Decryption Policies

The following topics provide an overview of decryption policy creation, configuration, management, and logging.

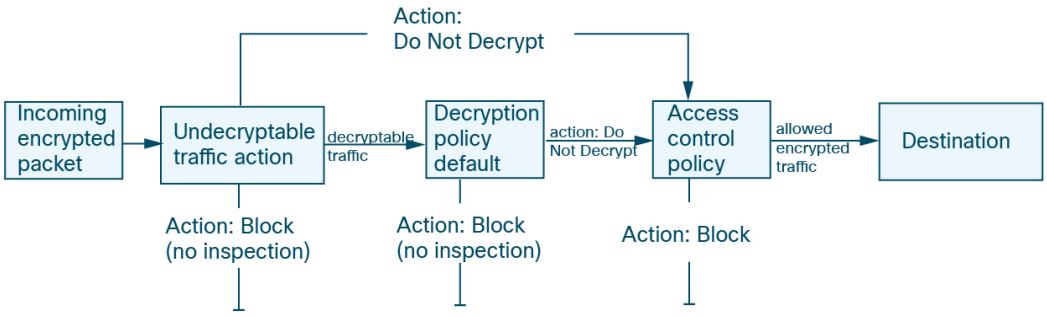
About Decryption Policies

A decryption policy determines how the system handles encrypted traffic on your network. You can configure one or more decryption policies, associate a decryption policy with an access control policy, then deploy the access control policy to a managed device. When the device detects a TCP handshake, the access control policy first handles and inspects the traffic. If it subsequently identifies a TLS/SSL-encrypted session over the TCP connection, the decryption policy takes over, handling and decrypting the encrypted traffic.

You can create multiple rules at the same time, including rules for decrypting incoming traffic (**Decrypt - Known Key** rule action) and outgoing traffic (**Decrypt - Resign** rule action). To create a rule with a **Do Not Decrypt** or other rule action (such as **Block** or **Monitor**), create an empty decryption policy and add the rule afterward.

To get started, see Create a Decryption Policy, on page 2.

Following is an example decryption policy with a **Do Not Decrypt** rule action:



The simplest decryption policy, as shown in the following diagram, directs the device where it is deployed to handle encrypted traffic with a single default action. You can set the default action to block decryptable traffic without further inspection, or to inspect undecrypted decryptable traffic with access control. The system can then either allow or block the encrypted traffic. If the device detects undecryptable traffic, it either blocks the traffic without further inspection or does not decrypt it, inspecting it with access control.

Requirements and Prerequisites for Decryption Policies

Supported Domains

Any

User Roles

- Admin
- Access Admin
- Network Admin

Create a Decryption Policy

This topic discusses how to create a decryption policy and optionally one or more rules to protect internal or external servers. You can also create a decryption policy without rules and add the rules later. Creating an empty policy is a good choice to create rules with a **Do Not Decrypt**, **Block**, **Block With Reset**, or **Monitor** rule actions.

Before you begin

Review your needs for decryption:

- Decryption is a way to expose network traffic to deep inspection; however, there are times you should *not* decrypt traffic: When to Decrypt Traffic, When Not to Decrypt.
- To protect *internal* servers by decrypting and optionally inspecting traffic, you must have the internal certificate for your internal server: PKI.
- To protect *external* servers by decrypting and optionally inspecting traffic, you must upload an internal CA object that will be used to decrypt ad resign the traffic: PKI.

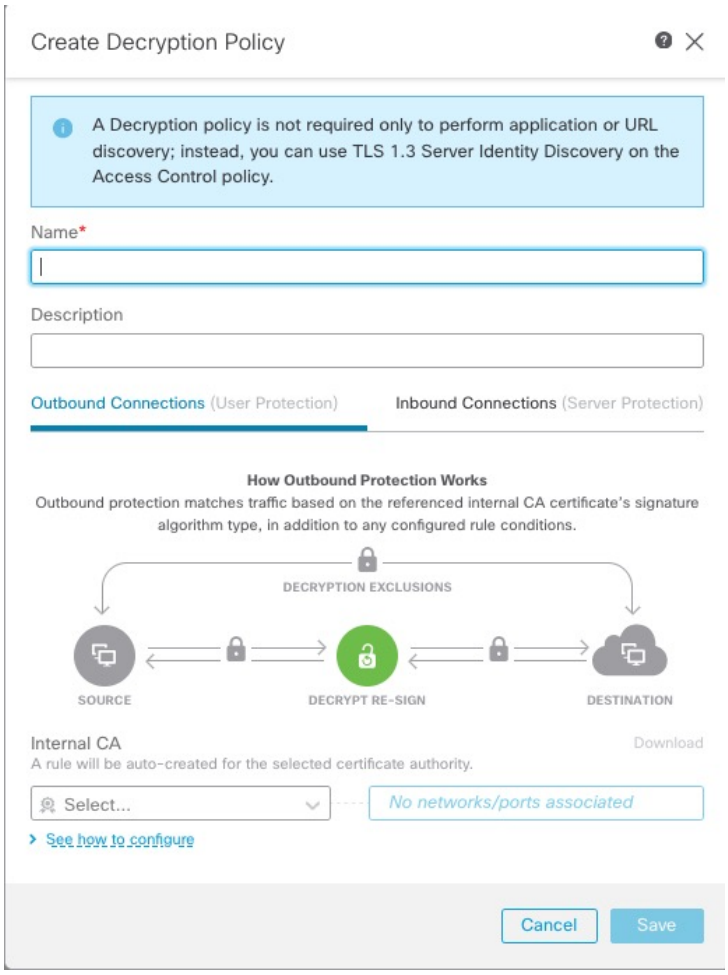
Procedure

Step 1 Log in to the management center if you haven't already done so.

Step 2 Click **Policies** > **Access Control** > **Decryption**.

Step 3 Click **New Policy**.

Step 4 Enter a name for the policy in the **Name** field and an optional description in the **Description** field.



The **Outbound Connections** tab page enables you to create **Decrypt - Resign** rules. These rules require an internal certificate that you can either create beforehand (using **Objects** > **Object Management** > **PKI** > **Internal CAs**) or you can create them as part of the outbound connection rule.

the **Inbound Connections** tab page enables you to create **Decrypt - Known Key** rules. These rules require an internal certificate that you can either create beforehand (using **Objects** > **Object Management** > **PKI** > **Internal Certs**) or you can create them as part of the inbound connection rule.

Step 5 Associate the decryption rule with an access control rule as discussed in Associating Other Policies with Access Control.

Step 6 Continue with one of the following sections.

What To Do Next

- Create a Decryption Policy with Outbound Connection Protection, on page 4 (**Decrypt - Resign**)
- Create a Decryption Policy with Inbound Connection Protection, on page 7 (**Decrypt - Known Key**)
- Create a Decryption Policy with Other Rule Actions, on page 9

Create a Decryption Policy with Outbound Connection Protection

This task discusses how to create a decryption policy with a rule that protects outbound connections; that is, the destination server is outside your protected network. This type of rule has a **Decrypt - Resign** rule action.

When you create a decryption policy, you can create multiple rules at the same time, including multiple **Decrypt - Known Key** rules and multiple **Decrypt - Resign** rules.

Before you begin

You must upload an internal certificate authority (CA) for your outbound server before you can create a decryption policy that protects outbound connections. You can do this in any of the following ways:

- Create an internal CA object by going to **Objects** > **Object Management** > **PKI** > **Internal CAs** and referring to PKI.
- At the time you create this decryption policy.

Procedure

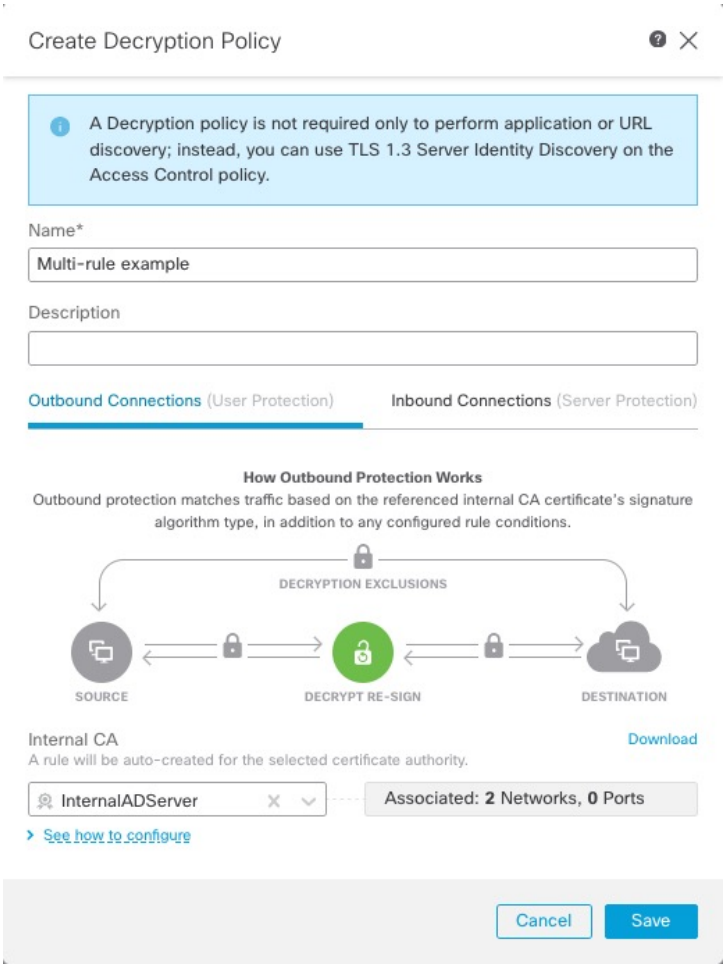
Step 1 Log in to the management center if you haven't already done so.

Step 2 Click **Policies** > **Access Control** > **Decryption**.

Step 3 Click **New Policy**.

Step 4 Give the policy a unique **Name** and, optionally, a **Description**.

Step 5 Click the **Outbound Connections** tab.



Step 6 Upload or choose certificates for the rules.

The system creates one rule per certificate.

Step 7 (Optional.) Choose networks and ports.

For more information:

- Decryption Rule Conditions
- Network Rule Conditions
- Port Rule Conditions

Step 8 Click **Save**.

What to do next

- Add rule conditions: Decryption Rule Conditions
- Add a default policy action: Decryption Policy Default Actions, on page 10

- Configure logging options for the default action as described in *Logging Connections with a Policy Default Action* in the Cisco Secure Firewall Management Center Administration Guide .
- Set advanced policy properties: Decryption Policy Advanced Options, on page 13.
- Associate the decryption policy with an access control policy as described in Associating Other Policies with Access Control.
- Deploy configuration changes; see Deploy Configuration Changes.

Upload an Internal CA for Outbound Protection

This task discusses how to upload an internal certificate authority when you create a decryption rule that protects outbound connections. You can also upload the internal CA using **Objects** > **Object Management** as discussed in Importing a CA Certificate and Private Key.

Before you begin

Make sure you have an internal certificate authority in one of the formats discussed in Internal Certificate Authority Objects.

Procedure

Step 1 Log in to the management center if you haven't already done so.
Step 2 Click **Policies** > **Access Control** > **Decryption**.
Step 3 Click **New Policy**.
Step 4 Enter a name for the policy in the **Name** field and an optional description in the **Description** field.
Step 5 Click the **Outbound Connections** tab.
Step 6 From the **Internal CA** list, click **Create New** > **Upload CA**.
Step 7 Give the internal CA a **Name**.
Step 8 Paste or browse to locate the certificate and its private key in the provided fields.
Step 9 If the CA has a password, select the **Encrypted** check box and enter the password in the adjacent field.

Generate an Internal CA for Outbound Protection

This task discusses how you can optionally generate an internal certificate authority when you create a decryption rule that protects outbound connections. You can also perform these tasks using **Objects** > **Object Management** as discussed in Uploading a Signed Certificate Issued in Response to a CSR.

Before you begin

Make sure you understand the requirements for generating an internal certificate authority object as discussed in Internal Certificate Authority Objects.

Procedure

Step 1 Log in to the management center if you haven't already done so.

Step 2 Click **Policies** > **Access Control** > **Decryption**.

Step 3 Click **New Policy**.

Step 4 Enter a name for the policy in the **Name** field and an optional description in the **Description** field.

Step 5 Click the **Outbound Connections** tab.

Step 6 From the **Internal CA** list, click **Create New** > **Generate CA**.

Step 7 Give the internal CA a **Name** and provide a two-letter **Country Name**.

Step 8 Click **Self-Signed** or **CSR**.

For more information about these options, see Internal Certificate Authority Objects.

Step 9 Enter the requested information in the provided fields.

Step 10 Click **Save**.

Step 11 If you chose **CSR**, after the signing request has been completed, click **Install Certificate** as follows:

a) Repeat the preceding steps in this procedure.

b) Edit the CA from the **Internal CA** list as follows.

c) Click **Install Certificate**.

d) Follow the prompts on your screen to complete the task.

Create a Decryption Policy with Inbound Connection Protection

This task discusses how to create a decryption policy with a rule that protects inbound connections; that is, the destination server is inside your protected network. This type of rule has a **Decrypt - Known Key** rule action.

When you create a decryption policy, you can create multiple rules at the same time, including multiple **Decrypt - Known Key** rules and multiple **Decrypt - Resign** rules.

Before you begin

You must upload an internal certificate for your internal server before you can create a decryption policy that protects inbound connections. You can do this in any of the following ways:

- Create an internal certificate object by going to **Objects** > **Object Management** > **PKI** > **Internal Certs** and referring to PKI.
- At the time you create this decryption policy.

Procedure

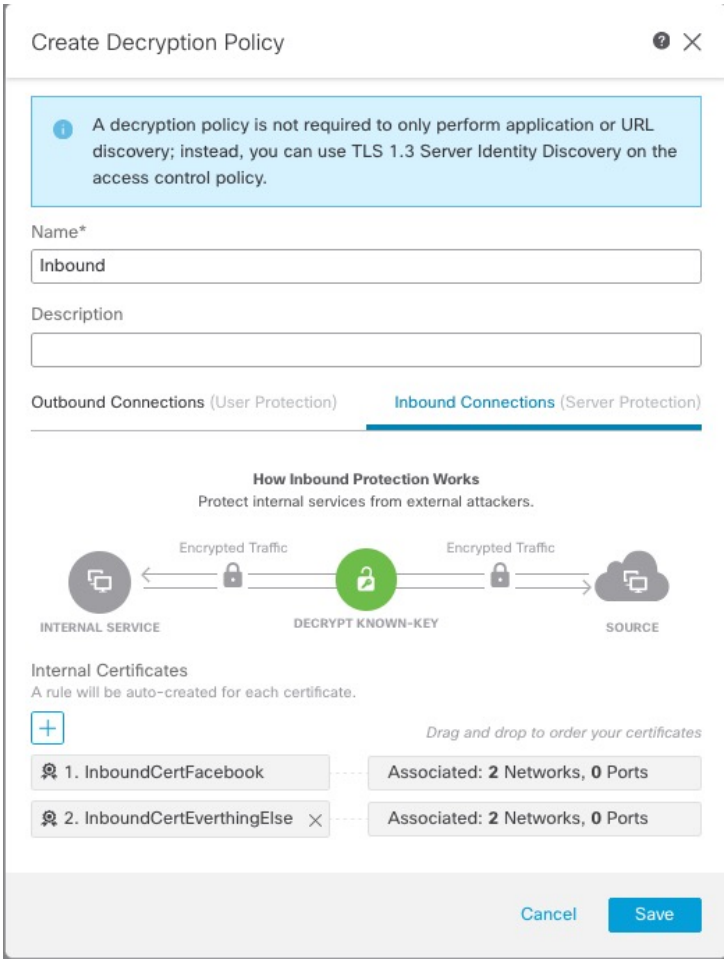
Step 1 Log in to the management center.

Step 2 Click **Policies** > **Access Control** > **Decryption**.

Step 3 Click **New Policy**.

Step 4 Give the policy a unique **Name** and, optionally, a **Description**.

Step 5 Click the **Inbound Connections** tab.



Step 6 Upload or choose certificates for the rules.

The system creates one rule per certificate.

Step 7 (Optional.) Choose networks and ports.

For more information:

- Decryption Rule Conditions
- Network Rule Conditions
- Port Rule Conditions

Step 8 Click **Save**.

What to do next

- Add rule conditions: Decryption Rule Conditions
- Add a default policy action: Decryption Policy Default Actions, on page 10
- Configure logging options for the default action as described in *Logging Connections with a Policy Default Action* in the Cisco Secure Firewall Management Center Administration Guide .
- Set advanced policy properties: Decryption Policy Advanced Options, on page 13.
- Associate the decryption policy with an access control policy as described in Associating Other Policies with Access Control.
- Deploy configuration changes; see Deploy Configuration Changes.

Create a Decryption Policy with Other Rule Actions

To create a decryption rule with a **Do Not Decrypt**, **Block**, **Block With Reset,** or **Monitor** rule action, create a decryption policy and edit the policy to add the rule.

When you create a decryption policy, you can create multiple rules at the same time, including multiple **Decrypt - Known Key** rules and multiple **Decrypt - Resign** rules.

Procedure

Step 1 Log in to the management center if you haven't already done so.

Step 2 Click **Policies** > **Access Control** > **Decryption**.

Step 3 Click **New Policy**.

Step 4 Give the policy a unique **Name** and, optionally, a **Description**.

Step 5 Click **Edit** (✎) next to the decryption policy name.

Step 6 Click **Add Rule**.

Step 7 Give the rule a Name.

Step 8 From the **Action** list, click a rule action and see one of the following sections for more information:

- Decryption Rule Do Not Decrypt Action
- Decryption Rule Blocking Actions
- Decryption Rule Monitor Action

Step 9 Click **Save**.

What to do next

- Add rule conditions: Decryption Rule Conditions

- Add a default policy action: Decryption Policy Default Actions, on page 10
- Configure logging options for the default action as described in *Logging Connections with a Policy Default Action* in the Cisco Secure Firewall Management Center Administration Guide .
- Set advanced policy properties: Decryption Policy Advanced Options, on page 13.
- Associate the decryption policy with an access control policy as described in Associating Other Policies with Access Control.
- Deploy configuration changes; see Deploy Configuration Changes.

Decryption Policy Default Actions

The default action for a decryption policy determines how the system handles decryptable encrypted traffic that does not match any non-monitor rule in the policy. When you deploy a decryption policy that does not contain any decryption rules, the default action determines how all decryptable traffic on your network is handled. Note that the system does not perform any kind of inspection on encrypted traffic blocked by the default action.

To set the decryption policy default action:

1. Log in to the management center if you haven't already done so.
2. Click **Policies** > **Access Control** > **Decryption**.
3. Click **Edit** (✎) next to the name of the decryption policy.
4. In the Default Action row, click one of the following actions from the list.

Table 1: Decryption Policy Default Actions

Default Action	Effect on Encrypted Traffic
Block	Block the TLS/SSL session without further inspection.
Block with reset	Block the TLS/SSL session without further inspection and reset the TCP connection. Choose this option if traffic uses a connectionless protocol like UDP. In that case, the connectionless protocol tries to reestablish the connection until it is reset. This action also displays a connection reset error in the browser so the user is informed that the connection is blocked.
Do not decrypt	Inspect the encrypted traffic with access control.

Default Handling Options for Undecryptable Traffic

Table 2: Undecryptable Traffic Types

Type	Description	Default Action	Available Action
Compressed Session	The TLS/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 ClientHello 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 TLS/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 TLS/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 a decryption 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.

Note that if your browser uses certificate pinning to verify a server certificate, you cannot decrypt this traffic by re-signing the server certificate. For more information, see Decryption Rule Guidelines and Limitations.

Related Topics

Set Default Handling for Undecryptable Traffic, on page 12

Set Default Handling for Undecryptable Traffic

You can set undecryptable traffic actions at the decryption policy level to handle certain types of encrypted traffic the system cannot decrypt or inspect. When you deploy a decryption policy that contains no decryption 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. This option is preferrable for connectionless protocols like UDP, which keep trying to connect until the connection is blocked.
- Inspect the encrypted traffic with access control.
- Inherit the default action from the decryption policy.

Procedure

Step 1 Log in to the management center if you haven't already done so.

Step 2 Click **Policies** > **Access Control** > **Decryption**.

Step 3 Click **Edit** (✎) next to the name of the decryption policy.

Step 4 In the decryption policy editor, click **Undecryptable Actions**.

Step 5 For each field, choose either the decryption policy's default action or another action you want to take on the type of undecryptable traffic. See Default Handling Options for Undecryptable Traffic, on page 11 and Decryption Policy Default Actions, on page 10 for more information.

Step 6 Click **Save** to save the policy.

What to do next

- Configure default logging for connections handled by the undecryptable traffic actions; see *Logging Connections with a Policy Default Action* in the Cisco Secure Firewall Management Center Administration Guide.
- Deploy configuration changes; see Deploy Configuration Changes.

Decryption Policy Advanced Options

A decryption policy 's **Advanced Settings** page has global settings that are applied to all managed devices that are configured for Snort 3 to which the policy is applied.

A decryption policy advanced settings are all ignored on any managed device that runs:

- A version earlier than 7.1
- Snort 2

Block flows requesting ESNI

Encrypted Server Name Indication (ESNI (link to draft proposal)) is a way for a client to tell a TLS 1.3 server what the client is requesting. Because the SNI is encrypted, you can optionally block these connections because the system cannot determine what the server is.

Disable HTTP/3 advertisement

This option strips HTTP/3 (RFC 9114) from the ClientHello in TCP connections. HTTP/3 is part of the QUIC transport protocol, not the TCP transport protocol. Blocking clients from advertising HTTP/3 provides protection against attacks and evasion attempts potentially burried within QUIC connections.

Propagate untrusted server certificates to clients

This applies only to traffic matching a **Decrypt - Resign** rule action.

Enable this option to substitute the certificate authority (CA) on the managed device for the server's certificate in cases where the server certificate is untrusted. An *untrusted* server certificate is one that is not listed as a trusted CA in the Secure Firewall Management Center. (**Objects** > **Object Management** > **PKI** > **Trusted CAs**).

Enable TLS 1.3 Decryption

Whether to apply decryption rules to TLS 1.3 connections. If you do not enable this option, the decryption rules apply to TLS 1.2 or lower traffic only. See TLS 1.3 Decryption Best Practices, on page 15.

Enable adaptive TLS server identity probe

Automatically enabled when TLS 1.3 decryption is enabled. A *probe* is a partial TLS connection with the server, the purpose of which is to obtain the server certificate and cache it. (If the certificate is already cached, the probe is never established.)

If TLS 1.3 Server Identity Discovery is disabled on the access control policy with which the decryption policy is associated, we attempt to use the Server Name Indication (SNI), which is not as reliable.

The adaptive TLS server identity probe occurs on any of the following conditions as opposed to on every connection as in earlier releases:

- Certificate Issuer—Matched when the value of **Issuer DNs** in a decryption rule's DN rule condition is matched.

  For more information, see Distinguished Name (DN) Rule Conditions.

- Certificate Status—Matched when any of the **Cert Status** conditions are matched in a decryption rule.

For more information, see Certificate Status Decryption Rule Conditions.

- Internal/External Certificate—Internal certificates can be matched by the certificate used in **Decrypt - Known Key** rule actions; external certificates can be matched in **Certificates** rule conditions.

  For more information, see Known Key Decryption (Incoming Traffic) and Certificate Decryption Rule Conditions.

- Application ID—Can be matched by **Applications** rule conditions in either an access control policy or a decryption policy.

  For more information, see Application Rule Conditions.

- URL Category—Can be matched by **URLs** rule conditions in an access control policy.

  For more information, see URL Rule Conditions.

Note **Enable adaptive TLS server discovery mode** is not supported on any Secure Firewall Threat Defense Virtual deployed to AWS. If you have any such managed devices managed by the Secure Firewall Management Center, the connection event **PROBE_FLOW_DROP_BYPASS_PROXY** increments every time the device attempts to extract the server certificate.

QUIC Decryption

Whether to apply decryption rules to connections that use the HTTP/3 over the QUIC protocol. When you decrypt QUIC connections, the system can inspect the contents of the sessions for intrusions, malware, or other issues. You can also apply granular control and filtering of decrypted QUIC connections based on specific criteria in the access control policy. QUIC support is in line with RFC 9000, 9001, 9002, 9114, 9204.

Consider the following when implementing QUIC decryption:

- QUIC decryption is not supported on high availability or clustered devices. Multi-instance is supported.
- Rules that apply to QUIC traffic would include the UDP protocol with destination port 443.
- Access control rules that apply to QUIC traffic would include the HTTP/3 or QUIC protocols, either explicitly or by implication.

The following limitations apply to QUIC decryption:

- QUIC decryption applies to Threat Defense 7.6+ only. Devices running a lower release cannot decrypt QUIC connections.
- Connections from browsers using the Chromium stack (Google Chrome, Opera, Edge) cannot be decrypted for outbound traffic. But inbound traffic from the same browsers can be decrypted.
- Connection Migration as described in RFC 9000 is not supported. The concept of Connection ID in QUIC allows endpoints to retain the same connection in the event of address change.
- Key update, session resumption, and QUIC version 2 are not supported.
- Interactive Block and Interactive Block with Reset (in access control rules) is not supported. These actions will work as Block and Block with Reset.

- The active connection-ID per connection is limited to 5. The maximum stream support per connection is limited to 25. If necessary, you can modify these limits using the **system support quic-tuning** and **system support quic-tuning-reset** commands in the device CLI.

TLS 1.3 Decryption Best Practices

Recommendation: When to enable advanced options

Both the decryption policy and the access control policy have advanced options that affect how traffic is handled, whether the traffic is being decrypted or not.

The advanced options are:

- Decryption policy:
  - TLS 1.3 decryption
  - TLS adaptive server identity probe
- Access control policy: TLS 1.3 Server Identity Discovery

  The access control policy setting takes precedence over the decryption policy setting.

Use the following table to decide which option to enable:

TLS adaptive server identity probe setting (decryption policy)	TLS 1.3 Server Identity Discovery setting (access control policy)	Result	Recommended when
Enabled	Disabled	Adaptive probe sent if decryption policy contains *any* rule conditions specified in Decryption Policy Advanced Options, on page 13 *and* if the server certificate is not cached.	• You're not using application or URL conditions in access control rules • You're decrypting traffic
Enabled	Enabled	Probe is always sent if the server certificate is not cached.	Use only if your access control rules have URL or application conditions
Disabled	Enabled	Probe is always sent if the server certificate is not cached.	Not recommended.
Disabled	Disabled	Probe is never sent.	Very limited usefulness; use only if not decrypting traffic and not using application or URL conditions in the access control rule

Note A cached TLS server's certificate is available to all Snort instances on a particular threat defense. The cache can be cleared with a CLI command and is automatically cleared when the device is rebooted.

Reference

For more information, see the discussion of TLS server identity discovery on secure.cisco.com.