection
Block with reset	block the SSL session without further inspection and reset the TCP connection
Do not decrypt	inspect the encrypted traffic with access control

When you first create an SSL policy, logging connections that are handled by the default action is disabled by default. You can change this, as well as the default action itself, after you create the policy.

The following procedure explains how to set the default action for an SSL policy while editing the policy. See Editing an SSL Policy, on page 186 for the complete procedure for editing an SSL policy.

To set the default action of an SSL policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **SSL**.

The **SSL policy** page appears.

Step 2 Click the **edit** icon next to the SSL policy you want to configure.

The **SSL policy editor** appears.

Step 3 Select a **Default Action**. See the Setting Default Handling and Inspection for Encrypted Traffic, on page 183 table for more information.

Step 4 Configure logging options for the default action as described in Setting Default Logging for Encrypted and Undecryptable Connections, on page 395.

Step 5 Click **Store ASA FirePOWER Changes**.

The **SSL Policy Editor** page appears. See Editing an SSL Policy, on page 186 for more information.

Setting Default Handling for Undecryptable Traffic

License: Any

You can set undecryptable traffic actions at the SSL policy level to handle certain types of encrypted traffic the system cannot decrypt or inspect. When you apply an SSL policy that does not contain any SSL rules, the undecryptable traffic actions determine how all undecryptable encrypted traffic on your network is handled.

Depending on the type of undecryptable traffic, you can choose to:

- block the connection
- block the connection, then reset it
- inspect the encrypted traffic with access control
- inherit the default action from the SSL policy

The following table describes the undecryptable traffic types:

Table 36: Undecryptable Traffic Types

Type	Description	Default Action	Available Actions
Compressed Session	The SSL session applies a data compression method.	Inherit default action	Do not decrypt Block Block with reset Inherit default action
SSLv2 Session	The session is encrypted with SSL version 2. Note that traffic is decryptable if the client hello message is SSL 2.0, and the remainder of the transmitted traffic is SSL 3.0.	Inherit default action	Do not decrypt Block Block with reset Inherit default action
Unknown Cipher Suite	The system does not recognize the cipher suite.	Inherit default action	Do not decrypt Block Block with reset Inherit default action
Unsupported Cipher Suite	The system does not support decryption based on the detected cipher suite.	Inherit default action	Do not decrypt Block Block with reset Inherit default action
Session not cached	The SSL session has session reuse enabled, the client and server reestablished the session with the session identifier, and the system did not cache that session identifier.	Inherit default action	Do not decrypt Block Block with reset Inherit default action
Handshake Errors	An error occurred during SSL handshake negotiation.	Inherit default action	Do not decrypt Block Block with reset Inherit default action
Decryption Errors	An error occurred during traffic decryption.	Block	Block Block with Reset

When you first create an SSL policy, logging connections that are handled by the default action is disabled by default. Because the logging settings for the default action also apply to undecryptable traffic handling, logging

connections handled by the undecryptable traffic actions is disabled by default. For more information on configuring default logging, see Logging Decryptable Connections with SSL Rules, on page 394.

Note The system cannot decrypt traffic if an HTTP proxy is positioned between a client and your device, and the client and server establish a tunneled SSL connection using the CONNECT HTTP method. The **Handshake Errors** undecryptable action determines how the system handles this traffic. See Decrypt Actions: Decrypting Traffic for Further Inspection, on page 206 for more information.

Note that if your browser uses certificate pinning to verify a server certificate, you cannot decrypt this traffic by re-signing the server certificate. Because you can still inspect this traffic with access control, it is not handled by the undecryptable traffic actions. If you want to allow this traffic, configure an SSL rule with the Do not decrypt action to match the server certificate common name or distinguished name.

To set the default handling for undecryptable traffic:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **SSL**.

The **SSL Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the SSL policy you want to configure.

The **SSL policy editor** appears.

Step 3 Select the **Undecryptable Actions** tab.

The **Undecryptable Actions** tab appears.

Step 4 For each field, select the action you want to take on the type of undecryptable traffic, or if you want to apply the SSL policy's default action. See the Table 35: SSL Policy Default Actions , on page 184 table for more information.

Step 5 Click **Store ASA FirePOWER Changes**.

You must apply the associated access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Editing an SSL Policy

License: Any

On the **SSL policy** editor, you can configure your policy and organize SSL rules. To configure an SSL policy, you must give the policy a unique name and specify a default action. You can also:

- add, edit, delete, enable, and disable SSL rules
- add trusted CA certificates
- determine the handling for encrypted traffic the system cannot decrypt
- log traffic that is handled by the default action and undecryptable traffic actions

After you create or modify an SSL policy, you can associate it with an access control policy, then apply the access control policy. You can also create custom user roles that allow you to assign different permissions to different users for configuring, organizing, and applying policies.

The following table summarizes the configuration actions you can take on the SSL policy editor.

Table 37: SSL Policy Configuration Actions

To...	You can...
modify the policy name or description	click the name or description field, delete any characters as needed, then type the new name or description.
set the default action	find more information at Setting Default Handling and Inspection for Encrypted Traffic, on page 183.
set default handling for undecryptable traffic	find more information at Setting Default Handling for Undecryptable Traffic, on page 184.
log connections for the default action and undecryptable traffic actions	find more information at Logging Decryptable Connections with SSL Rules, on page 394.
add trusted CA certificates	find more information at Trusting External Certificate Authorities, on page 234.
assign different rights to different users	find more information at Collecting Prerequisite Information to Configure SSL Rules, on page 170.
save your policy changes	click **Save**.
cancel your policy changes	click **Cancel, then, if you have made changes, click OK.**
add a rule to a policy	click **Add Rule** . See Understanding and Creating SSL Rules, on page 198 for more information. **Tip** You can also right-click a blank area in the row for a rule and select **Insert new rule**.
edit an existing rule	click the edit icon ( ) next to the rule. See Understanding and Creating SSL Rules, on page 198; for more information. **Tip** You can also right-click the rule and select **Edit**.
delete a rule	click the delete icon ( ) next to the rule, then click **OK**. **Tip** You can also right-click a blank area in the row for a selected rule, select **Delete**, then click **OK** to delete one or more selected rules.
enable or disable an existing rule	right-click a selected rule, select **State**, then select **Disable** or **Enable**. Disabled rules are grayed and marked (disabled) beneath the rule name.
display the configuration page for a specific rule attribute	click the name, value, or icon in the column for the condition on the row for the rule. For example, click the name or value in the **Source Networks** column to display the Networks page for the selected rule. See Tuning Traffic Decryption Using SSL Rules, on page 215 for more information.

When you change your configuration, a message indicates that you have unsaved changes. To retain your changes, you must save the policy before exiting the policy editor. If you attempt to exit the policy editor without saving your changes, you are cautioned that you have unsaved changes; you can then discard your changes and exit the policy, or return to the policy editor.

To protect the privacy of your session, after sixty minutes of inactivity on the policy editor, changes to your policy are discarded and you are returned to the SSL Policy page. After the first thirty minutes of inactivity, a message appears and updates periodically to provide the number of minutes remaining before changes are discarded. Any activity on the page cancels the timer.

When multiple users edit the same policy concurrently, a message on the policy editor identifies other users who have unsaved changes. Any user who attempts to save changes is cautioned that his changes will overwrite changes by other users. When the same policy is saved by multiple users, the last saved changes are retained.

To edit an SSL policy:

Step 1 Select **Configuration ASA FirePOWER Configuration Policies SSL**.

The **SSL Policy** page appears.

Step 2 You have the following choices:

- To configure your policy, you can take any of the actions summarized in the table in Setting Default Handling and Inspection for Encrypted Traffic, on page 183Getting Started with SSL Rules, on page 195.
- To organize rules in your policy, you can take any of the actions described in Ordering SSL Rules to Improve Performance and Avoid Preemption, on page 211.

Step 3 Save or discard your configuration. You have the following choices:

- To save your changes and continue editing, click **Store ASA FirePOWER Changes**.
- To discard your changes, click **Cancel** and, if prompted, click **OK**.

Your changes are discarded and the **SSL Policy** page appears.

Applying Decryption Settings Using Access Control

License: Any

After making any changes to an SSL policy, you must apply the access control policy it is associated with. For more information, see Deploying Configuration Changes, on page 73.

Keep the following points in mind when applying SSL policies:

- You cannot delete an SSL policy that has been applied or is currently applying.
- Applying an access control policy automatically applies the associated SSL policy. You cannot apply an SSL policy independently.

Note In a passive deployment, the system cannot influence the flow of traffic. If you attempt to apply an access control policy that references an SSL policy that blocks encrypted traffic, or that is configured to decrypt traffic by re-signing the server certificate, the system displays a warning. Also, passive deployments do not support decrypting traffic encrypted with the ephemeral Diffie-Hellman (DHE) or the elliptic curve Diffie-Hellman (ECDHE) cipher suites.

To associate an SSL policy with an access control policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the access control policy you want to configure.

The **access control policy** editor appears.

Step 3 Select the **Advanced** tab.

Advanced settings for the access control policy appear.

Step 4 Click the **edit** icon ( ) next to General Settings.

The **General Settings pop-up** window appears.

Step 5 Select an SSL policy from the **SSL Policy to use for inspecting encrypted connections** drop-down.

Step 6 Click **OK**.

Advanced settings for the access control policy appear.

Step 7 Click **Store ASA FirePOWER Changes**.

You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Generating a Report of Current Traffic Decryption Settings

License: Any

An **SSL policy report** is a record of the policy and rules configuration at a specific point in time. You can use the report for auditing purposes or to inspect the current configuration.

Tip You can also generate an SSL comparison report that compares a policy with the currently applied policy or with another policy. For more information, see Comparing SSL Policies, on page 190.

An SSL policy report contains the sections described in the following table.

Table 38: SSL Policy Report Sections

Section	Description
Title Page	Identifies the name of the policy report, the date and time the policy was last modified, and the name of the user who made that modification.
Table of Contents	Describes the contents of the report.
Policy Information	Provides the name and description of the policy, the name of the user who last modified the policy, and the date and time the policy was last modified.
Default Action	Provides the default action.
Default Logging	Provides the default connection logging settings.
Rules	Provides the rule action and conditions for each rule in the policy, by rule category.
Trusted CA Certificates	Provides the CA certificates that are automatically trusted if detected traffic is encrypted using these certificates or other certificates within the chain of trust.
Undecryptable Actions	Provides the action taken on detected types of traffic that cannot be decrypted.
Referenced Objects	Provides the name and configuration of all individual objects and group objects used in the policy, by type of condition (networks, ports, and so on) where the object is configured.

To view an SSL policy report:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **SSL**.

The **SSL Policy** page appears.

Step 2 Click the **report** icon ( ) next to the policy for which you want to generate a report. Remember to save any changes before you generate an SSL policy report; only saved changes appear in the report.

The system generates the report. Depending on your browser settings, the report may appear in a pop-up window, or you may be prompted to save the report to your computer.

Comparing SSL Policies

License: Any

To review policy changes for compliance with your organization's standards or to optimize system performance, you can examine the differences between two SSL policies. You can compare any two policies or the currently applied policy with another policy. Optionally, after you compare, you can then generate a PDF report to record the differences between the two policies.

There are two tools you can use to compare policies:

- The comparison view displays only the differences between two policies in a side-by-side format. The name of each policy appears in the title bar on the left and right sides of the comparison view except when you select **Running Configuration**, in which case a blank bar represents the currently active policy.

You can use this to view and navigate both policies on the web interface, with their differences highlighted.

- The comparison report creates a record of only the differences between two policies in a format similar to the policy report, but in PDF format.

You can use this to save, copy, print, and share your policy comparisons for further examination.

Using the SSL Policy Comparison View

License: Any

The comparison view displays both policies in a side-by-side format, with each policy identified by name in the title bar on the left and right sides of the comparison view. When comparing two policies other than the running configuration, the time of last modification and the last user to modify are displayed with the policy name. Differences between the two policies are highlighted:

- Blue indicates that the highlighted setting is different in the two policies, and the difference is noted in red text.
- Green indicates that the highlighted setting appears in one policy but not the other.

You can perform any of the actions in the following table.

Table 39: SSL Policy Comparison View Actions

To...	You can...
navigate individually through changes	click **Previous** or **Next** above the title bar. The **double-arrow** icon centered between the left and right sides moves, and the Difference number adjusts to identify which difference you are viewing.
generate a new policy comparison view	click **New Comparison.** The **Select Comparison** window appears. Using the SSL Policy Comparison Report for more information.
generate a policy comparison report	click **Comparison Report**. The policy comparison report creates a PDF document that lists only the differences between the two policies.

Using the SSL Policy Comparison Report

License: Any

An SSL policy comparison report is a record of all differences between two SSL policies or a policy and the currently applied policy identified by the policy comparison view, presented in PDF format. You can use this report to further examine the differences between two policy configurations and to save and disseminate your findings.

You can generate an SSL policy comparison report from the comparison view for any policies to which you have access. Remember to save any changes before you generate a policy report; only saved changes appear in the report.

The format of the policy comparison report is the same as the policy report with one exception: the policy report contains all configurations in the policy, and the policy comparison report lists only those configurations that differ between the policies. An SSL policy comparison report contains the sections described in Table 38: SSL Policy Report Sections , on page 190.

Tip You can use a similar procedure to compare access control, network analysis, intrusion, file, system, or health policies.

To compare two SSL policies:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **SSL**.

The **SSL Policy** appears.

Step 2 Click **Compare Policies**.

The **Select Comparison** window appears.

Step 3 From the **Compare Against** drop-down list, select the type of comparison you want to make:

- To compare two different policies, select **Other Policy**.

The page refreshes and the Policy A and Policy B drop-down lists appear.

- To compare another policy to the currently active policy, select **Running Configuration.**

The page refreshes and the **Target/Running Configuration A** and **Policy B** drop-down lists appear.

Step 4 Depending on the comparison type you selected, you have the following choices:

- If you are comparing two different policies, select the policies you want to compare from the Policy A and Policy B drop-down lists.
- If you are comparing the running configuration to another policy, select the second policy from the Policy B drop-down list.

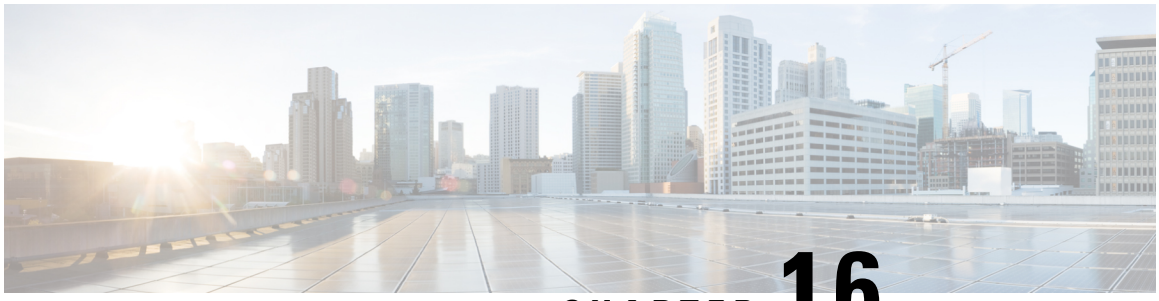
Step 5 Click **OK** to display the policy comparison view.

The **comparison view** appears.

Step 6 Optionally, click **Comparison Report** to generate the SSL policy comparison report.

The SSL policy comparison report appears. Depending on your browser settings, the report may appear in a pop-up window, or you may be prompted to save the report to your computer.

What to do next



CHAPTER 16

Getting Started with SSL Rules

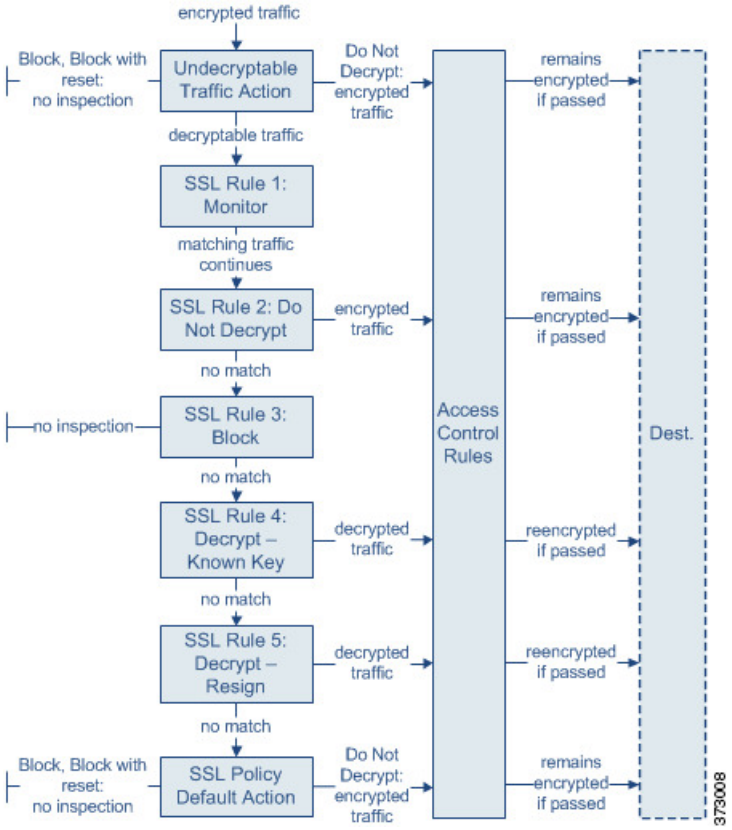
Within an SSL policy, *SSL rules* provide a granular method of handling encrypted traffic, whether blocking the traffic without further inspection, not decrypting the traffic and inspecting it with access control, or decrypting the traffic for access control analysis.

About SSL Rules

The ASA FirePOWER module matches traffic to SSL rules in the order you specify. In most cases, the module handles encrypted traffic according to the *first* SSL rule where *all* the rule's conditions match the traffic. Conditions can be simple or complex; you can control traffic by security zone, network or geographical location, port, application, requested URL, user, certificate, certificate distinguished name, certificate status, cipher suite, or encryption protocol version.

Each rule also has an *action* , which determines whether you monitor, block, or inspect matching traffic with access control, optionally after decrypting matching traffic. Note that the module does **not** further inspect encrypted traffic it blocks. It does inspect encrypted and undecryptable traffic with access control. However, some access control rule conditions require unencrypted traffic, so encrypted traffic may match fewer rules. Also, by default, the module disables intrusion and file inspection of encrypted payloads.

The following scenario summarizes the ways that SSL rules handle traffic in an inline deployment.



In this scenario, traffic is evaluated as follows:

- **Undecryptable Traffic Action** evaluates encrypted traffic first. For traffic the module cannot decrypt, the module either blocks it without further inspection or passes it for access control inspection. Encrypted traffic that does not match continues to the next rule.
- **SSL Rule 1: Monitor** evaluates encrypted traffic next. Monitor rules track and log encrypted traffic but do not affect traffic flow. The module continues to match traffic against additional rules to determine whether to permit or deny it.
- **SSL Rule 2: Do Not Decrypt** evaluates encrypted traffic third. Matching traffic is not decrypted; the module inspects this traffic with access control, but not file or intrusion inspection. Traffic that does not match continues to the next rule.
- **SSL Rule 3: Block** evaluates encrypted traffic fourth. Matching traffic is blocked without further inspection. Traffic that does not match continues to the next rule.
- **SSL Rule 4: Decrypt - Known Key** evaluates encrypted traffic fifth. Matching traffic incoming to your network is decrypted using a private key you upload. The decrypted traffic is then evaluated against access control rules. Access control rules handle decrypted and unencrypted traffic identically. The module can block traffic as a result of this additional inspection. All remaining traffic is reencrypted before being allowed to the destination. Traffic that does not match the SSL rule continues to the next rule.
- **SSL Rule 5: Decrypt - Resign** is the final rule. If traffic matches this rule, the module re-signs the server certificate with an uploaded CA certificate, then acts as a man-in-the-middle to decrypt traffic. The decrypted traffic is then evaluated against access control rules. Access control rules treat decrypted and unencrypted traffic identically. The module can block traffic as a result of this additional inspection.

All remaining traffic is reencrypted before being allowed to the destination. Traffic that does not match the SSL rule continues to the next rule.

- **SSL Policy Default Action** handles all traffic that does not match any of the SSL rules. The default action either blocks encrypted traffic without further inspection or does not decrypt it, passing it for access control inspection.

Configuring Supporting Inspection Information

License: Any

You must create reusable public key infrastructure (PKI) objects to control encrypted traffic based on encrypted session characteristics and decrypt encrypted traffic. You can add this information on the fly when uploading trusted certificate authority (CA) certificates to the SSL policy and creating SSL rule conditions, creating the associated object in the process. However, configuring these objects ahead of time reduces the chance of improper object creation.

Decrypting Encrypted Traffic with Certificates and Paired Keys

The ASA FirePOWER module can decrypt incoming encrypted traffic if you configure an internal certificate object by uploading the server certificate and private key used to encrypt the session. If you reference that object in an SSL rule with an action of **Decrypt - Known Key** and traffic matches that rule, the module uses the uploaded private key to decrypt the session.

The module can also decrypt outgoing traffic if you configure an internal CA object by uploading a CA certificate and private key. If you reference that object in an SSL rule with an action of **Decrypt - Resign** and traffic matches that rule, the module re-signs the server certificate passed to the client browser, then acts as a man-in-the-middle to decrypt the session.

Controlling Traffic Based on Encrypted Session Characteristics

The ASA FirePOWER module can control encrypted traffic based on the cipher suite or server certificate used to negotiate the session. You can configure one of several different reusable objects and reference the object in an SSL rule condition to match traffic. The following table describes the different types of reusable objects you can configure:

If you configure...	You can control encrypted traffic based on whether...
a cipher suite list containing one or more cipher suites	the cipher suite used to negotiate the encrypted session matches a cipher suite in the cipher suite list
a trusted CA object by uploading a CA certificate your organization trusts	the trusted CA trusts the server certificate used to encrypt the session, whether: • the CA issued the certificate directly • the CA issued a certificate to an intermediate CA that issued the server certificate
an external certificate object by uploading a server certificate	the server certificate used to encrypt the session matches the uploaded server certificate

If you configure...	You can control encrypted traffic based on whether...
a distinguished name object containing a certificate subject or issuer distinguished name	the subject or issuer common name, country, organization, or organizational unit on the certificate used to encrypt the session matches the configured distinguished name

See the following for more information:

- Working with Geolocation Objects, on page 60
- Working with Trusted Certificate Authority Objects, on page 57
- Working with External Certificate Objects, on page 58
- Working with Distinguished Name Objects, on page 51

Understanding and Creating SSL Rules

License: Any

Within an SSL policy, SSL rules provide a granular method of handling network traffic. In addition to its unique name, each SSL rule has the following basic components.

State

By default, rules are enabled. If you disable a rule, the module does not use it to evaluate network traffic, and stops generating warnings and errors for that rule.

Position

Rules in an SSL policy are numbered, starting at 1. The module matches traffic to rules in top-down order by ascending rule number. With the exception of Monitor rules, the first rule that traffic matches is the rule that handles that traffic.

Conditions

Conditions specify the specific traffic the rule handles. Conditions can match traffic by security zone, network or geographical location, port, application, requested URL, user, certificate, certificate subject or issuer, certificate status, cipher suite, or encryption protocol version. Conditions can be simple or complex; their use can depends on device licenses.

Action

A rule's action determines how the module handles matching traffic. You can monitor, trust, block, or decrypt matching traffic. Decrypted traffic is subject to further inspection. Note that the module does **not** perform inspection on blocked or trusted encrypted traffic.

Logging

A rule's logging settings govern the records the module keeps of the traffic it handles. You can keep a record of traffic that matches a rule. You can log a connection when the module blocks an encrypted session or allows it to pass uninspected, according to the settings in an SSL policy. You can also force the module to log connections that it decrypts for further evaluation by access control rules, regardless of how the module later handles or inspects the traffic. You can log connections to the module log (syslog) or to an SNMP trap server.

Tip Properly creating and ordering SSL rules is a complex task, but one that is essential to building an effective deployment. If you do not plan your policy carefully, rules can preempt other rules, require additional licenses, or contain invalid configurations. To help ensure that the module handles traffic as you expect, the SSL policy interface has a robust warning and error feedback system for rules. For more information, see Troubleshooting SSL Rules, on page 210.

To create or modify an SSL rule:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **SSL**.

The **SSL Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the SSL policy where you want to add a rule.

The **SSL policy editor** appears, focused on the Rules tab.

Step 3 You have the following options:

- To add a new rule, click **Add Rule**.
- To edit an existing rule, click the edit icon ( ) next to the rule you want to edit.

The SSL rule editor appears.

Step 4 Type a **Name** for the rule.

Each rule must have a unique name. You can use up to thirty printable characters, including spaces and special characters, with the exception of the colon (:).

Step 5 Configure the rule components, as summarized above. You can configure the following, or accept the defaults:

- Specify whether the rule is **Enabled**.
- Specify the rule position; see Specifying an SSL Rules Order of Evaluation, on page 200

  .
- Select a rule **Action**; see Using Rule Actions to Determine Encrypted Traffic Handling and Inspection, on page 202.
- Configure the rule's conditions; see Using Conditions to Specify the Encrypted Traffic a Rule Handles, on page 200.
- Specify **Logging** options; see Logging Decryptable Connections with SSL Rules, on page 394.

Step 6 Click **Save** to save the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Specifying an SSL Rules Order of Evaluation

License: Any

When you first create an SSL rule, you specify its position using the **Insert** drop-down list in the rule editor. SSL rules in an SSL policy are numbered, starting at 1. The ASA FirePOWER module matches traffic to SSL rules in top-down order by ascending rule number.

In most cases, the module handles network traffic according to the *first* SSL rule where *all* the rule's conditions match the traffic. Except in the case of Monitor rules (which log traffic but do not affect traffic flow), the module does **not** continue to evaluate traffic against additional, lower-priority rules after that traffic matches a rule.

Tip Proper SSL rule order reduces the resources required to process network traffic, and prevents rule preemption. Although the rules you create are unique to every organization and deployment, there are a few general guidelines to follow when ordering rules that can optimize performance while still addressing your needs. For more information, see Ordering SSL Rules to Improve Performance and Avoid Preemption, on page 211.

In addition to ordering rules by number, you can group rules by category. By default the module provides three categories: Administrator, Standard, and Root. You can add custom categories, but you cannot delete the ASA FirePOWER module-provided categories or change their order. For information on changing the position or category of an existing rule, see Changing an SSL Rules Position or Category, on page 208.

To add a rule to a category while editing or creating a rule:

In the SSL rule editor, from the **Insert** drop-down list, select **Into Category**, then select the category you want to use.

When you save the rule, it is placed last in that category.

Specifying an SSL Rules Order of Evaluation

To position a rule by number while editing or creating a rule:

In the SSL rule editor, from the **Insert** drop-down list, select **above rule** or **below rule**, then type the appropriate rule number.

When you save the rule, it is placed where you specified.

Using Conditions to Specify the Encrypted Traffic a Rule Handles

License: feature dependent

An SSL rule's conditions identify the type of encrypted traffic that rule handles. Conditions can be simple or complex, and you can specify more than one condition type per rule. Only if traffic meets all the conditions in a rule does the rule apply to the traffic.

If you do not configure a particular condition for a rule, the module does not match traffic based on that criterion. For example, a rule with a certificate condition but no version condition evaluates traffic based on the server certificate used to negotiate the session, regardless of the session SSL or TLS version.

When you add or edit an SSL rule, use the tabs on the left side of the lower portion of the rule editor to add and edit rule conditions. The conditions you can add to an SSL rule are described in the following table.

Table 40: SSL Rule Condition Types

This Condition...	Matches Encrypted Traffic...	Details
Zones	entering or leaving a device via an interface in a specific security zone	A security zone is a logical grouping of one or more interfaces according to your deployment and security policies. To build a zone condition, see Controlling Encrypted Traffic by Network Zone, on page 216.
Networks	by its source or destination IP address, country, or continent	You can explicitly specify IP addresses. The geolocation feature also allows you to control traffic based on its source or destination country or continent. To build a network condition, see Controlling Encrypted Traffic by Network or Geographical Location, on page 218.
Ports	by its source or destination port	You can control encrypted traffic based on the TCP port. To build a port condition, see Controlling Encrypted Traffic by Port, on page 219.
Users	by the user involved in the session	You can control encrypted traffic based on the LDAP user logged into a host involved in an encrypted, monitored session. You can control traffic based on individual users or groups retrieved from a Microsoft Active Directory server. To build a user condition, see Controlling Encrypted Traffic Based on User, on page 221.
Applications	by the application detected in a session	You can control access to individual applications in encrypted sessions, or filter access according to basic characteristics: type, risk, business relevance, and categories. To build an application condition, see Controlling Encrypted Traffic Based on Application, on page 222.
Categories	by the URL requested in the session, based on the certificate subject distinguished name	You can limit the websites that users on your network can access based on the URL's general classification and risk level. To build a URL condition, see Controlling Encrypted Traffic by URL Category and Reputation, on page 227.
Distinguished Names	by the subject or issuer distinguished name of the server certificate used to negotiate the encrypted session	You can control encrypted traffic based on the CA that issued a server certificate, or the server certificate holder. To build a distinguished name condition, see Controlling Encrypted Traffic by Certificate Distinguished Name, on page 230.
Certificates	by the server certificate used to negotiate the encrypted session	You can control encrypted traffic based on the server certificate passed to the user's browser in order to negotiate the encrypted session. To build a certificate condition, see Controlling Encrypted Traffic by Certificate Status, on page 233.
Certificate Status	by properties of the server certificate used to negotiate the encrypted session	You can control encrypted traffic based on a server certificate's status. To build a certificate status condition, see Controlling Encrypted Traffic by Certificate Status, on page 233.
Cipher Suites	by the cipher suite used to negotiate the encrypted session	You can control encrypted traffic based on the cipher suite selected by the server to negotiate the encrypted session. To build a cipher suite condition, see Controlling Encrypted Traffic by Cipher Suite, on page 238.

This Condition...	Matches Encrypted Traffic...	Details
Versions	by the version of SSL or TLS used to encrypt the session	You can control encrypted traffic based on the version of SSL or TLS used to encrypt the session. To build a version condition, see Controlling Traffic by Encryption Protocol Version, on page 239.

Note that while you can control and inspect encrypted traffic, controlling traffic using detected application, URL category, or user requires additional licenses. Also, overly complex rules can consume excessive resources and in some cases prevent you from applying the policy. For more information, see Troubleshooting SSL Rules, on page 210.

Using Rule Actions to Determine Encrypted Traffic Handling and Inspection

License: Any

Every SSL rule has an associated action that determines the following for matching encrypted traffic:

- handling — foremost, the rule action governs whether the ASA FirePOWER module will monitor, trust, block, or decrypt encrypted traffic that matches the rule's conditions
- logging — the rule action determines when and how you can log details about matching encrypted traffic.

Your SSL inspection configuration handles, inspects, and logs decrypted traffic:

- The SSL policy's undecryptable actions handle traffic that the ASA FirePOWER module cannot decrypt; see Setting Default Handling for Undecryptable Traffic, on page 184.
- The policy's default action handles traffic that does not meet the condition of any non-Monitor SSL rule; see Setting Default Handling and Inspection for Encrypted Traffic, on page 183.

You can log a connection event when the ASA FirePOWER module blocks or trusts an encrypted session. You can also force the module to log connections that it decrypts for further evaluation by access control rules, regardless of how the module later handles or inspects the traffic. Connection logs for encrypted sessions contain details about the encryption, such as the certificate used to encrypt that session. You can log only end-of-connection events, however:

- for blocked connections (Block, Block with reset), the module immediately ends the sessions and generates an event
- for trusted connections (Do not decrypt), the module generates an event when the session ends

Monitor Action: Postponing Action and Ensuring Logging

License: Any

The **Monitor** action does not affect encrypted traffic flow; matching traffic is neither immediately permitted nor denied. Rather, traffic is matched against additional rules, if present, to determine whether to trust, block, or decrypt it. The first non-Monitor rule matched determines traffic flow and any further inspection. If there are no additional matching rules, the ASA FirePOWER module uses the default action.

Because the primary purpose of Monitor rules is to track network traffic, the module automatically logs end-of connection events for monitored traffic. That is, the module always logs the end of the connection, regardless of the logging configuration of the rule or default action that later handles the connection. In other words, if a

packet matches a Monitor rule, the connection is always logged, even if the packet matches no other rules and you do not enable logging on the default action.

Do Not Decrypt Action: Passing Encrypted Traffic Without Inspection

License: Any

The **Do not decrypt** action passes encrypted traffic for evaluation by the access control policy's rules and default action. Because some access control rule conditions require unencrypted traffic, this traffic may match fewer rules. The module cannot perform deep inspection on encrypted traffic, such as intrusion or file inspection.

Blocking Actions: Blocking Encrypted Traffic Without Inspection

License: Any

The **Block** and **Block with reset** actions are analogous to the access control rule actions Block and Block with reset. These actions prevent the client and server from establishing the SSL-encrypted session and passing encrypted traffic. Block with reset rules also reset the connection.

Note that the ASA FirePOWER module does not display the configured response page for blocked encrypted traffic. Instead, users requesting prohibited URLs have their connection either reset or time out. See Displaying a Custom Web Page for Blocked URLs, on page 124 for more information.

Tip Note that you cannot use the Block or Block with reset action in a passive or inline (tap mode) deployment, as the device does not directly inspect the traffic. If you create a rule with the Block or Block with reset action that contains passive or inline (tap mode) interfaces within a security zone condition, the policy editor displays a warning icon (⚠) next to the rule.

Decrypt Actions: Decrypting Traffic for Further Inspection

License: Any

The **Decrypt - Known Key** and **Decrypt - Resign** actions decrypt encrypted traffic. The ASA FirePOWER module inspects decrypted traffic with access control. Access control rules handle decrypted and unencrypted traffic identically — you can detect and block intrusions, prohibited files, and malware. The module reencrypts allowed traffic before passing it to its destination.

When you configure the **Decrypt - Known Key** action, you can associate one or more server certificates and paired private keys with the action. If traffic matches the rule, and the certificate used to encrypt the traffic matches the certificate associated with the action, the module uses the appropriate private key to obtain the session encryption and decryption keys. Because you must have access to the private key, this action is best suited to decrypt traffic incoming to servers your organization controls.

Similarly, you can associate one Certificate Authority certificate and private key with the **Decrypt - Resign** action. If traffic matches this rule, the module re-signs the server certificate with the CA certificate, then acts as a man-in-the-middle. It creates two SSL sessions, one between client and device, one between device and server. Each session contains different cryptographic session details, and allows the module to decrypt and reencrypt traffic. This action is more suited for outgoing traffic, as you replace the certificate's private key with one you control to obtain the session keys.

Re-signing a server certificate involves either replacing the certificate's public key with a CA certificate public key, or replacing the entire certificate. Normally, if you replace an entire server certificate, the client browser warns the certificate is not signed by a trusted authority when establishing the SSL connection. However, if your client's browser trusts the CA in the policy, the browser does not warn that the certificate is not trusted. If the original server certificate is self-signed, the ASA FirePOWER module replaces the entire certificate, and trusts the re-signing CA, but the user's browser does not warn that the certificate is self-signed. In this case, replacing only the server certificate public key causes the client browser does warn that the certfcate is self-signed.

If you configure a rule with the **Decrypt - Resign** action, the rule matches traffic based on the referenced internal CA certificate's signature algorithm type, in addition to any configured rule conditions. Because you associate one CA certificate with a **Decrypt - Resign** action, you cannot create an SSL rule that decrypts multiple types of outgoing traffic encrypted with different signature algorithms. In addition, any external certificate objects and cipher suites you add to the rule must match the associated CA certificate encryption algorithm type.

For example, outgoing traffic encrypted with an elliptic curve (EC) algorithm matches a **Decrypt - Resign** rule only if the action references an EC-based CA certificate; you must add EC-based external certificates and cipher suites to the rule if you want to create certificate and cipher suite rule conditions. Similarly, a **Decrypt - Resign** rule that references an RSA-based CA certificate matches only outgoing traffic encrypted with an RSA algorithm; outgoing traffic encrypted with an EC algorithm does not match the rule, even if all other configured rule conditions match.

Note the following:

- You cannot use the **Decrypt - Known Key** action in a passive deployment if the cipher suite used to establish the SSL connection applies either the Diffie-Hellman ephemeral (DHE) or the elliptic curve Diffie-Hellman ephemeral (ECDHE) key exchange algorithm. If your SSL policy targets passive or inline (tap mode) interfaces, and contains a **Decrypt - Known Key** rule with a cipher suite condition containing either a DHE or an ECDHE cipher suite, the ASA FirePOWER module displays an information icon next to the rule. If you later add a zone condition to the SSL rule that contains passive or inline (tap mode) interfaces, the module displays a warning icon.
- You cannot use the **Decrypt - Resign** action in a passive or inline (tap mode) deployment, as the device does not directly inspect traffic. If you create a rule with the **Decrypt - Resign** action that contains passive or inline (tap mode) interfaces within a security zone, the policy editor displays a warning icon next to the rule. If your SSL policy targets passive or inline (tap mode) interfaces, and contains a **Decrypt - Resign** rule, the module displays an information icon ( ) next to the rule. If you later add a zone condition to the SSL rule that contains passive or inline (tap mode) interfaces, the module displays a warning icon ( ). If you apply an SSL policy that contains a Decrypt - Resign rule to a device with passive or inline (tap mode) interfaces, any SSL sessions that match the rule fail.
- If the client does not trust the CA used to re-sign the server certificate, it warns the user that the certificate should not be trusted. To prevent this, import the CA certificate into the client trusted CA store. Alternatively, if your organization has a private PKI, you can issue an intermediate CA certificate signed by the root CA which is automatically trusted by all clients in the organization, then upload that CA certificate to the device.
- You can add an anonymous cipher suite to the **Cipher Suite** condition in an SSL rule, but keep in mind:
  - The system automatically strips anonymous cipher suites during ClientHello processing. For the system to use the rule, you must also configure your SSL rules in an order that prevents ClientHello processing. For more information, see Ordering SSL Rules to Improve Performance and Avoid Preemption, on page 211.

  - You cannot use the **Decrypt - Resign** or **Decrypt - Known Key** action in the rule, because the system cannot decrypt traffic encrypted with an anonymous cipher suite.

- The ASA FirePOWER module cannot decrypt traffic if an HTTP proxy is positioned between a client and your device, and the client and server establish a tunneled SSL connection using the CONNECT HTTP method. The **Handshake Errors** undecryptable action determines how the module handles this traffic. See Setting Default Handling for Undecryptable Traffic, on page 184 for more information.
- You cannot match on **Distinguished Name** or **Certificate** conditions when creating an SSL rule with a **Decrypt - Known Key** action. The assumption is that if this rule matches traffic, the certificate, subject DN, and issuer DN already match the certificate associated with the rule. For more information, see Using Rule Actions to Determine Encrypted Traffic Handling and Inspection, on page 202

  .
- If you create an internal CA object and choose to generate a certificate signing request (CSR), you cannot use this CA for a **Decrypt - Resign** action until you upload the signed certificate to the object. For more information, see Obtaining and Uploading a New Signed Certificate, on page 55.
- If you configure a rule with the **Decrypt - Resign** action, and mismatch signature algorithm type for one or more external certificate objects or cipher suites, the policy editor displays an information icon next to the rule. If you mismatch signature algorithm type for all external certificate objects, or all cipher suites, the policy displays a warning icon next to the rule, and you cannot apply the access control policy associated with the SSL policy. For more information, see Controlling Encrypted Traffic by Certificate , on page 232 and Controlling Encrypted Traffic by Cipher Suite, on page 238.
- If decrypted traffic matches an access control rule with an action of **Interactive Block** or **Interactive Block with reset**, the ASA FirePOWER module blocks the matching connection without interaction and the module does **not** display a response page.
- If you enable the **Normalize Excess Payload** option in the inline normalization preprocessor, when the preprocessor normalizes decrypted traffic, it may drop a packet and replace it with a trimmed packet. This does not end the SSL session. If the traffic is allowed, the trimmed packet is encrypted as part of the SSL session.
- If your browser uses certificate pinning to verify a server certificate, you cannot decrypt this traffic by re-signing the server certificate. If you want to allow this traffic, configure an SSL rule with the Do not decrypt action to match the server certificate common name or distinguished name.

To configure a rule to decrypt incoming traffic:

Access: Admin/Access Admin/Network Admin

Step 1 In the **SSL policy editor** for the policy you want to decrypt incoming traffic, you have the following options:

- To add a new rule, click **Add Rule**.
- To edit an existing rule, click the **edit** icon next to the rule you want to edit.

The **SSL rule editor** appears.

Step 2 Select **Decrypt - Known Key** from the **Action** drop-down list.

The **Click to select decryption certs** field appears.

Step 3 Click the **Click to select decryption certs** field.

The **certificate selection** pop-up window appears.

Step 4 Click an internal certificate object in the **Available Certificates** list. Use the Shift and Ctrl keys to select multiple conditions, or right-click, then click **Select All**.

Certificates you select are highlighted.

Step 5 You have the following choices:

- Click **Add to Rule**.
- Drag and drop selected conditions into the **Selected Certificates** list.

Conditions you selected are added.

Step 6 Click **OK**.

The SSL rule editor appears.

Step 7 Click **Save** to save the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect

What to do next

To configure a rule to decrypt outgoing traffic:

Decrypt Actions: Decrypting Traffic for Further Inspection

Access: Admin/Access Admin/Network Admin

Step 1 In the **SSL policy editor** for the policy you want to decrypt incoming traffic, you have the following options:

- To add a new rule, click **Add Rule**.
- To edit an existing rule, click the **edit** icon next to the rule you want to edit.

The **SSL rule editor** appears.

Step 2 Select **Decrypt - Resign** from the **Action** drop-down list.

Additional fields appear.

Step 3 Select an internal CA certificate object from the drop-down list.

Step 4 Optionally, select **Replace Key** to replace the certificate's public key, instead of replacing the entire certificate.

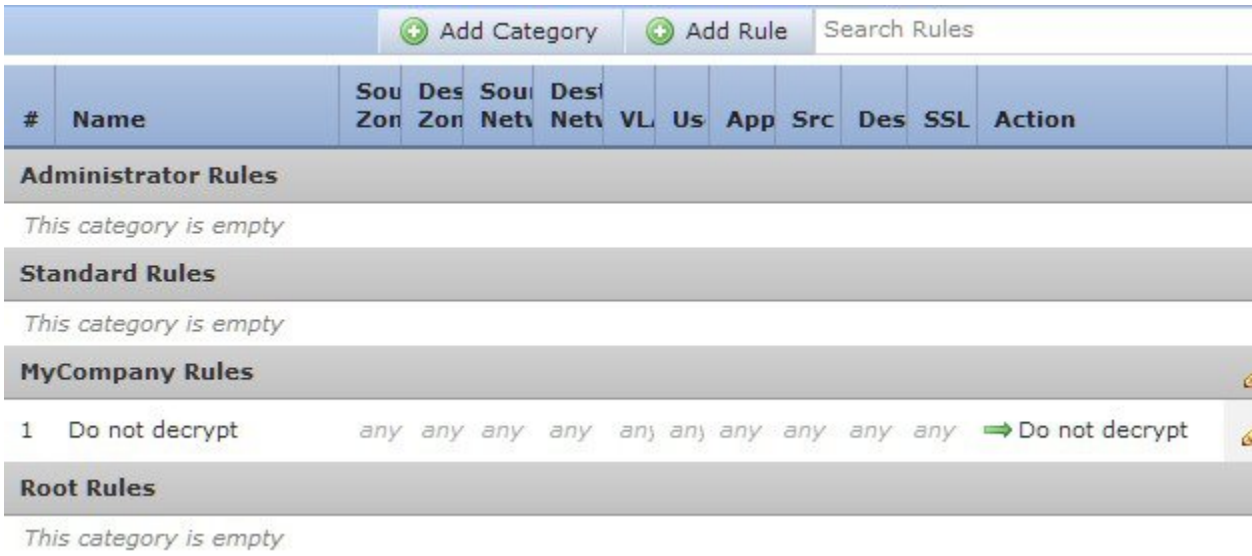
Step 5 Click **Save** to save the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Managing SSL Rules in a Policy

License: Any

The **Rules** tab of the **SSL policy editor**, shown in the following graphic, allows you to add, edit, search, move, enable, disable, delete, and otherwise manage SSL rules within your policy.



For each rule, the policy editor displays its name, a summary of its conditions, and the rule action. Icons represent warnings, errors, and other important information. Disabled rules are grayed out and marked (disabled) beneath the rule name. See Troubleshooting SSL Rules, on page 210 for more information about the icons.

Searching SSL Rules

License: Any

You can search the list of SSL rules for matching values using an alphanumeric string, including spaces and printable, special characters. The search inspects the rule name and any rule condition you have added to the rule. For rule conditions, the search matches any name or value you can add for each condition type (zone, network, application, and so on). This includes individual object names or values, group object names, individual object names or values within a group, and literal values.

You can use complete or partial search strings. The column for matching values is highlighted for each matching rule. For example, if you search on all or part of the string 100Bao , at a minimum, the Applications column is highlighted for each rule where you have added the 100Bao application. If you also have a rule named 100Bao , both the Name and Applications columns are highlighted.

You can navigate to each previous or next matching rule. A status message displays the current match and the total number of matches.

Matches may occur on any page of a multi-page rule list. When the first match is not on the first page, the page where the first match occurs is displayed. Selecting the next match when you are at the last match takes you to the first match, and selecting the previous match when you are at the first match takes you to the last match.

To search for rules:

Step 1 In the **SSL policy editor** for the policy you want to search, click the **Search Rules** prompt, type a search string, then press **Enter**. You can also use the Tab key or click a blank page area to initiate the search.

Columns for rules with matching values are highlighted, with differentiated highlighting for the indicated (first) match.

Step 2 Find the rules you are interested in:

- To navigate between matching rules, click the next-match or previous-match .
- To refresh the page and clear the search string and any highlighting, click the clear icon < >.

Enabling and Disabling SSL Rules

License: Any

When you create an SSL rule, it is enabled by default. If you disable a rule, the ASA FirePOWER module does not use it to evaluate network traffic and stops generating warnings and errors for that rule. When viewing the list of rules in an SSL policy, disabled rules are grayed out, although you can still modify them. Note that you can also enable or disable an SSL rule using the rule editor; see Understanding and Creating SSL Rules, on page 198.

To change an SSL rules state:

Step 1 In the **SSL policy editor** for the policy that contains the rule you want to enable or disable, right-click the rule and choose a rule state:

- To enable an inactive rule, select **State > Enable**.
- To disable an active rule , **State > Disable**.

Step 2 Click **Store ASA FirePOWER Changes**.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Changing an SSL Rules Position or Category

License: Any

To help you organize SSL rules, every SSL policy has three ASA FirePOWER module-provided rule categories: Administrator Rules, Standard Rules, and Root Rules. You cannot move, delete, or rename these categories, although you can create custom categories.

Moving an SSL Rule

License: Any

Proper SSL rule order reduces the resources required to process network traffic, and prevents rule preemption.

The following procedure explains how to move one or more rules at a time using the **SSL policy editor**. You can also move individual SSL rules using the rule editor; see Understanding and Creating SSL Rules, on page 198.

To move a rule:

Step 1 In the SSL policy editor for the policy that contains the rules you want to move, select the rules by clicking in a blank area for each rule. Use the Ctrl and Shift keys to select multiple rules.

The rules you selected are highlighted.

Step 2 Move the rules. You can cut and paste or drag and drop.

To cut and paste rules into a new location, right-click a selected rule and select **Cut**. Then, right-click a blank area for a rule next to where you want to paste the cut rules and select **Paste above** or **Paste below**. Note that you cannot copy and paste SSL rules between two different SSL policies.

Step 3 Click **Store ASA FirePOWER Changes**..

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Adding a New SSL Rule Category

License: Any

To help you organize SSL rules, every SSL policy has three ASA FirePOWER module-provided rule categories: Administrator Rules, Standard Rules, and Root Rules. You cannot move, delete, or rename these categories, although you can create custom categories between the Standard Rules and Root Rules.

Adding custom categories allows you to further organize your rules without having to create additional policies. You can rename and delete categories that you add. You cannot move these categories, but you can move rules into, within, and out of them.

To add a new category:

Step 1 In the **SSL policy editor** for the policy where you want to add a rule category, click **Add Category**.

Tip If your policy already contains rules, you can click a blank area in the row for an existing rule to set the position of the new category before you add it. You can also right-click an existing rule and select **Insert new category**.

The **Add Category** pop-up window appears.

Step 2 Type a unique category **Name**.

You can enter an alphanumeric name, including spaces and special printable characters, with up to 30 characters.

Step 3 You have the following choices:

- To position the new category immediately above an existing category, select **above Category** from the first **Insert** drop-down list, then select the category above which you want to position the rule from the second drop-down list.
- To position the new category rule below an existing rule, select **below rule** from the drop-down list, then enter an existing rule number. This option is valid only when at least one rule exists in the policy.

- To position the rule above an existing rule, select **above rule** from the drop-down list, then, enter an existing rule number. This option is valid only when at least one rule exists in the policy.

Step 4 Click **OK**.

Your category is added. You can click the edit icon next to a custom category to edit its name, or click the delete icon to delete the category. Rules in a category you delete are added to the category above.

Step 5 Click **Store ASA FirePOWER Changes** to save the policy.

Troubleshooting SSL Rules

License: Any

Properly creating and ordering SSL rules is a complex task, but one that is essential to building an effective deployment. If you do not plan your policy carefully, rules can preempt other rules, require additional licenses, or contain invalid configurations. To help ensure that the ASA FirePOWER module handles traffic as you expect, the SSL policy interface has a robust warning and error feedback system for rules.

For each rule, icons in the policy editor mark warnings and errors, as described in the following table. Hover your pointer over the icon to read the warning, error, or informational text.

Table 41: SSL Error Icons

Icon	Description	Details
	warning	Depending on the issue, you may be able to apply an SSL policy that displays rule or other warnings. In these cases, the misconfigured settings will have no effect. For example, a preempted rule never evaluates traffic. However, if a warning icon marks a licensing error or model mismatch, you cannot apply the policy until you correct the issue. If you disable a rule with a warning, the warning icon disappears. It reappears if you enable the rule without correcting the underlying issue.
	error	If a rule or other SSL policy configuration has an error, you cannot apply the policy until you correct the issue.
	information	Information icons convey helpful information about configurations that may affect the flow of traffic. These issues are minor and will not prevent you from applying the policy.

Properly configuring SSL rules can also reduce the resources required to process network traffic. Creating complex rules and mis-ordering rules can affect performance.

Understanding Rule Preemption and Invalid Configuration Warnings

License: Any

Properly configuring and ordering SSL rules is essential to building an effective deployment. Within an SSL policy, SSL rules can preempt other rules or contain invalid configurations. The module uses warning and error icons to mark these issues.

Understanding Rule Preemption Warnings

The conditions of an SSL rule may preempt a subsequent rule from matching traffic. For example:

```
Rule 1: do not decrypt Administrators
Rule 2: block Administrators
```

The second rule above will never block traffic because the first rule will have already allowed the traffic.

Understanding Invalid Configuration Warnings

Because outside settings that the SSL policy depends on may change, an SSL policy setting that was valid may become invalid. Consider the following examples:

- A rule that contains a URL category condition might be valid until you target a module that does not have a URL Filtering license. At that point, an error icon appears next to the rule, and you cannot apply the policy to that device until you edit or delete the rule, retarget the policy, or enable the appropriate license.
- If you create a Decrypt - Resign rule, and later add a security zone with passive interfaces to a zone condition, the module displays a warning icon next to the rule. Because you cannot decrypt traffic by re-signing a certificate in a passive deployment, the rule has no effect until you remove the passive interfaces from the rule or change the rule action.
- If you add a user to a rule, then change your LDAP user awareness settings to exclude that user, the rule will have no effect because the user is no longer an access-controlled user.

Ordering SSL Rules to Improve Performance and Avoid Preemption

License: Any

Rules in an SSL policy are numbered, starting at 1. The ASA FirePOWER module matches traffic to rules in top-down order by ascending rule number. With the exception of Monitor rules, the first rule that traffic matches is the rule that handles that traffic.

Proper SSL rule order reduces the resources required to process network traffic, and prevents rule preemption. Although the rules you create are unique to every organization and deployment, there are a few general guidelines to follow when ordering rules that can optimize performance while still addressing your needs.

Order Rules from Most to Least Critical

First, you must order rules to suit your organization's needs. Place priority rules that must apply to all traffic near the top of the policy. For example, if you want to decrypt outgoing traffic from a single user for further analysis (using a Decrypt - Resign rule), but not decrypt traffic from all other users in the department (using a Do not decrypt rule), place two SSL rules in that order.

Order Rules from Specific to General

You can improve performance by placing specific rules earlier, that is, rules that narrowly define the traffic they handle. This is also important because rules with broad conditions can match many different types of traffic, and can preempt later, more specific rules.

Consider a scenario where a trusted CA (Good CA) mistakenly issued a CA certificate to a malicious entity (Bad CA), but has not yet revoked that certificate. You want to block traffic encrypted with certificates issued by the untrusted CA, but otherwise allow traffic within the trusted CA's chain of trust. You should upload the CA certificates and all intermediate CA certificates, then order your rules as follows:

```
Rule 1: Block issuer CN=www.badca.com
Rule 2: Do not decrypt issuer CN=www.goodca.com
```

If you reverse the rules:

```
Rule 1: Do not decrypt issuer CN=www.goodca.com
Rule 2: Block issuer CN=www.badca.com
```

the first rule matches all traffic trusted by Good CA, including traffic trusted by Bad CA. Because no traffic ever matches the second rule, malicious traffic may be allowed instead of blocked.

Order Rules to Allow Traffic from Certificate Pinned Sites

Certificate pinning forces a client's browser to verify that a server's public key certificate matches a certificate the browser already associated with the server before establishing an SSL session. Because the Decrypt - Resign action involves modifying a server certificate before passing it to the client, these modified certificates are rejected if the browser already pinned that certificate.

For example, if a client browser connects to windowsupdate.microsoft.com , a site that uses certificate pinning, and you configure an SSL rule that matches that traffic with a Decrypt - Resign action, the ASA FirePOWER module re-signs the server certificate before passing it to the client browser. Because this modified server certificate does not match the browser's pinned certificate for windowsupdate.microsoft.com , the client browser rejects the connection.

If you want to allow this traffic, configure an SSL rule with the Do not decrypt action to match the server certificate common name or distinguished name. In the SSL policy, order this rule before all Decrypt - Resign rules that also match the traffic. You can retrieve the pinned certificate from the client's browser after a successful connection to the website. You can also view the certificate from the logged connection event, whether the connection succeeded or failed.

Place Rules that Decrypt Traffic Later

Because traffic decryption requires processing resources, placing rules that do not decrypt traffic (Do not decrypt, Block) before rules that do (Decrypt - Known Key, Decrypt - Resign) can improve performance. This is because traffic decryption can command significant resources. In addition, Block rules can divert traffic that the ASA FirePOWER module might otherwise have decrypted or inspected. All other factors being equal, that is, given a set of rules where none is more critical and preemption is not an issue, consider placing them in the following order:

- Monitor rules that log matching connections, but take no other action on traffic
- Block rules that block traffic without further inspection
- Do not decrypt rules that do not decrypt encrypted traffic
- Decrypt - Known Key rules that decrypt incoming traffic with a known private key
- Decrypt - Resign rules that decrypt outgoing traffic by re-signing the server certificate

Prioritize ClientHello Modifications

To prioritize ClientHello modifications, place rules that match on conditions that are available in the ClientHello message before rules that match on ServerHello or server Certificate conditions.

When a managed device processes an SSL handshake, it can modify the ClientHello message to increase the likelihood of decryption. For example, it may remove compression methods because the Firepower System cannot decrypt compressed sessions.

The system only modifies ClientHello messages if it can conclusively match them to an SSL rule with a Decrypt - Resign action. The first time the system detects an encrypted session to a new server, server Certificate data is not available for ClientHello processing, which can result in an undecrypted first session. For subsequent connections from the same client, the system can match the ClientHello message conclusively to rules with server Certificate conditions and process the message to maximize decryption potential.

If you place rules that match on ServerHello or server Certificate conditions (certificate, distinguished names, certificate status, cipher suites, version) before rules that match on ClientHello conditions (zones, networks, VLAN tags, ports, users, applications, URL categories), you can preempt ClientHello modification and increase the number of undecrypted sessions.

Configuring SSL Inspection to Improve Performance

License: Any

Complex SSL policies and rules can command significant resources. When you apply an SSL policy, the ASA FirePOWER module evaluates all the rules together and creates an expanded set of criteria that the device uses to evaluate network traffic. A pop-up window may warn that you have exceeded the maximum number of SSL rules supported by a device. This maximum depends on a number of factors, including the physical memory and the number of processors on the device.

Simplifying Rules

The following guidelines can help you simplify your SSL rules and improve performance:

- When constructing a rule, use as few individual elements in your conditions as possible. For example, in network conditions, use IP address blocks rather than individual IP addresses. In port conditions, use port ranges. Use application filters and URL categories and reputations to perform application control and URL filtering, and LDAP user groups to perform user control.

Note that combining elements into objects that you then use in SSL rule conditions does not improve performance. For example, using a network object that contains 50 individual IP addresses gives you only an organizational—not a performance—benefit over including those IP addresses in the condition individually.

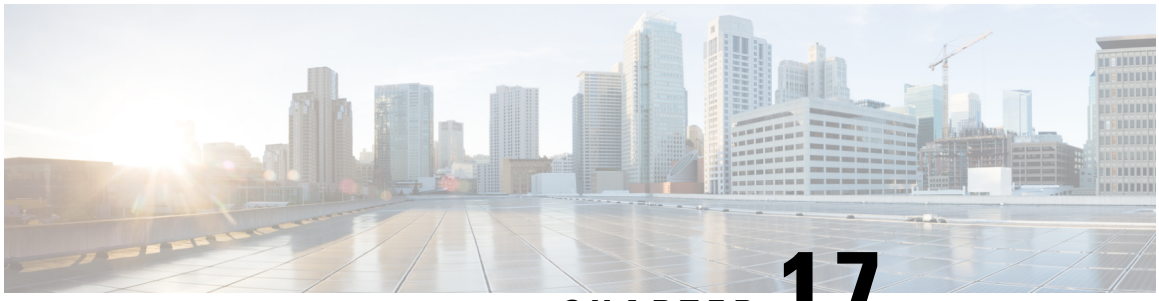
- Restrict rules by security zones whenever possible. If a device's interfaces are not in one of the zones in a zone-restricted rule, the rule does not affect performance on that device.
- Do not overconfigure rules. If one condition is enough to match the traffic you want to handle, do not use two.

Configuring Traffic Decryption

Keep the following guidelines in mind when configuring traffic decryption:

- Traffic decryption requires processing resources to decrypt the traffic, and to inspect it with access control. Create narrowly focused decrypt rules over broad decrypt rules to reduce the amount of traffic the ASA FirePOWER module decrypts, and as a result, reduce the processing resources required to decrypt traffic. Rather than decrypting then later allowing or blocking traffic using an access control rule, block or choose not to decrypt encrypted traffic where possible.

- If you configure certificate status conditions to trust traffic based on the root issuer CA, upload the root CA certificate and all intermediate CA certificates within the root CA's chain of trust to your SSL policy. All traffic within a trusted CA's chain of trust can be allowed without decryption, rather than unnecessarily decrypting it.



CHAPTER 17

Tuning Traffic Decryption Using SSL Rules

A basic SSL rule applies its rule action to all encrypted traffic inspected by the ASA FirePOWER module. To better control and decrypt encrypted traffic, you can configure rule conditions to handle and log specific types of traffic. Each SSL rule can contain 0, 1, or more rule conditions; a rule only matches traffic if the traffic matches every condition in that SSL rule.

Note When traffic matches a rule, the ASA FirePOWER module applies the configured rule action to the traffic. When the connection ends, the module logs the traffic if configured to do so. For more information, see Understanding How Access Control and SSL Rule Actions Affect Logging, on page 384 and Logging Connections Based on Access Control Handling, on page 389.

Each rule condition allows you to specify one or more properties of traffic you want to match against; these properties include details of:

- the flow of traffic, including the security zone through which it travels, IP address and port, and country of origin or destination
- the user associated with a detected IP address
- the traffic payload, including the application detected in the traffic
- the connection encryption, including the SSL/TLS protocol version and cipher suite and server certificate used to encrypt the connection
- the category and reputation of the URL specified in the server certificate's distinguished name

TLS/SSL Decrypt - Resign Guidelines

In some cases, access control Trust rule actions can block matching TLS/SSL traffic. The issue is limited to any ASA device capable of running ASA with FirePOWER Services, such as ASA 5555-X devices.

Use the following guidelines:

- For TLS/SSL traffc matching either **Decrypt - Resign** or **Do Not Decrypt** rule actions, make sure access control Allow rule actions are placed before Trust rule actions.
- If there is no SSL policy, or if the SSL policy has other rule actions, then there is no issue with access control Trust rule actions.

For a list of devices that can run ASA with FirePOWER Services, see the ASA and ASA FirePOWER Module Compatibility section of Cisco ASA Compatibility.

Controlling Encrypted Traffic with Network-Based Conditions

License: Any

SSL *rules* within *SSL policies* exert granular control over encrypted traffic logging and handling. Network-based conditions allow you to manage which encrypted traffic can traverse your network, using one or more of the following criteria:

- source and destination security zones
- source and destination IP addresses or geographical locations
- source and destination port

You can combine network-based conditions with each other and with other types of conditions to create an SSL rule. These SSL rules can be simple or complex, matching and inspecting traffic using multiple conditions. For detailed information on SSL rules, see Getting Started with SSL Rules, on page 195.

Controlling Encrypted Traffic by Network Zone

License: Any

Zone conditions in SSL rules allow you to control encrypted traffic by its source and destination security zones.

A *security zone* is a grouping of one or more interfaces. An option you choose during a device's initial setup, called its *detection mode* , determines how the ASA FirePOWER module initially configures the device's interfaces, and whether those interfaces belong to a security zone.

As a simple example, when you register a device with an **Inline** detection mode, the ASA FirePOWER module creates two zones: Internal and External, and assigns the first pair of interfaces on the device to those zones. Hosts connected to the network on the Internal side represent your protected assets.

Tip You are not required to group all internal (or external) interfaces into a single zone. Choose the grouping that makes sense for your deployment and security policies. For more information on creating zones, see Working with Security Zones, on page 49.

In this deployment, you may decide that although you want these hosts to have unrestricted access to the Internet, you nevertheless want to protect them by decrypting and inspecting incoming encrypted traffic.

To accomplish this with SSL inspection, configure an SSL rule with a zone condition where the **Destination Zone** is set to **Internal**. This simple SSL rule matches traffic that leaves the device from any interface in the Internal zone.

If you want to build a more complex rule, you can add a maximum of 50 zones to each of the **Sources Zones** and **Destination Zones** in a single zone condition:

- To match encrypted traffic *leaving* the device from an interface in the zone, add that zone to the **Destination Zones**.

Because devices deployed passively do not transmit traffic, you cannot use a zone comprised of passive interfaces in a **Destination Zone** condition.

- To match encrypted traffic *entering* the device from an interface in the zone, add that zone to the **Source Zones**.

If you add both source and destination zone conditions to a rule, matching traffic must originate from one of the specified source zones **and** egress through one of the destination zones.

Note that just as all interfaces in a zone must be of the same type (all inline, all passive, all switched, or all routed), all zones used in a zone condition for an SSL rule must be of the same type. That is, you cannot write a single rule that matches encrypted traffic to or from zones of different types.

Warning icons indicate invalid configurations, such as zones that contain no interfaces. For details, hover your pointer over the icon.

To control encrypted traffic by zone:

Step 1 In the SSL policy where you want to control encrypted traffic by zone, create a new SSL rule or edit an existing rule.

For detailed instructions, see Getting Started with SSL Rules, on page 195.

Step 2 In the **SSL rule editor**, select the **Zones** tab.

The **Zones** tab appears.

Step 3 Find and select the zones you want to add from the **Available Zones**.

To search for zones to add, click the **Search by name** prompt above the **Available Zones** list, then type a zone name. The list updates as you type to display matching zones.

Click to select a zone. To select multiple zones, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 4 Click **Add to Source** or **Add to Destination** to add the selected zones to the appropriate list.

You can also drag and drop selected zones.

Step 5 Save or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Controlling Encrypted Traffic by Network or Geographical Location

License: Any

Network conditions in SSL rules allow you to control and decrypt encrypted traffic by its source and destination IP address. You can either:

- explicitly specify the source and destination IP addresses for the encrypted traffic you want to control, or
- use the geolocation feature, which associates IP addresses with geographical locations, to control encrypted traffic based on its source or destination country or continent

When you build a network-based SSL rule condition, you can manually specify IP address and geographical locations. Alternately, you can configure network conditions with network and geolocation *objects* , which are reusable and associate a name with one or more IP addresses, address blocks, countries, continents, and so on.

Tip After you create a network or geolocation object, you can use it not only to build SSL rules, but also to represent IP addresses in various other places in the module interface. You can create these objects using the object manager; you can also create network objects on-the-fly while you are configuring SSL rules. For more information, see Managing Reusable Objects, on page 17.

Note that if you want to write rules to control traffic by geographical location, to ensure you are using up-to-date geolocation data to filter your traffic, Cisco **strongly** recommends you regularly update the geolocation database (GeoDB) on your ASA FirePOWER module; see Updating the Geolocation Database, on page 493.

The following graphic shows the network condition for an SSL rule that blocks encrypted connections originating from your internal network and attempting to access resources either in the Cayman Islands or an offshore holding corporation server at 182.16.0.3.

The example manually specifies the offshore holding corporation's server IP address, and uses a ASA FirePOWER module-provided Cayman Islands geolocation object to represent Cayman Island IP addresses.

You can add a maximum of 50 items to each of the **Source Networks** and **Destination Networks** in a single network condition, and you can mix network and geolocation-based configurations:

- To match encrypted traffic *from* an IP address or geographical location, configure the **Source Networks**.
- To match encrypted traffic *to* an IP address or geographical location, configure the **Destination Networks**.

If you add both source and destination network conditions to a rule, matching encrypted traffic must originate from one of the specified IP addresses **and** be destined for one of the destination IP addresses.

When building a network condition, warning icons indicate invalid configurations. For details, hover your pointer over the icon.

To control traffic by network or geographical location:

Access: Admin/Access Admin/Network Admin

Step 1 In the SSL policy where you want to control encrypted traffic by network, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor**, select the **Networks** tab.

The **Networks** tab appears.

Step 3 Find and select the networks you want to add from the **Available Networks**, as follows:

- Click the **Networks** tab to display network objects and groups to add; click the Geolocation tab to display geolocation objects.
- To add a network object on the fly, which you can then add to the condition, click the add icon ( ) above the Available Networks list; see Working with Network Objects, on page 19.
- To search for network or geolocation objects to add, select the appropriate tab, click the **Search by name or value** prompt above the **Available Networks** list, then type an object name or the value of one of the object's components. The list updates as you type to display matching objects.

To select an object, click it. To select multiple objects, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 4 Click **Add to Source** or **Add to Destination** to add the selected objects to the appropriate list.

You can also drag and drop selected objects.

Step 5 Add any source or destination IP addresses or address blocks that you want to specify manually.

Click the **Enter an IP address** prompt below the **Source Networks** or **Destination Networks** list; then type an IP address or address block and click **Add**.

Step 6 Save or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Controlling Encrypted Traffic by Port

License: Any

Port conditions in SSL rules allow you to control encrypted traffic by its source and destination TCP port. When you build a port-based SSL rule condition, you can manually specify TCP ports. Alternately, you can configure port conditions with port *objects* , which are reusable and associate a name with one or more ports.

Tip After you create a port object, you can use it not only to build SSL rules, but also to represent ports in various other places in the module interface. You can create port objects either using the object manager or on-the-fly while you are configuring SSL rules. For more information, see Working with Port Objects, on page 25.

You can add a maximum of 50 items to each of the **Selected Source Ports** and **Selected Destination Ports** lists in a single network condition:

- To match encrypted traffic *from* a TCP port, configure the **Selected Source Ports**.
- To match encrypted traffic *to* a TCP port, configure the **Selected Destination Ports**.
- To match encrypted traffic both originating from TCP **Selected Source Ports** *and* destined for TCP **Selected Destination Ports**, configure both.

You can only configure the **Selected Source Ports** and **Selected Destination Ports** lists with TCP ports. Port objects containing non-TCP ports are greyed out in the **Available Ports** list.

When building a port condition, warning icons indicate invalid configurations. For example, you can use the object manager to edit in-use port objects so that the rules that use those object groups become invalid. For details, hover your pointer over the icon.

To control traffic by port:

Step 1 In the SSL policy where you want to control encrypted traffic by TCP port, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor**, select the **Ports** tab.

The **Ports** tab appears.

Step 3 Find and select the TCP ports you want to add from the **Available Ports**, as follows:

- To add a TCP port object on the fly, which you can then add to the condition, click the add icon () above the Available Ports list; see Working with Port Objects, on page 25.
- To search for TCP-based port objects and groups to add, click the **Search by name or value** prompt above the **Available Ports** list, then type either the name of the object, or the value of a port in the object. The list updates as you type to display matching objects. For example, if you type 443, the ASA FirePOWER module displays the ASA FirePOWER module-provided HTTPS port object.

To select a TCP-based port object, click it. To select multiple TCP-based port objects, use the Shift and Ctrl keys, or right-click and then select **Select All**. If the object includes non-TCP-based ports, you cannot add it to your port condition.

Step 4 Click **Add to Source** or **Add to Destination** to add the selected objects to the appropriate list.

You can also drag and drop selected objects.

Step 5 Enter a **Port** under the **Selected Source Ports** or **Selected Destination Ports** list to manually specify source or destination ports. You can specify a single port with a value from 0 to 65535.

Step 6 Click **Add**.

Note that the ASA FirePOWER module will not add a port to a rule condition that results in an invalid configuration.

Step 7 Save or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Controlling Encrypted Traffic Based on User

License: Control

You can configure SSL rules to match traffic for users retrieved from a Microsoft Active Directory Server. User conditions in SSL rules allow you perform *user control*—to manage which traffic can traverse your network, by limiting traffic based on the LDAP user logged into a host.

User control works by associating *access controlled users* with IP addresses. Deployed agents monitor specified users as they log in and out of hosts or authenticate with Active Directory credentials for other reasons. For example, your organization may use services or applications that rely on Active Directory for centralized authentication.

For traffic to match an SSL rule with a user condition, the IP address of either the source or destination host in the monitored session must be associated with a logged in access controlled user. You can control traffic based on individual users or the groups those users belong to.

You can combine user conditions with each other and with other types of conditions to create an SSL rule. These SSL rules can be simple or complex, matching and inspecting traffic using multiple conditions. For detailed information on SSL rules, see Understanding and Creating SSL Rules, on page 198.

User control requires a Control license and is supported only for LDAP users and groups (*access controlled users*), using login and logoff records reported by a User Agent monitoring Microsoft Active Directory servers.

Before you can write SSL rules with user conditions, you must configure a connection between the ASA FirePOWER module and at least one of your organization's Microsoft Active Directory servers. This configuration, called an authentication object, contains connection settings and authentication filter settings for the server. It also specifies the users you can use in user conditions.

In addition, you must install User Agents. The agents monitor users when they authenticate against Active Directory credentials, and send records of those logins to the ASA FirePOWER module. These records associate users with IP addresses, which is what allows SSL rules with user conditions to trigger.

To control encrypted traffic by user:

Step 1 In the SSL policy where you want to control encrypted traffic by user, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor**, select the **Users** tab.

The **Users** tab appears.

Step 3 To search for users to add, click the **Search by name or value** prompt above the **Available Users** list, then type the username. The list updates as you type to display matching users.

To select a user, click it. To select multiple users, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 4 Click **Add to Rule** or to add the selected users to the **Selected Users** list.

You can also drag and drop selected users.

Step 5 Save or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see .Deploying Configuration Changes, on page 73

Controlling Encrypted Traffic by Reputation

License: Control or URL Filtering

Reputation-based conditions in SSL rules allow you to manage which encrypted traffic can traverse your network, by contextualizing your network traffic and limiting it where appropriate. SSL rules govern the following types of reputation-based control:

- Application conditions allow you to perform *application control* , which controls application traffic based on not only individual applications, but also applications' basic characteristics: type, risk, business relevance, and categories.
- URL conditions allow you to control web traffic based on a websites' assigned category and reputation.

You can combine reputation-based conditions with each other and with other types of conditions to create an SSL rule. These SSL rules can be simple or complex, matching and inspecting traffic using multiple conditions.

Controlling Encrypted Traffic Based on Application

License: Control

When the Firepower system analyzes encrypted IP traffic, it can identify and classify commonly used encrypted applications on your network prior to decrypting the encrypted session. The ASA FirePOWER module uses this discovery-based *application awareness* feature to allow you to control encrypted application traffic on your network.

Application conditions in SSL rules allow you to perform this *application control* . Within a single SSL rule, there are a few ways you can specify applications whose traffic you want to control:

- You can select individual applications, including custom applications.
- You can use ASA FirePOWER module-provided *application filters* , which are named sets of applications organized according to its basic characteristics: type, risk, business relevance, and categories.
- You can create and use custom application filters, which group applications (including custom applications) in any way you choose.

Note When you filter application traffic using access control rules, you can use application tags as a criterion. to filter. However, you cannot use application tags to filter encrypted traffic because there is no benefit. All applications that the ASA FirePOWER module can detect in encrypted traffic are tagged **SSL Protocol**; applications without this tag can only be detected in unencrypted or decrypted traffic.

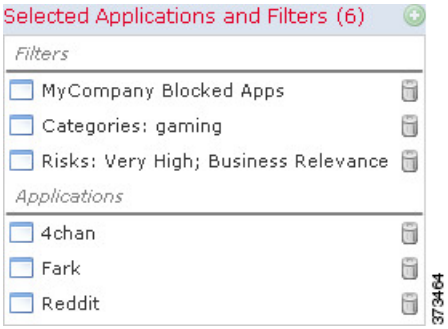
Application filters allow you to quickly create application conditions for SSL rules. They simplify policy creation and administration, and grant you assurance that the module will control web traffic as expected. For example, you could create an SSL rule that identifies and decrypts all high risk, low business relevance applications in

encrypted traffic. If a user attempts to use one of those applications, the session is decrypted and inspected with access control.

In addition, Cisco frequently updates and adds additional detectors via system and vulnerability database (VDB) updates. You can also create your own detectors and assign characteristics (risk, relevance, and so on) to the applications they detect. By using filters based on application characteristics, you can ensure that the module uses the most up-to-date detectors to monitor application traffic.

For traffic to match an SSL rule with an application condition, the traffic must match one of the filters or applications that you add to a **Selected Applications and Filters** list.

The following graphic shows the application condition for an SSL rule that decrypts a custom group of applications for MyCompany, all applications with high risk and low business relevance, gaming applications, and some individually selected applications.



In a single application condition, you can add a maximum of 50 items to the **Selected Applications and Filters** list. Each of the following counts as an item:

- One or more filters from the **Application Filters** list, individually or in custom combination. This item represents set of applications, grouped by characteristic.
- A filter created by saving search of the applications in the **Available Applications** list. This item represents a set of applications, grouped by substring match.
- An individual application from the **Available Applications** list.

In the module interface, filters added to a condition are listed above and separately from individually added applications.

Note that when you apply an SSL policy, for each rule with an application condition, the ASA FirePOWER module generates a list of unique applications to match. In other words, you may use overlapping filters and individually specified applications to ensure complete coverage.

Matching Encrypted Traffic with Application Filters

License: Control

When building an application condition in an SSL rule, use the **Application Filters** list to create a set of applications, grouped by characteristic, whose traffic you want to match.

For your convenience, the ASA FirePOWER module characterizes each application that it detects using a specified criteria. You can use these criteria as filters or create custom combinations of filters to perform application control.

Note that the mechanism for filtering applications within an SSL rule is the same as that for creating reusable, custom application filters using the object manager; see Working with Application Filters, on page 27. You

can also save many filters you create on-the-fly in access control rules as new, reusable filters. You cannot save a filter that includes another user-created filter because you cannot nest user-created filters.

Understanding How Filters Are Combined

When you select filters, singly or in combination, the **Available Applications** list updates to display only the applications that meet your criteria. You can select ASA FirePOWER module-provided filters in combination, but not custom filters.

The module links multiple filters of the same filter type with an OR operation. For example, if you select the Medium and High filters under the Risks type, the resulting filter is:

```
Risk: Medium OR High
```

If the Medium filter contained 110 applications and the High filter contained 82 applications, the module displays all 192 applications in the **Available Applications** list.

The module links different types of filters with an AND operation. For example, if you select the Medium and High filters under the Risks type, and the Medium and High filters under the Business Relevance type, the resulting filter is:

```
Risk: Medium OR HighANDBusiness Relevance: Medium OR High
```

In this case, the module displays only those applications that are included in both the Medium or High Risk type AND the Medium or High Business Relevance type.

Finding and Selecting Filters

To select filters, click the arrow next to a filter type to expand it, then select or clear the check box next to each filter whose applications you want to display or hide. You can also right-click a Cisco-provided filter type (**Risks**, **Business Relevance**, **Types**, or **Categories**) and select **Check All** or **Uncheck All**.

To search for filters, click the **Search by name** prompt above the **Available Filters** list, then type a name. The list updates as you type to display matching filters.

After you are done selecting filters, use the **Available Applications** list to add those filters to the rule; see Matching Traffic from Individual Applications, on page 224.

Matching Traffic from Individual Applications

License: Control

When building an application condition in an SSL rule, use the **Available Applications** list to select the applications whose traffic you want to match.

Browsing the List of Applications

When you first start to build the condition the list is unconstrained, and displays every application the module detects, 100 at a time:

- To page through the applications, click the arrows underneath the list.
- To display a pop-up window with summary information about the application's characteristics, as well as Internet search links that you can follow, click the information icon ( ) next to an application.

Finding Applications to Match

To help you find the applications you want to match, you can constrain the **Available Applications** list in the following ways:

- To search for applications, click the **Search by name** prompt above the list, then type a name. The list updates as you type to display matching applications.
- To constrain the applications by applying a filter, use the **Application Filters** list (see Matching Encrypted Traffic with Application Filters, on page 223). The **Available Applications** list updates as you apply filters.

Once constrained, an **All apps matching the filter** option appears at the top of the **Available Applications** list. This option allows you to add all the applications in the constrained list to the **Selected Applications and Filters** list, all at once.

Note If you select one or more filters in the Application Filters list and also search the **Available Applications** list, your selections and the search-filtered **Available Applications** list are combined using an AND operation. That is, the **All apps matching the filter** condition includes all the individual conditions currently displayed in the **Available Applications** list as well as the search string entered above the **Available Applications** list.

Selecting Single Applications to Match in a Condition

After you find an application you want to match, click to select it. To select multiple applications, use the Shift and Ctrl keys, or right-click and select **Select All** to select all applications in the current constrained view.

In a single application condition, you can match a maximum of 50 applications by selecting them individually; to add more than 50 you must either create multiple SSL rules or use filters to group applications.

Selecting All Applications Matching a Filter for a Condition

Once constrained by either searching or using the filters in the **Application Filters** list, the **All apps matching the filter** option appears at the top of the **Available Applications** list.

This option allows you to add the entire set of applications in the constrained **Available Applications** list to the **Selected Applications and Filters** list, at once. In contrast to adding applications individually, adding this set of applications counts as only one item against the maximum of 50, regardless of the number of individual application that comprise it.

When you build an application condition this way, the name of the filter you add to the **Selected Applications and Filters** list is a concatenation of the filter types represented in the filter plus the names of up to three filters for each type. More than three filters of the same type are followed by an ellipsis (...). For example, the following filter name includes two filters under the Risks type and four under Business Relevance:

```
Risks: Medium, High Business Relevance: Low, Medium, High,...
```

Filter types that are not represented in a filter you add with **All apps matching the filter** are not included in the name of the filter you add. The instructional text that is displayed when you hover your pointer over the filter name in the **Selected Applications and Filters** list indicates that these filter types are set to *any*; that is, these filter types do not constrain the filter, so any value is allowed for these.

You can add multiple instances of **All apps matching the filter** to an application condition, with each instance counting as a separate item in the **Selected Applications and Filters** list. For example, you could add all high risk applications as one item, clear your selections, then add all low business relevance applications as another item. This application condition matches applications that are high risk OR have low business relevance.

Adding an Application Condition to an SSL Rule

License: Control

For encrypted traffic to match an SSL rule with an application condition, the traffic must match one of the filters or applications that you add to a **Selected Applications and Filters** list.

You can add a maximum of 50 items per condition, and filters added to a condition are listed above and separately from individually added applications. When building an application condition, warning icons indicate invalid configurations. For details, hover your pointer over the icon.

To control encrypted application traffic:

Step 1 In the SSL policy where you want to control traffic by application, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor**, select the **Applications** tab.

The **Applications** tab appears.

Step 3 Optionally, use filters to constrain the list of applications displayed in the **Available Applications** list.

Select one or more filters in the **Application Filters** list. For more information, see Matching Encrypted Traffic with Application Filters, on page 223.

Step 4 Find and select the applications you want to add from the **Available Applications** list.

You can search for and select individual applications, or, when the list is constrained, **All apps matching the filter**. For more information, see Matching Traffic from Individual Applications, on page 224.

Step 5 Click **Add to Rule** to add the selected applications to the **Selected Applications and Filters** list.

You can also drag and drop selected applications and filters. Filters appear under the heading *Filters* , and applications appear under the heading *Applications* .

Tip Before you add another filter to this application condition, click **Clear All Filters** to clear your existing selections.

Step 6 Save or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Limitations to Encrypted Application Control

License: Control

Keep the following points in mind when performing application control.

Encrypted Application Identification

The ASA FirePOWER module can identify unencrypted applications that become encrypted using StartTLS. This includes such applications as SMTPS, POPS, FTPS, TelnetS, and IMAPS. In addition, it can identify certain encrypted applications based on the Server Name Indication in the TLS client hello message, or the server certificate subject distinguished name value.

Speed of Application Identification

The ASA FirePOWER module cannot perform application control on encrypted traffic before:

- an encrypted connection is established between a client and server, and
- the module identifies the application in the encrypted session

This identification occurs after the server certificate exchange. If traffic exchanged during the handshake matches all other conditions in an SSL rule containing an application condition but the identification is not complete, the SSL policy allows the packet to pass. This behavior allows the handshake to complete so that applications can be identified. For your convenience, affected rules are marked with an information icon ( ).

After the module completes its identification, it applies the SSL rule action to the remaining session traffic that matches its application condition.

Controlling Encrypted Traffic by URL Category and Reputation

License: URL Filtering

URL conditions in SSL rules allow you to handle and decrypt encrypted website traffic that users on your network can access. The module detects the requested URL based on information passed during the SSL handshake. With a URL Filtering license, you can control access to websites based on the URL's general classification, or *category* , and risk level, or *reputation* .

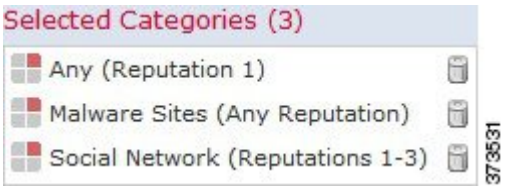
Note You can handle and decrypt traffic to specific URLs by defining a distinguished name SSL rule condition. The common name attribute in a certificate's subject distinguished name contains the site's URL. For more information, see Controlling Encrypted Traffic by Certificate Distinguished Name, on page 230.

Blocking Encrypted URLs Based on Category and Reputation

License: URL Filtering

With a URL Filtering license, you can control your users' access to websites based on the category and reputation of requested URLs. To block URLs that use encrypted connections, use a Category rule in an SSL rule. For a discussion of the URL filtering feature, see Blocking URLs Based on URL Category and Reputation, on page 118.

The following graphic shows the URL condition for an SSL rule that blocks: all malware sites, all high-risk sites, and all non-benign social networking sites.



The following table summarizes how you build the condition shown above. Note that you cannot qualify a literal URL or URL object with a reputation.

Table 42: Example: Building A URL Condition

To block...	Select this Category or URL Object...	And this Reputation...
malware sites, regardless of reputation	Malware Sites	Any
any URL with a high risk (level 1)	Any	1 - High Risk
social networking sites with a risk greater than benign (levels 1 through 3)	Social Network	3 - Benign sites with security risks

When building a URL condition, warning icons indicate invalid configurations. For details, hover your pointer over the icon and see Troubleshooting Access Control Policies and Rules, on page 74.

Tip If you decrypt traffic, then block it with access control, you can give users a chance to bypass the block by clicking through a warning page. See Interactive Blocking Actions: Allowing Users to Bypass Website Blocks, on page 97 for more information.

To control traffic by requested URL using category and reputation data:

Step 1 In the SSL policy where you want to control encrypted traffic by URL, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor**, select the **Categories** tab.

Step 3 Find and select the categories of URL you want to add from the **Categories** list. To match encrypted web traffic regardless of category, select **Any** category.

To search for categories to add, click the **Search by name or value** prompt above the **Categories** list, then type the category name. The list updates as you type to display matching categories.

To select a category, click it. To select multiple categories, use the Shift and Ctrl keys.

Tip Although you can right-click and **Select All** categories, adding all categories this way exceeds the 50-item maximum for an access control rule. Instead, use **Any**.

There may be more than one page of categories. Be sure you have addressed all pages by clicking the arrows below the categories list..

Step 4 Optionally, qualify your category selections by clicking a reputation level from the **Reputations** list. If you do not specify a reputation level, the module defaults to **Any**, meaning all levels.

You can only select one reputation level. When you choose a reputation level, the SSL rule behaves differently depending on its purpose:

- If the rule blocks web access or decrypts traffic (the rule action is **Block**, **Block with reset**, **Decrypt - Known Key**, **Decrypt - Resign**, or **Monitor**) selecting a reputation level also selects all reputations more severe than that level. For example, if you configure a rule to block **Suspicious sites** (level 2), it also automatically blocks **High Risk** (level 1) sites.

- If the rule allows web access, subject to access control (the rule action is **Do not decrypt**), selecting a reputation level also selects all reputations less severe than that level. For example, if you configure a rule to allow **Benign Sites** (level 4), it also automatically allows **Well known** (level 5) sites.

If you change the rule action for a rule, the module automatically changes the reputation levels in Category conditions according to the above points.

Step 5 Click **Add to Rule** or to add the selected items to the **Selected Categories** list.

You can also drag and drop selected items.

Step 6 Save or continue editing the rule.

What to do next

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Limitations on URL Detection and Blocking

License: URL Filtering

Keep the following points in mind when performing URL detection and blocking.

Speed of URL Identification

The module cannot categorize URLs before:

- a monitored connection is established between a client and server
- the module identifies the HTTPS application in the session
- the module identifies the requested URL from either the client hello message or the server certificate

This identification occurs after the server certificate exchange. If traffic exchanged during the handshake matches all other conditions in an SSL rule containing a URL condition but the identification is not complete, the SSL policy allows the packet to pass. This behavior allows the connection to be established so that URLs can be identified. For your convenience, affected rules are marked with an information icon ( ).

After the module completes its identification, it applies the SSL rule action to the remaining session traffic that matches its URL condition.

Search Query Parameters in URLs

The module does not use search query parameters in the URL to match URL conditions. For example, consider a scenario where you block all shopping traffic. In that case, using a web search to search for amazon.com is not blocked, but browsing to amazon.com is.

Controlling Traffic Based on Server Certificate Characteristics

License: Any

You can create SSL rules that handle and decrypt encrypted traffic based on server certificate characteristics. You can detect the protocol version or cipher suite used to encrypt the session, and handle traffic accordingly. You can also detect the server certificate and handle traffic, based on the following server certificate characteristics:

- the server certificate itself
- the certificate issuer, whether an issuing CA or if the certificate is self-signed
- the certificate holder
- various certificate statuses, such as whether the certificate is valid, or revoked by the issuing CA

To detect multiple cipher suites in a rule, the certificate issuer, or the certificate holder, you can create reusable cipher suite list and distinguished name objects and add them to your rule. To detect the server certificate and certain certificate statuses, you must create external certificate and external CA objects for the rule.

Controlling Encrypted Traffic by Certificate Distinguished Name

License: Any

Distinguished name conditions in SSL rules allow you to handle and inspect encrypted traffic based on the CA that issued a server certificate, or the certificate holder. Based on the issuer distinguished name, you can handle traffic based on the CA that issued a site's server certificate. Because the subject distinguished name contains the website's URL, you can also handle encrypted traffic to and from specific URLs.

When configuring the rule condition, you can manually specify a literal value, reference a distinguished name object, or reference a distinguished name group containing multiple objects.

Note You cannot configure a distinguished name condition if you also select the **Decrypt - Known Key** action. Because that action requires you to select a server certificate to decrypt traffic, the certificate already matches the traffic. See Decrypt Actions: Decrypting Traffic for Further Inspection, on page 206 for more information.

You can match against multiple subject and issuer distinguished names in a single certificate status rule condition; only one common or distinguished name needs to match to match the rule.

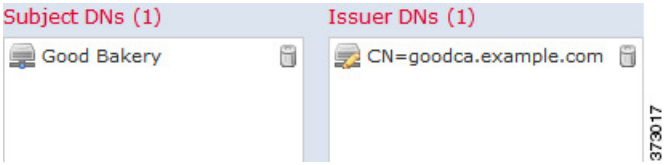
If you add a distinguished name manually, it can contain the common name attribute (**CN**). If you add a common name without CN= then the module prepends CN= before saving the object.

You can also add a distinguished name with one of each attribute listed in the following table, separated by commas.

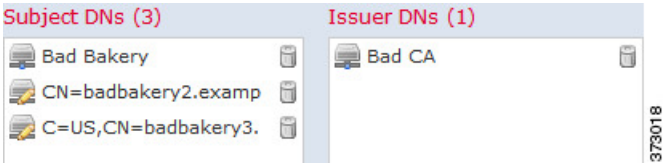
Table 43: Distinguished Name Attributes

Attribute	Description	Allowed Values
C	Country Code	two alphabetic characters
CN	Common Name	up to 64 alphanumeric, backslash (\), hyphen (-), quotation ("), asterisk (*), period (.), or space characters
O	Organization	
OU	Organizational Unit	

The following graphic illustrates a distinguished name rule condition searching for certificates issued to goodbakery.example.com or issued by goodca.example.com. Traffic encrypted with these certificates is allowed, subject to access control.



The following graphic illustrates a distinguished name rule condition searching for certificates issued to badbakery.example.com and associated domains, or certificates issued by badca.example.com. Traffic encrypted with these certificates is decrypted using a re-signed certificate.



You can add a maximum of 50 literal values and distinguished name objects to the **Subject DNs**, and 50 literal values and distinguished name objects to the **Issuer DNs**, in a single DN condition.

The ASA FirePOWER module-provided DN object group, Sourcefire Undecryptable Sites, contains websites whose traffic the module cannot decrypt. You can add this group to a DN condition to block or not decrypt traffic to or from these websites, without wasting system resources attempting to decrypt that traffic. You can modify individual entries in the group. You cannot delete the group. System updates can modify the entries on this list, but the module preserves user changes.

The first time the system detects an encrypted session to a new server, DN data is not available for ClientHello processing, which can result in an undecrypted first session. After the initial session, the managed device caches data from the server Certificate message. For subsequent connections from the same client, the system can match the ClientHello message conclusively to rules with DN conditions and process the message to maximize decryption potential.

To inspect encrypted traffic based on certificate subject or issuer distinguished name:

Step 1 In the SSL policy where you want to control encrypted traffic by certificate subject or issuer distinguished name, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor**, select the **DN** tab.

The **DN** tab appears.

Step 3 Find and select the distinguished names you want to add from the **Available DNs**, as follows:

- To add a distinguished name object on the fly, which you can then add to the condition, click the add icon above the **Available DNs** list; see Working with Distinguished Name Objects, on page 51.
- To search for distinguished name objects and groups to add, click the **Search by name or value** prompt above the **Available DNs** list, then type either the name of the object, or a value in the object. The list updates as you type to display matching objects.

To select an object, click it. To select multiple objects, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 4 You have the following options:

- Click **Add to Subject** to add the selected objects to the **Subject DNs** list.
- Click **Add to Issuer** to add the selected objects to the **Issuer DNs** list.

You can also drag and drop selected objects.

Step 5 Add any literal common names or distinguished names that you want to specify manually.

Click the **Enter DN or CN** prompt below the **Subject DNs** or **Issuer DNs** list; then type a common name or distinguished name and click **Add**.

Step 6 Add or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Controlling Encrypted Traffic by Certificate

License: Any

Certificate conditions in SSL rules allow you to handle and inspect encrypted traffic based on the server certificate used to encrypt that traffic. You can configure a condition with one or more certificates; traffic matches the rule if the certificate matches any of the condition's certificates.

When you build a certificate-based SSL rule condition, you can upload a server certificate; you save the certificate as an external certificate *object*, which is reusable and associates a name with a server certificate. Alternately, you can configure certificate conditions with existing external certificate objects and object groups.

You can search the **Available Certificates** field in the rule condition based for external certificate objects and object groups based on the following certificate distinguished name characteristics:

- subject or issuer common name (CN)
- subject or issuer organization (O)
- subject or issuer organizational unit (OU)

You can choose to match against multiple certificates in a single certificate rule condition; if the certificate used to encrypt the traffic matches any of the uploaded certificates, the encrypted traffic matches the rule.

You can add a maximum of 50 external certificate objects and external certificate object groups to the **Selected Certificates** in a single certificate condition.

Note the following:

- You cannot configure a certificate condition if you also select the **Decrypt - Known Key** action. Because that action requires you to select a server certificate to decrypt traffic, the implication is that the certificate already matches the traffic. See Decrypt Actions: Decrypting Traffic for Further Inspection, on page 206 for more information.
- If you configure a certificate condition with an external certificate object, any cipher suites you add to a cipher suite condition, or internal CA objects you associate with the **Decrypt - Resign** action, must match the external certificate's signature algorithm type. For example, if your rule's certificate condition

references an EC-based server certificate, any cipher suites you add, or CA certificates you associate with the **Decrypt - Resign** action, must also be EC-based. If you mismatch signature algorithm types in this case, the policy editor displays a warning icon next to the rule. For more information, see Controlling Encrypted Traffic by Cipher Suite, on page 238 and Decrypt Actions: Decrypting Traffic for Further Inspection, on page 206.

- The first time the system detects an encrypted session to a new server, certificate data is not available for ClientHello processing, which can result in an undecrypted first session. After the initial session, the managed device caches data from the server Certificate message. For subsequent connections from the same client, the system can match the ClientHello message conclusively to rules with certificate conditions and process the message to maximize decryption potential.

To inspect encrypted traffic based on server certificate:

Step 1 In the SSL policy where you want to control encrypted traffic based on server certificate, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor**, select the **Certificate** tab.

The **Certificate** tab appears.

Step 3 Find and select the server certificates you want to add from the **Available Certificates**, as follows;

- To add an external certificate object on the fly, which you can then add to the condition, click the add icon ( ) above the **Available Certificates** list; see Working with Distinguished Name Objects, on page 51.
- To search for certificate objects and groups to add, click the **Search by name or value** prompt above the **Available Certificates** list, then type either the name of the object, or a value in the object. The list updates as you type to display matching objects.

To select an object, click it. To select multiple objects, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 4 Click **Add to Rule** to add the selected objects to the **Subject Certificates** list.

You can also drag and drop selected objects.

Step 5 Add or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Controlling Encrypted Traffic by Certificate Status

License: Any

Certificate status conditions in SSL rules allow you to handle and inspect encrypted traffic based on the status of the server certificate used to encrypt the traffic, including whether a certificate is valid, revoked, expired, not yet valid, self-signed, or signed by a trusted CA.

Checking whether a CA issued or revoked a certificate requires uploading root and intermediate CA certificates and associated CRLs as objects. You then add these trusted CA objects to an SSL policy's list of trusted CA certificates.

For each certificate status SSL rule condition you configure, you can match traffic against the presence or absence of a given status. You can select several statuses in one rule condition; if the certificate matches any of the selected statuses, the rule matches the traffic.

Trusting External Certificate Authorities

License: Any

You can trust CAs by adding root and intermediate CA certificates to your SSL policy, then use these trusted CAs to verify server certificates used to encrypt traffic. Verified server certificates include certificates signed by trusted CAs.

If a trusted CA certificate contains an uploaded certificate revocation list (CRL), you can also verify whether a trusted CA revoked the encryption certificate. See Adding a Certificate Revocation List to a Trusted CA Object, on page 58 for more information.

After you add trusted CA certificates to the SSL policy, you can configure an SSL rule with various Certificate Status conditions to match against this traffic. See Working with Trusted Certificate Authority Objects, on page 57 and Controlling Encrypted Traffic by Certificate Status, on page 233or more information.

Tip Upload all certificates within a root CA's chain of trust to the list of trusted CA certificates, including the root CA certificate and all intermediate CA certificates. Otherwise, it is more difficult to detect trusted certificates issued by intermediate CAs.

When you create an SSL policy, the ASA FirePOWER module populates the Trusted CA Certificates tab with a default Trusted CA object group, Cisco Trusted Authorities. You can modify individual entries in the group, and choose whether to include this group in your SSL policy. You cannot delete the group. System updates can modify the entries on this list, but user changes are preserved. See Creating a Basic SSL Policy, on page 182 for more information.

To add trusted CAs to your policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **SSL**.

The **SSL Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the SSL policy you want to configure.

The **SSL policy editor** appears.

Step 3 Select the **Trusted CA Certificates** tab.

The **Trusted CA Certificates** page appears.

Step 4 Find and select the trusted CAs you want to add from the **Available Trusted CAs**, as follows:

- To add a trusted CA object on the fly, which you can then add to the condition, click the **add** icon ( ) above the **Available Trusted CAs** list; see Working with Trusted Certificate Authority Objects, on page 57.

- To search for trusted CA objects and groups to add, click the **Search by name or value** prompt above the **Available Trusted CAs** list, then type either the name of the object, or a value in the object. The list updates as you type to display matching objects.

To select an object, click it. To select multiple objects, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 5 Click **Add to Rule** to add the selected objects to the **Selected Trusted CAs** list.

You can also drag and drop selected objects.

Step 6 Add or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Working with Trusted Certificate Authority Objects, on page 57.

Matching Traffic on Certificate Status

License: Any

Based on the certificate status rule condition configuration, you can match encrypted traffic based on the status of the server certificate used to encrypt traffic. You can:

- check for a server certificate status
- check that a certificate does not have a status
- skip checking for the presence or absence of a certificate status

You can choose to match against the presence or absence of multiple certificate statuses in a single certificate status rule condition; the certificate needs to only match one of the criteria to match the rule.

The following table describes how the ASA FirePOWER module evaluates encrypted traffic based on the encrypting server certificate's status.

Table 44: Certificate Status Rule Condition Criteria

Status Check	Status Set to Yes	Status Set to No
Revoked	The policy trusts the CA that issued the server certificate, and the CA certificate uploaded to the policy contains a CRL that revokes the server certificate	The policy trusts the CA that issued the server certificate, and the CA certificate uploaded to the policy does not contain a CRL that revokes the certificate.
Self-signed	The detected server certificate contains the same subject and issuer distinguished name	The detected server certificate contains different subject and issuer distinguished names.

Status Check	Status Set to Yes	Status Set to No
Valid	All of the following are true: • The policy trusts the CA that issued the certificate • The signature is valid • The issuer is valid • None of the policy's trusted CAs revoked the certificate. • The current date is between the certificate Valid From and Valid To date	At least one of the following is true: • The policy does not trust the CA that issued the certificate • The signature is invalid • The issuer is invalid • A trusted CA in the policy revoked the certificate • The current date is before the certificate Valid From date • The current date is after the certificate Valid To date
Invalid signature	The certificate's signature cannot be properly validated against the certificate's content.	The certificate's signature is properly validated against the certificate's content.
Invalid issuer	The issuer CA certificate is not stored in the policy's list of trusted CA certificates.	The issuer CA certificate is stored in the policy's list of trusted CA certificates.
Expired	The current date is after the certificate Valid To date.	The current date is before or on the certificate Valid To date.
Not yet valid	The current date is before the certificate Valid From date.	The current date is after or on the certificate Valid From date.

Consider the following example. The organization trusts the Verified Authority certificate authority. The organization does not trust the Spammer Authority certificate authority. The system administrator uploads the Verified Authority certificate and an intermediate CA certificate issued by Verified Authority to the module. Because Verified Authority revoked a certificate it previously issued, the system administrator uploads the CRL that Verified Authority distributed.

The following graphic illustrates a certificate status rule condition checking for valid certificates, those issued by Verified Authority, not on the CRL, and still within the Valid From and Valid To date. Because of the configuration, traffic encrypted with these certificates is not decrypted and inspected with access control.

The following graphic illustrates a certificate status rule condition checking for the absence of a status. In this case, because of the configuration, it matches against traffic encrypted with a certificate that has not expired and monitors that traffic.

The following graphic illustrates a certificate status rule condition that matches on the presence or absence of several statuses. Because of the configuration, if the rule matches incoming traffic encrypted with a certificate issued by an invalid user, self-signed, invalid, or expired, it decrypts the traffic with a known key.

6>

Note that even though a certificate may match more than one status, the rule only takes an action on the traffic once.

Note The first time the system detects an encrypted session to a new server, certificate status is not available for ClientHello processing, which can result in an undecrypted first session. After the initial session, the managed device caches data from the server Certificate message. For subsequent connections from the same client, the system can match the ClientHello message conclusively to rules with certificate status conditions and process the message to maximize decryption potential.

To inspect encrypted traffic by server certificate status:

Step 1 In the SSL policy where you want to control encrypted traffic based on server certificate status, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor,** select the **Cert Status** tab.

The **Cert Status** tab appears.

Step 3 For each certificate status, you have the following options:

- Select **Yes** to match against the presence of that certificate status.
- Select **No** to match against the absence of that certificate status.
- Select **Do Not Match** to not match that certificate status.

Step 4 Add or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73 .

Controlling Encrypted Traffic by Cipher Suite

License: Any

Cipher suite conditions in SSL rules allow you to handle and inspect encrypted traffic based on the cipher suite used to negotiate the encrypted session. Cisco provides predefined cipher suites you can add to a cipher suite rule condition. You can also add cipher suite list objects containing multiple cipher suites. For more information on cipher suite lists, see Working with Geolocation Objects, on page 60.

Note You cannot add new cipher suites. You can neither modify nor delete predefined cipher suites.

You can add a maximum of 50 cipher suites and cipher suite lists to the **Selected Cipher Suites** in a single Cipher Suite condition.

Note the following:

- If you add cipher suites not supported for your deployment, you cannot apply the access control policy associated with the SSL policy. For example, passive deployments do not support decrypting traffic with the any of the ephemeral Diffie-Hellman (DHE) or ephemeral elliptic curve Diffie-Hellman (ECDHE) cipher suites. Creating a rule with these cipher suites prevents you from applying your access control policy.
- If you configure a cipher suite condition with a cipher suite, any external certificate objects you add to a certificate condition, or internal CA objects you associate with the **Decrypt - Resign** action, must match the cipher suite's signature algorithm type. For example, if your rule's cipher suite condition references an EC-based cipher suite, any server certificates you add, or CA certificates you associate with the **Decrypt - Resign** action, must also be EC-based. If you mismatch signature algorithm types in this case, the policy editor displays a warning icon next to the rule. For more information, see Controlling Encrypted Traffic by Cipher Suite, on page 238 and Decrypt Actions: Decrypting Traffic for Further Inspection, on page 206.
- You can add an anonymous cipher suite to the Cipher Suite condition in an SSL rule, but keep in mind:
  - The system automatically strips anonymous cipher suites during ClientHello processing. For the system to use the rule, you must also configure your SSL rules in an order that prevents ClientHello processing. For more information, see Ordering SSL Rules to Improve Performance and Avoid Preemption, on page 211.

- You cannot use either the **Decrypt - Resign** or **Decrypt - Known Key** action in the rule, because the system cannot decrypt traffic encrypted with an anonymous cipher suite.

- When specifying a cipher suite as a rule condition, consider that the rule matches on the negotiated cipher suite in the ServerHello message, rather than on the full list of cipher suites specified in the ClientHello message. During ClientHello processing, the managed device strips unsupported cipher suites from the ClientHello message. However, if this results in all specified cipher suites being stripped, the system retains the original list. If the system retains unsupported cipher suites, subsequent evaluation results in an undecrypted session.

To inspect encrypted traffic by cipher suite:

Step 1 In the SSL policy where you want to control encrypted traffic by cipher suite, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor**, select the **Cipher Suite** tab.

The **Cipher Suite** tab appears.

Step 3 Find and select the cipher suites you want to add from the **Available Cipher Suites**, as follows;

- To add a cipher suite list on the fly, which you can then add to the condition, click the add icon above the **Available Cipher Suites** list; see Working with Geolocation Objects, on page 60.
- To search for cipher suites and lists to add, click the **Search by name or value** prompt above the **Available Cipher Suites** list, then type either the name of the cipher suite, or a value in the cipher suite. The list updates as you type to display matching cipher suites.

To select a cipher suite, click it. To select multiple cipher suites, use the Shift and Ctrl keys, or right-click and then select **Select All**.

Step 4 Click **Add to Rule** to add the selected cipher suites to the **Selected Cipher Suites** list.

You can also drag and drop selected cipher suites.

Step 5 Add or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Controlling Traffic by Encryption Protocol Version

License: Any

Session conditions in SSL rules allow you to inspect encrypted traffic based on the SSL or TLS version used to encrypt the traffic. You can choose to match against traffic encrypted with SSL version 3.0, or TLS version 1.0, 1.1, or 1.2. By default, all protocol versions are selected when you create a rule; if you select multiple versions, encrypted traffic that matches any of the selected versions matches the rule. You must select at least one protocol version when saving the rule condition.

Note You cannot select SSL v2.0 in a version rule condition; the ASA FirePOWER module does not support decrypting traffic encrypted with SSL version 2.0. You can configure an undecryptable action to allow or block this traffic without further inspection. For more information, see Logging Decryptable Connections with SSL Rules, on page 394.

To inspect encrypted traffic by SSL or TLS version:

Step 1 In the SSL policy where you want to control encrypted traffic by encryption protocol version, create a new SSL rule or edit an existing rule.

For detailed instructions, see Understanding and Creating SSL Rules, on page 198.

Step 2 In the **SSL rule editor**, select the **Version** tab.

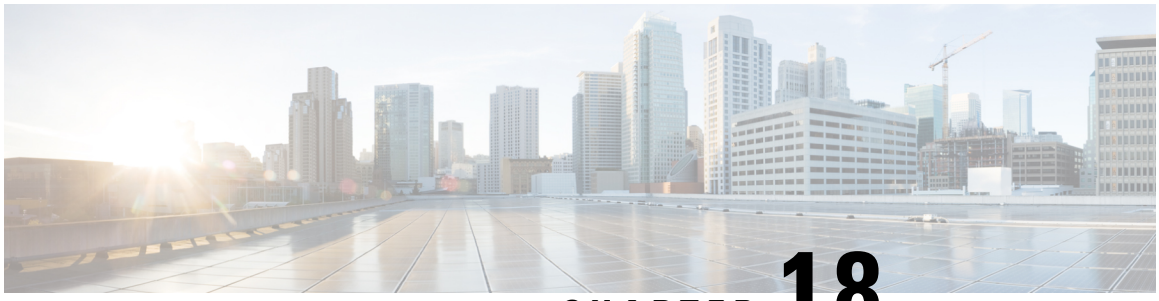
The **Version** tab appears.

Step 3 Select the protocol versions you want to match against: **SSL v3.0**, **TLS v1.0**, **TLS v1.1**, or **TLS v1.2**.

Step 4 Add or continue editing the rule.

You must apply the access control policy associated with the SSL policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

What to do next



CHAPTER 18

Understanding Network Analysis and Intrusion Policies

Network analysis and intrusion policies work together as part of the ASA FirePOWER module intrusion detection and prevention feature. The term *intrusion detection* generally refers to the process of passively analyzing network traffic for potential intrusions and storing attack data for security analysis. The term *intrusion prevention* includes the concept of intrusion detection, but adds the ability to block or alter malicious traffic as it travels across your network.

About Network Analysis and Intrusion Policies

The ASA FirePOWER module handles the intrusion detection and prevention feature where, it uses network analysis and intrusion policies.

In an intrusion prevention deployment, when the system examines packets:

- **network analysis policy** governs how traffic is *decoded* and *preprocessed* so that it can be further evaluated, especially for anomalous traffic that might signal an intrusion attempt.
- An **intrusion policy** uses *intrusion and preprocessor rules* (sometimes referred to collectively as *intrusion rules*) to examine the decoded packets for attacks based on patterns. Intrusion policies are paired with *variable sets* , which allow you to use named values to accurately reflect your network environment.

Both network analysis and intrusion policies are invoked by a parent access control policy, but at different times. As the system analyzes traffic, the network analysis (decoding and preprocessing) phase occurs before and separately from the intrusion prevention (additional preprocessing and intrusion rules) phase. Together, network analysis and intrusion policies provide broad and deep packet inspection. They can help you detect, alert on, and protect against network traffic that could threaten the availability, integrity, and confidentiality of hosts and their data.

The ASA FirePOWER moduleis delivered with several similarly named network analysis and intrusion policies (for example, Balanced Security and Connectivity) that complement and work with each other. By using system-provided policies, you can take advantage of the experience of the Cisco Vulnerability Research Team

(VRT). For these policies, the VRT sets intrusion and preprocessor rule states, as well as provides the initial configurations for preprocessors and other advanced settings.

You can also create custom network analysis and intrusion policies. You can tune settings in custom policies to inspect traffic in the way that matters most to you.

You create, edit, save, and manage network analysis and intrusion policies using similar policy editors. When you are editing either type of policy, a navigation panel appears on the left side of the user interface; the right side displays various configuration pages.

This chapter contains a brief overview of the types of configurations the network analysis and intrusion policies govern, explains how the policies work together to examine traffic and generate records of policy violations, and provides basic information on navigating the policy editors. This chapter also explains the benefits and limitations of using custom versus system-provided policies. To customize your intrusion deployment, see the following for your next steps:

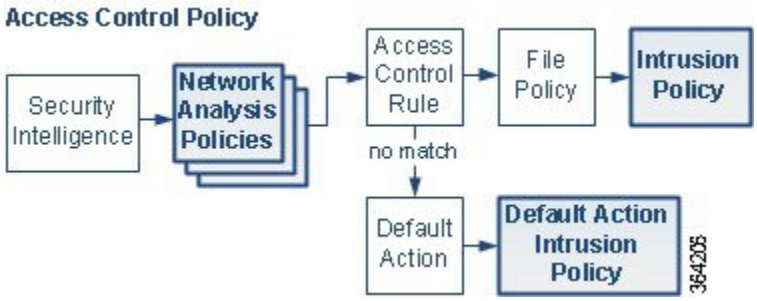
- Working with Variable Sets, on page 29 explains how to configure the system's intrusion variables to accurately reflect your network environment. Even if you do not use custom policies, Cisco **strongly** recommends that you modify the default variables in the default variable set. Advanced users can create and use custom variable sets for pairing with one or more custom intrusion policies.
- About Intrusion Policies, on page 277 explains how to create and edit a simple custom intrusion policy.
- Controlling Traffic Using Intrusion and File Policies, on page 135 explains how to configure the system to use intrusion policies to examine only the traffic you are interested in by associating intrusion policies with a parent access control policy. It also explains how to configure advanced intrusion policy performance options.
- Using Layers in a Network Analysis or Intrusion Policy Layers, on page 257 explain how, in larger organizations or complex deployments, you can use building blocks called policy *layers* to more efficiently manage multiple network analysis or intrusion policies.

Understanding How Policies Examine Traffic For Intrusions

License: Protection

When the system analyzes traffic as part of your access control deployment, the network analysis (decoding and preprocessing) phase occurs before and separately from the intrusion prevention (intrusion rules and advanced settings) phase.

The following diagram shows, in a simplified fashion, the order of traffic analysis in an inline, intrusion prevention and advanced malware protection (AMP) deployment. It illustrates how the access control policy invokes other policies to examine traffic, and in which order those policies are invoked. The network analysis and intrusion policy selection phases are highlighted.



Similarly, at each step of the process, a packet could cause the system to generate an event. Intrusion and preprocessor events (sometimes referred to collectively as *intrusion events*) are indications that a packet or its contents may represent a security risk.

Note that for a single connection, although the system selects a network analysis policy before an access control rule as shown in the diagram, some preprocessing (notably application layer preprocessing) occurs after access control rule selection. This does **not** affect how you configure preprocessing in custom network analysis policies.

Decoding, Normalizing, and Preprocessing: Network Analysis Policies

License: Protection

Without decoding and preprocessing, the system could not appropriately evaluate traffic for intrusions because protocol differences would make pattern matching impossible. As shown in the diagram in Understanding How Policies Examine Traffic For Intrusions, on page 242, network analysis policies govern these traffic-handling tasks:

- after traffic is filtered by Security Intelligence
- before traffic can be inspected by file or intrusion policies

A network analysis policy governs packet processing in phases. First the system decodes packets through the first three TCP/IP layers, then continues with normalizing, preprocessing, and detecting protocol anomalies.

- The packet decoder converts packet headers and payloads into a format that can be easily used by the preprocessors and later, intrusion rules. Each layer of the TCP/IP stack is decoded in turn, beginning with the data link layer and continuing through the network and transport layers. The packet decoder also detects various anomalous behaviors in packet headers.
- In inline deployments, the inline normalization preprocessor reformats (normalizes) traffic to minimize the chances of attackers evading detection. It prepares packets for examination by other preprocessors and intrusion rules, and helps ensure that the packets the system processes are the same as the packets received by the hosts on your network.
- Various network and transport layers preprocessors detect attacks that exploit IP fragmentation, perform checksum validation, and perform TCP and UDP session preprocessing.

Note that some advanced transport and network preprocessor settings apply globally to all traffic handled by an access control policy. You configure these in the access control policy rather than in a network analysis policy.

- Various application-layer protocol decoders normalize specific types of packet data into formats that the intrusion rules engine can analyze. Normalizing application-layer protocol encodings allows the system

to effectively apply the same content-related intrusion rules to packets whose data is represented differently, and to obtain meaningful results. For more information.

- The Modbus and DNP3 SCADA preprocessors detect traffic anomalies and provide data to intrusion rules. Supervisory Control and Data Acquisition (SCADA) protocols monitor, control, and acquire data from industrial, infrastructure, and facility processes such as manufacturing, production, water treatment, electric power distribution, airport and shipping systems, and so on.
- Several preprocessors allow you to detect specific threats, such as Back Orifice, portscans, SYN floods and other rate-based attacks.

Note that you configure the sensitive data preprocessor, which detects sensitive data such as credit card numbers and Social Security numbers in ASCII text, in intrusion policies.

In a newly created access control policy, one default network analysis policy governs preprocessing for *all* traffic for *all* intrusion policies invoked by the same parent access control policy. Initially, the system uses the Balanced Security and Connectivity network analysis policy as the default, but you can change it to another system-provided or custom network analysis policy. In a more complex deployment, advanced users can tailor traffic preprocessing options to specific security zones and networks by assigning different custom network analysis policies to preprocess matching traffic. For more information, see Comparing System-Provided with Custom Policies, on page 247.

Table 45: Decoded Packets

TCP/IP Layer	Decoded Packets
Data Link	• Ethernet • Virtual local area network (VLAN) • Multiprotocol Label Switching (MPLS)
Network	• Encapsulated Remote Switched Port Analyzer (ERSPAN) Type II, Type III • Internet Protocol version 4 (IPv4) • Internet Protocol version 6 (IPv6) • Internet Control Message Protocol version 4 (ICMPv4) • Internet Control Message Protocol version 6 (ICMPv6) • Point-to-Point Protocol (PPP) • Point-to-Point Protocol over Ethernet (PPPoE) • Generic Routing Encapsulation (GRE) • Encapsulating Security Protocol (ESP) • Teredo tunneling • GPRS Tunneling Protocol (GTP)

TCP/IP Layer	Decoded Packets
Transport	• Transmission Control Protocol (TCP) • User Datagram Protocol (UDP)

Access Control Rules: Intrusion Policy Selection

License: Protection

After initial preprocessing, access control rules (when present) evaluate traffic. In most cases, the first access control rule that a packet matches is the rule that handles that traffic; you can monitor, trust, block, or allow matching traffic.

When you allow traffic with an access control rule, the system can inspect the traffic for malware, prohibited files, and intrusions, in that order. Traffic not matching any access control rule is handled by the access control policy's default action, which can also inspect for intrusions.

Note All packets, regardless of which network analysis policy preprocesses them, are matched to configured access control rules—and thus are potentially subject to inspection by intrusion policies—in top-down order. For more information, see Limitations of Custom Policies, on page 251.

The diagram in Understanding How Policies Examine Traffic For Intrusions, on page 242 shows the flow of traffic through a device in an inline, intrusion prevention and AMP deployment, as follows:

- The access control rule allows matching traffic to proceed. The traffic is then inspected for prohibited files and malware by a file policy, and then for intrusions by an intrusion policy.
- In this scenario, the access control policy's default action allows matching traffic. The traffic is then inspected by an intrusion policy. You can (but do not have to) use a different intrusion policy when you associate intrusion policies with access control rules or the default action.

The example in the diagram does not include any blocking or trusting rules because the system does not inspect blocked or trusted traffic. For more information, see Using Rule Actions to Determine Traffic Handling and Inspection, on page 95 and Setting Default Handling and Inspection for Network Traffic, on page 66.

Intrusion Inspection: Intrusion Policies, Rules, and Variable Sets

License: Protection

You can use intrusion prevention as the system's last line of defense before traffic is allowed to proceed to its destination. Intrusion policies govern how the system inspects traffic for security violations and, in inline deployments, can block or alter malicious traffic. The main function of intrusion policies is to manage which intrusion and preprocessor rules are enabled and how they are configured.

Intrusion and Preprocessor Rules

An intrusion rule is a specified set of keywords and arguments that detects attempts to exploit vulnerabilities on your network; the system uses an intrusion rule to analyze network traffic to check if it matches the criteria

in the rule. The system compares packets against the conditions specified in each rule and, if the packet data matches all the conditions specified in a rule, the rule triggers.

The system includes the following types of rules created by the VRT:

- *shared object intrusion rules* , which are compiled and cannot be modified (except for rule header information such as source and destination ports and IP addresses)
- *standard text intrusion rules* , which can be saved and modified as new custom instances of the rule.
- *preprocessor rules* , which are rules associated with preprocessors and packet decoder detection options in the network analysis policy. You cannot copy or edit preprocessor rules. Most preprocessor rules are disabled by default; you must enable them to use preprocessors to generate events and, in an inline deployment, drop offending packets.

When the system processes packets according to an intrusion policy, first a rule optimizer classifies all activated rules in subsets based on criteria such as: transport layer, application protocol, direction to or from the protected network, and so on. Then, the intrusion rules engine selects the appropriate rule subsets to apply to each packet. Finally, a multi-rule search engine performs three different types of searches to determine if the traffic matches the rule:

- The protocol field search looks for matches in particular fields in an application protocol.
- The generic content search looks for ASCII or binary byte matches in the packet payload.
- The packet anomaly search looks for packet headers and payloads that, rather than containing specific content, violate well-established protocols.

In a custom intrusion policy, you can tune detection by enabling and disabling rules, as well as by writing and adding your own standard text rules.

Variable Sets

Whenever the system uses an intrusion policy to evaluate traffic, it uses an associated *variable set* . Most variables in a set represent values commonly used in intrusion rules to identify source and destination IP addresses and ports. You can also use variables in intrusion policies to represent IP addresses in rule suppressions and dynamic rule states.

The system provides a single default variable set, which is comprised of predefined default variables. Most system-provided shared object rules and standard text rules use these predefined default variables to define networks and port numbers. For example, the majority of the rules use the variable $HOME_NET to specify the protected network and the variable $EXTERNAL_NET to specify the unprotected (or outside) network. In addition, specialized rules often use other predefined variables. For example, rules that detect exploits against web servers use the $HTTP_SERVERS and $HTTP_PORTS variables.

Tip Even if you use system-provided intrusion policies, Cisco **strongly** recommends you modify key default variables in the default set. When you use variables that accurately reflect your network environment, processing is optimized and the system can monitor relevant systems for suspicious activity. Advanced users can create and use custom variable sets for pairing with one or more custom intrusion policies. For more information, see Optimizing Predefined Default Variables, on page 30.

Intrusion Event Generation

License: Protection

When the system identifies a possible intrusion, it generates an *intrusion* or *preprocessor event* (sometimes collectively called *intrusion events*). You can view the data to gain a greater understanding of the attacks against your network assets. In an inline deployment, the system can also drop or replace packets that you know to be harmful.

Each intrusion event includes an event header and contains information about the event name and classification; the source and destination IP addresses; ports; the process that generated the event; and the date and time of the event, as well as contextual information about the source of the attack and its target. For packet-based events, the system also logs a copy of the decoded packet header and payload for the packet or packets that triggered the event.

The packet decoder, the preprocessors, and the intrusion rules engine can all cause the system to generate an event. For example:

- If the packet decoder (configured in the network analysis policy) receives an IP packet that is less than 20 bytes, which is the size of an IP datagram without any options or payload, the decoder interprets this as anomalous traffic. If, later, the accompanying decoder rule in the intrusion policy that examines the packet is enabled, the system generates a preprocessor event.
- If the IP defragmentation preprocessor encounters a series of overlapping IP fragments, the preprocessor interprets this as a possible attack and, when the accompanying preprocessor rule is enabled, the system generates a preprocessor event.
- Within the intrusion rules engine, most standard text rules and shared object rules are written so that they generate intrusion events when triggered by packets.

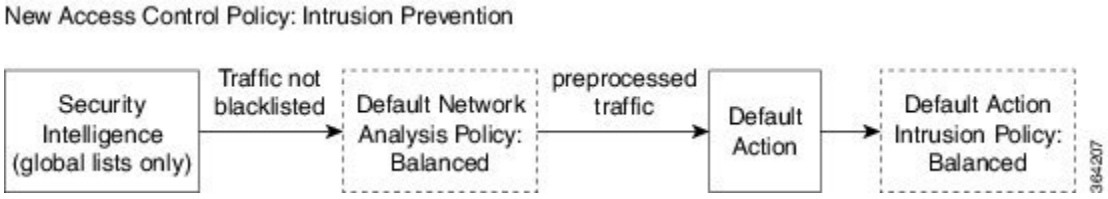
As the device accumulates intrusion events, you can begin your analysis of potential attacks. The system provides you with the tools you need to review intrusion events and evaluate whether they are important in the context of your network environment and your security policies.

Comparing System-Provided with Custom Policies

License: Protection

Creating a new access control policy is one of the first steps in managing traffic flow using the ASA FirePOWER module. By default, a newly created access control policy invokes system-provided network analysis and intrusion policies to examine traffic.

The following diagram shows how a newly created access control policy in an inline, intrusion-prevention deployment initially handles traffic. The preprocessing and intrusion prevention phases are highlighted.



Note how:

- A default network analysis policy governs the preprocessing of *all* traffic handled by the access control policy. Initially, the system-provided *Balanced Security and Connectivity network analysis policy* is the default.
- The default action of the access control policy allows all non-malicious traffic, as determined by the system-provided *Balanced Security and Connectivity intrusion policy* .

- The policy uses default Security Intelligence options (global whitelist and blacklist only), does not decrypt encrypted traffic with an SSL policy, and does not perform special handling and inspection of network traffic using access control rules.

A simple step you can take to tune your intrusion prevention deployment is to use a different set of system-provided network analysis and intrusion policies as your defaults. Cisco delivers several pairs of these policies with the ASA FirePOWER module.

Or, you can tailor your intrusion prevention deployment by creating and using custom policies. You may find that the preprocessor options, intrusion rule, and other advanced settings configured in those policies do not address the security needs of your network. By tuning your network analysis and intrusion policies you can configure, at a very granular level, how the system processes and inspects the traffic on your network for intrusions.

Understanding the System-Provided Policies

License: Protection

Cisco delivers several pairs of network analysis and intrusion policies with the ASA FirePOWER module. By using system-provided network analysis and intrusion policies, you can take advantage of the experience of the Cisco Vulnerability Research Team (VRT). For these policies, the VRT sets intrusion and preprocessor rule states, as well as provides the initial configurations for preprocessors and other advanced settings. You can use system-provided policies as-is, or you can use them as the base for custom policies.

Tip Even if you use system-provided network analysis and intrusion policies, you should configure the system's intrusion variables to accurately reflect your network environment. At a minimum, modify key default variables in the default set; see Optimizing Predefined Default Variables, on page 30.

As new vulnerabilities become known, the VRT releases intrusion rule updates. These rule updates can modify any system-provided network analysis or intrusion policy, and can provide new and updated intrusion rules and preprocessor rules, modified states for existing rules, and modified default policy settings. Rule updates may also delete rules from system-provided policies and provide new rule categories, as well as modify the default variable set.

If a rule update affects your deployment, the system marks affected intrusion and network analysis policies as out of date, as well as their parent access control policies. You must reapply an updated policy for its changes to take effect.

For your convenience, you can configure rule updates to automatically reapply affected intrusion policies, either alone or in combination with affected access control policies. This allows you to easily and automatically keep your deployment up-to-date to protect against recently discovered exploits and intrusions.

To ensure up-to-date preprocessing settings, you must reapply access control policies, which also reapplies any associated SSL, network analysis, and file policies that are different from those currently running, and can also can update default values for advanced preprocessing and performance options. For more information, see Importing Rule Updates and Local Rule Files, on page 483.

Cisco delivers the following network analysis and intrusion policies with the ASA FirePOWER module:

Balanced Security and Connectivity network analysis and intrusion policies

These policies are built for both speed and detection. Used together, they serve as a good starting point for most organizations. The system uses the Balanced Security and Connectivity policies and settings as defaults in most cases.

Connectivity Over Security network analysis and intrusion policies

These policies are built for organizations where connectivity (being able to get to all resources) takes precedence over network infrastructure security. The intrusion policy enables far fewer rules than those enabled in the Security over Connectivity policy. Only the most critical rules that block traffic are enabled.

Security Over Connectivity network analysis and intrusion policies

These policies are built for organizations where network infrastructure security takes precedence over user convenience. The intrusion policy enables numerous network anomaly intrusion rules that could alert on or drop legitimate traffic.

No Rules Active intrusion policy

In the No Rules Active intrusion policy, all intrusion rules and advanced settings are disabled. This policy provides a starting point if you want to create your own intrusion policy instead of basing it on the enabled rules in one of the other system-provided policies.

Caution Cisco uses another policy, Experimental Policy 1, for testing purposes. Do not use it unless instructed to do so by a Cisco representative.

Benefits of Custom Policies

License: Protection

You may find that the preprocessor options, intrusion rules, and other advanced settings configured in the system-provided network analysis and intrusion policies do not fully address the security needs of your organization.

Building custom policies can improve the performance of the system in your environment and can provide a focused view of the malicious traffic and policy violations occurring on your network. By creating and tuning custom policies you can configure, at a very granular level, how the system processes and inspects the traffic on your network for intrusions.

All custom policies have a base policy, also called a base layer, which defines the default settings for all configurations in the policy. A layer is a building block that you can use to efficiently manage multiple network analysis or intrusion policies; see Using Layers in a Network Analysis or Intrusion Policy Layers, on page 257.

In most cases, you base custom policies on system-provided policies, but you can use another custom policy. However, all custom policies have a system-provided policy as the eventual base in a policy chain. Because rule updates can modify system-provided policies, importing a rule update may affect you even if you are using a custom policy as your base. If a rule update affects your policies, the module interface marks affected policies as out of date. For more information, see Allowing Rule Updates to Modify a System-Provided Base Policy, on page 260.

Benefits of a Custom Network Analysis Policy

License: Protection

By default, one network analysis policy preprocesses all unencrypted traffic handled by the access control policy. That means that all packets are decoded and preprocessed according to the same settings, regardless of the intrusion policy (and therefore intrusion rule set) that later examines them.

Initially, the system-provided Balanced Security and Connectivity network analysis policy is the default. A simple way to tune preprocessing is to create and use a custom network analysis policy as the default.

Tuning options available vary by preprocessor, but some of the ways you can tune preprocessors and decoders include:

- You can disable preprocessors that do not apply to the traffic you are monitoring. For example, the HTTP Inspect preprocessor normalizes HTTP traffic. If you are confident that your network does not include any web servers using Microsoft Internet Information Services (IIS), you can disable the preprocessor option that looks for IIS-specific traffic and thereby reduce system processing overhead.

Note If you disable a preprocessor in a custom network analysis policy, but the system needs to use that preprocessor to later evaluate packets against an enabled intrusion or preprocessor rule, the system automatically enables and uses the preprocessor although the preprocessor remains disabled in the network analysis policy user interface.

- Specify ports, where appropriate, to focus the activity of certain preprocessors. For example, you can identify additional ports to monitor for DNS server responses or encrypted SSL sessions, or ports on which you decode telnet, HTTP, and RPC traffic

For advanced users with complex deployments, you can create multiple network analysis policies, each tailored to preprocess traffic differently. Then, you can configure the system to use those policies to govern the preprocessing of traffic using different security zones or networks.

Note Tailoring preprocessing using custom network analysis policies—especially multiple network analysis policies—is an advanced task. Because preprocessing and intrusion inspection are so closely related, you **must** be careful to allow the network analysis and intrusion policies examining a single packet to complement each other. For more information, see Limitations of Custom Policies, on page 251.

Benefits of Custom Intrusion Policies

License: Protection

In a newly created access control policy initially configured to perform intrusion prevention, the default action allows all traffic, but first inspects it with the system-provided Balanced Security and Connectivity intrusion policy. Unless you add access control rules or change the default action, all traffic is inspected by that intrusion policy; see the diagram in Comparing System-Provided with Custom Policies, on page 247.

To customize your intrusion prevention deployment, you can create multiple intrusion policies, each tailored to inspect traffic differently. Then, configure an access control policy with rules that specify which policy inspects which traffic. Access control rules can be simple or complex, matching and inspecting traffic using multiple criteria including security zone, network or geographical location, port, application, requested URL,

or user. The scenario in Understanding How Policies Examine Traffic For Intrusions, on page 242 shows a deployment where traffic is inspected by one of two intrusion policies.

The main function of intrusion policies is to manage which intrusion and preprocessor rules are enabled and how they are configured, as follows:

- Within each intrusion policy, you should verify that all rules applicable to your environment are enabled, and improve performance by disabling rules that are not applicable to your environment. In an inline deployment, you can specify which rules should drop or modify malicious packets. For more information, see Setting Rule States, on page 306.
- You can modify existing rules and write new standard text rules as needed to catch new exploits or to enforce your security policies.

Other customizations you might make to an intrusion policy include:

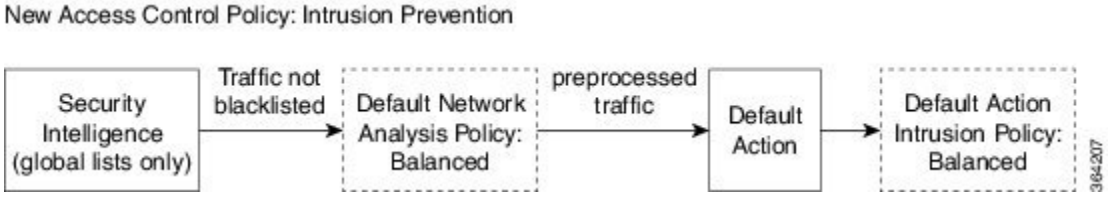
- The sensitive data preprocessor detects sensitive data such as credit card numbers and Social Security numbers in ASCII text. Note that other preprocessors that detect specific threats (back orifice attacks, several portscan types, and rate-based attacks that attempt to overwhelm your network with excessive traffic) are configured in network analysis policies.
- Global thresholds cause the system to generate events based on how many times traffic matching an intrusion rule originates from or is targeted to a specific address or address range within a specified time period. This helps prevent the system from being overwhelmed with a large number of events. For more information, see Limiting Intrusion Event Logging, on page 321.
- Suppressing intrusion event notifications and setting thresholds for individual rules or entire intrusion policies can also can prevent the system from being overwhelmed with a large number of events. For more information, see Filtering Intrusion Event Notification Per Policy, on page 308.
- In addition to intrusion events, you can enable logging to syslog facilities or send event data to an SNMP trap server. Per policy, you can specify intrusion event notification limits, set up intrusion event notification to external logging facilities, and configure external responses to intrusion events. For more information, see Configuring External Alerting for Intrusion Rules, on page 419.

Limitations of Custom Policies

License: Protection

Because preprocessing and intrusion inspection are so closely related, you **must** be careful that your configuration allows the network analysis and intrusion policies processing and examining a single packet to complement each other.

By default, the system uses one network analysis policy to preprocess all traffic. The following diagram shows how a newly created access control policy in an inline, intrusion-prevention deployment initially handles traffic. The preprocessing and intrusion prevention phases are highlighted.



Notice how a default network analysis policy governs the preprocessing of all traffic handled by the access control policy. Initially, the system-provided Balanced Security and Connectivity network analysis policy is the default.

A simple way to tune preprocessing is to create and use a custom network analysis policy as the default, as summarized in Benefits of a Custom Network Analysis Policy, on page 250. However, if you disable a preprocessor in a custom network analysis policy but the system needs to evaluate preprocessed packets against an enabled intrusion or preprocessor rule, the system automatically enables and uses the preprocessor although it remains disabled in the network analysis policy user interface.

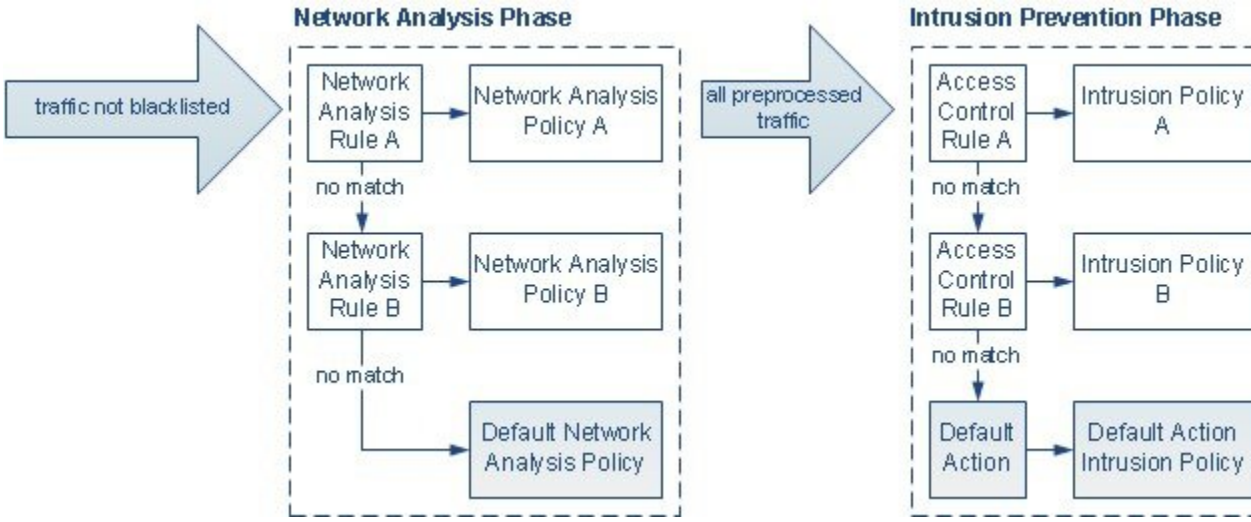
Note In order to get the performance benefits of disabling a preprocessor, you **must** make sure that none of your intrusion policies have enabled rules that require that preprocessor.

An additional challenge arises if you use multiple custom network analysis policies. For advanced users with complex deployments, you can tailor preprocessing to specific security zones and networks by assigning custom network analysis policies to preprocess matching traffic. To accomplish this, you add custom *network analysis rules* to your access control policy. Each rule has an associated network analysis policy that governs the preprocessing of traffic that matches the rule.

Tip You configure network analysis rules as an advanced setting in an access control policy. Unlike other types of rules in the ASA FirePOWER module, network analysis rules invoke—rather than being contained by—network analysis policies.

The system matches packets to any configured network analysis rules in top-down order by rule number. Traffic that does not match any network analysis rule is preprocessed by the default network analysis policy. While this allows you a great deal of flexibility in preprocessing traffic, keep in mind that all packets, **regardless** of which network analysis policy preprocessed them, are subsequently matched to access control rules—and thus to potential inspection by intrusion policies—in their own process. In other words, preprocessing a packet with a particular network analysis policy does **not** guarantee that the packet will be examined with any particular intrusion policy. You **must** carefully configure your access control policy so it invokes the correct network analysis and intrusion policies to evaluate a particular packet.

The following diagram shows in focused detail how the network analysis policy (preprocessing) selection phase occurs before and separately from the intrusion prevention (rules) phase. For simplicity, the diagram eliminates the file/malware inspection phases. It also highlights the default network analysis and default-action intrusion policies.



In this scenario, an access control policy is configured with two network analysis rules and a default network analysis policy:

- Network Analysis Rule A preprocesses matching traffic with Network Analysis Policy A. Later, you want this traffic to be inspected by Intrusion Policy A.
- Network Analysis Rule B preprocesses matching traffic with Network Analysis Policy B. Later, you want this traffic to be inspected by Intrusion Policy B.
- All remaining traffic is preprocessed with the default network analysis policy. Later, you want this traffic to be inspected by the intrusion policy associated with the access control policy's default action.

After the system preprocesses traffic, it can examine the traffic for intrusions. The diagram shows an access control policy with two access control rules and a default action:

- Access Control Rule A allows matching traffic. The traffic is then inspected by Intrusion Policy A.
- Access Control Rule B allows matching traffic. The traffic is then inspected by Intrusion Policy B.
- The access control policy's default action allows matching traffic. The traffic is then inspected by the default action's intrusion policy.

Each packet's handling is governed by a network analysis policy and intrusion policy pair, but the system does **not** coordinate the pair for you. Consider a scenario where you misconfigure your access control policy so that Network Analysis Rule A and Access Control Rule A do not process the same traffic. For example, you could intend the paired policies to govern the handling of traffic on a particular security zone, but you mistakenly use different zones in the two rules' conditions. This could cause traffic to be incorrectly preprocessed. For this reason, tailoring preprocessing using network analysis rules and custom policies is an **advanced** task.

Note that for a single connection, although the system selects a network analysis policy before an access control rule, some preprocessing (notably application layer preprocessing) occurs after access control rule selection. This does **not** affect how you configure preprocessing in custom network analysis policies.

Using the Navigation Panel

License: Protection

Network analysis and intrusion policies use similar user interfaces to edit and save changes to their configurations; see Editing Intrusion Policies, on page 280

A navigation panel appears on the left side of the user interface when you are editing either type of policy. The following graphic shows the navigation panel for the network analysis policy (left) and the intrusion policy (right).

A dividing line separates the navigation panel into links to policy settings you can configure with (below) or without (above) direct interaction with policy layers. To navigate to any settings page, click its name in the navigation panel. Dark shading of an item in the navigation panel highlights your current settings page. For example, in the illustration above the Policy Information page would be displayed to the right of the navigation panel.

Policy Information

The Policy Information page provides configuration options for commonly used settings. As shown in the illustration for the network analysis policy panel above, a policy change icon appears next to **Policy Information** in the navigation panel when the policy contains unsaved changes. The icon disappears when you save your changes.

Rules (intrusion policy only)

The Rules page in an intrusion policy allows you to configure rule states and other settings for shared object rules, standard text rules, and preprocessor rules. For more information, see Tuning Intrusion Policies Using Rules, on page 289.

Settings (network analysis policy) and Advanced Settings (intrusion policy)

The Settings page in a network analysis policy allows you to enable or disable preprocessors and access preprocessor configuration pages. Expanding the **Settings** link displays sublinks to individual configuration pages for all enabled preprocessors in the policy.

The Advanced Settings page in an intrusion policy allows you to enable or disable advanced settings and access configuration pages for those advanced settings. Expanding the **Advanced Settings** link displays sublinks to individual configuration pages for all enabled advanced settings in the policy. For more information, see Configuring Advanced Settings in an Intrusion Policy, on page 282.

Policy Layers

The Policy Layers page displays a summary of the layers that comprise your network analysis or intrusion policy. Expanding the Policy Layers link displays sublinks to summary pages for the layers in your policy. Expanding each layer sublink displays further sublinks to the configuration pages for all rules, preprocessors, or advanced settings that are enabled in the layer. For more information, see Using Layers in a Network Analysis or Intrusion Policy Layers, on page 257.

Resolving Conflicts and Committing Policy Changes

License: Protection

When you edit a network analysis or intrusion policy, you must save (or *commit*) your changes before the system recognizes them.

Note After you save, you must apply a network analysis or intrusion policy for your changes to take effect. If you apply a policy without saving, the system uses the most recently saved configuration. Although you can reapply an intrusion policy independently, network analysis policies are applied with their parent access control policy.

Resolving Editing Conflicts

The Network Analysis Policy page and Intrusion Policy page display whether each policy has unsaved changes; see Editing Intrusion Policies, on page 280.

Cisco recommends that only one person edit a policy at a time. If you are editing the same network analysis or intrusion policy via multiple user interface instances as the same user, and you save your changes for one instance, you cannot save your changes for the other instance.

Resolving Configuration Dependencies

To perform their particular analysis, many preprocessors and intrusion rules require that traffic first be decoded or preprocessed in a certain way, or have other dependencies. When you save a network analysis or intrusion policy, the system either automatically enables required settings, or warns you that disabled settings will have no effect on traffic, as follows:

- You cannot save an intrusion policy if you added an SNMP rule alert but did not configure SNMP alerting. You must either configure SNMP alerting or disable the rule alert, then save again.
- You cannot save an intrusion policy if it includes enabled sensitive data rules but you have not enabled the sensitive data preprocessor. You must either allow the system to enable the preprocessor and save the policy, or disable the rules and save again.
- If you disable a required preprocessor in a network analysis policy, you can still save the policy. However, the system automatically uses the disabled preprocessor with its current settings, even though the

preprocessor remains disabled in the user interface. For more information, see Limitations of Custom Policies, on page 251.

- If you disable inline mode in a network analysis policy but enable the Inline Normalization preprocessor, you can still save the policy. However, the system warns you that normalization settings will be ignored. Disabling inline mode also causes the system to ignore other settings that allow preprocessors to modify or block traffic, including checksum verification and rate-based attack prevention.

Committing, Discarding, and Caching Policy Changes

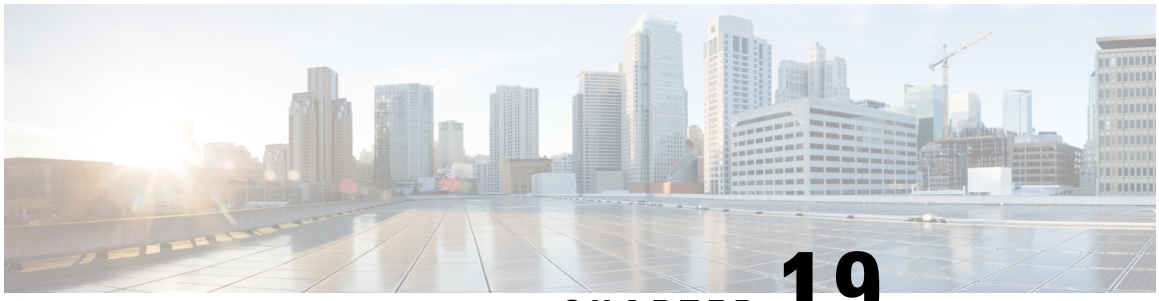
While editing a network analysis or intrusion policy, if you exit the policy editor without saving your changes, the system caches those changes. Your changes are cached even when you log out of the system or experience a system crash. The system cache can store unsaved changes for one network analysis and one intrusion policy; you must commit or discard your changes before editing another policy of the same type. The system discards the cached changes when you edit another policy without saving your changes to the first policy, or when you import an intrusion rule update.

You can commit or discard policy changes on the Policy Information page of either the network analysis or intrusion policy editor; see Editing Intrusion Policies, on page 280.

The following table summarizes how to save or discard changes to a network analysis or intrusion policy.

Table 46: Committing Changes to a Network Analysis or Intrusion Policy

To...	On the Policy Information page, you can...
save changes to the policy	click **Commit Changes**. Optionally, enter a comment; click **OK** to continue committing.
discard all unsaved changes	click **Discard Changes**, then click **OK** to discard your changes and go to the Intrusion Policy page. If you do not want to discard your changes, click **Cancel** to return to the Policy Information page.
exit the policy, but cache changes	select any menu or other path to another page. On exiting, click **Leave page** when prompted, or click **Stay on page** to remain in the advanced editor.



CHAPTER 19

Using Layers in a Network Analysis or Intrusion Policy Layers

Larger organizations with many ASA FirePOWER modules may have many intrusion policies and network analysis policies to support the unique needs of different departments, business units or, in some instances, different companies. Configurations in both policy types are contained in building blocks called *layers,* which you can use to efficiently manage multiple policies.

Layers in intrusion and network analysis policies work in essentially the same way. You can create and edit either policy type without consciously using layers. You can modify your policy configurations and, if you have not added user layers to your policy, the system automatically includes your changes in a single configurable layer that is initially named *My Changes* . Optionally, you can also add up to 200 layers where you can configure any combination of settings. You can copy, merge, move, and delete user layers and, most important, share individual user layers with other policies of the same type.

Understanding the Layer Stack

License: Protection

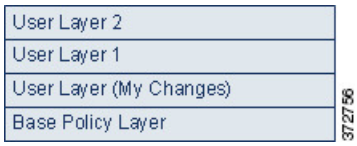
A network analysis or intrusion policy where you do not add layers includes the built-in, read-only base policy layer and a single user-configurable layer that is initially named My Changes. You can copy, merge, move, or delete any user-configurable layer and set any user-configurable layer to be shared by other policies of the same type.

Each policy layer contains complete configurations for either all preprocessors in a network analysis policy or all intrusion rules and advanced settings in an intrusion policy. The lowest, base policy layer includes all the settings from the base policy you selected when you created the policy. A setting in a higher layer takes precedence over the same setting in a lower layer. Features not explicitly set in a layer *inherit* their settings from the next highest layer where they are explicitly set.

The system *flattens* the layers, that is, it applies only the cumulative effect of all settings, when it handles network traffic.

Tip You can create an intrusion or network analysis policy based solely on the default settings in the base policy.

The following figure shows an example layer stack that, in addition to the base policy layer and the initial My Changes layer, also includes two additional user-configurable layers, *User Layer 1* and *User Layer 2* . Note in the figure that each user-configurable layer that you add is initially positioned as the highest layer in the stack; thus, User Layer 2 in the figure was added last and is highest in the stack.



Note the following points when working with multiple layers:

- When the highest layer in your policy is a read-only layer, or a shared layer as described in Sharing Layers Between Policies, on page 265, the system automatically adds a user-configurable layer as the highest layer in your intrusion policy if you do either of the following:
  - modify a rule action (that is, a rule state, event filtering, dynamic state, or alerting) on the intrusion policy Rules page. See Tuning Intrusion Policies Using Rules, on page 289 for more information.
  - enable, disable, or modify any preprocessor, intrusion rule, or advanced setting.

All settings in the system-added layer are inherited except for the changes that resulted in the new layer.

- When the highest layer is a shared layer, the system adds a layer when you take either of the following actions:
  - share the highest layer with other policies
  - add a shared layer to your policy
- Regardless of whether you allow rule updates to modify your policy, changes in a rule update never override changes you make in a layer. This is because changes in a rule update are made in the base policy, which determines the default settings in your base policy layer; your changes are always made in a higher layer, so they override any changes that a rule update makes to your base policy. See Importing Rule Updates and Local Rule Files, on page 483 for more information.

Understanding the Base Layer

License: Protection

The base layer, also referred to as the base policy, of an intrusion or network analysis policy defines the default settings for all configurations in the policy, and is the lowest layer in the policy. When you create a new policy and change a setting without adding new layers, the change is stored in the My Changes layer, and overrides—but does not change—the setting in the base policy.

Understanding System-Provided Base Policies

License: Protection

Cisco delivers several pairs of network analysis and intrusion policies with the ASA FirePOWER module. By using system-provided network analysis and intrusion policies, you can take advantage of the experience of the Cisco Vulnerability Research Team (VRT). For these policies, the VRT sets intrusion and preprocessor rule states, as well as provides the initial configurations for preprocessors and other advanced settings. You can use these system-provided policies as-is, or you can use them as the base for custom policies.

If you use a system-provided policy as your base, importing rule updates may modify settings in your base policy. However, you can configure a custom policy to not automatically make these changes to its system-provided base policy. This allows you to update system-provided base policies manually, on a schedule independent of rule update imports. In either case, changes that a rule update makes to your base policy do not change or override settings in your My Changes or any other layer. For more information, see Allowing Rule Updates to Modify a System-Provided Base Policy, on page 260.

System-provided intrusion and network analysis policies are similarly named but contain different configurations. For example, the Balanced Security and Connectivity network analysis policy and the Balanced Security and Connectivity intrusion policy work together and can both be updated in intrusion rule updates. For more information, see Understanding the System-Provided Policies, on page 248.

Understanding Custom Base Policies

License: Protection

If you do not want to use a system-provided policy as the base policy in your network analysis or intrusion policy, you can use a custom policy as your base. You can tune settings in custom policies to inspect traffic in ways that matter most to you so you can improve both the performance of your device and your ability to respond effectively to the events they generate.

You can chain up to five custom policies, with four of the five using one of the other four previously created policies as its base policy; the fifth must use a system-provided policy as its base.

Changes you make to a custom policy that you use as the base for another policy are automatically used as the default settings the of policy that uses the base. Additionally, because all policies have a system-provided policy as the eventual base in a policy chain, importing a rule update may affect your policy even if you use a custom base policy. If the first custom policy in a chain (the one that uses the system-provided policy as its base) allows rule updates to modify its base policy, your policy may be affected. For information on changing this setting, see Allowing Rule Updates to Modify a System-Provided Base Policy, on page 260.

Regardless of how they are made, changes to your base policy—whether by a rule update or when you modify a custom policy that you use as a base policy—do not change or override settings in your My Changes or any other layer.

Changing the Base Policy

License: Protection

You can select a different base policy for your network analysis or intrusion policy and, optionally, allow rule updates to modify a system-provided base policy, without affecting modifications in higher layers.

To change the base policy:

Step 1 While editing your policy, click **Policy Information** in the navigation panel.

The **Policy Information** page appears.

Step 2 Select a base policy from the **Base Policy** drop-down list.

Step 3 Optionally, if you choose a system-provided base policy, click **Manage Base Policy** to specify whether intrusion rule updates can automatically modify your base policy.

For more information, see Allowing Rule Updates to Modify a System-Provided Base Policy, on page 260.

Step 4 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255 .

Allowing Rule Updates to Modify a System-Provided Base Policy

License: Protection

Rule updates that you import provide system-provided policies with modified network analysis preprocessor settings, modified intrusion policy advanced settings, new and updated intrusion rules, and modified states for existing rules. Rule updates can also delete rules and provide new rule categories and default variables. See Importing Rule Updates and Local Rule Files, on page 483 for more information.

Rule updates always modify system-provided policies with any changes to preprocessors, advanced settings, and rules. Changes to default variables and rule categories are handled at the system level. See Understanding System-Provided Base Policies, on page 258 for more information.

When you use a system-provided policy as your base policy, you can allow rule updates to modify your base policy which, in this case, is a copy of the system-provided policy. If you allow rule updates to update your base policy, a new rule update makes the same changes in your base policy that it makes to the system-provided policy that you use as your base policy. If you have not modified the corresponding setting, a setting in your base policy determines the setting in your policy. However, rule updates do not override changes you make in your policy.

If you do not allow rule updates to update your base policy, you can manually update your base policy after importing one or more rule updates.

Rule updates always delete intrusion rules that VRT deletes, regardless of the rule state in your intrusion policy or whether you allow rule updates to update your base intrusion policy. Until you reapply your changes to network traffic, rules in your currently applied intrusion policies behave as follows:

- Disabled rules remain disabled.
- Rules set to Generate Events continue to generate events when triggered.
- Rules set to Drop and Generate Events continue to generate events and drop offending packets when triggered.

Rule updates do not modify a custom base policy unless both of the following conditions are met:

- You allow rule updates to modify the system-provided base policy of the parent policy, that is, the policy that originated the custom base policy.
- You have not made changes in the parent policy that override the corresponding settings in the parent's base policy.

When both conditions are met, changes in the rule update are passed to the child policy, that is, the policy using the custom base policy, when you save the parent policy.

For example, if a rule update enables a previously disabled intrusion rule, and you have not modified the rule's state in the parent intrusion policy, the modified rule state is passed to the base policy when you save the parent policy.

Likewise, if a rule update modifies a default preprocessor setting and you have not modified the setting in the parent network analysis policy, the modified setting is passed to the base policy when you save the parent policy.

See Changing the Base Policy, on page 259 for more information.

To allow rule updates to modify a system-provided base policy:

Step 1 While editing a policy that uses a system-provided policy as its base policy, click **Policy Information** in the navigation panel.

The **Policy Information** page appears.

Step 2 Click **Manage Base Policy**.

The **Base Policy summary** page appears.

Step 3 Select or clear the **Update when a new Rule Update is installed** check box.

When you save your policy with the check box cleared and then import a rule update, an **Update Now** button appears on the **Base Policy summary** page and the status message on the page updates to inform you that the policy is out of date. Optionally, you can click **Update Now** to update your base policy with the changes in the most recently imported rule update.

Step 4 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Managing Layers

License: Protection

The **Policy Layers** page provides a single-page summary of the complete layer stack for your network analysis or intrusion policy. On this page you can add shared and unshared layers, copy, merge, move, and delete layers, access the summary page for each layer, and access configuration pages for enabled, disabled, and overridden configurations within each layer.

For each layer, you can view the following information:

- whether the layer is a built-in, shared user, or unshared user layer
- which layers contain the highest, that is the effective, preprocessor or advanced setting configurations, by feature name
- in an intrusion policy, the number of intrusion rules whose states are set in the layer, and the number of rules set to each rule state.

The feature name in the summary for each layer indicates which configurations are enabled, disabled, overridden, or inherited in the layer, as follows:

This page also provides a summary of the net effect of all enabled preprocessors (network analysis) or advanced settings (intrusion) and, for intrusion policies, intrusion rules.

When the feature is...	The feature name is...
enabled in the layer	written in plain text

When the feature is...	The feature name is...
disabled in the layer	struck out
overridden by the configuration in a higher layer	written in italic text
inherited from a lower layer	not present

The following table lists the actions available on the **Policy Layers** page.

Table 47: Network Analysis and Intrusion Policy Layer Configuration Actions

To...	You can...
display the Policy Information page	click **Policy Summary**. See Tuning Intrusion Policies Using Rules, on page 289 and About Intrusion Policies, on page 277 for information on the actions you can take on the Policy Information page.
display the summary page for a layer	click the layer name in the row for the layer or, alternately, click the edit icon next to a user layer. You can also click the view icon to access the read-only summary page for a shared layer. See Sharing Layers Between Policies, on page 265, Configuring Preprocessors and Advanced Settings in Layers, on page 270, and Configuring Intrusion Rules in Layers, on page 267 for information on actions you can take on the summary page for a layer.
access a layer-level preprocessor or advanced setting configuration page	click the feature name in the row for the layer. Note that configuration pages are read-only in the base policy and in shared layers. See Configuring Preprocessors and Advanced Settings in Layers, on page 270 for more information.
access a layer-level rule configuration page filtered by rule state type	click the icon for drop and generate events, generate events or disabled in the summary for the layer. No rules are displayed if the layer contains no rules set to the selected rule state.
add a layer to your policy	see Adding a Layer, on page 263.
add a shared layer from another policy	see Sharing Layers Between Policies, on page 265.
change a layer's name or description	see Changing a Layer's Name and Description, on page 263.
move, copy, or delete a layer	see Moving, Copying, and Deleting Layers, on page 264.
merge a layer into the next layer beneath it	see Merging Layers, on page 264.

To use the Policy Layers page:

Step 1 While editing your policy, click **Policy Layers** in the navigation panel.

The **Policy Layers summary** page appears.

Step 2 You can take any of the actions in the Network Analysis and Intrusion Policy Layer Configuration Actions table.

Step 3 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Adding a Layer

License: Protection

You can add up to 200 layers to a network analysis or intrusion policy. When you add a layer, it appears as the highest layer in your policy. The initial state is Inherit for all features and, in an intrusion policy, no event filtering, dynamic state, or alerting rule actions are set.

To add a layer to your network analysis or intrusion policy:

Step 1 While editing your policy, click **Policy Layers** in the navigation panel.

The **Policy Layers** page appears.

Step 2 Click the **add layer** icon next to User Layers.

The **Add Layer** pop-up window appears.

Step 3 Type a unique layer **Name** and click **OK**.

The new layer appears as the topmost layer under User Layers.

Step 4 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Changing a Layer's Name and Description

License: Protection

You can change the name of a user-configurable layer in your network analysis or intrusion policy and, optionally, add or modify a description that is visible when you edit the layer.

To change a layer's name and add or modify its description:

Step 1 While editing your policy, click **Policy Layers** in the navigation panel.

The **Policy Layers** page appears.

Step 2 Click the **edit** icon next to the user layer you want to edit.

The **summary** page for the layer appears.

Step 3 You can take the following actions:

- Modify the layer **Name**.

- Add or modify the layer **Description**.

Step 4 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Moving, Copying, and Deleting Layers

License: Protection

You can copy, move, or delete a user layer in your network analysis or intrusion policy, including the initial My Changes layer. Note the following considerations:

- When you copy a layer, the copy appears as the highest layer.
- Copying a shared layer creates an unshared copy which, optionally, you can then share with other policies.
- You cannot delete a shared layer; a layer with sharing enabled that you have not shared with another policy is not a shared layer.

To copy, move, or delete a layer:

Step 1 While editing your policy, click **Policy Layers** in the navigation panel.

The **Policy Layers** page appears.

Step 2 You can take the following actions:

- To copy a layer, click the copy icon for the layer you want to copy.

The page refreshes and a copy of the layer appears as the highest layer.

- To move a layer up or down within the User Layers page area, click any open area in the layer summary and drag until the position arrow ▶ points to a line above or below a layer where you want to move the layer.

The screen refreshes and the layer appears in the new location.

- To delete a layer, click the delete icon for the layer you want to delete, then click **OK**

The page refreshes and the layer is deleted.

Step 3 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Merging Layers

License: Protection

You can merge a user-configurable layer in your network analysis or intrusion policy with the next user layer beneath it. A merged layer retains all settings that were unique to either layer, and accepts the settings from the higher layer if both layers included settings for the same preprocessor, intrusion rule, or advanced setting. The merged layer retains the name of the lower layer.

In the policy where you create a shared layer that you add to other policies, you can merge an unshared layer immediately above the shared layer with the shared layer, but you cannot merge the shared layer with an unshared layer beneath it.

In a policy where you add a shared layer that you created in another policy, you can merge the shared layer into an unshared layer immediately beneath it and the resulting layer is no longer shared; you cannot merge an unshared layer into a shared layer beneath it.

To merge a user layer with a user layer beneath it:

Step 1 While editing your policy, click **Policy Layers** in the navigation panel.

The **Policy Layers** page appears.

Step 2 Click the **merge** icon in the upper of the two layers, then click **OK**.

The page refreshes and the layer is merged with the layer beneath it.

Step 3 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Sharing Layers Between Policies

License: Protection

You can share a user-configurable layer with other policies of the same type (intrusion or network analysis). When you modify a configuration within a shared layer and then commit your changes, the system updates all policies that use the shared layer and provides you with a list of all affected policies. You can only modify shared layer feature configurations in the policy where you created the layer.

The following figure shows an example master policy that serves as the source for site-specific policies.

The master policy in the figure includes a company-wide layer with settings applicable to the policies at Site A and Site B. It also includes site-specific layers for each policy. For example, in the case of a network analysis policy Site A might not have web servers on the monitored network and would not require the protection or processing overhead of the HTTP Inspect preprocessor, but both sites would likely require TCP stream preprocessing. You could enable TCP stream processing in the company-wide layer that you share with both sites, disable the HTTP Inspect preprocessor in the site-specific layer that you share with Site A, and enable the HTTP Inspect preprocessor in the site-specific layer that you share with Site B. By editing configurations

in a higher layer in the site-specific policies, you could also further tune the policy for each site if necessary with any configuration adjustments.

It is unlikely that the flattened net settings in the example master policy would be useful for monitoring traffic, but the time saved in configuring and updating the site-specific policies makes this a useful application of policy layers.

Many other layer configurations are possible. For example, you could define policy layers by company, by department, or by network. In the case of an intrusion policy, you could also include advanced settings in one layer and rule settings in another.

Tip You cannot add a shared layer to a policy when your base policy is a custom policy where the layer you want to share was created. When you attempt to save your changes, an error message indicates that the policy includes a circular dependency. See Understanding Custom Base Policies, on page 259 for more information.

To share a layer with other policies, you must do the following:

- Enable sharing on the layer summary page of the layer you want to share.
- Add the shared layer on the Policy Layers page of the policy where you want to share it.

Sharing Layers Between Policies

You cannot disable sharing for a layer that is in use in another policy; you must first delete the layer from the other policy or delete the other policy.

To enable or disable sharing a layer with other policies:

Step 1 While editing your policy, click **Policy Layers** in the navigation panel.

The **Policy Layers** page appears.

Step 2 Click the **edit** icon next to the layer you want to share with other policies.

The **summary** page for the layer appears.

Step 3 Select (enable) or clear (disable) the **Sharing** check box.

Step 4 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache.

For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

To add a shared layer to your policy:

Step 5 While editing your policy, click **Policy Layers** in the navigation panel.

The **Policy Layers** page appears.

Step 6 Select the shared layer you want to add from the **Add Shared Layer** drop-down list, then click **OK**.

The **Policy Layers summary** page appears and the shared layer you selected appears as the highest layer in your policy.

If there are no shared layers in any other policies, no drop-down list appears; click **OK** or **Cancel** on the pop-up window to return to the **Policy Layers summary** page.

Step 7 Click the **add shared layer** icon next to User Layers.

The **Add Shared Layer** pop-up window appears.

Step 8 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache.

For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Configuring Intrusion Rules in Layers

License: Protection

In an intrusion policy, you can set the rule state, event filtering, dynamic state, alerting, and rule comments for a rule in any user-configurable layer. After accessing the layer where you want to make your changes, you add settings on the Rules page for the layer the same as you would on the intrusion policy Rules page; see Tuning Intrusion Policies Using Rules, on page 289.

You can view individual layer settings on the Rules page for the layer, or view the net effect of all settings on the policy view of the Rules page. When you modify rule settings on the policy view of the Rules page, you are modifying the highest user-configurable layer in the policy. You can switch to another layer using the layer drop-down list on any Rules page.

The following table describes the effects of configuring the same type of setting in multiple layers.

Table 48: Layer Rule Settings

You can set...	Of this setting type...	To...
one	rule state	override a rule state set for the rule in a lower layer, and ignore all thresholds, suppressions, rate-based rule states, and alerts for that rule configured in lower layers. See Setting Rule States, on page 306 for more information. If you want a rule to inherit its state from the base policy or a lower layer, set the rule state to Inherit. Note that when you are working on the intrusion policy Rules page, you cannot set a rule state to Inherit. Note also that rule state settings are color-coded when you view them on the Rules page for a specific layer: rules whose effective state is set in a lower layer are highlighted in yellow; rules whose effective state is set in a higher layer are highlighted in red; rules whose effective state is set in the current layer are not highlighted. Because the intrusion policy Rules page is a composite view of the net effect of all rule settings, rule states are not color-coded on this page.
one	thresholdSNMP alert	override a setting of the same type for the rule in a lower layer. Note that setting a threshold overwrites any existing threshold for the rule in the layer. See Configuring Event Thresholding, on page 309 and Adding SNMP Alerts, on page 318 for more information.
one or more	suppressionrate-based rule state	cumulatively combine settings of the same type for each selected rule down to the first layer where a rule state is set for the rule. Settings below the layer where a rule state is set are ignored. See Configuring Suppression Per Intrusion Policy, on page 312 and Adding Dynamic Rule States, on page 315 for more information.

You can set...	Of this setting type...	To...
one or more	comment	add a comment to a rule. Comments are rule-specific, not policy- or layer-specific. You can add one or more comments to a rule in any layer. See Adding Dynamic Rule States, on page 315 for more information.

For example, if you set a rule state to Drop and Generate Events in one layer and to Disabled in a higher layer, the intrusion policy Rules page shows that the rule is disabled.

In another example, if you set a source-based suppression for a rule to 192.168.1.1 in one layer, and you also set a destination-based suppression for the rule to 192.168.1.2 in another layer, the Rules page shows that the cumulative effect is to suppress events for the source address 192.168.1.1 and the destination address 192.168.1.2. Note that suppression and rate-based rule state settings cumulatively combine settings of the same type for each selected rule down to the first layer where a rule state is set for the rule. Settings below the layer where a rule state is set are ignored.

To modify rules in a layer:

Step 1 While editing your intrusion policy, expand **Policy Layers** in the navigation panel and expand the policy layer you want to modify.

Step 2 Click **Rules** immediately beneath the policy layer you want to modify.

The **Rules** page for the layer appears.

You can modify any of the settings in the Layer Rule Settings table. See Tuning Intrusion Policies Using Rules, on page 289 for more information on configuring intrusion rules.

To delete an individual setting from an editable layer, double-click the rule message on the **Rules** page for the layer to display rule details. Click **Delete** next to the setting you want to delete, then click **OK** twice.

Step 3 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Removing Multi-Layer Rule Settings

License: Protection

You can select one or more rules on the intrusion policy Rules page and then simultaneously remove a specific type of event filter, dynamic state, or alerting from multiple layers in your intrusion policy.

The system removes the setting type downward through each layer where it is set until it removes all the settings or encounters a layer where a rule state is set for the rule. If it encounters a layer where a rule state is set, it removes the setting from that layer and stops removing the setting type.

When the system encounters the setting type in a shared layer or in the base policy, and if the highest layer in the policy is editable, the system copies the remaining settings and rule state for the rule to that editable layer. Otherwise, if the highest layer in the policy is a shared layer, the system creates a new editable layer above the shared layer and copies the remaining settings and rule state for the rule to that editable layer.

Note Removing rule settings derived from a shared layer or the base policy causes any changes to this rule from lower layers or the base policy to be ignored. To stop ignoring changes from lower layers or the base policy, set the rule state to **Inherit** on the summary page for the topmost layer. See Setting Rule States, on page 306 for more information.

To remove rule settings in multiple layers:

Step 1 While editing your intrusion policy, click **Rules** immediately beneath Policy Information in the navigation panel.

Tip You can also select **Policy** from the layer drop-down list on the Rules page for any layer, or select **Manage Rules** on the Policy Information page.

The **intrusion policy Rules** page appears.

Step 2 Select the rule or rules from which you want to remove multiple settings. You have the following options:

- To select a specific rule, select the check box next to the rule.
- To select all the rules in the current list, select the check box at the top of the column.

See Understanding Rule Filtering in an Intrusion Policy, on page 298 and Setting a Rule Filter in an Intrusion Policy, on page 305 for information on locating rules.

Step 3 You have the following options:

- To remove all thresholds for a rule, select **Event Filtering > Remove Thresholds**.
- To remove all suppression for a rule, select **Event Filtering > Remove Suppressions**.
- To remove all rate-based rule states for a rule, select **Dynamic State** > **Remove Rate-Based Rule States**.
- To remove all SNMP alert settings for a rule, select **Alerting > Remove SNMP Alerts**.

A **confirmation** pop-up window appears.

Note Removing rule settings derived from a shared layer or the base policy causes any changes to this rule from lower layers or the base policy to be ignored. To stop ignoring changes from lower layers or the base policy, set the rule state to **Inherit** on the summary page for the topmost layer. See Setting Rule States, on page 306 for more information.

Step 4 Click **OK**.

The system removes the selected setting and copies the remaining settings for the rule to the highest editable layer in the policy. See the introduction to this procedure for conditions that affect how the system copies the remaining settings.

Step 5 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Accepting Rule Changes from a Custom Base Policy

License: Protection

When a custom network analysis or intrusion policy where you have not added layers uses another custom policy as its base policy, you must set a rule to inherit its rule state if:

- you delete an event filter, dynamic state, or SNMP alert set for the rule in the base policy, and
- you want the rule to accept subsequent changes that you make to it in the other custom policy that you use as your base policy

The following procedure explains how to accomplish this. See Removing Multi-Layer Rule Settings, on page 268 to accept settings for these rules in a policy where you have added layers.

To accept rule changes in a policy where you have not added layers:

Step 1 While editing your intrusion policy, expand the **Policy Layers** link in the navigation panel, then expand the **My Changes** link.

Step 2 Click the **Rules** link immediately beneath My Changes.

The **Rules** page for the My Changes layer appears.

Step 3 Select the rule or rules whose settings you want to accept. You have the following options:

- To select a specific rule, select the check box next to the rule.
- To select all the rules in the current list, select the check box at the top of the column.

See Understanding Rule Filtering in an Intrusion Policy, on page 298 and Setting a Rule Filter in an Intrusion Policy, on page 305 for information on locating rules.

Step 4 Select **Inherit** from the **Rule State** drop-down list.

Step 5 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Configuring Preprocessors and Advanced Settings in Layers

License: Protection

You use similar mechanisms to configure preprocessors in a network analysis policy and advanced settings in an intrusion policy. You can enable and disable preprocessors on the network analysis Settings page and intrusion policy advanced settings on the intrusion policy Advanced Settings page. These pages also provide summaries of the effective states for all relevant features. For example, if the network analysis SSL preprocessor is disabled in one layer and enabled in a higher layer, the Settings page shows it as enabled. Changes made on these pages appear in the top layer of the policy.

You can also enable or disable preprocessors or advanced settings and access their configuration pages on the summary page for a user-configurable layer. On this page you can modify the layer name and description and configure whether to share the layer with other policies of the same type; see Sharing Layers Between Policies, on page 265 for more information. You can switch to the summary page for another layer by selecting the layer name beneath **Policy Layers** in the navigation panel.

When you enable a preprocessor or advanced setting, a sublink to the configuration page for that feature appears beneath the layer name in the navigation panel, and an edit icon appears next to the feature on the summary page for the layer; these disappear when you disable the feature in the layer or set it to Inherit.

Setting the state (enabled or disabled) for a preprocessor or advanced setting overrides the state and configuration settings for that feature in lower layers. If you want a preprocessor or advanced setting to inherit its state and configuration from the base policy or a lower layer, set it to **Inherit**. Note that the Inherit selection is not available when you are working in the Settings or Advanced Settings page.

Color-coding on each layer summary page indicates as follows whether the effective configuration is in a higher, lower, or the current layer:

- red - the effective configuration is in a higher layer
- yellow - the effective configuration is in a lower layer
- unshaded - the effective configuration is in the current layer

Because the **Settings** and **Advanced Settings** pages are composite views of all relevant settings, these page do not use color coding to indicate the positions of effective configurations.

The system uses the configuration in the highest layer where the feature is enabled. Unless you explicitly modify the configuration, the system uses the default configuration. For example, if you enable and modify the network analysis DCE/RPC preprocessor in one layer, and you also enable but do not modify it in a higher layer, the system uses the default configuration in the higher layer.

The following table describes the actions available on the summary page for user-configurable layers.

Table 49: Layer Summary Page Actions

To...	You can...
modify the layer name or description	type a new value for **Name** or **Description**.
share the layer with other intrusion policies	select **Allow this layer to be used by other policies**. See Sharing Layers Between Policies, on page 265 for more information.
enable or disable a preprocessor/advanced setting in the current layer	click **Enabled** or **Disabled** next to the feature. When you enable, a sublink to the configuration page appears beneath the layer name in the navigation panel, and an edit icon appears on the summary page next to the feature. Disabling removes the sublink and edit icon.
inherit the preprocessor/advanced setting state and configuration from the settings in the highest layer below the current layer	click **Inherit**. The page refreshes and, if the feature was enabled, the feature sublink in the navigation panel and the **edit** icon no longer appear.
access the configuration page for an enabled preprocessor/advanced setting	click the **edit** icon or the feature sublink to modify the current configuration. Note that the Back Orifice preprocessor has no user-configurable options.

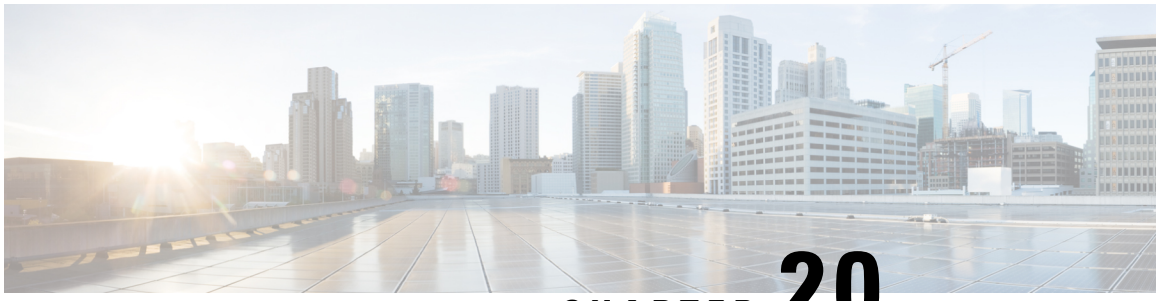
To modify preprocessors/advanced settings in a user layer:

Step 1 While editing your policy, expand **Policy Layers** in the navigation panel, then click the name of the layer you want to modify.

The **summary** page for the layer appears.

Step 2 You can take any of the actions in the **Layer Summary Page Actions** table.

Step 3 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.



CHAPTER 20

Tuning Preprocessing in Passive Deployments

Typically, the system uses the static settings in your network analysis policy to preprocess and analyze traffic. With the adaptive profiles feature, however, the system can adapt to network traffic by associating traffic with host information and processing the traffic accordingly.

When a host receives traffic, the operating system running on the host reassembles IP fragments. The order used for that reassembly depends on the operating system. Similarly, each operating system may implement TCP in different ways, and therefore reassemble TCP streams differently. If preprocessors reassemble data using a format other than that used for the operating system of the destination host, the system may miss content that could be malicious when reassembled on the receiving host.

Tip In a passive deployment, Cisco recommends that you configure adaptive profiles. In an inline deployment, Cisco recommends that you configure the inline normalization preprocessor with the **Normalize TCP Payload** option enabled.

Understanding Adaptive Profiles

License: Protection

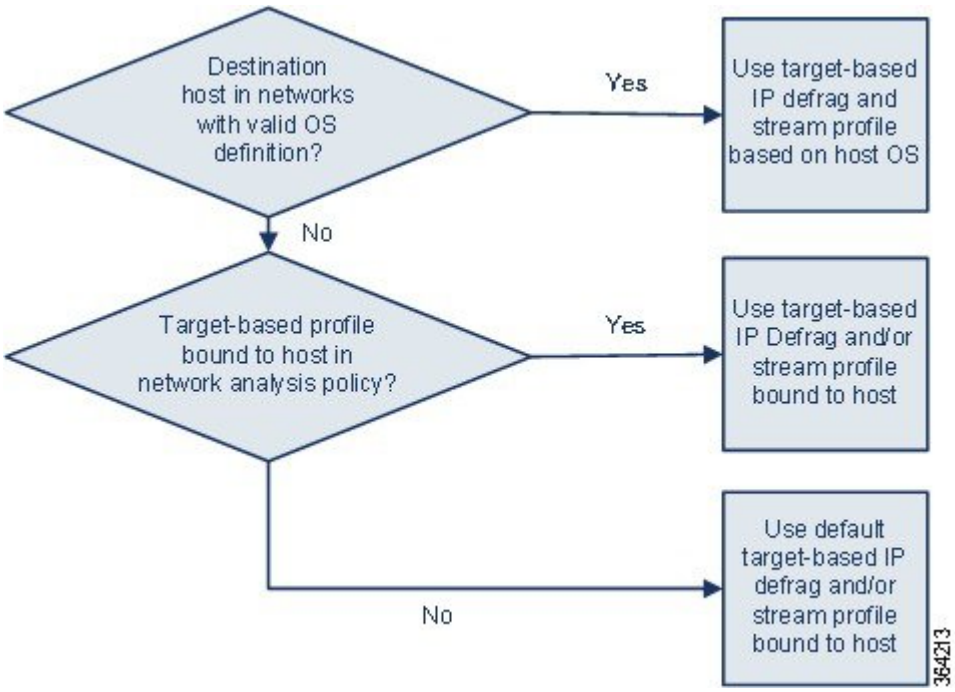
Adaptive profiles enable use of the most appropriate operating system profiles for IP defragmentation and TCP stream preprocessing.

Using Adaptive Profiles with Preprocessors

License: Protection

Adaptive profiles help to defragment IP packets and reassemble streams in the same way as the operating system on the target host. The intrusion rules engine then analyzes the data in the same format as that used by the destination host.

Adaptive profiles switch to the appropriate operating system profile based on the operating system in the host profile for the target host, as illustrated in the following diagram.



For example, you configure adaptive profiles for the 10.6.0.0/16 subnet and set the default IP Defragmentation target-based policy to Linux. The ASA FirePOWER module where you configure the settings includes the 10.6.0.0/16 subnet.

When a device detects traffic from Host A, which is not in the 10.6.0.0/16 subnet, it uses the Linux target-based policy to reassemble IP fragments. However, when it detects traffic from Host B, which is in the 10.6.0.0/16 subnet, it retrieves Host B's operating system data, where Host B is running Microsoft Windows XP Professional. The system uses the Windows target-based profile to do the IP defragmentation for the traffic destined for Host B.

Configuring Adaptive Profiles

License: Protection

To use host information to determine which target-based profiles are used for IP defragmentation and TCP stream preprocessing, you can configure adaptive profiles.

When you configure adaptive profiles, you need to bind the adaptive profile setting to a specific network or networks. To successfully use adaptive profiles, that network must be in the segment monitored by the device.

You can indicate the hosts in the network where adaptive profiles should be used to process traffic by specifying an IP address, a block of addresses, or a network variable with the desired value configured in the variable set linked to the default intrusion policy for your access control policy.

You can use any of these addressing methods alone or in any combination as a list of IP addresses, address blocks, or variables separated by commas, as shown in the following example:

```
192.168.1.101, 192.168.4.0/24, $HOME_NET
```

Tip You can apply adaptive profiles to all hosts in the network by using a variable with a value of any or by specifying 0.0.0.0/0 as the network value.

To configure adaptive profiles:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.
The **Access Control Policy** page appears.

Step 2 Click the **edit** icon next to the access control policy you want to edit.
The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.
The **access control policy advanced settings** page appears.

Step 4 Click the **edit** icon next to **Detection Enhancement Settings**.
The **Detection Enhancement Setting**s pop-up window appears.

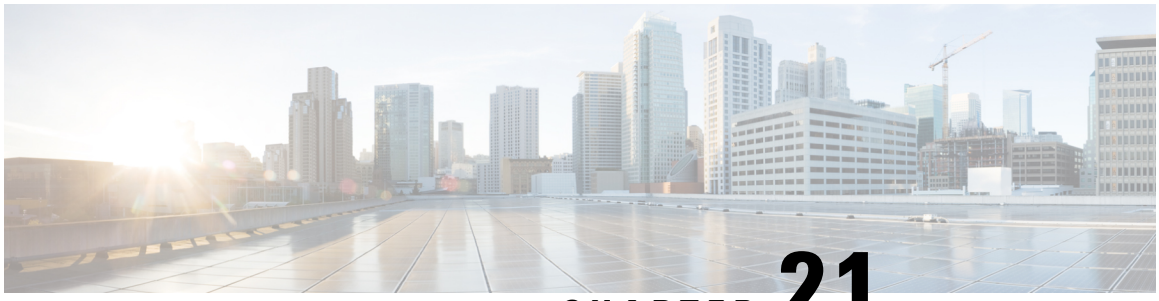
Step 5 Select **Adaptive Profiles - Enabled** to enable adaptive profiles.

Step 6 Optionally, in the **Adaptive Profiles - Attribute Update Interval** field, type the number of minutes that should elapse between synchronization of data.

Note Increasing the value for this option could improve performance in a large network.

Step 7 In the **Adaptive Profiles - Networks** field, type the specific IP address, address block, or variable, or a list that includes any of these addressing methods separated by commas, to identify any host in the network for which you want to use adaptive profiles.
See Working with Variable Sets, on page 29 for information on configuring variables.

Step 8 Click **OK** to retain your settings.



CHAPTER 21

Getting Started with Intrusion Policies

This chapter explains how to create a simple custom intrusion policy. The chapter also contains basic information on managing intrusion policies: editing, comparing, and so on.

About Intrusion Policies

Intrusion policies are defined sets of intrusion detection and prevention configurations that inspect traffic for security violations and, in inline deployments, can block or alter malicious traffic. Intrusion policies are invoked by your access control policy and are the system's last line of defense before traffic is allowed to its destination.

Cisco delivers several intrusion policies with the ASA FirePOWER module. By using system-provided policies you can take advantage of the experience of the Cisco Vulnerability Research Team (VRT). For these policies, the VRT sets intrusion and preprocessor rule states (enabled or disabled), as well as provides the initial configurations for other advanced settings. An enabled rule causes the system to generate intrusion events for (and optionally block) traffic matching the rule. Disabling a rule stops processing of the rule.

Tip System-provided intrusion and network analysis policies are similarly named but contain different configurations. For example, the Balanced Security and Connectivity network analysis policy and the Balanced Security and Connectivity intrusion policy work together and can both be updated in intrusion rule updates. However, the network analysis policy governs mostly preprocessing options, whereas the intrusion policy governs mostly intrusion rules. About Network Analysis and Intrusion Policies, on page 241 provides an overview of how network analysis and intrusion policies work together to examine your traffic, as well as some basics on using the navigation panel, resolving conflicts, and committing changes.

If you create a custom intrusion policy, you can:

- Tune detection by enabling and disabling rules, as well as by writing and adding your own rules.

- Configure various advanced settings such as external alerting, sensitive data preprocessing, and global rule thresholding.
- Use layers as building blocks to efficiently manage multiple intrusion policies.

When tailoring your intrusion policy, especially when enabling and adding rules, keep in mind that some intrusion rules require that traffic first be decoded or preprocessed in a certain way. Before an intrusion policy examines a packet, the packet is preprocessed according to configurations in a network analysis policy. If you disable a required preprocessor, the system automatically uses it with its current settings, although the preprocessor remains disabled in the network analysis policy user interface.

Note Because preprocessing and intrusion inspection are so closely related, the network analysis and intrusion policies examining a single packet **must** complement each other. Tailoring preprocessing, especially using multiple custom network analysis policies, is an **advanced** task. For more information, see Limitations of Custom Policies, on page 251.

After you configure a custom intrusion policy, you can use it as part of your access control configuration by associating the intrusion policy with one or more access control rules or an access control policy's default action. This forces the system to use the intrusion policy to examine certain allowed traffic before the traffic passes to its final destination. A variable set that you pair with the intrusion policy allows you to accurately reflect your home and external networks and, as appropriate, the servers on your network. For more information, see Controlling Traffic Using Intrusion and File Policies, on page 135.

Creating a Custom Intrusion Policy

License: Protection

When you create a new intrusion policy you must give it a unique name, specify a base policy, and specify drop behavior.

The base policy defines the intrusion policy's default settings. Modifying a setting in the new policy overrides—but does not change—the settings in the base policy. You can use either a system-provided or custom policy as your base policy. For more information, see Understanding the Base Layer, on page 258.

The intrusion policy's drop behavior, or **Drop when Inline** setting, determines how the system handles drop rules (intrusion or preprocessor rules whose rule state is set to Drop and Generate Events) and other intrusion policy configurations that affect traffic. You should enable drop behavior in inline deployments when you want to drop or replace malicious packets. Note that in passive deployments, the system cannot affect traffic flow regardless of the drop behavior. For more information, see Setting Drop Behavior in an Inline Deployment, on page 281.

To create an intrusion policy:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Policies > Intrusion Policy**.

The Intrusion Policy page appears.

Tip You can also import a policy from another ASA FirePOWER module; see Importing and Exporting Configurations, on page 511.

Step 2 Click **Create Policy**.

If you have unsaved changes in another policy, click **Cancel** when prompted to return to the Intrusion Policy page. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The Create Intrusion Policy pop-up window appears.

Step 3 Give the policy a unique **Name** and, optionally, a **Description**.

Step 4 Specify the initial **Base Policy**.

You can use either a system-provided or custom policy as your base policy.

Caution Do **not** use Experimental Policy 1 unless instructed to do so by a Cisco representative. Cisco uses this policy for testing.

Step 5 Set the system's drop behavior in an inline deployment:

- To allow intrusion policies to affect traffic and generate events, enable **Drop when Inline**.
- To prevent intrusion policies from affecting traffic while still generating events, disable **Drop when Inline**.

Step 6 Create the policy:

- Click **Create Policy** to create the new policy and return to the Intrusion Policy page. The new policy has the same settings as its base policy.
- Click **Create and Edit Policy** to create the policy and open it for editing in the advanced intrusion policy editor; see Editing Intrusion Policies, on page 280.

Managing Intrusion Policies

License: Protection

On the Intrusion Policy page (**Configuration > ASA FirePOWER Configuration > Policies > Intrusion Policy**) you can view your current custom intrusion policies, along with the following information:

- the time and date the policy was last modified (in local time)
- whether the **Drop when Inline** setting is enabled, which allows you to drop and modify traffic in an inline deployment
- which access control policies are using the intrusion policy to inspect traffic
- whether a policy has unsaved changes

Options on the Intrusion Policy page allow you to take the actions in the following table.

Table 50: Intrusion Policy Management Actions

To...	You can...	See...
create a new intrusion policy	click **Create Policy**.	Creating a Custom Intrusion Policy, on page 278

To...	You can...	See...
edit an existing intrusion policy	click the edit icon ( ) .	Editing Intrusion Policies, on page 280
reapply an intrusion policy	click the apply icon ( ).	Applying an Intrusion Policy, on page 283
export an intrusion policy to import on another ASA FirePOWER module	click the export icon ( ).	Exporting Configurations, on page 511
view a PDF report that lists the current configuration settings in a intrusion policy	click the report icon ( ).	Generating a Report of Current Intrusion Settings, on page 284
compare the settings of two intrusion policies or two revisions of the same policy	click **Compare Policies**.	Comparing Two Intrusion Policies or Revisions, on page 285
delete an intrusion policy	click the delete icon ( ), then confirm that you want to delete the policy. You cannot delete an intrusion policy if an access control policy references it.	

Editing Intrusion Policies

License: Protection

When you create a new intrusion policy, it has the same intrusion rule and advanced settings as its base policy. The following table explains the most common actions taken when editing an intrusion policy:

Table 51: Intrusion Policy Editing Actions

To...	You can...	See...
specify drop behavior in an inline deployment	select or clear the **Drop when Inline** check box on the Policy Information page.	Setting Drop Behavior in an Inline Deployment, on page 281
change the base policy	select a base policy from the **Base Policy** drop-down list on the Policy Information page.	Changing the Base Policy, on page 259
view the settings in the base policy	click **Manage Base Policy** on the Policy Information page	Understanding the Base Layer, on page 258
display or configure intrusion rules	click **Manage Rules** on the Policy Information page.	Viewing Rules in an Intrusion Policy, on page 291
display a filtered view of intrusion rules by current rule state and, optionally, configure those rules	on the Policy Information page, click **View** next to the number of rules under **Manage Rules** that are set to Generate Events or to Drop and Generate Events.	Filtering Rules in an Intrusion Policy, on page 297

To...	You can...	See...
enable, disable, or edit advanced settings	click **Advanced Settings** in the navigation panel	Configuring Advanced Settings in an Intrusion Policy, on page 282
manage policy layers	click **Policy Layers** in the navigation panel	Using Layers in a Network Analysis or Intrusion Policy Layers, on page 257

When tailoring an intrusion policy, especially when enabling and adding rules, keep in mind that some intrusion rules require that traffic first be decoded or preprocessed in a certain way. Before an intrusion policy examines a packet, the packet is preprocessed according to configurations in a network analysis policy. If you disable a required preprocessor, the system automatically uses it with its current settings, although the preprocessor remains disabled in the network analysis policy user interface.

Note Because preprocessing and intrusion inspection are so closely related, the network analysis and intrusion policies examining a single packet **must** complement each other. Tailoring preprocessing, especially using multiple custom network analysis policies, is an **advanced** task. For more information, see Limitations of Custom Policies, on page 251.

The system caches one intrusion policy. While editing an intrusion policy, if you select any menu or other path to another page, your changes stay in the system cache even if you leave the page. In addition to the actions you can perform in the table above, About Network Analysis and Intrusion Policies, on page 241 provides information on resolving conflicts and committing changes

To edit a intrusion policy:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Policies > Intrusion Policy**.

The Intrusion Policy page appears.

Step 2 Click the edit icon ( ) next to the intrusion policy you want to configure.

The intrusion policy editor appears, focused on the Policy Information page and with a navigation panel on the left.

Step 3 Edit your policy. Take any of the actions summarized above.

Step 4 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Setting Drop Behavior in an Inline Deployment

License: Protection

In an inline deployment, an intrusion policy can block and modify traffic:

- *Drop rules* can drop matching packets and generate intrusion events. To configure an intrusion or preprocessor drop rule, set its state to Drop and Generate Events; see Setting Rule States, on page 306.
- Intrusion rules can use the replace keyword to replace malicious content.

For intrusion rules to affect traffic, you must correctly configure drop rules and rules that replace content, as well as correctly deploy the system inline. Finally, you must enable the intrusion policy's *drop behavior* , or **Drop when Inline** setting.

Note To block the transfer of malware files over FTP, you must not only correctly configure network-based advanced malware protection (AMP), but also enable **Drop when Inline** in your access control policy's default intrusion policy.

If you want to assess how your configuration would function in an inline deployment without actually affecting traffic, you can disable drop behavior. In this case, the system generates intrusion events but does not drop packets that trigger drop rules. When you are satisfied with the results, you can enable drop behavior.

Note that in passive deployments the system cannot affect traffic regardless of the drop behavior. In other words, in a passive deployment, rules set to Drop and Generate Events behave identically to rules set to Generate Events—the system generates intrusion events but cannot drop packets.

When you view intrusion events, workflows can include the *inline result* , which indicates whether traffic was actually dropped, or whether it only would have dropped. When a packet matches a drop rule, the inline result is:

- Dropped**,** for packets dropped by a correctly configured inline deployment with drop behavior enabled.
- Would have dropped , for packets that were not dropped either because your device is deployed passively or because drop behavior is disabled. Note that the inline result is always Would have dropped for packets seen while the system is pruning, regardless of deployment.

To set the drop behavior of an intrusion policy in an inline deployment:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Policies > Intrusion Policy**.

The Intrusion Policy page appears.

Step 2 Click the edit icon next to the policy you want to edit.

The Policy Information page appears.

Step 3 Set the policy's drop behavior:

- To allow intrusion rules to affect traffic and generate events, enable **Drop when Inline**.
- To prevent intrusion rules from affecting traffic while still generating events, disable **Drop when Inline**.

Step 4 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Configuring Advanced Settings in an Intrusion Policy

License: Protection

An intrusion policy's *advanced settings* require specific expertise to configure. The base policy for your intrusion policy determines which advanced settings are enabled by default and the default configuration for each.

When you select **Advanced Settings** in the navigation panel of an intrusion policy, the policy lists its advanced settings by type. On the Advanced Settings page, you can enable or disable advanced settings in your intrusion policy, as well as access advanced setting configuration pages.

An advanced setting must be enabled for you to configure it. When you enable an advanced setting, a sublink to the configuration page for the advanced setting appears beneath the **Advanced Settings** link in the navigation panel, and an **Edit** link to the configuration page appears next to the advanced setting on the Advanced Settings page.

Tip To revert an advanced setting's configuration to the settings in the base policy, click **Revert to Defaults** on the configuration page for the advanced setting. When prompted, confirm that you want to revert.

When you disable an advanced setting, the sublink and **Edit** link no longer appear, but your configurations are retained. Note that some intrusion policy configurations (sensitive data rules, SNMP alerts for intrusion rules) require enabled and correctly configured advanced settings. You cannot save an intrusion policy misconfigured in this way; see Resolving Conflicts and Committing Policy Changes, on page 255.

Modifying the configuration of an advanced setting requires an understanding of the configuration you are modifying and its potential impact on your network. The following sections provide links to specific configuration details for each advanced setting.

Specific Threat Detection

The sensitive data preprocessor detects sensitive data such as credit card numbers and Social Security numbers in ASCII text.

Note that other preprocessors that detect specific threats (back orifice attacks, several portscan types, and rate-based attacks that attempt to overwhelm your network with excessive traffic) are configured in network analysis policies.

Intrusion Rule Thresholds

Global rule thresholding can prevent your system from being overwhelmed with a large number of events by allowing you to use thresholds to limit the number of times the system logs and displays intrusion events. For more information, see .

External Responses

In addition to the various views of intrusion events within the user interface, you can enable logging to system log (syslog) facilities or send event data to an SNMP trap server. Per policy, you can specify intrusion event notification limits, set up intrusion event notification to external logging facilities, and configure external responses to intrusion events.

Applying an Intrusion Policy

License: Protection

After you apply an intrusion policy using access control (see Deploying Configuration Changes, on page 73), you can reapply the intrusion policy at any time. This allows you to implement intrusion policy changes on your monitored network without reapplying the access control policy. While reapplying, you can also view a comparison report to review the changes made since the last time the intrusion policy was applied.

Note the following when reapplying intrusion policies:

- You can schedule intrusion policy reapply tasks to recur on a regular basis; see Automating Applying an Intrusion Policy, on page 443.
- When you import a rule update, you can automatically apply intrusion policies after the import completes. If you do not enable this option, you must manually reapply the policies changed by the rule update. See Importing Rule Updates and Local Rule Files, on page 483 for more information.

To reapply an intrusion policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the apply icon ( ) next to the policy you want to reapply.

The **Reapply Intrusion Policy** window appears.

Step 3 Click **Reapply**.

The policy is reapplied. You can monitor the status of the apply using the task queue (**Monitoring** > **ASA FirePOWER Monitoring** > **Task Status**). See Viewing the Task Queue, on page 517 for more information.

Generating a Report of Current Intrusion Settings

License: Protection

An intrusion policy report is a record of the policy configuration at a specific point in time. The system combines the settings in the base policy with the settings of the policy layers, and makes no distinction between which settings originated in the base policy or policy layer.

You can use the report, which contains the following information, for auditing purposes or to inspect the current configuration.

Table 52: Intrusion Policy Report Sections

Section	Description
Policy Information	Provides the name and description of the intrusion policy, the name of the user who last modified the policy, and the date and time the policy was last modified. Also indicates whether dropping packets in an inline deployment is enabled or disabled, the current rule update version, and whether the base policy is locked to the current rule update.
Advanced Settings	Lists all enabled intrusion policy advanced settings and their configurations.
Rules	Provides a list of all enabled rules and their actions.

You can also generate a comparison report that compares two intrusion policies, or two revisions of the same policy. For more information, see Comparing Two Intrusion Policies or Revisions, on page 285.

To view an intrusion policy report:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Policies > Intrusion Policy**.

The Intrusion Policy page appears.

Step 2 Click the report icon ( ) next to the intrusion policy for which you want to generate a report. Remember to commit any potential changes before you generate an intrusion policy report; only committed changes appear in the report.

The system generates the intrusion policy report. You are prompted to save the report to your computer.

Comparing Two Intrusion Policies or Revisions

License: Protection

To review policy changes for compliance with your organization's standards or to optimize system performance, you can examine the differences between two intrusion policies. You can compare any two intrusion policies or two revisions of the same intrusion policy, for the intrusion policies you can access. Optionally, after you compare, you can then generate a PDF report to record the differences between the two policies or policy revisions.

There are two tools you can use to compare intrusion policies:

- The comparison view displays only the differences between two intrusion policies or intrusion policy revisions in a side-by-side format; the name of each policy appears in the title bar on the left and right sides of the comparison view.

You can use this to view and navigate both policy revisions on the user interface, with their differences highlighted.

- The comparison report creates a record of only the differences between two intrusion policies or intrusion policy revisions in a format similar to the intrusion policy report, but in PDF format.

You can use this to save, copy, print and share your policy comparisons for further examination.

Using the Intrusion Policy Comparison View

License: Protection

The comparison view displays both intrusion policies or policy revisions in a side-by-side format, with each policy or policy revision identified by name in the title bar on the left and right sides of the comparison view. The time of last modification and the last user to modify are displayed to the right of the policy name. Note that the Intrusion Policy page displays the time a policy was last modified in local time, but the intrusion policy report lists the time modified in UTC. Differences between the two intrusion policies or policy revisions are highlighted:

- Blue indicates that the highlighted setting is different in the two policies or policy revisions, and the difference is noted in red text.
- Green indicates that the highlighted setting appears in one policy or policy revision but not the other.

You can perform any of the actions described in the following table.

Table 53: Intrusion Policy Comparison View Actions

To...	You can...
navigate individually through changes	click **Previous** or **Next** above the title bar.
generate a new intrusion policy comparison view	click **New Comparison.** The **Select Comparison** window appears. See Using the Intrusion Policy Comparison Report, on page 286 for more information.
generate an intrusion policy comparison report	click **Comparison Report**. The policy comparison report creates a PDF that lists only the differences between the two policies or policy revisions.

Using the Intrusion Policy Comparison Report

License: Protection

An intrusion policy comparison report is a record of all differences between two intrusion policies or two revisions of the same intrusion policy identified by the intrusion policy comparison view, presented as a PDF. You can use this report to further examine the differences between two intrusion policy configurations and to save and disseminate your findings.

You can generate an intrusion policy comparison report from the comparison view for any intrusion policies to which you have access. Remember to commit any potential changes before you generate an intrusion policy report; only committed changes appear in the report.

The format of the intrusion policy comparison report is the same as the intrusion policy report with one exception: the intrusion policy report contains all settings in the intrusion policy, and the intrusion policy comparison report lists only those settings which differ between the policies.

Depending on your configuration, an intrusion policy comparison report can contain one or more sections as described in the Table 52: Intrusion Policy Report Sections , on page 284 table.

Tip You can use a similar procedure to compare SSL, access control, network analysis, file, or system policies.

- To compare two intrusion policies or two revisions of the same policy:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Policies > Intrusion Policy**.

The Intrusion Policy page appears.

Step 2 Click **Compare Policies**.

The Select Comparison window appears.

Step 3 From the **Compare Against** drop-down list, select the type of comparison you want to make:

- To compare two different policies, select **Other Policy**.

- To compare two revisions of the same policy, select **Other Revision**.

Remember to commit any changes before you generate an intrusion policy report; only committed changes appear in the report.

Step 4 Depending on the comparison type you selected, you have the following choices:

- If you are comparing two different policies, select the policies you want to compare from the **Policy A** and **Policy B** drop-down lists.
- If you are comparing two revisions of the same policy, select the policy from the **Policy** drop-down list, then select the revisions you want to compare from the **Revision A** and **Revision B** drop-down lists.

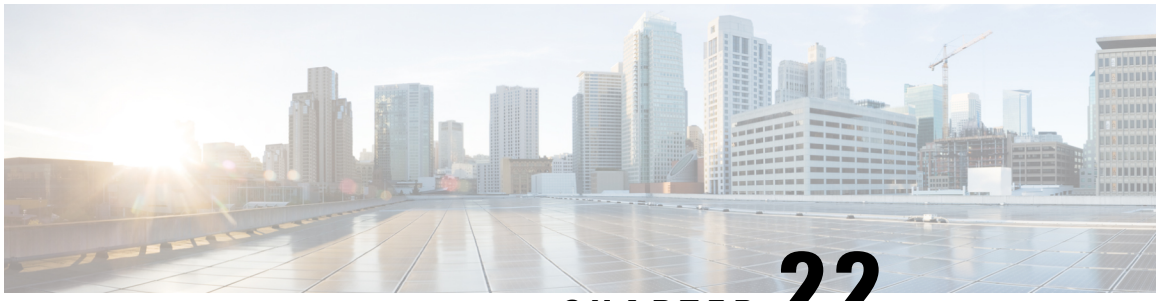
Step 5 Click **OK** to display the intrusion policy comparison view.

The comparison view appears.

Step 6 Click **Comparison Report** to generate the intrusion policy comparison report.

Step 7 The intrusion policy report appears. You are prompted to save the report to your computer.

What to do next



CHAPTER 22

Tuning Intrusion Policies Using Rules

You can use the **Rules** page in an intrusion policy to configure rule states and other settings for shared object rules, standard text rules, and preprocessor rules.

You enable a rule by setting its rule state to Generate Events or to Drop and Generate Events. Enabling a rule causes the system to generate events on traffic matching the rule. Disabling a rule stops processing of the rule. Optionally, you can set your intrusion policy so that a rule set to Drop and Generate Events in an inline deployment generates events on, and drops, matching traffic. See Setting Drop Behavior in an Inline Deployment, on page 281 for more information. In a passive deployment, a rule set to Drop and Generate Events just generates events on matching traffic.

You can filter rules to display a subset of rules, enabling you to select the exact set of rules where you want to change rule states or rule settings.

When an intrusion rule or rule argument requires a disabled preprocessor, the system automatically uses it with its current configuration even though it remains disabled in the network analysis policy's user interface. For more information, see Limitations of Custom Policies, on page 251.

See the following sections for more information:

- Understanding Intrusion Prevention Rule Types, on page 290 describes the intrusion rules and preprocessor rules you can view and configure in an intrusion policy.
- Viewing Rules in an Intrusion Policy, on page 291 describes how you can change the order of rules on the **Rules** page, interpret the icons on the page, and focus in on rule details.
- Filtering Rules in an Intrusion Policy, on page 297 describes how you can use rule filters to find the rules for which you want to apply rule settings.
- Setting Rule States, on page 306 describes how to enable and disable rules from the **Rules** page.
- Filtering Intrusion Event Notification Per Policy, on page 308 explains how to set event filtering thresholds for specific rules and set suppression on specific rules.
- Adding Dynamic Rule States, on page 315 explains how to set rule states that trigger dynamically when rate anomalies are detected in matching traffic.
- Adding SNMP Alerts, on page 318 describes how to associate SNMP alerts with specific rules.
- Adding Rule Comments, on page 319 describes how to add comments to rules in an intrusion policy.

- Understanding Intrusion Prevention Rule Types, on page 290
- Viewing Rules in an Intrusion Policy, on page 291

Understanding Intrusion Prevention Rule Types

License: Protection

An intrusion policy contains two types of rules: intrusion rules and preprocessor rules.

An intrusion rule is a specified set of keywords and arguments that detects attempts to exploit vulnerabilities on your network; an intrusion rule analyzes network traffic to check if it matches the criteria in the rule. The system compares packets against the conditions specified in each rule and, if the packet data matches all the conditions specified in a rule, the rule triggers. The system includes two types of intrusion rules created by the Cisco Vulnerability Research Team (VRT): shared object rules, which are compiled and cannot be modified (except for rule header information such as source and destination ports and IP addresses), and standard text rules, which can be saved and modified as new custom instances of the rule.

The system also includes preprocessor rules, which are rules associated with preprocessor and packet decoder detection options. You cannot copy or edit preprocessor rules. Most preprocessor rules are disabled by default and must be enabled (that is, set to Generate Events or to Drop and Generate Events) if you want the system to generate events for preprocessor rules and, in an inline deployment, drop offending packets.

The VRT determines the default rule states of Cisco's shared object rules, standard text rules, and preprocessor rules for each default intrusion policy included with the system.

The following table describes each type of rule included with the ASA FirePOWER module.

Table 54: Rule types

Type	Description
shared object rule	An intrusion rule created by the Cisco Vulnerability Research Team (VRT) that is delivered as a binary module compiled from C source code. You can use shared object rules to detect attacks in ways that standard text rules cannot. You cannot modify the rule keywords and arguments in a shared object rule; you are limited to either modifying variables used in the rule, or modifying aspects such as the source and destination ports and IP addresses and saving a new instance of the rule as a custom shared object rule. A shared object rule has a GID (generator ID) of 3.
standard text rule	An intrusion rule either created by the VRT, copied and saved as a new custom rule, created using the rule editor, or imported as a local rule that you create on a local machine and import. You cannot modify the rule keywords and arguments in a standard rule created by the VRT; you are limited to either modifying variables used in the rule, or modifying aspects such as the source and destination ports and IP addresses and saving a new instance of the rule as a custom standard text rule. See Importing Local Rule Files, on page 488for more information. A standard text rule created by the VRT has a GID (generator ID) of 1. Custom standard text rules that you create using the rule editor or import as local rules have a SID (Signature ID) of 1000000 or greater.
preprocessor rule	A rule associated with a detection option of the packet decoder or with one of the preprocessors included with the ASA FirePOWER module. You must enable preprocessor rules if you want them to generate events. These rules have a decoder- or preprocessor-specific GID (generator ID).

Viewing Rules in an Intrusion Policy

License: Protection

You can adjust how rules are displayed in the intrusion policy, and can sort rules by several criteria. You can also display the details for a specific rule to see rule settings, rule documentation, and other rule specifics.

The **Rules** page has four primary areas of functionality:

- the filtering features—for more information, see Filtering Rules in an Intrusion Policy, on page 297.
- the rule attribute menus—for more information, see Setting Rule States, on page 306, Filtering Intrusion Event Notification Per Policy, on page 308Adding Dynamic Rule States, on page 315, Adding SNMP Alerts, on page 318and Adding Rule Comments, on page 319.
- the rules listing—for more information, see the Table 55: Rules Page Columns, on page 291table.
- the rule details—for more information, see Viewing Rule Details, on page 293.

You can also sort rules by different criteria; for more information, see Sorting the Rule Display, on page 292.

Note that the icons used as column headers correspond to the menus in the menu bar, where you access those configuration items. For example, the **Rule State** menu is marked with the same icon as the **Rule State** column.

The following table describes the columns on the **Rules** page.

Table 55: Rules Page Columns

Heading	Description	For more information, see...
GID	Integer which indicates the Generator ID (GID) for the rule.	Viewing Events, on page 397
SID	Integer which indicates the Snort ID (SID), which acts a unique identifier for the rule.	Viewing Events, on page 397
Message	Message included in events generated by this rule, which also acts as the name of the rule.	
	The rule state for the rule, which may be one of three states: • drop and generate events • generate events • disable Note that you can access the Set rule state dialog box for a rule by clicking on its rule state icon.	Setting Rule States, on page 306
	Event filter, including event thresholds and event suppression, applied to the rule.	Filtering Intrusion Event Notification Per Policy, on page 308
	Dynamic rule state for the rule, which goes into effect if specified rate anomalies occur.	Adding Dynamic Rule States, on page 315

Heading	Description	For more information, see...
	Alerts configured for the rule (currently SNMP alerts only).	Adding SNMP Alerts, on page 318
	Comments added to the rule.	Adding Rule Comments, on page 319

You can also use the layer drop-down list to switch to the Rules page for other layers in your policy. Note that, unless you add layers to your policy, the only editable views listed in the drop-down list are the policy Rules page and the Rules page for a policy layer that is originally named My Changes ; note also that making changes in one of these views is the same as making the changes in the other. See Using Layers in a Network Analysis or Intrusion Policy Layers, on page 257 for more information. The drop-down list also lists the Rules page for the read-only base policy. See Understanding the Base Layer, on page 258 for information on the base policy.

To view the rules in an intrusion policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules** on the **Policy Information** page.

The **Rules** page appears. By default, the page lists the rules alphabetically by message.

Note that selecting **Rules** above the dividing line in the navigation panel takes you to the same rules listing. You can view and set all rule attributes in your policy in this view.

Sorting the Rule Display

License: Protection

You can sort rules by any of the columns in the Rules page by clicking on the heading title or icon.

Note that an up or down arrow on a heading or icon indicates that the sort is on that column in that direction.

To sort rules in an intrusion policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules**.

The **Rules** page appears. By default, the page lists the rules alphabetically by message.

Step 4 Click the title or icon in the top of the column you want to sort by.

The rules are sorted by the column, in the direction indicated by the arrow that appears on the column heading. To sort in the opposite direction, click the heading again. The sort order and the arrow reverse.

Viewing Rule Details

License: Protection

You can view rule documentation and rule overhead from the Rule Detail view. You can also view and add rule-specific features.

Note that local rules do not have any overhead, unless they are mapped to a vulnerability.

Table 56: Rule Details

Item	Description	For more information, see...
Summary	The rule summary. For rule-based events, this row appears when the rule documentation contains summary information.	Viewing Events, on page 397
Rule State	The current rule state for the rule. Also indicates the layer where the rule state is set.	Setting Rule States, on page 306; Using Layers in a Network Analysis or Intrusion Policy Layers, on page 257
Thresholds	Thresholds currently set for this rule, as well as the facility to add a threshold for the rule.	Setting a Threshold for a Rule, on page 294
Suppressions	Suppression settings currently set for this rule, as well as the facility to add suppressions for the rule.	Setting Suppression for a Rule, on page 295
Dynamic State	Rate-based rule states currently set for this rule, as well as the facility to add dynamic rule states for the rule.	Setting a Dynamic Rule State for a Rule, on page 295
Alerts	Alerts currently set for this rule, as well as the facility to add an alert for the rule. Currently, only SNMP alerts are supported.	Adding SNMP Alerts, on page 318
Comments	Comments added to this rule, as well as the facility to add comments for the rule.	Adding Rule Comments, on page 319
Documentation	The rule documentation for the current rule, supplied by the Cisco Vulnerability Research Team (VRT).	Viewing Events, on page 397

To view rule details:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules**.

The **Rules** page appears. By default, the page lists the rules alphabetically by message.

Step 4 Highlight the rule whose rule details you want to view.

Step 5 Click **Show details**.

The **Rule Detail** view appears. To hide the details again, click **Hide details**.

Tip You can also open Rule Detail by double-clicking a rule in the **Rules** view.

Setting a Threshold for a Rule

License: Protection

You can set a single threshold for a rule from the Rule Detail page. Adding a threshold overwrites any existing threshold for the rule. For more information on thresholding, see Configuring Event Thresholding, on page 309.

Note that a revert icon ( ) appears in a field when you type an invalid value; click it to revert to the last valid value for that field or to clear the field if there was no previous value.

To set a threshold from the rule details:

Step 1 Click **Add** next to **Thresholds**.

The Set Threshold dialog box appears.

Step 2 From the **Type** drop-down list, select the type of threshold you want to set:

- Select **Limit** to limit notification to the specified number of event instances per time period.
- Select **Threshold** to provide notification for each specified number of event instances per time period.
- Select **Both** to provide notification once per time period after a specified number of event instances.

Step 3 From the **Track By** drop-down list, select **Source** or **Destination** to indicate whether you want the event instances tracked by source or destination IP address.

Step 4 In the **Count** field, type the number of event instances you want to use as your threshold.

Step 5 In the **Seconds** field, type a number between 0 and 2147483647 that specifies the time period, in seconds, for which event instances are tracked.

Step 6 Click **OK**.

The system adds your threshold and displays an event filter icon ( ) next to the rule in the Event Filtering column. If you add multiple event filters to a rule, the system includes an indication over the icon of the number of event filters.

Setting Suppression for a Rule

License: Protection

You can set one or more suppressions for a rule from the Rule Detail page. For more information on suppression, see Setting Suppression for a Rule, on page 295 .

Note that a **revert** icon ( ) appears in a field when you type an invalid value; click it to revert to the last valid value for that field or to clear the field if there was no previous value.

To set suppression from the rule details:

Step 1 Click **Add** next to **Suppressions**.

The **Add Suppression** dialog box appears.

Step 2 From the **Suppression Type** drop-down list, select one of the following options:

- Select **Rule** to completely suppress events for a selected rule.
- Select **Source** to suppress events generated by packets originating from a specified source IP address.
- Select **Destination** to suppress events generated by packets going to a specified destination IP address.

Step 3 If you selected **Source** or **Destination** for the suppression type, the **Network** field appears. In the **Network** field, enter the IP address, an address block, or a comma-separated list comprised of any combination of these. If the intrusion policy is associated with the default action of an access control policy, you can also specify or list a network variable in the default action variable set.

For information on using IPv4 CIDR and IPv6 prefix length address blocks, see Firepower System IP Address Conventions in your version of the *Firepower Management Center Configuration Guide*.

Step 4 Click **OK**.

The system adds your suppression conditions and displays an **event filter** icon next to the rule in the **Event Filtering** column next the suppressed rule. If you add multiple event filters to a rule, a number over the icon indicates the number of filters.

Setting a Dynamic Rule State for a Rule

License: Protection

You can set one or more dynamic rule states for a rule from the Rule Detail page. The first dynamic rule state listed has the highest priority. Note that when two dynamic rule states conflict, the action of the first is carried out. For more information on dynamic rule states, see Understanding Dynamic Rule States, on page 315.

Note that a **revert** icon ( ) appears in a field when you type an invalid value; click it to revert to the last valid value for that field or to clear the field if there was no previous value.

To set a dynamic rule state from the rule details:

Step 1 Click **Add** next to **Dynamic State**.

The Add Rate-Based Rule State dialog box appears.

Step 2 From the **Track By** drop-down list, select an option to indicate how you want the rule matches tracked:

- Select **Source** to track the number of hits for that rule from a specific source or set of sources.
- Select **Destination** to track the number of hits for that rule to a specific destination or set of destinations.
- Select **Rule** to track all matches for that rule.

Step 3 Optionally, if you set **Track By** to **Source** or **Destination**, enter the IP address of each host you want to track in the **Network** field.

Step 4 Next to **Rate**, indicate the number of rule matches per time period to set the attack rate:

- In the **Count** field, using an integer between 0 and 2147483647, specify the number of rule matches you want to use as your threshold.
- In the **Seconds** field, using an integer between 0 and 2147483647, specify the number of seconds that make up the time period for which attacks are tracked.

Step 5 From the **New State** drop-down list, select the new action to be taken when the conditions are met:

- Select **Generate Events** to generate an event.
- Select **Drop and Generate Events** to generate an event and drop the packet that triggered the event in inline deployments or to generate an event in passive deployments.
- Select **Disabled** to take no action.

Step 6 In the **Timeout** field, using an integer between 1 and 2147483647 (approximately 68 years), type the number of seconds you want the new action to remain in effect. After the timeout occurs, the rule reverts to its original state. Specify 0 to prevent the new action from timing out.

Step 7 Click **OK**.

The system adds the dynamic rule state and displays a dynamic state icon next to the rule in the Dynamic State column. If you add multiple dynamic rule state filters to a rule, a number over the icon indicates the number of filters.

If any required fields are blank, you receive an error message indicating which fields you must fill.

Setting an SNMP Alert for a Rule

License: Protection

You can set an SNMP alert for a rule from the Rule Detail page. For more information on SNMP alerts, see Using SNMP Responses, on page 419.

To add an SNMP alert from the rule details:

Click **Add SNMP Alert** next to **Alerts**.

The system adds the alert and displays an **alert** icon next to the rule in the **Alerting** column. If you add multiple alerts to a rule, the system includes an indication over the icon of the number of alerts.

Adding a Rule Comment for a Rule

License: Protection

You can add a rule comment for a rule from the **Rule Detail** page. For more information on rule comments, see Adding Rule Comments, on page 319.

To add a comment from the rule details:

Step 1 Click **Add** next to **Comments**.

The **Add Comment** dialog box appears.

Step 2 In the **Comment** field, type the rule comment.

Step 3 Click **OK**.

The system adds the comment and displays a comment icon next to the rule in the Comments column. If you add multiple comments to a rule, a number over the icon indicates the number of comments.

Tip To delete a rule comment, click **Delete** in the rule comments section. Note that you can only delete a comment if the comment is cached with uncommitted intrusion policy changes. After intrusion policy changes are committed, the rule comment is permanent.

Filtering Rules in an Intrusion Policy

License: Protection

You can filter the rules you display on the Rules page by a single criteria, or a combination of one or more criteria.

The filter you construct is shown in the Filter text box. You can click keywords and keyword arguments in the filter panel to construct a filter. When you select multiple keywords, the system combines them using AND logic to create a compound search filter. For example, if you select **preprocessor** under **Category** and then select **Rule Content** > **GID** and enter **116** , you get a filter of Category: "preprocessor" GID:"116" which retrieves all rules that are preprocessor rules **and** have a GID of 116.

The Category, Microsoft Vulnerabilities, Microsoft Worms, Platform Specific, Preprocessor, and Priority filter groups allow you to submit more than one argument for a keyword, separated by commas. For example, you can press Shift and then select **os-linux** and **os-windows** from **Category** to produce the filter Category:"os-windows,os-linux" , which retrieves any rules in the os-linux category or in the os-windows category.

To show the filter panel, click the **show** icon .

To hide the filter panel, click the **hide** icon .

Understanding Rule Filtering in an Intrusion Policy

License: Protection

Rule filter keywords help you find the rules for which you want to apply rule settings, such as rule states or event filters. You can filter by a keyword and simultaneously select the argument for the keyword by selecting the argument you want from the Rules page filter panel.

Guidelines for Constructing Intrusion Policy Rule Filters

License: Protection

In most cases, when you are building a filter, you can use the filter panel to the left of the Rules page in the intrusion policy to select the keywords/arguments you want to use.

Rule filters are grouped into rule filter groups in the filter panel. Many rule filter groups contain sub-criteria so that you can more easily find the specific rules you are looking for. Some rule filters have multiple levels that you can expand to drill down to individual rules.

Items in the filter panel sometimes represent filter type groups, sometimes represent keywords, and sometimes represent the argument to a keyword. Use the following rules of thumb to help you build your filters:

- When you select a filter type group heading that is not a keyword (Rule Configuration, Rule Content, Platform Specific, and Priority), it expands to list the available keywords.

When you select a keyword by clicking on a node in the criteria list, a pop-up window appears, where you supply the argument you want to filter by.

If that keyword is already used in the filter, the argument you supply replaces the existing argument for that keyword.

- When you select a filter type group heading that is a keyword (Category, Classifications, Microsoft Vulnerabilities, Microsoft Worms, Priority, and Rule Update), it lists the available arguments.

When you select an item from this type of group, the argument and the keyword it applies to are immediately added to the filter. If the keyword is already in the filter, it replaces the existing argument for the keyword that corresponds to that group.

For example, if you click **os-linux** under **Category** in the filter panel, Category:"os-linux" is added to the filter text box. If you then click **os-windows** under **Category**, the filter changes to Category:"os-windows" .

- Reference under Rule Content is a keyword, and so are the specific reference ID types listed below it. When you select any of the reference keywords, a pop-up window appears, where you supply an argument and the keyword is added to the existing filter. If the keyword is already in use in the filter, the new argument you supply replaces the existing argument.

For example, if you click **Rule Content > Reference > CVE ID** in the filter panel, a pop-up window prompts you to supply the CVE ID. If you enter 2007 , then CVE:"2007" is added to the filter text box. In another example, if you click **Rule Content > Reference** in the filter panel, a pop-up window prompts you to supply the reference. If you enter 2007 , then Reference:"2007" is added to the filter text box.

- When you select rule filter keywords from different groups, each filter keyword is added to the filter and any existing keywords are maintained (unless overridden by a new value for the same keyword).

For example, if you click **os-linux** under **Category** in the filter panel, Category:"os-linux" is added to the filter text box. If you then click **MS00-006** under **Microsoft Vulnerabilities**, the filter changes to Category:"os-linux" MicrosoftVulnerabilities:"MS00-006" .

- When you select multiple keywords, the system combines them using AND logic to create a compound search filter. For example, if you select **preprocessor** under **Category** and then select **Rule Content > GID** and enter 116 , you get a filter of Category: "preprocessor" GID:"116" , which retrieves all rules that are preprocessor rules **and** have a GID of 116.
- The Category, Microsoft Vulnerabilities, Microsoft Worms, Platform Specific, and Priority filter groups allow you to submit more than one argument for a keyword, separated by commas. For example, you can press Shift and then select **os-linux** and **os-windows** from **Category** to produce the filter Category:"os-windows,app-detect" , which retrieves any rules in the os-linux category or in the os-windows category.

The same rule may be retrieved by more than one filter keyword/argument pair. For example, the DOS Cisco attempt rule (SID 1545) appears if rules are filtered by the **dos** category, and also if you filter by the **High** priority.

Note The Cisco VRT may use the rule update mechanism to add and remove rule filters.

Note that the rules on the Rules page may be either shared object rules (generator ID 3) or standard text rules (generator ID 1). The following table describes the different rule filters.

Table 57: Rule Filter Groups

Filter Group	Description	Multiple Argument Support?	Heading is...	Items in List are...
Rule Configuration	Finds rules according to the configuration of the rule. See Understanding Rule Configuration Filters, on page 300.	No	A grouping	keywords
Rule Content	Finds rules according to the content of the rule. See Understanding Rule Content Filters, on page 302.	No	A grouping	keywords
Category	Finds rules according to the rule categories used by the rule editor. Note that local rules appear in the local sub-group. See <Understanding Rule Categories, on page 304.	Yes	A keyword	arguments
Classifications	Finds rules according to the attack classification that appears in the packet display of an event generated by the rule. .	No	A keyword	arguments
Microsoft Vulnerabilities	Finds rules according to Microsoft bulletin number.	Yes	A keyword	arguments
Microsoft Worms	Finds rules based on specific worms that affect Microsoft Windows hosts.	Yes	A keyword	arguments

Filter Group	Description	Multiple Argument Support?	Heading is...	Items in List are...
Platform Specific	Finds rules according to their relevance to specific versions of operating systems. Note that a rule may affect more than one operating system or more than one version of an operating system. For example, enabling SID 2260 affects multiple versions of Mac OS X, IBM AIX, and other operating systems.	Yes	A keyword	arguments Note that if you pick one of the items from the sub-list, it adds a modifier to the argument.
Preprocessors	Finds rules for individual preprocessors. Note that you must enable preprocessor rules associated with a preprocessor option to generate events for the option when the preprocessor is enabled; see Setting Rule States, on page 306.	Yes	A grouping	sub-groupings
Priority	Finds rules according to high, medium, and low priorities. The classification assigned to a rule determines its priority. These groups are further grouped into rule categories. Note that local rules (that is, rules that you create) do not appear in the priority groups.	Yes	A keyword	arguments Note that if you pick one of the items from the sub-list, it adds a modifier to the argument.
Rule Update	Finds rules added or modified through a specific rule update. For each rule update, view all rules in the update, only new rules imported in the update, or only existing rules changed by the update.	No	A keyword	arguments

Understanding Rule Configuration Filters

License: Protection

You can filter the rules listed in the Rules page by several rule configuration settings.

When you select a keyword by clicking on a node in the criteria list, a pop-up window appears, where you supply the argument you want to filter by.

If that keyword is already used in the filter, the argument you supply replaces the existing argument for that keyword.

See the following procedures for more information on the rule configuration settings you can use to filter.

Step 1 To use the Rule State filter:

a) Under **Rule Configuration**, click **Rule State**.

b) From the **Rule State** drop-down list, select the rule state to filter by:

- To find rules that only generate events, select **Generate Events**, then click **OK**.
- To find rules that are set to generate events and drop the matching packet, select **Drop and Generate Events**, then click **OK**.

- To find disabled rules, select **Disabled**, then click **OK**.

The Rules page updates to display rules according to current rule state.

Step 2 To use the Threshold filter:

a) Under **Rule Configuration**, click **Threshold**.

b) From the **Threshold** drop-down list, select the threshold setting to filter by:

- To find rules with a threshold type of limit , select **Limit**, then click **OK**.
- To find rules with a threshold type of threshold , select **Threshold**, then click **OK**.
- To find rules with a threshold type of both , select **Both**, then click **OK**.
- To find rules with thresholds tracked by source , select **Source**, then click **OK**.
- To find rules with thresholds tracked by destination , select **Destination**, then click **OK**.
- To find any rule with a threshold set, select **All**, then click **OK**.

The **Rules** page updates to display rules where the type of threshold indicated in the filter has been applied to the rule.

Step 3 To use the Suppression filter:

a) Under **Rule Configuration**, click **Suppression**.

b) From the **Suppression** drop-down list, select the suppression setting to filter by:

- To find rules where events are suppressed for packets inspected by that rule, select **By Rule**, then click **OK**.
- To find rules where events are suppressed based on the source of the traffic, select **By Source**, then click **OK**.
- To find rules where events are suppressed based on the destination of the traffic, select **By Destination**, then click **OK**.
- To find any rule with suppression set, select **All**, then click **OK**

.

The **Rules** page updates to display rules where the type of suppression indicated in the filter has been applied to the rule.

Step 4 To use the Dynamic State filter:

a) Under **Rule Configuration**, click **Dynamic State**.

b) From the **Dynamic State** drop-down list, select the suppression setting to filter by:

- To find rules where a dynamic state is configured for packets inspected by that rule, select **By Rule**, then click **OK**.
- To find rules where a dynamic state is configured for packets based on the source of the traffic, select **By Source**, then click **OK**.
- To find rules where a dynamic state is configured based on the destination of the traffic, select **By Destination**, then click **OK**.
- To find rules where a dynamic state of Generate Events is configured, select **Generate Events**, then click **OK**.

- To find rules where a dynamic state of Drop and Generate Events is configured, select **Drop and Generate Events**, then click **OK**.
- To find where a dynamic state of Disabled is configured, select **Disabled**, then click **OK**.
- To find any rule with suppression set, select **All**, then click **OK**.

The Rules page updates to display rules where the dynamic rule state indicated in the filter has been applied to the rule.

Step 5 To use the Alert filter:

a) Under **Rule Configuration**, click **Alert**.
b) From the **Alert** drop-down list, select the alert setting to filter by: **SNMP**.
c) Click **OK**.

The **Rules** page updates to display rules where you have applied an alert filter.

Step 6 To use the Comment filter:

a) Under **Rule Configuration**, click **Comment**.
b) In the **Comment** field, type the string of comment text to filter by, then click **OK**.

The **Rules** page updates to display rules where comments applied to the rule contain the string indicated in the filter.

Understanding Rule Content Filters

License: Protection

You can filter the rules listed in the Rules page by several rule content items. For example, you can quickly retrieve a rule by searching for the rule's SID. You can also find all rules that inspect traffic going to a specific destination port.

When you select a keyword by clicking on a node in the criteria list, a pop-up window appears, where you supply the argument you want to filter by.

If that keyword is already used in the filter, the argument you supply replaces the existing argument for that keyword.

For example, if you click **SID** under **Rule Content** in the filter panel, a pop-up window appears, prompting you to supply a SID. If you type 1045 , then SID:"1045" is added to the filter text box. If you then click **SID** again and change the SID filter to 1044 , the filter changes to SID:"1044" .

For more information on the rule content you can use to filter, see the following table.

Table 58: Rule Content Filters

To use this filter, click...	Then...	Result
Message	Type the message string to filter by, then click **OK**.	Finds rules that contain the supplied string in the message field.
SID	Type the SID number to filter by, then click **OK**.	Finds rules that have the specified SID.

To use this filter, click...	Then...	Result
GID	Type the GID number to filter by, then click **OK**.	Finds rules that have the specified GID.
Reference	Type the reference string to filter by, then click **OK**. To enter a string for a specific type of reference that you want to filter by, select **CVE ID**, **URL**, **Bugtraq ID**, **Nessus ID**, **Arachnids ID**, or **Mcafee ID**, then type a string and click **OK**.	Finds rules that contain the supplied string in the reference field.
Action	Select the action to filter by: • To find alert rules, select **Alert**, then click **OK**. • To find pass rules, select **Pass**, then click **OK**.	Finds rules that start with alert or pass .
Protocol	Select the protocol to filter by: **ICMP**, **IP**, **TCP**, or **UDP**; then click **OK**.	Finds rules that include the selected protocol.
Direction	Select a directional setting to filter by: • To find rules that inspect traffic moving in a specific direction, select **Directional**, then click **OK**. • To find rules that inspect traffic moving in either direction between a source and destination, select **Bidirectional**, then click **OK**.	Finds rules based on whether the rule includes the indicated directional setting.
Source IP	Type the source IP address to filter by, then click **OK**. Note that you can filter by a valid IP address, a CIDR block/prefix length, or using variables such as $HOME_NET or $EXTERNAL_NET .	Finds rules that use the specified addresses or variables for the source IP address designation in the rule.
Destination IP	Type the destination IP address to filter by, then click **OK**. Note that you can filter by a valid IP address, a CIDR block/prefix length, or using variables such as $HOME_NET or $EXTERNAL_NET .	Finds rules that use the specified addresses or variables for the source IP address designation in the rule.
Source port	Type the source port to filter by, then click **OK**. The port value must be an integer between 1 and 65535 or a port variable.	Finds rules that include the specified source port.
Destination port	Type the destination port to filter by, then click **OK**. The port value must be an integer between 1 and 65535 or a port variable.	Finds rules that include the specified destination port.
Rule Overhead	Select the amount of rule overhead to filter by: **Low**, **Medium**, **High**, or **Very High**; then click **OK**.	Finds rules with the selected rule overhead.

To use this filter, click...	Then...	Result
Metadata	Type the metadata key-value pair to filter by, separated by a space; then click **OK**. For example, type metadata:"service http" to locate rules with metadata relating to the HTTP application protocol.	Find rules with metadata containing the matching key-value pair.

Understanding Rule Categories

License: Protection

The ASA FirePOWER module places rules in categories based on the type of traffic the rule detects. On the Rules page, you can filter by rule category, so you can set a rule attribute for all rules in a category. For example, if you do not have Linux hosts on your network, you could filter by the **os-linux** category, then disable all the rules showing to disable the entire **os-linux** category.

Note The Cisco VRT may use the rule update mechanism to add and remove rule categories.

Editing a Rule Filter Directly

License: Protection

You can edit your filter to modify the special keywords and their arguments that are supplied when you click on a filter in the filter panel. Custom filters on the Rules page function like those used in the rule editor, but you can also use any of the keywords supplied in the Rules page filter, using the syntax displayed when you select the filter through the filter panel. To determine a keyword for future use, click on the appropriate argument in the filter panel on the right. The filter keyword and argument syntax appear in the filter text box.

To see lists of arguments for keywords which only support specific values, see Understanding Rule Configuration Filters, on page 300, Understanding Rule Content Filters, on page 302, and Understanding Rule Categories, on page 304. Remember that comma-separated multiple arguments for a keyword are only supported for the Category and Priority filter types.

You can use keywords and arguments, character strings, and literal character strings in quotes, with spaces separating multiple filter conditions. A filter cannot include regular expressions, wild card characters, or any special operator such as a negation character (!), a greater than symbol (>), less than symbol (<), and so on. When you type in search terms without a keyword, without initial capitalization of the keyword, or without quotes around the argument, the search is treated as a string search and the category, message, and SID fields are searched for the specified terms.

All keywords, keyword arguments, and character strings are case-insensitive. Except for the gid and sid keywords, all arguments and strings are treated as partial strings. Arguments for gid and sid return only exact matches.

Each rule filter can include one or more keywords in the format:

```
Keyword:"argument"
```

where **keyword** is one of the keywords in the filter groups described in the Table 54: Rule types, on page 290table and **argument** is enclosed in double quotes and is a single, case-insensitive, alphanumeric string to

search for in the specific field or fields relevant to the keyword. Note that keywords should be typed with initial capitalization.

Arguments for all keywords except gid and sid are treated as partial strings. For example, the argument 123 returns "12345" , "41235" , "45123", and so on. The arguments for gid and sid return only exact matches; for example, sid:3080 returns only SID 3080 .

Each rule filter can also include one or more alphanumeric character strings. Character strings search the rule Message field, Signature ID, and Generator ID. For example, the string 123 returns the strings "Lotus123" , "123mania" , and so on in the rule message, and also returns SID 6123 , SID 12375 , and so on. You can search for a partial SID by filtering with one or more character strings.

All character strings are case-insensitive and are treated as partial strings. For example, any of the strings ADMIN , admin , or Admin return "admin" , "CFADMIN" , "Administrator" and so on.

You can enclose character strings in quotes to return exact matches. For example, the literal string "overflow attempt" in quotes returns only that exact string, whereas a filter comprised of the two strings overflow and attempt without quotes returns "overflow attempt" , "overflow multipacket attempt" , "overflow with evasion attempt" , and so on.

You can narrow filter results by entering any combination of keywords, character strings, or both, separated by spaces. The result includes any rule that matches all the filter conditions.

You can enter multiple filter conditions in any order. For example, each of the following filters returns the same rules:

- url:at login attempt cve:200
- login attempt cve:200 url:at
- login cve:200 attempt url:at

Setting a Rule Filter in an Intrusion Policy

License: Protection

You can filter the rules on the Rules page to display a subset of rules. You can then use any of the page features. This can be useful, for example, when you want to set a threshold for all the rules in a specific category. You can use the same features with rules in a filtered or unfiltered list. For example, you can apply new rule states to rules in a filtered or unfiltered list.

You can select predefined filter keywords from the filter panel on the left side of the Rules page in the intrusion policy. When you select a filter, the page displays all matching rules, or indicates when no rules match.

For more information on all the keywords and arguments you can use and how you can construct filters from the filter panel, see Understanding Rule Filtering in an Intrusion Policy, on page 298.

You can add keywords to a filter to further constrain it. Any filter you enter searches the entire rules database and returns all matching rules. When you enter a filter while the page still displays the result of a previous filter, the page clears and returns the result of the new filter instead.

You can also type a filter using the same keyword and argument syntax supplied when you select a filter, or modify argument values in a filter after you select it. When you type in search terms without a keyword, without initial capitalization of the keyword, or without quotes around the argument, the search is treated as a string search and the category, message, and SID fields are searched for the specified terms.

To filter for specific rules in an intrusion policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules**.

The **Rules** page appears. By default, the page lists the rules alphabetically by message.

Step 4 Construct a filter by clicking on keywords or arguments in the filter panel on the left. Note that if you click an argument for a keyword already in the filter, it replaces the existing argument.

The page refreshes to display all matching rules, and the number of rules matching the filter is displayed above the filter text box.

Step 5 Select the rule or rules where you want to apply a new setting. You have the following options:

- To select a specific rule, select the check box next to the rule.
- To select all the rules in the current list, select the check box at the top of the column.

Step 6 Optionally, make any changes to the rule that you would normally make on the page. See the following sections for more information:

- See Setting Rule States, on page 306 for information on enabling and disabling rules on the Rules page.
- See Filtering Intrusion Event Notification Per Policy, on page 308 for information on adding thresholding and suppression to rules.
- See Adding Dynamic Rule States, on page 315 for information on setting dynamic rule states that trigger when rate anomalies occur in matching traffic.
- See Adding SNMP Alerts, on page 318 for information on adding SNMP alerts to specific rules.
- See Adding Rule Comments, on page 319 for information on adding rule comments to rules.

Step 7 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache.

See Managing Intrusion Policies, on page 279 and Editing Intrusion Policies, on page 280 for more information.

Setting Rule States

License: Protection

The Cisco Vulnerability Research Team (VRT) sets the default state of each intrusion and preprocessor rule in each default policy. For example, a rule may be enabled in the Security over Connectivity default policy and

disabled in the Connectivity over Security default policy. Intrusion policy rules you create inherit the default states of the rules in the default policy you use to create your policy.

You can set a rule to **Generate Events**, to **Drop and Generate Events**, or to **Disable individually**, or you can filter the rules by a variety of factors to select the rules for which you want to modify the state. In an inline deployment, you can use the Drop and Generate Events rule state in inline intrusion deployments to drop malicious packets. Note that rules with the Drop and Generate Events rule state generate events but do not drop packets in a passive deployment. Setting a rule to Generate Events or to Drop and Generate Events enables the rule; setting the rule to Disable disables it.

Consider two scenarios. In the first scenario, the rule state for a specific rule is set to Generate Events. When a malicious packet crosses your network and triggers the rule, the packet is sent to its destination and the system generates an intrusion event. In the second scenario, assume that the rule state for the same rule is set to Drop and Generate Events in an inline deployment. In this case, when the malicious packet crosses the network, the system drops the malicious packet and generates an intrusion event. The packet never reaches its target.

In an intrusion policy, you can set a rule's state to one of the following:

- Set the rule state to **Generate Events** if you want the system to detect a specific intrusion attempt and generate an intrusion event when it finds matching traffic.
- Set the rule state to **Drop and Generate Events** if you want the system to detect a specific intrusion attempt, then drop the packet containing the attack and generate an intrusion event when it finds matching traffic in an inline deployment, or to generate an intrusion event when it finds matching traffic in a passive deployment.

Note that for the system to drop packets, your intrusion policy must be set to drop rules in an inline deployment; see Setting Drop Behavior in an Inline Deployment, on page 281 for more information.

- Set the rule state to **Disable** if you do not want the system to evaluate matching traffic.

To use drop rules, you must:

- Enable the **Drop when Inline** option in your intrusion policy.
- Set the rule state to **Drop and Generate Events** for any rules that should drop all packets that match the rule.
- Apply an access control policy that includes an access control rule that is associated with your intrusion policy in an inline deployment.

Filtering rules on the **Rules** page can help you find the rules you want to set as drop rules. For more information, see Filtering Rules in an Intrusion Policy, on page 297.

The VRT sometimes uses a rule update to change the default state of one or more rules in a default policy. If you allow rule updates to update your base policy, you also allow the rule update to change the default state of a rule in your policy when the default state changes in the default policy you used to create your policy (or in the default policy it is based on). Note, however, that if you have changed the rule state, the rule update does not override your change.

To change the rule state for one or more rules:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Note that this page indicates the total number of enabled rules, the total number of enabled rules set to **Generate Events**, and the total number set to **Drop and Generate Events**. Note also that in a passive deployment, rules set to **Drop and Generate Events** only generate events.

Step 3 Click **Rules**.

The **Rules** page appears. By default, the page lists the rules alphabetically by message.

Step 4 Locate the rule or rules where you want to set the rule state. You have the following options:

- To sort the current display, click on a column heading or icon. To reverse the sort, click again.
- Construct a filter by clicking on keywords or arguments in the filter panel on the left. For more information, see the following topics: Understanding Rule Filtering in an Intrusion Policy, on page 298 and Setting a Rule Filter in an Intrusion Policy, on page 305.

The page refreshes to display all matching rules.

Step 5 Select the rule or rules where you want to set the rule state. You have the following options:

- To select a specific rule, select the check box next to the rule.
- To select all the rules in the current list, select the check box at the top of the column.

Step 6 You have the following options:

- To generate events when traffic matches the selected rules, select **Rule State** > **Generate Events**.
- To generate events and drop the traffic in inline deployments when traffic matches the selected rules, select **Rule State** > **Drop and Generate Events** > .
- To not inspect traffic matching the selected rules, select **Rule State** > **Disable**.

Note Cisco **strongly** recommends that you **do not** enable all the intrusion rules in an intrusion policy. The performance of your device is likely to degrade if all rules are enabled. Instead, tune your rule set to match your network environment as closely as possible.

Step 7 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache. See Managing Intrusion Policies, on page 279 and Editing Intrusion Policies, on page 280 for more information.

Filtering Intrusion Event Notification Per Policy

License: Protection

The importance of an intrusion event can be based on frequency of occurrence, or on source or destination IP address. In some cases you may not care about an event until it has occurred a certain number of times. For example, you may not be concerned if someone attempts to log into a server until they fail a certain number

of times. In other cases, you may only need to see a few occurrences to know there is a widespread problem. For example, if a DoS attack is launched against your web server, you may only need to see a few occurrences of an intrusion event to know that you need to address the situation. Seeing hundreds of the same event only overwhelms your system.

Configuring Event Thresholding

License: Protection

You can set thresholds for individual rules, per intrusion policy, to limit the number of times the system logs and displays an intrusion event based on how many times the event is generated within a specified time period. This can prevent you from being overwhelmed with a large number of identical events. You can set thresholds per shared object rule, standard text rule, or preprocessor rule.

Understanding Event Thresholding

License: Protection

First, you must specify the thresholding type. You can select from the options discussed in the following table.

Table 59: Thresholding Options

Option	Description
Limit	Logs and displays events for the specified number of packets (specified by the Count argument) that trigger the rule during the specified time period. For example, if you set the type to **Limit**, the **Count** to 10 , and the **Seconds** to 60 , and 14 packets trigger the rule, the system stops logging events for the rule after displaying the first 10 that occur within the same minute.
Threshold	Logs and displays a single event when the specified number of packets (specified by the Count argument) trigger the rule during the specified time period. Note that the counter for the time restarts after you hit the threshold count of events and the system logs that event. For example, you set the type to **Threshold**, **Count** to 10 , and **Seconds** to 60 , and the rule triggers 10 times by second 33. The system generates one event, then resets the Seconds and Count counters to 0. The rule then triggers another 10 times in the next 25 seconds. Because the counters reset to 0 at second 33, the system logs another event.
Both	Logs and displays an event once per specified time period, after the specified number (count) of packets trigger the rule. For example, if you set the type to **Both**, **Count** to two, and **Seconds** to 10 , the following event counts result: • If the rule is triggered once in 10 seconds, the system does not generate any events (the threshold is not met) • If the rule is triggered twice in 10 seconds, the system generates one event (the threshold is met when the rule triggers the second time) • If the rule is triggered four times in 10 seconds, the system generates one event (the threshold is met when the rule triggers the second time, and following events are ignored)

Next, you must specify tracking, which determines whether the event threshold is calculated per source or destination IP address. Select one of the options from the following table to specify how the system tracks event instances.

Table 60: Thresholding IP Options

Option	Description
Source	Calculates event instance count per source IP address.
Destination	Calculates event instance count per destination IP address.

Finally, you must specify the number of instances and time period that define the threshold.

Table 61: Thresholding Instance/Time Options

Option	Description
Count	The number of event instances per specified time period per tracking IP address required to meet the threshold.
Seconds	The number of seconds that elapse before the count resets. If you set the threshold type to **limit**, the tracking to **Source IP**, the **count** to 10 , and the **seconds** to 10 , the system logs and displays the first 10 events that occur in 10 seconds from a given source port. If only 7 events occur in the first 10 seconds, the system logs and displays those; if 40 events occur in the first 10 seconds, the system logs and displays 10, then begins counting again when the 10-second time period elapses.

Note that you can use intrusion event thresholding alone or in any combination with rate-based attack prevention, the detection_filter keyword, and intrusion event suppression. See Adding Dynamic Rule States, on page 315, and Configuring Suppression Per Intrusion Policy, on page 312 for more information.

Adding and Modifying Intrusion Event Thresholds

License: Protection

You can set a threshold for one or more specific rules. You can also separately or simultaneously modify existing threshold settings. You can set a a single threshold for each. Adding a threshold overwrites any existing threshold for the rule.

For more information on viewing and deleting threshold configurations, see Viewing and Deleting Intrusion Event Thresholds, on page 311.

You can also modify the global threshold that applies by default to all rules and preprocessor-generated events. For more information, see Limiting Intrusion Event Logging, on page 321.

Note that a **revert** icon ( ) appears in a field when you type an invalid value; click it to revert to the last valid value for that field or to clear the field if there was no previous value.

To add or modify event thresholds:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules**.

The **Rules** page appears. By default, the page lists the rules alphabetically by message.

Step 4 Locate the rule or rules where you want to set a threshold. You have the following options:

- To sort the current display, click on a column heading or icon. To reverse the sort, click again.
- Construct a filter by clicking on keywords or arguments in the filter panel on the left. For more information, see the following topics: Understanding Rule Filtering in an Intrusion Policy, on page 298 and Setting a Rule Filter in an Intrusion Policy, on page 305.

The page refreshes to display all matching rules.

Step 5 Select the rule or rules where you want to set a threshold. You have the following options:

- To select a specific rule, select the check box next to the rule.
- To select all the rules in the current list, select the check box at the top of the column.

Step 6 Select **Event Filtering** > **Threshold**.

The **thresholding** pop-up window appears.

Step 7 From the **Type** drop-down list, select the type of threshold you want to set:

- Select **Limit** to limit notification to the specified number of event instances per time period.
- Select **Threshold** to provide notification for each specified number of event instances per time period.
- Select **Both** to provide notification once per time period after a specified number of event instances.

Step 8 From the **Track By** drop-down list, select whether you want the event instances tracked by **Source** or **Destination** IP address.

Step 9 In the **Count** field, specify the number of event instances you want to use as your threshold.

Step 10 In the **Seconds** field, specify the number of seconds that make up the time period for which event instances are tracked.

Step 11 Click **OK**.

The system adds your threshold and displays an **event filter** icon ( ) next to the rule in the **Event Filtering** column. If you add multiple event filters to a rule, a number over the icon indicates the number of event filters.

Step 12 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache.

See Managing Intrusion Policies, on page 279 and Editing Intrusion Policies, on page 280 for more information.

Viewing and Deleting Intrusion Event Thresholds

License: Protection

You may want to view or delete an existing threshold setting. You can use the Rules Details view to display the configured settings for a threshold to see if they are appropriate for your system. If they are not, you can add a new threshold to overwrite the existing values.

Note that you can also modify the global threshold that applies by default to all rules and preprocessor-generated events. See Limiting Intrusion Event Logging, on page 321 for more information.

To view or delete a threshold:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules**.

The **Rules** page appears. By default, the page lists the rules alphabetically by message.

Step 4 Locate the rule or rules that have a configured threshold you want to view or delete. You have the following options:

- To sort the current display, click on a column heading or icon. To reverse the sort, click again.
- Construct a filter by clicking on keywords or arguments in the filter panel on the left. For more information, see the following topics: Understanding Rule Filtering in an Intrusion Policy, on page 298 and Setting a Rule Filter in an Intrusion Policy, on page 305.

The page refreshes to display all matching rules.

Step 5 Select the rule or rules with a configured threshold you want to view or delete. You have the following options:

- To select a specific rule, select the check box next to the rule.
- To select all the rules in the current list, select the check box at the top of the column.

Step 6 To remove the threshold for each selected rule, select **Event Filtering** > **Remove Thresholds**. Click **OK** in the confirmation pop-up window that appears.

Tip To remove a specific threshold, you can also highlight the rule and click **Show details**. Expand the threshold settings, then click **Delete** next to the threshold settings you want to remove. Click **OK** to confirm that you want to delete the configuration.

The page refreshes and the threshold is deleted.

Step 7 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache. See Managing Intrusion Policies, on page 279 and Editing Intrusion Policies, on page 280 for more information.

Configuring Suppression Per Intrusion Policy

License: Protection

You can suppress intrusion event notification when a specific IP address or range of IP addresses triggers a specific rule or preprocessor. This is useful for eliminating false positives. For example, if you have a mail server that transmits packets that look like a specific exploit, you might suppress event notification for that event when it is triggered by your mail server. The rule triggers for all packets, but you only see events for legitimate attacks.

Note that you can use intrusion event suppression alone or in any combination with rate-based attack prevention, the detection_filter keyword, and intrusion event thresholding. See Adding Dynamic Rule States, on page 315, and Configuring Event Thresholding, on page 309 for more information.

Suppressing Intrusion Events

License: Protection

You can suppress intrusion event notification for a rule or rules. When notification is suppressed for a rule, the rule triggers but events are not generated. You can set one or more suppressions for a rule. The first suppression listed has the highest priority. Note that when two suppressions conflict, the action of the first is carried out.

Note that a revert icon ( ) appears in a field when you type an invalid value; click it to revert to the last valid value for that field or to clear the field if there was no previous value.

To suppress event display:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules**.

The **Rules** page appears. By default, the page lists the rules alphabetically by message.

Step 4 Locate the rule or rules where you want to set suppression. You have the following options:

- To sort the current display, click on a column heading or icon. To reverse the sort, click again.
- Construct a filter by clicking on keywords or arguments in the filter panel on the left. For more information, see the following topics: Understanding Rule Filtering in an Intrusion Policy, on page 298 and Setting a Rule Filter in an Intrusion Policy, on page 305.

The page refreshes to display all matching rules.

Step 5 Select the rule or rules for which you want to configure suppression conditions. You have the following options:

- To select a specific rule, select the check box next to the rule.
- To select all rules in the current list, select the check box at the top of the column.

Step 6 Select **Event Filtering** > **Suppression**.

The **suppression** pop-up window appears.

Step 7 Select one of the following **Suppression Type** options:

- Select **Rule** to completely suppress events for a selected rule.

- Select **Source** to suppress events generated by packets originating from a specified source IP address.
- Select **Destination** to suppress events generated by packets going to a specified destination IP address.

Step 8 If you selected **Source** or **Destination** for the suppression type, in the **Network** field enter the IP address, address block, or variable you want to specify as the source or destination IP address, or a comma-separated list comprised of any combination of these.

Step 9 Click **OK**.

The system adds your suppression conditions and displays an event filter icon ( ) next to the rule in the **Event Filtering** column next the suppressed rule. If you add multiple event filters to a rule, a number over the icon indicates the number of event filters.

Step 10 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache.

See Managing Intrusion Policies, on page 279 and Editing Intrusion Policies, on page 280 for more information.

Viewing and Deleting Suppression Conditions

License: Protection

You may want to view or delete an existing suppression condition. For example, you can suppress event notification for packets originating from a mail server IP address because the mail server normally transmits packets that look like exploits. If you then decommission that mail server and reassign the IP address to another host, you should delete the suppression conditions for that source IP address.

To view or delete a defined suppression condition:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules**.

The **Rules** page appears. By default, the page lists rules alphabetically by message.

Step 4 Locate the rule or rules where you want to view or delete suppressions. You have the following options:

- To sort the current display, click on a column heading or icon. To reverse the sort, click again.
- Construct a filter by clicking on keywords or arguments in the filter panel on the left. For more information, see the following topics:Understanding Rule Filtering in an Intrusion Policy, on page 298 and Setting a Rule Filter in an Intrusion Policy, on page 305.

The page refreshes to display all matching rules.

Step 5 Select the rule or rules for which you want to view or delete suppressions. You have the following options:

- To select a specific rule, select the check box next to the rule.
- To select all rules in the current list, select the check box at the top of the column.

Step 6 You have two options:

- To remove all suppression for a rule, select **Event Filtering** > **Remove Suppressions**. Click **OK** in the **confirmation** pop-up window that appears.
- To remove a specific suppression setting, highlight the rule and click **Show details**. Expand the suppression settings and click **Delete** next to the suppression settings you want to remove. Click **OK** to confirm that you want to delete your selected settings.

The page refreshes and the suppression settings are deleted.

Step 7 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache. See Managing Intrusion Policies, on page 279 and Editing Intrusion Policies, on page 280for more information.

Adding Dynamic Rule States

License: Protection

Rate-based attacks attempt to overwhelm a network or host by sending excessive traffic toward the network or host, causing it to slow down or deny legitimate requests. You can use rate-based prevention to change the action of a rule in response to excessive rule matches for specific rules.

Understanding Dynamic Rule States

License: Protection

You can configure your intrusion policies to include a rate-based filter that detects when too many matches for a rule occur in a given time period. You can use this feature on a device deployed inline to block rate-based attacks for a specified time, then revert to a rule state where rule matches only generate events and do not drop traffic.

Rate-based attack prevention identifies abnormal traffic patterns and attempts to minimize the impact of that traffic on legitimate requests. You can identify excessive rule matches in traffic going to a particular destination IP address or addresses or coming from a particular source IP address or addresses. You can also respond to excessive matches for a particular rule across all detected traffic.

In the intrusion policy, you can configure a rate-based filter for any intrusion or preprocessor rule. The rate-based filter contains three components:

- the rule matching rate, which you configure as a count of rule matches within a specific number of seconds
- a new action to be taken when the rate is exceeded, with three available actions: Generate Events, Drop and Generate Events, and Disable
- the duration of the action, which you configure as a timeout value

Note that when started, the new action occurs until the timeout is reached, even if the rate falls below the configured rate during that time period. When the timeout is reached, if the rate has fallen below the threshold, the action for the rule reverts to the action initially configured for the rule.

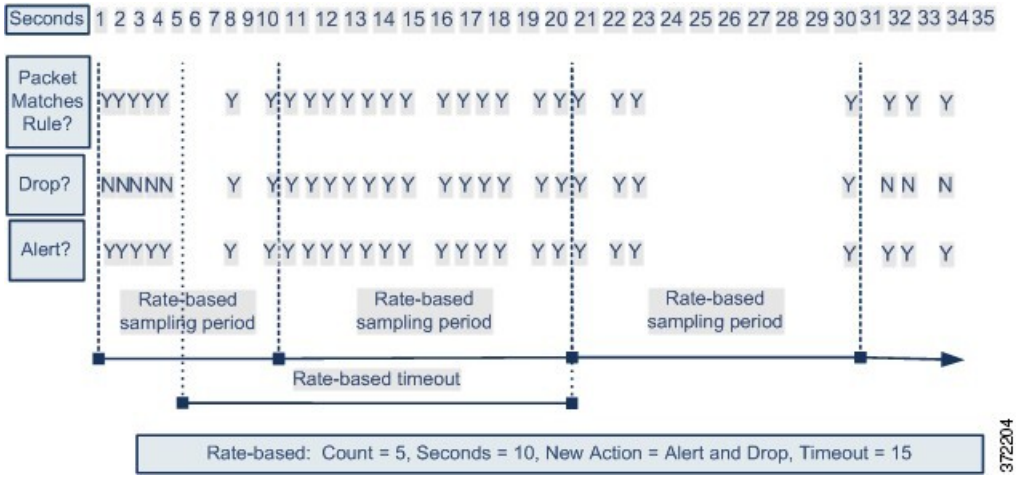
You can configure rate-based attack prevention in an inline deployment to block attacks, either temporarily or permanently. Without rate-based configuration, rules set to Generate Events do generate events, but the system does not drop packets for those rules. However, if the attack traffic matches rules that have rate-based criteria configured, the rate action may cause packet dropping to occur for the period of time that the rate action is active, even if those rules are not initially set to Drop and Generate Events.

Note Rate-based actions cannot enable disabled rules or drop traffic that matches disabled rules.

You can define multiple rate-based filters on the same rule. The first filter listed in the intrusion policy has the highest priority. Note that when two rate-based filter actions conflict, the action of the first rate-based filter is carried out.

The following diagram shows an example where an attacker is attempting to access a host. Repeated attempts to find a password trigger a rule which has rate-based attack prevention configured. The rate-based settings change the rule attribute to **Drop and Generate Events** after rule matches occur five times in a 10-second span. The new rule attribute times out after 15 seconds.

After the timeout, note that packets are still dropped in the rate-based sampling period that follows. If the sampled rate is above the threshold in the current or previous sampling period, the new action continues. The new action reverts to Generate Events only after a sampling period completes where the sampled rate was below the threshold rate.



Setting a Dynamic Rule State

License: Protection

In some cases, you may not want to set a rule to the Drop and Generate Events state because you do not want to drop every packet that matches the rule, but you do want to drop packets matching the rule if a particular rate of matches occurs in a specified time. Dynamic rule states let you configure the rate that should trigger a change in the action for a rule, what the action should change to when the rate is met, and how long the new action should persist.

You set the number of hits for that rule by specifying a count and the number of seconds within which that number of hits should occur to trigger the action change. In addition, you can set a timeout to cause the action to revert to the previous state for the rule when the timeout expires.

You can define multiple dynamic rule state filters for the same rule. The first filter listed in the rule details in the intrusion policy has the highest priority. Note that when two rate-based filter actions conflict, the action of the first rate-based filter is carried out.

Note that a **revert** icon appears in a field when you type an invalid value; click it to revert to the last valid value for that field or to clear the field if there was no previous value.

Note Dynamic rule states cannot enable disabled rules or drop traffic that matches disabled rules.

To add a dynamic rule state:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The Policy Information page appears.

Step 3 Click **Rules**.

The **Rules** page appears.

Step 4 Locate the rule or rules where you want to add a dynamic rule state. You have the following options:

- To sort the current display, click on a column heading or icon. To reverse the sort, click again.
- Construct a filter by clicking on keywords or arguments in the filter panel on the left.

The page refreshes to display all matching rules.

Step 5 Select the rule or rules where you want to add a dynamic rule state. You have the following options:

- To select a specific rule, select the check box next to the rule.
- To select all the rules in the current list, select the check box at the top of the column.

Step 6 Select **Dynamic State** > **Add Rate-Based Rule** State.

The **Add Rate-Based Rule State** dialog box appears.

Step 7 From the **Track By** drop-down list, select how you want the rule matches tracked:

- Select **Source** to track the number of hits for that rule from a specific source or set of sources.
- Select **Destination** to track the number of hits for that rule to a specific destination or set of destinations.
- Select **Rule** to track all matches for that rule.

Step 8 If you set **Track By** to **Source** or **Destination**, enter the address of each host you want to track in the **Network** field.

You can specify a single IP address, address block, variable, or a comma-separated list comprised of any combination of these.

Step 9 Next to **Rate**, indicate the number of rule matches per time period to set the attack rate:

- In the **Count** field, using an integer between 1 and 2147483647, specify the number of rule matches you want to use as your threshold.
- In the **Seconds** field, using an integer between 1 and 2147483647, specify the number of seconds that make up the time period for which attacks are tracked.

Step 10 From the **New State** drop-down list, specify the new action to be taken when the conditions are met:

- Select **Generate Events** to generate an event.
- Select **Drop and Generate Events** to generate an event and drop the packet that triggered the event in inline deployments or generate an event in passive deployments.
- Select **Disabled** to take no action.

Step 11 In the **Timeout** field, type the number of seconds you want the new action to remain in effect. After the timeout occurs, the rule reverts to its original state. Specify 0 or leave the **Timeout** field blank to prevent the new action from timing out.

Step 12 Click **OK**.

The system adds the dynamic rule state and displays a dynamic state icon next to the rule in the Dynamic State column. If you add multiple dynamic rule state filters to a rule, a number over the icon indicates the number of filters.

If any required fields are blank, you receive an error message indicating which fields you must fill.

Tip To delete all dynamic rule settings for a set of rules, select the rules on the Rules page, then select **Dynamic State** > **Remove Rate-Based States**. You can also delete individual rate-based rule state filters from the rule details for the rule by selecting the rule, clicking **Show details**, then clicking **Delete** by the rate-based filter you want to remove.

Step 13 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache.

See Managing Intrusion Policies, on page 279 and Editing Intrusion Policies, on page 280 for more information.

Adding SNMP Alerts

License: Protection

If you configure SNMP alerting for your ASA FirePOWER module, you can configure specific rules to provide an SNMP alert when the rule generates an event. For more information, see Using SNMP Responses, on page 419.

To set an SNMP alert:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules**.

The **Rules** page appears.

Step 4 Locate the rule or rules where you want to set SNMP alerts. You have the following options:

- To sort the current display, click on a column heading or icon. To reverse the sort, click again.
- Construct a filter by clicking on keywords or arguments in the filter panel on the left. For more information, see the following topics: Understanding Rule Filtering in an Intrusion Policy, on page 298 and Setting a Rule Filter in an Intrusion Policy, on page 305.

The page refreshes to display all matching rules.

Step 5 Select the rule or rules where you want to set SNMP alerts:

- To select a specific rule, select the check box next to the rule.
- To select all the rules in the current list, select the check box at the top of the column.

Step 6 Select **Alerting** > **Add SNMP Alert**.

The system adds the alert and displays an alert icon next to the rule in the Alerting column. If you add multiple alert types to a rule, a number over the icon indicates the number of alert types.

Tip To remove an SNMP alert from a rule, click the check box next to the rule and select **Alerting** > **Remove SNMP Alerts**, then click **OK** to confirm the deletion.

Step 7 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache. See Managing Intrusion Policies, on page 279 and Editing Intrusion Policies, on page 280 for more information.

Adding Rule Comments

License: Protection

You can add comments to a rule. Any comments you add can be seen in the Rule Details view on the Rules page.

After you commit the intrusion policy changes containing the comment, you can also view the comment by clicking **Rule Comment** on the rule Edit page.

To add a comment to a rule:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Rules**.

The **Rules** page appears.

Step 4 Locate the rule or rules where you want to add a comment to a rule. You have the following options:

- To sort the current display, click on a column heading or icon. To reverse the sort, click again.
- Construct a filter by clicking on keywords or arguments in the filter panel on the left. For more information, see the following topics: Understanding Rule Filtering in an Intrusion Policy, on page 298 and Setting a Rule Filter in an Intrusion Policy, on page 305.

The page refreshes to display all matching rules.

Step 5 Select the rule or rules where you want to add a comment:

- To select a specific rule, select the check box next to the rule.
- To select all the rules in the current list, select the check box at the top of the column.

Step 6 Select **Comments** > **Add Rule Comment**.

The **Add Comment** dialog box appears.

Step 7 In the **Comment** field, type the rule comment.

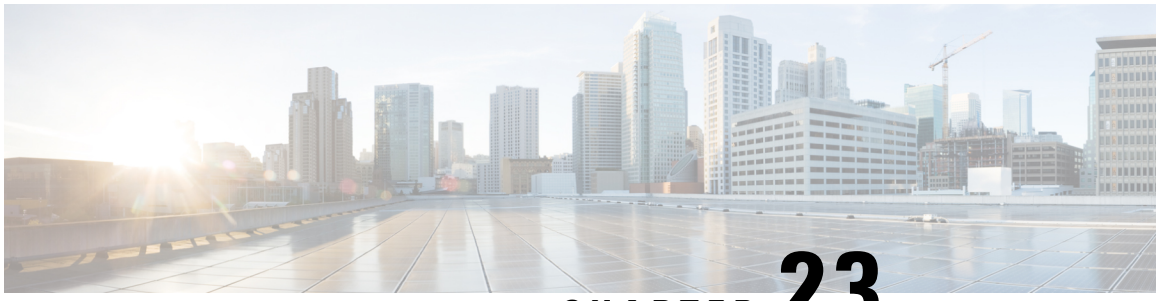
Step 8 Click **OK**.

The system adds the comment and displays a comment icon next to the rule in the Comments column. If you add multiple comments to a rule, a number over the icon indicates the number of comments.

Tip To delete a rule comment, highlight the rule and click **Show Details**, then click **Delete** in the **Comments** section. Note that you can only delete a comment if the comment is cached with uncommitted intrusion policy changes. After intrusion policy changes are committed, the rule comment is permanent.

Step 9 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache.

See Managing Intrusion Policies, on page 279 and Editing Intrusion Policies, on page 280 for more information.



CHAPTER 23

Globally Limiting Intrusion Event Logging

You can use thresholds to limit the number of times the system logs and displays intrusion events. This chapter covers the following sections:

Limiting Intrusion Event Logging

Thresholds, which you configure as part of your intrusion policy, cause the system to generate events based on how many times traffic matching a rule originates from or is targeted to a specific address or address range within a specified time period. This can prevent you from being overwhelmed with a large number of events. This feature requires a Protection license.

You can set event notification thresholds in two ways:

- You can set a global threshold across all traffic to limit how often events from a specific source or destination are logged and displayed per specified time period. For more information, see Understanding Thresholding, on page 321 and Configuring Global Thresholds, on page 323.
- You can set thresholds per shared object rule, standard text rule, or preprocessor rule in your intrusion policy configuration, as described in Configuring Event Thresholding, on page 309.

Understanding Thresholding

License: Protection

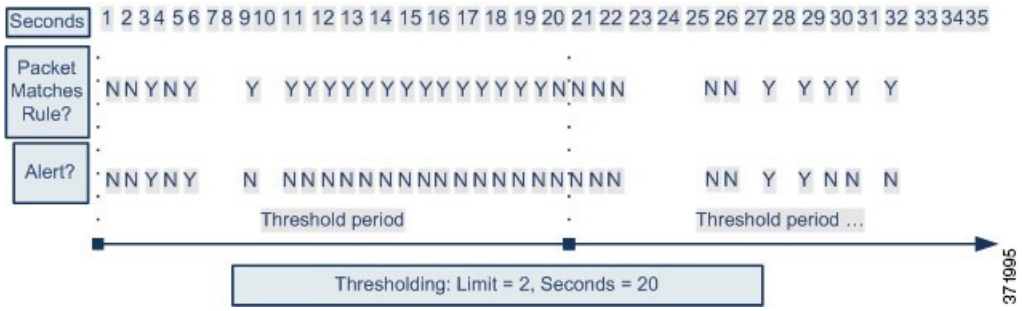
By default, every intrusion policy contains a global rule threshold. The default threshold limits event generation for each rule to one event every 60 seconds on traffic going to the same destination. This global threshold applies by default to all intrusion rules and preprocessor rules. Note that you can disable the threshold in the Advanced Settings page in an intrusion policy.

You can also override this threshold by setting individual thresholds on specific rules. For example, you might set a global limit threshold of five events every 60 seconds, but then set a specific threshold of ten events for every 60 seconds for SID 1315. All other rules generate no more than five events in each 60-second period, but the system generates up to ten events for each 60-second period for SID 1315.

For more information on setting rule-based thresholds, see Configuring Event Thresholding, on page 309.

The following diagram shows an example where an attack is in progress for a specific rule. A global limit threshold limits event generation for each rule to two events every 20 seconds.

Note that the period starts at one second and ends at 21 seconds. After the period ends, note that the cycle starts again and the next two rule matches generate events, then the system does not generate any more events during that period.



Understanding Thresholding Options

License: Protection

Thresholding allows you to limit intrusion event generation by generating only a specific number of events in a time period, or by generating one event for a set of events. When you configure global thresholding, you must first specify the thresholding type, as described in the following table.

Table 62: Thresholding Options

Option	Description
Limit	Logs and displays events for the specified number of packets (specified by the count argument) that trigger the rule during the specified time period. For example, if you set the type to **Limit**, the **Count** to 10 , and the **Seconds** to 60 , and 14 packets trigger the rule, the system stops logging events for the rule after displaying the first 10 that occur within the same minute.
Threshold	Logs and displays a single event when the specified number of packets (specified by the count argument) trigger the rule during the specified time period. Note that the counter for the time restarts after you hit the threshold count of events and the system logs that event. For example, you set the type to **Threshold**, **Count** to 10 , and **Seconds** to 60 , and the rule triggers 10 times by second 33. The system generates one event, then resets the Seconds and Count counters to 0 . The rule then triggers another 10 times in the next 25 seconds. Because the counters reset to 0 at second 33, the system logs another event.
Both	Logs and displays an event once per specified time period, after the specified number (count) of packets trigger the rule. For example, if you set the type to **Both**, **Count** to 2 , and **Seconds** to 10 , the following event counts result: • If the rule is triggered once in 10 seconds, the system does not generate any events (the threshold is not met) • If the rule is triggered twice in 10 seconds, the system generates one event (the threshold is met when the rule triggers the second time) • If the rule is triggered four times in 10 seconds, the system generates one event (the threshold is met when the rule triggered the second time and following events are ignored)

Next, specify the tracking, which determines whether the event instance count is calculated per source or destination IP address. Finally, specify the number of instances and time period that define the threshold.

Table 63: Thresholding Instance/Time Options

Option	Description
Count	The number of event instances per specified time period per tracking IP address or address range required to meet the threshold.
Seconds	The number of seconds that elapse before the count resets. If you set the threshold type to **Limit**, the tracking to **Source**, **Count** to 10, and **Seconds** to 10, the system logs and displays the first 10 events that occur in 10 seconds from a given source port. If only seven events occur in the first 10 seconds, the system logs and displays those, if 40 events occur in the first 10 seconds, the system logs and displays 10, then begins counting again when the 10-second time period elapses.

Configuring Global Thresholds

License: Protection

You can set a global threshold to manage the number of events generated by each rule over a period of time. When you set a global threshold, that threshold applies for each rule that does not have an overriding specific threshold. For more information on configuring thresholds, see Understanding Thresholding, on page 321.

A global threshold is configured on your system by default. The default values are as follows:

- **Type** — Limit
- **Track By** — Destination
- **Count** — 1
- **Seconds** — 60

To configure global thresholding:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Policies> Intrusion Policy**.

The Intrusion Policy page appears.

Step 2 Click the edit icon ( ) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The Policy Information page appears.

Step 3 Click **Advanced Settings** in the navigation panel on the left.

The Advanced Settings page appears.

Step 4 You have two choices, depending on whether **Global Rule Thresholding** under **Intrusion Rule Thresholds** is enabled:

- If the configuration is enabled, click **Edit**.

- If the configuration is disabled, click **Enabled**, then click **Edit**.

The Global Rule Thresholding page appears. A message at the bottom of the page identifies the intrusion policy layer that contains the configuration. See Using Layers in a Network Analysis or Intrusion Policy Layers, on page 257 for more information.

Step 5 From the **Type** radio buttons, select the type of threshold that will apply over the time specified by the seconds argument. See the Table 62: Thresholding Options , on page 322 table for more information:

- Select **Limit** to log and display an event for each packet that triggers the rule until the limit specified by the count argument is exceeded.
- Select **Threshold** to log and display a single event for each packet that triggers the rule and represents either the instance that matches the threshold set by the count argument or is a multiple of the threshold.
- Select **Both** to log and display a single event after the number of packets specified by the count argument trigger the rule.

Step 6 Select the tracking method from the **Track By** radio buttons:

- Select **Source** to identify rule matches in traffic coming from a particular source IP address or addresses.
- Select **Destination** to identify rule matches in traffic going to a particular destination IP address.

Step 7 In the **Count** field:

- For a **Limit** threshold, specify the number of event instances per specified time period per tracking IP address required to meet the threshold.
- For a **Threshold** threshold, specify the number of rule matches you want to use as your threshold.

Step 8 In the **Seconds** field:

- For a **Limit** threshold, specify the number of seconds that make up the time period when attacks are tracked.
- For a **Threshold** threshold, specify the number of seconds that elapse before the count resets. Note that the count resets if the number of rule matches indicated by the **Count** field occur before the number of seconds indicated elapse.

Step 9 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache. See Resolving Conflicts and Committing Policy Changes, on page 255 for more information.

Disabling the Global Threshold

License: Protection

By default, a global limit threshold limits the number of events on traffic going to a destination to one event per 60 seconds. You can disable global thresholding in the highest policy layer if you want to threshold events for specific rules and not apply thresholding to every rule by default.

To disable global thresholding:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Policies> Intrusion Policy**.

The Intrusion Policy page appears.

Step 2 Click the edit icon ( ) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The Policy Information page appears.

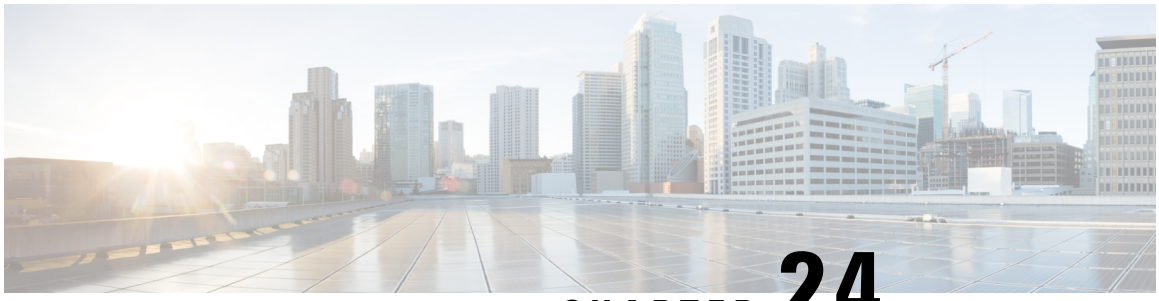
Step 3 Click **Settings** in the navigation panel on the left.

The Settings page appears.

Step 4 Under **Intrusion Rule Thresholds**, disable **Global Rule Thresholding**.

Step 5 Save your policy, continue editing, discard your changes, or exit while leaving your changes in the system cache. See Resolving Conflicts and Committing Policy Changes, on page 255 for more information.

What to do next



CHAPTER 24

Introduction to Identity Data

You can configure identity policies to use User Agents, ISE/ISE-PIC devices, or captive portal to obtain data about the users on your network. For more information, see User Identity Sources, on page 351.

Uses for Identity Data

Collecting identity data allows you to take advantage of many features, including:

- perform user control by writing access control rules using realm, user, user group, and ISE attribute conditions
- alert you via email, SNMP trap, or syslog when the system generates an intrusion event with a specific impact flag

User Detection Fundamentals

You can use your identity policies to monitor user activity on your network, which allows you to correlate threat, endpoint, and network intelligence with user identity information. By linking network behavior, traffic, and events directly to individual users, the system can help you to identify the source of policy breaches, attacks, or network vulnerabilities. For example, you could determine:

- who owns the host targeted by an intrusion event that has a Vulnerable (level 1: red) impact level
- who initiated an internal attack or portscan
- who is attempting unauthorized access of a server that has high host criticality
- who is consuming an unreasonable amount of bandwidth
- who has not applied critical operating system updates
- who is using instant messaging software or peer-to-peer file-sharing applications in violation of company IT policy

Armed with this information, you can use other features of the ASA FirePOWER module to mitigate risk, perform access control, and take action to protect others from disruption. These capabilities also significantly improve audit controls and enhance regulatory compliance.

After you configure user identity sources, you can perform user awareness and user control.

User awareness

The ability to view and analyze user data

User control

The ability to configure user access control rule conditions to block users or user activity in traffic on your network, based on conclusions you drew from user awareness.

You can obtain user data from authoritative identity sources (referenced by your identity policy).

An identity source is authoritative if a trusted server validated the user login. You can use the data obtained from authoritative logins to perform user awareness and user control. Authoritative user logins are obtained from passive and active authentications:

- *Passive authentications* occur when a user authenticates through an external server. The User Agent and ISE/ISE-PIC are the only passive authentication methods supported by the ASA FirePOWER module.
- *Active authentications* occur when a user authenticates through a Firepower device. Captive portal is the only active authentication method supported by the ASA FirePOWER module.

The following table provides a brief overview of the user identity sources supported by the ASA FirePOWER module.

User Identity Source	Server Requirements	Source Type	Authentication Type	User Awareness?	User Access Control?	For more information, see...
User Agent	Microsoft Active Directory	authoritative logins	passive	Yes	Yes	The User Agent Identity Source, on page 353
ISE/ISE-PIC	Microsoft Active Directory	authoritative logins	passive	Yes	Yes	The ISE/ISE-PIC Identity Source, on page 354
Captive portal	LDAP or Microsoft Active Directory	authoritative logins	active	Yes	Yes	The Captive Portal Active Authentication Identity Source, on page 357

Consider the following when selecting identity sources to deploy:

- you must use captive portal to record failed authentication activity. A failed authentication attempt does not add a new user to the list of users in the database.
- you must deploy an appliance that has an IP address for its sensing interface (for example, a routed interface) in order to use captive portal.

User Identity Deployments

When the system detects user data from a user login, from any identity source, the user from the login is checked against the list of users in the user database. If the login user matches an existing user, the data from the login is assigned to the user. Logins that do not match existing users cause a new user to be created, unless the login is in SMTP traffic. Non-matching logins in SMTP traffic are discarded.

The User Activity Database

The user activity database on the device contains records of user activity on your network reported by all of your configured identity sources. The system logs events in the following circumstances:

- when it detects individual logins or logoffs
- when it detects a new user
- when you manually delete a user
- when the system detects a user that is not in the database, but cannot add the user because you have reached your user limit

The Users Database

The users database contains a record for each user reported by your configured identity sources.

The total number of users the device can store depends on the model. When the limit has been reached, you must delete users (manually or with a database purge) to allow new users to be added.

If an identity source is configured to exclude specific user names, user activity data for those user names are not reported to the ASA FirePOWER module. These excluded user names remain in the database, but are not associated with IP addresses.

Current User Identities

When the system detects multiple logins to the same host by different users, the system assumes that only one user is logged into any given host at a time, and that the current user of a host is the last authoritative user login. If multiple users are logged in through remote sessions, the last user reported by the server is the user reported to the ASA FirePOWER module.

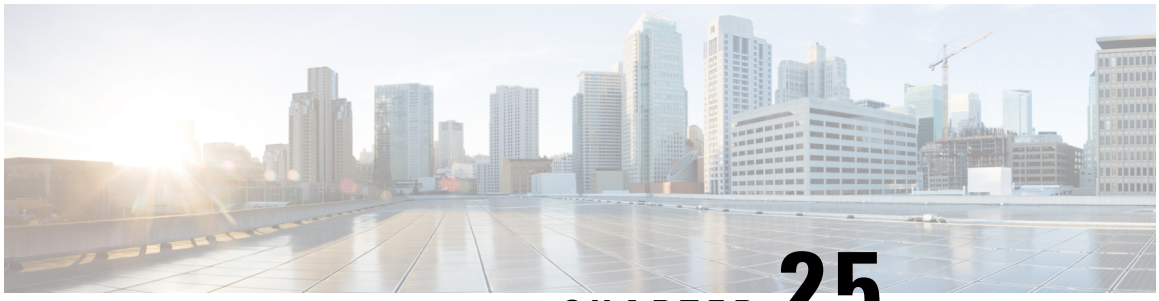
When the system detects multiple logins to the same host by the same user, the system records the first time that a user logs into a specific host and disregards subsequent logins. If an individual user is the only person who logs into a specific host, the only login that the system records is the original login.

If another user logs into that host, however, the system records the new login. Then, if the original user logs in again, his or her new login is recorded.

User Database Limits

Your device model determines how many users you can monitor, as well as how many users you can use to perform user control.

When deploying an ASA FirePOWER module managed via ASDM, you can store a maximum of 2,000 authoritative users in the Users database.



CHAPTER 25

Realms and Identity Policies

This chapter covers the following sections:

About Servers and Realms

License: Any

Realms establish connections between the ASA FirePOWER module and the servers targeted for monitoring. They specify the connection settings and authentication filter settings for the server. Realms can:

- Specify the users and user groups whose activity you want to monitor.
- Allow you to query the server for user metadata on authoritative users.

You can add multiple servers as directories in a realm, but they must share the same basic realm information. The directories within a realm must be exclusively LDAP or exclusively AD servers. After you enable a realm, your saved changes take effect next time the ASA FirePOWER module queries the server.

To perform user awareness, you must configure a realm for any of the supported server types. The module uses these connections to query the servers for data associated with POP3 and IMAP users. The module uses the email addresses in POP3 and IMAP logins to correlate with LDAP users on an Active Directory, OpenLDAP, or Oracle Directory Server Enterprise Edition server. For example, if a device detects a POP3 login for a user with the same email address as an LDAP user, the module associates the LDAP user's metadata with that user.

To perform user access control, you can configure the following:

- a realm for an AD server configured for either a User Agent or ISE/ISE-PIC device.

Note Configuring a realm is optional if you plan to configure SGT ISE attribute conditions but not user, group, realm, Endpoint Location, or Endpoint Profile conditions.

- a realm for an Oracle or OpenLDAP server configured for captive portal.

If you configure a realm to download users (for user awareness or user control), the ASA FirePOWER module regularly queries the server to obtain metadata for new and updated users whose activity was detected since the last query.

User activity data is stored in the user activity database and user identity data is stored in the users database. The maximum number of users you can store and use in access control depends on your device model. When choosing which users and groups to include, make sure the total number of users is less than your model limit. If your access control parameters are too broad, the ASA FirePOWER module obtains information on as many users as it can and reports the number of users it failed to retrieve in the task queue.

Note If you remove a user that has been detected by the module from your LDAP servers, the ASA FirePOWER module does not remove that user from its users database; you must manually delete it. However, your LDAP changes are reflected in access control rules when the ASA FirePOWER module next updates its list of authoritative users.

Supported Servers for Realms

License: Any

You can configure realms to connect to the following types of servers, providing they have TCP/IP access from the ASA FirePOWER module: <Table Title:Supported Servers for Realms>

Server Type	Supported for user awareness data retrieval?	Supported for User Agent data retrieval?	Supported for ISE/ISE-PIC data retrieval?	Supported for captive portal data retrieval?
Microsoft Active Directory on Windows Server 2003, Windows Server 2008, and Windows Server 2012	Yes	Yes	Yes	Yes, except Windows Server 2003 if you are using NTLM captive portal
Oracle Directory Server Enterprise Edition 7.0 on Windows Server 2003 and Windows Server 2008	Yes	No	No	Yes
OpenLDAP on Linux	Yes	No	No	Yes

Note the following about your server group configurations:

- If you want to perform user control on user groups or on users within groups, you must configure user groups on the server. The ASA FirePOWER module cannot perform user group control if the server organizes the users in basic object hierarchy.

Cisco recommends that you limit the size of your LDAP or AD server groups to contain a maximum of 1500 users. Configuring realms to include or exclude oversized groups, or creating access control rules that target oversized user groups may result in performance issues.

- By default, AD servers limit the number of users they report from secondary groups. You must customize this limit so that all of the users in your secondary groups are reported to the ASA FirePOWER module.

Supported Server Field Names

License: Any

The servers in your realms must use the field names listed in the following table in order for the ASA FirePOWER module to retrieve user metadata the servers. If the field names are incorrect on your server, the ASA FirePOWER module cannot populate its database with the information in that field.

Table 64: Mapping Server Fields to ASA FirePOWER Fields

Metadata	ASA FirePOWER module	Active Directory	Oracle Directory Server	OpenLDAP
LDAP user name	Username	samaccountname	cn uid	cn uid
first name	First Name	givenname	givenname	givenname
last name	Last Name	sn	sn	sn
email address	Email	mail userprincipalname (if mail has no value)	mail	mail
department	Department	department distinguishedname (if department has novalue)	department	ou
telephone number	Phone	telephonenumber	n/a	telephonenumber

Troubleshooting Issues with Realms

License: Any

If you notice unexpected server connection behavior, consider tuning your realm configuration, device settings, or server settings.

User timeouts are occurring at unexpected times

If you notice the system performing user timeouts at unexpected intervals, confirm that the time on your User Agent or ISE/ISE-PIC device is synchronized with the time on the ASA FirePOWER module. If the appliances are not synchronized, the system may perform user timeouts at unexpected intervals.

Users are not included or excluded as specified in your realm configuration

If you configure a realm for an Active Directory server that includes or excludes users who are members of a secondary group on your Active Directory server, your server may be limiting the number of users it reports.

By default, Active Directory servers limit the number of users they report from secondary groups. You must customize this limit so that all of the users in your secondary groups are reported to the ASA FirePOWER module.

User download is slow

If you notice that user download is slow, confirm that your LDAP and AD server groups contain a maximum of 1500 users. Configuring realms to include or exclude oversized user groups may result in performance issues.

Identity Policy Fundamentals

License: Any

Identity policies contain identity rules. Identity rules associate sets of traffic with a realm and an authentication method: passive authentication, active authentication, or no authentication.

You must fully configure the realms and authentication methods you plan to use before you can invoke them in your identity rules:

- You configure realms outside of your identity policy, at **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Realms**.
- You configure the passive authentication identity sources, the User Agent and ISE/ISE-PIC, at **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Identity Sources**.
- You configure the active authentication identity source, captive portal, within the identity policy.

After you configure one or more identity policies, you must invoke one identity policy in your access control policy. When traffic on your network matches the conditions in your identity rule and the authentication method is passive or active, the module associates the traffic with the specified realm and authenticates the users in the traffic using the specified identity source.

If you do not configure an identity policy, the module does not perform user authentication.

Creating a Realm

License: Control

To create a realm:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > .

Step 2 Click **Realms**.

Step 3 Click **New Realm**.

Step 4 Configure basic realm information as described in Configuring Basic Realm Information, on page 337

Step 5 Configure directories as described in Configuring a Realm Directory, on page 338

Step 6 Configure user and user group download (required for access control) as described in Configuring Automatic User Download, on page 338

Step 7 Save the realm settings.

Step 8 Optionally, edit the realm and modify the default User Session Timeout settings as described in Configuring Realm User Session Timeouts, on page 338

Step 9 Save the realm settings.

What to do next

What to Do Next

- Enable the realm as described in Enabling or Disabling a Realm, on page 348
- Optionally, monitor the task status; see the Task Status page (**Monitoring** > **ASA FirePOWER Monitoring** > **Task Status**).

Realm Fields

License: Any

The following fields are used to configure a realm.

Realm Configuration Fields

AD Primary Domain

For AD realms only, the domain for the Active Directory server where users should be authenticated.

AD Join Username and AD Join Password

For AD realms intended for Kerberos captive portal active authentication, the distinguished username and password for a user with appropriate rights to join clients to the domain.

If you select Kerberos (or HTTP Negotiate, if you want Kerberos as an option) as the **Authentication Type** in an identity rule, the **Realm** you select must be configured with an **AD Join Username** and **AD Join Password** in order to perform Kerberos captive portal authentication.

Description

An optional description for the realm.

Directory Username and Directory Password

The distinguished username and password for a user with appropriate rights to the user information you want to retrieve.

Base DN

The directory tree on the server where the ASA FirePOWER module should begin searching for user data.

Typically, the base DN has a basic structure indicating the company domain and operational unit. For example, the Security organization of the Example company might have a base DN of ou=security,dc=example,dc=com.

Group DN

The directory tree on the server where the ASA FirePOWER module should search for users with the group attribute.

Group Attribute

The group attribute for the server: Member, Unique Member, or Custom.

Name

A unique name for the realm.

Type

The type of realm, AD or LDAP.

User Session Timeout: Authenticated Users

The maximum amount of time, in minutes, before a user's session is timed out.

If a user was passively authenticated and their session times out, they are identified as Unknown and their current session is allowed or blocked depending on their access control rule settings. The module re-identifies the user the next time they log in.

If a user was actively authenticated (captive portal) and their session times out, they are prompted to re-authenticate.

User Session Timeout: Failed Authentication Users

The amount of time, in minutes, after a failed active authentication attempt that a user's session is timed out. When a user fails to authenticate and their session times out, they are prompted to re-authenticate.

User Session Timeout: Guest Users

The maximum amount of time, in minutes, before an actively authenticated (captive portal) guest user's session is timed out. When their session times out, they are prompted to re-authenticate.

Realm Directory Fields

These settings apply to individual servers (directories) within a realm.

Encryption

The encryption method you want to use for the server connection. If you specify an Encryption method, you must specify a host name in this field.

Hostname / IP Address

The hostname or IP address for the server.

Port

The port you want to use for the server connection.

SSL Certificate

The SSL certificate you want to use for authentication to the server. You must configure the **Encryption** type in order to use an SSL certificate.

If you are using a certificate to authenticate, the name of the server in the certificate must match the server **Hostname / IP Address**. For example, if you use 10.10.10.250 as the IP address but computer1.example.com in the certificate, the connection fails.

User Download Fields

Download for access control

Selecting this check box configures the automatic download of user data. You can use the data for user awareness and, in some cases, user access control.

Use the **Begin automatic download at and Repeat every drop-down** menus to configure the download frequency.

Configuring Basic Realm Information

License: Control

To configure basic realm information:

Step 1 On the **Add New Realm** page, type a **Name** and, optionally, a **Description**.

Step 2 Select a **Type** from the drop-down list.

Step 3 If you are configuring an AD realm, enter an **AD Primary Domain**.

Step 4 If you are configuring an AD realm intended for Kerberos captive portal active authentication, enter a distinguished **AD Join Username** and **AD Join Password** for a user with appropriate rights to join clients to the domain.

Step 5 Enter a distinguished **Directory Username** and **Directory Password** for a user with appropriate rights to the user information you want to retrieve.

Step 6 Enter a **Base DN** for the directory.

Step 7 Enter a **Group DN** for the directory.

Step 8 Optionally, select a **Group Attribute** from the drop-down list.

Step 9 Click **OK**.

What to do next

- Configure the realm directory as described in Configuring a Realm Directory, on page 338

Configuring a Realm Directory

License: Control

To configure a realm directory:

Step 1 On the **Directory** tab, click **Add Directory**.

Step 2 Enter the Hostname / IP Address and Port for the server.

Step 3 Select an **Encryption Mode**.

Step 4 Optionally, select an SSL Certificate from the drop-down list. Note that you can click the add icon ( ) to create an object on the fly.

Step 5 If you want to test the connection, click **Test**.

Step 6 Click **OK**.

Configuring Automatic User Download

License: Control

If you do not specify any groups to include, the ASA FirePOWER module retrieves user data for all the groups that match the parameters you provided. For performance reasons, Cisco recommends that you explicitly include only the groups that represent the users you want to use in access control.

To configure automatic user download:

Step 1 On the **User Download** tab, select the **Download users and groups (required for user access control)** check box.

Step 2 Select a time to **Begin automatic download at** from the drop-down lists.

Step 3 Select a download interval from the **Repeat Every** drop-down list.

Step 4 To include or exclude user groups from the download, select user groups from the **Available Groups** column and click **Add to Include** or **Add to Exclude**.

Step 5 To include or exclude individual users, type the user into the field below Groups to Include or Groups to Exclude and click **Add**.

Note Excluding users from download prevents you from writing an access control rule with that user as a condition. Separate multiple users with commas. You can also use an asterisk (*) as a wildcard character in this field.

Configuring Realm User Session Timeouts

License: Control

Note If the module is performing user timeouts at unexpected intervals, confirm that the time on your User Agent or ISE/ISE-PIC device is synchronized with the time on the ASA FirePOWER module.

To configure realm user session timeouts:

Step 1 Select the **Realm Configuration** tab.

Step 2 Enter user session timeout values for **Authenticated Users**, **Failed Authentication Users**, and **Guest Users**.

Step 3 Click **Save** or continue editing the realm.

Configuring an Identity Policy

License: Control

Before You Begin

- Create and enable one or more realms as described in Creating a Realm, on page 334

To configure an Identity Policy:

Access: Admin/Access Admin/Network Admin

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Identity Policy**.

Step 2 Type a **Name** and, optionally, a **Description**.

Step 3 If you want to add a rule to the policy, click **Add Rule** as described in Creating an Identity Rule, on page 342

Step 4 If you want to add a rule category, click **Add Category** as described in Adding an Identity Rule Category, on page 349

Step 5 If you want to configure active authentication using captive portal, click **Active Authentication** as described in Configuring Captive Portal (Active Authentication), on page 340

Captive Portal (Active Authentication) Fields

License: Any

Use the following fields to configure captive portal.

Server Certificate

The server certificate presented by the captive portal daemon.

Port

The port number you want to use for the captive portal connection. The port number in this field must match the port number you configured on the ASA FirePOWER device using the captive-portal CLI command.

Maximum login attempts

The maximum allowed number of failed login attempts before the module denies a user's login request.

Active Authentication Response Page

The system-provided or custom **HTTP response** page you want to display to captive portal users. After you select an **Active Authentication Response** page in your identity policy active authentication settings, you must also configure one or more identity rules with **HTTP Response** Page as the Authentication Type.

The system-provided **HTTP response** page includes **Username** and **Password** fields, as well as a **Login as guest** button to allow users to access the network as guests. If you want to display a single login method, configure a custom **HTTP response** page.

Configuring Captive Portal (Active Authentication)

License: Control

You can select either a system-provided or a custom HTTP response page to display to captive portal users. The system-provided HTTP response page includes Username and Password fields, as well as a **Login as guest** button to allow users to access the network as guests. If you want to display a single login method, configure a custom HTTP response page.

For more information about captive portal, see The Captive Portal Active Authentication Identity Source, on page 357

Before You Begin

- Confirm that your device manages one or more ASA FirePOWER devices in routed mode running Version 9.5(2) or later.
- Configure an access control rule to allow traffic destined for the port you plan to use for captive portal.
- If you want to perform active authentication via captive portal on HTTPS traffic, you must create SSL rules to decrypt the traffic originating from the users you want to authenticate using captive portal.
- If you want to decrypt traffic in the captive portal connection, create an SSL rule to decrypt the traffic destined for the port you plan to use for captive portal.
- Use the **captive-portal ASA** CLI command to enable captive portal for active authentication and define the port as described in the ASA Firewall Configuration Guide (Version 9.5(2) or later): https://www.cisco.com/c/en/us/support/security/asa-5500-series-next-generation-firewalls/products-installation-and-configuration-guides-list.html.

To configure captive portal:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Identity Policy** and edit an identity policy.

Step 2 Click **Active Authentication**.

Step 3 Select the appropriate **Server Certificate** from the drop-down list. Optionally, click the **add** icon ( )to create an object on the fly.

Step 4 Type a **Port** and specify the **Maximum login attempts**.

Step 5 Optionally, to authenticate users through a HTTP response page, select an **Active Authentication Response Page**.

Step 6 Click **Save**.

Step 7 Configure an identity rule with **Active Authentication** as the **Action** as described in Creating an Identity Rule, on page 342 If you selected a response page in step 5, you must also select **HTTP Response** Page as the **Authentication Type**.

What to do next

- Deploy configuration changes; see Deploying Configuration Changes, on page 73

Excluding Applications From Active Authentication

License: Control

You can select applications (identified by their HTTP User-Agent strings) and exempt them from captive portal (active authentication). This allows traffic from the selected applications to pass through the identity policy without authenticating.

To exclude applications from active authentication:

Step 1 On the **Realm & Settings** tab of the **identity rule editor** page, use Cisco-provided filters in the **Application Filters** list to narrow the list of applications you want to add to the filter.

- Click the arrow next to each filter type to expand and collapse the list.
- Right-click a filter type and click **Check All** or **Uncheck All**. Note that the list indicates how many filters you have selected of each type.
- To narrow the filters that appear, type a search string in the **Search by name** field; this is especially useful for categories and tags. To clear the search, click the clear icon ( ).
- To refresh the filters list and clear any selected filters, click the **reload** icon ( ).
- To clear all filters and search fields, click **Clear All Filters**.

Note The list displays 100 applications at a time.

Step 2 Select the applications that you want to add to the filter from the **Available Applications** list:

- Select **All apps matching the filter** to add all the applications that meet the constraints you specified in the previous step.
- To narrow the individual applications that appear, type a search string in the **Search by name** field. To clear the search, click the **clear** icon ( )

  .
- Use the paging icons at the bottom of the list to browse the list of individual available applications.
- To refresh the applications list and clear any selected applications, click the reload icon ( ).

Step 3 Add the selected applications to exclude from external authentication. You can click and drag, or you can click **Add to Rule**. The result is the combination of:

- the selected Application Filters

- either the selected individual Available Applications, or **All apps matching the filter**

What to do next

- Continue configuring the identity rule as described in Creating an Identity Rule, on page 342

Associating an Identity Policy with an Access Control Policy

License: Control

You can have one identity policy currently applied to an ASA FirePOWER module. You cannot apply an identity policy independently. You cannot delete an identity policy that has been applied or is currently applying.

To associate an Identity Policy with an Access Control Policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

Step 2 Select the **Advanced** tab.

Step 3 Click the **edit** icon ( ) next to Identity Policy Settings.

Step 4 Select an identity policy from the drop-down.

Step 5 Click **OK**.

Step 6 Click **Store ASA FirePOWER Changes** to save your changes.

Creating an Identity Rule

License: Control

To create an identity rule:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Identity Policy**.

Step 2 Click **Add Rule**.

Step 3 Configure basic identity rule information as described in Configuring Basic Identity Rule Information, on page 344

Step 4 Optionally, add a zone condition as described in Adding a Zone Condition to an Identity Rule, on page 346

Note If you are configuring the rule for captive portal and your captive portal device contains inline and routed interfaces, you must configure a zone condition to target only the routed interfaces on the device.

Step 5 Optionally, add a network or geolocation condition as described in Adding a Network or Geolocation Condition to an Identity Rule, on page 345

Step 6 Optionally, add a port condition as described in Adding a Port Condition to an Identity Rule, on page 345

Step 7 Associate the rule with a realm as described in Associating a Realm and Configuring Active Authentication Settings in an Identity Rule, on page 346

Step 8 Click **Add**.

Step 9 Click **Store ASA FirePOWER Changes**.

What to do next

- Deploy configuration changes; see Deploying Configuration Changes, on page 73

Identity Rule Fields

Use the following fields to configure identity rules.

Enabled

Selecting this option enables the identity rule in the identity policy. Deselecting this option disables the identity rule.

Action

The type of authentication you want to perform on the users in the specified **Realm**. You can select Passive Authentication (User Agent or ISE/ISE-PIC), Active Authentication (captive portal), or No Authentication. You must fully configure the authentication method, or identity source, before selecting it as the action in an identity rule.

Realm

The realm containing the users you want to perform the specified **Action** on. You must fully configure a realm before selecting it as the realm in an identity rule.

If you select Kerberos (or HTTP Negotiate, if you want Kerberos as an option) as the A**uthentication Type** in an identity rule, the **Realm** you select must be configured with an **AD Join Username** and **AD Join Password** in order to perform Kerberos captive portal authentication.

Use active authentication if passive authentication cannot identify user

Selecting this option authenticates users via active authentication if passive authentication fails to identify them. You must configure active authentication (captive portal) in order to select this option.

If you disable this option, users that passive authentication cannot identify are identified as Unknown. You must set the rule action to Passive Authentication in order to see this field.

Identify as Special Identities/Guest if authentication cannot identify user

Selecting this option identifies unknown users as **Special Identities/Guest** in all areas of the ASDM interface. You must set the rule action to Active Authentication or select **Use active authentication if passive authentication cannot identify user** in order to see this field.

Authentication Type

The method you want to use to perform active authentication. The selections vary depending on the type of realm, LDAP or AD:

- Select HTTP Basic if you want to authenticate users using an unencrypted HTTP Basic Authentication (BA) connection. Users log in to the network using their browser's default authentication popup window.

Most web browsers cache the credentials from HTTP Basic logins and use the credentials to seamlessly begin a new session after an old session times out.

- Select NTLM if you want to authenticate users using a NT LAN Manager (NTLM) connection. This selection is only available when you select an AD realm. Users log in to the network using their browser's default authentication popup window. If you select NTLM as your identity rule Authentication Type, you cannot use a 2003 Windows Server as your identity rule realm.
- Select Kerberos if you want to authenticate users using a Kerberos connection. This selection is available only when you select an AD realm for a server with secure LDAP (LDAPS) enabled. If transparent authentication is configured in a user's browser, the user is automatically logged in. If transparent authentication is not configured, users log in to the network using their browser's default authentication popup window.

The **Realm** you select must be configured with an **AD Join Username** and **AD Join Password** in order to perform Kerberos captive portal authentication.

Note If you have DNS resolution configured and you create an identity rule to perform Kerberos (or HTTP Negotiate, if you want Kerberos as an option) captive portal, you must configure your DNS server to resolve the fully qualified domain name (FQDN) of the captive portal device. The FQDN must match the hostname you provided when configuring DNS. For ASA with FirePOWER Services devices, the FQDN must resolve to the IP address of the routed interface used for captive portal.

- Select HTTP Negotiate to allow the captive portal server to choose between HTTP Basic, Kerberos, or NTLM for the authentication connection. This selection is only available when you select an AD realm. Users log in to the network using their browser's default authentication popup window.

The **Realm** you select must be configured with an **AD Join Username** and **AD Join Password** in order to perform Kerberos captive portal authentication.

If you are creating an identity rule to perform HTTP Negotiate captive portal and you have DNS resolution configured, you must configure your DNS server to resolve the hostname of the captive portal device. The hostname of the device you are using for captive portal must match the host name you provided when configuring DNS.

- Select HTTP Response Page if you want to authenticate users using a ASA FirePOWER module-provided or custom HTTP response page. Users log in to the network using the response page you configure.

The system-provided HTTP response page includes Username and Password fields, as well as a **Login as guest** button to allow users to access the network as guests. If you want to display a single login method, configure a custom HTTP response page.

Users who log in as guests appear in the web interface with the username **Guest**, and their realm is the realm specified in the identity rule.

Configuring Basic Identity Rule Information

License: Control

To configure basic identity rule information:

Step 1 On the **identity rule editor** page, type a **Name**.

Step 2 Specify whether the rule is **Enabled**.

Step 3 To add the rule to a rule category, see Adding an Identity Rule Category, on page 349

Step 4 Select a rule **Action** from the drop-down list.

Step 5 Click **Add** or continue editing the rule.

Adding a Network or Geolocation Condition to an Identity Rule

License: Control

To add a network or geolocation condition to an Identity Rule:

Step 1 On the **identity rule editor** page, select the **Networks** tab.

Step 2 Find the networks you want to add from the **Available Networks**, as follows:

- To add a network object on the fly, which you can then add to the condition, click the **add** icon ( ) above the **Available Networks** list.
- To search for network or geolocation objects to add, select the appropriate tab, click the **Search by name or value** prompt above the **Available Networks** list, then type an object name or the value of one of the object's components. The list updates as you type to display matching objects.

Step 3 To select an object, click it. To select all objects, right-click and then select **Select All**.

Step 4 Click **Add to Source** or **Add to Destination**.

Step 5 Add any source or destination IP addresses or address blocks that you want to specify manually. Click the **Enter an IP address** prompt below the **Source Networks** or **Destination Networks** list; then type an IP address or address block and click **Add**.

Step 6 Click **Add** or continue editing the rule.

Adding a Port Condition to an Identity Rule

License: Control

To add a port condition to an Identity Rule:

Step 1 On the identity rule editor page, select the **Ports** tab.

Step 2 Find the TCP ports you want to add from the **Available Ports**, as follows:

- To add a TCP port object on the fly, which you can then add to the condition, click the **add** icon ( ) above the Available Ports list.
- To search for TCP-based port objects and groups to add, click the **Search by name or value** prompt above the **Available Ports** list, then type either the name of the object, or the value of a port in the object. The list updates as

you type to display matching objects. For example, if you type 443, the ASA FirePOWER module displays the provided HTTPS port object.

Step 3 To select a TCP-based port object, click it. To select all TCP-based port objects, right-click and then select **Select All**. If the object includes non-TCP-based ports, you cannot add it to your port condition.

Step 4 Click **Add to Source** or **Add to Destination**.

Step 5 Enter a **Port** under the **Selected Source Ports** or **Selected Destination Ports** list to manually specify source or destination ports. You can specify a single port with a value from 0 to 65535.

Step 6 Click **Add**.

Note The ASA FirePOWER module will not add a port to a rule condition that results in an invalid configuration.

Step 7 Click **Add** or continue editing the rule.

Adding a Zone Condition to an Identity Rule

License: Control

If the device you want to use for captive portal contains both inline and routed interfaces, you must configure a zone condition in your captive portal identity rules to target only the routed interfaces on the captive portal device.

For more information about security zones, see Working with Security Zones, on page 49

To add a Zone Condition to an Identity Rule:

Step 1 On the **identity rule editor** page, select the **Zones** tab.

Step 2 Find the zones you want to add from the **Available Zones**. To search for zones to add, click the **Search by name** prompt above the **Available Zones** list, then type a zone name. The list updates as you type to display matching zones.

Step 3 Click to select a zone. To select all zones, right-click and then select **Select All**.

Step 4 Click **Add to Source** or **Add to Destination**.

Step 5 Click **Add** or continue editing the rule.

Associating a Realm and Configuring Active Authentication Settings in an Identity Rule

License: Control

Associate the identity rule with a realm and, optionally, configure additional settings for active authentication.

To associate Identity Rules With a Realm:

Step 1 On the **identity rule editor** page, select the **Realm & Settings** tab.

Step 2 Select a **Realm** from the drop-down list.

Step 3 Optionally, select the **Use active authentication if passive authentication cannot identify user** check box. Note that this check box appears only when configuring a Passive Authentication rule.

Step 4 If you selected the check box in step 3, or if this is an Active Authentication rule, continue with step 4. Otherwise, skip to step 8.

Step 5 Optionally, select the **Identify as Special Identities/Guest if authentication cannot identify user** check box.

Step 6 Select an **Authentication Type** from the drop-down list.

Step 7 Optionally, **Exclude HTTP User-Agents** to exempt specific application traffic from active authentication as described in Excluding Applications From Active Authentication, on page 341

Step 8 Click **Add** or continue editing the rule.

Managing Realms

License: Control

To manage a Realm:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Realms**.

Step 2 If you want to delete a realm, click the **delete** icon ( ).

Step 3 If you want to edit a realm, click the **edit** icon ( ) next to the realm and make changes as described in Creating a Realm, on page 334

Step 4 If you want to enable or disable a realm, click the State slider next to the realm you want to enable or disable as described in Enabling or Disabling a Realm, on page 348.

Step 5 If you want to download users and user groups on demand, click the **download** icon ( ) as described in Downloading Users and User Groups On-Demand, on page 348

Step 6 If you want to copy a realm, click the **copy** icon ( ).

Step 7 If you want to compare realms, see Comparing Realms, on page 347.

Comparing Realms

License: Control

To Compare Realms:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Realms**.

Step 2 Click **Compare Realms**.

Step 3 Select **Compare Realm** from the **Compare Against** drop-down list.

Step 4 Select the realms you want to compare from the **Realm A** and **Realm B** drop-down lists.

Step 5 Click **OK**.

Step 6 If you want to navigate individually through changes, click **Previous** or **Next** above the title bar.

Step 7 Optionally, click **Comparison Report** to generate the **realm comparison report**.

Step 8 Optionally, click **New Comparison** to generate a new **realm comparison view**.

Downloading Users and User Groups On-Demand

License: Control

If you change the user or group download parameters in a realm, or if you change the users or groups on your server and want the changes to be immediately available for user control, you can force the ASA FirePOWER module to perform an on-demand user download from the server.

The maximum number of users the ASA FirePOWER module can retrieve from the server depends on your device model. If the download parameters in your realm are too broad, the ASA FirePOWER module obtains information on as many users as it can and reports the number of users it failed to retrieve in the task queue.

Before You Begin

- Enable the realm as described in Enabling or Disabling a Realm, on page 348

To download users and user groups on-demand:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Realms**.

Step 2 Click the **download** icon ( ) next to the realm where you want to download users and user groups.

What to do next

- Optionally, monitor the task status; see the Task Status page (**Monitoring** > **ASA FirePOWER Monitoring** > **Task Status**).

Enabling or Disabling a Realm

License: Control

Only enabled realms allow the ASA FirePOWER module to query servers. To stop queries, disable the realm.

To enable or disable a realm:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Realms**.

Step 2 Click the **State** slider next to the realm you want to enable or disable.

What to do next

- Optionally, monitor the task status; see the Task Status page (**Monitoring** > **ASA FirePOWER Monitoring** > **Task Status**).

Managing the Identity Policy

License: Control

To manage the Identity Policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Identity Policy**.

Step 2 If you want to copy a policy, click the **copy** icon ( ).

Step 3 If you want to generate a report for the policy, click the **report** icon ( ).

Managing Identity Rules

License: Control

To manage Identity Rules:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Identity Policy**.

Step 2 If you want to edit an identity rule, click the **edit** icon ( )and make changes as described in Creating an Identity Rule, on page 342.

Step 3 If you want to delete an identity rule, click the **delete** icon ( ).

Step 4 Click **Store ASA FirePOWER Changes**.

What to do next

- Deploy configuration changes; see Deploying Configuration Changes, on page 73.

Adding an Identity Rule Category

License: Control

To add an Identity Rule Category:

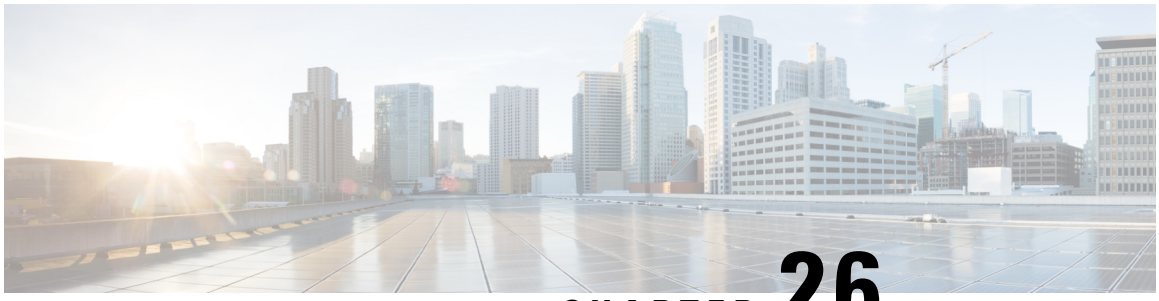
Step 1 On the **identity rule editor** page, you have the following choices:

- Select **above Category** from the first **Insert** drop-down list, then select the category above which you want to position the rule from the second drop-down list.
- Select **below rule** from the drop-down list, then enter an existing rule number. This option is valid only when at least one rule exists in the policy.
- Select **above rule** from the drop-down list, then, enter an existing rule number. This option is valid only when at least one rule exists in the policy.

Step 2 Click **OK**.

Note Rules in a category you delete are added to the category above.

Step 3 Click **Add** or continue editing the rule.



CHAPTER 26

User Identity Sources

The ASA FirePOWER module supports the following identity sources:

- Authoritative *User Agent* reporting collects user data for user awareness and user access control. If you want to configure User Agents to monitor users when they log in and out of hosts or authenticate with Active Directory credentials, see The User Agent Identity Source, on page 353.
- Authoritative *Identity Services Engine (ISE)* or *ISE-PIC* reporting collects user data for user awareness and user access control. If you have an ISE/ISE-PIC deployment and you want to configure ISE/ISE-PIC to monitor users as they authenticate via Active Directory domain controllers (DC), see The ISE/ISE-PIC Identity Source, on page 354.
- Authoritative *captive portal authentication* actively authenticates users on your network and collects user data for user awareness and user control. If you want to configure virtual routers or Firepower Threat Defense devices to perform captive portal authentication, see The Captive Portal Active Authentication Identity Source, on page 357.

Data from those identity sources is stored in the ASA FirePOWER module users database and the user activity database.You can configure database-server queries to automatically download new data to your module.

For more information about user detection in the ASA FirePOWER module, see User Detection Fundamentals, on page 327.

Troubleshooting Issues with User Identity Sources

License: Any

See the following sections for information about troubleshooting issues with your identity sources.

User Agent

If you experience issues with the User Agent connection, see the *Firepower User Agent Configuration Guide* .

If you experience issues with user data reported by the User Agent, note the following:

- After the system detects activity from a User Agent user whose data is not yet in the database, the system retrieves information about them from the server. In some cases, the system requires up to 60 minutes to successfully retrieve this information from Active Directory servers. Until the data retrieval succeeds, activity seen by the User Agent user is handled by access control rules, and is not displayed in the web interface.

ISE/ISE-PIC

If you experience issues with the ISE/ISE-PIC connection, check the following:

- The pxGrid Identity Mapping feature within ISE must be enabled before you can successfully integrate ISE with the Firepower System.
- All ISE system certificates and Firepower Management Center certificates must include the **serverAuth** and **clientAuth** extended key usage values.
- The time on your ISE device must be synchronized with the time on the Firepower Management Center. If the appliances are not synchronized, the system may perform user timeouts at unexpected intervals.
- If your deployment includes a primary and a secondary pxGrid node, the certificates for both nodes must be signed by the same certificate authority.
- If your deployment includes a primary and a secondary MNT node, the certificates for both nodes must be signed by the same certificate authority.

If you experience issues with user data reported by ISE/ISE-PIC, note the following:

- After the system detects activity from an ISE user whose data is not yet in the database, the system retrieves information about them from the server. In some cases, the system requires up to 60 minutes to successfully retrieve this information from Active Directory servers. Until the data retrieval succeeds, activity seen by the ISE user is handled by access control rules, and is not displayed in the web interface.
- You cannot perform user control on ISE users who were authenticated by an LDAP, RADIUS, or RSA domain controller.
- The ASA FirePOWER module does not receive user data for ISE Guest Services users.
- Your ISE version and configuration impact how you can use ISE in the Firepower System. For more information, see The ISE/ISE-PIC Identity Source, on page 354.
- ISE-PIC does not provide ISE attribute data.

Captive Portal

If you experience issues with captive portal authentication, note the following:

- The time on your captive portal server must be synchronized with the time on the ASA FirePOWER module.
- If you have DNS resolution configured and you create an identity rule to perform Kerberos (or HTTP Negotiate, if you want Kerberos as an option) captive portal, you must configure your DNS server to resolve the fully qualified domain name (FQDN) of the captive portal device. The FQDN must match the hostname you provided when configuring DNS.

For ASA with FirePOWER Services devices, the FQDN must resolve to the IP address of the routed interface used for captive portal.

- If you select Kerberos (or HTTP Negotiate, if you want Kerberos as an option) as the **Authentication Type** in an identity rule, the **Realm** you select must be configured with an **AD Join Username** and **AD Join Password** in order to perform Kerberos captive portal active authentication.
- If you select HTTP Basic as the **Authentication Type** in an identity rule, users on your network may not notice their sessions time out. Most web browsers cache the credentials from HTTP Basic logins and use the credentials to seamlessly begin a new session after an old session times out.
- If the device you want to use for captive portal contains both inline and routed interfaces, you must configure a zone condition in your captive portal identity rules to target only the routed interfaces on the captive portal device.

The User Agent Identity Source

License: Any

The User Agent is a passive authentication method and one of the authoritative identity sources supported by the ASA FirePOWER module. When integrated with the ASA FirePOWER module, the agent monitors users when they log in and out of hosts or authenticate with Active Directory credentials. The User Agent does not report failed login attempts. The data gained from the User Agent can be used for user awareness and user control. You invoke passive authentication in your identity policy.

Installing and using User Agents allows you to perform user control; the agents associate users with IP addresses, which allows access control rules with user conditions to trigger. You can use one agent to monitor user activity on up to five Active Directory servers.

The User Agent requires a multi-step configuration, and includes the following:

- Computers or servers with the agent installed.
- Connections between an ASA FirePOWER module and the computers or Active Directory servers with the agent installed.
- Connections between the ASA FirePOWER module and the monitored LDAP servers, configured as directories within identity realms.

For detailed information about the multi-step User Agent configuration and a complete discussion of the server requirements, see the *User Agent Configuration Guide* .

The ASA FirePOWER module connection not only allows you to retrieve metadata for the users whose logins and logoffs were detected by User Agents, but also is used to specify the users and groups you want to use in access control rules. If the agent is configured to exclude specific user names, login data for those user names are not reported to the ASA FirePOWER module. User agent data is stored in the user database and user activity database on the device.

Note User Agents cannot transmit Active Directory user names ending with the $ character to the ASA FirePOWER module. You must remove the final $ character if you want to monitor these users.

If multiple users are logged into a host using remote sessions, the agent may not detect logins from that host properly. For information about how to prevent this, see the *User Agent Configuration Guide* .

Configuring a User Agent Connection

License: Control

Before you Begin

If you plan to implement user access control, configure and enable an Active Directory realm for your User Agent connection as described in Creating a Realm, on page 334

To configure a User Agent Connection:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration Integration** > **Identity Sources**.

Step 2 Select **User Agent** for the **Service Type** to enable the User Agent connection.

Note To disable the connection, select **None**.

Step 3 Click the **Add New Agent** button to add a new agent.

Step 4 Type the **Hostname** or **Address** of the computer where you plan to install the agent. You must use an IPv4 address; you cannot configure the ASA FirePOWER module to connect to a User Agent using an IPv6 address.

Step 5 Click **Add**.

Step 6 To delete a connection, click the delete icon and confirm that you want to delete it.

What to do next

- Continue User Agent setup as described in the *Firepower User Agent Configuration Guide* .

The ISE/ISE-PIC Identity Source

License: Any

You can integrate your Cisco Identity Services Engine (ISE) or ISE Passive Identity Connector (ISE-PIC) deployment with the ASA FirePOWER module to use ISE/ISE-PIC for passive authentication. You invoke passive authentication in your identity policy.

ISE/ISE-PIC is an authoritative identity source, and provides user awareness data for users who authenticate via Active Directory (AD), LDAP, RADIUS, or RSA. Additionally, you can perform user control on AD users. ISE/ISE-PIC does not report failed login attempts or the activity of ISE Guest Services users.

Note The ASA FirePOWER module does not support 802.1x machine authentication alongside AD authentication, because the system does not associate machine authentication with users. If you use 802.1x active logins, configure ISE to report only 802.1x active logins (both machine and user). That way, a machine login is reported only once to the system.

For more information on Cisco ISE/ISE-PIC, see the *Cisco Identity Services Engine Administrator Guide* and the *Identity Services Engine Passive Identity Connector (ISE-PIC) Installation and Administrator Guide* .

Your ISE/ISE-PIC version and configuration affects its integration and interaction with the ASA FirePOWER module, as follows:

- Synchronize the time on the ISE/ISE-PIC server and the ASA FirePOWER module. Otherwise, the system may perform user timeouts at unexpected intervals.
- If you configure ISE/ISE-PIC to monitor a large number of user groups, the system may drop user mappings based on groups, due to memory limitations. As a result, access control rules with realm or user conditions may not fire as expected.
- Version 2.0 patch 4 of ISE includes support for IPv6-enabled endpoints.
- ISE-PIC does not provide ISE attribute data.

For the specific versions of ISE/ISE-PIC that are compatible with this version of the ASA FirePOWER module, see the *Cisco Firepower Compatibility Guide* .

Configuring an ISE connection populates the ASA FirePOWER module database with ISE attribute data. You can use the following ISE attributes for user awareness and user control. This is not supported with ISE-PIC.

Security Group Tags (SGT)

The Security Group Tag (SGT) specifies the privileges of a traffic source within a trusted network. Security Group Access (a feature of both Cisco TrustSec and Cisco ISE) automatically generates the SGT when a user adds a security group in TrustSec or ISE. SGA then applies the SGT attribute as packets enter the network. You can use SGTs for access control by configuring ISE as an identity source or creating custom SGT objects. For more information, see ISE SGT and Custom SGT Rule Conditions, on page 131.

SGT ISE attribute rule conditions can be configured in policies with or without an associated identity policy.

Endpoint Location (also known as the Location IP)

The Endpoint Location attribute is applied by Cisco ISE and identifies the IP address of the endpoint device.

You can only configure Location IP as an ISE attribute rule condition in policies with an associated identity policy.

Endpoint Profile (also known as the Device Type)

The Endpoint Profile attribute is applied by Cisco ISE and identifies the endpoint device type for each packet.

You can only configure Device Type as an ISE attribute rule condition in policies with an associated identity policy.

ISE/ISE-PIC Fields

The following fields are used to configure a connection to ISE/ISE-PIC.

Primary and Secondary Host Name/IP Address

The hostname or IP address for the primary and, optionally, the secondary ISE servers.

pxGrid Server CA

The certificate authority for the pxGrid framework. If your deployment includes a primary and a secondary pxGrid node, the certificates for both nodes must be signed by the same certificate authority.

MNT Server CA

The certificate authority for the ISE certificate when performing bulk downloads. If your deployment includes a primary and a secondary MNT node, the certificates for both nodes must be signed by the same certificate authority.

MC Server Certificate

The certificate and key that the ASA FirePOWER module should provide to ISE when connecting to ISE or performing bulk downloads.

The **MC Server Certificate** must include the **clientAuth** extended key usage value, or it must not include any extended key usage values.

ISE Network Filter

An optional filter you can set to restrict the networks monitored by ISE. If you provide a filter, ISE monitors the networks within that filter. You can specify a filter in the following ways:

- Leave the field blank to specify any.
- Enter a single IPv4 address block using CIDR notation.
- Enter a list of IPv4 address blocks using CIDR notation, separated by commas.

Note This version of the Firepower System does not support filtering using IPv6 addresses, regardless of your ISE version.

Configuring an ISE/ISE-PIC Connection

License: Control

Before You Begin

- Configure a realm as described in Creating a Realm, on page 334. A user download (automatic or on-demand) must be performed before you can configure an ISE attribute condition in an access control rule.

Note Configuring a realm is optional if you plan to configure SGT ISE attribute conditions but not user, group, realm, Endpoint Location, or Endpoint Profile conditions.

To configure an ISE/ISE-PIC Connection:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Identity Sources**.

Step 2 Select **Identity Services Engine** for the **Service Type** to enable the ISE/ISE-PIC connection.

Note To disable the connection, select **None**.

Step 3 Type a **Primary Host Name/IP Address** and, optionally, a **Secondary Host Name/IP Address**.

Step 4 Select the appropriate certificates from the **pxGrid Server CA**, **MNT Server CA**, and **MC Server Certificate** drop-down lists. Optionally, click the add icon to create an object on the fly.

Step 5 Optionally, type an **ISE Network Filter** using CIDR block notation.

Step 6 If you want to test the connection, click **Test**.

The Captive Portal Active Authentication Identity Source

License: Any

Captive portal is one of the authoritative identity sources supported by the ASA FirePOWER module. It is the only active authentication method supported by the ASA FirePOWER module, where users can authenticate onto the network through a device.

Active authentication via captive portal is performed on HTTP and HTTPS traffic only. If you want to perform captive portal on HTTPS traffic, you must create SSL rules to decrypt the traffic originating from the users you want to authenticate using captive portal.

When configured and deployed, users from specified realms authenticate through ASA FirePOWER devices in routed mode running Version 9.5(2) or later. The authentication data gained from captive portal can be used for user awareness and user control.

Captive portal also records failed authentication attempts. A failed attempt does not add a new user to the list of users in the database. The user activity type for failed authentication activity reported by captive portal is **Failed Auth User**.

You use the captive-portal ASA CLI command to enable captive portal for active authentication as described in the *ASA Firewall Configuration Guide* for your version.

You continue configuring captive portal in your identity policy and invoke it (active authentication) in your identity rules. Identity policies are invoked in your access control policies. For more information, see Configuring Captive Portal (Active Authentication), on page 340

Captive portal can only be performed by a device with one or more routed interfaces configured.

Note the following access control rule and SSL rule requirements:

- If you want to perform active authentication via captive portal on HTTPS traffic, you must create SSL rules to decrypt the traffic originating from the users you want to authenticate using captive portal.
- If you want to decrypt traffic in the captive portal connection, you must create an SSL rule to decrypt the traffic destined for the port you plan to use for captive portal.
- You must create an access control rule to allow traffic destined for the IP address and port you plan to use for captive portal. Traffic cannot be authenticated using captive portal if the destination port is not allowed in your access control policy.

ASA FirePOWER Module-Server Downloads

License: Any

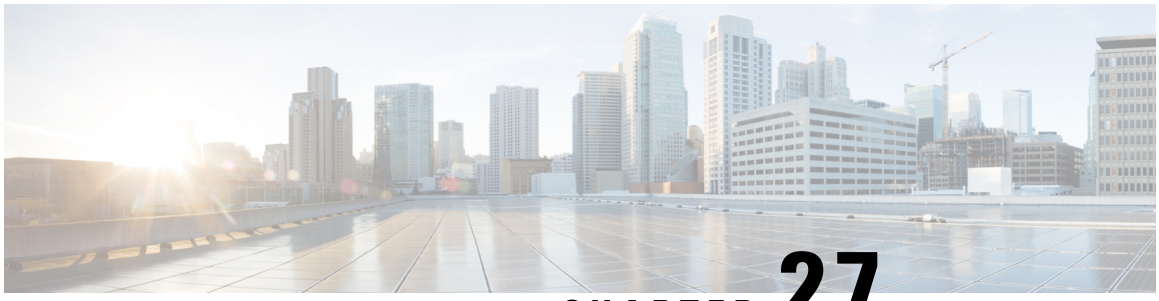
Connections between the ASA FirePOWER module and your LDAP or AD servers allow you to retrieve user and user group metadata for certain detected users:

- LDAP and AD users authenticated by captive portal or reported by a User Agent or ISE/ISE-PIC. This metadata can be used for user awareness and user control.
- POP3 and IMAP user logins detected by traffic-based detection, if those users have the same email address as an LDAP or AD user. This metadata can be used for user awareness.

You configure an ASA FirePOWER module user database-server connection as a directory within a realm. You must select the **Download users and user groups for access control** check box to download a realm's user and user group data for user awareness and user control.

The ASA FirePOWER module obtains the following information and metadata about each user:

- LDAP user name
- first and last names
- email address
- department
- telephone number



CHAPTER 27

DNS Policies

License: Any

DNS-based Security Intelligence allows you to block traffic, or exempt it from blocking, based on the domain name requested by a client. Cisco provides domain name intelligence you can use to filter your traffic; you can also configure custom lists and feeds of domain names tailored to your deployment. DNS-based Security Intelligence filtering takes place after hardware-level handling and traffic decryption, and before most other policy-based inspection, analysis, or traffic handling.

Traffic blocked by a DNS policy is immediately blocked and therefore is not subject to any further inspection—not for intrusions, exploits, malware, and so on. You can override blocking by adding it to a whitelist, to force access control rule evaluation. Also, recommended in passive deployments, you can use a "monitor-only" setting for Security Intelligence filtering. This allows the ASA FirePOWER module to analyze connections that would have been blocked, but also logs the match to the blacklist and generates an end-of-connection security intelligence event.

You configure DNS-based Security Intelligence using a DNS policy and associated DNS rules. To deploy it, you must associate your DNS policy with an access control policy, then deploy your configuration.

DNS Policy Components

License: Any

A DNS policy allows you to block (or exempt from blocking) domain name-based connections. The following list describes the configurations you can change after creating a DNS policy.

Name and Description

Each DNS policy must have a unique name. A description is optional.

Rules

Rules provide a granular method of handling network traffic based on the domain name. Rules in a DNS policy are numbered, starting at 1. The ASA FirePOWER module matches traffic to DNS rules in top-down order by ascending rule number.

When you create a DNS policy, the ASA FirePOWER module populates it with a default Global DNS Whitelist rule, and a default Global DNS Blacklist rule. Each rule is fixed to the first position in their respective categories. You cannot modify these rules, but you can disable them. The module evaluates rules in the following order:

- Global DNS Whitelist rule (if enabled)
- Whitelist rules
- Global DNS Blacklist rule (if enabled)
- Blacklist and monitor rules

Usually, the module handles domain name-based network traffic according to the first DNS rule where all the rule's conditions match the traffic. If no DNS rules match the traffic, the module continues evaluating the traffic based on the associated access control policy's rules. DNS rule conditions can be simple or complex.

Editing a DNS Policy

License: Protection

Only one person should edit a DNS policy at a time, using a single browser window. If multiple users attempt to save the same policy, only the first set of saved changes are retained.

To protect the privacy of your session, after thirty minutes of inactivity on the policy editor, a warning appears. After sixty minutes, the module discards your changes.

To edit a DNS policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **DNS Policy**.

Step 2 Edit your DNS policy:

- Name and Description - To change the name or description, click the field and type the new information.
- Rules - To add, categorize, enable, disable, or otherwise manage DNS rules, click the **Rules** tab and proceed as described in Creating and Editing DNS Rules, on page 361.

Step 3 Click **Store ASA FirePOWER Changes.**

What to do next

- Deploy configuration changes; see Deploying Configuration Changes, on page 73.

DNS Rules

License: Any

DNS rules handle traffic based on the domain name requested by a host. As part of Security Intelligence, this evaluation happens after any traffic decryption, and before access control evaluation.

The ASA FirePOWER module matches traffic to DNS rules in the order you specify. In most cases, the module handles network traffic according to the first DNS rule where all the rule's conditions match the traffic. When

you create DNS rules, the module places whitelist rules before monitor and blacklist rules, and evaluates traffic against whitelist rules first.

.

In addition to its unique name, each DNS rule has the following basic components:

State

By default, rules are enabled. If you disable a rule, the ASA FirePOWER module does not use it to evaluate network traffic, and stops generating warnings and errors for that rule.

Position

Rules in a DNS policy are numbered, starting at 1. The ASA FirePOWER module matches traffic to rules in top-down order by ascending rule number. With the exception of Monitor rules, the first rule that traffic matches is the rule that handles that traffic.

Conditions

Conditions specify the specific traffic the rule handles. A DNS rule must contain a DNS feed or list condition, and can also match traffic by security zone or network.

Action

A rule's action determines how the ASA FirePOWER module handles matching traffic:

- Traffic on a whitelist is allowed, subject to further access control inspection.
- Monitored traffic is subject to further evaluation by remaining DNS blacklist rules. If the traffic does not match a DNS blacklist rule, it is inspected with access control rules. The module logs a Security Intelligence event for the traffic.
- Blocked traffic is dropped without further inspection. You can also return a Domain Not Found response, or redirect the DNS query to a sinkhole server.

Creating and Editing DNS Rules

License: Protection

In a DNS policy, you can add up to a total of 32767 DNS lists to the whitelist and blacklist rules. That is, the number of lists in the DNS policy cannot exceed 32767.

To create and edit DNS Rules:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **DNS Policy**.

Step 2 You have the following options:

- To add a new rule, click **Add DNS Rule**.
- To edit an existing rule, click the **edit** icon.

Step 3 Enter a **Name**.

Step 4 Configure the rule components, or accept the defaults:

- Action - Select a rule **Action**; see DNS Rule Actions, on page 363.
- Conditions - Configure the rule's conditions; see DNS Rule Conditions, on page 364.
- Enabled - Specify whether the rule is **Enabled**.

Step 5 Click **Add** or **OK**.

Step 6 Click **Store ASA FirePOWER Changes**.

DNS Rule Management

License: Any

The **Rules** tab of the DNS policy editor allows you to add, edit, move, enable, disable, delete, and otherwise manage DNS rules within your policy.

For each rule, the policy editor displays its name, a summary of its conditions, and the rule action. Other icons represent warnings, errors, and other important information. Disabled rules are dimmed and marked (disabled) beneath the rule name.

Enabling and Disabling DNS Rules

License: Protection

When you create a DNS rule, it is enabled by default. If you disable a rule, the ASA FirePOWER module does not use it to evaluate network traffic and stops generating warnings and errors for that rule. When viewing the list of rules in a DNS policy, disabled rules are dimmed, although you can still modify them. Note that you can also enable or disable a DNS rule using the DNS rule editor.

To enable and disable DNS Rules:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **DNS Policy**.

Step 2 In the **DNS policy editor** that contains the rule you want to enable or disable, right-click the **rule** and choose a **rule state**.

Step 3 Click **OK**.

Step 4 Click **Store ASA FirePOWER Changes**.

What to do next

- Deploy configuration changes; see Deploying Configuration Changes, on page 73.

DNS Rule Order Evaluation

License: Any

Rules in a DNS policy are numbered, starting at 1. The ASA FirePOWER module matches traffic to DNS rules in top-down order by ascending rule number. In most cases, the module handles network traffic according to the first DNS rule where all the rule's conditions match the traffic:

- For Monitor rules, the module logs the traffic, then continues evaluating traffic against lower-priority DNS blacklist rules.
- For non-Monitor rules, the module does not continue to evaluate traffic against additional, lower-priority DNS rules after that traffic matches a rule.

Note the following regarding rule order:

- The Global Whitelist is always first, and takes precedence over all other rules.
- The Whitelist section precedes the Blacklist section; whitelist rules always take precedence over other rules.
- The Global Blacklist is always first in the Blacklist section, and takes precedence over all other Monitor and blacklist rules.
- The Blacklist section contains Monitor and blacklist rules.
- When you first create a DNS rule, the module positions it last in the Whitelist section if you assign a **Whitelist** action, or last in the Blacklist section if you assign any other action.

You can drag and drop rules to reorder them, and change the evaluation order.

DNS Rule Actions

License: Any

Every DNS rule has an *action* that determines the following for matching traffic:

- handling—foremost, the rule action governs whether the module will monitor or block traffic that matches the rule's conditions, or simply allow it to pass to the next step in processing.
- logging—the rule action determines when and how you can log details about matching traffic

Keep in mind that only devices deployed inline can block traffic. Devices deployed passively can pass and log, but not affect, traffic.

Whitelist Action

The **Whitelist** action allows matching traffic to pass. If you choose this option, traffic is subject to further inspection either by a matching access control rule, or by the access control policy's default action.

The module does not log whitelist matches. Logging of these connections depends on their eventual disposition.

Monitor Action

The **Monitor** action does not affect traffic flow; matching traffic is neither immediately passed nor blocked. Rather, traffic is matched against additional rules to determine whether to permit or deny it. The first non-Monitor DNS rule matched determines whether the module blocks the traffic. If there are no additional matching rules, the traffic is subject to access control evaluation.

For connections monitored by a DNS policy, the ASA FirePOWER module logs end-of-connection Security Intelligence and connection events.

Blacklist Actions

These actions block traffic without further inspection of any kind:

- The **Drop** action drops the traffic.
- The **Domain Not Found** action returns a non-existent internet domain response to the DNS query, which prevents the client from resolving the DNS request.
- The **Sinkhole** action returns a sinkhole object's IPv4 or IPv6 address in response to the DNS query. The sinkhole server can log, or log and block, follow-on connections to the IP address. If you configure a **Sinkhole** action, you must also configure a sinkhole object.

For a connection blocked based on the **Drop** or **Domain Not Found** actions, the module logs beginning-of-connection Security Intelligence and connection events. Because blocked traffic is immediately denied without further inspection, there is no unique end of connection to log.

For a connection blocked based on the **Sinkhole** action, logging depends on the sinkhole object configuration. If you configure your sinkhole object to only log sinkhole connections, the module logs end-of-connection connection events for the follow-on connection. If you configure your sinkhole object to log and block sinkhole connections, the module logs beginning-of-connection connection events for the follow-on connection, then blocks that connection.

DNS Rule Conditions

License: Any

A DNS rule's conditions identify the type of traffic that rule handles. Conditions can be simple or complex. You must define a DNS feed or list condition. You can additionally control traffic by security zone or network.

When adding conditions to a DNS rule:

- If you do not configure a particular condition for a rule, the module does not match traffic based on that criterion.
- You can configure multiple conditions per rule. Traffic must match **all** the conditions in the rule for the rule to apply to traffic.
- For each condition in a rule, you can add up to 50 criteria. Traffic that matches **any** of a condition's criteria satisfies the condition. For example, you can use a single rule to block traffic based on up to 50 DNS lists and feeds.

Controlling Traffic Based on DNS and Security Zone

License: Protection

Zone conditions in DNS rules allow you to control traffic by its source and destination security zones. A security zone is a grouping of one or more interfaces. An option you choose during a device's initial setup, called its detection mode, determines how the module initially configures the device's interfaces, and whether those interfaces belong to a security zone.

To control traffic based on DNS and security zone:

Step 1 In the **DNS rule editor**, click the **Zones** tab.

Step 2 Find and select the zones you want to add from the **Available Zones**. To search for zones to add, click the **Search by name** prompt above the **Available Zones** list, then type a zone name. The list updates as you type to display matching zones.

Step 3 Click to select a zone, or right-click and then select **Select All**.

Step 4 Click **Add to Source**.

Tip You can also drag and drop selected zones.

Step 5 Save or continue editing the rule.

What to do next

- Deploy configuration changes; see Deploying Configuration Changes, on page 73.

Controlling Traffic Based on DNS and Network

License: Protection

Network conditions in DNS rules allow you to control traffic by its source IP address. You can explicitly specify the source IP addresses for the traffic you want to control.

To control traffic based on DNS and network:

Step 1 In the **DNS rule editor**, click the **Networks** tab.

Step 2 Find and select the networks you want to add from the **Available Networks**, as follows:

- To add a network object on the fly, which you can then add to the condition, click the **add** icon above the **Available Networks** list and proceed as described in Working with Network Objects, on page 19.
- To search for network objects to add, click the **Search by name or value** prompt above the **Available Networks** list, then type an object name or the value of one of the object's components. The list updates as you type to display matching objects.

Step 3 Click **Add to Source**.

Tip You can also drag and drop selected objects.

Step 4 Add any source IP addresses or address blocks that you want to specify manually. Click the **Enter an IP address** prompt below the **Source Networks** list; then type an IP address or address block and click **Add**.

Step 5 Save or continue editing the rule.

What to do next

- Deploy configuration changes; see Deploying Configuration Changes, on page 73.

Controlling Traffic Based on DNS List, Feed, or Category

License: Protection

DNS conditions in DNS rules allow you to control traffic if a DNS list, feed, or category contains the domain name requested by the client. You must define a DNS condition in a DNS rule.

Regardless of whether you add a global or custom whitelist or blacklist to a DNS condition, the ASA FirePOWER module applies the configured rule action to the traffic. For example, if you add the Global Whitelist to a rule, and configure a **Drop** action, the module blocks all traffic that should have been passed for further assessment.

To control traffic based on DNS list, feed, or category:

Step 1 In the **DNS rule editor**, click the **DNS** tab.

Step 2 Find and select the DNS lists and feeds you want to add from the **DNS Lists and Feeds**, as follows:

- To add a DNS list or feed on the fly, which you can then add to the condition, click the **add** icon above the **DNS Lists and Feeds** list and proceed as described in Working with the Intelligence Feed, on page 22.
- To search for DNS lists, feeds, or categories to add, click the **Search by name or value** prompt above the **DNS Lists and Feeds** list, then type an object name or the value of one of the object's components. The list updates as you type to display matching objects.

Step 3 Click **Add to Rule**.

Tip You can also drag and drop selected objects.

Step 4 Save or continue editing the rule.

What to do next

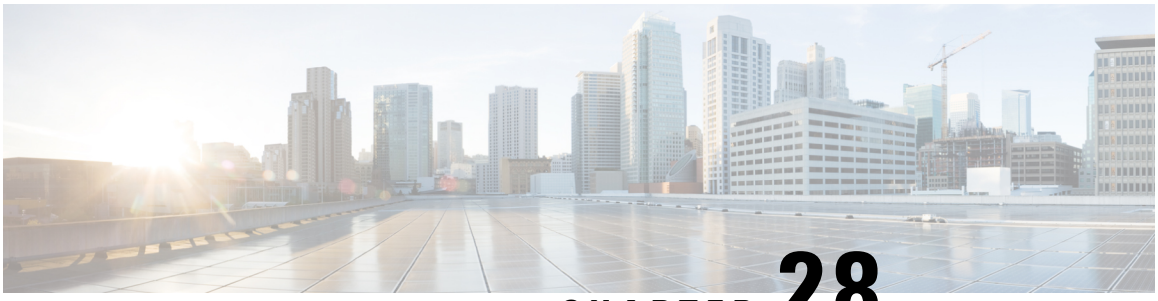
- Deploy configuration changes; see Deploying Configuration Changes, on page 73.

DNS Policy Deploy

License: Any

After you finishing updating your DNS policy configuration, you must deploy it as part of an access control policy for your changes to take effect. You must do the following:

- Associate your DNS policy with an access control policy, as described in Building the Security Intelligence Blacklist and Whitelist , on page 85.
- Deploy configuration changes; see Deploying Configuration Changes, on page 73.



CHAPTER 28

Blocking Malware and Prohibited Files

Malicious software, or *malware* , can enter your organization's network via multiple routes. To help you identify and mitigate the effects of malware, the ASA FirePOWER module's file control and advanced malware protection components can detect, track, store, analyze, and optionally block the transmission of malware and other types of files in network traffic.

You configure the system to perform malware protection and file control as part of your overall access control configuration. *File policies* that you create and associate with access control rules handle network traffic that matches the rules.

Although you can create file policies with any license, certain aspects of malware protection and file control require that you enable specific licensed capabilities on the ASA FirePOWER module, as described in the following table.

Table 65: License and Appliance Requirements for Intrusion and File Inspection

Feature	Description	Add this license...
intrusion prevention	detect and optionally block intrusions and exploits	Protection
file control	detect and optionally block the transmission of file types	Protection
advanced malware protection (AMP)	detect, track, and optionally block the transmission of malware	Malware

- Understanding Malware Protection and File Control, on page 367
- Understanding and Creating File Policies, on page 370

Understanding Malware Protection and File Control

License: Protection, Malware, or Any

Using the *advanced malware protection* feature, you can configure the ASA FirePOWER module to detect, track, analyze, and optionally block malware files being transmitted on your network.

The system can detect and optionally block malware in many types of files, including PDFs, Microsoft Office documents, and others. ASA FirePOWER modules monitor specific application protocol-based network traffic for transmissions of those file types. When the ASA FirePOWER module detects an eligible file, the ASA

FirePOWER module then performs a *malware cloud lookup* using the file's SHA-256 hash value. Based on these results, the Cisco cloud returns a file disposition to the ASA FirePOWER module.

If a file has a disposition in the cloud that you know to be incorrect, you can add the file's SHA-256 value to a file list:

- To treat a file as if the cloud assigned a clean disposition, add the file to the *clean list* .
- To treat a file as if the cloud assigned a malware disposition, add the file to the *custom detection list*.

If the system detects a file's SHA-256 value on a file list, it takes the appropriate action without performing a malware lookup or checking the file disposition. Note that you must configure a rule in the file policy with either a **Malware Cloud Lookup** or **Block Malware** action and a matching file type to calculate a file's SHA value. You can enable use of the clean list or custom detection list on a per-file-policy basis.

To inspect or block files, you must enable a Protection license on the ASA FirePOWER module. To add files to a file list, you must also enable a Malware license.

Understanding File Dispositions

The system determines file dispositions based on the disposition returned by the Cisco cloud. A file can have one of the following file dispositions returned by the Cisco cloud, as a result of addition to a file list, or due to threat score:

- Malware indicates that the cloud categorized the file as malware.
- Clean indicates that the cloud categorized the file as clean, or that a user added the file to the clean list.
- Unknown indicates that a malware cloud lookup occurred before the cloud assigned a disposition. The cloud has not categorized the file.
- Custom Detection indicates that a user added the file to the custom detection list.
- Unavailable indicates that the ASA FirePOWER module could not perform a malware cloud lookup. You may see a small percentage of events with this disposition; this is expected behavior.

Tip If you see several Unavailable malware events in quick succession, check your cloud connection and port configuration. For more information, see Security, Internet Access, and Communication Ports, on page 519.

Based on the file disposition, the ASA FirePOWER module either blocks the file or blocks its upload or download. To improve performance, if the system already knows the disposition for a file based on its SHA-256 value, your appliance uses the cached disposition rather than querying the Cisco cloud.

Note that file dispositions can change. For example, the cloud can determine that a file that was previously thought to be clean is now identified as malware, or the reverse—that a malware-identified file is actually clean. When the disposition changes for a file for which you performed a malware lookup in the last week, the cloud notifies the ASA FirePOWER module so the system can take appropriate action the next time it detects that file being transmitted. A changed file disposition is called a *retrospective* disposition.

File dispositions returned from a malware cloud lookup have a time-to-live (TTL) value. After a file disposition has been held for the duration specified in the TTL value without update, the system purges the cached information. Dispositions have the following TTL values:

- Clean—4 hours

- Unknown—1 hour
- Malware—1 hour

If a malware cloud lookup against the cache identifies a cached disposition that timed out, the system performs a fresh lookup to determine a file disposition.

Understanding File Control

If your organization wants to block not only the transmission of malware files, but all files of a specific type (regardless of whether the files contain malware), the *file control* feature allows you to cast a wider net. As with malware protection, the ASA FirePOWER module monitors network traffic for transmissions of specific file types, then either blocks or allows the file.

File control is supported for all file types where the system can detect malware, plus many additional file types. These file types are grouped into basic categories, including multimedia (swf, mp3), executables (exe, torrent), and PDFs. Note that file control, unlike malware protection, does not require queries of the Cisco cloud.

Configuring Malware Protection and File Control

License: Protection or Malware

You configure malware protection and file control as part of your overall access control configuration by associating file policies with access control rules. This association ensures that before the system passes a file in traffic that matches an access control rule's conditions, it first inspects the file.

A file policy, like its parent access control policy, contains rules that determine how the system handles files that match the conditions of each rule. You can configure separate file rules to take different actions for different file types, application protocols, or directions of transfer.

When a file matches a rule, the rule can:

- allow or block files based on simple file type matching
- block files based on malware file disposition

In addition, the file policy can automatically treat a file as if it is clean or malware based on entries in the clean list or custom detection list

As a simple example, you could implement a file policy that blocks your users from downloading executable files. For detailed information on file policies and associating them with access control rules, see Understanding and Creating File Policies, on page 370.

Logging Events Based on Malware Protection and File Control

License: Protection or Malware

The ASA FirePOWER module logs records of the system's file inspection and handling file events, and malware events:

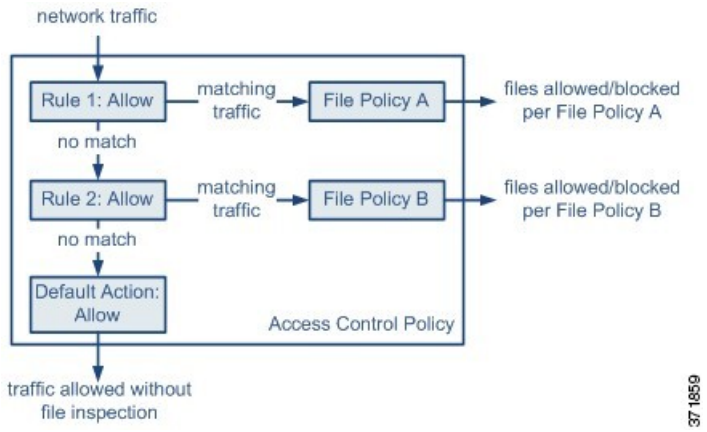
- *File events* represent files that the system detected, and optionally blocked, in network traffic.
- *Malware events* represent malware files detected, and optionally blocked, in network traffic by the system.
- *Retrospective malware events* represent files whose malware file dispositions have changed.

When the system generates a malware event based on detection or blocking of malware in network traffic, it also generates a file event, because to detect malware in a file the system must first detect the file itself.

Understanding and Creating File Policies

License: Protection or Malware

A file policy is a set of configurations that the system uses to perform advanced malware protection and file control, as part of your overall access control configuration.



The policy has two access control rules, both of which use the Allow action and are associated with file policies. The policy's default action is also to allow traffic, but without file policy inspection. In this scenario, traffic is handled as follows:

- Traffic that matches Rule 1 is inspected by File Policy A .
- Traffic that does not match Rule 1 is evaluated against Rule 2 . Traffic that matches Rule 2 is inspected by File Policy B.
- Traffic that does not match either rule is allowed; you cannot associate a file policy with the default action.

A file policy, like its parent access control policy, contains rules that determine how the system handles files that match the conditions of each rule. You can configure separate file rules to take different actions for different file types, application protocols, or directions of transfer.

Once a file matches a rule, the rule can:

- allow or block files based on simple file type matching
- block files based on Malware file disposition

In addition, the file policy can automatically treat a file as if it is clean or malware based on entries in the clean list or custom detection list

You can associate a single file policy with an access control rule whose action is **Allow**, **Interactive Block**, or **Interactive Block with reset**. The system then uses that file policy to inspect network traffic that meets the conditions of the access control rule. By associating different file policies with different access control rules, you have granular control over how you identify and block files transmitted on your network. Note, however, that you **cannot** use a file policy to inspect traffic handled by the access control default action. For detailed information, see Inspecting Allowed Traffic For Intrusions and Malware, on page 136.

File Rules

You populate a file policy with file rules. The following table describes the components of a file rule.

Table 66: File Rule Components

File Rule Component	Description
application protocol	The system can detect and inspect files transmitted via FTP, HTTP, SMTP, IMAP, POP3, and NetBIOS-ssn (SMB). To improve performance, you can restrict file detection to only one of those application protocols on a per-file rule basis.
direction of transfer	You can inspect incoming FTP, HTTP, IMAP, POP3, and NetBIOS-ssn (SMB) traffic for downloaded files; you can inspect outgoing FTP, HTTP, SMTP, and NetBIOS-ssn (SMB) traffic for uploaded files.
file categories and types	The system can detect various types of files. These file types are grouped into basic categories, including multimedia (swf, mp3), executables (exe, torrent), and PDFs. You can configure file rules that detect individual file types, or on entire categories of file types. For example, you could block all multimedia files, or just ShockWave Flash (swf) files. Or, you could configure the system to alert you when a user downloads a BitTorrent (torrent) file. **Caution** Frequently triggered file rules can affect system performance. For example, detecting multimedia files in HTTP traffic (YouTube, for example, transmits significant Flash content) could generate an overwhelming number of events.
file rule action	A file rule's action determines how the system handles traffic that matches the conditions of the rule. **Note** File rules are evaluated in rule-action, not numerical, order. For more information, see the next section, File Rule Actions and Evaluation Order.

File Rule Actions and Evaluation Order

Each file rule has an associated action that determines how the system handles traffic that matches the conditions of the rule. You can set separate rules within a file policy to take different actions for different file types, application protocols, or directions of transfer. The rule actions are as follows, in rule-action order:

- *Block Files* rules allow you to block specific file types.
- *Block Malware* rules allow you to calculate the SHA-256 hash value of specific file types, then use a cloud lookup process to first determine if files traversing your network contain malware, then block files that represent threats.
- *Malware Cloud Lookup* rules allow you to log the malware disposition of files traversing your network based on a cloud lookup, while still allowing their transmission.
- *Detect Files* rules allow you to log the detection of specific file types while still allowing their transmission.

For each file rule action, you can configure options to reset the connection when a file transfer is blocked. The following table details the options available to each file action.

Table 67: File Rule Action

Action	Resets Connection?
Block Files	yes (recommended)
Block Malware	yes (recommended)
Detect Files	no
Malware Cloud Lookup	no

File and Malware Detection, Capture, and Blocking Notes and Limitations

Note the following details and limitations on file and malware detection, capture, and blocking behavior:

- Until a file is detected and block in a session, packets from the session may be subject to intrusion inspection.
- If an end-of-file marker is not detected for a file, regardless of transfer protocol, the file is not blocked by a **Block Malware** rule or by the custom detection list. The system waits to block the file until the entire file has been received, as indicated by the end-of-file marker, and blocks the file after the marker is detected.
- If the end-of-file marker for an FTP file transfer is transmitted separately from the final data segment, the marker is blocked and the FTP client indicates that the file transfer failed, but the file actually completely transfers to disk.
- FTP transfers commands and data over different channels. In a passive deployment, the traffic from an FTP data session and its control session may not be load-balanced to the same Snort.
- If a file matches a rule with an application protocol condition, file event generation occurs after the system successfully identifies a file's application protocol. Unidentified files do not generate file events.
- For an access control policy using a file policy with **Block Malware** rules for FTP, if you set the default action to an intrusion policy with **Drop when Inline** disabled, the system generates events for detected files or malware matching the rules, but does not drop the files. To block FTP fire transfers and use an intrusion policy as the default action for the access control policy where you select the file policy, you must select an intrusion policy with **Drop when Inline** enabled.
- File rules with **Block Files** and **Block Malware** actions block automatic resumption of file download via HTTP by blocking new sessions with the same file, URL, server, and client application detected for 24 hours after the initial file transfer attempt occurs.
- In rare cases, if traffic from an HTTP upload session is out of order, the system cannot reassemble the traffic correctly and therefore does not block it or generate a file event.
- If you transfer a file over NetBIOS-ssn (such as an SMB file transfer) that is blocked with a **Block Files** rule, you may see a file on the destination host. However, the file is unusable because it is blocked after the download starts, resulting in an incomplete file transfer.
- If you create file rules to detect or block files transferred over NetBIOS-ssn (such as an SMB file transfer), the system does not inspect files transferred in an established TCP or SMB session started before you apply an access control policy invoking the file policy, so those files will not be detected or blocked.

- A rule configured to block files in a passive deployment does not block matching files. Because the connection continues to transmit the file, if you configure the rule to log the beginning of the connection, you may see multiple events logged for this connection.
- If the total number of bytes for all file names for files in a POP3, POP, SMTP, or IMAP session exceeds 1024, file events from the session may not reflect the correct file names for files that were detected after the file name buffer filled.
- When transmitting text-based files over SMTP, some mail clients convert newlines to the CRLF newline character standard. Since Mac-based hosts use the carriage return (CR) character and Unix/Linux-based hosts use the line feed (LF) character, newline conversion by the mail client may modify the size of the file. Note that some mail clients default to newline conversion when processing an unrecognizable file type.
- Cisco recommends that you enable **Reset Connection** for the **Block Files** and **Block Malware** actions to prevent blocked application sessions from remaining open until the TCP connection resets. If you do not reset connections, the client session remains open until the TCP connection resets itself.
- If a file rule is configured with a **Malware Cloud Lookup** or **Block Malware** action and the ASA FirePOWER module cannot establish connectivity with the cloud, the system cannot perform any configured rule action options until cloud connectivity is restored.

File Rule Evaluation Example

Unlike in access control policies, where rules are evaluated in numerical order, file policies handle files in File Rule Actions and Evaluation Order. That is, simple blocking takes precedence over malware inspection and blocking, which takes precedence over simple detection and logging. As an example, consider four rules that handle PDF files in a single file policy. Regardless of the order in which they appear in the module interface, these rules are evaluated in the following order:

Table 68: File Rule Evaluation Order Example

App. Protocol	Direction	Action	Action Options	Result
SMTP	Upload	Block Files	Reset Connection	Blocks users from emailing PDF files and resets the connection.
FTP	Download	Block Malware	Reset Connection	Blocks the download of malware PDF files via file transfer, and resets the connection.
POP3 IMAP	Download	Malware Cloud Lookup	none	Inspects PDF files received via email for malware.
Any	Any	Detect Files	none	Detects and logs, but allows the traffic, when users view PDF files on the web (that is, via HTTP).

The ASA FirePOWER module uses warning icons to designate conflicting file rules.

Note that you cannot perform malware analysis on all file types detected by the system. After you select values from the **Application Protocol**, **Direction of Transfer**, and **Action** drop-down lists, the system constrains the list of file types.

Logging File Events, Malware Events and Alerts

When you associate a file policy with an access control rule, the system automatically enables file and malware event logging for matching traffic. When the system inspects a file, it can generate the following types of events:

- *file events* , which represent detected or blocked files, as well as detected malware files
- *malware events* , which represent detected malware files
- *retrospective malware events* , which are generated when the Malware file disposition for a previously detected file changes

When a file policy generates a file or malware event, or captures a file, the system automatically logs the end of the associated connection, regardless of the logging configuration of the invoking access control rule.

Note File events generated by inspecting NetBIOS-ssn (SMB) traffic do not immediately generate connection events because the client and server establish a persistent connection. The system generates connection events after the client or server ends the session.

For each of these connection events:

- The **Files** field contains an icon that indicates the number of files (including malware files) detected in the connection; click the icon to see a list of those files and, for malware files, their file dispositions.
- The **Reason** field indicates the reason the connection event was logged, which depends on the file rule action:
  - File Monitor for Detect Files and Malware Cloud Lookup file rules and for files on the clean list
  - File Block for Block Files or Block Malware file rules
  - File Custom Detection if the system encountered a file on the custom detection list
  - File Resume Allow where file transmission was originally blocked by a Block Files or Block Malware file rule. After a new access control policy was applied that allowed the file, the HTTP session automatically resumed.
  - File Resume Block where file transmission was originally allowed by a Detect Files or Malware Cloud Lookup file rule. After a new access control policy was applied that blocked the file, the HTTP session automatically stopped.
- For connections where a file or malware was blocked, the **Action** is Block.

As with any kind of event generated by the ASA FirePOWER module, you can view file and malware events. You can also use malware events to alert you via SNMP or syslog.

Internet Access

The system uses port 443 to perform malware cloud lookups for network-based AMP. You must open that port outbound on the ASA FirePOWER module.

Managing File Policies

You create, edit, delete, and compare file policies on the File Policies page (**Policies > Files**), which displays a list of existing file policies along with their last-modified dates.

Clicking the apply icon for a file policy displays a dialog box that tells you which access control policies use the file policy, then redirects you to the Access Control Policy page. This is because you cannot apply a file policy independently, as a file policy is considered part of its parent access control policies. To use a new file policy, or to apply changes made to an existing file policy, you must apply or reapply the parent access control policies.

Note that you cannot delete a file policy used in a saved or applied access control policy.

Creating a File Policy

License: Protection or Malware

After you create a file policy and populate it with rules, you can use it in an access control policy.

Tip To make a copy of an existing file policy, click the copy icon, then type a unique name for the new policy in the dialog box that appears. You can then modify the copy

To create a file policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Files**.

The **File Policies** page appears.

For a new policy, the module interface indicates that the policy is not in use. If you are editing an in-use file policy, the module interface tells you how many access control policies use the file policy. In either case, you can click the text to jump to the Access Control Policies page; see Getting Started with Access Control Policies, on page 63.

Step 2 Enter a **Name** and optional **Description** for your new policy, then click **Save**.

The **File Policy Rules** tab appears.

Step 3 Add one or more rules to the file policy.

File rules give you granular control over which file types you want to log, block, or scan for malware. For information on adding file rules, see Working with File Rules, on page 375.

Step 4 Configure the advanced options. See Configuring Advanced File Policy General Options, on page 377 for more information.

Step 5 Click **Store ASA FirePOWER Changes**.

To use your new policy, you must add the file policy to an access control rule, then apply the access control policy. If you are editing an existing file policy, you must reapply any access control policies that use the file policy.

Working with File Rules

License: Protection or Malware

To be effective, a file policy must contain one or more rules. You create, edit, and delete rules on the File Policy Rules page, which appears when you create a new file policy or edit an existing policy. The page lists all the rules in the policy, along with each rule's basic characteristics.

The page also notifies you of how many access control policies use this file policy. You can click the notification to display a list of the parent policies and, optionally, continue to the Access Control Policies page.

To create a file rule:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Policies > Files**.

The File Policies page appears.

Step 2 You have the following options:

- To add rules to a new policy, click **New File Policy** to create a new policy; see Creating a File Policy, on page 375.
- To add rules to an existing policy, click the **edit** icon next to the policy.

Step 3 On the **File Policy Rules** page that appears, click **Add File Rule**.

The **Add File Rule** dialog box appears.

Step 4 Select an **Application Protocol** from the drop-down list.

Any, the default, detects files in HTTP, SMTP, IMAP, POP3, FTP, and NetBIOS-ssn (SMB) traffic.

Step 5 Select a **Direction of Transfer** from the drop-down list.

You can inspect the following types of incoming traffic for downloaded files:

- HTTP
- IMAP
- POP3
- FTP
- NetBIOS-ssn (SMB)

You can inspect the following types of outgoing traffic for uploaded files:

- HTTP
- FTP
- SMTP
- NetBIOS-ssn (SMB)

Use **Any** to detect files over multiple application protocols, regardless of whether users are sending or receiving.

Step 6 Select a file rule **Action**. See the File Rule Actions table for more information.

When you select either **Block Files** or **Block Malware**, **Reset Connection** is enabled by default. To **not** reset the connection where a blocked file transfer occurs, clear the **Reset Connection** check box.

Note Cisco recommends that you leave **Reset Connection** enabled to prevent blocked application sessions from remaining open until the TCP connection resets.

For detailed information on file rule actions, see File Rule Actions and Evaluation Order.

Step 7 Select one or more **File Types**. Use the Shift and Ctrl keys to select multiple file types. You can filter the list of file types in the following ways:

- Select one or more **File Type Categories**.
- Search for a file type by its name or description. For example, type Windows in the **Search name and description** field to display a list of Microsoft Windows-specific files.

The file types that you can use in a file rule vary depending on your selections for **Application Protocol**, **Direction of Transfer**, and **Action**.

For example, selecting **Download** as the **Direction of Transfer** removes GIF , PNG , JPEG , TIFF , and ICO from the **Graphics** category to prevent an excess of file events.

Step 8 Add the selected file types to the **Selected Files Categories and Types** list:

- Click **Add** to add selected file types to the rule.
- Drag and drop one or more file types into the **Selected Files Categories and Types** list.
- With a category selected, click **All types in selected Categories**, then either click **Add** or drag and drop that selection to the **Selected Files Categories and Types** list.

Step 9 Click **Store** ASA FirePOWER **Changes**.

The file rule is added to the policy. If you are editing an existing file policy, you must reapply any access control policies that use the file policy for your changes to take effect.

Configuring Advanced File Policy General Options

License: Malware

In a file policy, you can set the following advanced options in the General section.

Table 69: Advanced File Policy General Options

Field	Description	Default Value
Enable Custom Detection List	Select this to block files on the custom detection list when detected.	enabled
Enable Clean List	Select this to allow files on the clean list when detected.	enabled

To configure advanced file policy general options:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Files**.

The **File Policies** page appears.

Step 2 Click the **edit** icon next to the policy you want to edit.

The **File Policy Rule** page appears.

Step 3 Select the **Advanced** tab.

The **Advanced** tab appears.

Step 4 Modify the options as described in the Advanced File Policy General Optionstable.

Step 5 Click **Store** ASA FirePOWER **Changes**.

You must reapply any access control policies that use the file policy you edited.

Comparing Two File Policies

License: Protection

To review policy changes for compliance with your organization's standards or to optimize system performance, you can examine the differences between any two file policies, or two revisions of the same policy.

The file policy *comparison view* displays two file policies or revisions in a side-by-side format, with the time of last modification and the last user to modify displayed next to each policy name. Differences between the two policies are highlighted:

- Blue indicates that the highlighted setting is different in the two policies, and the difference is noted in red text.
- Green indicates that the highlighted setting appears in one policy but not the other.

You can navigate through the differences by clicking **Previous** and **Next**. The double-arrow icon centered between the left and right sides moves, and the **Difference** number adjusts to identify which difference you are viewing. Optionally, you can generate a file policy *comparison report* , which is a PDF version of the comparison view.

To compare two file policies:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Files**.

The **File Policies** page appears.

Step 2 Click **Compare Policies**.

The **Select Comparison** dialog box appears.

Step 3 From the **Compare Against** drop-down list, select the type of comparison you want to make:

- To compare two different policies, select either **Running Configuration** or **Other Policy**. The practical difference between the two options is that if you select **Running Configuration**, the system limits one of your comparison choices to the set of currently applied file policies.
- To compare revisions of the same policy, select **Other Revision**.

The dialog box refreshes, displaying your comparison options.

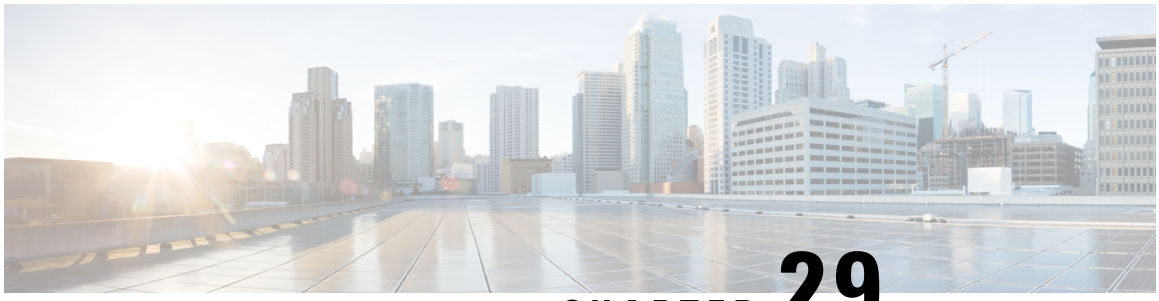
Step 4 Depending on the comparison type you selected, you have the following choices:

- If you are comparing two different policies, select the policies you want to compare: **Policy A** or **Target/Running Configuration A**, and **Policy B**.
- If you are comparing revisions of the same policy, select the **Policy** you want to use, then select the two revisions: **Revision A** and **Revision B**. Revisions are listed by date and user name.

Step 5 Click **OK**.

The *comparison view* appears.

Step 6 Optionally, click **Comparison Report** to generate a file policy comparison report. You are prompted to save the report to your computer.



CHAPTER 29

Logging Connections in Network Traffic

As devices monitor traffic generated by the hosts on your network, they can generate logs of the connections they detect. Various settings in access control and SSL policies give you granular control over which connections you log, when you log them, and where you store the data. An access control rule's specific logging configuration also determines whether you log file and malware events associated with the connection.

In most cases, you can log a connection at its beginning and its end. When you log a connection, the system generates a *connection event*. You can also log a special kind of connection event, called a *Security Intelligence event*, whenever a connection is blocked by the reputation-based Security Intelligence feature.

Connection events contain data about the detected sessions.

You should log connections according to the security and compliance needs of your organization.

Deciding Which Connections To Log

License: Any

Using various settings in access control and SSL policies, you can log any connection that your ASA FirePOWER module monitors. In most cases, you can log a connection at its beginning and its end. However, because blocked traffic is immediately denied without further inspection, the system can log only beginning-of-connection events for blocked traffic; there is no unique end of connection to log.

When you log a connection event, you can view it in the event viewer. You can also send connection data to an external syslog or SNMP trap server.

Tip To perform detailed analysis of connection data using the ASA FirePOWER module, Cisco recommends you log the ends of critical connections.

Logging Critical Connections

License: Any

You should log connections according to the security and compliance needs of your organization. If your goal is to limit the number of events you generate and improve performance, only enable logging for the connections critical to your analysis. However, if you want a broad view of your network traffic for profiling purposes, you can enable logging for additional connections. Various settings in access control and SSL policies give you granular control over which connections you log, when you log them, and where you store the data.

Caution Logging blocked TCP connections during a Denial of Service (DoS) attack can overwhelm the system with multiple similar events. Before you enable logging for an Block rule, consider whether the rule monitors traffic on an Internet-facing interface or other interface vulnerable to DoS attack.

In addition to the logging that you configure, the system automatically logs most connections where the system detects a prohibited file, malware, or intrusion attempt. The system saves these end-of-connection events for further analysis. All connection events reflect why they were automatically logged using the Action and Reason fields.

Security Intelligence Blocking Decisions (Optional)

You can log a connection whenever it is blocked by the reputation-based Security Intelligence feature. Optionally, and recommended in passive deployments, you can use a monitor-only setting for Security Intelligence filtering. This allows the system to further analyze connections that would have been blocked, but still log the match.

When you enable Security Intelligence logging, traffic that matches the blacklist generates a Security Intelligence event as well as a connection event. A Security Intelligence event is a special kind of connection event that you can view and analyze separately, and that is also stored and pruned separately. For more information, see Logging Security Intelligence Decisions, on page 387.

Access Control Handling (Optional)

You can log a connection when it is handled by an access control rule or the access control default action. You configure this logging on a per-access control rule basis so that you only log critical connections. For more information, see Logging Connections Based on Access Control Handling, on page 389.

Connections Associated with Intrusions (Automatic)

When an intrusion policy invoked by an access control rule (see Tuning Traffic Flow Using Access Control Rules, on page 89) detects an intrusion and generates an intrusion event, the system automatically logs the end of the connection where the intrusion occurred, regardless of the logging configuration of the rule.

However, when an intrusion policy associated with the access control default action (see Setting Default Handling and Inspection for Network Traffic, on page 66) generates an intrusion event, the system does **not** automatically log the end of the associated connection. Instead, you must explicitly enable default action connection logging. This is useful for intrusion prevention-only deployments where you do not want to log any connection data.

For connections where an intrusion was blocked, the action for the connection in the connection log is Block , with a reason of Intrusion Block , even though to perform intrusion inspection you must use an Allow rule.

Connections Associated with File and Malware Events (Automatic)

When a file policy invoked by an access control rule detects a prohibited file (including malware) and generates a file or malware event, the system automatically logs the end of the connection where the file was detected, regardless of the logging configuration of the access control rule. You **cannot** disable this logging.

Note File events generated by inspecting NetBIOS-ssn (SMB) traffic do not immediately generate connection events because the client and server establish a persistent connection. The system generates connection events after the client or server ends the session.

For connections where a file was blocked, the action for the connection in the connection log is Block even though to perform file and malware inspection you must use an Allow rule. The connection's reason is either File Monitor (a file type or malware was detected), or Malware Block or File Block (a file was blocked).

Logging the Beginning and End of Connections

License: Any

When the system detects a connection, in most cases you can log it at its beginning and its end.

However, because blocked traffic is immediately denied without further inspection, in most cases you can log only beginning-of-connection events for blocked traffic; there is no unique end of connection to log.

Note For a single non-blocked connection, the end-of-connection event contains all of the information in the beginning-of-connection event, as well as information gathered over the duration of the session.

Note that monitoring a connection for any reason forces end-of-connection logging; see Understanding Logging for Monitored Connections, on page 384.

The following table details the differences between beginning and end-of-connection events, including the advantages to logging each.

Context	Beginning-of-Connection Events	End-of-Connection Events
Can be generated...	when the system detects the beginning of a connection (or, after the first few packets if event generation depends on application or URL identification)	when the system: • detects the close of a connection • does not detect the end of a connection after a period of time • can no longer track the session due to memory constraints
Can be logged for...	all connections evaluated by Security Intelligence or access control rules	all connections are configurable, though the system cannot log the end of blocked connections

Context	Beginning-of-Connection Events	End-of-Connection Events
Contain...	only information that can be determined in the first packet (or the first few packets, if event generation depends on application or URL identification)	all information in the beginning-of-connection event, plus information determined by examining traffic over the duration of the session, for example, the total amount of data transmitted or the timestamp of the last packet in the connection
Are useful...	if you want to log: • blocked connections, including Security Intelligence blocking decisions	if you want to: • perform any kind of detailed analysis on information collected over the duration of the session • view connection data in graphical format

Logging Connections to the ASA FirePOWER Module or External Server

License: Any

You can log connection events to the ASA FirePOWER module, as well as to an external syslog or SNMP trap server. Before you can log connection data to an external server, you must configure a connection to that server called an *alert response* ; see Working with Alert Responses, on page 412.

Understanding How Access Control and SSL Rule Actions Affect Logging

License: feature dependent

Every access control and SSL rule has an *action* that determines not only how the system inspects and handles the traffic that matches the rule, but also when and how you can log details about matching traffic.

Understanding Logging for Monitored Connections

License: feature dependent

The system always logs the ends of the following connections to the ASA FirePOWER module, regardless of the logging configuration of the rule or default action that later handles the connection:

- connections matching a Security Intelligence blacklist set to monitor
- connections matching an access control Monitor rule

In other words, if a packet matches a Monitor rule or Security Intelligence monitored blacklist, the connection is always logged, even if the packet matches no other rules and you do not enable logging on the default action. Whenever the system logs a connection event as the result of Security Intelligence filtering, it also logs a matching Security Intelligence event, which is a special kind of connection event that you can view and analyze separately; see Logging Security Intelligence Decisions, on page 387.

Because monitored traffic is always later handled by another rule or by the default action, the action associated with a connection logged due to a monitor rule is never Monitor . Rather, it reflects the action of the rule or default action that later handles the connection.

The system does **not** generate a separate event each time a single connection matches an SSL or access control Monitor rule. Because a single connection can match multiple Monitor rules, each connection event

logged to the ASA FirePOWER module can include and display information on the first eight Monitor access control rules that the connection matches, as well as the first matching Monitor SSL rule.

Similarly, if you send connection events to an external syslog or SNMP trap server, the system does not send a separate alert each time a single connection matches a Monitor rule. Rather, the alert that the system sends at the end of the connection contains information on the Monitor rules the connection matched.

Understanding Logging for Trusted Connections

License: feature dependent

A trusted connection is one that is handled by a Trust access control rule or the default action in an access control policy. You can log the beginnings and ends of these connections; however, keep in mind that trusted connections, regardless of whether they are encrypted, are not inspected for intrusions, or prohibited files and malware. Therefore, connection events for trusted connections contain limited information.

Understanding Logging for Blocked and Interactively Blocked Connections

License: feature dependent

For access control rules and access control policy default actions that block traffic (including interactive blocking rules), the system logs **beginning**-of-connection events. Matching traffic is denied without further inspection.

Connection events for sessions blocked by an access control or SSL rule have an action of Block or Block with reset . Blocked encrypted connections have a reason of SSL Block .

Interactive blocking access control rules, which cause the system to display a warning page when a user browses to a prohibited website, log ends of connections. This is because if the user clicks through the warning page, the connection is considered a new, allowed connection which the system can monitor and log; see Understanding Logging for Allowed Connections, on page 385.

Therefore, for packets that match an Interactive Block or Interactive Block with reset rule, the system can generate the following connection events:

- a beginning-of-connection event when a user's request is initially blocked and the warning page is displayed; this event has an associated action of Interactive Block or Interactive Block with reset
- multiple beginning- or end-of-connection events if the user clicks through the warning page and loads the originally requested page; these events have an associated action of Allow and a reason of User Bypass

Note that only devices deployed inline can block traffic. Because blocked connections are not actually blocked in passive deployments, the system may report multiple beginning-of-connection events for each blocked connection.

Caution Logging blocked TCP connections during a Denial of Service (DoS) attack can overwhelm the system with multiple similar events. Before you enable logging for an Block rule, consider whether the rule monitors traffic on an Internet-facing interface or other interface vulnerable to DoS attack.

Understanding Logging for Allowed Connections

License: feature dependent

Decrypt SSL rules, Do not decrypt SSL rules, and Allow access control rules permit matching traffic to pass to the next phase of inspection and traffic handling.

When you allow traffic with an access control rule, you can use an associated intrusion or file policy (or both) to further inspect traffic and block intrusions, prohibited files, and malware before the traffic can reach its final destination.

Connections for traffic matching an Allow access control rule are logged as follows:

- When an intrusion policy invoked by an access control rule detects an intrusion and generates an intrusion event, the system automatically logs the end of the connection where the intrusion occurred to the ASA FirePOWER module, regardless of the logging configuration of the rule.
- When a file policy invoked by an access control rule detects a prohibited file (including malware) and generates a file or malware event, the system automatically logs the end of the connection where the file was detected to the ASA FirePOWER module, regardless of the logging configuration of the access control rule.
- Optionally, you can enable beginning- and end-of-connection logging for any allowed traffic, including traffic that the system deems safe or that you do not inspect with an intrusion or file policy.

For all of the resulting connection events, the **Action** and **Reason** fields reflect why the events were logged. Note that:

- An action of Allow represents explicitly allowed and user-bypassed interactively blocked connections that reached their final destination.
- An action of Block represents a connection that was at first allowed by an access control rule, but where an intrusion, prohibited file, or malware was detected.

Disabling File and Malware Event Logging for Allowed Connections

License: Protection or Malware

When you allow unencrypted or decrypted traffic with an access control rule, you can use an associated file policy to inspect transmitted files, and block prohibited files and malware before it can reach its destination; see Tuning Intrusion Prevention Performance, on page 140.

When the system detects a prohibited file, it automatically logs one of the following types of event to the ASA FirePOWER module:

- *file events* , which represent detected or blocked files, including malware files
- *malware events* , which represent detected or blocked malware files only
- *retrospective malware events* , which are generated when the malware disposition for a previously detected file changes

If you do not want to log file or malware events, you can disable this logging on a per-access-control-rule basis by clearing the **Log Files** check box on the **Logging** tab of the access control rule editor.

Note Cisco recommends you leave file and malware event logging enabled.

Regardless of whether you save file and malware events, when network traffic violates a file policy, the system automatically logs the end of the associated connection to the ASA FirePOWER module, regardless of the logging configuration of the invoking access control rule; see Connections Associated with File and Malware Events (Automatic), on page 383.

License Requirements for Connection Logging

License: feature dependent

Because you configure connection logging in access control and SSL policies, you can log any connection that those policies can successfully handle.

Although you can create access control and SSL policies regardless of the licenses on your ASA FirePOWER module, certain aspects of access control require that you enable specific licensed capabilities before you can apply the policy.

The following table explains the licenses you must have to successfully configure access control, and therefore to log connections handled by an access control policy.

Table 70: License Requirements for Connection Logging in Access Control Policies

To log connections...	License
for traffic handled using, network, port, or literal URL criteria	Any
for traffic handled using geolocation data	Any
associated with: • IP addresses with a poor reputation (Security Intelligence filtering) • intrusions or prohibited files in unencrypted or decrypted traffic	Protection
associated with malware detected in unencrypted or decrypted traffic	Malware
for traffic handled by user control or application control	Control
for traffic that the system filters using URL category and reputation data, and to display URL category and URL reputation information for URLs requested by monitored hosts	URL Filtering

Logging Security Intelligence Decisions

License: Protection

As a first line of defense against malicious Internet content, the ASA FirePOWER module includes the Security Intelligence feature, which allows you to immediately block connections based on the latest reputation intelligence, removing the need for a more resource-intensive, in-depth analysis. This traffic filtering takes place before any other policy-based inspection, analysis, or traffic handling.

Optionally, and recommended in passive deployments, you can use a monitor-only setting for Security Intelligence filtering. This allows the system to further analyze connections that would have been blocked, but still log the match.

Enabling Security Intelligence logging logs all blocked and monitored connections handled by an access control policy. However, the system does not log whitelist matches; logging of these connections depends on their eventual disposition.

When the system logs a connection event as the result of Security Intelligence filtering, it also logs a matching Security Intelligence event, which is a special kind of connection event that you can view and analyze separately. Both types of events use the Action and Reason fields to reflect the match to the blacklist. Additionally, so that you can identify the blocked IP address in the connection, host icons next to blocked and monitored IP addresses look slightly different in the event viewer.

Logging Blocked Connections

For a blocked connection, the system logs beginning-of-connection Security Intelligence and connection events. Because blocked traffic is immediately denied without further inspection, there is no unique end of connection to log. For these events, the action is Block and the reason is IP Block .

IP Block connection events have a threshold of 15 seconds per unique initiator-responder pair. That is, once the system generates an event when it blocks a connection, it does not generate another connection event for additional blocked connections between those two hosts for the next 15 seconds, regardless of port or protocol.

Logging Monitored Connections

For connections monitored—rather than blocked—by Security Intelligence, the system logs end-of-connection Security Intelligence and connection events to the ASA FirePOWER module. This logging occurs regardless of how the connection is later handled by an SSL policy, access control rule, or the access control default action.

For these connection events, the action depends on the connection's eventual disposition. The **Reason** field contains IP Monitor , as well as any other reason why the connection may have been logged.

Note that the system may also generate beginning-of-connection events for monitored connections, depending on the logging settings in the access control rule or default action that later handles the connection.

To log blocked connections:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon next to the access control policy you want to configure.

The access control policy editor appears.

Step 3 Select the Security Intelligence tab.

Security Intelligence settings for the access control policy appear.

Step 4 Click the **logging** icon.

The **Blacklist Options** pop-up window appears.

Step 5 Select the **Log Connections** check box.

Step 6 Specify where to send connection and Security Intelligence events. You have the following choices:

- To send events to the ASA FirePOWER module, select **Event Viewer**.

- To send events to an external syslog server, select **Syslog**, then select a syslog alert response from the drop-down list. Optionally, you can add a syslog alert response by clicking the **add** icon; see Creating a Syslog Alert Response, on page 413.
- To send connection events to an SNMP trap server, select **SNMP Trap**, then select an SNMP alert response from the drop-down list. Optionally, you can add an SNMP alert response by clicking the **add** icon; see Creating an SNMP Alert Response, on page 412.

You **must** send events to the **Event Viewer** if you want to set blocked objects to monitor-only, or perform any other ASA FirePOWER module-based analysis on connection events generated by Security Intelligence filtering. For more information, see Logging Connections to the ASA FirePOWER Module or External Server, on page 384.

Step 7 Click **OK** to set your logging options.

The **Security Intelligence** tab appears again.

Step 8 Click **Store ASA FirePOWER Changes**.

You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Logging Connections Based on Access Control Handling

License: Any

Within an access control policy, access control rules provide a granular method of handling network traffic. So that you can log only critical connections, you enable connection logging on a per-access-control-rule basis—if you enable connection logging for a rule, the system logs all connections handled by that rule.

You can also log connections for the traffic handled by the default action of your access control policy. The default action determines how the system handles traffic that matches none of the access control rules in the policy (except Monitor rules, which match and log—but do not handle or inspect—traffic).

Note that even if you disable logging for all access control rules and the default action, end-of-connection events may still be logged to the ASA FirePOWER module if the connection matches an access control rule and contains an intrusion attempt, prohibited file, or malware, or if it was decrypted by the system and you enabled logging for the connection in the SSL policy.

Depending on the rule or default policy action and the associated inspection options that you configure, your logging options differ.

Logging Connections Matching an Access Control Rule

License: Any

To log only critical connections, you enable connection logging on a per-access-control-rule basis. If you enable logging for a rule, the system logs all connections handled by that rule.

Depending on the rule action and intrusion and file inspection configuration of the rule, your logging options differ; see Understanding How Access Control and SSL Rule Actions Affect Logging, on page 384. Also, note that even if you disable logging for an access control rule, end-of-connection events for connections matching that rule may still be logged to the ASA FirePOWER module if the connection:

- contains an intrusion attempt, prohibited file, or malware
- previously matched at least one access control Monitor rule

To configure an access control rule to log connection, file, and malware information:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon next to the access control policy you want to modify.

The **access control policy editor** appears, focused on the **Rules** tab.

Step 3 Click the **edit** icon next to the rule where you want to configure logging.

The **access control rule editor** appears.

Step 4 Select the **Logging** tab.

The **Logging** tab appears.

Step 5 Specify whether you want to **Log at Beginning and End of Connection**, **Log at End of Connection**, or you want **No Logging at Connection**.

For a single non-blocked connection, the end-of-connection event contains all of the information in the beginning-of-connection event, as well as information gathered over the duration of the session. Because blocked traffic is immediately denied without further inspection, the system logs only beginning-of-connection events for Block rules. For this reason, when you set the rule action to **Block** or **Block with reset** you are prompted **Log at Beginning of Connection**.

Step 6 Use the **Log Files** check box to specify whether the system should log any file and malware events associated with the connection.

The system automatically enables this option when you associate a file policy with the rule to perform either file control or AMP. Cisco recommends you leave this option enabled; see Disabling File and Malware Event Logging for Allowed Connections, on page 386.

Step 7 Specify where to send connection events. You have the following choices:

- To send connection events to the ASA FirePOWER module, select **Event Viewer.** You cannot disable this option for Monitor rules.
- To send events to an external syslog server, select **Syslog**, then select a syslog alert response from the drop-down list. Optionally, you can add a syslog alert response by clicking the **add** icon; see Creating a Syslog Alert Response, on page 413.
- To send events to an SNMP trap server, select **SNMP Trap**, then select an SNMP alert response from the drop-down list. Optionally, you can add an SNMP alert response by clicking the **add** icon; see Creating an SNMP Alert Response, on page 412.

You **must** send events to the event viewer if you want to perform ASA FirePOWER module-based analysis on connection events. For more information, see Logging Connections to the ASA FirePOWER Module or External Server, on page 384.

Step 8 Click **Store ASA FirePOWER Changes** to save the rule.

Your rule is saved. You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Logging Connections Handled by the Access Control Default Action

License: Any

You can log connections for the traffic handled by the default action of your access control policy. The default action determines how the system handles traffic that matches none of the access control rules in the policy (except Monitor rules, which match and log—but do not handle or inspect—traffic); see Setting Default Handling and Inspection for Network Traffic, on page 66.

The mechanisms and options for logging connections handled by the policy default action largely parallel the options for logging connections handled by individual access control rules, as described in the following table. That is, except for blocked traffic, the system logs the beginning and end of connections, and you can send connection events to the ASA FirePOWER module, or to an external syslog or SNMP trap server.

Table 71: Access Control Default Action Logging Options

Default Action	Compare To	See...
Access Control: Block All Traffic	Block rules	Understanding Logging for Blocked and Interactively Blocked Connections, on page 385
Access Control: Trust All Traffic	Trust rules	Understanding Logging for Trusted Connections, on page 385
Intrusion Prevention	Allow rules with associated intrusion policies	Understanding Logging for Allowed Connections, on page 385

However, there are some differences between logging connections handled by access control rules versus the default action:

- The default action has no file logging options. You cannot perform file control or AMP using the default action.
- When an intrusion policy associated with the access control default action generates an intrusion event, the system does **not** automatically log the end of the associated connection. This is useful for intrusion detection and prevention-only deployments, where you do not want to log any connection data.

An exception to this rule occurs if you enable beginning- and end-of-connection logging for the default action. In that case, the system **does** log the end of the connection when an associated intrusion policy triggers, in addition to logging the beginning of the connection.

Note that even if you disable logging for the default action, end-of-connection events for connections matching that rule may still be logged to the ASA FirePOWER module if the connection previously matched at least one access control Monitor rule, or was inspected and logged by an SSL policy.

To log connections in traffic handled by the access control default action:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the **edit** icon next to the access control policy you want to modify.

The **access control policy editor** appears, focused on the Rules tab.

Step 3 Click the **logging** icon next to the **Default Action** drop-down list.

The **Logging pop-up** window appears.

Step 4 Specify whether you want to **Log at Beginning and End of Connection**, **Log at End of Connection**, or you want **No Logging at Connection**.

For a single non-blocked connection, the end-of-connection event contains all of the information in the beginning-of-connection event, as well as information gathered over the duration of the session. Because blocked traffic is immediately denied without further inspection, the system logs only beginning-of-connection events for the Block All Traffic default action. For this reason, when you set the default action to **Access Control: Block All Traffic** you are prompted **Log at Beginning of Connection**.

Step 5 Specify where to send connection events. You have the following choices:

- To send connection events to the ASA FirePOWER module, select **Event Viewer**. You cannot disable this option for Monitor rules.
- To send events to an external syslog server, select **Syslog**, then select a syslog alert response from the drop-down list. Optionally, you can add a syslog alert response by clicking the **add** icon; see Creating a Syslog Alert Response, on page 413.
- To send events to an SNMP trap server, select **SNMP Trap**, then select an SNMP alert response from the drop-down list. Optionally, you can add an SNMP alert response by clicking the **add** icon; see Creating an SNMP Alert Response, on page 412.

You **must** send events to the event viewer if you want to perform ASA FirePOWER module-based analysis on connection events. For more information, see Logging Connections to the ASA FirePOWER Module or External Server, on page 384.

Step 6 Click **Store ASA FirePOWER Changes** to save the policy.

Your policy is saved. You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Logging URLs Detected in Connections

License: Any

When you log an end-of-connection event to the ASA FirePOWER module for HTTP traffic, the system records the URL requested by the monitored host during the session.

By default, the system stores the first 1024 characters of the URL in the connection log. However, you can configure the system to store up to 4096 characters per URL to make sure you capture the full URLs requested by monitored hosts. Or, if you are uninterested in the individual URLs visited, you can disable URL storage

entirely by storing zero characters. Depending on your network traffic, disabling or limiting the number of stored URL characters may improve system performance.

Note that disabling URL logging does not affect URL filtering. Access control rules properly filter traffic based on requested URLs, their categories, and reputations, even though the system does not record the individual URLs requested in the traffic handled by those rules. For more information, see Blocking URLs, on page 117.

To customize the number of URL characters you store:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Access Control Policy**.

The **Access Control Policy** page appears.

Step 2 Click the edit icon next to the access control policy you want to configure.

The **access control policy editor** appears.

Step 3 Select the **Advanced** tab.

Advanced settings for the access control policy appear.

Step 4 Click the **edit** icon next to **General Settings**.

The **General Settings** pop-up window appears.

Step 5 Type the **Maximum URL characters to store in connection events**.

You can specify any number from zero to 4096. Storing zero characters disables URL storage without disabling URL filtering.

Step 6 Click **OK**.

Advanced settings for the access control policy appear.

Step 7 Click **Store ASA FirePOWER Changes** to save the policy.

Your policy is saved. You must apply the access control policy for your changes to take effect; see Deploying Configuration Changes, on page 73.

Logging Encrypted Connections

License: Any

As part of access control, the *SSL inspection* feature allows you to use an SSL policy to decrypt encrypted traffic for further evaluation by access control rules. You can force the system to log these decrypted connections, regardless of how the system later handles or inspects the traffic. You can also log connections when you block encrypted traffic, or when you allow it to pass to access control rules without decryption.

Connection logs for encrypted sessions contain details about the encryption, such as the certificate used to encrypt that session. You configure connection logging for encrypted sessions in the SSL policy on a per-SSL rule basis so that you only log critical connections.

Logging Decryptable Connections with SSL Rules

License: Any

Within an SSL policy, *SSL rules* provide a granular method of handling encrypted traffic across multiple managed devices. So that you can log only critical connections, you enable connection logging on a per-SSL-rule basis—if you enable connection logging for a rule, the system logs all connections handled by that rule.

For encrypted connections inspected by an SSL policy, you can log connection events to an external syslog or SNMP trap server. You can log only end-of-connection events, however:

- for blocked connections (Block, Block with reset), the system immediately ends the session and generates an event
- for monitored connections (Monitor) and connections that you pass to access control rules (Decrypt, Do not decrypt), the system generates an event when the session ends, regardless of the logging configuration of the access control rule or default action that later handles it

For more information, see Understanding How Access Control and SSL Rule Actions Affect Logging, on page 384.

To log decryptable connections:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **SSL**.

The **SSL Policy** page appears.

Step 2 Click the **edit** icon next to the rule where you want to configure logging.

The **SSL rule editor** appears.

Step 3 Select the **Logging** tab.

The **Logging** tab appears

Step 4 Select **Log at End of Connection**.

Step 5 Specify where to send connection events. You have the following choices:

- To send events to an external syslog, select **Syslog**, then select a syslog alert response from the drop-down list. Optionally, you can add a syslog alert response by clicking the **add** icon; see Creating a Syslog Alert Response, on page 413.
- To send events to an SNMP trap server, select **SNMP Trap**, then select an SNMP alert response from the drop-down list. Optionally, you can add an SNMP alert response by clicking the **add** icon; seeCreating an SNMP Alert Response, on page 412.

Step 6 Click **Add** to save your changes.

You must apply the access control policy the SSL policy is associated with for your changes to take effect; see Deploying Configuration Changes, on page 73.

Setting Default Logging for Encrypted and Undecryptable Connections

License: SSL

You can log connections for the traffic handled by the default action of your SSL policy. These logging settings also govern how the system logs undecryptable sessions.

The SSL policy default action determines how the system handles encrypted traffic that matches none of the SSL rules in the policy (except Monitor rules, which match and log—but do not handle or inspect—traffic). If your SSL policy does not contain any SSL rules, the default action determines how all encrypted sessions on your network are logged. For more information, see Setting Default Handling and Inspection for Encrypted Traffic, on page 183.

You can configure the SSL policy default action to log connection events to an external syslog or SNMP trap server. You can log only end-of-connection events, however:

- for blocked connections (Block, Block with reset), the system immediately ends the sessions and generates an event
- for connections that you allow to pass unencrypted to access control rules (Do not decrypt), the system generates an event when the session ends

Note that even if you disable logging for the SSL policy default action, end-of-connection events may still be logged if the connection previously matched at least one SSL Monitor rule, or later matches an access control rule or the access control policy default action.

To set the default handling for encrypted and undecryptable traffic:

Access: Admin/Access Admin/Network Admin/Security Approver

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **SSL**.

The **SSL Policy** page appears.

Step 2 Click the logging icon next to the **Default Action** drop-down list.

The **Logging pop-up** window appears.

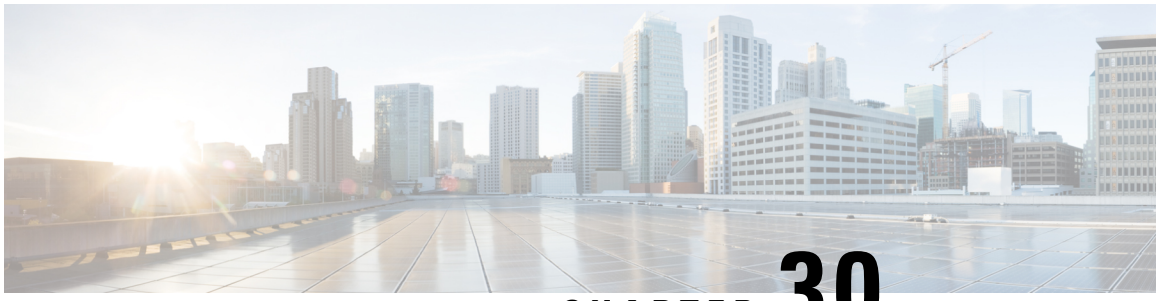
Step 3 Select **Log at End of Connection** to enable logging connection events.

Step 4 Specify where to send connection events. You have the following choices:

- To send events to an external syslog server, select **Syslog**, then select a syslog alert response from the drop-down list. Optionally, you can configure a syslog alert response by clicking the add icon; see Creating a Syslog Alert Response, on page 413.
- To send events to an SNMP trap server, select **SNMP Trap**, then select an SNMP alert response from the drop-down list. Optionally, you can configure an SNMP alert response by clicking the add icon; see Creating an SNMP Alert Response, on page 412.

Step 5 Click **OK** to save your changes.

You must apply the access control policy the SSL policy is associated with for your changes to take effect; see Deploying Configuration Changes, on page 73.



CHAPTER 30

Viewing Events

You can view real-time events logged against the traffic inspected by the ASA FirePOWER module.

Note The module only caches the most recent 100 events in memory.

Accessing ASA FirePOWER Real-Time Events

You can view events detected by the ASA FirePOWER module in several predefined event views or create a custom event view to view the event fields you select.

Note The module only caches the most recent 100 events in memory.

To view ASA FirePOWER events:

Step 1 Select **Monitoring > ASA FirePOWER Monitoring > Real-time Eventing**.

Step 2 You have two choices:

- Click an existing tab for the type of event you want to view: connection events, security intelligence events, intrusion events, file events, or malware events.
- Click the + icon to create a custom event view and select the event fields you want to include in the view.

For more information, see Understanding ASA FirePOWER Event Types, on page 398 and Event Fields in ASA FirePOWER Events, on page 399.

Understanding ASA FirePOWER Event Types

The ASA FirePOWER module provides real-time event viewing of event fields from five event types: connection events, security intelligence events, intrusion events, file events, and malware events.

Connection Events

Connection logs, called *connection events*, contain data about the detected sessions. The information available for any individual connection event depends on several factors, but in general includes:

- basic connection properties: timestamp, source and destination IP address, ingress and egress zones, the device that handled the connection, and so on
- additional connection properties discovered or inferred by the system: applications, requested URLs, or users associated with the connection, and so on
- metadata about why the connection was logged: which access control rule (or other configuration) in which policy handled the traffic, whether the connection was allowed or blocked, and so on

Various settings in access control give you granular control over which connections you log, when you log them, and where you store the data. You can log any connection that your access control policies can successfully handle. You can enable connection logging in the following situations:

- when a connection is blocked or monitored by the reputation-based Security Intelligence feature
- when a connection is handled by an access control rule or the access control default action

In addition to the logging that you configure, the system automatically logs most connections where the system detects a prohibited file, malware, or intrusion attempt.

Security Intelligence Events

When you enable Security Intelligence logging, blacklist matches automatically generate *Security Intelligence events* as well as connection events. A Security Intelligence event is a special kind of connection event that you can view and analyze separately. For detailed information on configuring connection logging, including Security Intelligence blocking decisions, see Logging Connections in Network Traffic, on page 381.

Tip General information about connection events also pertains to Security Intelligence events, unless otherwise noted. For more information on Security Intelligence, see Controlling Traffic With Reputation-Based Rules, on page 111.

Intrusion Events

The system examines the packets that traverse your network for malicious activity that could affect the availability, integrity, and confidentiality of a host and its data. When the system identifies a possible intrusion, it generates an *intrusion event*, which is a record of the date, time, type of exploit, and contextual information about the source of the attack and its target.

File Events

File events represent files that the system detected, and optionally blocked, in network traffic.

The system logs the file events generated when a managed device detects or blocks a file in network traffic, according to the rules in currently applied file policies.

Malware Events

Malware events represent malware files detected, and optionally blocked, in network traffic by the system.

With a Malware license, your ASA FirePOWER module can detect malware in network traffic as part of your overall access control configuration; see Understanding and Creating File Policies, on page 370.

The following scenarios can lead to generating malware events:

- If a managed device detects one of a set of specific file types, the ASA FirePOWER module performs a malware cloud lookup, which returns a file disposition to the ASA FirePOWER module of Malware , Clean , or Unknown .
- If the ASA FirePOWER module cannot establish a connection with the cloud, or the cloud is otherwise unavailable, the file disposition is Unavailable . You may see a small percentage of events with this disposition; this is expected behavior.
- If the managed device detects a file on the clean list, the ASA FirePOWER module assigns a file disposition of Clean to the file.

The ASA FirePOWER module logs records of files' detection and dispositions, along with other contextual data, as malware events.

Files detected in network traffic and identified as malware by the ASA FirePOWER module generate both a file event and a malware event. This is because to detect malware in a file, the system must first detect the file itself.

Event Fields in ASA FirePOWER Events

Action

For connection or security intelligence events, the action associated with the access control rule or default action that logged the connection:

- Allow represents explicitly allowed and user-bypassed interactively blocked connections.
- Trust represents trusted connections. TCP connections detected by a trust rule on the first packet only generate an end-of-connection event. The system generates the event one hour after the final session packet.
- Block and Block with reset represent blocked connections. The system also associates the Block action with connections blocked by Security Intelligence, connections where an exploit was detected by an intrusion policy, and connections where a file was blocked by a file policy.
- Interactive Block and Interactive Block with reset mark the beginning-of-connection event that you can log when the system initially blocks a user's HTTP request using an Interactive Block rule. If the user clicks through the warning page that the system displays, any additional connection events you log for the session have an action of Allow .
- Default Action indicates the connection was handled by the default action.

- For Security Intelligence-monitored connections, the action is that of the first non-Monitor access control rule triggered by the connection, or the default action. Similarly, because traffic matching a Monitor rule is always handled by a subsequent rule or by the default action, the action associated with a connection logged due to a monitor rule is never Monitor .

For file or malware events, the file rule action associated with the rule action for the rule the file matched, and any associated file rule action options.

Allowed Connection

Whether the system allowed the traffic flow for the event.

Application

The application detected in the connection.

Application Business Relevance

The business relevance associated with the application traffic detected in the connection: Very High , High , Medium , Low , or Very Low . Each type of application detected in the connection has an associated business relevance; this field displays the lowest (least relevant) of those.

Application Categories

Categories that characterize the application to help you understand the application's function.

Application Risk

The risk associated with the application traffic detected in the connection: Very High , High , Medium , Low , or Very Low . Each type of application detected in the connection has an associated risk; this field displays the highest of those.

Application Tag

Tags that characterize the application to help you understand the application's function.

Block Type

The type of block specified in the access control rule matching the traffic flow in the event: block or interactive block.

Client

The client application detected in the connection.

If the system cannot identify the specific client used in the connection, this field displays client appended to the application protocol name to provide a generic name, for example, FTP client .

Client Business Relevance

The business relevance associated with the client traffic detected in the connection: Very High , High , Medium , Low , or Very Low . Each type of client detected in the connection has an associated business relevance; this field displays the lowest (least relevant) of those.

Client Categories

Categories that characterize the client detected in the traffic to help you understand the client's function.

Client Risk

The risk associated with the client traffic detected in the connection: Very High , High , Medium , Low , or Very Low . Each type of client detected in the connection has an associated risk; this field displays the highest of those.

Client Tag

Tags that characterize the client detected in the traffic to help you understand the client's function.

Client Version

The version of the client detected in the connection.

Connection

The unique ID for the traffic flow, internally generated.

Connection Blocktype Indicator

The type of block specified in the access control rule matching the traffic flow in the event: block or interactive block.

Connection Bytes

The total bytes for the connection.

Connection Time

The time for the beginning of the connection.

Connection Timestamp

The time the connection was detected.

Context

The metadata identifying the security context through which the traffic passed. Note that the system only populates this field for devices in multiple context mode.

Denied Connection

Whether the system denied the traffic flow for the event.

Destination Country and Continent

The country and continent of the receiving host.

Destination IP

The IP address used by the receiving host.

Destination Port, Destination Port Icode, Destination Port/ICMP Code

The destination port or ICMP code used by the session responder.

Direction

The direction of transmission for a file.

Disposition

One of the following file dispositions:

- Malware indicates that the cloud categorized the file as malware.
- Clean indicates that the cloud categorized the file as clean, or that a user added the file to the clean list.
- Unknown indicates that a malware cloud lookup occurred before the cloud assigned a disposition. The file is uncategorized.
- Custom Detection indicates that a user added the file to the custom detection list.
- Unavailable indicates that the ASA FirePOWER module could not perform a malware cloud lookup. You may see a small percentage of events with this disposition; this is expected behavior.
- N/A indicates a Detect Files or Block Files rule handled the file and the ASA FirePOWER module did not perform a malware cloud lookup.

Egress Interface

The egress interface associated with the connection. Note that, if your deployment includes an asynchronous routing configuration, the ingress and egress interface may belong to the same interface set.

Egress Security Zone

The egress security zone associated with the connection.

Event

The event type.

Event Microseconds

The time, in microseconds, when the event was detected.

Event Seconds

The time, in seconds, when the event was detected.

Event Type

The type of event.

File Category

The general categories of file type, for example: Office Documents , Archive , Multimedia , Executables , PDF files , Encoded , Graphics , or System Files .

File Event Timestamp

The time and date the file or malware file was created.

File Name

The name of the file or malware file.

File SHA256

The SHA-256 hash value of the file.

File Size

The size of the file or malware file, in kilobytes.

File Type

The file type of the file or malware file, for example, HTML or MSEXE .

File/Malware Policy

The file policy associated with the generation of the event.

Filelog Blocktype Indicator

The type of block specified in the file rule matching the traffic flow in the event: block or interactive block.

Firewall Policy Rules/SI Category

The name of the object that represents or contains the blocked IP address in the connection. The Security Intelligence category can be the name of a network object or group, the global blacklist, a custom Security Intelligence list or feed, or one of the categories in the Intelligence Feed. Note that this field is only populated if the **Reason** is IP Block or IP Monitor ; entries in Security Intelligence event views always display a reason.

Firewall Rule

The access control rule or default action that handled the connection, as well as up to eight Monitor rules matched by that connection.

First Packet

The date and time the first packet of the session was seen.

HTTP Referrer

The HTTP referrer, which represents the referrer of a requested URL for HTTP traffic detected in the connection (such as a website that provided a link to, or imported a link from, another URL).

IDS Classification

The classification where the rule that generated the event belongs. See the Table 72: Rule Classifications , on page 409 table for a list of rule classification names and numbers.

Impact

The impact level in this field indicates the correlation between intrusion data, network discovery data, and vulnerability information.

Impact Flag

See Impact.

Ingress Interface

The ingress interface associated with the connection. Note that, if your deployment includes an asynchronous routing configuration, the ingress and egress interface may belong to the same interface set.

Ingress Security Zone

The ingress security zone associated with the connection.

Initiator Bytes

The total number of bytes transmitted by the session initiator.

Initiator Country and Continent

When a routable IP is detected, the country and continent associated with the host IP address that initiated the session.

Initiator IP

The host IP address (and host name, if DNS resolution is enabled) that initiated the session responder.

Initiator Packets

The total number of packets transmitted by the session initiator.

Inline Result

One of the following:

- a black down arrow, indicating that the system dropped the packet that triggered the rule
- a gray down arrow, indicating that IPS would have dropped the packet if you enabled the **Drop when Inline** intrusion policy option (in an inline deployment), or if a Drop and Generate rule generated the event while the system was pruning
- blank, indicating that the triggered rule was not set to Drop and Generate Events
- Note that the system does not drop packets in a passive deployment, including when an inline interface is in tap mode, regardless of the rule state or the inline drop behavior of the intrusion policy.

IPS Blocktype Indicator

The action of the intrusion rule matching the traffic flow in the event.

Last Packet

The date and time the last packet of the session was seen.

MPLS Label

The Multiprotocol Label Switching label associated with the packet that triggered this intrusion event.

Malware Blocktype Indicator

The type of block specified in the file rule matching the traffic flow in the event: block or interactive block.

Message

The explanatory text for the event.

For rule-based intrusion events, the event message is pulled from the rule. For decoder- and preprocessor-based events, the event message is hard coded.

For malware events, any additional information associated with the malware event. For network-based malware events, this field is populated only for files whose disposition has changed.

Monitor Rules

Up to eight Monitor rules matched by that connection.

Netbios Domain

The NetBIOS domain used in the session.

Num Ioc

Whether the traffic that triggered the intrusion event also triggered an indication of compromise (IOC) for a host involved in the connection.

Original Client Country and Continent

The country where the original client IP address belongs. To obtain this value, the system extracts the original client IP address from an X-Forwarded-For (XFF), True-Client-IP, or custom-defined HTTP header, then maps it to the country using the geolocation database (GeoDB). To populate this field, you must enable an access control rule that handles proxied traffic based on its original client.

Original Client IP

The original client IP address from an X-Forwarded-For (XFF), True-Client-IP, or custom-defined HTTP header. To populate this field, you must enable an access control rule that handles proxied traffic based on its original client.

Policy

The access control, intrusion, or network analysis policy (NAP), if any, associated with the generation of the event.

Policy Revision

The revision of the access control, file, intrusion, or network analysis policy (NAP), if any, associated with the generation of the event.

Priority

The event priority as determined by the Cisco VRT.

Protocol

The protocol detected in the connection.

Reason

The reason or reasons the connection was logged, in the following situations:

- User Bypass indicates that the system initially blocked a user's HTTP request, but the user chose to continue to the originally requested site by clicking through a warning page. A reason of User Bypass is always paired with an action of Allow .
- IP Block indicates that the system denied the connection without inspection, based on Security Intelligence data. A reason of IP Block is always paired with an action of Block .
- IP Monitor indicates that the system would have denied the connection based on Security Intelligence data, but you configured the system to monitor, rather than deny, the connection.
- File Monitor indicates that the system detected a particular type of file in the connection.
- File Block indicates the connection contained a file or malware file that the system prevented from being transmitted. A reason of File Block is always paired with an action of Block .
- File Custom Detection indicates the connection contained a file on the custom detection list that the system prevented from being transmitted.
- File Resume Allow indicates that file transmission was originally blocked by a Block Files or Block Malware file rule. After a new access control policy was applied that allowed the file, the HTTP session automatically resumed. Note that this reason only appears in inline deployments.
- File Resume Block indicates that file transmission was originally allowed by a Detect Files or Malware Cloud Lookup file rule. After a new access control policy was applied that blocked the file, the HTTP session automatically stopped. Note that this reason only appears in inline deployments.
- Intrusion Block indicates the system blocked or would have blocked an exploit (intrusion policy violation) detected in the connection. A reason of Intrusion Block is paired with an action of Block for blocked exploits and Allow for would-have-blocked exploits.
- Intrusion Monitor indicates the system detected, but did not block, an exploit detected in the connection. This occurs when the state of the triggered intrusion rule is set to **Generate Events**.
- Content Restriction indicates the system modified the packet to enforce content restrictions related to either the Safe Search or YouTube EDU feature.

Receive Times

The time the destination host or responder responded to the event.

Referenced Host

If the protocol in the connection is DNS, HTTP, or HTTPS, this field displays the host name that the respective protocol was using.

Responder Bytes

The total number of bytes transmitted by the session responder.

Responder Country and Continent

When a routable IP is detected, the country and continent associated with the host IP address for the session responder.

Responder Packets

The total number of packets transmitted by the session responder.

Responder IP

The host IP address (and host name, if DNS resolution is enabled) that responded to the session initiator.

Security Group Tag Name

The Security Group Tag (SGT) attribute of the packet involved in the connection. The SGT specifies the privileges of a traffic source within a trusted network. Security Group Access (a feature of both Cisco TrustSec and Cisco ISE) applies the attribute as packets enter the network.

Signature

The signature ID of the intrusion rule matching the traffic for the event.

Source Country and Continent

The country and continent of the sending host.

Source IP

The IP address used by the sending host in an intrusion event.

Source or Destination

The host originating or receiving the connection for the event.

Source Port, Source Port Type, Source Port/ICMP Type

The source port or ICMP type used by the session initiator.

TCP Flags

The TCP flags detected in the connection.

URL

The URL requested by the monitored host during the session.

URL Category

The category associated with the URL requested by the monitored host during the session, if available.

URL Reputation

The reputation associated with the URL requested by the monitored host during the session, if available.

URL Reputation Score

The reputation score associated with the URL requested by the monitored host during the session, if available.

User

The user of the host (**Receiving IP**) where the event occurred.

User Agent

User agent application information extracted from HTTP traffic detected in the connection.

VLAN

The innermost VLAN ID associated with the packet that triggered the event.

Web App Business Relevance

The business relevance associated with the web application traffic detected in the connection: Very High , High , Medium , Low , or Very Low . Each type of web application detected in the connection has an associated business relevance; this field displays the lowest (least relevant) of those.

Web App Categories

Categories that characterize the web application detected in the traffic to help you understand the web application's function.

Web App Risk

The risk associated with the web application traffic detected in the connection: Very High , High , Medium , Low , or Very Low . Each type of web application detected in the connection has an associated risk; this field displays the highest of those.

Web App Tag

Tags that characterize the web application detected in the traffic to help you understand the web application's function.

Web Application

The web application detected in the traffic.

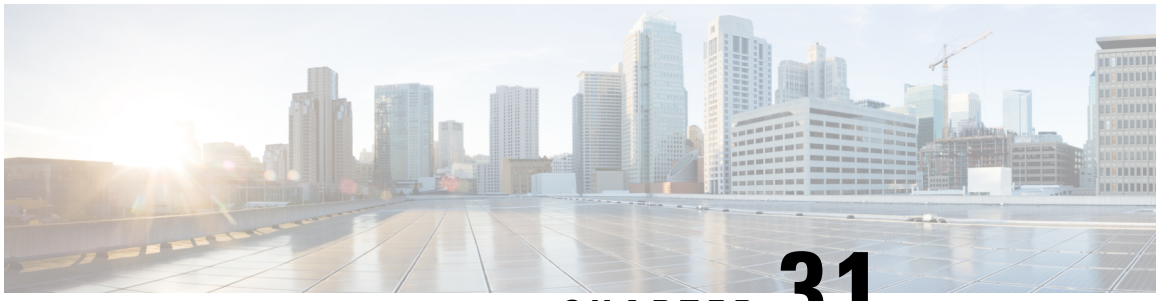
Intrusion Rule Classifications

Intrusion rules include an attack classification. The following table lists the name and number for each classification

Table 72: Rule Classifications

Number	Classification Name	Description
1	not-suspicious	Not Suspicious Traffic
2	unknown	Unknown Traffic
3	bad-unknown	Potentially Bad Traffic
4	attempted-recon	Attempted Information Leak
5	successful-recon-limited	Information Leak
6	successful-recon-largescale	Large Scale Information Leak
7	attempted-dos	Attempted Denial of Service
8	successful-dos	Denial of Service
9	attempted-user	Attempted User Privilege Gain
10	unsuccessful-user	Unsuccessful User Privilege Gain
11	successful-user	Successful User Privilege Gain
12	attempted-admin	Attempted Administrator Privilege Gain
13	successful-admin	Successful Administrator Privilege Gain
14	rpc-portmap-decode	Decode of an RPC Query
15	shellcode-detect	Executable Code was Detected
16	string-detect	A Suspicious String was Detected
17	suspicious-filename-detect	A Suspicious Filename was Detected
18	suspicious-login	An Attempted Login Using a Suspicious Username was Detected
19	system-call-detect	A System Call was Detected
20	tcp-connection	A TCP Connection was Detected
21	trojan-activity	A Network Trojan was Detected
22	unusual-client-port-connection	A Client was Using an Unusual Port
23	network-scan	Detection of a Network Scan

Number	Classification Name	Description
24	denial-of-service	Detection of a Denial of Service Attack
25	non-standard-protocol	Detection of a Non-Standard Protocol or Event
26	protocol-command-decode	Generic Protocol Command Decode
27	web-application-activity	Access to a Potentially Vulnerable Web Application
28	web-application-attack	Web Application Attack
29	misc-activity	Misc Activity
30	misc-attack	Misc Attack
31	icmp-event	Generic ICMP Event
32	inappropriate-content	Inappropriate Content was Detected
33	policy-violation	Potential Corporate Privacy Violation
34	default-login-attempt	Attempt to Login By a Default Username and Password
35	sdf	Sensitive Data
36	malware-cnc	Known malware command and control traffic
37	client-side-exploit	Known client side exploit attempt
38	file-format	Known malicious file or file based exploit



CHAPTER 31

Configuring External Alerting

While the ASA FirePOWER module provides various views of events within the module interface, you may want to configure external event notification to facilitate constant monitoring of critical systems. You can configure the module to generate alerts that notify you using an SNMP trap or by writing to syslog when one of the following is generated:

- A network-based malware event or retrospective malware event
- A connection event, triggered by a specific access control rule

To have the ASA FirePOWER module send these alerts, you must first create an *alert response* , which is a set of configurations that allows the module to interact with the external system where you plan to send the alert. Those configurations may specify, for example, SNMP alerting parameters or syslog facilities and priorities.

After you create the alert response, you associate it with the event that you want to use to trigger the alert. Note that the process for associating alert responses with events is different depending on the type of event:

- You associate alert responses with malware events using their own configuration pages.
- You associate SNMP and syslog alert responses with logged connections using access control rules and policies.

There is another type of alerting you can perform in the ASA FirePOWER module, which is to configure SNMP and syslog intrusion event notifications for individual intrusion events. You configure these notifications in intrusion policies; see Configuring External Alerting for Intrusion Rules, on page 419 and Adding SNMP Alerts, on page 318. The following table explains the licenses you must have to generate alerts.

Table 73: License Requirements for Generating Alerts

To generate an alert based on...	You need this license...
an intrusion event	Protection
a network-based malware event	Malware
a connection event	the license required to log the connection

- Working with Alert Responses, on page 412

Working with Alert Responses

License: Any

The first step in configuring external alerting is to create an alert response, which is a set of configurations that allows the ASA FirePOWER module to interact with the external system where you plan to send the alert. You can create alert responses to send alerts using an SNMP trap by writing to syslog.

The information you receive in an alert depends on the type of event that triggered the alert.

When you create an alert response, it is automatically enabled. Only enabled alert responses can generate alerts. To stop alerts from being generated, you can temporarily disable alert responses rather than deleting your configurations.

You manage alert responses on the Alerts page (**ASA FirePOWER Configuration** > **Policies** > **Actions Alerts**). The slider next to each alert response indicates whether it is active; only enabled alert responses can generate alerts. The page also indicates whether the alert response is being used in a configuration, for example, to log connections in an access control rule. You can sort alert responses by name, type, in use status, and enabled/disabled status by clicking the appropriate column header; click the column header again to reverse the sort.

Creating an SNMP Alert Response

License: Any

You can create SNMP alert responses using SNMPv1, SNMPv2, or SNMPv3.

Note If you want to monitor 64-bit values with SNMP, you must use SNMPv2 or SNMPv3. SNMPv1 does not support 64-bit monitoring.

To create an SNMP alert response:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Actions Alerts**.

The **Alerts** page appears.

Step 2 From the **Create Alert** drop-down menu, select **Create SNMP Alert**.

The **Create SNMP Alert Configuration** pop-up window appears.

Step 3 In the **Name** field, type the name that you want to use to identify the SNMP response.

Step 4 In the **Trap Server** field, type the hostname or IP address of the SNMP trap server, using alphanumeric characters.

Note that the system does **not** warn you if you enter an invalid IPv4 address (such as 192.169.1.456) in this field. Instead, the invalid address is treated as a hostname.

Step 5 From the **Version** drop-down list, select the SNMP version you want to use.

SNMP v3 is the default. If you select SNMP v1 or SNMP v2, different options appear.

Step 6 Which version of SNMP did you select?

- For SNMP v1 or SNMP v2, type the SNMP community name, using alphanumeric characters or the special characters * or $, in the **Community String** field and skip to step 12.
- For SNMP v3, type the name of the user that you want to authenticate with the SNMP server in the **User Name** field and continue with the next step.

Step 7 From the **Authentication Protocol** drop-down list, select the protocol you want to use for authentication.

Step 8 In the **Authentication Password** field, type the password required for authentication with the SNMP server.

Step 9 From the **Privacy Protocol** list, select **None** to use no privacy protocol or **DES** to use Data Encryption Standard as the privacy protocol.

Step 10 In the **Privacy Password** field, type the privacy password required by the SNMP server.

Step 11 In the **Engine ID** field, type an identifier for the SNMP engine, in hexadecimal notation, using an even number of digits.

When you use SNMPv3, the system uses an Engine ID value to encode the message. Your SNMP server requires this value to decode the message.

Cisco recommends that you use the hexadecimal version of the ASA FirePOWER module's IP address. For example, if the ASA FirePOWER module has an IP address of 10.1.1.77 , use 0a01014D0 .

Step 12 Click **Store ASA FirePOWER Changes**.

The alert response is saved and is automatically enabled.

Creating a Syslog Alert Response

License: Any

When configuring a syslog alert response, you can specify the severity and facility associated with the syslog messages to ensure that they are processed properly by the syslog server. The facility indicates the subsystem that creates the message and the severity defines the severity of the message. Facilities and severities are not displayed in the actual message that appears in the syslog, but are instead used to tell the system that receives the syslog message how to categorize it.

Tip For more detailed information about how syslog works and how to configure it, refer to the documentation for your system. On UNIX systems, the man pages for syslog and syslog.conf provide conceptual information and configuration instructions.

Although you can select any type of facility when creating a syslog alert response, you should select one that makes sense based on your syslog server; not all syslog servers support all facilities. For UNIX syslog servers, the syslog.conf file should indicate which facilities are saved to which log files on the server.

The following table lists the syslog facilities you can select.

Table 74: Available Syslog Facilities

Facility	Description
ALERT	An alert message.

Facility	Description
AUDIT	A message generated by the audit subsystem.
AUTH	A message associated with security and authorization.
AUTHPRIV	A restricted access message associated with security and authorization. On many systems, these messages are forwarded to a secure file.
CLOCK	A message generated by the clock daemon. Note that syslog servers running a Windows operating system will use the CLOCK facility.
CRON	A message generated by the clock daemon. Note that syslog servers running a Linux operating system will use the CRON facility.
DAEMON	A message generated by a system daemon.
FTP	A message generated by the FTP daemon.
KERN	A message generated by the kernel. On many systems, these messages are printed to the console when they appear.
LOCAL0-LOCAL7	A message generated by an internal process.
LPR	A message generated by the printing subsystem.
MAIL	A message generated by a mail system.
NEWS	A message generated by the network news subsystem.
NTP	A message generated by the NTP daemon.
SYSLOG	A message generated by the syslog daemon.
USER	A message generated by a user-level process.
UUCP	A message generated by the UUCP subsystem.

The following table lists the standard syslog severity levels you can select.

Table 75: Syslog Severity Levels

Level	Description
ALERT	A condition that should be corrected immediately.
CRIT	A critical condition.
DEBUG	Messages that contain debugging information.
EMERG	A panic condition broadcast to all users.
ERR	An error condition.
INFO	Informational messages.

Level	Description
NOTICE	Conditions that are not error conditions, but require attention.
WARNING	Warning messages.

Before you start sending syslog alerts, make sure that the syslog server can accept remote messages.

To create a syslog alert:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Actions Alerts**.

The **Alerts** page appears.From the **Create Alert** drop-down menu, select **Create Syslog Alert**.

The **Create Syslog Alert Configuration** pop-up window appears.

Step 2 In the **Name** field, type the name you want to use to identify the saved response.

Step 3 In the **Host** field, type the hostname or IP address of your syslog server.

Note that the system does **not** warn you if you enter an invalid IPv4 address (such as 192.168.1.456) in this field. Instead, the invalid address is treated as a hostname.

Step 4 In the **Port** field, type the port the server uses for syslog messages.

By default, this value is 514.

Step 5 From the **Facility** list, select a facility.

See the Available Syslog Facilities table for a list of the available facilities.

Step 6 From the **Severity** list, select a severity.

See the Syslog Severity Levels table for a list of the available severities.

Step 7 In the **Tag** field, type the tag name that you want to appear with the syslog message.

Use only alphanumeric characters in tag names. You **cannot** use spaces or underscores.

As an example, if you wanted all messages sent to the syslog to be preceded with From MC, type From MC in the field.

Step 8 Click **Store ASA FirePOWER Changes**.

The alert response is saved and is automatically enabled.

Modifying an Alert Response

License: Any

For most types of alerting, if an alert response is enabled and in use, changes to the alert response take effect immediately. However, for alert responses used in access control rules to log connection events, changes do not take effect until you reapply the access control policy.

To edit an alert response:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Actions Alerts**.

The **Alerts** page appears.

Step 2 Next to the alert response you want to edit, click the **edit** icon.

A **configuration** pop-up window for that alert response appears.

Step 3 Make changes as needed.

Step 4 Click **Store ASA FirePOWER Changes**.

The alert response is saved.

Deleting an Alert Response

License: Any

You can delete any alert response that is not in use.

To delete an alert response:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Actions Alerts**.

The **Alerts** page appears.

Step 2 Next to the alert response you want to delete, click the **delete** icon.

Step 3 Confirm that you want to delete the alert response.

The alert response is deleted.

Enabling and Disabling Alert Responses

License: Any

Only enabled alert responses can generate alerts. To stop alerts from being generated, you can temporarily disable alert responses rather than deleting your configurations. Note that if an alert is in use when you disable it, it is still considered in use even though it is disabled.

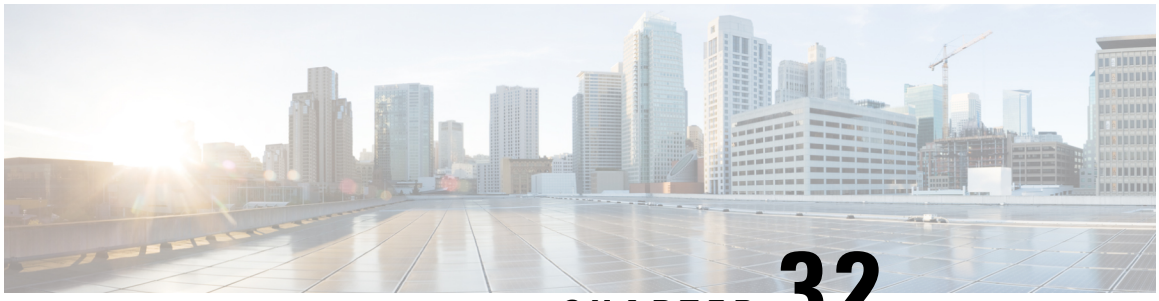
To enable or disable an alert response:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Actions Alerts**.

The **Alerts** page appears.

Step 2 Next to the alert response you want to enable or disable, click the **enable/disable** slider.

If the alert response was enabled, it is disabled. If it was disabled, it is enabled.



CHAPTER 32

Configuring External Alerting for Intrusion Rules

While the ASA FirePOWER module provides various views of intrusion events within the user interface, some enterprises prefer to define external intrusion event notification to facilitate constant monitoring of critical systems. You can enable logging to syslog facilities or send event data to an SNMP trap server.

Within each intrusion policy, you can specify intrusion event notification limits, set up intrusion event notification to external logging facilities, and configure external responses to intrusion events.

Tip Some analysts prefer not to receive multiple alerts for the same intrusion event, but want to control how often they are notified of a given intrusion event occurrence. See Filtering Intrusion Event Notification Per Policy, on page 308 for more information.

There is another type of alerting you can perform in the ASA FirePOWER module, outside of your intrusion policies. You can configure SNMP and syslog alert responses for other types of events, including connection events logged by specific access control rules. For more information, see Configuring External Alerting, on page 411.

See the following sections for more information on external intrusion event notification:

- The Using SNMP Responses section describes the options you can configure to send event data to specified SNMP trap servers and provides the procedure for specifying the SNMP alerting options.
- The Using Syslog Responses section describes the options you can configure to send event data to an external syslog and provides the procedure for specifying the syslog alerting options.

Using SNMP Responses

License: Protection

An *SNMP trap* is a network management notification. You can configure the device to send intrusion event notifications as SNMP traps, also known as *SNMP alerts* . Each SNMP alert includes:

- the name of the server generating the trap
- the IP address of the device that detected it

- the name of the device that detected it
- the event data

You can set a variety of SNMP alerting parameters. Available parameters vary depending on the version of SNMP you use. For details on enabling and disabling SNMP alerting, see Configuring Advanced Settings in an Intrusion Policy, on page 282.

Tip If your network management system requires a management information base file (MIB), you can obtain it from the ASA FirePOWER module at /etc/sf/DCEALERT.MIB .

SNMP v2 Options

For SNMP v2, you can specify the options described in the following table.

Table 76: SNMP v2 Options

Option	Description
Trap Type	The trap type to use for IP addresses that appear in the alerts. If your network management system correctly renders the INET_IPV4 address type, then you can select **as Binary**. Otherwise, select **as String**. For example, HP Openview requires the string type.
Trap Server	The server that will receive SNMP traps notification. You can specify a single IP address or hostname.
Community String	The community name.
Sensor ID	The user-defined integer representing the managed device sending intrusion events as SNMP traps.

SNMP v3 Options

For SNMP v3, you can specify the options described in the following table.

Note When using SNMP v3, the appliance uses an Engine ID value to encode the message. Your SNMP server requires this value to decode the message. Currently, this Engine ID value will always be the hexadecimal version of the appliance's IP address with 01 at the end of the string. For example, if the appliance sending the SNMP alert has an IP address of 172.16.1.50 , the Engine ID is 0xAC10013201 or, if the appliance has an IP address of 10.1.1.77 , 0x0a01014D01 is used as the Engine ID.

Option	Description
Trap Type	The trap type to use for IP addresses that appear in the alerts. If your network management system correctly renders the INET_IPV4 address type, then you can select **as Binary**. Otherwise, select **as String**. For example, HP Openview requires the string type.
Trap Server	The server that will receive SNMP traps notification. You can specify a single IP address or hostname.
Authentication Password	The password required for authentication. SNMP v3 uses either the Message Digest 5 (MD5) hash function or the Secure Hash Algorithm (SHA) hash function to encrypt this password, depending on configuration. If you specify an authentication password, authentication is enabled.
Private Password	The SNMP key for privacy. SNMP v3 uses the Data Encryption Standard (DES) block cipher to encrypt this password. If you specify a private password, privacy is enabled. If you specify a private password, you must also specify an authentication password.
User Name	Your SNMP user name.

For information about configuring SNMP Alerting, see Using SNMP Responses, on page 419.

Configuring SNMP Responses

License: Protection

You can configure SNMP alerting in an intrusion policy. After you apply the policy as part of an access control policy, the system notifies you of any intrusion events it detects via SNMP trap. For more details on SNMP alerting, see Configuring SNMP Responses, on page 421.

To configure SNMP alerting options:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies**> **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Advanced Settings** in the navigation panel on the left.

The **Advanced Settings** page appears.

Step 4 You have two choices, depending on whether **SNMP Alerting** under **External Responses** is enabled:

- If the configuration is enabled, click **Edit**.

- If the configuration is disabled, click **Enabled**, then click **Edit**.

The **SNMP Alerting** page appears.

A message at the bottom of the page identifies the intrusion policy layer that contains the configuration. See Using Layers in a Network Analysis or Intrusion Policy Layers, on page 257 for more information.

Step 5 Specify the trap type format that you want to use for IP addresses that appear in the alerts, **as Binary** or **as String**.

Note If your network management system correctly renders the INET_IPV4 address type, then you can use the **as Binary** option. Otherwise, use the **as String** option. For example, HP OpenView requires the **as String** option.

Step 6 Select either **SNMP v2** or **SNMP v3**:

- To configure SNMP v2, enter the IP address and the community name of the trap server you want to use in the corresponding fields. See SNMP v2 Options, on page 420 .
- To configure SNMP v3, enter the IP address of the trap server you want to use, an authentication password, a private password, and a user name in the corresponding fields. See SNMP v3 Options, on page 420 for more information.

Note You must select **SNMP v2** or **SNMP v3**.

Note When you enter an SNMP v3 password, the password displays in plain text during initial configuration but is saved in encrypted format.

Step 7 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. See Resolving Conflicts and Committing Policy Changes, on page 255 for more information.

Using Syslog Responses

License: Protection

The system log, or *syslog,* is the standard logging mechanism for network event logging. You can send *syslog alerts* , which are intrusion event notifications, to the syslog on an appliance. The syslog allows you to categorize information in the syslog by priority and facility. The *priority* reflects the severity of the alert and the *facility* indicates the subsystem that generated the alert. Facilities and priorities are not displayed in the actual message that appears in syslog, but are instead used to tell the system that receives the syslog message how to categorize it.

Syslog alerts contain the following information:

- date and time of alert generation
- event message
- event data
- generator ID of the triggering event
- Snort ID of the triggering event
- revision

In an intrusion policy, you can turn on syslog alerting and specify the syslog priority and facility associated with intrusion event notifications in the syslog. When you apply the intrusion policy as part of an access control policy, the system then sends syslog alerts for the intrusion events it detects to the syslog facility on the local host or on the logging host specified in the policy. The host receiving the alerts uses the facility and priority information you set when configuring syslog alerting to categorize the alerts.

The following table lists the facilities you can select when configuring syslog alerting. Be sure to configure a facility that makes sense based on the configuration of the remote syslog server you use. The syslog.conf file located on the remote system (if you are logging syslog messages to a UNIX- or Linux-based system) indicates which facilities are saved to which log files on the server.

Table 77: Available Syslog Facilities

Facility	Description
AUTH	A message associated with security and authorization.
AUTHPRIV	A restricted access message associated with security and authorization. On many systems, these messages are forwarded to a secure file.
CRON	A message generated by the clock daemon.
DAEMON	A message generated by a system daemon.
FTP	A message generated by the FTP daemon.
KERN	A message generated by the kernel. On many systems, these messages are printed to the console when they appear.
LOCAL0-LOCAL7	A message generated by an internal process.
LPR	A message generated by the printing subsystem.
MAIL	A message generated by a mail system.
NEWS	A message generated by the network news subsystem.
SYSLOG	A message generated by the syslog daemon.
USER	A message generated by a user-level process.
UUCP	A message generated by the UUCP subsystem.

Select one of the following standard syslog priority levels to display on all notifications generated by this alert:

Table 78: Syslog Priority Levels

Level	Description
EMERG	A panic condition broadcast to all users
ALERT	A condition that should be corrected immediately
CRIT	A critical condition
ERR	An error condition

Level	Description
WARNING	Warning messages
NOTICE	Conditions that are not error conditions, but require attention
INFO	Informational messages
DEBUG	Messages that contain debug information

For more detailed information about how syslog works and how to configure it, refer to the documentation that accompanies your system. If you are logging to a UNIX- or Linux-based system's syslog, the syslog.conf man file (type man syslog.conf at the command line) and syslog man file (type man syslog at the command line) provide information about how syslog works and how to configure it.

Configuring Syslog Responses

License: Protection

You can configure syslog alerting in an intrusion policy. After you apply the policy as part of an access control policy, the system notifies you of any intrusion events it detects via the syslog. For more information on syslog alerting, see Using Syslog Responses, on page 422.

To configure syslog alerting options:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Policies**> **Intrusion Policy**.

The **Intrusion Policy** page appears.

Step 2 Click the **edit** icon () next to the policy you want to edit.

If you have unsaved changes in another policy, click **OK** to discard those changes and continue. See Resolving Conflicts and Committing Policy Changes, on page 255 for information on saving unsaved changes in another policy.

The **Policy Information** page appears.

Step 3 Click **Advanced Settings** in the navigation panel on the left.

The **Advanced Settings** page appears.

Step 4 You have two choices, depending on whether **Syslog Alerting** under **External Responses** is enabled:

- If the configuration is enabled, click **Edit**.
- If the configuration is disabled, click **Enabled**, then click **Edit**.

The **Syslog Alerting** page appears.

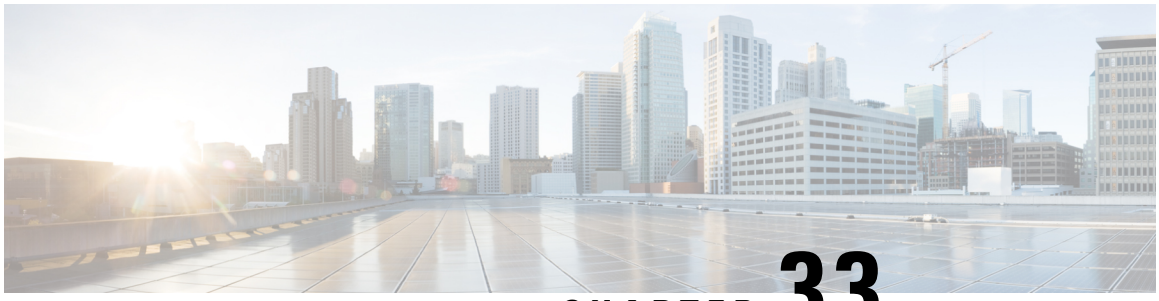
A message at the bottom of the page identifies the intrusion policy layer that contains the configuration. See Using Layers in a Network Analysis or Intrusion Policy Layers, on page 257 for more information.

Step 5 Optionally, in the **Logging Hosts** field, enter the remote access IP address you want to specify as logging host. Separate multiple hosts with commas.

Step 6 Select facility and priority levels from the drop-down lists.

See Using Syslog Responses, on page 422 for details on facility and priority options.

Step 7 Save your policy, continue editing, discard your changes, revert to the default configuration settings in the base policy, or exit while leaving your changes in the system cache. See Resolving Conflicts and Committing Policy Changes, on page 255 for more information.



CHAPTER 33

Using the ASA FirePOWER Dashboard

The ASA FirePOWER module dashboard provides you with at-a-glance views of current system status. The dashboard displays widgets in a three-column layout. Widgets are small, self-contained components that provide insight into different aspects of the ASA FirePOWER module. Your system is delivered with several predefined widgets. For example, the Appliance Information widget tells you the appliance name, model, and currently running version of the ASA FirePOWER module software.

The dashboard has a time range that constrains its widgets. You can change the time range to reflect a period as short as the last hour or as long as the last year.

Each appliance is delivered with a default dashboard. This dashboard provides the user with general system status information for your ASA FirePOWER module deployment.

Understanding Dashboard Widgets

License: Any

The dashboard displays multiple widgets in a three-column layout. The ASA FirePOWER module is delivered with several predefined dashboard widgets, each of which provides insight into a different aspect of the system. You can minimize and maximize widgets, as well as rearrange the widgets.

Understanding Widget Preferences

License: Any

Each widget has a set of preferences that determines its behavior.

Widget preferences can be simple. For example, you can set preferences for the Current Interface Status widget, which displays the current status of all enabled interfaces on the internal network. You can only configure the update frequency for this widget.

To modify a widget's preferences:

Step 1 On the title bar of the widget whose preferences you want to change, click the **show preferences** icon.

The **preferences** section for that widget appears.

Step 2 Make changes as needed.

Your changes take effect immediately. For information on the preferences you can specify for individual widgets, see Understanding the Predefined Widgets, on page 428.

Step 3 On the widget title bar, click the **hide preferences** icon to hide the preferences section.

Understanding the Predefined Widgets

License: Any

The ASA FirePOWER module is delivered with several predefined widgets that can provide you with at-a-glance views of current system status.

Understanding the Appliance Information Widget

License: Any

The Appliance Information widget provides:

- the name, IPv4 address, IPv6 address, and model of the appliance
- the versions of the ASA FirePOWER module software, rule update, vulnerability database (VDB), and geolocation update installed on the appliance.

You can configure the widget to display more or less information by modifying the widget preferences to display a simple or an advanced view; the preferences also control how often the widget updates. For more information, see Understanding Widget Preferences, on page 427.

Understanding the Current Interface Status Widget

License: Any

The Current Interface Status widget shows the status of all interfaces on the appliance, enabled or unused. For each interface, the widget provides:

- the name of the interface
- the link state of the interface
- the link mode (for example, 100Mb full duplex, or 10Mb half duplex) of the interface
- the type of interface, that is, copper or fiber
- the amount of data received (Rx) and transmitted (Tx) by the interface

The color of the ball representing link state indicates the current status, as follows:

- green: link is up and at full speed
- yellow: link is up but not at full speed

- red: link is not up
- gray: link is administratively disabled
- blue: link state information is not available (for example, ASA)

The widget preferences control how often the widget updates. For more information, see Understanding Widget Preferences, on page 427.

Understanding the Disk Usage Widget

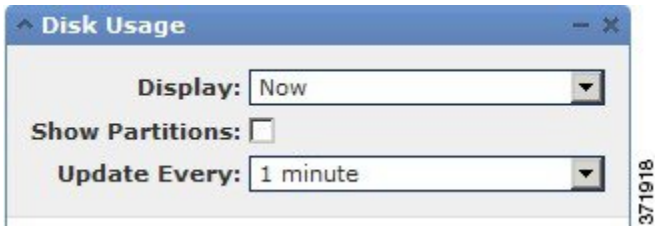
License: Any

The **Disk Usage** widget displays the space used on the hard drive, based on disk usage category. It also indicates the space used on and capacity of each partition of the appliance's hard drive. The By Category stacked bar displays each disk usage category as a proportion of the total available disk space used. The following table describes the available categories.

Table 79: Disk Usage Categories

Disk Usage Category	Description
Events	all events logged by the system
Files	all files stored by the system
Backups	all backup files
Updates	all files related to updates, such as rule updates and system updates
Other	system troubleshooting files and other miscellaneous files
Free	free space remaining on the appliance

You can configure the widget to display only the By Category stacked bar, or you can show the stacked bar plus the admin (/), /Volume, and /boot partition usage, as well as the /var/storage partition if the malware storage pack is installed, by modifying the widget preferences.



The widget preferences also control how often the widget updates, as well as whether it displays the current disk usage or collected disk usage statistics over the dashboard time range. For more information, see Understanding Widget Preferences, on page 427.

Understanding the Product Licensing Widget

License: Any

The **Product Licensing** widget shows the device and feature licenses currently installed. It also indicates the number of items (such as hosts or users) licensed and the number of remaining licensed items allowed.

The top section of the widget displays all device and feature licenses installed, including temporary licenses, while the **Expiring Licenses** section displays only temporary and expired licenses.

The bars in the widget background show the percentage of each type of license that is being used; you should read the bars from right to left. Expired licenses are marked with a strikethrough.

You can configure the widget to display either the features that are currently licensed, or all the features that you can license, by modifying the widget preferences. The preferences also control how often the widget updates. For more information, see Understanding Widget Preferences, on page 427.

You can click any of the license types to go to the License page of the local configuration and add or delete feature licenses. For more information, see Licensing the ASA FirePOWER Module, on page 469.

Understanding the Product Updates Widget

License: Any

The **Product Updates** widget provides you with a summary of the software (ASA FirePOWER module software and rule updates) currently installed on the appliance as well as information on available updates that you have downloaded, but not yet installed, for that software.

Note that the widget displays Unknown as the latest version of the software unless you have configured a scheduled task to download, push, or install software updates; the widget uses scheduled tasks to determine the latest version. For more information, see Scheduling Tasks, on page 441.

The widget also provides you with links to pages where you can update the software.

You can configure the widget to hide the latest versions by modifying the widget preferences. The preferences also control how often the widget updates. For more information, see Understanding Widget Preferences, on page 427.

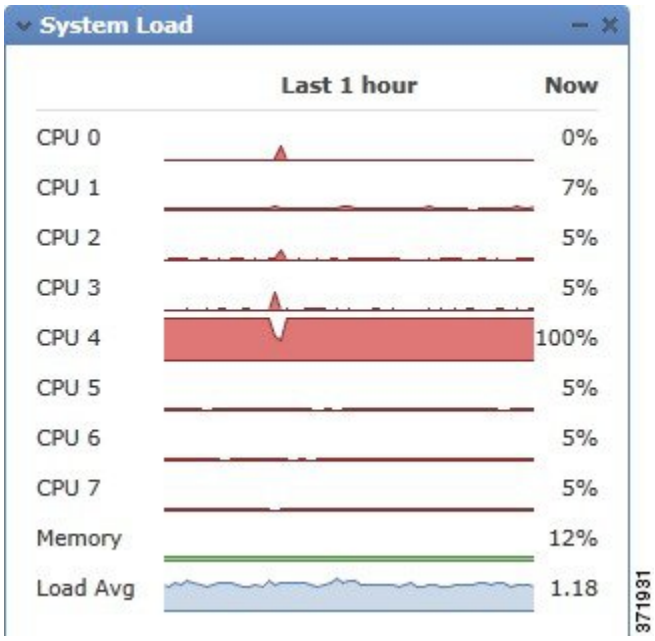
On the **Product Updates** widget, you can:

- manually update an appliance by clicking the current version of the ASA FirePOWER module software, rule update, VDB, or geolocation update:
- to update the system software, VDB, or geolocation database, see Updating the ASA FirePOWER Module Software, on page 478.
- to import the newest rule update, see Importing Rule Updates and Local Rule Files, on page 483.
- create a scheduled task to download the latest version of the ASA FirePOWER module software, VDB, or rule update by clicking the latest version; see Scheduling Tasks, on page 441.

Understanding the System Load Widget

License: Any

The System Load widget shows the CPU usage (for each CPU), memory (RAM) usage, and system load (also called the load average, measured by the number of processes waiting to execute) on the appliance, both currently and over the dashboard time range.

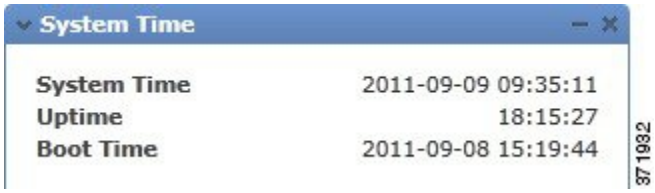


You can configure the widget to show or hide the load average by modifying the widget preferences. The preferences also control how often the widget updates. For more information, see Understanding Widget Preferences, on page 427.

Understanding the System Time Widget

License: Any

The System Time widget shows the local system time, uptime, and boot time for the appliance.



You can configure the widget to hide the boot time by modifying the widget preferences. The preferences also control how often the widget synchronizes with the appliance's clock. For more information, see Understanding Widget Preferences, on page 427.

Working with the Dashboard

License: Any

You can view and modify the widgets that appear on the dashboard.

Viewing the Dashboard

License: Any

At any time, to view the dashboard for your ASA FirePOWER module, select Home > ASA FirePOWER Dashboard.

The dashboard has a time range that constrains its widgets. You can change the time range to reflect a period as short as the last hour (the default) or as long as the last year. When you change the time range, the widgets that can be constrained by time automatically update to reflect the new time range.

Note that not all widgets can be constrained by time. For example, the dashboard time range has no effect on the Appliance Information widget, which provides information that includes the appliance name, model, and current version of the ASA FirePOWER module software.

To view the dashboard:

- Select **Home** > **ASA FirePOWER Dashboard**.

The **ASA FirePOWER** dashboard appears.

To change the dashboard time range:

- From the **Show the Last** drop-down list, choose a dashboard time range.

All appropriate widgets on the page update to reflect the new time range.

Modifying the Dashboard

License: Any

The dashboard displays widgets in a three-column layout. You can minimize and maximize widgets, as well as rearrange the widgets.

Rearranging Widgets

License: Any

You can change the location of any widget.

To move a widget:

Click the title bar of the widget you want to move, then drag it to its new location.

Minimizing and Maximizing Widgets

License: Any

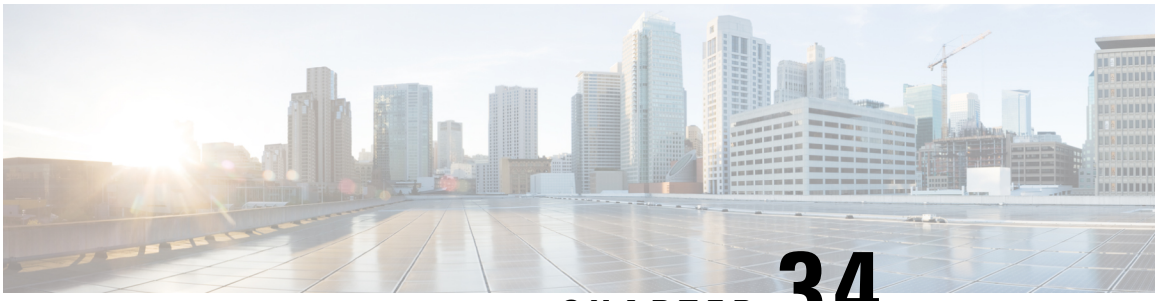
You can minimize widgets to simplify your view, then maximize them when you want to see them again.

To minimize a widget:

Click the **minimize** icon in a widget's title bar.

To maximize a widget:

Click the **maximize** icon in a minimized widget's title bar.



CHAPTER 34

Using ASA FirePOWER Reporting

You can view reports on various time periods to analyze the traffic on your network. Reports aggregate information on various aspects of your network traffic. In most cases, you can drill down from general information to specific information. For example, you can view a report on all users, then view details about specific users.

Overview and detail reports include multiple report components such as top policies and web categories. These reports show the most often occurring items of that type for the report you are viewing. For example, if you are viewing the detail report for a specific user, the top policies show the policy hits most associated with that user.

Understanding Available Reports

License: Any

Available reports include the main reports available in the ASA FirePOWER module. You can view these reports from the ASA FirePOWER Reporting menu.

In general, you can click on many items, including names and View More links, to get more detailed information about individual items or about the monitored category as a whole.

Network Overview

This report shows summary information about the traffic in the network. Use this information to help identify areas that need deeper analysis, or to verify that the network is behaving within general expectations.

Users

This report shows the top users of your network. Users who fail active authentication are represented in user reports under the username ANONYMOUS, unless you enabled guest access, in which case the username is Guest. Users who do not have a mapping because they were not required to authenticate are shown as their IP address. Use this information to help identify anomalous activity for a user.

Tip User names are available only when user identity information is associated with traffic flows. If you want to ensure that user identity is available in reports for the majority of traffic, the access control policy should use active authentication.

Applications

This report displays applications, which represent the content or requested URL for HTTP traffic detected in the traffic that triggered an intrusion event. Note that if the module detects an application protocol of HTTP, but cannot detect a specific web application, the module supplies a generic web browsing designation here.

Web categories

This report shows which categories of web sites, such as gambling, advertisements, or search engines and portals are being used in the network based on the categorization of web sites visited. Use this information to help identify the top categories visited by users and to determine whether your access control policies are sufficiently blocking undesired categories.

Policies

This report shows how your access control policies have been applied to traffic in the network. If you deleted the policy, the name is appended with "- DELETED." Use this information to help evaluate policy efficacy.

Ingress zones

This report displays the ingress security zone of the packet that triggered an event. Only this security zone field is populated in a passive deployment.

Egress zones

This report displays, for an inline deployment, the egress security zone of the packet that triggered the event. This security zone field is not populated in a passive deployment.

Destinations

This report shows which applications, such as Facebook, are being used in the network based on the analysis of the traffic in the network. Use this information to help identify the top applications used in the network and to determine whether additional access control policies are needed to reduce the usage of unwanted applications.

Attackers

This report displays the source IP addresses, used by the sending hosts, that triggered an event.

Targets

This report displays the destination IP addresses, used by the receiving hosts, that triggered an event.

Threats

This report displays the unique identifying number and explanatory text assigned to each detected threat to your network.

Files logs

This report displays the type of files detected, for example, HTML or MSEXE.

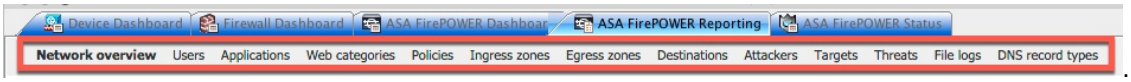
Report Basics

License: Any

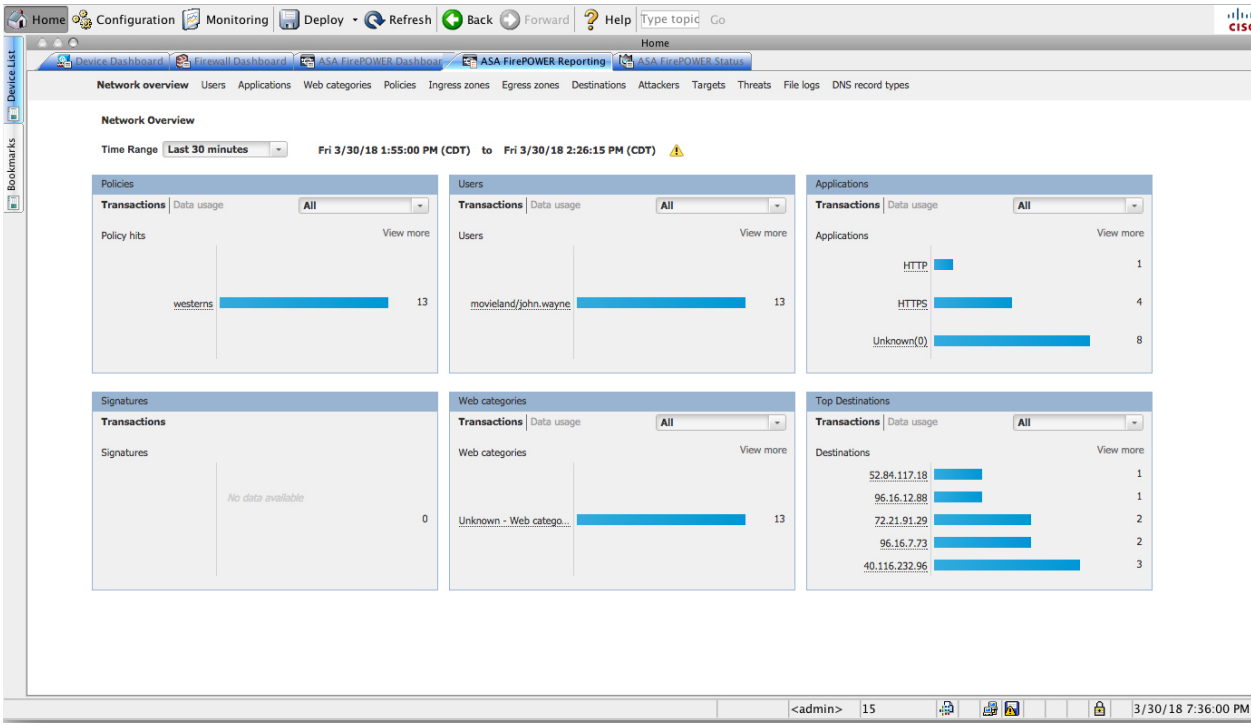
The following sections explain the basics of using reports. These topics apply to reports in general and not to any single specific report.

Getting Started with Reports

To run reports, log in to your ASA FirePOWER module and click **Home** > **ASA FirePOWER Reporting**. Available report types are displayed across the top of the window as the following figure shows



Following is an example of the Network Overview report. Click any underlined text to get more information about it



Understanding Report Data

License: Any

Report data is collected immediately from the device, so there is little lag time between the data reflected in a report and network activity. However, keep the following points in mind when analyzing the data:

- Data is collected for traffic that matches an access control policy applied to your ASA FirePOWER module.
- Data is aggregated into 5 minute buckets, and 30 minute and one hour graphs show data points in 5 minute increments. At the end of the hour, the 5 minute buckets are aggregated into one hour buckets, which are subsequently aggregated into day and week buckets. The 5 minute buckets are kept for 7 days, the one hour buckets for 31 days, and the day buckets for up to 365 days. The farther back you look, the more aggregated the data. When you query for old data, you get the best results if you align your queries to the availability of these data buckets. All day calculations are based on UTC time; the time on the server or your client is ignored.

Note If a data point is missing, for example, because the device was unreachable for longer than 5 minutes, there will be gaps in line charts.

Drilling into Reports

License: Any

Reports include many links to help you drill down to the information that you need. Mouse over items to see which ones might take you to more information about the item.

For example, in a typical reporting item, you can click the View More link to go to the summary report for that item.

You can also get to a detail report on a specific item by clicking the item in a summary report. For example, clicking Hypertext Transfer Protocol (HTTP) in the applications summary report takes you to the applications detail report for HTTP.

Changing the Report Time Range

License: Any

When you view a report, you can change the time range that defines the information to include in the report using the Time Range list. The time range list appears at the top of each report, and allows you to select predefined time ranges, such as the last hour or week, or to define a custom time range with specific start and end times. The time range you select is carried over to any other report that you view until you change the selection.

Reports automatically update every 10 minutes.

Tip The module bases time on the time zone defined on the device, not the zone configured on your workstation.

Table 80: Time Ranges for reports

Time Range	Data Returned In
Last 30 minutes	30 complete minutes in five minute intervals, plus up to five additional minutes.
Last hour	60 complete minutes in five minute intervals, plus up to five additional minutes.

Time Range	Data Returned In
Last 24 hours	One hour intervals for the last 24 hours rounded to the previous hour boundary. For example, if the current time is 13:45, the Last 24 Hour period is from 13:00 yesterday to 13:00 today.
Last 7 days	One hour intervals for the last seven days rounded to the previous hour boundary.
Last 30 days	One day intervals for the last 30 days starting from the previous midnight.
Custom Range	The time range you define. Edit boxes are displayed for start date, start time, end date, and end time; click in each box and select the desired value. Click **Apply** to update the report when you are finished. When constructing a custom time range, you should align your range with the availability of data buckets. For ranges 7-31 days in the past, align your query on the hour. For older ranges, align them on the day; for ranges over a year, align them on the week.In all cases, use UTC time to determine the day boundaries; the time zone of the query, server, and client do not relate to the data bucket. For example, if the time zone is Pacific Daylight Time (PDT), and you are querying data from 40 days ago, use 4PM on day 1 and 4PM on day 2 to align with UTC (8 hour offset to PDT).

Controlling the Data Displayed in Reports

License: Any

Overview and detail reports include several subordinate reports such as Top Policies and Web Categories. Each report panel includes controls that let you view different aspects of the data. You can use the following controls:

Transactions or Data Usage

Click these links to view charts based on the number of transactions or the amount of data in the transactions.

All, Denied, Allowed

The unlabeled list in the upper right of each report includes these options. Use them to change whether you see denied connections only, allowed connections only, or all connections whether denied or allowed.

View More

Click the View More link to go to the report for the item you are viewing. For example, clicking View More in the Web Categories chart of the Destinations report takes you to the Web Categories report. If you are viewing the report in a detailed report, you go to the detailed Web Categories report for the item you are viewing details about.

Understanding Report Columns

License: Any

Reports typically contain one or more tables to present information in addition to the information displayed in graphical format.

- The meaning of many columns is modified by the report in which they are included. For example, the transactions column shows the number of transactions for the type of item reported on. You can also

toggle the values between raw numbers and as a percentage of the total reported raw values for the item by clicking **Values** or **Percentages**.

- You can change the sort order of the columns by clicking the column heading.

The following table explains the standard columns that you can find in the various reports. The standard columns are in all reports, the variable columns appear in the reports for those items only.

Table 81: Report Columns

Column	Description
Transactions	The total number of transactions for the reported item. In top-level reports, the number is a link; click it to open the Event Viewer with the events table filtered based on the item you are viewing.The number of events shown can differ from the transaction count, especially for queries of older time periods, because events are removed from storage as disk space is depleted and new events arrive. Queries of time periods over 30 days ago might return no matching events. Conversely, you might see more events than transactions, if the item was not one of the top N in each 5 minute bucket covered by the time range, because transaction counts do not include these periods.
Transactions allowed	The number of transactions that were allowed for the reported item.
Transactions denied	The number of transactions that were blocked (based on policy) for the reported item.
Total bytes	The sum of bytes sent and received for the reported item.
Bytes received	The number of bytes received for the reported item.
Total Bytes Sent	The number of bytes sent for the reported item.

Example Report

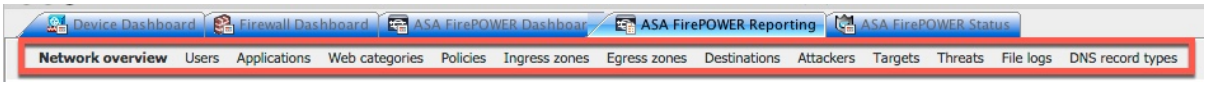
This section discusses how to run the Policies report. You can use the tasks discussed in this procedure to run any other reports you wish.

To run reports:

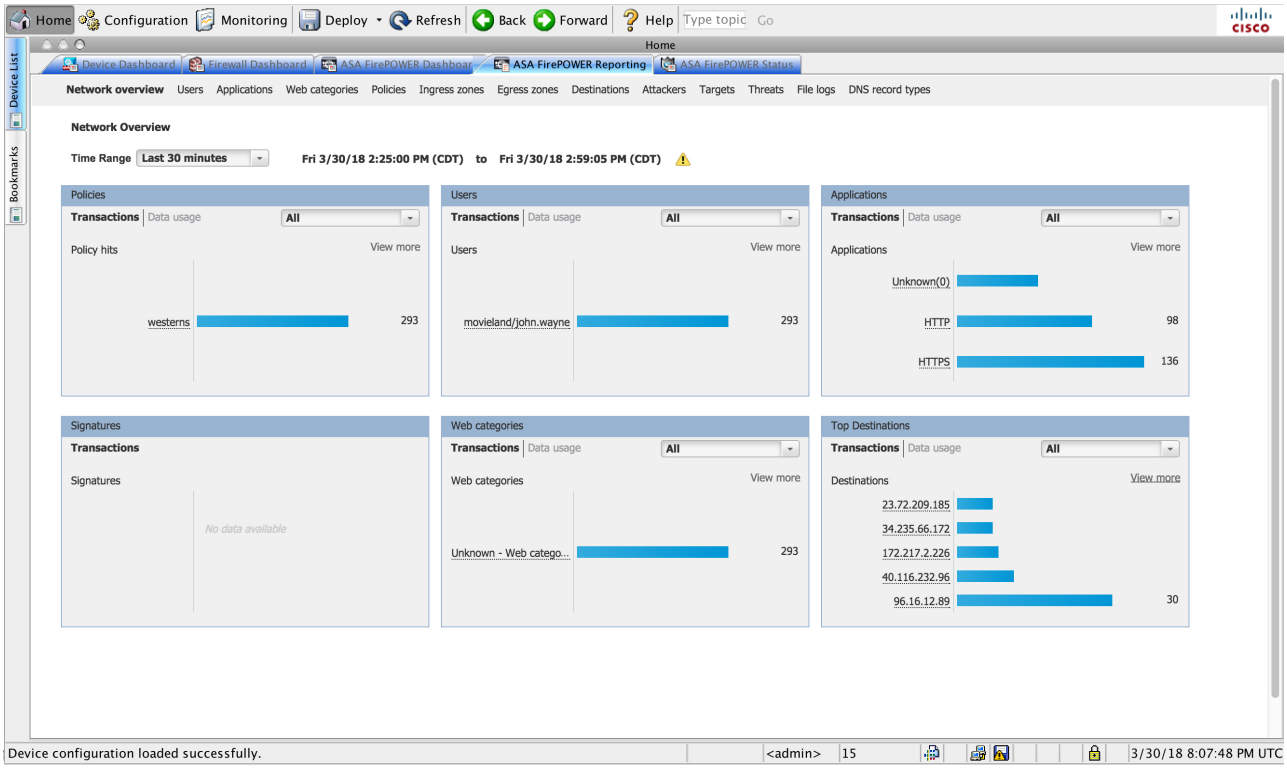
Step 1 Log in to your ASA FirePOWER module.

Step 2 Click **Home** > **ASA FirePOWER Reporting**.

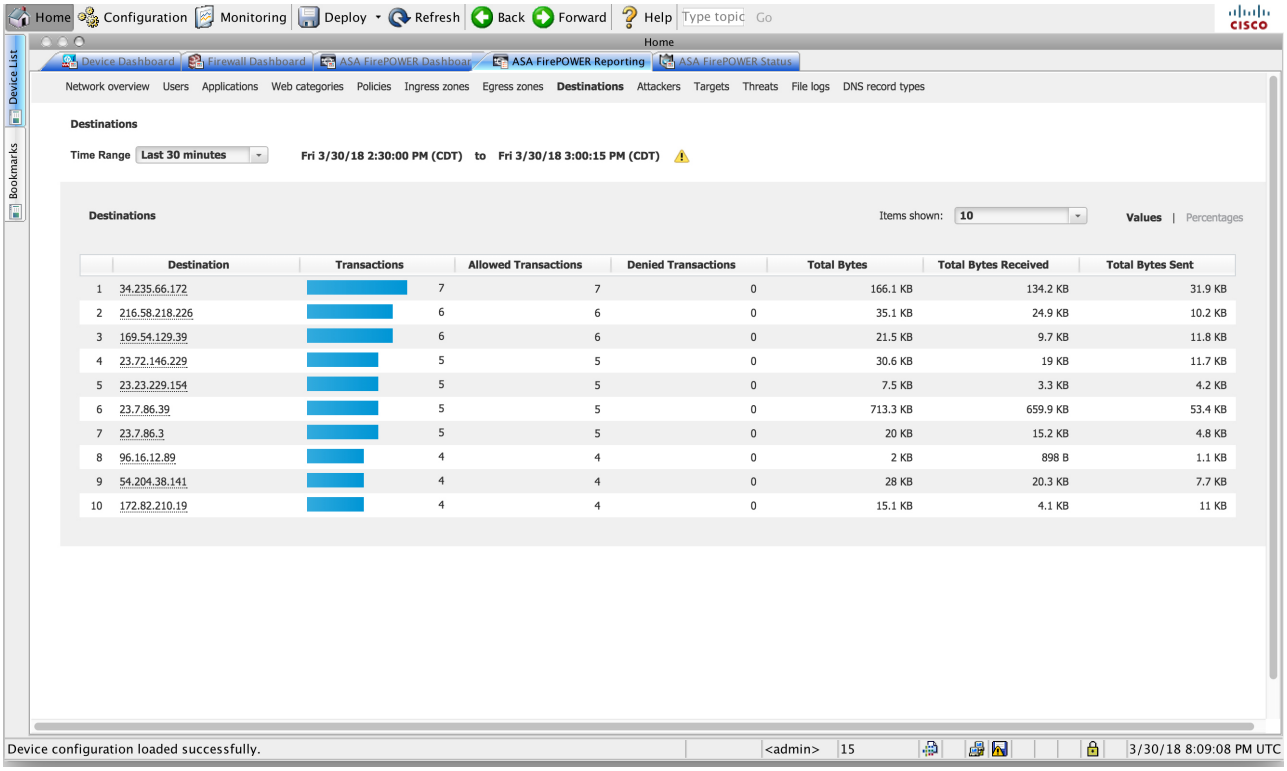
Available report types are displayed across the top of the window as the following figure shows.



Step 3 Many reports enable you to view details about categories contained in the report. For example, click **Network**

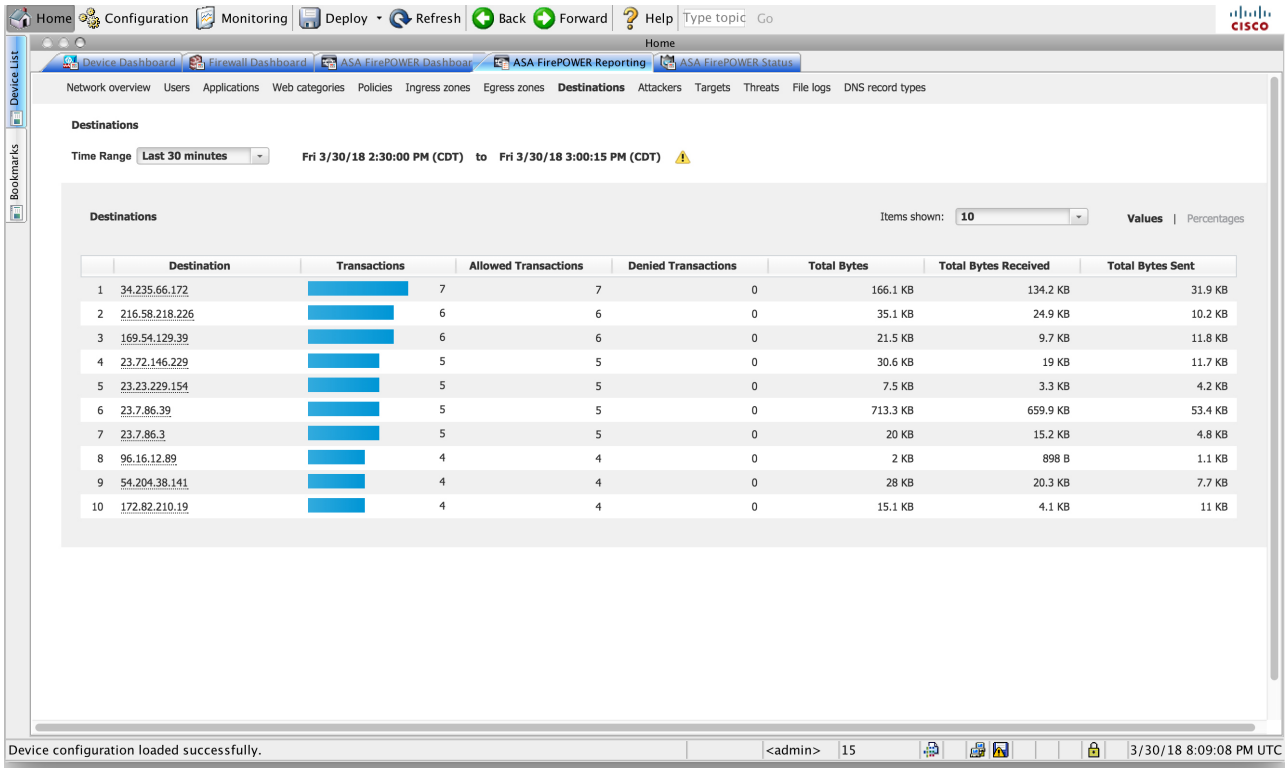


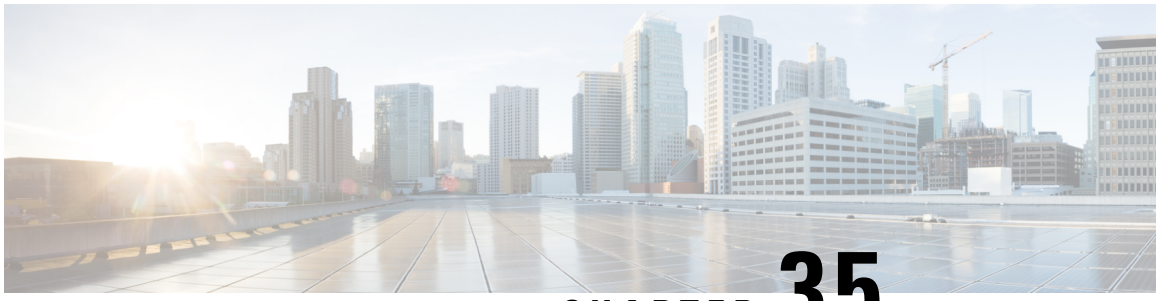
Step 4 In the Network Overview report results, click the name of any Top Destinations to get more information about destinations.



The results display summary information and details about the destinations.

(Optional.) Click **View More** to view additional details.





CHAPTER 35

Scheduling Tasks

You can schedule many different types of administrative tasks to run at designated times, either once or on a recurring basis.

Note Some tasks (such as those involving automated software updates) may place a significant load on networks with low bandwidths. You should schedule tasks like these to run during periods of low network use.

Configuring a Recurring Task

License: Any

You set the frequency for a recurring task using the same process for all types of tasks.

Note that the time displayed on most pages on the user interface is the local time, which is determined by using the time zone you specify in your local configuration. Further, the ASA FirePOWER module automatically adjusts its local time display for daylight saving time (DST), where appropriate. However, recurring tasks that span the transition dates from DST to standard time and back do not adjust for the transition. That is, if you create a task scheduled for 2:00 AM during standard time, it will run at 3:00 AM during DST. Similarly, if you create a task scheduled for 2:00 AM during DST, it will run at 1:00 AM during standard time.

To configure a recurring task:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The Scheduling page appears.

Step 2 Click **Add Task**.

The New Task page appears.

Step 3 From the **Job Type** list, select the type of task that you want to schedule.

Each of the types of tasks you can schedule is explained in its own section.

Step 4 For the **Schedule task to run** option, select **Recurring**.

The page reloads with the recurring task options.

Step 5 In the **Start On** field, specify the date when you want to start your recurring task. You can use the drop-down list to select the month, day, and year.

Step 6 In the **Repeat Every** field, specify how often you want the task to recur. You can specify a number of hours, days, weeks, or months.

You can either type a number or click the up icon (▲) and the down icon (▼) to specify the interval. For example, type 2 and select Days to run the task every two days.

Step 7 In the **Run At** field, specify the time when you want to start your recurring task.

Step 8 If you selected Weeks for **Repeat Every**, a **Repeat On** field appears. Select the check boxes next to the days of the week when you want to run the task.

Step 9 If you selected Months for **Repeat Every**, a **Repeat On** field appears. Use the drop-down list to select the day of the month when you want to run the task.

The remaining options on the New Task page are determined by the task you are creating.

Automating Backup Jobs

You can use the scheduler to automate backups of your ASA FirePOWER module. You must design a backup profile before you can configure a backup as a scheduled task. For more information, see Creating Backup Profiles, on page 505.

To automate backup tasks:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The Scheduling page appears.

Step 2 Click **Add Task**.

The New Task page appears.

Step 3 From the **Job Type** list, select **Backup**.

The page reloads to show the backup options.

Step 4 Specify how you want to schedule the backup, **Once** or **Recurring**:

- For one-time tasks, use the drop-down lists to specify the start date and time. The **Current Time** field indicates the current time on the appliance.

- For recurring tasks, you have several options for setting the interval between instances of the task. See Configuring a Recurring Task, on page 441 for details.

Step 5 In the **Job Name** field, type a name using up to 255 alphanumeric characters, spaces, or dashes.

Step 6 From the **Backup Profile** list, select the appropriate backup profile.

For more information on creating new backup profiles, see Creating Backup Profiles, on page 505.

Step 7 Optionally, in the **Comment** field, type a comment using up to 255 alphanumeric characters, spaces, or periods.

Tip The comment field appears in the View Tasks section of the page, so you should try to keep it relatively short.

Step 8 Optionally, in the **Email Status To:** field, type the email address (or multiple email addresses separated by commas) where you want task status messages sent.

You must have a valid email relay server configured to send status messages. See Configuring a Mail Relay Host and Notification Address, on page 458 for more information about configuring a relay host.

Step 9 Click **Save**.

The task is added. You can check the status of a running task on the Task Status page; see Viewing the Status of Long-Running Tasks, on page 517.

Automating Applying an Intrusion Policy

License: Protection

You can queue an intrusion policy apply to the ASA FirePOWER module. This task only applies the intrusion policy if an access control policy that references the intrusion policy is applied to the ASA FirePOWER module when the task runs. Otherwise, the task aborts before completion.

You must associate an intrusion policy with an access control policy and apply the access control policy to a device before scheduling this task; see Controlling Traffic Using Intrusion and File Policies, on page 135.

To queue a policy apply:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The schedule calendar page for the current month appears.

Step 2 Click **Add Task**.

The New Task page appears.

Step 3 From the **Job Type** list, select **Queue Intrusion Policy Apply**.

The page reloads to show the options for queuing a policy apply.

Step 4 Specify how you want to schedule the task, **Once** or **Recurring**:

- For one-time tasks, use the drop-down lists to specify the start date and time. The **Current Time** field indicates the current time on the ASA FirePOWER module.

- For recurring tasks, you have several options for setting the interval between instances of the task. See Configuring a Recurring Task, on page 441 for details.

Step 5 In the **Job Name** field, type a name using up to 255 alphanumeric characters, spaces, or dashes.

Step 6 In the **Intrusion Policy** field, you have the following options:

- Select an intrusion policy to apply to the ASA FirePOWER module.
- Select **All intrusion policies** to apply all intrusion policies already applied to the ASA FirePOWER module.

Step 7 Optionally, in the **Comment** field, type a comment using up to 255 alphanumeric characters, spaces, or periods.

Tip The comment field appears in the Tasks Details section at the bottom of the schedule calendar page, so you should limit the size of your comment.

Step 8 Optionally, in the **Email Status To:** field, type the email address (or multiple email addresses separated by commas) where you want task status messages sent.

You must have a valid email relay server configured to send status messages. See Configuring a Mail Relay Host and Notification Address, on page 458 for more information about configuring a relay host.

Step 9 Click **Save**.

The task is added. You can check the status of a running task in the Task Details section of the calendar page; see Viewing the Status of Long-Running Tasks, on page 517.

Step 10 To edit your saved task, click the task anywhere it appears on the schedule calendar page.

The Task Details section appears at the bottom of the page. To make any changes, click the edit icon ( ) .

Automating Geolocation Database Updates

License: Any

You can use the scheduler to automate recurring geolocation database (GeoDB) updates. Recurring GeoDB updates run once every 7 days (weekly); you can configure the time the update recurs each week. For more information on GeoDB updates, see Updating the Geolocation Database, on page 493.

To automate geolocation database updates:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Updates**.

The Product Updates page appears.

Step 2 Click the **Geolocation Updates** tab.

The Geolocation Updates page appears.

Step 3 Under **Recurring Geolocation Updates**, select the **Enable Recurring Weekly Updates** check box.

The Update Start Time field appears.

Step 4 In the **Update Start Time** field, specify the time and day of the week when you want weekly GeoDB updates to occur.

Step 5 Click **Save**.

The task is added. You can check the status of a running task on the Task Status page; see Viewing the Status of Long-Running Tasks, on page 517.

Automating Software Updates

You can automatically download and apply most patches and feature releases to the ASA FirePOWER module.

Note You must manually upload and install updates in two situations. First, you cannot schedule major updates to the ASA FirePOWER module. Second, you cannot schedule updates for or pushes from appliances that cannot access the Support Site. For information on manually updating the ASA FirePOWER module, see Updating ASA FirePOWER Module Software, on page 475.

If you want to have more control over this process, you can use the **Once** option to download and install updates during off-peak hours after you learn that an update has been released.

Automating Software Downloads

You can create a scheduled task that automatically downloads the latest software updates from Cisco. You can use this task to schedule download of updates you plan to install manually.

To automate software update downloads:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The Scheduling page appears.

Step 2 Click **Add Task**.

The New Task page appears.

Step 3 From the **Job Type** list, select **Download Latest Update**.

The New Task page reloads to show the update options.

Step 4 Specify how you want to schedule the task, **Once** or **Recurring**:

- For one-time tasks, use the drop-down lists to specify the start date and time. The **Current Time** field indicates the current time on the appliance.
- For recurring tasks, you have several options for setting the interval between instances of the task. See Configuring a Recurring Task, on page 441 for details.

Step 5 In the **Job Name** field, type a name using up to 255 alphanumeric characters, spaces, or dashes.

Step 6 In the **Update Items** section, select **Software**.

Step 7 Optionally, in the **Comment** field, type a comment using up to 255 alphanumeric characters, spaces, or periods.

Tip The comment field appears in the View Tasks section of the page, so you should try to keep it relatively short.

Step 8 Optionally, in the **Email Status To:** field, type the email address (or multiple email addresses separated by commas) where you want task status messages sent.

You must have a valid email relay server configured to send status messages. See Configuring a Mail Relay Host and Notification Address, on page 458 for more information about configuring a relay host.

Step 9 Click **Save**.

The task is added. You can check the status of a running task on the Task Status page; see Viewing the Status of Long-Running Tasks, on page 517.

Automating Software Installs

Caution Depending on the update being installed, the appliance may reboot after the software is installed.

To schedule a software installation task:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The Scheduling page appears.

Step 2 Click **Add Task**.

The New Task page appears.

Step 3 From the **Job Type** list, select **Install Latest Update**.

The page reloads to show the options for installing updates.

Step 4 Specify how you want to schedule the task, **Once** or **Recurring**:

- For one-time tasks, use the drop-down lists to specify the start date and time. The **Current Time** field indicates the current time on the appliance.
- For recurring tasks, you have several options for setting the interval between instances of the task. See Configuring a Recurring Task, on page 441 for details.

Step 5 In the **Job Name** field, type a name using up to 255 alphanumeric characters, spaces, or dashes.

Step 6 Optionally, in the **Comment** field, type a comment using up to 255 alphanumeric characters, spaces, or periods.

Tip The comment field appears in the View Tasks section of the page, so you should try to keep it relatively short.

Step 7 Optionally, in the **Email Status To:** field, type the email address (or multiple email addresses separated by commas) where you want task status messages sent.

You must have a valid email relay server configured to send status messages. See Configuring a Mail Relay Host and Notification Address, on page 458 for more information about configuring a relay host.

Step 8 Click **Save**.

The task is added. You can check the status of a running task on the Task Status page; see Viewing the Status of Long-Running Tasks, on page 517.

Automating URL Filtering Updates

License: URL Filtering

You can use the scheduler to automate updates of URL filtering data from the Collective Security Intelligence Cloud. For a URL filtering update task to succeed:

- The ASA FirePOWER module must have access to the Internet or it cannot contact the cloud.
- You must enable URL filtering, as described in Enabling Cloud Communications, on page 466.

Note that when you enable URL filtering, you can also enable automatic updates. This forces the ASA FirePOWER module to contact the cloud every 30 minutes for URL filtering data updates. If you have enabled automatic updates, you should **not** create a scheduled task to update URL filtering data.

Although daily updates tend to be small, if it has been more than five days since your last update, new URL filtering data may take up to 20 minutes to download, depending on your bandwidth. Then, it may take up to 30 minutes to perform the update itself.

To automate URL filtering data tasks:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The Scheduling page appears.

Step 2 Click **Add Task**.

The New Task page appears.

Step 3 From the **Job Type** list, select **Update URL Filtering Database**.

The page reloads to show the URL filtering update options.

Step 4 Specify how you want to schedule the update, **Once** or **Recurring**:

- For one-time tasks, use the drop-down lists to specify the start date and time. The **Current Time** field indicates the current time on the appliance.
- For recurring tasks, you have several options for setting the interval between instances of the task. See Configuring a Recurring Task, on page 441 for details.

Step 5 In the **Job Name** field, type a name using up to 255 alphanumeric characters, spaces, or dashes.

Step 6 Optionally, in the **Comment** field, type a comment using up to 255 alphanumeric characters, spaces, or periods.

Tip The comment field appears in the View Tasks section of the page, so you should try to keep it relatively short.

Step 7 Optionally, in the **Email Status To** field, type the email address (or multiple email addresses separated by commas) where you want task status messages sent.

You must have a valid email relay server configured to send status messages. See Configuring a Mail Relay Host and Notification Address, on page 458 for more information about configuring a relay host.

Step 8 Click **Save**.

The task is added. You can check the status of a running task on the Task Status page; see Viewing the Status of Long-Running Tasks, on page 517.

Viewing Tasks

After adding scheduled tasks, you can view them and evaluate their status. The View Options section of the page allows you to view scheduled tasks using a calendar and a list of scheduled tasks.

Using the Calendar

The Calendar view option allows you to view which scheduled tasks occur on which day.

To view scheduled tasks using the calendar:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The Scheduling page appears.

Step 2 You can perform the following tasks using the calendar view:

- Click the double left arrow icon « to move back one year.
- Click the single left arrow icon ‹ to move back one month.
- Click the single right arrow icon › to move forward one month.
- Click the double right arrow icon » to move forward one year.
- Click **Today** to return to the current month and year.
- Click **Add Task** to schedule a new task.
- Click a date to view all scheduled tasks for the specific date in a task list table below the calendar.
- Click a specific task on a date to view the task in a task list table below the calendar.

Note For more information about using the task list, see Using the Task List, on page 448.

Using the Task List

The Task List shows a list of tasks along with their status. The task list appears below the calendar when you open the calendar. In addition, you can access it by selecting a date or task from the calendar. See Using the Calendar, on page 448 for more information.

Table 82: Task List Columns

Column	Description
Name	Displays the name of the scheduled task and the comment associated with it.
Type	Displays the type of scheduled task.
Start Time	Displays the scheduled start date and time.
Frequency	Displays how often the task is run.
Status	Describes the current status for a scheduled task: • A check mark icon ( ) indicates that the task ran successfully. • A question mark icon ( ) indicates that the task is in an unknown state. • An exclamation mark icon ( ) indicates that the task failed .
Creator	Displays the name of the user that created the scheduled task.
Edit	Edits the scheduled task.
Delete	Deletes the scheduled task.

Editing Scheduled Tasks

You can edit a scheduled task that you previously created. This feature is especially useful if you want to test a scheduled task once to make sure that the parameters are correct. Later, after the task completes successfully, you can change it to a recurring task.

To edit an existing scheduled task:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The Scheduling page appears.

Step 2 Click either the task that you want to edit or the day on which the task appears.

The Task Details table containing the selected task or tasks appears.

Step 3 Locate the task you want to edit in the table and click the edit icon ( )

The Edit Task page appears, showing the details of the task you selected.

Step 4 Edit the task to meet your needs, including the start time, the job name, the comment, and how often the task runs, once or recurring. You cannot change the type of job.

The remaining options are determined by the task you are editing.

Step 5 Click **Save** to save your edits.

Your change are saved and the Scheduling page appears again.

Deleting Scheduled Tasks

There are two types of deletions you can perform from the Schedule View page. You can delete a specific one-time task that has not yet run or you can delete every instance of a recurring task. If you delete an instance of a recurring task, all instances of the task are deleted. If you delete a task that is scheduled to run once, only that task is deleted.

The following sections describe how to delete tasks:

- To delete all instances of a task, delete a recurring task.
- To delete a single instance of a task, delete a one-time task.

Deleting a Recurring Task

When you delete one instance of a recurring task, you automatically delete all instances of that task.

To delete a recurring task:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The Scheduling page appears.

Step 2 On the calendar, select an instance of the recurring task you want to delete.

The page reloads to display a table of tasks below the calendar.

Step 3 Locate an instance of the recurring task you want to delete in the table and click the delete icon ( ) .

All instances of the recurring task are deleted.

Deleting a One-Time Task

You can delete a one-time scheduled task or delete the record of a previously run scheduled task using the task list.

To delete a single task or, if it has already run, delete a task record:

Step 1 In ASDM, select **Configuration > ASA FirePOWER Configuration > Tools > Scheduling**.

The Scheduling page appears.

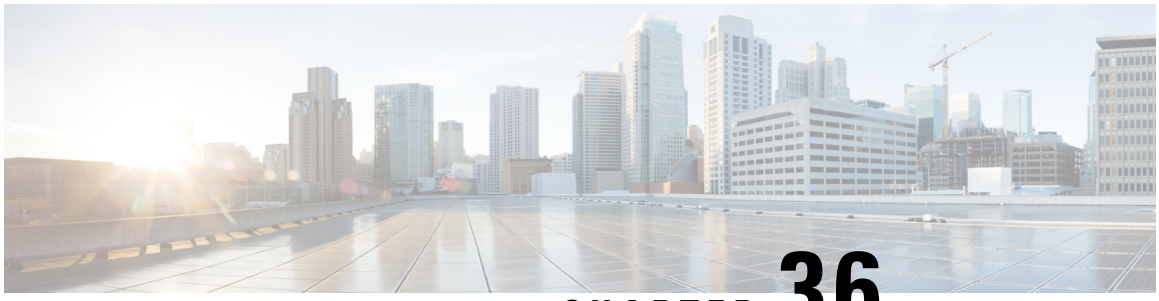
Step 2 Click the task that you want to delete or the day on which the task appears.

A table containing the selected task or tasks appears.

Step 3 Locate the task you want to delete in the table and click the delete icon ( ) .

The instance of the task you selected is deleted.

What to do next



CHAPTER 36

Managing System Policies

A system policy allows you to manage the following on your ASA FirePOWER module:

- audit log settings
- the mail relay host and notification address
- SNMP polling settings
- STIG compliance

Creating a System Policy

License: Any

As an alternative to configuring a system policy, you can export a system policy from another ASA FirePOWER module and then import it onto your ASA FirePOWER module. You can then edit the imported policy to suit your needs before you apply it. For more information, see Importing and Exporting Configurations, on page 511.

To create a system policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **System Policy**.

The **System Policy** page appears.

Step 2 From the drop-down list, select an existing policy to use as a template for your new system policy.

Step 3 Type a name for your new policy in the **Policy Name** field.

Step 4 Type a description for your new policy in the **Policy Description** field.

Step 5 Click **Create**.

Your system policy is saved and the **Edit System Policy** page appears.

Editing a System Policy

License: Any

If you edit a system policy that is currently applied to an ASA FirePOWER module, reapply the policy after you have saved your changes. For more information, see Applying a System Policy, on page 454.

To edit an existing system policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **System Policy**.

The **System Policy** page appears, including a list of the existing system policies.

Step 2 Click the **edit** icon () next to the system policy.

The **Edit Policy** page appears. You can change the policy name and policy description. If you are editing a system policy applied to an ASA FirePOWER module, make sure you reapply the updated policy when you are finished. See Applying a System Policy, on page 454.

Step 3 Click **Save Policy and Exit** to save your changes. The changes are saved, and the System Policy page appears.

Applying a System Policy

License: Any

You can apply a system policy to an ASA FirePOWER module. If a system policy is already applied, any changes you make do not take effect until you reapply it.

To apply a system policy:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **System Policy**.

The **System Policy** page appears.

Step 2 Click the **apply** icon () next to the system policy.

Step 3 Click **Apply**.

The **System Policy** page appears. A message indicates the status of applying the system policy.

Deleting System Policy Rules

License: Any

You can delete a system policy rule, even if the rule is in use. If the rule is still in use, it is used until a new policy is applied. You cannot delete the system policy.

To delete a system policy rule:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **System Policy**.

The **System Policy** page appears.

Step 2 Click the **delete** icon ( ) next to a system policy rule. To delete the rule, click **OK.**

The **System Policy** page appears. A pop-up message appears, confirming the policy deletion.

Configuring the Access List for Your Appliance

License: Any

You can configure various system policy settings. Configuring the Access List for Your Appliance

License: Any

The Access List page allows you to control which computers can access your appliance on specific ports. By default, port 443 (Hypertext Transfer Protocol Secure, or HTTPS), which is used to access the web interface, and port 22 (Secure Shell, or SSH), which is used to access the command line, are enabled for any IP address. You can also add SNMP access over port 161. Note that you must add SNMP access for any computer you plan to use to poll for SNMP information.

Caution By default, access to the appliance is **not** restricted. To operate the appliance in a more secure environment, consider adding access to the appliance for specific IP addresses and then deleting the default any option.

Note After a user makes three consecutive failed attempts to log into the CLI or shell using SSH, the system terminates the SSH connection.

The access list is part of the system policy. You can specify the access list either by creating a new system policy or by editing an existing system policy. In either case, the access list does not take effect until you apply the system policy.

To configure the access list:

Access: Admin

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **System Policy** .

The **System Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the system policy.

Step 3 Optionally, to delete one of the current settings, click the **delete** icon .

The setting is removed.

Caution If you delete access for the IP address that you are currently using to connect to the appliance interface, and there is no entry for " IP=any port=443 ", you will lose access to the system when you apply the policy.

Step 4 Optionally, to add access for one or more IP addresses, click **Add Rules**.

The **Add IP Address** page appears.

Step 5 In the **IP Address** field, you have the following options, depending on the IP addresses you want to add:

- an exact IP address (for example, 192.168.1.101)
- an IP address block using CIDR notation (for example, 192.168.1.1/24)
- any , to designate any IP address

Step 6 Select **SSH**, **HTTPS**, **SNMP**, or a combination of these options to specify which ports you want to enable for these IP addresses.

Step 7 Click **Add**.

The **Access List** page appears again, reflecting the changes you made.

Step 8 Click **Save Policy and Exit**.

The system policy is updated. Your changes do not take effect until you apply the system policy. See Applying a System Policy, on page 454 for more information.

Configuring Audit Log Settings

License: Any

You can configure the system policy so that the ASA FirePOWER module streams an audit log to an external host.

Note You must ensure that the external host is functional and accessible from the ASA FirePOWER module sending the audit log.

The sending host name is part of the information sent. You can further identify the audit log stream with a facility, a severity, and an optional tag. The ASA FirePOWER module does not send the audit log until you apply the system policy.

After you apply a policy with this feature enabled, and your destination host is configured to accept the audit log, the syslog messages are sent. The following is an example of the output structure:

Date Time Host [**Tag**] Sender: [**User_Name**]@[**User_IP**], [**Subsystem**], [**Action**

where the local date, time, and hostname precede the bracketed optional tag, and the sending device name precedes the audit log message.

For example:

Mar 01 14:45:24 localhost [**TAG**] Dev-DC3000: admin@10.1.1.2, **Operations** > **Monitoring**, **Page View**

To configure the audit log settings:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **System Policy**.

The **System Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the system policy.

Step 3 Click **Audit Log Settings**.

The **Audit Log Settings** page appears.

Step 4 Select **Enabled** from the **Send Audit Log to Syslog** drop-down menu. (The default setting is **Disabled**.)

Step 5 Designate the destination host for the audit information by using the IP address or the fully qualified name of the host in the **Host** field. The default port (514) is used.

Caution If the computer you configure to receive an audit log is not set up to accept remote messages, the host will not accept the audit log.

Step 6 Select a syslog facility from the **Facility** field.

Step 7 Select a severity from the **Severity** field.

Step 8 Optionally, insert a reference tag in the **Tag (optional)** field.

Step 9 To send regular audit log updates to an external HTTP server, select **Enabled** from the **Send Audit Log to HTTP Server** drop-down list. The default setting is **Disabled**.

Step 10 In the **URL to Post Audit** field, designate the URL where you want to send audit information. You must enter an URL that corresponds to a listener program that expects the HTTP POST variables as listed:

- subsystem
- actor
- event_type
- message
- action_source_ip
- action_destination_ip
- result
- time
- tag (if defined, as above)

Caution To allow encrypted posts, you must use an HTTPS URL. Note that sending audit information to an external URL may affect system performance.

Step 11 Click **Save Policy and Exit**.

The system policy is updated. Your changes do not take effect until you apply the system policy. See Applying a System Policy, on page 454 for more information.

Configuring a Mail Relay Host and Notification Address

License: Any

You must configure a mail host if you plan to:

- email event-based reports
- email status reports for scheduled tasks
- email change reconciliation reports
- email data pruning notifications
- use email for intrusion event alerting

You can select an encryption method for the communication between appliance and mail relay host, and can supply authentication credentials for the mail server if needed. After configuring settings, you can test the connection between the appliance and the mail server using the supplied settings.

To configure a mail relay host:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **System Policy**.

The **System Policy** page appears.

Step 2 Click the **edit** icon (✎) next to the system policy.

Step 3 Click **Email Notification**.

The **Configure Email Notification** page appears.

Step 4 In the **Mail Relay Host** field, type the hostname or IP address of the mail server you want to use.

Note The mail host you enter must allow access from the appliance.

Step 5 Enter the port number to use on the email server in the **Port Number** field. Typical ports include 25, when using no encryption, 465, when using SSLv3, and 587, when using TLS.

Step 6 To select an encryption method, you have the following options:

- To encrypt communications between the appliance and the mail server using Transport Layer Security, select **TLS** from the **Encryption Method** drop-down list.
- To encrypt communications between the appliance and the mail server using Secure Socket Layers, select **SSLv3** from the **Encryption Method** drop-down list.
- To allow unencrypted communication between the appliance and the mail server, select **None** from the **Encryption Method** drop-down list.

Note that certificate validation is not required for encrypted communication between the appliance and mail server.

Step 7 Enter a valid email address in the **From Address** field for use as the source email address for messages sent by the appliance.

Step 8 Optionally, to supply a user name and password when connecting to the mail server, select **Use Authentication**. Enter a user name in the **Username** field. Enter a password in the **Password** field.

Step 9 To send a test email using the configured mail server, click **Test Mail Server Settings**.

A message appears next to the button indicating the success or failure of the test.

Step 10 Click **Save Policy and Exit**.

The system policy is updated. Your changes do not take effect until you apply the system policy. See Applying a System Policy, on page 454 for more information.

Configuring SNMP Polling

License: Any

You can enable Simple Network Management Protocol (SNMP) polling of an appliance using the system policy. The SNMP feature supports use of versions 1, 2, and 3 of the SNMP protocol.

Note that enabling the system policy SNMP feature does not cause the appliance to send SNMP traps; it only makes the information in the MIBs available for polling by your network management system.

Note You must add SNMP access for any computer you plan to use to poll the appliance. For more information, see Configuring the Access List for Your Appliance, on page 455. Note that the SNMP MIB contains information that could be used to attack your appliance. Cisco recommends that you restrict your access list for SNMP access to the specific hosts that will be used to poll for the MIB. Cisco also recommends you use SNMPv3 and use strong passwords for network management access.

To configure SNMP polling:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **System Policy**.

The **System Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the system policy.

Step 3 If you have not already added SNMP access for each computer you plan to use to poll the appliance, do so now. For more information, see Configuring the Access List for Your Appliance, on page 455.

Step 4 Click **SNMP**.

The **SNMP** page appears.

Step 5 From the **SNMP Version** drop-down list, select the SNMP version you want to use.

The drop-down list displays the version you selected.

Step 6 You have the following options:

- If you selected **Version 1** or **Version 2**, type the SNMP community name in the **Community String** field. Go to step 15.
- If you selected **Version 3**, click **Add User** to display the user definition page.

Step 7 Enter a username in the **Username** field.

Step 8 Select the protocol you want to use for authentication from the **Authentication Protocol** drop-down list.

Step 9 Type the password required for authentication with the SNMP server in the **Authentication Password** field.

Step 10 Retype the authentication password in the **Verify Password** field just below the **Authentication Password** field.

Step 11 Select the privacy protocol you want to use from the **Privacy Protocol** list, or select **None** to not use a privacy protocol.

Step 12 Type the SNMP privacy key required by the SNMP server in the **Privacy Password** field.

Step 13 Retype the privacy password in the **Verify Password** field just below the **Privacy Password** field.

Step 14 Click **Add**.

The user is added. You can repeat steps 6 through 13 to add additional users. Click the delete icon ( ) to delete a user.

Step 15 Click **Save Policy and Exit**.

The system policy is updated. Your changes do not take effect until you apply the system policy. See Applying a System Policy, on page 454 for more information.

Enabling STIG Compliance

License: Any

Organizations within the United States federal government sometimes need to comply with a series of security checklists set out in Security Technical Implementation Guides (STIGs). The STIG Compliance option enables settings intended to support compliance with specific requirements set out by the United States Department of Defense.

Enabling STIG compliance does not guarantee strict compliance to all applicable STIGs.

When you enable STIG compliance, password complexity and retention rules for local shell access accounts change. In addition, you cannot use ssh remote storage when in STIG compliance mode.

Note that applying a system policy with STIG compliance enabled forces appliances to reboot. If you apply a system policy with STIG enabled to an appliance that already has STIG enabled, the appliance does not reboot. If you apply a system policy with STIG disabled to an appliance that has STIG enabled, STIG remains enabled and the appliance does not reboot.

Caution You cannot disable this setting without assistance from Support. In addition, this setting may substantially impact the performance of your system. Cisco does not recommend enabling STIG compliance except to comply with Department of Defense security requirements.

To enable STIG compliance:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **System Policy**.

The **System Policy** page appears.

Step 2 Click the **edit** icon ( ) next to the system policy.

Step 3 Click **STIG Compliance**.

The **STIG Compliance** page appears.

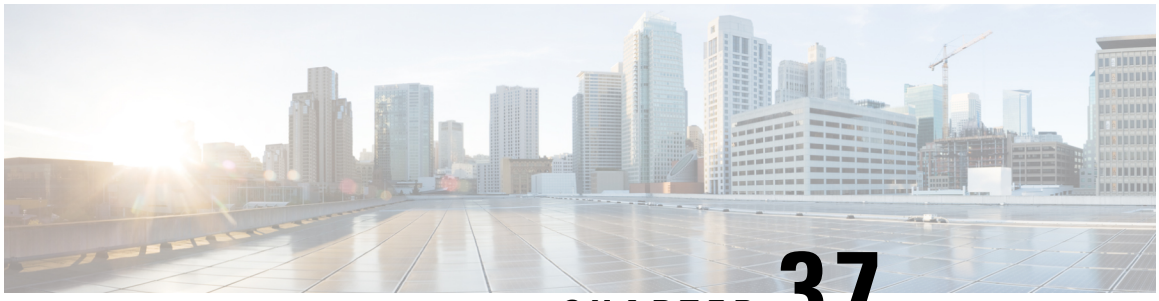
Step 4 If you want to *permanently* enable STIG compliance on the appliance, select **Enable STIG Compliance**.

Caution You cannot disable STIG compliance on an appliance after you apply a policy with STIG compliance enabled. If you need to disable compliance, contact Support.

Step 5 Click **Save Policy and Exit**.

The system policy is updated. Your changes do not take effect until you apply the system policy. See Applying a System Policy, on page 454 for more information.

When you apply a system policy that enables STIG compliance to an appliance, note that the appliance reboots. Note that if you apply a system policy with STIG enabled to an appliance that already has STIG enabled, the appliance does not reboot.



CHAPTER 37

Configuring ASA FirePOWER Module Settings

The following table summarizes an ASA FirePOWER module's local configuration.

Table 83: Local Configuration Options

Option	Description
Information	Allows you to view current information about the appliance. You can also change the appliance name.
Cloud Services	Allows you to download URL filtering data from the Collective Security Intelligence Cloud, perform lookups for uncategorized URLs, and send diagnostic information on detected files to Cisco.

Viewing and Modifying the Appliance Information

License: Any

The Information page provides you with information about your ASA FirePOWER module. The information includes read-only information, such as the product name and model number, the operating system and version, and the current system policy. The page also provides you with an option to change the name of the appliance.

The following table describes each field.

Table 84: Appliance Information

Field	Description
Name	A name you assign to the appliance. Note that this name is only used within the context of the ASA FirePOWER module. Although you can use the hostname as the name of the appliance, entering a different name in this field does not change the hostname.
Product Model	The model name for the appliance.

Field	Description
Serial Number	The chassis serial number of the appliance.
Software Version	The version of the software currently installed.
Operating System	The operating system currently running on the appliance.
Operating System Version	The version of the operating system currently running on the appliance.
IPv4 Address	The IPv4 address of the default (eth0) management interface of the appliance. If IPv4 management is disabled for the appliance, this field indicates that.
IPv6 Address	The IPv6 address of the default (eth0) management interface of the appliance. If IPv6 management is disabled for the appliance, this field indicates that.
Current Policies	The appliance-level policies currently applied. If a policy has been updated since it was last applied, the name of the policy appears in italics.
Model Number	The model number for the appliance. This number may be important for troubleshooting.

To modify the appliance information:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **Configuration**.

The **Information** page appears.

Step 2 To change the appliance name, type a new name in the **Name** field.

The name **must** be alphanumeric characters and cannot be composed of numeric characters only.

Step 3 To save your changes, click **Save**.

The page refreshes and your changes are saved.

Cloud Communications Options for URL Filtering and Malware Detection

License: URL Filtering or Malware

The ASA FirePOWER module contacts Cisco's Collective Security Intelligence Cloud to obtain various types of information:

- File policies associated with access control rules allow devices to detect files transmitted in network traffic. The ASA FirePOWER module uses data from the Cisco cloud to determine if the files represent malware; see Understanding and Creating File Policies, on page 370.
- When you enable URL filtering, the ASA FirePOWER module can retrieve category and reputation data for many commonly visited URLs, as well as perform lookups for uncategorized URLs. You can then quickly

create URL conditions for access control rules; see Blocking URLs Based on URL Category and Reputation, on page 118.

Use the ASA FirePOWER module's local configuration to specify the following options:

Enable URL Filtering

You must enable this option to perform category and reputation-based URL filtering.

Enable Automatic Updates

Allows the system to contact the cloud on a regular basis to obtain updates to the URL category and reputation data in your appliance's local data set. Although the cloud typically updates its data once per day, enabling automatic updates forces the ASA FirePOWER module to check every 30 minutes to make sure that you always have up-to-date information.

Although daily updates tend to be small, if it has been more than five days since your last update, new URL filtering data may take up to 20 minutes to download, depending on your bandwidth. Then, it may take up to 30 minutes to perform the update itself.

If you want to have strict control of when the system contacts the cloud, you can disable automatic updates and use the scheduler instead, as described in Automating URL Filtering Updates, on page 447.

Note Cisco recommends that you either enable automatic updates or use the scheduler to schedule updates. Although you can manually perform on-demand updates, allowing the system to automatically contact the cloud on a regular basis provides you with the most up-to-date, relevant URL data.

Query Cloud for Unknown URL

Allows the system to query the cloud when someone on your monitored network attempts to browse to a URL that is not in the local data set.

If the cloud does not know the category or reputation of a URL, or if the ASA FirePOWER module cannot contact the cloud, the URL does **not** match access control rules with category or reputation-based URL conditions. You cannot assign categories or reputations to URLs manually.

Disable this option if you do not want your uncategorized URLs to be cataloged by the Cisco cloud, for example, for privacy reasons.

Cached URLs Expire

This setting is relevant only if **Query Cisco Cloud for Unknown URLs** is enabled.

To minimize instances of URLs matching on stale data, you can set URLs in the cache to expire. For greater accuracy and currency of threat data, choose a shorter expiration time.

Caching category and reputation data makes web browsing faster. By default, cached data for URLs never expires, for fastest performance.

A cached URL refreshes *after* the first time a user on the network accesses it after the specified time has passed. The first user does not see the refreshed result, but the next user who visits this URL does see the refreshed result.

Licensing

Performing category and reputation-based URL filtering and device-based malware detection require that you enable the appropriate licenses on your ASA FirePOWER module; see Licensing the ASA FirePOWER Module, on page 469.

You **cannot** configure cloud connection options if you have no URL Filtering license on the ASA FirePOWER module. The Cloud Services local configuration page displays only the options for which you are licensed. ASA FirePOWER modules with expired licenses cannot contact the cloud.

Note that, in addition to causing the URL Filtering configuration options to appear, adding a URL Filtering license to your ASA FirePOWER module automatically enables **Enable URL Filtering** and **Enable Automatic Updates**. You can manually disable the options if needed.

Internet Access

The system uses ports 80/HTTP and 443/HTTPS to contact the Cisco cloud.

The following procedures explain how to enable communications the Cisco cloud, and how to perform an on-demand update of URL data. Note that you cannot start an on-demand update if an update is already in progress.

Enabling Cloud Communications

To enable communications with the cloud:

Step 1 Ensure that your appliance can communicate with the Cisco cloud at all of the following URLs:

database.brightcloud.com

service.brightcloud.com

Step 2 Select **Configuration** > **ASA FirePOWER Configuration** > **Integration** > **Cloud Services**.

The **Information** page appears.

Step 3 Click **Cloud Services**.

The **Cloud Services** page appears. If you have a URL Filtering license, the page displays the last time URL data was updated.

Step 4 Configure cloud connection options as described above.

You must **Enable URL Filtering** before you can **Enable Automatic Updates** or **Query Cloud for Unknown URLs**.

Step 5 Click **Save**.

Your settings are saved. If you enabled URL filtering, depending on how long it has been since URL filtering was last enabled, or if this is the first time you enabled URL filtering, the ASA FirePOWER module retrieves URL filtering data from the cloud.

What to do next

- To perform an on-demand update of the system's URL data:

1. Select **Configuration** > **ASA FirePOWER Configuration** > **Local** > **Configuration**.

   The **Information** page appears.
2. Click **URL Filtering**.

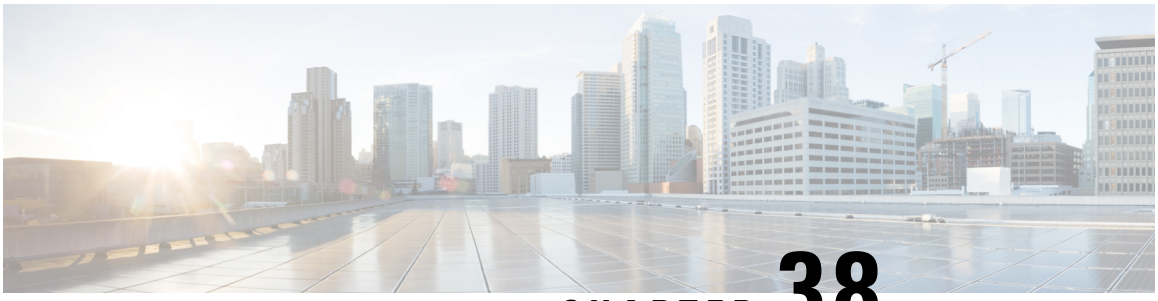
   The **URL Filtering** page appears.
3. Click **Update Now**.

   The ASA FirePOWER module contacts the cloud and updates its URL filtering data if an update is available.

System Information

Time

You can view the current time and time source on the ASA FirePOWER module using the Time page.



CHAPTER 38

Licensing the ASA FirePOWER Module

Understanding Licensing

License: Any

You can license a variety of features to create an optimal ASA FirePOWER deployment for your organization.

Licenses allow your device to perform a variety of functions including:

- intrusion detection and prevention
- Security Intelligence filtering
- file control and advanced malware protection
- application, user, and URL control

There are a few ways you may lose access to licensed features in the ASA FirePOWER module. You can remove licensed capabilities. Though there are some exceptions, you cannot use the features associated with an expired or deleted license.

This section describes the types of licenses available in an ASA FirePOWER module deployment. The licenses you can enable on an appliance can depend the other licenses enabled.

The following table summarizes ASA FirePOWER module licenses.

Table 85: ASA FirePOWER Module Licenses

License	Granted Capabilities	Requires
Protection	intrusion detection and prevention file control Security Intelligence filtering	none
Control	user and application control	Protection

License	Granted Capabilities	Requires
Malware	advanced malware protection (network-based malware detection and blocking)	Protection
URL Filtering	category and reputation-based URL filtering	Protection

Protection

License: Protection

A Protection license allows you to perform intrusion detection and prevention, file control, and Security Intelligence filtering:

- *Intrusion detection and prevention* allows you to analyze network traffic for intrusions and exploits and, optionally, drop offending packets.
- *File control* allows you to detect and, optionally, block users from uploading (sending) or downloading (receiving) files of specific types over specific application protocols. With a Malware license (see Malware, on page 471), you can also inspect and block a restricted set of those file types based on their malware dispositions.
- *Security Intelligence filtering* allows you to block—deny traffic to and from—specific IP addresses, before the traffic is subjected to analysis by access control rules. Dynamic feeds allow you to immediately block connections based on the latest intelligence. Optionally, you can use a "monitor-only" setting for Security Intelligence filtering.

Although you can configure an access control policy to perform Protection-related inspection without a license, you cannot apply the policy until you first add a Protection license to the ASA FirePOWER module.

If you delete your Protection license from the ASA FirePOWER module, the ASA FirePOWER module stops detecting intrusion and file events. Additionally, the ASA FirePOWER module will not contact the internet for either Cisco-provided or third-party Security Intelligence information. You cannot reapply existing policies until you re-enable Protection.

Because a Protection license is required for URL Filtering, Malware, and Control licenses, deleting or disabling a Protection license has the same effect as deleting or disabling your URL Filtering, Malware, or Control license.

Control

License: Control

A Control license allows you to implement user and application control by adding user and application conditions to access control rules. To enable Control, you must also enable Protection.

Although you can add user and application conditions to access control rules without a Control license, you cannot apply the policy until you first add a Control license to the ASA FirePOWER module.

If you delete your Control license, you cannot reapply existing access control policies if they include rules with user or application conditions.

URL Filtering

License: URL Filtering

URL filtering allows you to write access control rules that determine the traffic that can traverse your network based on URLs requested by monitored hosts, correlated with information about those URLs, which is obtained from the Cisco cloud by the ASA FirePOWER module. To enable URL Filtering, you must also enable a Protection license.

Tip Without a URL Filtering license, you can specify individual URLs or groups of URLs to allow or block. This gives you granular, custom control over web traffic, but does not allow you to use URL category and reputation data to filter network traffic.

URL filtering requires a subscription-based URL Filtering license. Although you can add category and reputation-based URL conditions to access control rules without a URL Filtering license, the ASA FirePOWER module will not contact the cloud for URL information. You cannot apply the access control policy until you first add a URL Filtering license to the ASA FirePOWER module.

You may lose access to URL filtering if you delete the license from the ASA FirePOWER module. Also, URL Filtering licenses may expire. If your license expires or if you delete it, access control rules with URL conditions immediately stop filtering URLs, and your ASA FirePOWER module can no longer contact the cloud. You cannot reapply existing access control policies if they include rules with category and reputation-based URL conditions.

Malware

License: Malware

A Malware license allows you to perform advanced malware protection, that is, use devices to detect and block malware in files transmitted over your network. To enable Malware on a device, you must also enable Protection.

You configure malware detection as part of a file policy, which you then associate with one or more access control rules. File policies can detect your users uploading or downloading files of specific types over specific application protocols. The Malware license allows you to inspect a restricted set of those file types for malware. The Malware license also allows you to add specific files to a file list and enable the file list within a file policy, allowing those files to be automatically allowed or blocked on detection.

Although you can add a malware-detecting file policy to an access control rule without a Malware license, the file policy is marked with a warning icon in the access control rule editor. Within the file policy, Malware Cloud Lookup rules are also marked with the warning icon. Before you can apply an access control policy that includes a malware-detecting file policy, you **must** add a Malware license. If you later delete the license, you cannot reapply an existing access control policy to those devices if it includes file policies that perform malware detection.

If you delete your Malware license or it expires, the ASA FirePOWER module stops performing malware cloud lookups, and also stops acknowledging retrospective events sent from the Cisco cloud. You cannot reapply existing access control policies if they include file policies that perform malware detection. Note that for a very brief time after a Malware license expires or is deleted, the system can use cached dispositions for files detected by Malware Cloud Lookup file rules. After the time window expires, the system assigns a disposition of Unavailable to those files, rather than performing a lookup.

Viewing Your Licenses

License: Any

Use the **Licenses** page to view the licenses for an ASA FirePOWER module.

Other than the **Licenses** page, there are a few other ways you can view licenses and license limits:

- The **Product Licensing dashboard** widget provides an at-a-glance overview of your licenses.
- The Device page (**Configuration** > **ASA FirePOWER Configuration** > **Device Management** > **Device**) lists the licenses.

To view your licenses:

Select **Configuration** > **ASA FirePOWER Configuration** > **Licenses**.

The **Licenses** page appears.

Adding a License to the ASA FirePOWER module

License: Any

Before you add a license to the ASA FirePOWER module, make sure you have the activation key provided by Cisco when you purchased the license. You **must** add licenses before you can use licensed features.

Note If you add licenses after a backup has completed, these licenses will not be removed or overwritten if this backup is restored. To prevent a conflict on restore, remove those licenses before restoring the backup, noting where the licenses were used, and add and reconfigure them after restoring the backup. If a conflict occurs, contact Support.

To add a license:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Licenses**.

The **Licenses** page appears.

Step 2 Click **Add New License**.

The **Add License** page appears.

Step 3 Did you receive an email with your license?

- If yes, copy the license from the email, paste it into the **License** field, and click **Submit License**.

If the license is correct, the license is added. Skip the rest of the procedure.

- If no, click **Get License**.

The **Product License Registration** portal appears. If you cannot access the Internet, switch to a computer that can. Note the license key at the bottom of the page and browse to https://www.cisco.com/go/license .

Step 4 Follow the on-screen instructions to obtain your license, which will be sent to you in an email.

Tip You can also request a license on the **Licenses** tab after you log into the Support Site.

Step 5 Copy the license from the email, paste it into the **License** field in the ASA FirePOWER module's web user interface, and click **Submit License**.

If the license is valid, it is added.

Deleting a License

License: Any

Use the following procedure if you need to delete a license for any reason. Keep in mind that because Cisco generates licenses based on each ASA FirePOWER module's unique license key, you cannot delete a license from one ASA FirePOWER module and then reuse it on a different ASA FirePOWER module.

In most cases, deleting a license removes your ability to use features enabled by that license. For more information, see Understanding Licensing, on page 469.

To delete a license:

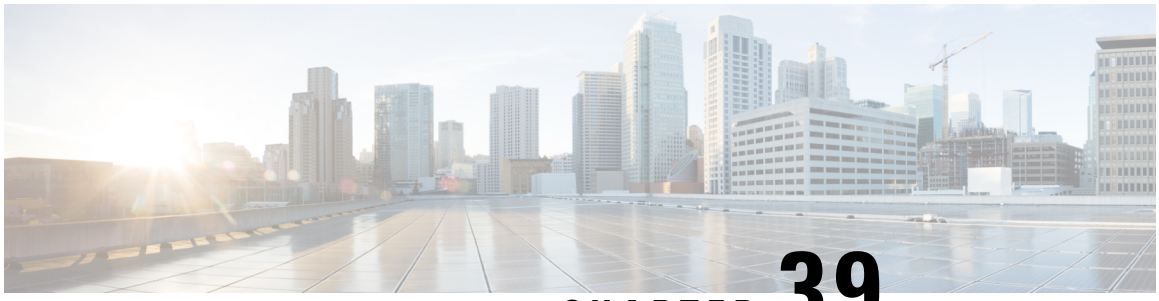
Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Licenses**.

The **Licenses** page appears.

Step 2 Next to the license you want to delete, click the **delete** icon ( ).

Step 3 Confirm that you want to delete the license.

The license is deleted.



CHAPTER 39

Updating ASA FirePOWER Module Software

Cisco electronically distributes several different types of updates, including major and minor updates to the ASA FirePOWER module software itself, as well as rule updates, geolocation database (GeoDB) updates, and Vulnerability Database (VDB) updates.

Caution This section contains general information on updating the ASA FirePOWER module. Before you update, including the VDB, GeoDB, or intrusion rules, you **must** read the release notes or advisory text that accompanies the update. The release notes provide important information, including prerequisites, warnings, and specific installation and uninstallation instructions.

Unless otherwise documented in the release notes or advisory text, updating does not modify configurations; the settings remain intact.

Understanding Update Types

License: Any

Cisco electronically distributes several different types of updates, including major and minor updates to the ASA FirePOWER module software itself, as well as intrusion rule updates and VDB updates.

The following table describes the types of updates provided by Cisco. For most update types, you can schedule their download and installation; see Scheduling Tasks, on page 441 and Using Recurring Rule Updates, on page 486.

Table 86: ASA FirePOWER Module Update Types

Update Type	Description	Schedule?	Uninstall?
patches	Patches include a limited range of fixes (and usually change the fourth digit in the version number; for example, 5.4.0.1).	yes	yes

Update Type	Description	Schedule?	Uninstall?
feature updates	Feature updates are more comprehensive than patches and generally include new features (and usually change the third digit in the version number; for example, 5.4.1).	yes	yes
major updates (major and minor version releases)	Major updates, sometimes referred to as upgrades, include new features and functionality and may entail large-scale changes (and usually change the first or second digit in the version number; for example, 5.3 or 5.4).	no	no
VDB	VDB updates affect the database of known vulnerabilities to which hosts may be susceptible.	yes	no
intrusion rules	Intrusion rule updates provide new and updated intrusion rules and preprocessor rules, modified states for existing rules, and modified default intrusion policy settings. Rule updates may also delete rules, provide new rule categories and default variables, and modify default variable values.	yes	no
geolocation database (GeoDB)	GeoDB updates provide updated information on physical locations, connection types, and so on that your system can associate with detected routable IP addresses. You can use geolocation data as a condition in access control rules. You must install the GeoDB to view geolocation details.	yes	no

Note that while you can uninstall patches and other minor updates, you cannot uninstall major updates or return to previous versions of the VDB, GeoDB, or intrusion rules. If you updated to a new major version and you need to revert to an older version, contact Cisco TAC.

Performing Software Updates

License: Any

There are a few basic steps to updating. First, you **must** prepare for the update by reading the release notes and completing any required pre-update tasks. Then, you can begin the update. You must verify the update's success. Finally, complete any required post-update steps.

Planning for the Update

License: Any

Before you begin the update, you must thoroughly read and understand the release notes, which you can download from the Support Site. The release notes describe new features and functionality, and known and resolved issues. The release notes also contain important information on prerequisites, warnings, and specific installation and uninstallation instructions.

The following sections provide an overview of some of the factors you must consider when planning for the update.

Software Version Requirements

You must make sure you are running the correct software version. The release notes indicate the required version. If you are running an earlier version, you can obtain updates from the Support Site.

Time and Disk Space Requirements

Make sure you have enough free disk space and allow enough time for the update. The release notes indicate space and time requirements.

Configuration Backup Guidelines

Before you begin a major update, Cisco recommends that you delete any backups that reside on the ASA FirePOWER module after copying them to an external location. Regardless of the update type, you should also back up current configuration data to an external location. See Using Backup and Restore, on page 503.

When to Perform the Update

Because the update process may affect traffic inspection and traffic flow, and because the Data Correlator is disabled while an update is in progress, Cisco recommends you perform the update in a maintenance window or at a time when the interruption will have the least impact.

Understanding the Update Process

License: Any

You use the ASA FirePOWER module interface to update the ASA FirePOWER module.

The Product Updates page (**Configuration > ASA FirePOWER Configuration > Updates**) shows the version of each update, as well as the date and time it was generated. It also indicates whether a software reboot is required as part of the update. When you upload updates obtained from Support, they appear on the page. Uninstallers for patch and feature updates also appear; see Uninstalling Software Updates, on page 481. The page can also list VDB updates.

Tip For patches and feature updates, you can take advantage of the automated update feature; see Automating Software Updates, on page 445.

Traffic Flow and Inspection

When you install or uninstall updates, the following capabilities may be affected:

- traffic inspection, including application and user awareness and control, URL filtering, Security Intelligence filtering, intrusion detection and prevention, and connection logging
- traffic flow

The Data Correlator does not run during system updates. It resumes when the update is complete.

The manner and duration of network traffic interruption depends on how yourASA FirePOWER module is configured and deployed, and whether the update reboots the ASA FirePOWER module. For specific information on how and when network traffic is affected for a particular update, see the release notes.

Using the ASA FirePOWER Module During the Update

Regardless of the type of update, do **not** use the ASA FirePOWER module to perform tasks other than monitoring the update.

To prevent you from using the ASA FirePOWER module during a major update, and to allow you to easily monitor a major update's progress, the system streamlines the ASA FirePOWER module interface. You can monitor a minor update's progress in the task queue (**Monitoring** > ASA FirePOWER **Monitoring** > **Task Status**). Although you are not prohibited from using the ASA FirePOWER module during a minor update, Cisco recommends against it.

Even for minor updates, the ASA FirePOWER module may become unavailable during the update process. This is expected behavior. If this occurs, wait until you can again access the ASA FirePOWER module. If the update is still running, you **must** continue to refrain from using the ASA FirePOWER module until the update has completed. Note that while updating, the ASA FirePOWER module may reboot a second time; this is also expected behavior.

Caution If you encounter issues with the update (for example, if the update has failed or if a manual refresh of the Update Status page shows no progress), do **not** restart the update. Instead, contact Support.

After the Update

You **must** complete all of the post-update tasks listed in the release notes to ensure that your deployment is performing properly.

The most important post-update task is to reapply access control policies. Note that applying an access control policy may cause a short pause in traffic flow and processing, and may also cause a few packets to pass uninspected; see Deploying Configuration Changes, on page 73.

Additionally, you should:

- verify that the update succeeded
- update your intrusion rules, VDB, and GeoDB, if necessary
- make any required configuration changes, based on the information in the release notes
- perform any additional post-update tasks listed in the release notes

Updating the ASA FirePOWER Module Software

License: Any

Update the ASA FirePOWER module software in one of two ways, depending on the type of update and whether your ASA FirePOWER module has access to the Internet:

- You can obtain the update directly from the Support Site if your ASA FirePOWER module has access to the Internet. This option is **not** supported for major updates.
- You can manually download the update from the Support Site and then upload it to the ASA FirePOWER module. Choose this option if your ASA FirePOWER module does not have access to the Internet or if you are performing a major update.

For major updates, updating the ASA FirePOWER module removes uninstallers for previous updates.

- To update the ASA FirePOWER Module Software:

Step 1 Read the release notes and complete any required pre-update tasks.

Pre-update tasks may include making sure that: the ASA FirePOWER module is running the correct version of the Cisco software, you have enough free disk space to perform the update, you set aside adequate time to perform the update, you backed up configuration data, and so on.

Step 2 Upload the update. You have two options, depending on the type of update and whether your ASA FirePOWER module has access to the Internet:

- For all except major updates, and if your ASA FirePOWER module has access to the Internet, select **Configuration** > **ASA FirePOWER Configuration** > **Updates**, then click **Download Updates** to check for the latest updates on either of the following Support Sites:
  - **Sourcefire:** (https://support.sourcefire.com/)
  - **Cisco:**

    (http://www.cisco.com/cisco/web/support/index.html)
- For major updates, or if your ASA FirePOWER module does not have access to the Internet, you must first manually download the update from either of the following Support Sites:
  - **Sourcefire:** (https://support.sourcefire.com/)
  - **Cisco:** (http://www.cisco.com/cisco/web/support/index.html)
- Select **Configuration** > **ASA FirePOWER Configuration** > **Updates**, then click **Upload Update**. Click **Choose File** to navigate to and select the update and click **Upload**.

Note Download the update directly from the Support Site, either manually or by clicking **Download Updates** on the Product Updates tab. If you transfer an update file by email, it may become corrupted.

The update is uploaded.

Step 3 Select **Monitoring >** ASA FirePOWER **Monitoring > Task Status** to view the task queue and make sure that there are no jobs in process.

Tasks that are running when the update begins are stopped and cannot be resumed; you must manually delete them from the task queue after the update completes. The task queue automatically refreshes every 10 seconds. You must wait until any long-running tasks are complete before you begin the update.

Step 4 Select **Configuration** > **ASA FirePOWER Configuration** > **Updates**.

The **Product Updates** page appears.

Step 5 Click the **install** icon next to the update you uploaded.

The update process begins. How you monitor the update depends on whether the update is a major or minor update. See the Table 86: ASA FirePOWER Module Update Types, on page 475 table and the release notes to determine your update type:

- For minor updates, you can monitor the update's progress in the task queue (**Monitoring** > **ASA FirePOWER**> **Monitoring** > **Task Status**).
- For major updates, you can begin monitoring the update's progress in the task queue. However, after the ASA FirePOWER module completes its necessary pre-update checks, you are locked out of the module interface. When

you regain access, the Upgrade Status page appears. See Monitoring the Status of Major Updates, on page 480for information.

Caution Regardless of the update type, do **not** use the ASA FirePOWER module to perform tasks other than monitoring the update until the update has completed and, if necessary, the ASA FirePOWER module reboots. For more information, seeUsing the ASA FirePOWER Module During the Update, on page 477

Step 6 After the update finishes, access the ASA FirePOWER module interface and refresh the page. Otherwise, the interface may exhibit unexpected behavior. If you are the first user to access the interface after a major update, the End User License Agreement (EULA) may appear. You must review and accept the EULA to continue.

Step 7 If the rule update available on the Support Site is newer than the rules on your ASA FirePOWER module, import the newer rules.

For more information, see Importing Rule Updates and Local Rule Files, on page 483.

Step 8 Reapply access control policies.

Applying an access control policy may cause a short pause in traffic flow and processing, and may also cause a few packets to pass uninspected. For more information, see Deploying Configuration Changes, on page 73.

Step 9 If the VDB available on the Support Site is newer than the most recently installed VDB, install the latest VDB.

Installing a VDB update causes a short pause in traffic flow and processing, and may also cause a few packets to pass uninspected. For more information, see Updating the Vulnerability Database, on page 482.

Monitoring the Status of Major Updates

License: Any

For major updates, the ASA FirePOWER module provides you with a streamlined interface so that you can easily monitor the update process. The streamlined interface also prevents you from using the ASA FirePOWER module to perform tasks other than monitoring the update.You can begin monitoring the update's progress in the task queue (**Monitoring >** ASA FirePOWER **Monitoring > Task Status**). However, after the ASA FirePOWER module completes its necessary pre-update checks, you are locked out of the user interface until a streamlined update page appears.

The streamlined interface displays the version you are updating from, the version you are updating to, and the time that has elapsed since the update began. It also displays a progress bar and gives details about the script currently running.

Tip Click **show log for current script** to see the update log. Click **hide log for current script** to hide the log again.

If the update fails for any reason, the page displays an error message indicating the time and date of the failure, which script was running when the update failed, and instructions on how to contact Support. Do **not** restart the update.

Caution If you encounter any other issue with the update (for example, if a manual refresh of the page shows no progress for an extended period of time), do **not** restart the update. Instead, contact Support.

When the update completes, the ASA FirePOWER module displays a success message and reboots. After the ASA FirePOWER module finishes rebooting, complete any required post-update steps.

Uninstalling Software Updates

License: Any

When you apply a patch or feature update, the update process creates an uninstaller that allows you to remove the update.

When you uninstall an update, the resulting Cisco software version depends on the update path. For example, consider a scenario where you updated directly from Version 5.0 to Version 5.0.0.2. Uninstalling the Version 5.0.0.2 patch might result in Version 5.0.0.1, even though you never installed the Version 5.0.0.1 update. For information on the resulting Cisco software version when you uninstall an update, see the release notes.

Note Uninstalling is not supported for major updates. If you updated to a new major version and you need to revert to an older version, contact Support.

Traffic Flow and Inspection

Uninstalling an update may affect traffic inspection and traffic flow. For specific information on how and when network traffic is affected for a particular update, see the release notes.

After the Uninstallation

After you uninstall the update, verify that the uninstall succeeded. For specific information for each update, see the release notes.

To uninstall a patch or feature update:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Updates**.

The **Product Updates** page appears.

Step 2 Click the install icon next to the uninstaller for the update you want to remove.

If prompted, confirm that you want to uninstall the update and reboot the ASA FirePOWER module.

The uninstall process begins. You can monitor its progress in the task queue (**MonitoringASA** > **FirePOWER Monitoring** > **Task Status**).

Caution Do **not** use the ASA FirePOWER module interface to perform tasks until the uninstall has completed and, if necessary, the ASA FirePOWER module reboots. For more information, see Understanding the Update Process, on page 477.

Step 3 Refresh the page. Otherwise, the interface might exhibit unexpected behavior.

Updating the Vulnerability Database

License: Any

The Cisco Vulnerability Database (VDB) is a database of known vulnerabilities to which hosts may be susceptible. The Cisco Vulnerability Research Team (VRT) issues periodic updates to the VDB. To update the VDB, use the Product Updates page.

Note Installing a VDB update with detection updates may cause a short pause in traffic flow and processing, and may also cause a few packets to pass uninspected.You may want to schedule the update during low system usage times to minimize the impact of any system downtime.

Note After you complete a VDB update, reapply any out-of-date access control policy. Keep in mind that installing a VDB or reapplying an access control policy can cause a short pause in traffic flow and processing, and may also cause a few packets to pass uninspected. For more information, see Deploying Configuration Changes, on page 73.

This section explains how to plan for and perform manual VDB updates.

To update the vulnerability database:

Step 1 Read the **VDB Update Advisory Text** for the update.

The advisory text includes information about the changes to the VDB made in the update.

Step 2 Select **Configuration** > **ASA FirePOWER Configuration** > **Updates**.

The **Product Updates** page appears.

Step 3 Upload the update:

- If your ASA FirePOWER module has access to the Internet, click **Download Updates** to check for the latest updates on either of the following Support Sites:
- **Sourcefire:** (https://support.sourcefire.com/)
- **Cisco:** (http://www.cisco.com/cisco/web/support/index.html)
- If your ASA FirePOWER module does not have access to the Internet, manually download the update from one of the following Support Sites, then click **Upload Update**. Click **Choose File** to navigate to and select the update and click **Upload**:
- **Sourcefire:** (https://support.sourcefire.com/)
- **Cisco:**(http://www.cisco.com/cisco/web/support/index.html)

Note Download the update directly from the Support Site either manually or by clicking **Download Updates**. If you transfer an update file by email, it may become corrupted.

The update is uploaded.

Step 4 Click the **install** icon next to the VDB update.

The **Install Update** page appears.

Step 5 Click **Install**.

The update process begins. You can monitor the update's progress in the task queue (**Monitoring** > ASA FirePOWER **Monitoring** > **Task Status**).

Caution If you encounter issues with the update (for example, if the task queue indicates that the update has failed) **do not** restart the update. Instead, contact Support.

You must reapply any out-of-date access control policies for the VDB update to take effect; see Deploying Configuration Changes, on page 73.

Importing Rule Updates and Local Rule Files

License: Any

As new vulnerabilities become known, the Cisco Vulnerability Research Team (VRT) releases rule updates that you can first import onto your ASA FirePOWER module, then implement by applying affected access control, network analysis, and intrusion policies.

Rule updates are cumulative, and Cisco recommends you always import the latest update. You cannot import a rule update that either matches or predates the version of the currently installed rules.

Note Rule updates may contain new binaries, so make sure your process for downloading and installing them complies with your security policies. In addition, rule updates may be large, so import rules during periods of low network use.

A rule update may provide the following:

1. **new and modified rules and rule states**—Rule updates provide new and updated intrusion and preprocessor rules. For new rules, the rule state may be different in each system-provided intrusion policy. For example, a new rule may be enabled in the Security over Connectivity intrusion policy and disabled in the Connectivity over Security intrusion policy. Rule updates may also change the default state of existing rules, or delete existing rules entirely.
2. **new rule categories**—Rule updates may include new rule categories, which are always added.
3. **modified preprocessor and advanced settings**—Rule updates may change the advanced settings in the system-provided intrusion policies and the preprocessor settings in system-provided network analysis policies. They can also update default values for the advanced preprocessing and performance options in your access control policies.
4. **new and modified variables**—Rule updates may modify default values for existing default variables, but do not override your changes. New variables are always added.

Understanding When Rule Updates Modify Policies

Rule updates can affect both system-provided and custom network analysis policies, as well as all access control policies:

- **system provided**—Changes to system-provided network analysis and intrusion policies, as well as any changes to advanced access control settings, automatically take effect when you reapply the policies after the update.
- **custom**—Because every custom network analysis and intrusion policy uses a system-provided policy as its base, or as the eventual base in a policy chain, rule updates can affect custom network analysis and intrusion policies. However, you can prevent rule updates from automatically making those changes. This allows you to update system-provided base policies manually, on a schedule independent of rule update imports. Regardless of your choice (implemented on a per-custom-policy basis), updates to system-provided policies do **not** override any settings you customized. For more information, see Allowing Rule Updates to Modify a System-Provided Base Policy, on page 260.

Note that importing a rule update discards all cached changes to network analysis and intrusion policies. For your convenience, the Rule Updates page lists policies with cached changes. For more information, see Resolving Conflicts and Committing Policy Changes, on page 255.

Reapplying Policies

For changes made by a rule update to take affect, you must reapply any modified policies. When importing a rule update, you can configure the system to automatically reapply intrusion or access control policies. This is especially useful if you allow the rule update to modify system-provided base policies.

- Reapplying an access control policy also reapplies associated SSL, network analysis, and file policies, but does **not** reapply intrusion policies. It also updates the default values for any modified advanced settings. Because you cannot apply a network analysis policy independently, you **must** reapply access control policies if you want to update preprocessor settings in network analysis policies.
- Reapplying intrusion policies allows you to update rules and other changed intrusion policy settings. You can reapply intrusion policies in conjunction with access control policies, or you can apply only intrusion policies to update intrusion rules without updating any other access control configurations.

When a rule update includes shared object rules, applying an access control or intrusion policy for the first time after the import causes a short pause in traffic flow and processing, and may also cause a few packets to pass uninspected. For more information on applying access control and intrusion policies, including requirements, other effects, and recommendations, see Deploying Configuration Changes, on page 73.

Using One-Time Rule Updates

License: Any

There are two methods that you can use for one-time rule updates:

- Using manual one-time rule updates - to manually download a rule update from the Support Site and then manually install the rule update.
- Using automatic one-time rule updates - to use an automated feature to search the Support Site for new rule updates and upload them.

Using Manual One-Time Rule Updates

License: Any

The following procedure explains how to import a new rule update manually. This procedure is especially useful if your ASA FirePOWER module does not have Internet access.

To manually import a rule update:

Step 1 From a computer that can access the Internet, access either of the following sites:

- **Sourcefire:**(https://support.sourcefire.com/)
- **Cisco:** (http://www.cisco.com/cisco/web/support/index.html)

Step 2 Click **Download**, then click **Rules**.

Step 3 Navigate to the latest rule update.

Rule updates are cumulative; you cannot import a rule update that either matches or predates the version of the currently installed rules.

Step 4 Click the rule update file that you want to download and save it to your computer.

Step 5 Select **Configuration > ASA FirePOWER Configuration > Updates**, then select the **Rule Updates** tab.

The Rule Updates page appears.

Tip You can also click **Import Rules** on the Rule Editor page (**Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy** > **Rule Editor**).

Step 6 Optionally, click **Delete All Local Rules**, then click **OK** to move all user-defined rules that you have created or imported to the deleted folder.

Step 7 Select **Rule Update or text rule file to upload and install** and click **Choose File** to navigate to and select the rule update file.

Step 8 Optionally, reapply policies after the update completes:

- Select **Reapply intrusion policies after the rule update import completes** to automatically reapply intrusion policies. Choose only this option to update rules and other changed intrusion policy settings without having to update any other access control configurations you may have made. You **must** select this option to reapply intrusion policies in conjunction with access control policies; reapplying access control policies in this case does not perform a complete apply.
- Select **Reapply access control policies after the rule update import completes** to automatically reapply access control policies and their associated SSL, network analysis, and file policies, but not intrusion policies. Selecting this option also updates the default values for any modified access control advanced settings. Because you cannot apply a network analysis policy independently of its parent access control policy, you **must** reapply access control policies if you want to update preprocessor settings in network analysis policies.

Step 9 Click **Import**.

The system installs the rule update and displays the Rule Update Log detailed view; see Understanding the Rule Update Import Log Detailed View, on page 491. The system also applies policies as you specified in the previous step; see Deploying Configuration Changes, on page 73 and Applying an Intrusion Policy, on page 283.

Note Contact Support if you receive an error message while installing the rule update.

Using Automatic One-Time Rule Updates

License: Any

The following procedure explains how to import a new rule update by automatically connecting to the Support Site. You can use this procedure only if the ASA FirePOWER module has Internet access.

To automatically import a rule update:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Updates**, then select the **Rule Updates** tab.

The **Rule Updates** page appears.

Tip You can also click **Import Rules** on the **Rule Editor** page (**Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy** > **Rule Editor**.

Step 2 Optionally, click **Delete All Local Rules**, then click **OK** to move all user-defined rules that you have created or imported to the deleted folder.

Step 3 Select **Download new Rule Update from the Support Site**.

Step 4 Optionally, reapply policies after the update completes:

- Select **Reapply intrusion policies after the rule update import completes** to automatically reapply intrusion policies. Choose only this option to update rules and other changed intrusion policy settings without having to update any other access control configurations you may have made. You **must** select this option to reapply intrusion policies in conjunction with access control policies; reapplying access control policies in this case does not perform a complete apply.
- Select **Reapply access control policies after the rule update import completes** to automatically reapply access control, network analysis, and file policies, but not intrusion policies. Selecting this option also updates the default values for any modified access control advanced settings. Because you cannot apply a network analysis policy independently of its parent access control policy, you **must** reapply access control policies if you want to update preprocessor settings in network analysis policies.

Step 5 Click **Import**.

The system installs the rule update and displays the Rule Update Log detailed view; see Understanding the Rule Update Import Log Detailed View, on page 491 . The system also applies policies as you specified in the previous step; see Deploying Configuration Changes, on page 73 and Applying an Intrusion Policy, on page 283.

Note Contact Support if you receive an error message while installing the rule update.

Using Recurring Rule Updates

License: Any

You can import rule updates on a daily, weekly, or monthly basis, using the Rule Updates page.

Applicable subtasks in the rule update import occur in the following order: download, install, base policy update, and policy reapply. When one subtask completes, the next subtask begins. Note that you can only apply policies previously applied by the ASA FirePOWER module where the recurring import is configured.

To schedule recurring rule updates:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Updates**, then select the **Rule Updates** tab.

The Rule Updates page appears.

Tip You can also click **Import Rules** on the **Rule Editor** page (**Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy** > **Rule Editor**.

Step 2 Optionally, click **Delete All Local Rules**, then click **OK** to move all user-defined rules that you have created or imported to the deleted folder.

Step 3 Select **Enable Recurring Rule Update Imports**.

The page expands to display options for configuring recurring imports. Import status messages appear beneath the **Recurring Rule Update Imports** section heading. Recurring imports are enabled when you save your settings.

Tip To disable recurring imports, clear the **Enable Recurring Rule Update Imports** check box and click **Save**.

Step 4 In the **Import Frequency** field, select **Daily**, **Weekly**, or **Monthly** from the drop-down list.

If you selected a weekly or monthly import frequency, use the drop-down lists that appear to select the day of the week or month when you want to import rule updates. Select from a recurring task drop-down list either by clicking or by typing the first letter or number of your selection one or more times and pressing Enter.

Step 5 In the **Import Frequency** field, specify the time when you want to start your recurring rule update import.

Step 6 Optionally, reapply policies after the update completes:

- Select **Reapply intrusion policies after the rule update import completes** to automatically reapply intrusion policies. Choose only this option to update rules and other changed intrusion policy settings without having to update any other access control configurations you may have made. You **must** select this option to reapply intrusion policies in conjunction with access control policies; reapplying access control policies in this case does not perform a complete apply.
- Select **Reapply access control policies after the rule update import completes** to automatically reapply access control policies and their associated SSL, network analysis, and file policies, but not intrusion policies. Selecting this option also updates the default values for any modified access control advanced settings. Because you cannot apply a network analysis policy independently of its parent access control policy, you **must** reapply access control policies if you want to update preprocessor settings in network analysis policies.

Step 7 Click **Save** to enable recurring rule update imports using your settings.

The status message under the Recurring Rule Update Imports section heading changes to indicate that the rule update has not yet run. At the scheduled time, the system installs the rule update and applies policies as you specified in the previous step; see Deploying Configuration Changes, on page 73 and Applying an Intrusion Policy, on page 283.

You can log off or perform other tasks before or during the import. When accessed during an import, the Rule Update Log displays a red status icon , and you can view messages as they occur in the Rule Update Log detailed view. Depending on the rule update size and content, several minutes may pass before status messages appear. For more information, see Viewing the Rule Update Log, on page 489.

Note Contact Support if you receive an error message while installing the rule update.

Importing Local Rule Files

License: Any

A local rule is a custom standard text rule that you import from a local machine as a plain text file with ASCII or UTF-8 encoding. You can create local rules using the instructions in the Snort users manual, which is available at http://www.snort.org

Note the following regarding importing local rules:

- The text file name can include alphanumeric characters, spaces, and no special characters other than underscore (_), period (.), and dash (-).
- You do not have to specify a Generator ID (GID); if you do, you can specify only GID 1 for a standard text rule or 138 for a sensitive data rule.
- Do **not** specify a Snort ID (SID) or revision number when importing a rule for the first time; this avoids collisions with SIDs of other rules, including deleted rules.

The system will automatically assign the rule the next available custom rule SID of 1000000 or greater, and a revision number of 1.

- You **must** include the SID assigned by the system and a revision number greater than the current revision number when importing an updated version of a local rule that you have previously imported.

To view the revision number for a current local rule, display the Rule Editor page (**Policies > Intrusion Policy > Rule Editor**), click on the local rule category to expand the folder, then click **Edit** next to the rule.

- You can reinstate a local rule that you have deleted by importing the rule using the SID assigned by the system and a revision number greater than the current revision number. Note that the system automatically increments the revision number when you delete a local rule; this is a device that allows you to reinstate local rules.

To view the revision number for a deleted local rule, display the Rule Editor page (**Policies > Intrusion Policy > Rule Editor**), click on the deleted rule category to expand the folder, then click **Edit** next to the rule.

- You cannot import a rule file that includes a rule with a SID greater than 2147483647; the import will fail.
- If you import a rule that includes a list of source or destination ports that is longer than 64 characters, the import will fail.
- The system always sets local rules that you import to the disabled rule state; you must manually set the state of local rules before you can use them in your intrusion policy. See Setting Rule States, on page 306 for more information.
- You must make sure that the rules in the file do not contain any escape characters.
- The rules importer requires that all custom rules are imported in ASCII or UTF-8 encoding.
- All imported local rules are automatically saved in the local rule category.
- All deleted local rules are moved from the local rule category to the deleted rule category.

- The system imports local rules preceded with a single pound character (#).
- The system ignores local rules preceded with two pound characters (##) and does not import them.
- Policy validation fails if you enable an imported local rule that uses the deprecated threshold keyword in combination with the intrusion event thresholding feature in an intrusion policy. See Configuring Event Thresholding, on page 309 for more information.

To import local rule files:

Step 1 Select **Policies > Intrusion Policy > Rule Editor**.

The **Rule Editor** page appears.

Step 2 Click **Import Rules**.

The Import Rules page appears.

Tip You can also select **System** > **Updates**, then select the **Rule Updates** tab.

Step 3 Select **Rule Update or text rule file to upload and install** and click **Choose File** to navigate to the rule file. Note that all rules uploaded in this manner are saved in the local rule category.

Tip You can import **only** plain text files with ASCII or UTF-8 encoding.

Step 4 Click **Import**.

The rule file is imported. Make sure you enable the appropriate rules in your intrusion policies. The rules are not activated until the next time you apply the affected policies.

Note The system does **not** use the new rule set for inspection until after you apply your intrusion policies. See Deploying Configuration Changes, on page 73 for procedures.

Viewing the Rule Update Log

License: Any

The ASA FirePOWER module generates a record for each rule update and local rule file that you import.

Each record includes a time stamp, the name of the user who imported the file, and a status icon indicating whether the import succeeded or failed. You can maintain a list of all rule updates and local rule files that you import, delete any record from the list, and access detailed records for all imported rules and rule update components. Actions you can take in the Rule Update Log are described in the following table.

Table 87: Rule Update Log Actions

To...	You can...
learn more about the contents of the columns in the table	find more information in Understanding the Rule Update Log Table, on page 490.

To...	You can...
delete an import file record from the import log, including detailed records for all objects included with the file	click the delete icon ( ) next to the file name for the import file. **Note** Deleting the file from the log does not delete any object imported in the import file, but only deletes the import log records.
view details for each object imported in a rule update or local rule file	click the view icon ( ) next to the file name for the import file.

To view the Rule Update Log:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Updates**, then select the **Rule Updates** tab.

The Rule Updates page appears.

Tip You can also click **Import Rules** on the Rule Editor page (**Configuration > ASA FirePOWER Configuration > Policies > Intrusion Policy > Rule Editor**).

Step 2 Click **Rule Update Log**.

The Rule Update Log page appears. This page lists each imported rule update and local rule file.

Understanding the Rule Update Log Table

License: Any

The fields in the list of rule updates and local rule files that you import are described in the following table.

Table 88: Rule Update Log Fields

Field	Description
Summary	The name of the import file. If the import fails, a brief statement of the reason for the failure appears under the file name.
Time	The time and date that the import started.
User ID	The user name of the user that triggered the import.
Status	Whether the import: • succeeded • failed or is currently in progress **Tip** The red status icon indicating an unsuccessful or incomplete import appears on the Rule Update Log page during the import and is replaced by the green icon only when the import has successfully completed.

Click the view icon ( ) next to the rule update or file name to view the Rule Update Log detailed page for the rule update or local rule file, or click the delete icon ( ) to delete the file record and all detailed object records imported with the file.

Tip You can view import details as they appear while a rule update import is in progress.

Viewing Rule Update Import Log Details

License: Any

The Rule Update Import Log detailed view lists a detailed record for each object imported in a rule update or local rule file. You can also create a custom workflow or report from the records listed that includes only the information that matches your specific needs.

The following table describes specific actions you can perform on a Rule Update Import Log detailed view.

Table 89: Rule Update Import Log Detailed View Actions

To...	You can...
learn more about the contents of the columns in the table	find more information in Understanding the Rule Update Import Log Detailed View, on page 491.

To view the Rule Update Import Log Detailed View:

Step 1 Select **Configuration > ASA FirePOWER Configuration > Updates**, then select the **Rule Updates** tab.

The Rule Updates page appears.

Tip You can also click **Import Rules** on the Rule Editor page (**Configuration** > **ASA FirePOWER Configuration** > **Policies** > **Intrusion Policy** > **Rule Editor**.

Step 2 Click **Rule Update Log**.

The **Rule Update Log** page appears.

Step 3 Click the **view** icon ( ) next to the file whose detailed records you want to view.

The table view of detailed records appears.

Understanding the Rule Update Import Log Detailed View

License: Any

You can view a detailed record for each object imported in a rule update or local rule file. The fields in the Rule Update Log detailed view are described in the following table.

Table 90: Rule Update Import Log Detailed View Fields

Field	Description
Time	The time and date the import began.
Name	The name of the imported object, which for rules corresponds to the rule Message field, and for rule update components is the component name.
Type	The type of imported object, which can be one of the following: • rule update component (an imported component such as a rule pack or policy pack) • rule (for rules, a new or updated rule; note that in Version 5.0.1 this value replaced the update value, which is deprecated) • policy apply (the **Reapply intrusion policies after the Rule Update import completes** option was enabled for the import)
Action	An indication that one of the following has occurred for the object type: • new (for a rule, this is the first time the rule has been stored on this ASA FirePOWER module) • changed (for a rule update component or rule, the rule update component has been modified, or the rule has a higher revision number and the same GID and SID) • collision (for a rule update component or rule, import was skipped because its revision conflicts with an existing component or rule) • deleted (for rules, the rule has been deleted from the rule update) • enabled (for a rule update edit, a preprocessor, rule, or other feature has been enabled in a system-provided policy) • disabled (for rules, the rule has been disabled in a system-provided policy) • drop (for rules, the rule has been set to Drop and Generate Events in a system-provided policy) • error (for a rule update or local rule file, the import failed) • apply (the **Reapply intrusion policies after the Rule Update import completes** option was enabled for the import)
Default Action	The default action defined by the rule update. When the imported object type is rule , the default action is Pass , Alert , or Drop . For all other imported object types, there is no default action.
GID	The generator ID for a rule. For example, 1 (standard text rule) or 3 (shared object rule).
SID	The SID for a rule.
Rev	The revision number for a rule.
Policy	For imported rules, this field displays All , which indicates that the imported rule was included in all system-provided intrusion policies. For other types of imported objects, this field is blank.
Details	A string unique to the component or rule. For rules, the GID, SID, and previous revision number for a changed rule, displayed as previously (GID:SID:Rev) . This field is blank for a rule that has not changed.

Field	Description
Count	The count (1) for each record. The Count field appears in a table view when the table is constrained, and the Rule Update Log detailed view is constrained by default to rule update records.

Updating the Geolocation Database

License: Any

The Cisco Geolocation Database (GeoDB) is a database of geographical data associated with routable IP addresses. The ASA FirePOWER module provides the country and continent. When your system detects GeoDB information that matches a detected IP address, you can view the geolocation information associated with that IP address. Cisco issues periodic updates to the GeoDB.

To update the GeoDB, use the Geolocation Updates page (**Configuration > ASA FirePOWER Configuration > Updates > Geolocation Updates**). When you upload GeoDB updates, they appear on this page.

The installation usually takes 30 to 40 minutes. Although a GeoDB update does not interrupt any other system functions (including the ongoing collection of geolocation information), the update does consume system resources while it completes. Consider this when planning your updates.

This section explains how to plan for and perform manual GeoDB updates. You can also take advantage of the automated update feature to schedule GeoDB updates; for more information, see Updating the Geolocation Database, on page 493.

To update the geolocation database:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Updates**.

The **Product Updates** page appears.

Step 2 Click the **Geolocation Updates** tab.

The Geolocation Updates page appears.

Step 3 Upload the update.

If your ASA FirePOWER module has access to the Internet, click **Download and install geolocation update from the Support Site** to check for the latest updates on either of the following Support Sites:

- **Sourcefire:** (https://support.sourcefire.com/)
- **Cisco:** (http://www.cisco.com/cisco/web/support/index.html)
- If your ASA FirePOWER module does not have access to the Internet, manually download the update from either of the Support Sites, then click **Upload and install geolocation update**. Click **Choose File** to navigate to and select the update and click **Import**:
  - **Sourcefire:** (https://support.sourcefire.com/)
  - **Cisco:** (http://www.cisco.com/cisco/web/support/index.html)

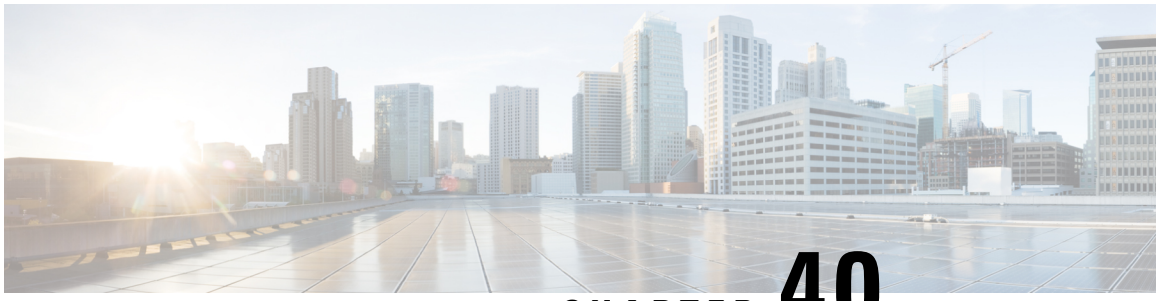
Note Download the update directly from the Support Site, either manually or by clicking **Download and install geolocation update from the Support Site** on the Geolocation Updates page. If you transfer an update file by email, it may become corrupted.

The update process begins. The average duration of update installation is 30 to 40 minutes. You can monitor the update's progress in the task queue (**Monitoring >** ASA FirePOWER **Monitoring > Task Status**).

Step 4 After the update finishes, return to the Geolocation Updates page to confirm that the GeoDB build number matches the update you installed.

The GeoDB update overrides any previous versions of the GeoDB and is effective immediately. Although it may take a few minutes for a GeoDB update to take effect throughout your deployment, you do not have to reapply access control policies after you update.

What to do next



CHAPTER 40

Monitoring the System

The ASA FirePOWER module provides many useful monitoring features to assist you in the daily administration of your system, all on a single page. For example, on the Host Statistics page you can monitor basic host statistics.

Viewing Host Statistics

License: Any

The **Statistics** page lists the current status of the following:

- general host statistics; see the Table 91: Host Statistics , on page 495 table for details
- intrusion event information (requires Protection); see Viewing Events, on page 397 or details

The following table describes the host statistics listed on the Statistics page.

Table 91: Host Statistics

Category	Description
Time	The current time on the system.
Uptime	The number of days (if applicable), hours, and minutes since the system was last started.
Memory Usage	The percentage of system memory that is being used.
Load Average	The average number of processes in the CPU queue for the past 1 minute, 5 minutes, and 15 minutes.
Disk Usage	The percentage of the disk that is being used. Click the arrow to view more detailed host statistics. See Monitoring System Status and Disk Space Usage, on page 496 for more information.

Category	Description
Processes	A summary of the processes running on the system. See Monitoring System Status and Disk Space Usage, on page 496 for more information.

To view the Statistics page:

Select **Monitoring** > **ASA FirePOWER Monitoring** > **Statistics**.

The **Statistics** page appears.

Monitoring System Status and Disk Space Usage

License: Any

The **Disk Usage** section of the Statistics page provides a quick synopsis of disk usage, both by category and by partition status. If you have a malware storage pack installed on a device, you can also check its partition status. You can monitor this page from time to time to ensure that enough disk space is available for system processes and the database.

To access disk usage information:

Step 1 Select **Monitoring** > **ASA FirePOWER Monitoring** > **Statistics**.

The **Statistics** page appears.

For more information on the disk usage categories, see Understanding the Disk Usage Widget, on page 429.

Step 2 Click the down arrow next to **Total** to expand it.

The **Disk Usage** section expands, displaying partition usage. If you have a malware storage pack installed, the /var/storage partition usage is also displayed.

About System Process Status

License: Any

The **Processes** section of the Host Statistics page allows you to see the processes that are currently running on an appliance. It provides general process information and specific information for each running process.

The following table describes each column that appears in the process list.

Table 92: Process Status

Column	Description
Pid	The process ID number

Column	Description
Username	The name of the user or group running the process
Pri	The process priority
Nice	The *nice* value, which is a value that indicates the scheduling priority of a process. Values range between -20 (highest priority) and 19 (lowest priority)
Size	The memory size used by the process (in kilobytes unless the value is followed by m , which indicates megabytes)
Res	The amount of resident paging files in memory (in kilobytes unless the value is followed by m , which indicates megabytes)
State	The process state: • D — process is in uninterruptible sleep (usually Input/Output) • N — process has a positive nice value • R — process is runnable (on queue to run) • S — process is in sleep mode • T — process is being traced or stopped • W — process is paging • X — process is dead • Z — process is defunct • < — process has a negative nice value
Time	The amount of time (in hours:minutes:seconds) that the process has been running
Cpu	The percentage of CPU that the process is using
Command	The executable name of the process

Viewing System Process Status

To expand the process list:

Step 1 Select **Monitoring** > **ASA FirePOWER Monitoring** > **Statistics**.

The **Statistics** page appears.

Step 2 Click the down arrow next to **Processes**.

The process list expands, listing general process status information that includes the number and types of running tasks, the current time, the current system uptime, the system load average, CPU, memory, and swap information, and specific information about each running process.

Cpu(s) lists the following CPU usage information:

- user process usage percentage
- system process usage percentage
- nice usage percentage (CPU usage of processes that have a negative nice value, indicating a higher priority)

Nice values indicate the scheduled priority for system processes and can range between -20 (highest priority) and 19 (lowest priority).

- idle usage percentage

Mem lists the following memory usage information:

- total number of kilobytes in memory
- total number of used kilobytes in memory
- total number of free kilobytes in memory
- total number of buffered kilobytes in memory

Swap lists the following swap usage information:

- total number of kilobytes in swap
- total number of used kilobytes in swap
- total number of free kilobytes in swap
- total number of cached kilobytes in swap

Note For more information about the types of processes that run on the appliance, see Understanding Executables and System Utilities, on page 500.

What to do next

To collapse the process list:

Click the up arrow next to **Processes**.

The process list collapses.

Understanding Running Processes

License: Any

There are two different types of processes that run on an appliance: daemons and executable files. Daemons always run, and executable files are run when required.

Understanding System Daemons

License: Any

Daemons continually run on an appliance. They ensure that services are available and spawn processes when required. The following table lists daemons that you may see on the Process Status page and provides a brief description of their functionality.

Note The table below is not an exhaustive list of all processes that may run on an appliance.

Table 93: System Daemons

Daemon	Description
crond	Manages the execution of scheduled commands (cron jobs)
dhclient	Manages dynamic host IP addressing
httpd	Manages the HTTP (Apache web server) process
httpsd	Manages the HTTPS (Apache web server with SSL) service, and checks for working SSL and valid certificate authentication; runs in the background to provide secure web access to the appliance
keventd	Manages Linux kernel event notification messages
klogd	Manages the interception and logging of Linux kernel messages
kswapd	Manages Linux kernel swap memory
kupdated	Manages the Linux kernel update process, which performs disk synchronization
mysqld	Manages ASA FirePOWER module database processes
ntpd	Manages the Network Time Protocol (NTP) process
pm	Manages all Cisco processes, starts required processes, restarts any process that fails unexpectedly
reportd	Manages reports
safe_mysqld	Manages safe mode operation of the database; restarts the database daemon if an error occurs and logs runtime information to a file
sfmgr	Provides the RPC service for remotely managing and configuring an appliance using an sftunnel connection to the appliance
sftroughd	Listens for connections on incoming sockets and then invokes the correct executable (typically the Cisco message broker, sfmb) to handle the request
sftunnel	Provides the secure communication channel for all processes requiring communication with a remote appliance
sshd	Manages the Secure Shell (SSH) process; runs in the background to provide SSH access to the appliance
syslogd	Manages the system logging (syslog) process

Understanding Executables and System Utilities

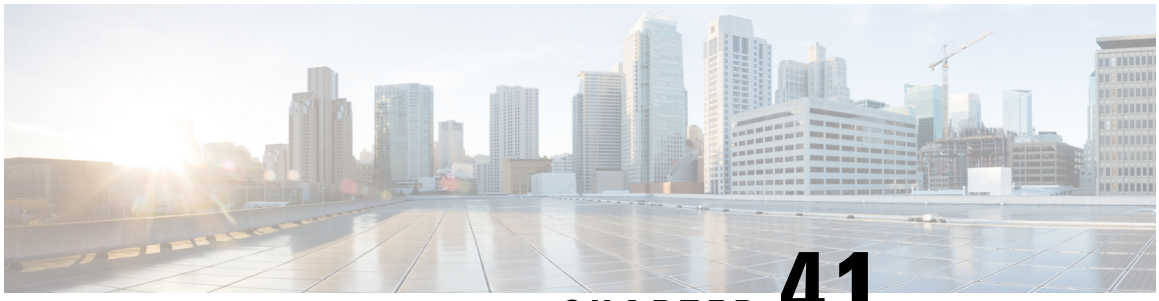
License: Any

There are a number of executables on the system that run when executed by other processes or through user action. The following table describes the executables that you may see on the Process Status page

Table 94: System Executables and Utilities

Executable	Description
awk	Utility that executes programs written in the awk programming language
bash	GNU Bourne-Again SHell
cat	Utility that reads files and writes content to standard output
chown	Utility that changes user and group file permissions
chsh	Utility that changes the default login shell
cp	Utility that copies files
df	Utility that lists the amount of free space on the appliance
echo	Utility that writes content to standard output
egrep	Utility that searches files and folders for specified input; supports extended set of regular expressions not supported in standard grep
find	Utility that recursively searches directories for specified input
grep	Utility that searches files and directories for specified input
halt	Utility that stops the server
httpsdctl	Handles secure Apache Web processes
hwclock	Utility that allows access to the hardware clock
ifconfig	Indicates the network configuration executable. Ensures that the MAC address stays constant
iptables	Handles access restriction based on changes made to the Access List page. See Configuring the Access List for Your Appliance, on page 455 for more information about access configuration.
iptables-restore	Handles iptables file restoration
iptables-save	Handles saved changes to the iptables
kill	Utility that can be used to end a session and process
killall	Utility that can be used to end all sessions and processes
ksh	Public domain version of the Korn shell

Executable	Description
logger	Utility that provides a way to access the syslog daemon from the command line
md5sum	Utility that prints checksums and block counts for specified files
mv	Utility that moves (renames) files
myisamchk	Indicates database table checking and repairing
mysql	Indicates a database process; multiple instances may appear
openssl	Indicates authentication certificate creation
perl	Indicates a perl process
ps	Utility that writes process information to standard output
sed	Utility used to edit one or more text files
sh	Public domain version of the Korn shell
shutdown	Utility that shuts down the appliance
sleep	Utility that suspends a process for a specified number of seconds
smtpclient	Mail client that handles email transmission when email event notification functionality is enabled
snmptrap	Forwards SNMP trap data to the SNMP trap server specified when SNMP notification functionality is enabled
snort(requires Protection)	Indicates that Snort is running
ssh	Indicates a Secure Shell (SSH) connection to the appliance
sudo	Indicates a sudo process, which allows users other than admin to run executables
top	Utility that displays information about the top CPU processes
touch	Utility that can be used to change the access and modification times of specified files
vim	Utility used to edit text files
wc	Utility that performs line, word, and byte counts on specified files



CHAPTER 41

Using Backup and Restore

Backup and restoration is an essential part of any system maintenance plan. While each organization's backup plan is highly individualized, the ASA FirePOWER module provides a mechanism for archiving data so that data can be restored in case of disaster.

The following are backed up:

- Access, intrusion, and identity policies
- Local database
- Events

Note the following limitations about backup and restore:

- Backups are valid only for the product version on which you create them.
- You can restore a backup only when running the same version of the ASA FirePOWER module software as that used to create the backup.

Caution Do not use the backup and restore process to copy the configuration files between ASA FirePOWER modules. The configuration files include information that uniquely identifies an ASA FirePOWER module and cannot be shared.

Caution If you applied any intrusion rule updates, those updates are not backed up. You need to apply the latest rule update **after** you restore.

You can save backup files to the appliance or to your local computer.

- Creating Backup Files, on page 504
- Creating Backup Profiles, on page 505
- Uploading Backups from a Local Host, on page 506
- Restoring the Appliance from a Backup File, on page 506

Creating Backup Files

License: Any

You can perform backups of the ASA FirePOWER module using the module interface. To view and use existing system backups, go to the Backup Management page. You should periodically save a backup file that contains all of the configuration files required to restore the appliance, in addition to event data. You may also want to back up the system when testing configuration changes so that you can revert to a saved configuration if needed. You can choose to save the backup file on the appliance or on your local computer.

You cannot create a backup file if your appliance does not have enough disk space; backups may fail if the backup process uses more than 90% of available disk space. If necessary, delete old backup files, transfer old backup files off the appliance.

As an alternative, or if your backup file is larger than 4GB, copy it via SCP to a remote host. Uploading a backup from your local computer does not work on backup files larger than 4GB.

Caution If you configured any interface associations with security zones, these associations are not backed up. You must reconfigure them after you restore. For more information, see Working with Security Zones, on page 49.

To create a backup file of the ASA FirePOWER module:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Tools** > **Backup/Restore**.

The **Backup Management** page appears.

Step 2 Click **Device Backup**.

The **Create Backup** page appears.

Step 3 In the **Name** field, type a name for the backup file. You can use alphanumeric characters, punctuation, and spaces.

Step 4 Optionally, to be notified when the backup is complete, select the **Email** check box and type your email address in the accompanying text box.

Note To receive email notifications, you must configure a relay host as described in Configuring a Mail Relay Host and Notification Address, on page 458.

Step 5 Optionally, to use secure copy protocol (SCP) to copy the backup archive to a different machine, select the **Copy when complete** check box, then type the following information in the accompanying text boxes:

- In the **Host** field, the hostname or IP address of the machine where you want to copy the backup
- In the **Path** field, the path to the directory where you want to copy the backup
- In the **User** field, the user name you want to use to log into the remote machine
- In the **Password** field, the password for that user nameIf you prefer to access your remote machine with an SSH public key instead of a password, you must copy the contents of the **SSH Public Key** field to the specified user's authorized_keys file on that machine.

With this option cleared, the system stores temporary files used during the backup on the remote server; temporary files are **not** stored on the remote server when this option is selected.

Tip Cisco recommends that you periodically save backups to a remote location so the appliance can be restored in case of system failure.

Step 6 You have the following options:

- To save the backup file to the appliance, click **Start Backup**.

The backup file is saved in the /var/sf/backup directory.

When the backup process is complete, you can view the file on the Restoration Database page. For information about restoring a backup file, see Restoring the Appliance from a Backup File, on page 506.

- To save this configuration as a backup profile that you can use later, click **Save As New**.

You can modify or delete the backup profile by selecting **Configuration** > **ASA FirePOWER Configuration** > **Tools** > **Backup/Restore**, then clicking **Backup Profiles**. See Creating Backup Profiles, on page 505 for more information.

Creating Backup Profiles

License: Any

You can use the Backup Profiles page to create backup profiles that contain the settings that you want to use for different types of backups. You can later select one of these profiles when you back up the files on your appliance.

Tip When you create a backup file as described in Creating Backup Files, on page 504, a backup profile is automatically created.

To create a backup profile:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Tools** > **Backup/Restore**.

The **Backup Management** page appears.

Step 2 Click the **Backup Profiles** tab.

The **Backup Profiles** page appears with a list of existing backup profiles.

Tip You can click the **edit** icon to modify an existing profile or click the delete icon to delete a profile from the list.

Step 3 Click **Create Profile**.

The Create Backup page appears.

Step 4 Type a name for the backup profile. You can use alphanumeric characters, punctuation, and spaces.

Step 5 Configure the backup profile according to your needs.

See Creating Backup Files, on page 504 for more information about the options on this page.

Step 6 Click **Save As New** to save the backup profile.

The **Backup Profiles** page appears and your new profile appears in the list.

Uploading Backups from a Local Host

License: Any

If you download a backup file to your local host using the download function described in the Backup Management table, you can upload it to an ASA FirePOWER module.

If your backup file contains PKI objects, private keys associated with internal CA and internal certificate objects are re-encrypted on upload with a randomly generated key.

Tip You cannot upload a backup larger than 4GB from your local host. As an alternative, copy the backup via SCP to a remote host and retrieve it from there.

To upload a backup from your local host:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Tools** > **Backup/Restore**.

The **Backup Management** page appears.

Step 2 Click **Upload Backup.**

The **Upload Backup** page appears.

Step 3 Click **Choose File** and navigate to the backup file you want to upload.

After you select the file to upload, click **Upload Backup**.

Step 4 Click **Backup Management** to return to the **Backup Management** page.

The backup file is uploaded and appears in the backup list. After the ASA FirePOWER moduleverifies the file integrity, refresh the **Backup Management** page to reveal detailed file system information.

Restoring the Appliance from a Backup File

License: Any

You can restore the appliance from backup files using the Backup Management page. To restore a backup, the VDB version in the backup file must match the current VDB version on your appliance. After you complete the restoration process, you **must** apply the latest Cisco Rule Update.

Caution Do not restore backups created on virtual Firepower Management Centers to physical Firepower Management Centers — this may stress system resources. If you must restore a virtual backup on a physical Firepower Management Center, contact Support.

If your backup file contains PKI objects, private keys associated with internal CA and internal certificate objects are reencrypted on upload with a randomly generated key.

If you use local storage, backup files are saved to /var/sf/backup , which is listed with the amount of disk space used in the /var partition at the bottom of the Backup Management page.

Note If you add licenses after a backup has completed, these licenses will not be removed or overwritten if this backup is restored. To prevent a conflict on restore, remove those licenses before restoring the backup, noting where the licenses were used, and add and reconfigure them after restoring the backup. If a conflict occurs, contact Support.

The following table describes each column and icon on the **Backup Management** page.

Table 95: Backup Management

Functionality	Description
System Information	The originating appliance name, type, and version. Note that you can only restore a backup to an identical appliance type and version.
Date Created	The date and time that the backup file was created
File Name	The full name of the backup file
VDB Version	The build of the vulnerability database (VDB) running on the appliance at the time of backup.
Location	The location of the backup file
Size (MB)	The size of the backup file, in megabytes
View	Click the name of the backup file to view a list of the files included in the compressed backup file.
Restore	Click with the backup file selected to restore it on the appliance. If your VDB version does not match the VDB version in the backup file, this option is disabled.
Download	Click with the backup file selected to save it to your local computer.
Delete	Click with the backup file selected to delete it.
Move	When you have a previously created local backup selected, click to send the backup to the designated remote backup location.

To restore the appliance from a backup file:

Step 1 Select **Configuration** > **ASA FirePOWER Configuration** > **Tools** > **Backup/Restore**.

The **Backup Management** page appears.

Step 2 To view the contents of a backup file, click the name of the file.

The manifest appears, listing the name of each file, its owner and permissions, and its file size and date.

Step 3 Click **Backup Management** to return to the Backup Management page.

Step 4 Select the backup file that you want to restore and click **Restore**.

The **Restore Backup** page appears.

Note that if the VDB version in the backup does not match the VDB version currently installed on your appliance, the **Restore** button is grayed out.

Caution This procedure overwrites all configuration files.

Step 5 To restore files, select **Replace Configuration Data.**

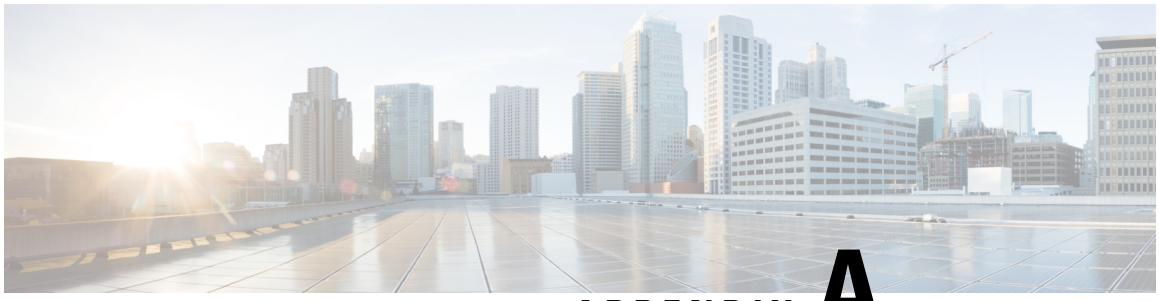
Step 6 Click **Restore** to begin the restoration.

The appliance is restored using the backup file you specified.

Step 7 Reboot the appliance.

Step 8 Apply the latest Cisco Rule Update to reapply rule updates.

Step 9 Redeploy policies to the restored system.



APPENDIX A

Generating Troubleshooting Files

In some cases, if you have a problem with your appliance, Support may ask you to generate troubleshooting files to help them diagnose the problem. You can select any of the options listed in the following table to customize the troubleshooting data that the ASA FirePOWER module reports.

Table 96: Selectable Troubleshoot Options

This option...	Reports...
Snort Performance and Configuration	data and configuration settings related to Snort on the appliance
Hardware Performance and Logs	data and logs related to the performance of the appliance hardware
System Configuration, Policy, and Logs	configuration settings, data, and logs related to the current system configuration of the appliance
Detection Configuration, Policy, and Logs	configuration settings, data, and logs related to detection on the appliance
Interface and Network Related Data	configuration settings, data, and logs related to inline sets and network configuration of the appliance
Discovery, Awareness, VDB Data, and Logs	configuration settings, data, and logs related to the current discovery and awareness configuration on the appliance
Upgrade Data and Logs	data and logs related to prior upgrades of the appliance
All Database Data	all database-related data that is included in a troubleshoot report
All Log Data	all logs collected by the appliance database
Network Map Information	current network topology data

Note that some options overlap in terms of the data they report, but the troubleshooting files will not contain redundant copies, regardless of what options you select.

- Generating Appliance Troubleshooting Files, on page 510
- Downloading Troubleshooting Files, on page 510

Generating Appliance Troubleshooting Files

License: Any

Use the following procedure to generate customized troubleshooting files that you can send to Support.

To generate troubleshooting files:

Step 1 In ASDM, select **Configuration** > **ASA FirePOWER Configuration** > **Tools** > **Troubleshooting**.

Step 2 Click **Generate Troubleshooting Files**.

The **Troubleshooting Options** pop-up window appears.

Step 3 Select **All Data** to generate all possible troubleshooting data, or select individual check boxes to customize your report. For more information, see the Table 96: Selectable Troubleshoot Options , on page 509 table.

Step 4 Click **OK**.

The ASA FirePOWER module generates the troubleshooting files. You can monitor the file generation process in the task queue (**Monitoring** > **ASA FirePOWER Monitoring** > **Task Status**).

Step 5 Continue with the procedure in the next section, Downloading Troubleshooting Files, on page 510.

Downloading Troubleshooting Files

License: Any

Use the following procedure to download copies of your generated troubleshooting files.

To download troubleshooting files:

Step 1 In ASDM, select **Monitoring** > **ASA FirePOWER Monitoring** > **Task Status**.

The **Task Status** page appears.

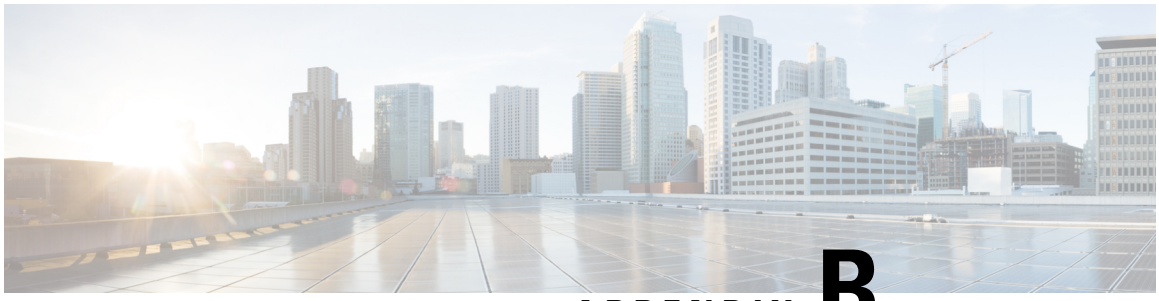
Step 2 Find the task that corresponds to the troubleshooting files you generated.

Step 3 After the appliance generates the troubleshooting files and the task status changes to Completed , click **Click to retrieve generated files**.

Step 4 Follow your browser's prompts to download the files.

The files are downloaded in a single .tar.gz file.

Step 5 Follow the directions from Support to send the troubleshooting files to Cisco.



APPENDIX B

Importing and Exporting Configurations

You can use the Import/Export feature to copy several types of configurations, including policies, from one appliance to another appliance of the same type. Configuration import and export is not intended as a backup tool, but can be used to simplify the process of adding new ASA FirePOWER modules.

You can import and export the following configurations:

- Access control policies and their associated network analysis, SSL, and file policies
- Intrusion policies
- System policies
- Alert responses

To import an exported configuration, both ASA FirePOWER modules must be running the same software version. To import an exported intrusion or access control policy, the rule update versions on both appliances must also match.

Note You can import policies exported from an ASA with FirePOWER services device managed by ASDM into a device managed by Firepower Management Center, provided the versions match.

- Exporting Configurations, on page 511
- Importing Configurations, on page 513

Exporting Configurations

License: Any

You can export a single configuration, or you can export a set of configurations (of the same type or of different types) at once. When you later import the package onto another appliance, you can choose which configurations in the package to import.

When you export a configuration, the appliance also exports revision information for that configuration. The ASA FirePOWER module uses that information to determine whether you can import that configuration onto another appliance; you cannot import a configuration revision that already exists on an appliance.

In addition, when you export a configuration, the appliance also exports system configurations that the configuration depends on.

Tip Many list pages in the ASA FirePOWER module include an export icon next to list items. Where this icon is present, you can use it as a quick alternative to the export procedure that follows.

You can export the following configurations:

- *Alert responses* — An alert response is a set of configurations that allows the ASA FirePOWER module to interact with the external system where you plan to send the alert.
- *Access control policies* — Access control policies include a variety of components that you can configure to determine how the system manages traffic on your network. These components include access control rules; associated intrusion, file, and network analysis, and SSL policies; and objects the rules and policies use, including intrusion variable sets. Exporting an access control policy exports all settings and components for the policy except (where present) URL reputations and categories, which are equivalent across appliances and which users cannot change. Note that to import an access control policy, the rule update version on the exporting and importing ASA FirePOWER module must match.

If an access control policy that you export, or the SSL policy it invokes, contains rules that reference geolocation data, the importing module's geolocation database (GeoDB) update version is used.

- *Intrusion policies* — Intrusion policies include a variety of components that you can configure to inspect your network traffic for intrusions and policy violations. These components are intrusion rules that inspect the protocol header values, payload content, and certain packet size characteristics, and other advanced settings.

Exporting an intrusion policy exports all settings for the policy. For example, if you choose to set a rule to generate events, or if you set SNMP alerting for a rule, or if you turn on the sensitive data preprocessor in a policy, those settings remain in place in the exported policy. Custom rules, custom rule classifications, and user-defined variables are also exported with the policy.

Note that if you export an intrusion policy that uses a layer that is shared by a second intrusion policy, that shared layer is copied into the policy you are exporting and the sharing relationship is broken. When you import the intrusion policy on another appliance, you can edit the imported policy to suit your needs, including deleting, adding, and sharing layers.

If you export an intrusion policy from one ASA FirePOWER module to another, the imported policy may behave differently if the second ASA FirePOWER module has differently configured default variables.

Note You cannot use the Import/Export feature to update rules created by the Vulnerability Research Team (VRT). Instead, download and apply the latest rule update version; see Importing Rule Updates and Local Rule Files, on page 483.

- *System policies* — A system policy controls the aspects of an ASA FirePOWER module that are likely to be similar to other ASA FirePOWER modules in your deployment, including time settings, SNMP settings, and so on.

Note Depending on the number of configurations being exported and the number of objects those configurations reference, the export process may take several minutes.

To export one or more configurations:

Step 1 Make sure that the ASA FirePOWER module where you are exporting the configurations and the ASA FirePOWER module where you plan to import the configurations are running the same version. If you are exporting an intrusion or access control policy, make sure that the rule update versions match.

If the versions of the ASA FirePOWER module (and, if applicable, the rule update versions) do not match, the import will fail.

Step 2 Select **Configuration** > **ASA FirePOWER Configuration** > **Tools** > **Import Export**.

The Import/Export page appears, including a list of the configurations on the ASA FirePOWER module. Note that configuration categories with no configurations to export do not appear in this list.

Tip You can click the **collapse** icon next to a configuration type to collapse the list of configurations. Click the expand folder icon next to an configuration type to reveal configurations.

Step 3 Select the check boxes next to the configurations you want to export and click **Export**.

Step 4 Follow the prompts to save the exported package to your computer.

Importing Configurations

License: Any

After you export a configuration from an ASA FirePOWER module, you can import it onto a different module as long as that module supports it.

Depending on the type of configuration you are importing, you should keep the following points in mind:

- You must make sure that the ASA FirePOWER module where you import a configuration is running the same version as the ASA FirePOWER module you used to export the configuration. If you are importing an intrusion or access control policy, the rule update versions on both appliances must also match. If the versions do not match, the import will fail.

Note You can import policies exported from an ASA with FirePOWER services device managed by ASDM into a device managed by Firepower Management Center, provided the versions match.

- If you import an access control policy that evaluates traffic based on zones, you must map the zones in the imported policy to zones on the importing ASA FirePOWER module. When you map zones, their types must match. Therefore, you must create any zone types you need on the importing ASA FirePOWER module before you begin the import. For more information about security zones, see Working with Security Zones, on page 49.
- If you import an access control policy that includes an object or object group that has an identical name to an existing object or group, you must rename the object or group.
- If you import an access control policy or an intrusion policy, the import process replaces existing default variables in the default variable set with the imported default variables. If your existing default variable

set contains a custom variable not present in the imported default variable set, the unique variable is preserved.

- If you import an intrusion policy that used a shared layer from a second intrusion policy, the export process breaks the sharing relationship and the previously shared layer is copied into the package. In other words, imported intrusion policies do not contain shared layers.

Note You cannot use the Import/Export feature to update rules created by the Vulnerability Research Team (VRT). Instead, download and apply the latest rule update version; see Importing Rule Updates and Local Rule Files, on page 483.

Because you can export several configurations in a single package, when you import the package you must choose which configurations in the package to import.

When you attempt to import a configuration, your ASA FirePOWER module determines whether that configuration already exists on the appliance. If a conflict exists, you can:

- keep the existing configuration,
- replace the existing configuration with a new configuration,
- keep the newest configuration, or
- import the configuration as a new configuration.

If you import a configuration and then later make a modification to the configuration on the destination system, and then re-import the configuration, you must choose which version of the configuration to keep.

Depending on the number of configurations being imported and the number of objects those configurations reference, the import process may take several minutes.

To import one or more configurations:

Step 1 Make sure that the ASA FirePOWER module where you are exporting the configurations and the module where you plan to import the configurations are running the same version. If you want to import an intrusion or access control policy, you must also make sure that the rule update versions match.

If the versions of the ASA FirePOWER module (and, if applicable, the rule update versions) do not match, the import will fail.

Step 2 Export the configurations you want to import; see Exporting Configurations, on page 511.

Step 3 On the appliance where you want to import the configurations, select **Configuration** > **ASA FirePOWER Configuration** > **Tools** > **Import Export**.

The **Import Export** page appears.

Tip Click the **collapse** icon next to a configuration type to collapse the list of configurations. Click the expand folder icon next to a configuration type to reveal configurations.

Step 4 Click **Upload Package**.

The **Upload Package** page appears.

Step 5 You have two options:

- Type the path to the package you want to upload.
- Click **Upload File** to locate the package.

Step 6 Click **Upload**.

The result of the upload depends on the contents of the package:

- If the configurations and rule versions in the package exactly match versions that already exist on your appliance, a message displays indicating that the versions already exist. The appliance has the most recent configurations, so you do not need to import them.
- If there is an ASA FirePOWER module or (if applicable) rule update version mismatch between your appliance and the appliance where the package was exported, a message appears, indicating that you cannot import the package. Update the ASA FirePOWER module or the rule update version and attempt the process again.
- If the package contains any configurations or rule versions that do not exist on your appliance, the Package Import page appears. Continue with the next step.

Step 7 Select the configurations you want to import and click **Import**.

The import process resolves, with the following results:

- If the configurations you import do not have previous revisions on your ASA FirePOWER module, the import completes automatically and a success message appears. Skip the rest of the procedure.
- If you are importing an access control policy that includes security zones, the Access Control Import Resolution page appears. Continue with step 8.
- If the configurations you import do have previous revisions on your appliance, the Import Resolution page appears. Continue with step 9.

Step 8 Next to each incoming security zone, select an existing local security zone of a matching type to map to and click **Import**.

Return to step 7.

Step 9 Expand each configuration and select the appropriate option:

- To keep the configuration on your appliance, select **Keep existing**.
- To replace the configuration on your appliance with the imported configuration, select **Replace existing**.
- To keep the newest configuration, select **Keep newest**.
- To save the imported configuration as a new configuration, select **Import as new** and, optionally, edit the configuration name.

If you are importing an access control policy that includes a file policy with either the clean list or custom detection list enabled, the **Import as new** option is not available.

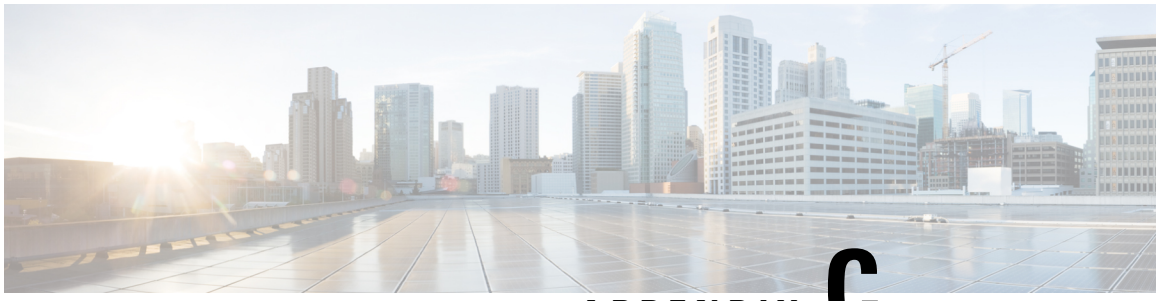
- If you are importing an access control policy or saved search that includes a dependent object, either accept the suggested name or rename the object. The system always imports these dependent objects as new. You do not have the option to keep or to replace existing objects. Note that the system treats objects and object groups in the same manner.

Step 10 Click **Import**.

The configurations are imported.

What to do next

After importing an access control policy with Security Intelligence feeds, you must update the Security Intelligence feeds and wait for the latest data to be downloaded before deploying the policy. Feed contents are not part of the export or import process, and this ensures that the latest feeds are always used.



APPENDIX C

Viewing the Status of Long-Running Tasks

Some tasks that you can perform on the ASA FirePOWER module, such as applying a policy or installing updates, do not complete instantly and require some time to run.

You can check the progress of these long-running tasks in the task queue. The task queue also reports when they are successfully or unsuccessfully resolved.

Viewing the Task Queue

License: Any

When you perform long-running tasks, such as applying a policy or installing updates, the status of these tasks is reported in the task queue. The task queue provides information about complex tasks and reports when they are complete.

You view the task queue on the **Task Status** page, which automatically refreshes every 10 seconds.

The **Job Summary** section displays the state of the tasks listed on the page, as described in the following table.

Table 97: Task Queue Task Types

Task Type	Description
Running	The number of tasks currently in progress.
Waiting	The number of tasks waiting for an in-progress task to complete before running.
Completed	The number of tasks that completed successfully.
Retrying	The number of tasks that are automatically retrying. Note that not all tasks are permitted to try again.
Stopped	The number of tasks that were interrupted due to a system update. Stopped tasks cannot be resumed; you must manually delete them from the task queue.
Failed	The number of tasks that did not complete successfully.

The **Jobs** section provides information about each task, including a brief description, when the task was launched, the current status of the task, and when the status last changed. Tasks of the same type appear together in a task group.

To make sure that the **Task Status** page loads quickly, once per week, the ASA FirePOWER module removes from the queue all completed, failed, and stopped tasks that are over a month old, as well the oldest tasks from any task group that contains over 1000 tasks. You can also manually remove tasks from the queue; see Managing the Task Queue, on page 518 for directions.

To view the task queue:

You have two options:

- If you manually launched the task, click the **Task Status** link in the notification box that appeared when you launched the task.

The **Task Status** page appears in a pop-up window.

- If you scheduled a task, or if a task was launched from a page you are not viewing, select **Monitoring** > **ASA FirePOWER Monitoring** > **Task Status**.

The **Task Status** page appears.

For information on the actions you can perform on the **Task Status** page, see Managing the Task Queue, on page 518.

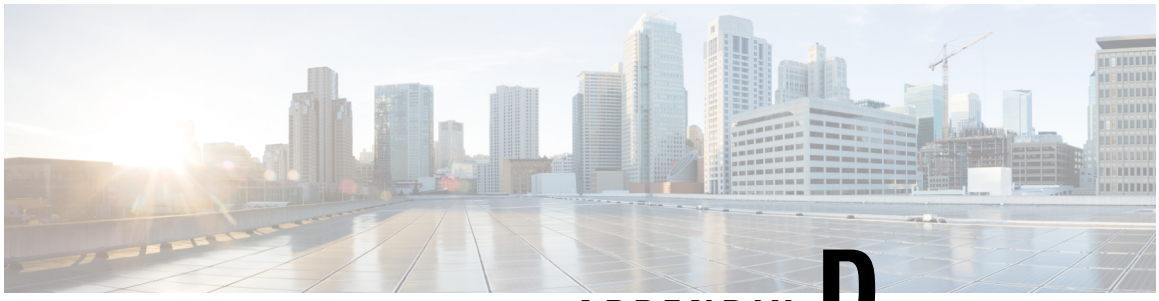
Managing the Task Queue

License: Any

There are several actions you can perform while viewing the task queue (see Viewing the Task Queue, on page 517), as described in the following table.

Table 98: Task Queue Actions

To...	You can...
remove all completed tasks from the task queue	click **Remove Completed Jobs**.
remove all failed tasks from the task queue	click **Remove Failed Jobs**.
remove a single task from the task queue	click the delete icon ( ) next to the task you want to delete. Note that you cannot delete a running task. If you need to delete a running task (for example, if a task repeatedly fails), contact Support.
collapse a task group and hide tasks	click the open folder icon ( ) next to the expanded task group.
expand a task group and view tasks	click the closed folder icon ( ) next to the collapsed task group.



APPENDIX D

Security, Internet Access, and Communication Ports

To safeguard the ASA FirePOWER module, you should install it on a protected internal network. Although the ASA FirePOWER module is configured to have only the necessary services and ports available, you must make sure that attacks cannot reach it from outside the firewall.

Also note that specific features of the ASA FirePOWER module require an Internet connection. By default, the ASA FirePOWER module is configured to directly connect to the Internet. Additionally, the system requires certain ports remain open for secure appliance access and so that specific system features can access the local or Internet resources to operate correctly.

Internet Access Requirements

By default, the ASA FirePOWER module is configured to directly connect to the Internet on ports 443/tcp (HTTPS) and 80/tcp (HTTP), which are open by default on the ASA FirePOWER module; see Communication Ports Requirements, on page 520.

The following table describes the Internet access requirements of specific features of the ASA FirePOWER module.

Table 99: ASA FirePOWER module Feature Internet Access Requirements

Feature	Internet access is required to...
intrusion rule, VDB, and GeoDB updates	download or schedule the download of a intrusion rule, GeoDB, or VDB update directly to an appliance.
network-based AMP	perform malware cloud lookups.
Security Intelligence filtering	download Security Intelligence feed data from an external source, including the Intelligence Feed.
system software updates	download or schedule the download of a system update directly to an appliance.

Feature	Internet access is required to...
URL filtering	download cloud-based URL category and reputation data for access control, and perform lookups for uncategorized URLs. database.brightcloud.com service.brightcloud.com
whois	request whois information for an external host.

Communication Ports Requirements

Open ports allow:

- access to an appliance's user interface
- secure remote connections to an appliance
- certain features of the system to access the local or Internet resources they need to function correctly

In general, feature-related ports remain closed until you enable or configure the associated feature.

Caution Do **not** close an open port until you understand how this action will affect your deployment.

For example, closing port 25/tcp (SMTP) outbound on a manage device blocks the device from sending email notifications for individual intrusion events (see Configuring External Alerting for Intrusion Rules, on page 419).

The following table lists the open ports required so that you can take full advantage of ASA FirePOWER module features.

Table 100: Default Communication Ports for ASA FirePOWER module Features and Operations

Port	Description	Direction	Is Open to...
22/tcp	SSH/SSL	Bidirectional	allow a secure remote connection to the appliance.
25/tcp	SMTP	Outbound	send email notices and alerts from the appliance.
53/tcp	DNS	Outbound	use DNS.
67/udp 68/udp	DHCP	Outbound	use DHCP. **Note** These ports are **closed** by default.
		Bidirectional	update custom and third-party Security Intelligence feeds via HTTP. download URL category and reputation data (port 443 also required).
161/udp	SNMP	Bidirectional	allow access to an appliance's MIBs via SNMP polling.
162/udp	SNMP	Outbound	send SNMP alerts to a remote trap server.

Port	Description	Direction	Is Open to...
389/tcp 636/tcp	LDAP	Outbound	communicate with an LDAP server for external authentication.
389/tcp 636/tcp	LDAP	Outbound	obtain metadata for detected LDAP users.
443/tcp	HTTPS	Inbound	access an appliance's user interface.
443/tcp	HTTPS cloud comms.	Bidirectional	obtain: • software, intrusion rule, VDB, and GeoDB updates • URL category and reputation data (port 80 also required) • the Intelligence Feed and other secure Security Intelligence feeds • malware dispositions for files detected in network traffic
			download software updates using the device's local user interface.
514/udp	syslog	Outbound	send alerts to a remote syslog server.
8305/tcp	appliance comms.	Bidirectional	securely communicate between appliances in a deployment. **Required.**
8307/tcp	host input client	Bidirectional	communicate with a host input client.

Security, Internet Access, and Communication Ports