Access Control Rules

The following topics describe how to configure access control rules:

Introduction to Access Control Rules

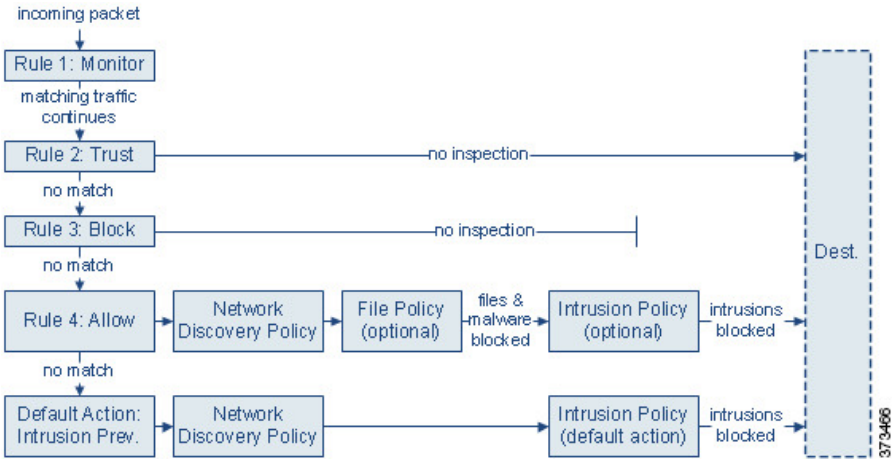
Within an access control policy, *access control rules* provide a granular method of handling network traffic across multiple managed devices.

Note Prefilter evaluation/8000 series fastpathing, Security Intelligence filtering, SSL inspection, user identification, and some decoding and preprocessing occur before access control rules evaluate network traffic.

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.

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.

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. The system continues to match traffic against additional rules to determine whether to permit or deny it. (However, see an important exception and caveat at Access Control Rule Monitor Action, on page 9.)
- **Rule 2: Trust** evaluates traffic next. Matching traffic is allowed to pass to its destination without further inspection, though it is still subject to identity requirements and rate limiting. 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, though it is still subject to identity requirements and rate limiting. You can configure 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.)

Traffic you allow, whether with an access control rule or the default action, is automatically eligible for inspection for host, application, and user data by the network discovery policy. You do not explicitly enable discovery, although you can enhance or disable it. However, allowing traffic does not automatically guarantee discovery data collection. The system performs discovery only for connections involving IP addresses that are explicitly monitored by your network discovery policy; additionally, application discovery is limited for encrypted sessions.

Note that access control rules handle encrypted traffic when your SSL inspection configuration allows it to pass, or if you do not configure SSL inspection. 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.

Access Control Rule Management

The **Rules** tab of the access control policy editor allows you to add, edit, categorize, search, move, enable, disable, delete, and otherwise manage access control rules in the current policy.

For each access control rule, the policy editor displays its name, a summary of its conditions, the rule action, and icons that communicate the rule's inspection options or status. These icons represent:

- **Intrusion policy** ( )
- **File policy** ( )
- **Safe search** ( )
- **YouTube EDU** ( )
- **Logging** ( )
- **Original Client option**
- **Comment** ( )
- **Warning** ( )
- **Errors** ( )
- important **Information** ( )

Disabled rules are dimmed and marked `(disabled)` beneath the rule name.

To create or edit a rule, use the access control rule editor. You can:

- 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.

Related Topics

Access Control Rule Components, on page 4
Example: Custom User Roles and Access Control
Best Practices for Access Control Rules

Access Control Rule Components

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 and stops generating warnings and errors for that rule.

Position

Rules in an access control policy are numbered, starting at 1. If you are using policy inheritance, rule 1 is the first rule in the outermost policy. 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.

Rules can also belong to a section and a category, which are organizational only and do not affect rule position. Rule position goes across sections and categories.

Section and Category

To help you organize access control rules, every access control policy has two system-provided rule sections, Mandatory and Default. To further organize access control rules, you can create custom rule categories inside the Mandatory and Default sections.

If you are using policy inheritance, the current policy's rules are nested between its parent policy's Mandatory and Default sections.

Conditions

Conditions specify the specific traffic the rule handles. Conditions can be simple or complex; their use often depends on license.

Traffic must meet all of the conditions specified in all of the tabs in a rule. For example, if the Applications tab specifies HTTP but not HTTPS, the URL category and reputation conditions in the URLs tab will not apply to HTTPS traffic.

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. The system does **not** perform deep inspection on trusted, blocked, or encrypted traffic.

Inspection

Deep inspection options 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 or end of a connection, or both. You can log connections to the database, 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 comments.

Related Topics

Best Practices for Access Control Rules
Access Control Rule Management, on page 3
Create and Edit Access Control Rules, on page 6
Rule Condition Types
Access Control Rule Actions, on page 9
Deep Inspection Using File and Intrusion Policies
Best Practices for Connection Logging
Access Control Rule Comments, on page 12

Access Control Rule Order

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 for Monitor rules, the system does not continue to evaluate traffic against additional, lower-priority rules after that traffic matches a rule.

To help you organize access control rules, every access control policy has two system-provided rule sections, Mandatory and Default. To further organize, you can create custom rule categories inside the Mandatory or Default sections. After you create a category, you cannot move it, although you can delete it, rename it, and move rules into, out of, within, and around it. The system assigns rule numbers across sections and categories.

If you use policy inheritance, the current policy's rules are nested between its parent policy's Mandatory and Default rule sections. Rule 1 is the first rule in the outermost policy, not the current policy, and the system assigns rule numbers across policies, sections, and categories.

Any predefined user role that allows you to modify access control policies also allows you to move and modify access control rules within and among rules categories. You can, however, create custom roles that restrict users from moving and modifying rules. Any user who is allowed to modify access control policies can add rules to custom categories and modify rules in them without restriction.

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.

Related Topics

Best Practices for Ordering Rules

Requirements and Prerequisites for Access Control Rules

Model Support

Any

Supported Domains

Any

User Roles

- Admin
- Access Admin
- Network Admin

Adding an Access Control Rule Category

You can divide an access control policy's Mandatory and Default rule sections into custom categories. After you create a category, you cannot move it, although you can delete it, rename it, and move rules into, out of, within, and around it. The system assigns rule numbers across sections and categories.

Procedure

Step 1 In the access control policy editor, 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**.

Step 2 Enter a **Name**.

Step 3 From the **Insert** drop-down list, choose where you want to add the category:

- To insert a category below all existing categories in a section, choose **into Mandatory** or **into Default**.
- To insert a category above an existing category, choose **above category**, then choose a category.
- To insert a category above or below an access control rule, choose **above rule** or **below rule**, then enter an existing rule number.

Step 4 Click **OK**.

Step 5 Click **Save** to save the policy.

What to do next

- Deploy configuration changes; see Deploy Configuration Changes.

Create and Edit Access Control Rules

If you edit an access control rule that is actively in use, the changes do not apply to established connections at deploy-time. The updated rule is used to match against future connections. However, if the system is actively

inspecting a connection (for example, with an intrusion policy), it *will* apply changed matching or action criteria to existing connections.

For Firepower Threat Defense, you can ensure that your changes apply to all current connections by using the FTD **clear conn** CLI command to end established connections. Note that you should only do this if it is OK to end those connections, on the assumption that the sources for the connections will then attempt to reestablish the connection and thus be matched appropriately against the new rule.

Caution Changing the total number of intrusion policies used by an access control policy 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 how the target device handles traffic. See Snort® Restart Traffic Behavior for more information.You change the total number of intrusion policies by adding an intrusion policy that is not currently used, or by removing the last instance of an intrusion policy. You can use an intrusion policy in an access control rule, as the default action, or as the default intrusion policy.

Procedure

Step 1 In the access control policy editor, you have the following options:

- To add a new rule, click **Add Rule**.
- To edit an existing rule, click **Edit** ( ).

If **View** ( ) appears next to a rule instead, the rule belongs to an ancestor policy, or you do not have permission to modify the rule.

Step 2 If this is a new rule, enter a **Name**.

Step 3 Configure the rule components, or accept the defaults.

- Enabled—Specify whether the rule is **Enabled**.
- Position—Specify the rule position; see Access Control Rule Order, on page 5.
- Action—Choose a rule **Action**; see Access Control Rule Actions, on page 9.

  Note For FTD, VLAN tags in access rules only apply to inline sets; they cannot be used in access rules applied to firewall interfaces.

- Conditions—Click the corresponding condition you want to add. See Rule Condition Types for more information.
- Deep Inspection—For Allow and Interactive Block rules, click **Intrusion policy** ( ) or **File policy** ( ) to configure the rule's **Inspection** options. If the option is dimmed, no policy of that type is selected for the rule. See Understanding Access Control for more information.
- Content Restriction—Click **Safe search** ( ) or **YouTube EDU** ( ) to configure content restriction settings on **Applications** of the rule editor. If the option are dimmed, content restriction is disabled for the rule. See About Content Restriction for more information.

- Logging—Click **Logging** ( ) to specify **Logging** options. If the option is dimmed, connection logging is disabled for the rule. See Best Practices for Connection Logging for more information.
- Comments—Click the number in the comment column to add **Comments**. The number indicates how many comments the rule already contains. See Access Control Rule Comments, on page 12 for more information.

Step 4 Save the rule.

Step 5 Click **Save** to save the policy.

What to do next

Deploy configuration changes; see Deploy Configuration Changes.

Related Topics

Best Practices for Access Control Rules

Enabling and Disabling Access Control Rules

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.

Tip You can also enable or disable an access control rule using the rule editor.

Procedure

Step 1 In the access control policy editor, right-click the rule and choose a rule state.

If **View** ( ) appears next to a rule instead, the rule belongs to an ancestor policy, or you do not have permission to modify the rule.

Step 2 Click **Save**.

What to do next

- Deploy configuration changes; see Deploy Configuration Changes.

Related Topics

Access Control Rule Components, on page 4

Positioning an Access Control Rule

You can move an existing rule within an access control policy. When you add or move a rule to a category, the system places it last in the category.

Tip You can move multiple rules at once by selecting the rules then cutting and pasting using the right-click menu.

Before you begin

Review rule order guidelines in Best Practices for Access Control Rules.

Procedure

Step 1 In the access control rule editor, you have the following options:

- If you are adding a new rule, use the **Insert** drop-down list.
- If you are editing an existing rule, click **Move**.

Step 2 Choose where you want to move or insert the rule:

- Choose **into Mandatory** or **into Default**.
- Choose a **into Category**, then choose the user-defined category.
- Choose **above rule** or **below rule**, then type the appropriate rule number.

Step 3 Click **Save**.

Step 4 Click **Save** to save the policy.

What to do next

- Deploy configuration changes; see Deploy Configuration Changes.

Access Control Rule Actions

Every access control rule has an *action* that determines how the system handles and logs matching traffic. You can monitor, trust, block, or allow (with or without further inspection).

The access control policy's *default action* handles traffic that does not meet the conditions of any access control rule with an action other than Monitor.

Access Control Rule Monitor Action

The **Monitor** action is not designed to permit or deny traffic. Rather, its primary purpose is to force connection logging, regardless of how matching traffic is eventually handled.

If a connection matches a Monitor rule, the next non-Monitor rule that the connection matches should determine traffic handling and any further inspection. If there are no additional matching rules, the system should use the default action.

There is an exception, however. If a Monitor rule contains layer 7 conditions—such as an application condition—the system *allows early packets to pass* and the connection to be established (or the SSL handshake to complete). This occurs even if the connection should be blocked by a subsequent rule; this is because these early packets *are not evaluated against subsequent rules*. So that these packets do not reach their destination completely uninspected, you can specify an intrusion policy for this purpose in the access control policy's Advanced settings; see Inspection of Packets That Pass Before Traffic Is Identified. After the system completes its layer 7 identification, it applies the appropriate action to the remaining session traffic.

Caution As a best practice, *avoid placing layer 7 conditions on broadly-defined monitor rules high in your rule priority order*, to prevent inadvertently allowing traffic into your network. Also, if locally bound traffic matches a Monitor rule in a Layer 3 deployment, that traffic may bypass inspection. To ensure inspection of the traffic, enable **Inspect Local Router Traffic** in the advanced device settings for the managed device routing the traffic.

Related Topics

Logging for Monitored Connections

Access Control Rule Trust Action

The **Trust** action allows traffic to pass without deep inspection or network discovery. Trusted traffic is still subject to identity requirements and rate limiting.

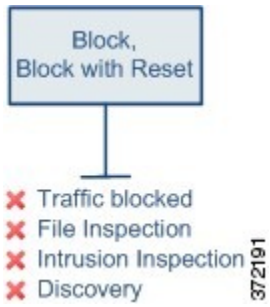
Note Some protocols, such as FTP and SIP, use secondary channels, which the system opens through the process of inspection. In some cases, trusted traffic can bypass all inspection, and these secondary channels cannot be opened properly. If you run into this problem, change the trust rule to **Allow**.

Related Topics

Logging for Trusted Connections

Access Control Rule Blocking Actions

The **Block** and **Block with reset** actions deny traffic without further inspection of any kind.



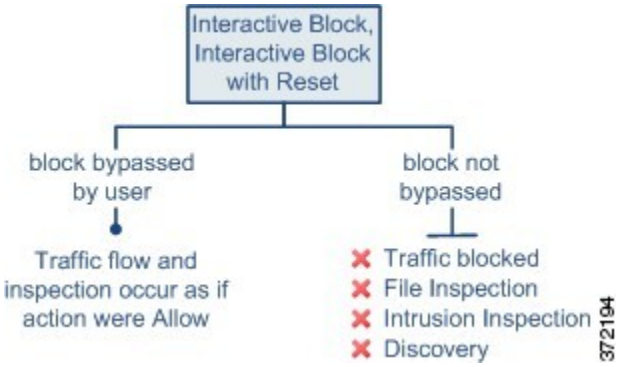
Block with reset rules reset the connection, with the exception of web requests met with an *HTTP response page*. This is because the response page, which you configure to appear when the system blocks web requests, cannot display if the connection is immediately reset. For more information, see HTTP Response Pages and Interactive Blocking.

Related Topics

Logging for Blocked Connections
About HTTP Response Pages

Access Control Rule Interactive Blocking Actions

For more information, see HTTP Response Pages and Interactive Blocking.



If a user bypasses the block, the rule mimics an allow rule. Therefore, you can associate interactive block rules with file and intrusion policies, and matching traffic is also eligible for network discovery.

If a user does not (or cannot) bypass the block, the rule mimics a block rule. Matching traffic is denied without further inspection.

Note that if you enable interactive blocking, you cannot reset *all* blocked connections. This is because the response page cannot display if the connection is immediately reset. Use the **Interactive Block with reset** action to (non-interactively) block-with-reset all non-web traffic, while still enabling interactive blocking for web requests.

For more information, see HTTP Response Pages and Interactive Blocking.

Related Topics

Logging for Allowed Connections
TLS/SSL Rule Blocking Actions

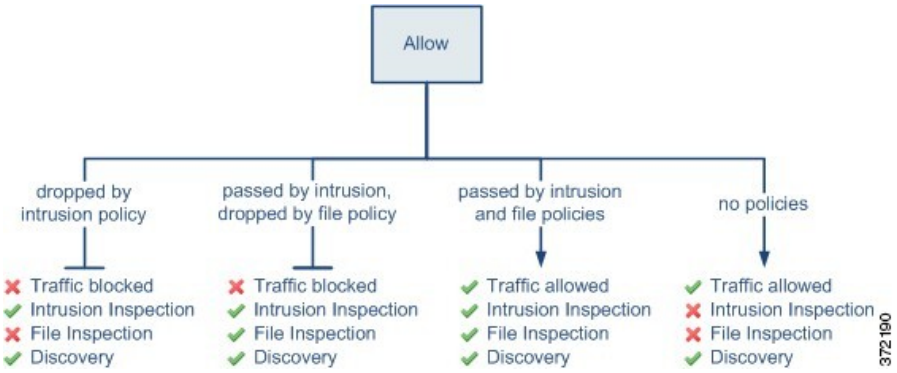
Access Control Rule Allow Action

The **Allow** action allows matching traffic to pass, though it is still subject to identity requirements and rate limiting.

Optionally, you can use deep inspection to further inspect and block unencrypted or decrypted traffic before it reaches its destination:

- You can use an intrusion policy to analyze network traffic according to intrusion detection and prevention configurations, and drop offending packets depending on the configuration.
- 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.
- You can perform network-based advanced malware protection (AMP), also using a file policy. AMP for Networks can inspect files for malware, and block detected malware depending on the configuration.

The following diagram illustrates the types of inspection performed on traffic that meets the conditions of an Allow rule (or a user-bypassed Interactive Block rule. 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.

Regardless of whether the traffic is inspected or dropped by an intrusion or file policy, the system can inspect it using network discovery. However, allowing traffic does not automatically guarantee discovery inspection. The system performs discovery only for connections involving IP addresses that are explicitly monitored by your network discovery policy; additionally, application discovery is limited for encrypted sessions.

Related Topics

Logging for Allowed Connections

Access Control Rule Comments

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.

Related Topics

Configuring Access Control Policy Preferences

Adding Comments to an Access Control Rule

Procedure

Step 1 In the access control rule editor, click **Comments**.

Step 2 Click **New Comment**.

Step 3 Enter your comment and click **OK**. You can edit or delete this comment until you save the rule.

Step 4 Click **Save**.

Step 5 Click **Save** to save the policy.

What to do next

- Deploy configuration changes; see Deploy Configuration Changes.