ForeScout CounterACT®

SecureConnector™ Advanced Features

How-to Guide

Version 8.0

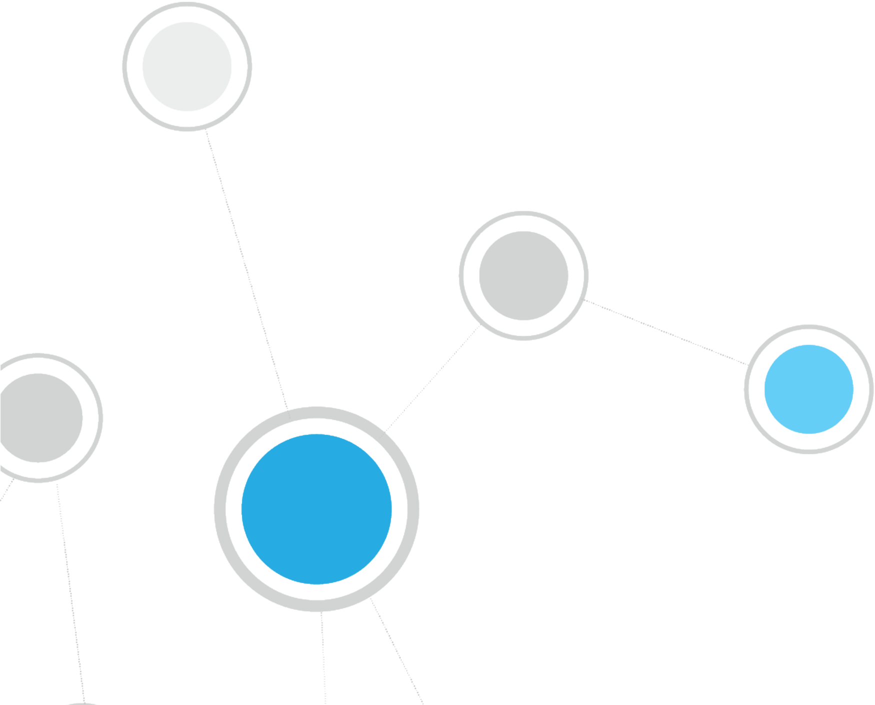


Table of Contents

About this How-to Guide

This guide describes the following advanced SecureConnector™ features:

- Certificate Based Rapid Authentication of Endpoints
- Endpoint Roaming Among Multiple CounterACT Deployments

Certificate Based Rapid Authentication of Endpoints

Typically CounterACT endpoint detection capabilities are combined with endpoint authentication and compliance policies to enforce network access control: Upon connection, network access of endpoints is restricted (typically to the DHCP and DNS servers and to CounterACT for detection and remediation interactions) until the user/endpoint is authenticated and compliance is proven. Only then is the necessary network access granted. However, authenticating endpoints and verifying compliance can cause a delay during which even legitimate endpoints have only restricted access. If complex compliance policies are in place, this delay in network access may be noticeable, resulting in an unsatisfactory user experience for corporate users.

Certificate based rapid authentication provides a strong, secure and extremely fast endpoint authentication mechanism. It uses your corporate PKI (Public Key Infrastructure) to provide immediate, authenticated network access for corporate users and other known endpoints.

The following describes a typical scenario when endpoints connect to the network:

- Corporate endpoints and other trusted endpoints managed by SecureConnector immediately initiate certificate-based authentication as part of SecureConnector's TLS interaction with CounterACT. Endpoints are granted immediate network access based on a signed X.509 digital certificate. CounterACT continues the compliance checks defined in active policies, and may revoke or change endpoint access if these checks fail.
- A corporate policy may grant limited network access to endpoints without a valid rapid authentication certificate, or with an expired or revoked certificate, or endpoints not managed by SecureConnector, until normal, policy-driven compliance checks are run.

Requirements for Rapid Authentication

This section describes requirements for working with rapid authentication.

Install the following modules:

- Endpoint Module version 1.0 with the following components running:
  - HPS Inspection Engine
  - Linux Plugin
  - OS X Plugin

- Network Module version 1.0 with the Switch Plugin running.

To use this feature, endpoints must be managed by SecureConnector. Versions of SecureConnector that support this feature identify rapid authentication client certificates on endpoints, and submit them for authentication as part of SecureConnector initial connection. For best performance, SecureConnector should be installed as a service; this ensures that authentication and consequent actions to grant network access can take place before the user has logged on, minimizing the time end users must wait to access the network.

CounterACT authenticates these client certificates based on certificates and CRL files generated by your PKI that are installed on each Appliance.

This feature requires your organization to have an existing Public/Private Key Infrastructure for certificate-based authentication, as described in the X.509 standard, including:

- a trusted Certificate Authority that can generate signed certificates
- support for certificate revocation

Administrators use the PKI in your network to generate signed certificates unique to the rapid authentication feature, and to distribute and manage these certificates on corporate devices and other trusted endpoints. Authentication chain and CRL information for these certificate is also distributed to CounterACT devices to allow authentication of client certificates.

What to Do

Follow this general procedure to implement certificate based rapid authentication.

1. Review the Requirements for Rapid Authentication and plan deployment. You can implement different levels of network access based on certificate details. See Detect and Authenticate Endpoints.
2. Work with the PKI/desktop team in your environment to generate Rapid Authentication Certificate Components.
3. Install Rapid Authentication Files on CounterACT Devices.

   If your environment uses the same CA to generate several certificates, you may Use an Extended Key Usage Object ID to distinguish the rapid authentication certificate from other certificates.
4. Install Rapid Authentication Client Certificates on Endpoints

   SecureConnector on managed endpoints detects these certificates to allow rapid authentication.
5. Create CounterACT policies that Detect and Authenticate Endpoints based on rapid authentication certificates.

Rapid Authentication Certificate Components

This section describes certificates and revocation lists that must be generated by the PKI team in your environment. The complete certification chain for the rapid authentication certificate takes the form:

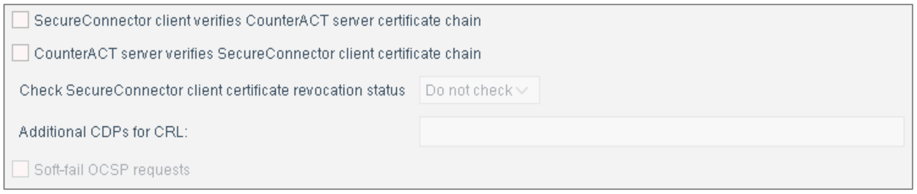
[Certificate_chain][certificate]

[Certificate_chain] is the full certificate chain, including the root CA and any intermediate Certificate Authorities.

[certificate] is the signed client certificate installed on each endpoint.

In addition, a certificate revocation list **[CRL]** for this certificate chain is required. Because this list is updated at regular intervals, your PKI team should provide a URL to the most recent CRL. There are two ways to configure this in CounterACT:

- When you Install Certificate Components in CounterACT, URL information in the certificate chain is parsed and stored.
- When you configure Endpoint Module plugins, use configuration fields in the SecureConnector tab to specify CRL information.



□ SecureConnector client verifies CounterACT server certificate chain

□ CounterACT server verifies SecureConnector client certificate chain

Check SecureConnector client certificate revocation status: Do not check

Additional CDPs for CRL:

□ Soft-fail OCSP requests

Install Certificate Components in CounterACT

Use the Trusted Certificates pane to install the certificate in CounterACT. In the Console, select **Tools > Options**, then select **Certificates > Trusted Certificates** from the Options tree. For details, see the *Certificate Interface Configuration Guide*.

Use an Extended Key Usage Object ID

In some environments the same issuing CA is used to sign certificates for different purposes. In these environments clients have several certificates issued by the same CA, and an Extended Key Usage extension is used to distinguish each certificate. Typically an Object ID (OID) string is used as the key.

In Linux environments, use unique installation folders or other methods to distinguish different certificates signed by an issuing CA.

To use an Extended Key Usage extension with OS X endpoints:

1. Verify that the certificate chain was installed in CounterACT.
2. Log in to the Enterprise Manager CLI.
3. Submit the following commands to set the OID:
   - For Windows endpoints:

     ```
     fstool va setproperty config.windows_client_auth_oid.value <OID>
     fstool oneach fstool va setproperty
     config.windows_client_auth_oid.value <OID>
     ```

   - For OS X endpoints:

     ```
     fstool osx_pkg -c <OID> -o
     ```

Omit the **-o** flag to implement OID changes only on this CounterACT device.

These commands set the Extended Key Usage Object ID to the value specified in <*OID*>. The **osx_pkg** command also adds the OID value to the SecureConnector installers used by the OS X Plugin.

Existing SecureConnector clients receive the OID value the next time they connect to CounterACT. New OS X endpoints receive the OID value during SecureConnector installation.

Install Rapid Authentication Client Certificates on Endpoints

When endpoints access the network:

- SecureConnector connects to CounterACT, making endpoints manageable.
- SecureConnector authenticates using rapid authentication certificates on endpoints, and the plugin reports authentication-related host property values. You can use these properties in CounterACT policies to grant network access to endpoints with valid certificates.

This section describes installation requirements that allow CounterACT to find the rapid authentication certificate on endpoints running different operating systems:

- Install Rapid Authentication Certificates on Windows Endpoints
- Install Rapid Authentication Certificates on Linux Endpoints
- Install Rapid Authentication Certificates on OS X Endpoints

Rapid authentication certificates are installed on endpoints by the team in your environment that is responsible for your PKI or desktop infrastructure. Any valid certificate enrollment procedure may be used to install certificates.

🗎 *When you Use an Extended Key Usage Object ID to distinguish rapid authentication certificates, the object/OID value should be included in the client-side distribution. SecureConnector on endpoints searches certificate stores for the OID value that was configured during server-side certificate installation on CounterACT devices.*

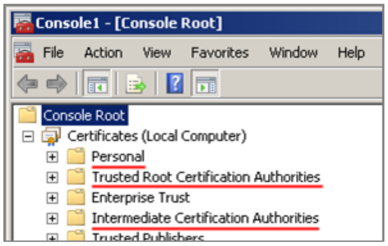
Install Rapid Authentication Certificates on Windows Endpoints

All certificates should be installed in the certificate store of the local computer.

To install rapid authentication certificates on Windows endpoints:

- Install the rapid authentication certificate under the *Personal* certificate store.
  - The *Client Authentication* certificate purpose must be enabled.
- Install [root_CA] – the certificate of the root Certification Authority - under the *Trusted Root Certification Authorities* store.

- Install [intermediate_CAs] – the intermediate Certificate Authorities relevant to this feature – under the *Intermediate Certification Authorities* store.


Console1 - [Console Root]
File
Action
View
Favorites
Window
Help
Console Root
Certificates (Local Computer)
Personal
Trusted Root Certification Authorities
Enterprise Trust
Intermediate Certification Authorities
Trusted Publishers

Install Rapid Authentication Certificates on Linux Endpoints

To install rapid authentication certificates on Linux endpoints:

1. For each client certificate, save the key pair as two files:

   `fs_sc_cert.pem` contains the client certificate.

   `fs_sc_cert_key.pem` contains the private key of the client certificate.

2. Create the following directory, and place both files in the directory:

   – When SecureConnector is run as permanent service or as dissolvable executable under the root user account:

   ```
   $HOME/etc/forescout/certs/
   ```

   – When SecureConnector is run as dissolvable executable under another user account:

   ```
   <user_ home>/forescout/certs/
   ```

   Where <*user_home*> is the home directory of the user account.

Install Rapid Authentication Certificates on OS X Endpoints

To install rapid authentication certificates on OS X endpoints:

1. If necessary, convert the client certificate key pair file to .pfx format.
2. Copy the .pfx file to the endpoint.
3. Attach this .pfx file to the System Keychain. For example, the following command attaches a file copied to the desktop to the Keychain.

   ```
   sudo security import ~/Desktop/<client_cert>.pfx -k
   /Library/Keychains/System.keychain -f pkcs12 -A -P <pass>
   ```

   Where <*client_cert*> is the name of the client certificate file in .pfx format, and <*pass*> is the passphrase used to unwrap the file.

4. Verify that SecureConnector can access this client certificate. If necessary, change key permissions.

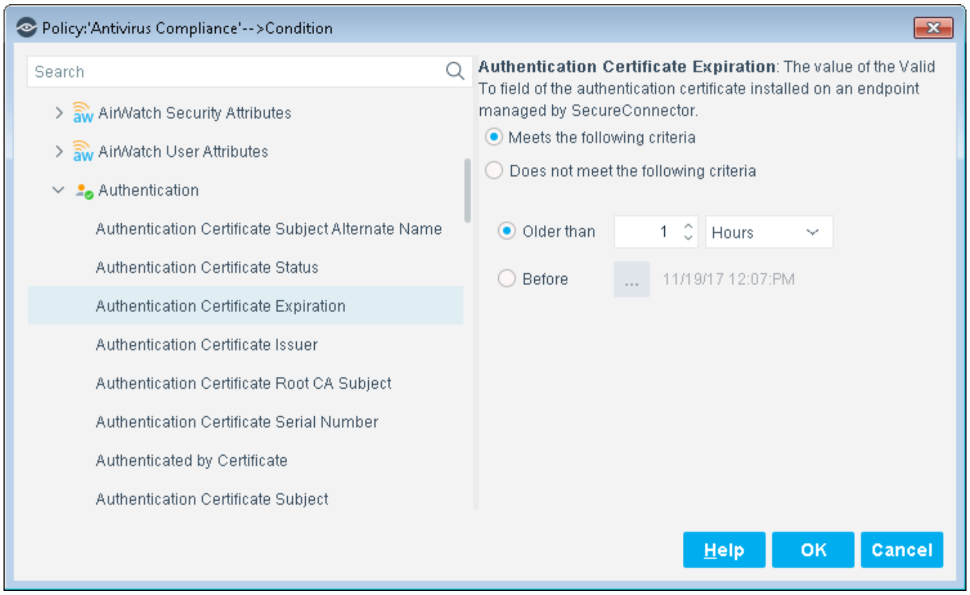
Detect and Authenticate Endpoints

When you install plugin releases that support this feature, new host properties are available. The properties are described in the table below.

Use these properties to create policies that detect endpoints with valid rapid authentication certificates, and to grant them network access. Most of these properties report fields of the client certificate, and several of these properties track the certificate based authentication process.

Consider creating the following policies to support certificate-based rapid authentication. In some cases, you can incorporate new rules in existing policies:

- *Detect and install SecureConnector:* It may be necessary to detect corporate endpoints and other trusted devices that are not yet managed by SecureConnector, and install or upgrade SecureConnector.
- *Manage the rapid authentication process:* Use the **Authentication Certificate Status** and the **Authenticated by Certificate** host properties to track the rapid authentication process, and to troubleshoot endpoints that failed to authenticate.
- *Grant network access based on certificate details:* Use the host properties below to detect endpoints based on the subject or other fields of the certificate, and to provide a specific network access profile based on the information in the certificate on the endpoint. This allows definition of several basic levels of access, determined by the rapid authentication certificate.
- *Handle non-compliant trusted devices:* detect certificate-authenticated endpoints which subsequently fail one or more policy-based compliance checks that are standard in your environment. If endpoints are significantly non-compliant, you may want to revoke the certificates of these endpoints to prevent rapid authentication the next time they connect.
- *Troubleshoot rapid authentication certificates:* Use the host properties below to detect endpoints with invalid or expired certificates.



Policy:'Antivirus Compliance'-->Condition

Search

AirWatch Security Attributes

AirWatch User Attributes

Authentication

Authentication Certificate Subject Alternate Name

Authentication Certificate Status

Authentication Certificate Expiration

Authentication Certificate Issuer

Authentication Certificate Root CA Subject

Authentication Certificate Serial Number

Authenticated by Certificate

Authentication Certificate Subject

Authentication Certificate Expiration: The value of the Valid To field of the authentication certificate installed on an endpoint managed by SecureConnector.

● Meets the following criteria

○ Does not meet the following criteria

● Older than 1 Hours

○ Before ... 11/19/17 12:07:PM

Help OK Cancel

Authentication Certificate Subject Alternate Name	The value of the Subject Alternate Name field of the certificate installed on the endpoint for certificate-based authentication.
Authentication Certificate Status	Indicates the state of the certificate installed on the endpoint for certificate-based authentication, and any verification errors for the certificate. If a certificate for this feature is not found on the endpoint, this property returns the value *No certificate.*
Authentication Certificate Expiration	The value of the Valid To field of the certificate installed on the endpoint for certificate-based authentication.
Authentication Certificate Issuer	The value of the Issuer field of the certificate installed on the endpoint for certificate-based authentication.
Authentication Certificate Root CA Subject	The value of the Subject field of the certificate installed on the endpoint for certificate-based authentication.
Authentication Certificate Serial Number	The value of the Serial Number field of the certificate installed on the endpoint for certificate-based authentication.
Authenticated by Certificate	Indicates whether certificate-based authentication process for the endpoint was successful. If a certificate for this feature is not found on the endpoint, this property returns the value *No.*
Authentication Certificate Subject	The value of the Subject field of the certificate installed on the endpoint for certificate-based authentication.

Tuning CounterACT Devices for Rapid Authentication

This section describes information regarding tuning of internal processes to improve performance of the Certificate Based Rapid Authentication feature.

To minimize the time it takes to detect new endpoints on the network and authenticate then, and similarly, to detect their disconnection, use the following procedure to change default settings on CounterACT devices.

To configure CounterACT devices for rapid authentication:

1. Log in to the Enterprise Manager or a standalone Appliance as root.
2. Submit the following commands:

   ```
   fstool va set_property conf.agent_close_state_timeout.value 0
   ```

   This internal parameter specifies the interval, in seconds, which the HPS Inspection Engine Plugin waits before reporting an endpoint as *Not Manageable* after two expected keep-alive messages were not received.

   ```
   fstool va set_property config.kpa_recv_interval.value 60
   ```

   This internal parameter specifies the timeout interval, in seconds, which the HPS Inspection Engine Plugin waits for keep-alive messages from SecureConnector agents on managed endpoints.

   Modifying these values precipitates reconnection more quickly if an endpoint managed by SecureConnector fails to connect to its Appliance.

3. Submit the following command to restart the HPS Inspection Engine Plugin with these new settings:

   ```
   fstool va restart
   ```

4. (Enterprise Manager only) Submit the following commands to implement these configuration settings on each CounterACT device in the network:

   ```
   fstool oneach fstool va set_property
   conf.agent_close_state_timeout.value 0
   ```

   ```
   fstool oneach fstool va set_property config.kpa_recv_interval.value
   60
   ```

   ```
   fstool oneach fstool va restart
   ```

To restore default settings for these parameters:

1. Log in to the Enterprise Manager or a standalone Appliance as root.
2. Submit the following commands:

   ```
   fstool va remove_property conf.agent_close_state_timeout.value
   ```

   ```
   fstool va remove_property config.kpa_recv_interval.value
   ```

3. Submit the following commands to restart the HPS Inspection Engine Plugin with these new settings:

   ```
   fstool va restart
   ```

4. (Enterprise Manager only) Submit the following commands to implement these configuration settings on each CounterACT device in the network:

   ```
   fstool oneach fstool va remove_property
   conf.agent_close_state_timeout.value
   ```

   ```
   fstool oneach fstool va remove_property
   config.kpa_recv_interval.value
   ```

   ```
   fstool oneach fstool va restart
   ```

Endpoint Roaming Among Multiple CounterACT Deployments

This feature lets endpoints that are managed by SecureConnector roam to various corporate CounterACT deployments and still remain managed. For example, in a large organization separate CounterACT deployments may support geographically disperse segments of the corporate network. When an endpoint managed by SecureConnector in one CounterACT deployment roams to a segment of the corporate network managed by another CounterACT deployment, it is recognized, allowed to connect, and is managed by SecureConnector.

This section describes how to configure CounterACT so that SecureConnector can work with several independent Enterprise Managers or standalone Appliances.

Endpoints must initially connect to their home CounterACT deployment after defining this configuration to receive the roaming capabilities.

Requirements

This section describes requirements for working with this feature.

Install the following plugin releases:

- For SecureConnector on Windows: Endpoint Module version 1.0 with the HPS Inspection Engine running.
- For SecureConnector on OS X: Endpoint Module version 1.0 with the OS X Plugin running.
- For SecureConnector on Linux: Endpoint Module version 1.0 with the Linux Plugin running.

Roaming for Windows Endpoints with SecureConnector

This procedure lets Windows endpoints managed by SecureConnector roam to other CounterACT deployments in your corporate network while remaining manageable.

To support roaming for Windows endpoints managed by SecureConnector:

1. On each Enterprise Manager:
   - **a.** Log in to the Enterprise Manager CLI.
   - **b.** If roaming endpoints can still connect to their home Appliance over the corporate network, submit the following command:

     ```
     fstool va set_property config.disconnect_unassigned_sc.value true
     ```

     From the CounterACT Console, restart the HPS Inspection Engine plugin.
   - **c.** In the CounterACT Console, select **Options** from the **Tools** menu.
   - **d.** Select **Modules > Endpoint Module > HPS Inspection Engine** and select **Configure**.
   - **e.** Select the SecureConnector tab. In the **Additional Appliance Connections** field, enter a comma-separated list of IP addresses for the other Enterprise Managers:

     <EM_IP1>,*<EM_IP2>,...,<EM_IPn>*
   - **f.** If several configurations are defined for the plugin, repeat step e in all configurations.
   - **g.** Select **Apply** to save changes.

Roaming for Linux Endpoints with SecureConnector

This procedure lets Linux endpoints managed by SecureConnector roam to other CounterACT deployments in your corporate network while remaining manageable.

To support roaming for Linux endpoints managed by SecureConnector:

1. Prepare a file named **multiple_em_ips.conf**. Each row of the file has the following format:

   <*EM_IP*>;<*EM_public_key*>

   Where

   <*EM_IP*> is the IP address of an Enterprise Manager

   <*EM_public_key*> is the public key found on the Enterprise Manager at:

   /root/.ssh/id_rsa.pub

   This file must contain all Enterprise Managers in all CounterACT deployments.

2. Place this file at the following location on all Enterprise Managers:

   /usr/local/forescout/plugin/mac/multiple_em_ips.conf

3. On each Enterprise Manager:

   h. Log in to the Enterprise Manager CLI.

   i. Submit the following commands:

   ```
   fstool mac set_property config.use_multiple_em.value true
   fstool oneach fstool mac set_property config.use_multiple_em.value
   true
   fstool oneach scp
   /usr/local/forescout/plugin/mac/multiple_em_ips.conf
   ```

   j. If roaming endpoints can still connect to their home Appliance over the corporate network, submit the following command:

   ```
   fstool mac set_property config.disconnect_unassigned_sc.value true
   ```

   k. From the Console, restart all instances of the plugin.

Roaming for OS X Endpoints with SecureConnector

This procedure lets OS X endpoints managed by SecureConnector roam to other CounterACT deployments in your corporate network while remaining manageable.

To define Enterprise Manager roaming for OS X endpoints managed by SecureConnector:

1. On each Enterprise Manager:

   a. Log in to the Enterprise Manager CLI.

   b. Submit the command **fstool osx additional_sites**.

   Output containing a certificate and other information is generated.

   c. Select the information including the curly brackets, as indicated below. Save this information to a file.

   ```
   {
    "resource" : "/sc",
    "client_auth_oid" : "1.3.6.1.4.1.694.21.8.815",
    "servers" :
   ```

```
   [
      {
        …
       "reconnect_interval" : "2",
       "server" : "10.34.1.14",
       "port" : 10005,
       "compliance_center_url" :
        "http://10.34.1.14/status?cc=true&fromsc=true"
      }
   ]
}
```

2. In each CounterACT environment with its own Enterprise Manager:

Create a file named **`additional_sites`**. Edit the file and paste in the Enterprise Manager data you prepared in Step 1. Do not include data for this Enterprise Manager; the file should contain only data from other Enterprise Managers. The **`additional_sites`** file should have the following structure:

`[{`*EM_1_info***`},{`***EM_2_info***`},…,{`***EM_n_info***`}]`**

- Curly brackets enclose information from each Enterprise Manager.

- A comma separates information from different Enterprise Managers.

- Enclose the entire comma-separated list in square brackets.

d. Log in to the Enterprise Manager as root.

e. Save the **`additional_sites`** file you prepared in Step 2 to the following location on the Enterprise Manager:
`/usr/local/forescout/plugin/osx/`

f. Submit the following command:

```
fstool oneach scp /usr/local/forescout/plugin/osx/additional_sites
```

g. From the CounterACT Console, restart all instances of the OS X Plugin in this CounterACT environment.

Additional CounterACT Documentation

For information about other CounterACT features and modules, refer to the following resources:

- Documentation Downloads
- Documentation Portal
- CounterACT Help Tools

Documentation Downloads

Documentation downloads can be accessed from one of two ForeScout portals, depending on which licensing mode your deployment is using.

- ***Per-Appliance Licensing Mode*** - Product Updates Portal

- ***Centralized Licensing Mode*** - Customer Portal

🗎 *Software downloads are also available from these portals.*

To learn which licensing mode your deployment is using, see Identifying Your Licensing Mode in the Console.

Product Updates Portal

The Product Updates Portal provides links to CounterACT version releases, Base and Content Modules, and Extended Modules, as well as related documentation. The portal also provides a variety of additional documentation.

To access the Product Updates Portal:

1. Go to https://updates.forescout.com/support/index.php?url=counteract.
2. Select the CounterACT version you want to discover.

Customer Portal

The Downloads page on the ForeScout Customer Portal provides links to purchased CounterACT version releases, Base and Content Modules, and Extended Modules, as well as related documentation. Software and related documentation will only appear on the Downloads page if you have a license entitlement for the software. The Documentation page on the portal provides a variety of additional documentation.

To access documentation on the ForeScout Customer Portal:

1. Go to https://forescout.force.com/support/.
2. Select **Downloads** or **Documentation**.

Documentation Portal

The ForeScout Documentation Portal is a searchable, web-based library containing information about CounterACT tools, features, functionality and integrations.

🗎 *If your deployment is using Centralized Licensing Mode, you may not have credentials to access this portal.*

To access the Documentation Portal:

1. Go to www.forescout.com/docportal.
2. Use your customer support credentials to log in.
3. Select the CounterACT version you want to discover.

CounterACT Help Tools

Access information directly from the CounterACT Console.

Console Help Buttons

Use context sensitive *Help* buttons to quickly access information about the tasks and topics you are working with.

CounterACT Administration Guide

Select **CounterACT Help** from the **Help** menu.

Plugin Help Files

1. After the plugin is installed, select **Options** from the **Tools** menu and then select **Modules**.
2. Select the plugin and then select **Help**.

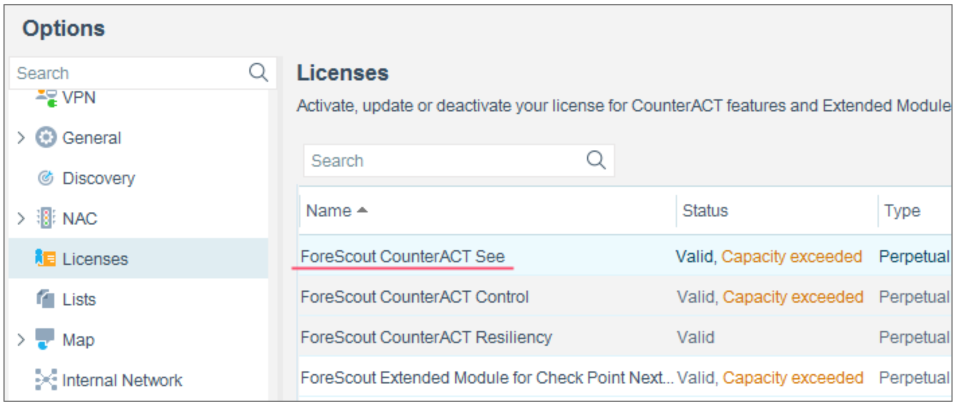
Documentation Portal

Select **Documentation Portal** from the **Help** menu.

Identifying Your Licensing Mode in the Console

If your Enterprise Manager has a *ForeScout CounterACT See* license listed in the Console, your deployment is operating in Centralized Licensing Mode. If not, your deployment is operating in Per-Appliance Licensing Mode.

Select **Options > Licenses** to see whether you have a *ForeScout CounterACT See* license listed in the table.



Licenses

Activate, update or deactivate your license for CounterACT features and Extended Module

Search

Name ▲	Status	Type
ForeScout CounterACT See	Valid, Capacity exceeded	Perpetual
ForeScout CounterACT Control	Valid, Capacity exceeded	Perpetual
ForeScout CounterACT Resiliency	Valid	Perpetual
ForeScout Extended Module for Check Point Next...	Valid, Capacity exceeded	Perpetual

Contact your ForeScout representative if you have any questions about identifying your licensing mode.

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