



ForeScout

eyeExtend Connect Module: Connect Plugin

Application Building and Deployment Guide

Version 1.5



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About the Documentation

- Refer to the Technical Documentation page on the Forescout website for additional documentation: <https://www.Forescout.com/company/technical-documentation/>
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About the Connect Plugin

The Connect Plugin provides an infrastructure for integrating third-party vendors with the Forescout platform. Use Connect to create third-party vendor integrations quickly. Use this guide to build and deploy applications.

Audience

The audience for Connect is technical people who want to create third-party vendor integrations, such as:

- Forescout users who want to build custom integrations
- Forescout experts
- Forescout partners
- Third-party developers who want to build integrations with Forescout

The audience needs the following:

- Knowledge of the Forescout platform
- Beginner to intermediate skills with Python scripting
- Knowledge of RESTful API concepts

The following knowledge may also be helpful:

- Forescout platform's Open Integration Module (OIM)
- Third-party vendor APIs

This guide also supports a non-technical user, one who configures the applications built by the technical audience.

About this Guide

This guide has two parts. [Build an App with Connect](#) describes how to define a third-party vendor integration with Connect. It is intended for app developers and describes how to create an app.

[Deploy an App with Connect](#) describes how to deploy an app. It is intended for app users and describes downloading and installing an app, licensing, and configuring. The [Connect User Interface Overview](#) and [Connect User Interface Details](#) are also relevant topics for this user.

What an App Builder Does

An app builder does the following:

- *Defines* content in configuration files for the system description, which is the connection to the third-party vendor, as well as the properties, actions, and policy templates for the integration
- *Writes* Python scripts to accomplish tasks in the Forescout platform such as resolve properties, take actions, or poll for endpoints
- *Creates* an application (app) by putting the configuration files and Python scripts in a zip file
- *Imports* the app into the Connect Plugin

The result is a user interface in which an app user *configures* the connection and the policies or takes actions in Connect for that integration.

Supported Forescout Platform Version

The following table lists the Forescout platform version that works with each version covered by this guide.

Version	Forescout Platform Version
1.5	Minimum version: 8.2.2

Customer Support

The Connect Plugin is supported by Forescout Customer Support. See <https://forescout.force.com/support/s/>.

Connect Apps, including those provided by Forescout, are not supported by Forescout.

Architecture

The Connect Plugin lets you import apps that solve specific use cases for a third-party integration. The architecture has the following components.



At the base of the architecture is the Forescout platform infrastructure, including the Forescout Console and CounterACT® Appliances.

The Connect Plugin software is deployed on a CounterACT Appliance and installed with a .fpi file, similar to other plugins or eyeExtend modules.

To run the scripts in an app, a Python process is started. The Python server runs on a CounterACT Appliance and is shared by all apps.

Apps contain the configuration files and Python scripts for a specific integration.

About Apps

Apps contain the following:

- System configuration file (system.conf): a configuration file in JSON format that contains information that a user would need to configure an integration. The system.conf file determines the panels and fields that are displayed in the **Connect** pane in the Forescout Console. For example, the system.conf file might specify that an integration needs an Add Connection panel with fields for a URL, username, and password, an Assign CounterACT Devices panel, and a Proxy Server panel.

- Property configuration file (property.conf): a configuration file in JSON format that contains properties specific to the integration you want to create. The property.conf file also defines actions, policy templates, and maps scripts. Script mapping ties the properties and actions in the property.conf file to the Python scripts.
 - Python script: a script file to solve a specific use case. There can be multiple scripts. For example, one script might resolve properties, another might take actions, and a third might poll for endpoints.
- 📄 *In this guide, the system configuration file and property configuration file are referred to as system.conf and property.conf, however, system.json and property.json are also accepted file names. The suffixes do not have to match, for example, an app can have a property.conf and a system.json file.*

At a minimum, an app contains three files:

- system.conf
- property.conf
- one Python script

All the files are put in a zip file to be imported into Connect.

- 📄 *In this guide, the app examples refer to Cylance (even though the new name is BlackBerry Protect).*

Connect User Interface Overview

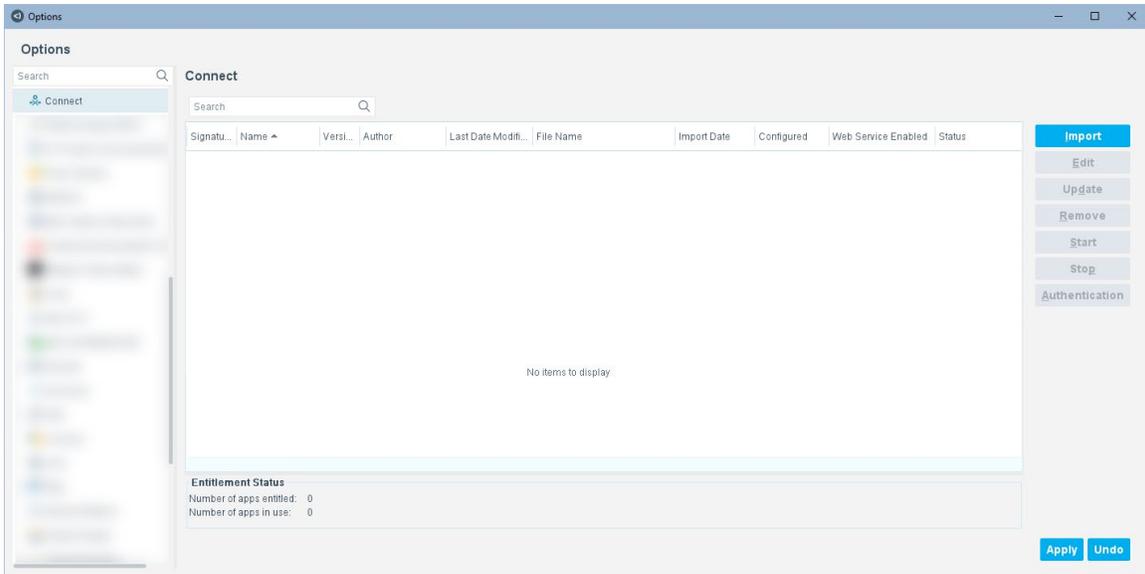
This topic provides an overview of the user interface.

After Connect is installed, **Connect** is displayed under **Options**. See [Install Connect Plugin](#).



Connect Pane Overview

Initially, the **Connect** pane is blank. No apps have been imported yet and no system descriptions have been configured yet.



There are several buttons on the **Connect** pane:

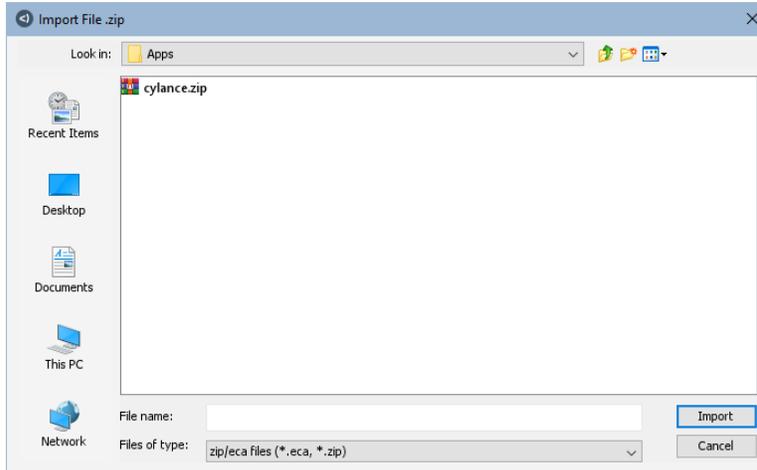


The buttons on the **Connect** pane are as follows:

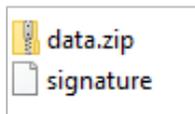
Button	Description
Import	Import an app
Edit	Edit an app
Update	Update an app
Remove	Remove an app
Start	Start an app
Stop	Stop an app
Authentication	Configure authentication for Connect web service

The **Import** and **Edit** buttons are briefly described in this overview. All the buttons are described in [Connect User Interface Details](#).

Select **Import** to import apps into Connect. Apps are in zip or eca format. They can be in any folder. The following example shows a .zip file, which contains the files for the app.

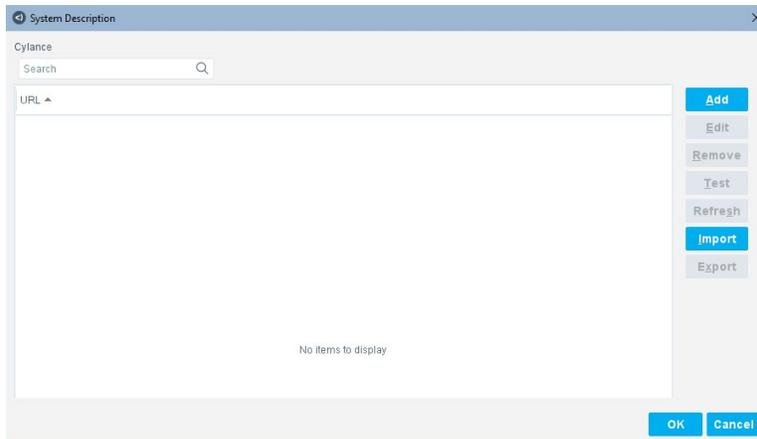


Apps that have been signed by Forescout are in a .eca file, which contains a data.zip file and a signature file.

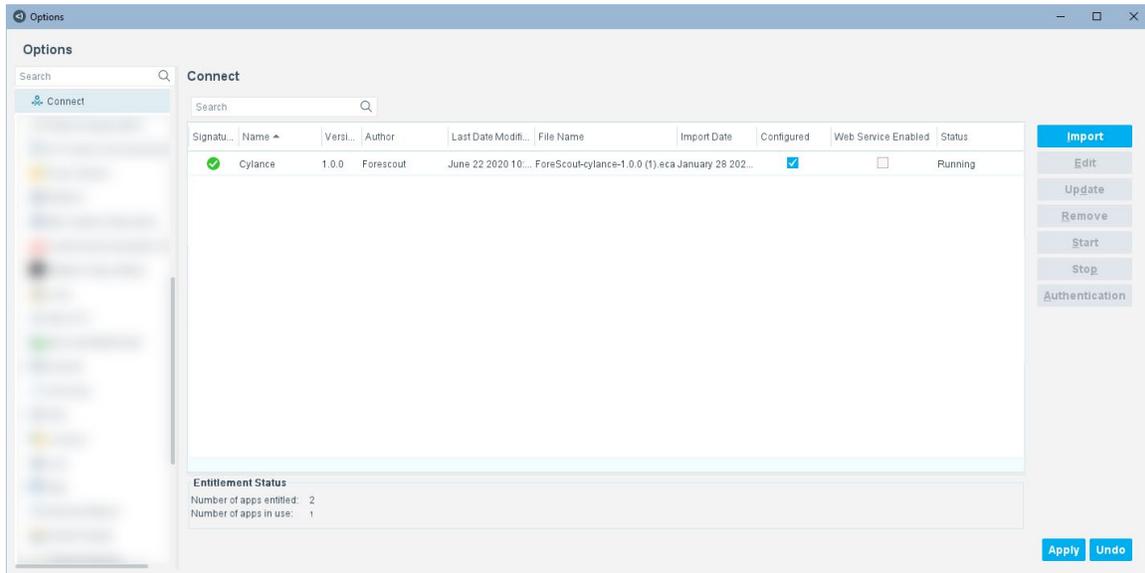


The data.zip file contains the files for the app.

After an app is imported, the **System Description** dialog box opens. It is initially blank. See [System Description Dialog Box Overview](#) for details.



After the system description for an app is configured, it is displayed in the **Connect** pane. There can be multiple apps displayed in this pane.



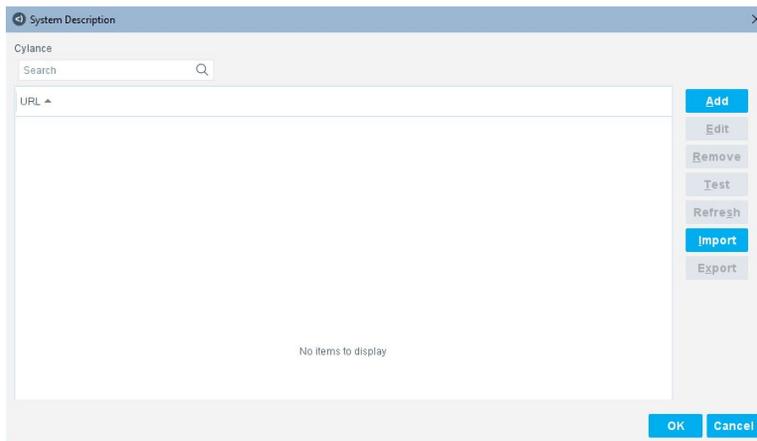
*Third-party vendor integrations are displayed inside the **Connect** pane, not on the left under **Options**.*

If the configuration has not been saved, select **Apply** to enable the **Start** button, which starts an app and the **Stop** button, which stops an app.

You can select an existing app and then select **Edit** to open the **System Description** dialog box.

System Description Dialog Box Overview

If no system descriptions have been configured yet, the **System Description** dialog box is blank.



There are several buttons for a system description as follows:

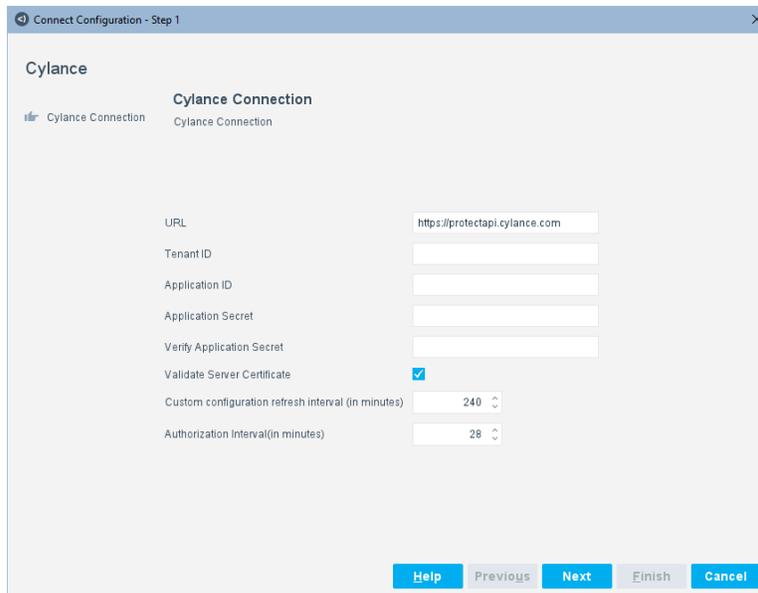


The buttons on the **System Description** dialog box are as follows:

Button	Description
Add	Add a system description
Edit	Edit a system description
Remove	Remove a system description
Test	(Optional) Test a system description
Refresh	Refresh app features
Import	Import a system description
Export	Export a system description

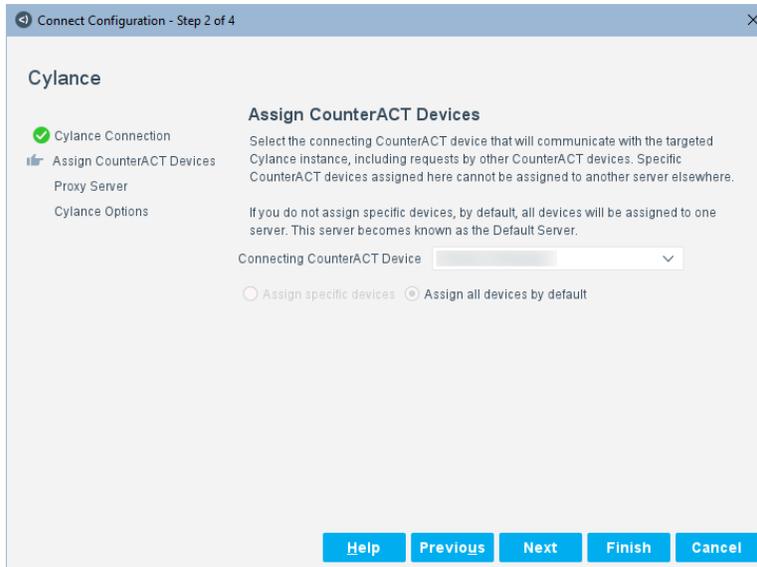
This overview describes the **Add** button. The other buttons are described in [Connect User Interface Details](#).

Select **Add** on the **System Description** dialog box to add a system description, which defines a connection to a third-party vendor. The system.conf file determines the configuration panels and the fields on each panel that can be configured when you select **Add**.



The user configuring the system description enters the information on the panel.

Select **Next** to display the next configuration panel that is defined in the system.conf file.

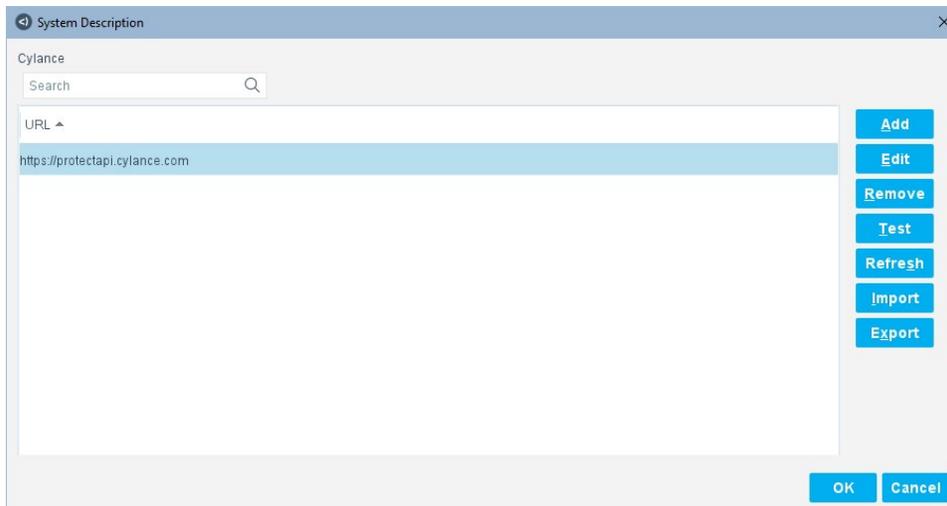


The user configuring the system description enters the information on the panel.

Select **Next** to display the next configuration panel that is defined in the system.conf file. There can be multiple panels.

Then select **Finish**.

After a system description is configured, it is displayed in the **System Description** dialog box.



Build an App with Connect

This topic describes how to define a third-party vendor integration with Connect. It is intended for app developers and describes how to create an app. See the following:

- [Define system.conf File](#)
- [Define property.conf File](#)
- [Create Policy Template XML File for Connect](#)
- [Write Python Scripts for Connect](#)
- [Use the Connect Web Service](#)
- [Create a Connect App](#)

Define system.conf File

The system configuration or system.conf file contains information that a user needs to configure an integration. The file is in JSON format. You can use any text editor to edit it, such as Notepad++.

The system.conf file determines the panels and fields that are displayed in the user interface. For example, the system configuration file might specify that an integration needs a Connection panel with several fields, an Assign CounterACT Devices panel, and a Proxy Server panel.

The system configuration file must be named either system.conf or system.json. It has the following sections:

- App information, such as name, version, and author. See [Define Name, Version, and Author in system.conf](#).
- Definitions of the panels and the fields in the user interface. See [Define User Interface Panels and Fields in system.conf](#).

The following is a sample system.conf file (split into two parts). Four panels have been defined. The first panel has been defined with seven fields.

```

{
  "name": "Cylance",
  "version": "1.0.0",
  "author": "Concert Masters",
  "testEnable": true,
  "web service": false,
  "panels": [
    {
      "title": "Cylance Connection",
      "description": "Cylance Connection",
      "fields": [
        {
          "display": "URL",
          "field ID": "connect_cylance_url",
          "type": "shortString",
          "mandatory": "true",
          "add to column": "true",
          "show column": "true",
          "identifier": "true",
          "tooltip": "URL"
        },
        {
          "display": "Tenant ID",
          "field ID": "connect_cylance_tenant_id",
          "type": "shortString",
          "mandatory": "true",
          "add to column": "true",
          "show column": "false",
          "tooltip": "Tenant ID"
        },
        {
          "display": "Application ID",
          "field ID": "connect_cylance_application_id",
          "type": "shortString",
          "mandatory": "true",
          "add to column": "true",
          "show column": "false",
          "tooltip": "Application ID"
        },
        {
          "display": "Application Secret",
          "field ID": "connect_cylance_application_secret",
          "type": "encrypted",
          "mandatory": "true",
          "tooltip": "Application Secret"
        },
        {
          "certification validation": true
        },
        {
          "app_instance_cache": true,
          "display": "Custom configuration refresh interval (in minutes)",
          "min": 5,
          "max": 2400,
          "value": 240
        },
        {
          "authorization": true,
          "display": "Authorization Interval (in minutes)",
          "min": 1,
          "max": 100,
          "value": 28
        }
      ]
    }
  ]
}

```

App name, version, author

First panel

First field on first panel

Second field on first panel

Third field on first panel

Fourth field on first panel

Fifth field on first panel

Sixth field on first panel

Seventh field on first panel

```

{
  "focal appliance":true,
  "title":"Assign CounterACT Devices",
  "description":"<html>Select the connecting CounterACT device that will communicate with the targeted Cylance instance, including requests by other CounterACT devices. Specific CounterACT devices assigned here cannot be assigned to another server elsewhere.<br><br>If you do not assign specific devices, by default, all devices will be assigned to one server. This server becomes known as the Default Server.</html>"
},
{
  "proxy server":true,
  "title":"Proxy Server",
  "description":"<html>Select a Proxy Server device to manage all communication between CounterACT and Cylance.</html>"
},
{
  "title":"Cylance Options",
  "description":"Cylance Options",
  "fields": [
    {
      "host discovery": true,
      "display":"Discovery Frequency",
      "max":300000,
      "add to column":"true",
      "show column":"false",
      "value":3600
    },
    {
      "rate limiter": true,
      "display":"Number of API queries per unit time",
      "unit":1,
      "min": 1,
      "max":1000,
      "add to column":"true",
      "show column":"false",
      "value":100
    }
  ]
}
]
}

```

Second panel

Third panel

Fourth panel

First field on fourth panel

Second field on fourth panel

Define Name, Version, and Author in system.conf

Define "name", "version", and "author" in the system.conf file, all of which are required fields. There are also fields to define an optional, predefined **Test** button and to enable the Connect web service.

```

{
  "name": "appname",
  "version": "1.0.0",
  "author": "Firstname Lastname",
  "testEnable": true,
  "web service": true,

```

Name, Version, and Author in User Interface

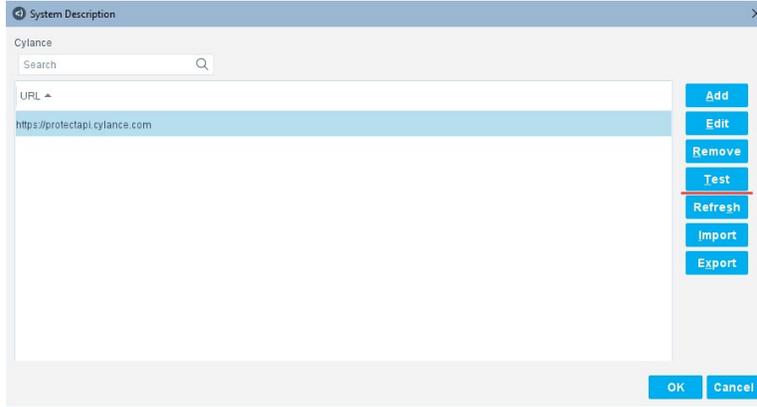
The name, version, and author defined in the system configuration file are displayed in the user interface on the **Connect** pane.

The screenshot shows the 'Connect' pane in a user interface. At the top, there is a search bar with the text 'Search' and a magnifying glass icon. Below the search bar is a table with four columns: 'Signature', 'Name', 'Version', and 'Author'. The 'Name' column is highlighted with a red underline. The 'Signature' column has a small upward-pointing triangle next to it.

Test Button in User Interface

If enabled, the **Test** button is displayed on the **System Description** dialog box.

The **Test** button can be used to test connectivity to a third-party vendor through a Python script.



Web Service Enabled in User Interface

If the Connect web service is enabled, there is a check box in the Web Service Enabled column in the **Connect** pane.

Connect									
Search									
Signature	Name	Version	Author	Last Date Modified	File Name	Import Date	Configured	Web Service Enabled	Status
✓	Cylance	1.0.0	Concert...	September 08 2020...	cylance.zip	January 26 ...	✓	✓	Running

In addition, the **Authentication** button is available when an app that has the web service enabled is selected in the **Connect** pane.



Parameter Details for Name, Version, Author, and Test Button

The parameters in the system configuration file are as follows:

Parameter	Description
"name"	<p>(Required) The name of the app. Each app must have a unique name. The name in the system.conf and property.conf files must match.</p> <p>The name can contain letters (uppercase and lowercase), numbers, spaces, and special characters, but not the underscore character (_).</p> <p>Names are used in various places in configuration files and Python scripts. Select a specific name rather than a generic name.</p>

Parameter	Description
"version"	(Required) The version of the app. The format of the version can be one, two, or three integers with a period as a separator, for example: <ul style="list-style-type: none"> ▪ 1 ▪ 1.0 ▪ 1.0.1
"author"	(Required) The author of the app. The author can contain letters (uppercase and lowercase), numbers, spaces, and special characters.
"testEnable"	(Optional) The device test button. If set to true, a Test button is displayed in the System Description dialog box.
"web service"	(Optional) The Connect web service. If set to true, the web service is enabled. The default is false. See Use the Connect Web Service for details.

Edit Name, Version, and Author

To edit the system.conf file:

1. Specify a name, version, and author by entering the text within the quotation marks, for example:

```
"name": "Cylance",
"version": "1.0.0",
"author": "Thomas Smith",
```

2. (Optional) To display the **Test** button on the **System Description** dialog box, keep the following:

```
"testEnable": true,
```

To not display the **Test** button on the **System Description** dialog box, either replace true with false or remove "testEnable" from the system.conf file.

3. (Optional) To enable the Connect web service, replace false with true as follows:

```
"web service": true,
```

Define User Interface Panels and Fields in system.conf

The rest of the system.conf file defines the configuration panels and fields needed in the user interface to define the system description of the integration.

In the following sample configuration (split into two parts), there are four panels. Two of the panels (the second and third) are predefined. The first panel is a custom panel with seven fields. The first four fields on that panel are defined using several parameters, while the fifth, sixth, and seventh fields on that panel are predefined. The fourth panel has two predefined fields.

```

{
  "name": "Cylance",
  "version": "1.0.0",
  "author": "Concert Masters",
  "testEnable": true,
  "web_service": false,
  "panels": [
    {
      "title": "Cylance Connection",
      "description": "Cylance Connection",
      "fields": [
        {
          "display": "URL",
          "field ID": "connect_cylance_url",
          "type": "shortString",
          "mandatory": "true",
          "add to column": "true",
          "show column": "true",
          "identifier": "true",
          "tooltip": "URL"
        },
        {
          "display": "Tenant ID",
          "field ID": "connect_cylance_tenant_id",
          "type": "shortString",
          "mandatory": "true",
          "add to column": "true",
          "show column": "false",
          "tooltip": "Tenant ID"
        },
        {
          "display": "Application ID",
          "field ID": "connect_cylance_application_id",
          "type": "shortString",
          "mandatory": "true",
          "add to column": "true",
          "show column": "false",
          "tooltip": "Application ID"
        },
        {
          "display": "Application Secret",
          "field ID": "connect_cylance_application_secret",
          "type": "encrypted",
          "mandatory": "true",
          "tooltip": "Application Secret"
        },
        {
          "certification validation": true
        },
        {
          "app_instance_cache": true,
          "display": "Custom configuration refresh interval (in minutes)",
          "min": 5,
          "max": 2400,
          "value": 240
        },
        {
          "authorization": true,
          "display": "Authorization Interval (in minutes)",
          "min": 1,
          "max": 100,
          "value": 28
        }
      ]
    }
  ]
}
    
```

App name, version, author

First panel, which is a custom panel with seven fields

First field on first panel, which is defined with parameters

Second field on first panel, which is defined with parameters

Third field on first panel, which is defined with parameters

Fourth field on first panel, which is defined with parameters

Fifth field on first panel, which is predefined

Sixth field on first panel, which is predefined

Seventh field on first panel, which is predefined

```

{
  "focal appliance":true,
  "title":"Assign CounterACT Devices",
  "description":"<html>Select the connecting CounterACT device that will communicate with the targeted Cylance instance, including requests by other CounterACT devices. Specific CounterACT devices assigned here cannot be assigned to another server elsewhere.<br><br>If you do not assign specific devices, by default, all devices will be assigned to one server. This server becomes known as the Default Server.</html>"
},
{
  "proxy server":true,
  "title":"Proxy Server",
  "description":"<html>Select a Proxy Server device to manage all communication between CounterACT and Cylance.</html>"
},
{
  "title":"Cylance Options",
  "description":"Cylance Options",
  "fields": [
    {
      "host discovery": true,
      "display":"Discovery Frequency",
      "max":300000,
      "add to column":"true",
      "show column":"false",
      "value":3600
    },
    {
      "rate limiter": true,
      "display":"Number of API queries per unit time",
      "unit":1,
      "min": 1,
      "max":1000,
      "add to column":"true",
      "show column":"false",
      "value":100
    }
  ]
}
}
    
```

Second panel, which is predefined

Third panel, which is predefined

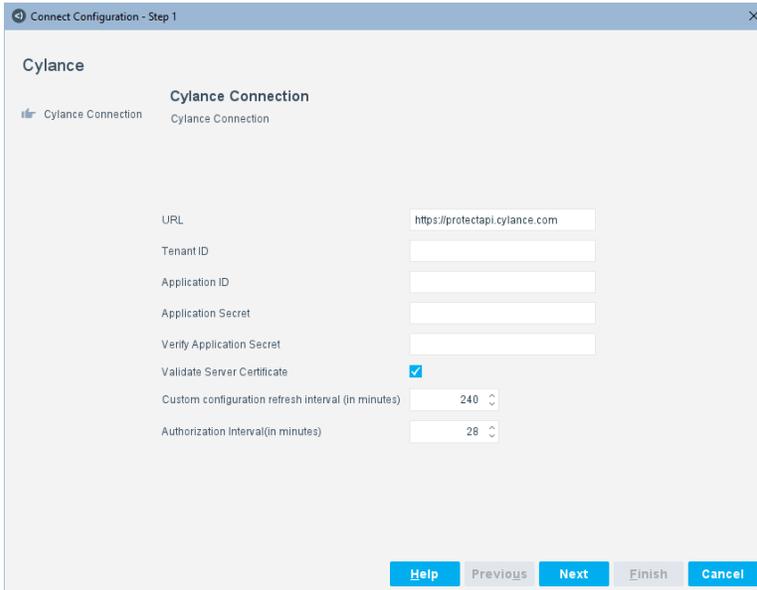
Fourth panel, which is a custom panel with two fields

First field on fourth panel, which is predefined

Second field on fourth panel, which is predefined

Panels and Fields in User Interface

When you select **Add** in the **System Description** dialog box, the first configuration panel defined in the system.conf file is displayed. For example, the following panel has several fields as well as a Validate Server Certificate checkbox.



When you select **Next**, the second configuration panel defined in the system.conf file is displayed, for example, the predefined Assign CounterACT Devices panel.

Connect Configuration - Step 2 of 4

Cylance

- ✓ Cylance Connection
- Assign CounterACT Devices
- Proxy Server
- Cylance Options

Assign CounterACT Devices

Select the connecting CounterACT device that will communicate with the targeted Cylance instance, including requests by other CounterACT devices. Specific CounterACT devices assigned here cannot be assigned to another server elsewhere.

If you do not assign specific devices, by default, all devices will be assigned to one server. This server becomes known as the Default Server.

Connecting CounterACT Device

Assign specific devices Assign all devices by default

Help Previous Next Finish Cancel

When you select **Next**, the third configuration panel defined in the system.conf file is displayed, for example, the predefined Proxy Server panel.

Framework Configuration - Step 3 of 3

Cylance

- ✓ Cylance Connection
- ✓ Assign CounterACT Devices
- Proxy Server

Proxy Server

Select a Proxy Server device to manage all communication between CounterACT and Cylance.

Use Proxy Server

Proxy Server

Proxy Server Port

Proxy Server Username

Proxy Server Password

Verify Proxy Server Password

Help Previous Next Finish Cancel

See ["rate limiter" Field](#) and ["host discovery" Field](#) for the fourth panel defined in this sample configuration.

When you select **Finish**, the system description is configured.

Parameter Details for Panels and Fields

The parameters for “panels” and “fields” in the system configuration file are as follows:

Panel	Field	Description
“panels”		<p>(Required) The definition of the configuration panels in the user interface.</p> <p>In this sample configuration, there are four panels:</p> <ul style="list-style-type: none"> ▪ “title”:“Cylance Connection”—a custom panel ▪ “focal appliance”:true—a predefined panel ▪ “proxy server”:true—a predefined panel ▪ “title”:“Cylance Options”—a custom panel <p>The value is a JSON array. Each element of the JSON array is a JSON object.</p>
	“title”	(Required) The title of a custom panel.
	“description”	The description of a custom panel.

Panel	Field	Description
	"fields"	<p>(Required) The fields of a custom panel. In this sample configuration there are several fields that start with "display", as well as predefined fields.</p> <p>The value is a JSON array. Each element of the JSON array is a JSON object.</p> <p>Use the following parameters to define fields:</p> <ul style="list-style-type: none"> ▪ "display"—(Required) The label of the field, which will be displayed on the left of the field in the user interface, such as URL or Proxy Server Port. ▪ "field ID"—(Required) The internal, unique name of the field, in ASCII characters. It must start with <i>connect_<appname></i>. The <appname> must consist of all lowercase letters of the name defined in the app without any spaces or underscores. For example, the <appname> for VMware AirWatch would be <i>vmwareairwatch</i>. Field ID values are global variables. ▪ "type"—(Required) The type of the field. The valid types are: <i>shortString</i>, <i>longString</i>, <i>ip</i>, <i>integer</i>, <i>boolean</i>, <i>encrypted</i>, and <i>option</i>. See "type" Parameter Details. ▪ "mandatory"—(Required) When set to true, the field is mandatory in the user interface, which means that when it is configured, the field must not be empty. See "mandatory" Parameter. ▪ "add to column"—When set to true, you can select the field from the Add/Remove Columns dialog box. You cannot set this parameter to true if the field type is encrypted. See "add to column" Parameter in User Interface. ▪ "show column"—When set to true, you can display the field as a column in the System Description dialog box, if "add to column" is also set to true. See "show column" Parameter in User Interface. ▪ "identifier"—When set to true, the value of the field must be unique. For example, for a URL. See Error Message for "identifier" Parameter in User Interface. ▪ "tooltip"—The text for the tooltip in the user interface. ▪ "value"—The value for a field that is prepopulated with a default, such as an actual URL. For example, to prepopulate the Cylance URL, use: "value":"https://protectapi.cylance.com" <p>The predefined fields are:</p> <ul style="list-style-type: none"> ▪ "certification validation"—When set to true, the predefined Validate Server Certificate checkbox is displayed. See "certification validation" Field. ▪ "app_instance_cache"—When set to true, the predefined refresh interval field for app instance cache data is displayed. See "app instance cache" Field. ▪ "authorization"—When set to true, the predefined Authorization Interval field is displayed. See "authorization" Field.

Panel	Field	Description
"focal appliance"		(Required) The predefined focal appliance panel. If set to true, a focal appliance panel is displayed as a configuration panel. It cannot be set to false because it is a required panel. See Assign CounterACT Devices Panel Details .
	"title"	(Required) The title of the panel, which is the predefined focal appliance panel.
	"description"	The description of the focal appliance panel. HTML formatting can be used in the description, for example, to create multiple paragraphs.
"proxy server"		(Optional) The predefined proxy server panel. If set to true, a proxy server panel is displayed as a configuration panel. See Proxy Server Panel Details .
	"title"	(Required) The title of the panel, which is the predefined proxy server panel.
	"description"	The description of the proxy server panel. HTML formatting can be used in the description, for example, to create multiple paragraphs.

Define Panels and Fields

Define at least two panels with one field on each panel by replacing the text in quotation marks for "panels" and "fields" in the sample system.conf file. See [Sample system.conf File](#).

In the user interface, there will be at a minimum, a **Next** button on the first panel and a **Finish** button on the second panel.

It is recommended that you put the most important fields in the first panel, such as IP address, URL, or username/password.

You can define many parameters for each field. Four parameters for each field are required: "display", "field ID", "type", and "mandatory".

To define four fields on a panel, you need four field definitions in the system.conf file.

In the following sample configuration, the Cylance Connection panel is defined with four fields. The definition of each field uses different parameters. See [Parameter Details for Panels and Fields](#).

<pre> { "name": "Cylance", "version": "1.0.0", "author": "Concert Masters", "testEnable": true, "panels": [{ "title": "Cylance Connection", "description": "Cylance Connection", "fields": [{ "display": "URL", "field ID": "connect_cylance_url", "type": "shortString", "mandatory": "true", "add to column": "true", "show column": "true", "identifier": "true", "tooltip": "URL" }, { "display": "Tenant ID", "field ID": "connect_cylance_tenant_id", "type": "shortString", "mandatory": "true", "add to column": "true", "show column": "false", "tooltip": "Tenant ID" }, { "display": "Application ID", "field ID": "connect_cylance_application_id", "type": "shortString", "mandatory": "true", "add to column": "true", "show column": "false", "tooltip": "Application ID" }, { "display": "Application Secret", "field ID": "connect_cylance_application_secret", "type": "encrypted", "mandatory": "true", "tooltip": "Application Secret" }] }] } </pre>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px; text-align: center;">Panel title and description</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">First field: a mandatory as well as unique field of string type that will be displayed in the System Description dialog box and available in Add/Remove Columns</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Second field: a mandatory field of string type that will not be displayed in the System Description dialog box but will be available in Add/Remove Columns</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Third field: a mandatory field of string type that will not be displayed in the System Description dialog box but will be available in Add/Remove Columns</div> <div style="border: 1px solid black; padding: 5px;">Fourth field: a mandatory field that will not be displayed in the System Description dialog box nor will it be available in Add/Remove Columns because the type is encrypted</div>
---	---

“mandatory” Parameter

It is recommended that at least one field in the first panel have the “mandatory” parameter set to true. Mandatory means that when the field is configured in the user interface, it must not be empty.

It is also recommended that you put the most important fields in the first panel, such as IP address, URL, or username/password, which are typical uses of the “mandatory” parameter.

An error message is displayed for a “mandatory” field if nothing is entered in the user interface when **Next** is selected.



Error Message for “identifier” Parameter in User Interface

If a field is “identifier”, the value of the field must be unique when it is configured in the user interface. For example, if the field is a URL, it must be unique.

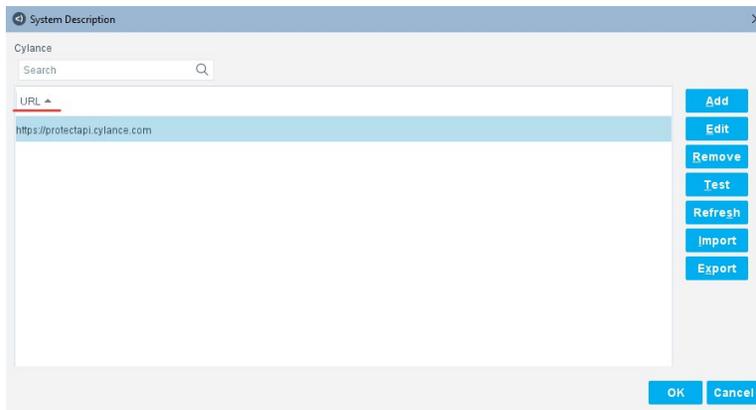
Only one “identifier” is allowed in a system.conf file.

An error message is displayed for an “identifier” field if the same value is entered in the user interface when **Next** is selected.



“show column” Parameter in User Interface

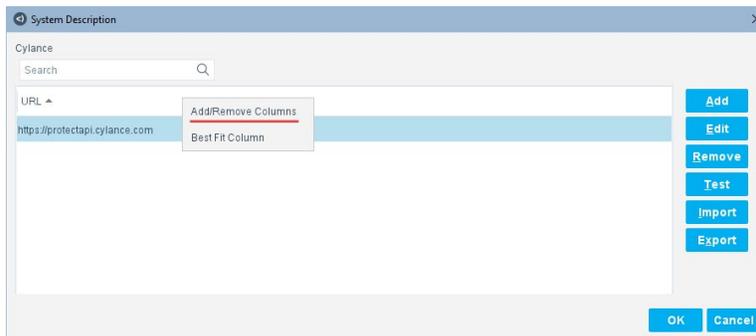
The “show column” parameter results in fields being displayed as columns in the **System Description** dialog box. In the following example, there is one column.



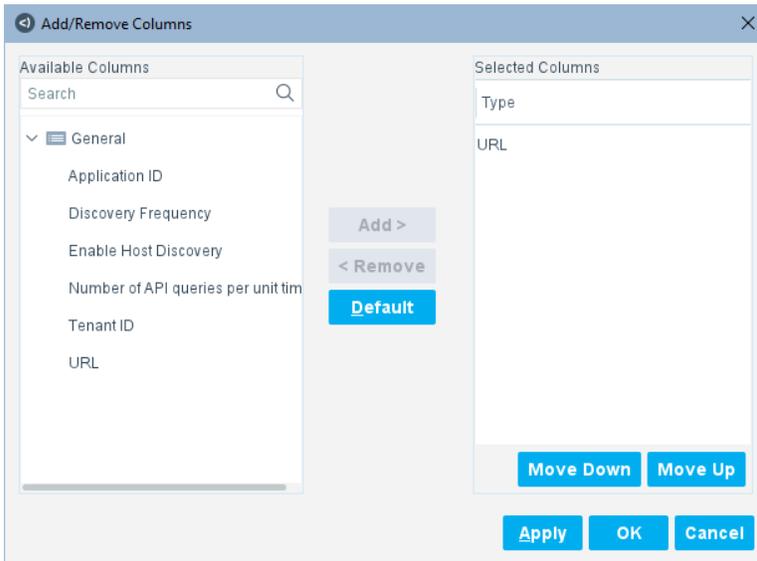
When “show column” is set to true, the field is displayed as a column in the **System Description** dialog box, if “add to column” is also set to true.

“add to column” Parameter in User Interface

The “add to column” parameter results in the following menu when you right-click in the **System Description** dialog box.



If you select **Add/Remove Columns**, you can select columns to add or remove from the Available Columns and Selected Columns tables.



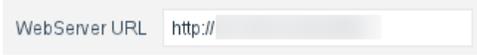
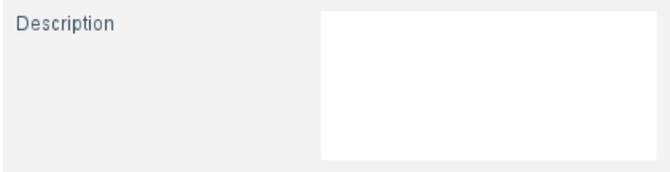
Select **OK** to see the selected columns displayed in the **System Description** dialog box.

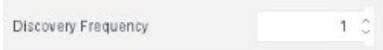
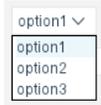
If the field type is “encrypted”, you cannot add it as a column. This prevents the display of passwords in a column.

At least one field in a system description must have the “add to column” parameter set to true or an error message is displayed.

“type” Parameter Details

The “type” parameters are as follows:

Type	Description
“shortString”	<p>A string field, consisting of one row of editable text. Use this type for a username or a URL.</p> 
“longString”	<p>A string field, consisting of five rows of editable text. Use this type for a multi-line field, such as a description.</p> 

Type	Description
"ip"	<p>An IP field. Use this type for an IPv4 address.</p> 
"integer"	<p>An integer field, which can be a number from 1 to 2,147,483,647. Use this type for a list of numbers. You can either scroll to select a number or type a number in the field.</p> 
"boolean"	<p>A Boolean field. Use this type to create a checkbox that takes only a "true" (checked) or "false" (unchecked) value.</p> 
"encrypted"	<p>An encrypted field, in which the values are encrypted. This field type also creates a field to verify the value. Use this type for a password.</p>  <p>The two values are checked to see if they match.</p>
"option"	<p>An option field containing a drop-down menu. Use this type for a selectable list.</p> <p>In addition to specifying the type, you also must specify the name and value of the options. The following sample "option" definition produces the user interface on the right.</p> <pre> "option": "option", "options": [{ "display": "option1", "value": "OPTION1_FIELD_ID" }, { "display": "option2", "value": "OPTION2_FIELD_ID" }, { "display": "option3", "value": "OPTION3_FIELD_ID" }], </pre> 

"certification validation" Field

The "certification validation" field is predefined and results in the following checkbox on a panel in the user interface.



Only one "certification validation" field is allowed in a system.conf file.

If this checkbox is selected during configuration, the identity of the third-party server is validated before establishing a connection. If this checkbox is not selected during configuration, certificate-based authentication is disabled and self-signed certificates are accepted.

Trusted certificates must be uploaded in the Forescout Console to **Certificates > Trusted Certificates**. Upload the entire certificate chain. For more information about certificates, refer to “Configuring the Certificate Interface” in the *Forescout Administration Guide*.

Certificates in Connect can be used by all apps.

“app_instance_cache” Field

The following is a sample configuration of an application instance cache field that can be defined in the system.conf file. It uses a predefined parameter named “app_instance_cache”.

```
{
  "app_instance_cache":true,
  "display":"Custom configuration refresh interval (in minutes)",
  "min":5,
  "max":2400,
  "value":240
},
```

You can store and retrieve non-endpoint data from a third-party product (the data is not associated with an endpoint).

The value is stored as a string type of system description field, which you can save in any format, such as a JSON array. It is retrievable in property resolve, action, and discovery scripts using `params.get("connect_app_instance_cache")`.

The different types of scripts (property, action, polling) can access the data at the per configuration instance of the app.

For example, you can use this functionality to get a list of all users, then use the list in an action script. See [Use App Instance Cache in Connect Scripts](#).

The predefined “app_instance_cache” field lets you configure the interval of how often you want to refresh the data.

You also need to specify the script used for retrieving the data from the third-party. The script must be mapped in the property.conf file. See [Map Scripts in property.conf](#).

When app instance cache is defined in the system.conf file, the **Refresh** button on the **System Description** dialog box is enabled to let you manually trigger a refresh. See [Refresh App Features](#).

Only one “app_instance_cache” field is allowed in a system.conf file.

The parameters of the app_instance_cache field are as follows:

Parameter	Description
“app_instance_cache”	(Required) When set to true, indicates an integer field for configuring the app instance cache data refresh interval, in minutes.
“display”	(Required) The label of the field, which will be displayed on the left of the field in the user interface.

Parameter	Description
"min"	(Optional) The minimum value of the field. If none is set, "min" defaults to 1.
"max"	(Optional) The maximum value of the field. If none is set, "max" will be the maximum positive value for a 32-bit signed binary integer.
"value"	(Optional) The prepopulated default value of the field. If none is set, "value" will be the "min".

The following is an example of the refresh interval field in the user interface:

"authorization" Field

The following is a sample configuration of an authorization field that can be defined in the system.conf file. It uses a predefined parameter named "authorization".

```
{
  "authorization":true,
  "display":"Authorization Interval (in minutes)",
  "min":1,
  "max":100,
  "value":28
}
```

You can enable an interval-based authorization mechanism, which you can then use in all action, polling, and resolve scripts.

For the Authorization Interval field, you specify the minimum and maximum number of minutes for the interval at which the authorization is refreshed, and a default. In this sample configuration, the minimum is one minute, the maximum is 100 minutes, and the default is 28 minutes, which means the authorization is refreshed every 28 minutes.

It is recommended that you set the value of the field to less than the authorization expiry. For example, if the authorization expires every 30 minutes, but you refresh every 28 minutes, you can guarantee that you will always have a valid authorization.

You also need to specify the script used for authorization. See [Authorization Script for Connect](#). The script must be mapped in the property.conf file. See [Map Scripts in property.conf](#).

When authorization is defined in the system.conf file, the **Refresh** button on the **System Description** dialog box is enabled to let you manually trigger a refresh. See [Refresh App Features](#).

Only one "authorization" field is allowed in a system.conf file.

The parameters of the authorization field are as follows:

Parameter	Description
"authorization"	(Required) When set to true, indicates an integer field for the authorization refresh interval (in minutes).

Parameter	Description
"display"	(Required) The label of the field, which will be displayed on the left of the field in the user interface.
"min"	(Optional) The minimum value of the field. If none is set, "min" defaults to 1.
"max"	(Optional) The maximum value of the field. If none is set, "max" will be the maximum positive value for a 32-bit signed binary integer.
"value"	(Optional) The prepopulated default value of the field. If none is set, "value" will be the "min".

The resulting field, Authorization Interval(in minutes), is displayed in the user interface.

Authorization Interval(in minutes)

"rate limiter" Field

The following is a sample configuration of a rate limiter field that can be defined in the system.conf file. It uses a predefined parameter named "rate limiter".

```
{
  "rate limiter": true,
  "display": "Number of API queries per unit time",
  "unit": 1,
  "min": 1,
  "max": 1000,
  "add to column": "true",
  "show column": "false",
  "value": 100
}
```

You can rate limit the requests sent to the third-party server. The rate limiter specifies the number of times a script is invoked during the specified time. It is triggered when the app starts.

For the Number of API queries per unit time field, you specify the unit to use, such as seconds, minutes, or hours, the minimum and maximum values, and a default. In this sample configuration, the unit is one second, the minimum is one second, the maximum is 1000 seconds, and the default is 100 seconds.

The script invocations are held as tasks in a queue. When the rate limiter constraint is reached, there is a wait before the script is invoked again.

The tasks, up to the number specified in the value field, will be executed from the pending queue per the specified time.

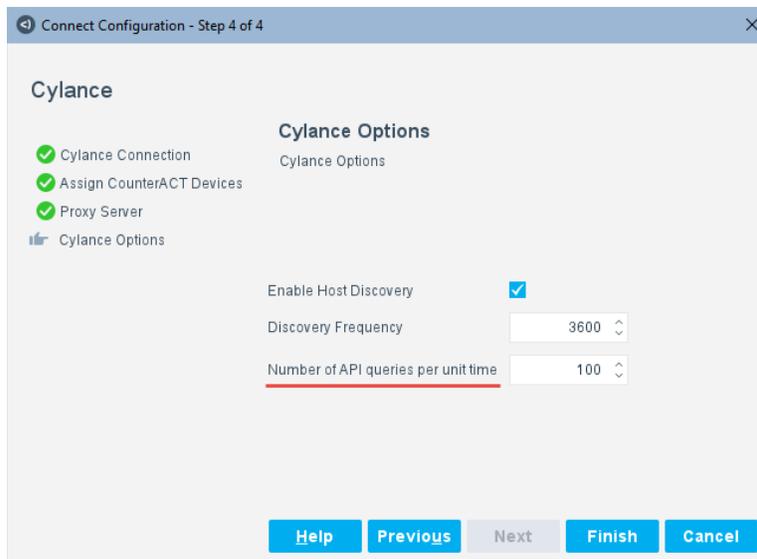
Only one "rate limiter" field is allowed in a system.conf file.

The parameters of the rate limiter field are as follows:

Parameter	Description
"rate limiter"	(Required) When set to true, indicates an integer field for the rate limiter.

Parameter	Description
"display"	(Required) The label of the field, which will be displayed on the left of the field in the user interface.
"unit"	(Required) The unit for the rate limiter, which is an integer. For example, a unit of 1 is 1 second, a unit of 60 is 1 minute, and a unit of 3600 is 1 hour.
"min"	(Optional) The minimum value of the field. If none is set, "min" defaults to 1.
"max"	(Optional) The maximum value of the field. If none is set, "max" will be the maximum positive value for a 32-bit signed binary integer.
"add to column"	When set to true, you can select the field from the Add/Remove Columns dialog box.
"show column"	When set to false, the field is not displayed as a column in the System Description dialog box. When set to true, the field is displayed as a column in the System Description dialog box if "add to column" is set to true.
"value"	(Optional) The prepopulated default value of the field. If none is set, "value" will be the "min".

The resulting field, Number of API queries per unit time, is displayed in the user interface.



"host discovery" Field

The following is a sample configuration of a host discovery checkbox and field that can be defined in the system.conf file. It uses a predefined parameter named "host discovery".

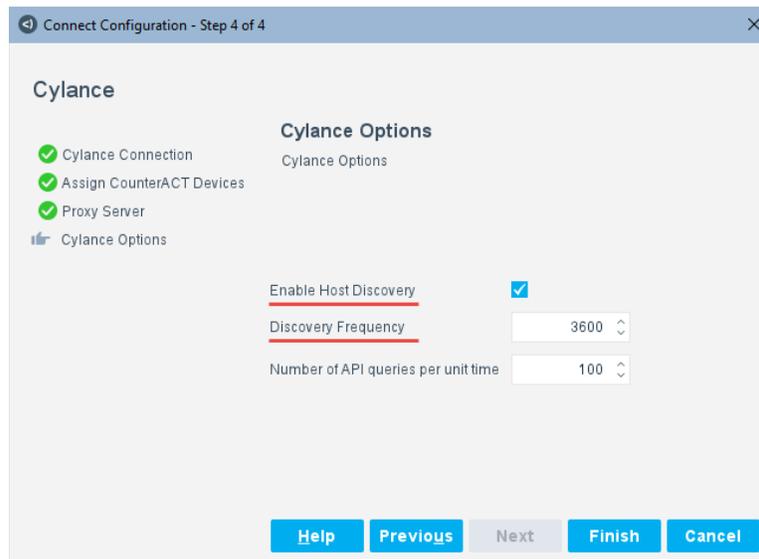
```
{
  "host discovery": true,
  "display": "Discovery Frequency",
  "max": 300000,
  "add to column": "true",
  "show column": "false",
  "value": 3600
},
```

Only one “host discovery” field is allowed in a system.conf file.

The parameters of the host discovery field are as follows:

Parameter	Description
“host discovery”	(Required) When set to true, indicates a checkbox to enable and disable a host discovery field as well as an integer field for the discovery frequency.
“display”	(Required) The label of the field, which will be displayed on the left of the field in the user interface.
“max”	(Optional) The maximum value of the field. If none is set, “max” will be the maximum positive value for a 32-bit signed binary integer.
“add to column”	When set to true, you can select the field from the Add/Remove Columns dialog box.
“show column”	When set to false, the field is not displayed as a column in the System Description dialog box. When set to true, the field is displayed as a column in the System Description dialog box if “add to column” is set to true.
“value”	(Optional) The prepopulated default value of the field. If none is set, “value” defaults to 1. The unit is minutes.

The resulting fields are displayed in the user interface. To enable the Discovery Frequency field, select the Enable Host Discovery checkbox.



You also need to specify the script used for host discovery. The script must be mapped in the property.conf file. See [Map Scripts in property.conf](#).

When discovery is defined in the system.conf file and the Enable Host Discovery checkbox is selected, the **Refresh** button on the **System Description** dialog box is enabled to let you manually trigger a refresh. See [Refresh App Features](#).

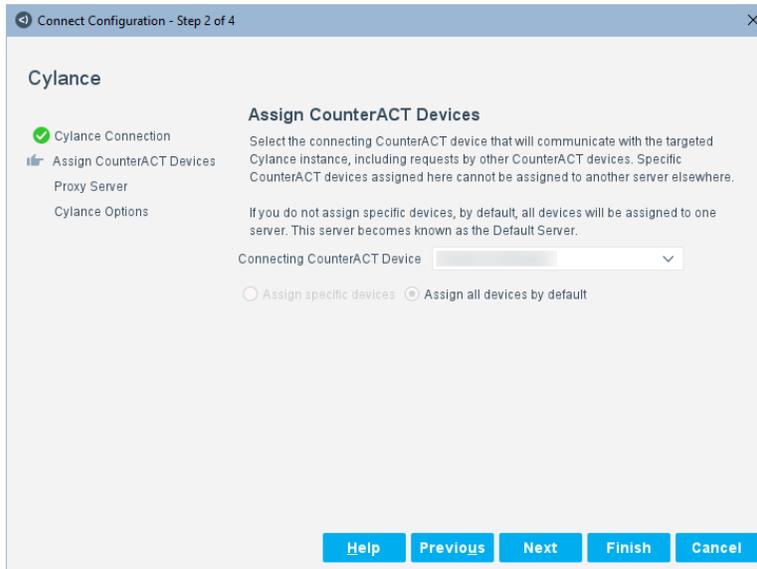
Assign CounterACT Devices Panel Details

The “focal appliance” panel is required in the system.conf file. Host discovery, property resolve, and actions are communicated via the focal appliance to the endpoint.

You cannot set "focal appliance" to false. If it is missing from the configuration, an error message is displayed.

In general, it is not recommended to use the Enterprise Manager as the connecting CounterACT device. But if you must, make sure that it is not used to discover MAC-only hosts.

The "focal appliance" panel is predefined and results in the following panel, with **Assign all devices by default** selected, so you can add one device.



More devices can be added after the first device. Subsequently, the Assign CounterACT Devices panel has more fields. See [Add a System Description](#) for details about the predefined fields on the panel.

Note the following:

- An error message is displayed if you try to add a device that is already used.
- Only one focal appliance panel is allowed in a system.conf file.
- The focal appliance panel cannot be the first panel defined in the system.conf file.
- The focal appliance must be the managing appliance for overlapping IPs.

Proxy Server Panel Details

The “proxy server” panel is predefined and results in the following panel.

The screenshot shows a window titled "Connect Configuration - Step 3 of 4". On the left, under the "Cylance" section, there are three items: "Cylance Connection" (checked), "Assign CounterACT Devices" (checked), and "Proxy Server" (selected). Below "Proxy Server" is "Cylance Options". The main area is titled "Proxy Server" and contains the instruction: "Select a Proxy Server device to manage all communication between CounterACT and Cylance." Below this are several fields: "Use Proxy Server" (checkbox, unchecked), "Proxy Server" (text input), "Proxy Server Port" (spin box with value 0), "Proxy Server Username" (text input), "Proxy Server Password" (text input), and "Verify Proxy Server Password" (text input). At the bottom are buttons for "Help", "Previous", "Next", "Finish", and "Cancel".

Both authentication and non-authentication modes are supported. For example, a proxy server username and password are not required.

Only one proxy server panel is allowed in a system.conf file.

See [Add a System Description](#) for details about the predefined fields on the panel.

The Proxy Server panel has predefined field IDs, which you might need to use in a Python script. The field IDs for the Proxy Server panel are:

- Use Proxy Server: connect_proxy_enable
- Proxy Server: connect_proxy_ip
- Proxy Server Port: connect_proxy_port
- Proxy Server Username: connect_proxy_username
- Proxy Server Password: connect_proxy_password

There is no field ID for the Verify Password field because the "encrypted" field type includes the verify field.

To enable the proxy server functionality, you must include it in a script. You also need to specify the script in the property.conf file. See [Map Scripts in property.conf](#).

Summary of system.conf Rules

The following is a summary of the system.conf rules:

Rule	For More Information
Use the same “name” in the system.conf and property.conf files	Parameter Details for Name, Version, Author, and Test Button

Rule	For More Information
Define at least two panels with one field on each panel	Define Panels and Fields
Define at least one field on the first panel with a "mandatory" parameter set to "true"	"mandatory" Parameter
Only one "identifier" parameter is allowed	Error Message for "identifier" Parameter in User Interface
Only one "certification validation" field is allowed	"certification validation" Field
Only one "app_instance_cache" field is allowed	"app_instance_cache" Field
Only one "authorization" field is allowed	"authorization" Field
Only one "rate limiter" field is allowed	"rate limiter" Field
Only one "host discovery" field is allowed	"host discovery" Field
Define at least one field with "add to column" parameter set to true	"add to column" Parameter in User Interface
If the "type" is <i>encrypted</i> , it cannot be added as a column	"add to column" Parameter in User Interface
Focal appliance panel is required Only one focal appliance panel is allowed Focal appliance panel cannot be the first panel	Assign CounterACT Devices Panel Details.
Only one proxy server panel is allowed	Proxy Server Panel Details

Define property.conf File

The property configuration or property.conf file contains properties specific to the integration you want to create. The property.conf file also defines actions and maps scripts. Script mapping ties the properties and actions in the property.conf file to the Python scripts. The property.conf file is in JSON format. You can use any text editor to edit it, such as Notepad++.

You can also define policy templates and icons in the property.conf file.

The property configuration file must be named either property.conf or property.json. It has the following sections:

- [Define Name in property.conf](#)
- [Define Property Groups in property.conf](#)
- [Define Properties in property.conf](#)
- [Define Action Groups in property.conf](#)
- [Define Actions in property.conf](#)
- [Map Scripts in property.conf](#)
- [Define Policy Templates in Connect](#)
- [Define Policy Template Group in property.conf](#)

- [Define Policies in property.conf](#)
- [Define Icons in Connect](#)

See [Sample property.conf File](#).

Define Name in property.conf

Define the "name" field in the property.conf file, which is a required field.

```
{  
  "name": "Cylance",  
}
```

Parameter Details for Name

The parameter for "name" is as follows:

Parameter	Description
"name"	(Required) The name of the app. Each app must have a unique name. The name in the system.conf and property.conf files must match. The name can contain letters (uppercase and lowercase), numbers, spaces, and special characters, but not the underscore character (_). Names are used in various places in configuration files and Python scripts. Select a specific name rather than a generic name.

Define Property Groups in property.conf

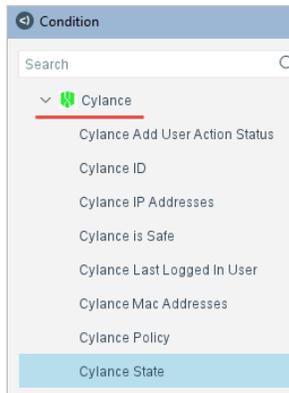
Use "groups" to define property group names. The value of "groups" is a JSON array. Each element of the JSON array is a JSON object.

In the following example, one group is defined, but there can be multiple.

```
"groups": [  
  {  
    "name": "connect_cylance_cylance",  
    "label": "Cylance"  
  }  
],
```

“groups” in User Interface

The “groups” parameter results in a label for the property group displayed in the user interface in the **Condition** dialog box.



Parameter Details for Property Groups

The parameters for “groups” are as follows:

Parameter	Description
“name”	(Required) The internal, unique name of the group, in ASCII characters. It must start with <i>connect_<appname>_</i> . The <appname> must consist of all lowercase letters of the name defined in the app without any spaces or underscores. For example, the <appname> for VMware AirWatch would be <i>vmwareairwatch</i> .
“label”	(Required) The label of the group displayed in the user interface.

Define Properties in property.conf

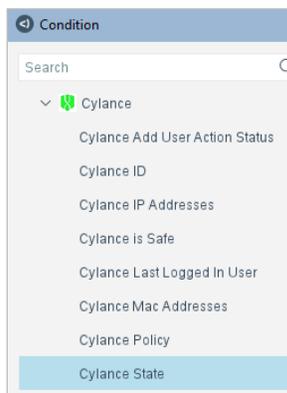
Use “properties” to define the properties that can be used as conditions in policies. The value of “properties” is a JSON array. Each element of the JSON array is a JSON object.

In the following example, one property is defined. There can be multiple properties, each with different parameters.

```
"properties": [
  {
    "tag": "connect_cylance_state",
    "label": "Cylance State",
    "description": "Cylance State",
    "type": "string",
    "web_enable": true,
    "options": [
      {
        "name": "Online",
        "label": "Online"
      },
      {
        "name": "Offline",
        "label": "Offline"
      }
    ],
    "group": "connect_cylance_cylance",
    "resolvable": true,
    "require_host_access": false,
    "inventory": {
      "enable": true,
      "description": "Inventory of Cylance State"
    },
    "asset_portal": true,
    "track_change": {
      "enable": true,
      "label": "Cylance State Changed",
      "description": "Track Change property for cylance state"
    },
    "dependencies": [
      {
        "name": "mac",
        "redo_new": true,
        "redo_change": true
      }
    ]
  }
]
```

“properties” in User Interface

The “properties” parameter results in properties displayed in the user interface in the **Condition** dialog box.



Parameter Details for Properties

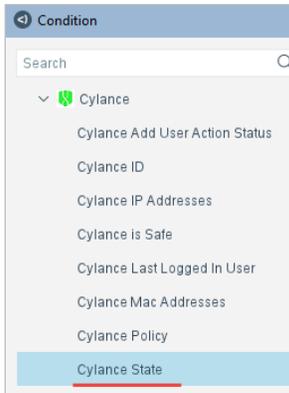
The parameters for “properties” are as follows:

Parameter	Description
“tag”	(Required) The internal, unique name of the property, in ASCII characters. It must start with <i>connect_<appname>_</i> . The <appname> must consist of all lowercase letters of the name defined in the app without any spaces or underscores. For example, the <appname> for VMware AirWatch would be vmwareairwatch. If the properties are used in a script to resolve properties, the property tags must be listed in the property.conf file under “scripts”. See Parameter Details for Scripts .
“label”	(Required) The label of the property displayed in the user interface. See “label” in User Interface .
“description”	(Required) The description of the property displayed in the user interface. See “description” in User Interface .
“type”	(Required) The type of the property. The valid types are string, boolean, integer, date, and composite. See Property “type” Details .
“web_enable”	(Optional) When set to true, this property can be updated through the Connect web service. The default is false. To use the web service API to update a property, set “web_enable” to true. See Use the Connect Web Service for details.
“group”	(Required) The group to which the property belongs. This must match the name defined in “groups” or the name of an existing property group in the Forescout platform. See Define Property Groups in property.conf .
“options”	(Optional) The options of a string property type. See Property “type” Details .
“resolvable”	(Optional) When set to true, the Forescout platform requests to resolve the property through policy recheck. When set to false, there is no request for rechecking the property; it is resolved through periodic polling/host discovery. The default is true.
“require_host_access”	(Optional) When set to true, resolving the host requires open TCP or UDP ports on the host. When set to false, resolving the host does not require open TCP or UDP ports on the host. The default is false.
“inventory”	(Optional) When set to true, add this field as a column in the Inventory view. The default is false. The value of “inventory” is a JSON object with the following fields: <ul style="list-style-type: none"> ▪ “enable”—(Required) When set to true, the Inventory view is required to create the property ▪ “description”—(Required) The description of the Inventory
“asset_portal”	(Optional) When set to true, the property is displayed in the asset profile. When set to false, the property is not displayed in the asset profile. The default is true.

Parameter	Description
"track_change"	<p>(Optional) Indicates if another property needs to be created in the Track Change group, which can be used as a policy condition that identifies changes in the property value.</p> <p>The value of "track_change" is a JSON object with the following fields:</p> <ul style="list-style-type: none"> ▪ "enable"—(Required) When set to true, add track change to the property ▪ "label"—(Required) The label of the track change property in the user interface ▪ "description"—(Required) The description of the track change property
"dependencies"	<p>(Optional) Indicates if resolving this property requires values of other properties. Use "dependencies" to add a dependent field to a property. When resolving this property, the value of the dependent property is sent to the Python script.</p> <p>The value of "dependencies" is a JSON array. Each element of the JSON array is a JSON object with the following fields:</p> <ul style="list-style-type: none"> ▪ "name"—(Required) The tag name of the dependent property in the Forescout platform. For example, a MAC address could be a dependency that is used in a Python script to resolve a property. ▪ "redo_new"—(Optional) When set to true, the property needs to be resolved again when the dependent property has a value for the first time. The default is false. ▪ "redo_change"—(Optional) When set to true, the property needs to be resolved again when the value of the dependent property changes. The default is false.
"list"	<p>(Optional) When set to true, the property is a list. When set to false, the property is a single string, integer, boolean, or date. The default is false.</p>
"overwrite"	<p>(Optional) When set to true, the property is a simple list and the old property values are replaced by new resolved values every time, if "list is also set to true.</p> <p>When set to false, the property is a list and the new resolved values are appended to the old values every time. The default is false.</p>

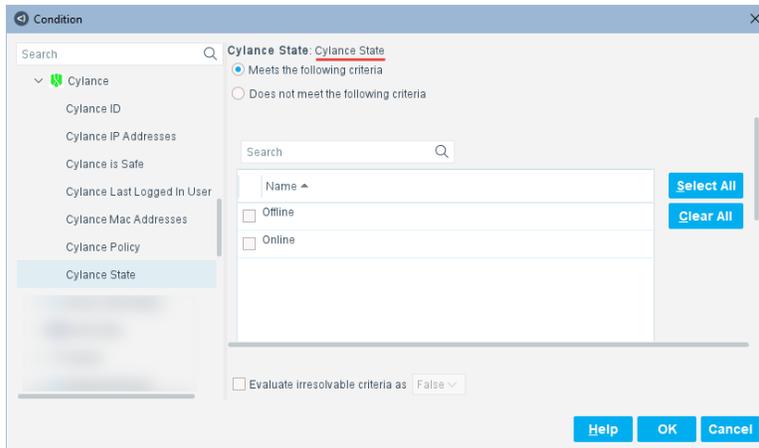
"label" in User Interface

The "label" of a property is displayed in the **Condition** dialog box in the user interface.



"description" in User Interface

The "description" of a property is displayed in the **Condition** dialog box in the user interface.



Property "type" Details

The property "type" parameters are as follows:

Type	Sub-Type	Description
"string"		A string type of property. Speed <input type="text"/>
	"options"	A sub-type of the string property. Use "options" to define multiple options so that a user can select a value instead of typing it. The value of "options" is a JSON array. Each element of the JSON array is a JSON object with the following fields:

Type	Sub-Type	Description
		<ul style="list-style-type: none"> "name"—(Required) The value of the option used to resolve the property "label"—(Required) The label in the user interface See "options" Details .
"boolean"		A Boolean type of property. <input checked="" type="radio"/> Meets the following criteria <input type="radio"/> Does not meet the following criteria
"integer"		An integer type of property. Launch Index <input type="text"/>
"date"		A date type of property. <input checked="" type="radio"/> Older than <input type="text" value="1"/> <input type="text" value="Hours"/> See "date" Details .
"composite"	"subfields"	A type of property that has multiple fields. The value of "subfields" is a JSON array. Each element of the JSON array is a JSON object with the following fields: <ul style="list-style-type: none"> "tag"—(Required) The tag of the field, which is a text string, in ASCII characters. It must be unique only within the property. "label"—(Required) The label in the user interface. "description"—(Required) The description in the user interface. "type"—(Required) The type of the subfield. The valid types are string, integer, boolean, and date. "inventory"—(Optional) When set to true, add this field as a column in the Inventory view. If this subfield needs an Inventory column, "inventory" must be enabled in this property first. The default is false. See "composite" Details .

"options" Details

The following sample "options" definition produces the user interface on the right in the **Condition** dialog box.

```

"type": "string",
"options": [
  {
    "name": "Online",
    "label": "Online"
  },
  {
    "name": "Offline",
    "label": "Offline"
  }
],

```

Name ▲

Offline

Online

“date” Details

When populating the "date" property type, use epoch time.

The following two examples use the datetime library in Python scripts:

Example 1:

```
prop_val = "2021-02-17T09:40:30Z"

prop_val = int(datetime.strptime(prop_val, '%Y-%m-%dT%H:%M:%SZ').strftime('%s'))
```

Example 2:

```
time_str = "02/17/2021 10:00:00"

epoch = int(datetime.strptime(time_str, '%m/%d/%Y %H:%M:%S').timestamp())
```

“composite” Details

The following sample “composite” definition produces the user interface on the right in the **Condition** dialog box.

```
"type": "composite",
"group": "connect_cylance_cylance",
"inventory": {
  "enable": true,
  "description": "Inventory of Cylance Policy"
},
"subfields": [
  {
    "tag": "id",
    "label": "ID",
    "description": "Policy ID",
    "type": "string",
    "inventory": true
  },
  {
    "tag": "name",
    "label": "Name",
    "description": "Policy Name",
    "type": "string",
    "inventory": true
  }
]
```

Cylance Policy: Cylance Policy

ID
 Policy ID
 Meets the following criteria
 Does not meet the following criteria

Any Value

 Match case

Name
 Policy Name
 Meets the following criteria
 Does not meet the following criteria

Any Value

 Match case

To add the property to the Inventory view, enable inventory on the property as well as on the subfields of a composite property:

```

"type": "composite",
"group": "connect_cylance_cylance",
"inventory": {
  "enable": true,
  "description": "Inventory of Cylance Policy"
},
"subfields": [
  {
    "tag": "id",
    "label": "ID",
    "description": "Policy ID",
    "type": "string",
    "inventory": true
  },
  {
    "tag": "name",
    "label": "Name",
    "description": "Policy Name",
    "type": "string",
    "inventory": true
  }
]

```

Enable inventory on property

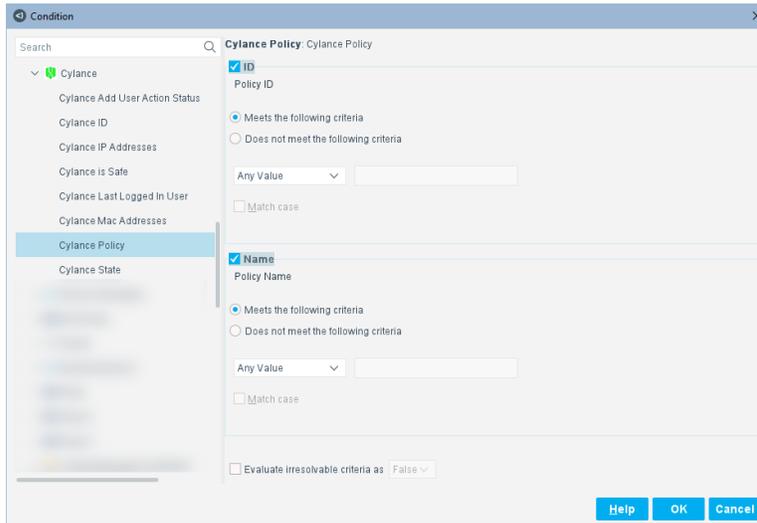
Enable inventory on subfield

Enable inventory on subfield

Composite subfields cannot be added as dependencies. However, you can access the subfields if you add the parent composite property as a dependency.

Properties in Policy Templates

Properties in policy templates are selected from the **Condition** dialog box.



Properties can be used in a rule.

See [Configure Policy Templates in Connect](#) for the policy template procedure.

Define Action Groups in property.conf

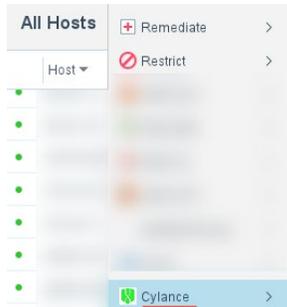
Use "action_groups" to define action group names. The value of "action_groups" is a JSON array. Each element of the JSON array is a JSON object.

In the following example, one action group is defined, but there can be multiple.

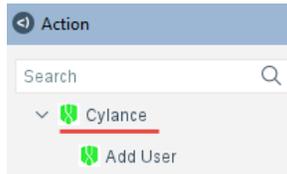
```
"action_groups": [
  {
    "name": "connect_cylance_cylance",
    "label": "Cylance"
  }
]
```

“action_groups” in User Interface

The “action_groups” parameter results in a label for the action group displayed in the user interface menu when you right-click an endpoint in the **All Hosts** pane.



The “action_groups” parameter is also displayed in the user interface menu for Actions in the **Action** dialog box.



Parameter Details for Action Groups

The parameters for “action_groups” are as follows:

Parameter	Description
“name”	(Required) The internal, unique name of the action group, in ASCII characters. It must start with <i>connect_<appname>_</i> . The <appname> must consist of all lowercase letters of the name defined in the app without any spaces or underscores. For example, the <appname> for VMware AirWatch would be <i>vmwareairwatch</i> .
“label”	(Required) The label of the action group displayed in the user interface.

Define Actions in property.conf

You can define actions that make API calls to the third-party vendor. Actions can be scheduled in policies.

One-time actions are supported, such as locking a device. With one-time actions, once the action is done, it is done. There is no need to cancel the action.

Continuous actions are also supported, such as sending data to a third-party server from an endpoint. Continuous actions maintain a state. To stop a continuous action, you need to cancel the action. A continuous action can be cancelled either manually or if the policy no longer applies.

Use “actions” to define actions. The value of “actions” is a JSON array. Each element of the JSON array is a JSON object.

In the following example, one action is defined, but there can be multiple.

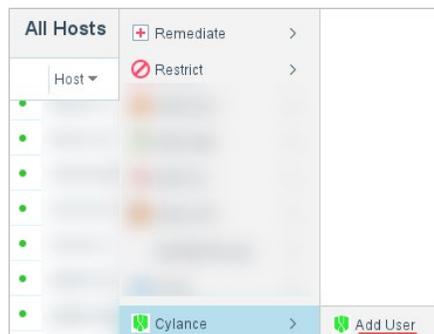
```

"actions": [
  {
    "name": "connect_cylance_add_user",
    "label": "Add User",
    "group": "connect_cylance_cylancee",
    "description": "Add New User",
    "ip_required": false,
    "threshold_percentage": 1,
    "params": [
      {
        "name": "cylance_email",
        "label": "Email address",
        "description": "Cylance email address",
        "type": "string"
      },
      {
        "name": "cylance_first_name",
        "label": "First name",
        "description": "Cylance first name",
        "type": "string"
      },
      {
        "name": "cylance_last_name",
        "label": "Last name",
        "description": "Cylance last name",
        "type": "string"
      }
    ],
    "dependencies": [
      {
        "name": "mac",
        "redo_new": true,
        "redo_change": true
      }
    ],
    "undo": {
      "label": "Cancel Cylance Add User",
      "description": "Remove Added User"
    }
  }
]

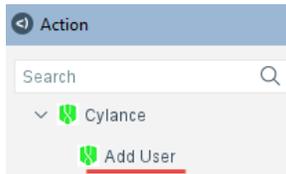
```

“actions” in User Interface

The “actions” parameter results in a label for the action displayed in the user interface menu item when you right-click an endpoint in the **All Hosts** pane.



The “actions” parameter is also displayed in the user interface menu for Actions in the **Action** dialog box.



Parameter Details for Actions

The parameters for “actions” are as follows:

Parameter	Description
“name”	(Required) The internal, unique name of the action, in ASCII characters. It must start with <i>connect_<appname>_</i> . The <appname> must consist of all lowercase letters of the name defined in the app without any spaces or underscores. For example, the <appname> for VMware AirWatch would be <i>vmwareairwatch</i> . If the actions are used in a script to execute actions, the action names must be listed in the property.conf file under “scripts”. See Parameter Details for Scripts .
“label”	(Required) The label of the action displayed in the user interface.
“description”	(Required) The description of the action.
“group”	(Required) The group to which the action belongs. This must match a name defined for “action_groups” or the name of an existing action group in the Forescout platform.
“ip_required”	(Optional) When set to true, the action cannot be taken when the IP address is missing on the host. The default is false.
“threshold_percentage”	(Optional) The threshold control on the action as a percentage. If the number of action requests reaches the threshold, the remaining actions are held while waiting for approval.
“params”	(Optional) The parameters that a user must enter when taking the action. See “params” Parameter Details and “params” in User Interface .
“dependencies”	(Optional) Indicates if this action requires dependent fields. Use “dependencies” to add a dependent field to the action. The value of the dependent properties is sent to the Python script. The value of “dependencies” is a JSON array. Each element of the JSON array is a JSON object with the following fields: <ul style="list-style-type: none"> “name”—(Required) The tag name of the dependent property, in the Forescout platform. “redo_new”—(Optional) When set to true, the property needs to be resolved again when the dependent property has a value for the first time. The default is false. “redo_change”—(Optional) When set to true, the property needs to be resolved again when the value of the dependent property changes. The default is false.

Parameter	Description
"undo"	<p>(Optional) Indicates if the action can be canceled (for a continuous action). Use "undo" to define a cancel action.</p> <p>The value of "undo" is a JSON object with the following fields:</p> <ul style="list-style-type: none"> "label"—(Required) The label of the cancel action in the user interface "description"—(Required) The description of the cancel action <p>See "undo" in User Interface.</p>

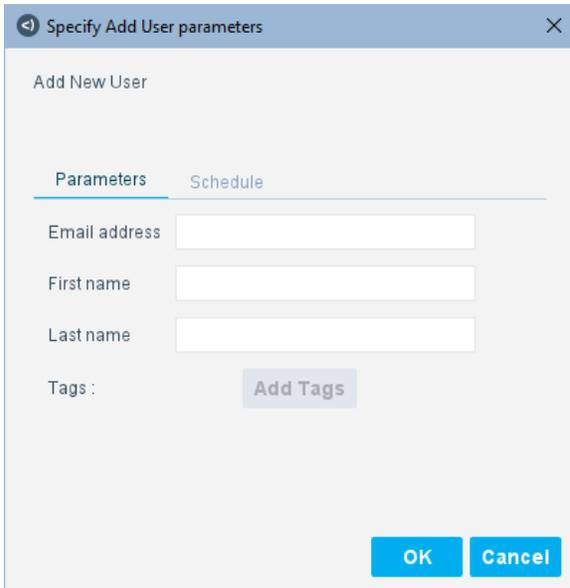
"params" Parameter Details

The "params" parameters are as follows:

Parameter	Description
"name"	(Required) The unique name of the parameter, in ASCII characters.
"label"	(Required) The label of the parameter displayed in the user interface.
"description"	(Required) The description of the parameter.
"type"	(Required) The type of the parameter. The valid types are string, integer, and boolean.
"default"	(Optional) The default value of the action parameter. It is displayed when you add a new action. The only valid type is string.
"multiline"	(Optional) When set to true, the action parameter is a string type that needs multiple lines of text. The default is false.
"min"	(Optional) The minimum value that users can enter in the user interface for the parameter, when the type is integer.
"max"	(Optional) The maximum value that users can enter in the user interface for the parameter, when the type is integer.

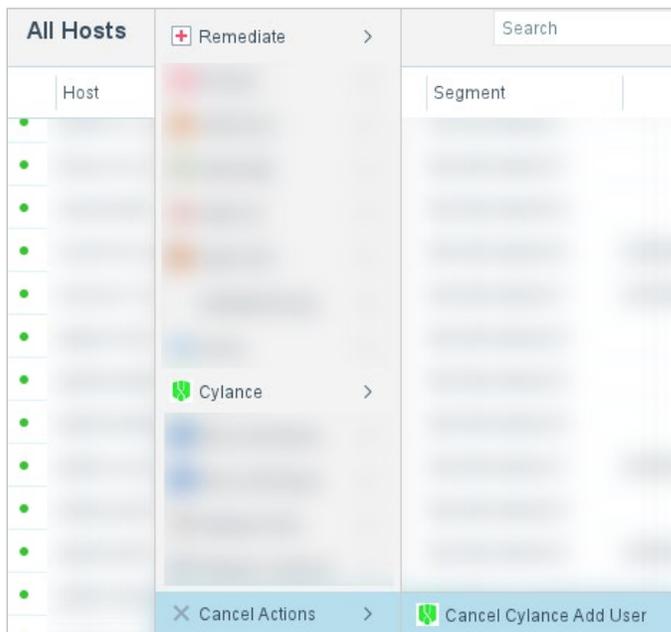
“params” in User Interface

When you select an action with “params”, the user is prompted for information in the user interface.



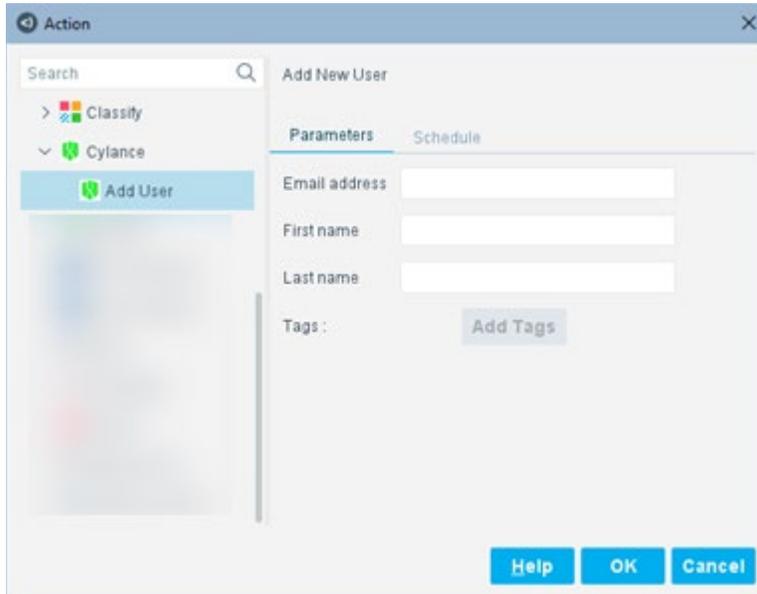
“undo” in User Interface

The “undo” parameter results in a label for the cancel action displayed in the user interface menu item when you right-click an endpoint in the **All Hosts** pane.

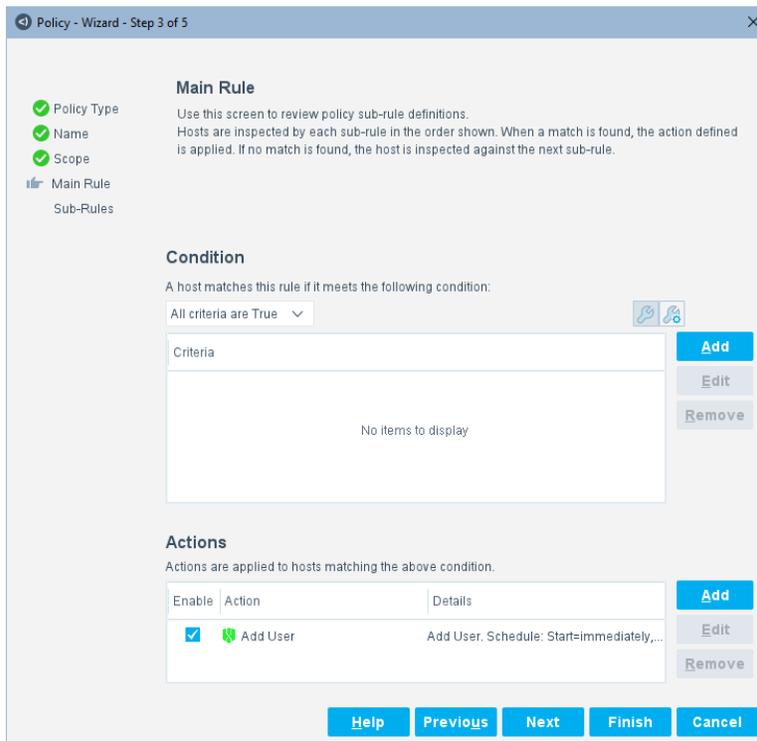


Actions in Policy Templates

Actions in policy templates are selected from the **Action** dialog box.



Actions can be used in a rule.



See [Configure Policy Templates in Connect](#) for the policy template procedure.

Map Scripts in property.conf

Use "scripts" to provide the name of the script to call as well as its usage. Script mapping ties the properties and actions in the property.conf file to the Python scripts.

Each app must have at least one Python script in it. See [Write Python Scripts for Connect](#).

The value of "scripts" is a JSON array. Each element of the JSON array is a JSON object.

Parameter Details for Scripts

The parameters for "scripts" are as follows:

Parameter	Description
"name"	(Required) The name of the script. You can name a script using the third-party vendor and what the script does, for example, cylance_poll.py. Since the scripts must be added to the top level of the .zip or data.zip file, there is no need to provide a path to them.
"properties"	When properties are listed, the script resolves properties. This parameter is required if the script resolves properties. The value is a JSON array of property tags. See "tag" in Parameter Details for Properties .
"actions"	When actions are listed, the script executes actions. This parameter is required if the script executes actions. The value is a JSON array of action names. See "name" in Parameter Details for Actions .
"is_cancel"	When set to true, the script cancels the action. This parameter is required if the script cancels an action. The value is a JSON array of action names. See "name" and "undo" in Parameter Details for Actions and see also Action Script for Connect .
"test"	When set to true, the script runs the test when the Test button in the user interface is selected. See "testEnable" in Parameter Details for Name, Version, Author, and Test Button and Test Script for Connect .
"discovery"	When set to true, the script discovers hosts from a third-party.
"authorization"	When set to true, the script gets authorizations.
"app_instance_cache"	When set to true, the script gets app instance cache data.
"library_file"	When set to true, you can put your own Python files to serve as library files within an app. See Library Files .

“scripts” Details

The following sample “scripts” in the property.conf file shows the mapping of seven different scripts.

<pre> "scripts": [{ "name": "cylance_resolve.py", "properties": ["connect_cylance_state", "connect_cylance_last_logged_in_user", "connect_cylance_mac_addresses", "connect_cylance_is_safe", "connect_cylance_id"] }, { "name": "cylance_add_user.py", "actions": ["connect_cylance_add_user"] }, { "name": "cylance_delete_user.py", "is_cancel": true, "actions": ["connect_cylance_add_user"] }, { "name": "cylance_test.py", "test": true }, { "name": "cylance_poll.py", "discovery": true }, { "name": "cylance_authorization.py", "authorization": true }, { "name": "cylance_users.py", "app_instance_cache": true }], </pre>	<p>first script</p>	<p>resolve properties script, which needs property tags</p>
	<p>second script</p>	<p>add user action script, which needs action names</p>
	<p>third script</p>	<p>cancel add user action script</p>
	<p>fourth script</p>	<p>test script</p>
	<p>fifth script</p>	<p>discovery script</p>
	<p>sixth script</p>	<p>authorization script</p>
	<p>seventh script</p>	<p>app instance cache script</p>

Define Policy Templates in Connect

If you need policy templates for your app, read [Create Policy Template XML File for Connect](#) to gain an understanding of the steps before returning to this section.

If you do not have a need for policy templates, you can skip this section.

Use “policy_template” to define policy templates.

The value of “policy_template” is a JSON object with the following fields:

Parameter	Description
“policy_template_group”	(Required) The policy template group in the app. See Define Policy Template Group in property.conf .
“policies”	(Required) The policy templates in the app. See Define Policies in property.conf .

Define Policy Template Group in property.conf

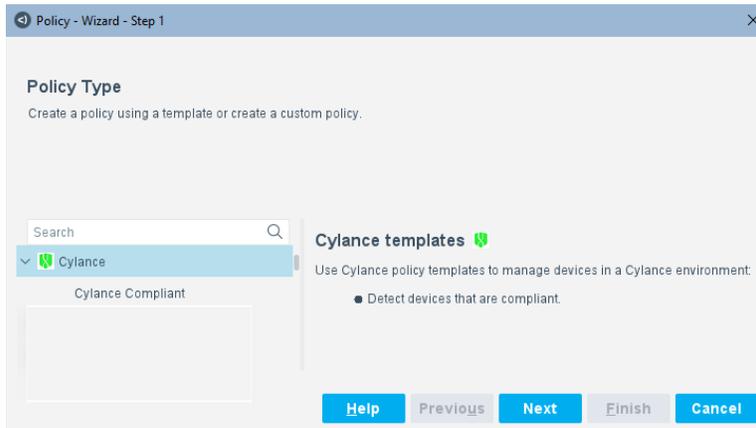
Use "policy_template_group" to define the policy template group. The value of "policy_template_group" is a JSON object.

Only one policy template group can be defined.

```
"policy_template": {
  "policy_template_group": {
    "name": "connect_cylance",
    "label": "Cylance",
    "display": "Cylance",
    "description": "Cylance templates",
    "full_description": "<html>Use Cylance policy templates to manage devices in a Cylance
environment:<ul><li>Detect devices that are compliant.</li></ul></html>",
    "title_image": "connect_cylance.png",
  },
},
```

"policy_template_group" in User Interface

The "policy_template_group" parameter results in a label for the policy template group displayed in the user interface.



Parameter Details for Policy Template Group

The parameters for policy template group are as follows:

Parameter	Description
"name"	(Required) The internal, unique name of the policy template group, in ASCII characters. It must be named <i>connect_<appname></i> . The <appname> must consist of all lowercase letters of the name defined in the app without any spaces or underscores. For example, the <appname> for VMware AirWatch would be <i>vmwareairwatch</i> .
"label"	(Required) The label of the policy template group displayed in the user interface.
"display"	(Required) The heading of the policy template group displayed in the user interface.
"description"	(Optional) The description of the policy template group displayed in the user interface.

Parameter	Description
"full_description"	(Optional) The full description of the policy template group displayed in the user interface. HTML formatting can be used in the full description, for example, to create a bulleted list.
"title_image"	(Optional) The icon image for the policy template group. See Define Icons in Connect .

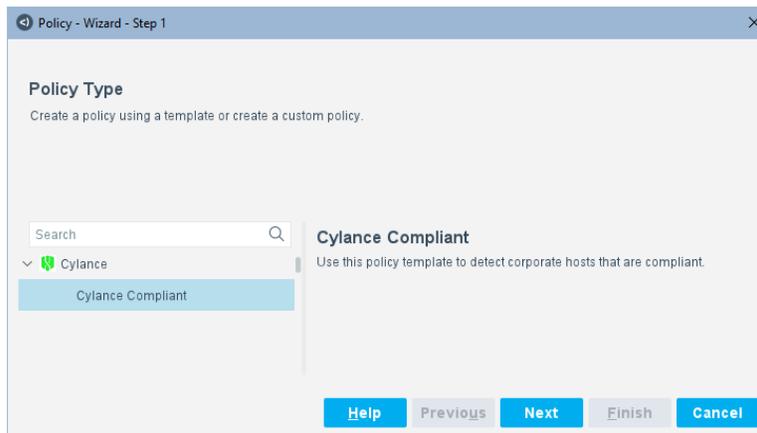
Define Policies in property.conf

You can customize a third-party vendor integration by defining policy templates. Use "policies" to define the policy templates. The value of "policies" is a JSON object. In the following example, one policy template is defined, but there can be multiple.

```
"policies": [
  {
    "name": "connect_cylance_compliant",
    "label": "Cylance Compliant",
    "display": "Cylance Compliant",
    "help": "Cylance Compliant Policy",
    "description": "Creates Cylance compliant policies",
    "file_name": "CylanceCompliance.xml",
    "full_description": "<html>Use this policy template to detect corporate hosts that are compliant.</html>",
    "title_image": "cylance.png"
  }
]
```

"policies" in User Interface

The "policies" parameter results in policy templates in the user interface.



Parameter Details for Policy Templates

The parameters for policy templates are as follows:

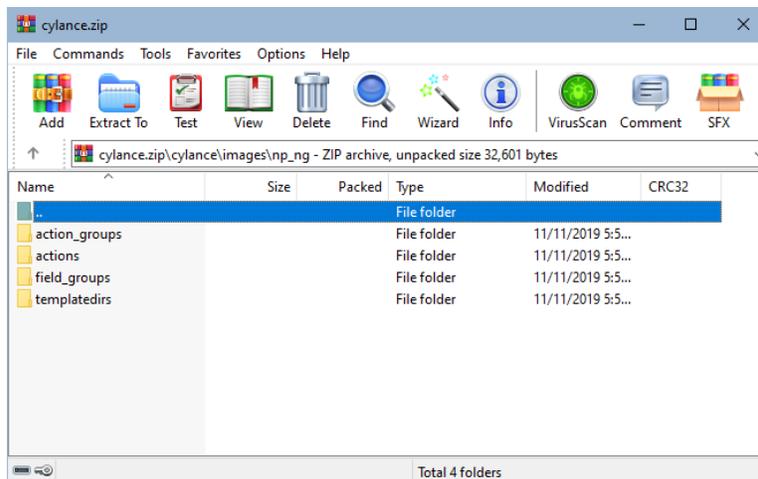
Parameter	Description
"name"	(Required) The internal, unique name of the policy template, in ASCII characters. It must start with <i>connect_<appname>_</i> . The <appname> must consist of all lowercase letters of the name defined in the app without any spaces or underscores. For example, the <appname> for VMware AirWatch would be vmwareairwatch.

Parameter	Description
"label"	(Required) The label of the policy template displayed in the user interface.
"display"	(Required) The heading of the policy template displayed in the user interface.
"description"	(Optional) The description of the policy template displayed in the user interface.
"help"	(Optional) The help information of the policy template, which is displayed when you hover the mouse over the Help button in the user interface.
"file_name"	(Required) The name of the .xml file containing the policy template. The .xml file must be saved in the app in the following path: policies/nptemplates See App Folder Paths .
"full_description"	(Optional) The full description of the policy template displayed in the user interface. HTML formatting can be used in the full description, for example, to create a bulleted list.
"title_image"	(Optional) The icon image for the policy template. See Define Icons in Connect .

Define Icons in Connect

You can customize an app by adding icons to help identify a third-party integration visually. You can add icons for actions, action groups, property groups, and policy templates. The only valid format for icons is .png.

You must put the icons in specific folders in the zip file of the app. See [App Folder Paths](#).



The image names for policy templates must be specified in the property.conf file, for example:

```
"title_image": cylance.png
```

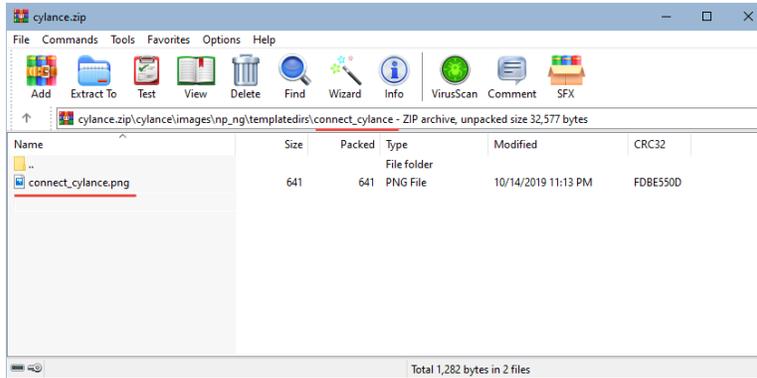
For policy template icons, the folder name and the image name (the .png file) must be the same as the name defined in the property.conf file for "policy_template_group". To display the policy template group icon in the user interface, use the following naming convention for the icon in the zip file:

`<appname>/images/np_ng/templatedirs/connect_<appname>/connect_<appname>.png`

For example, in the folder, `cylance/images/np_ng/templatedirs/connect_cylance`, the image must be named, `connect_cylance.png`.

For other policy template icons, put them in the folder:

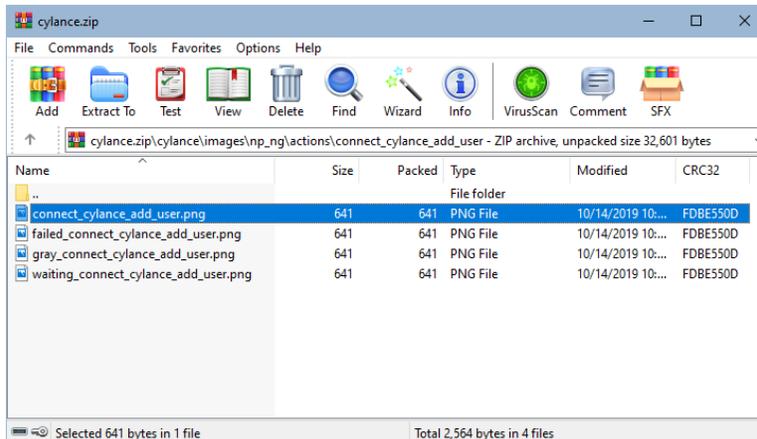
`<appname>/images/np_ng/templatedirs/connect_<appname>`



For action icons, if the action name is `connect_cylance_add_user`, then all icons regarding this action should be put in the following folder:

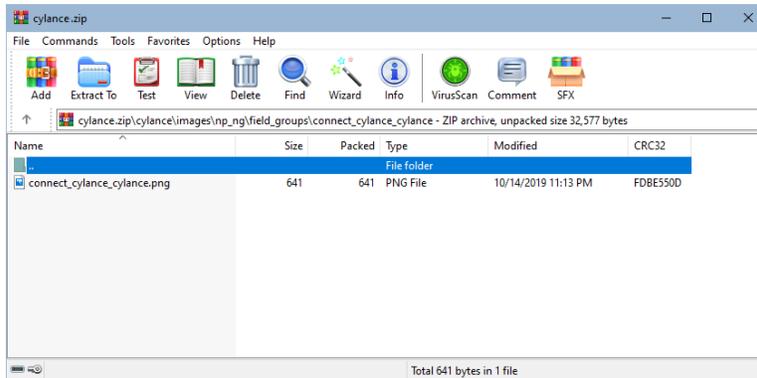
`<appname>/images/np_ng/actions/connect_cylance_add_user`

For action icons, the icon names have a specific format. For example, if the action icon is named `connect_cylance_add_user.png`, the icon for the corresponding failed action must have the same name but be prefixed with *failed_*. Similarly, use the prefixes *gray_* and *waiting_* for those action states.

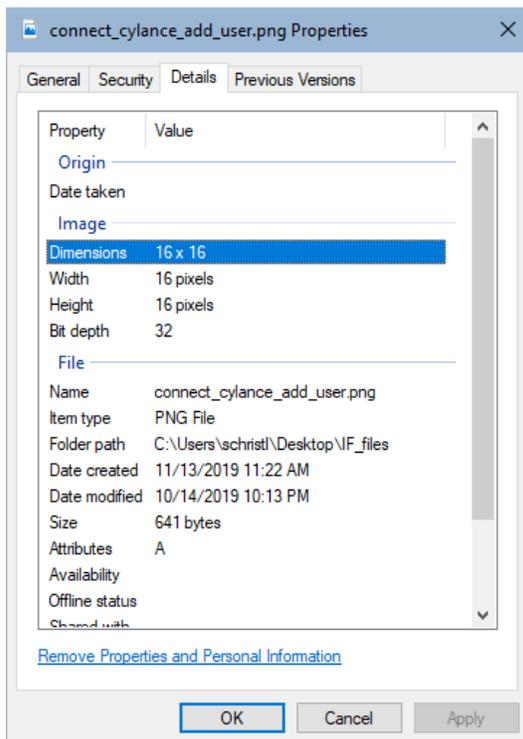


For action group icons, each group defined in the property.conf file must have a folder in the `action_groups` folder. The folder name and image name should be the same as the name defined in the property.conf file for "action_groups".

For property group icons, each group defined in the property.conf file must have a folder under the field_groups folder. The folder name and image name must be the same as the name defined in the property.conf file for “groups”.



An icon has specific dimensions. They must be 16 x 16 pixels.



Create Policy Template XML File for Connect

A policy template file, in .xml format, needs to be created before you can complete the policy template definition in the property.conf file.

If you have three different policy templates, you will need three policy .xml files. See [Sample Policy Template .xml File for Connect](#) for a sample of an .xml file. The .xml files are added to the zip folder of the app.

To create policy templates:

1. Define the properties and actions in the property.conf file that will be needed by your policies.
2. Import the app containing those properties and actions into Connect.
3. In the Forescout Console, go to **Policy**.
4. Create a custom policy template by selecting **Custom** and then:
 - a. Select **Add**.
 - b. Name the policy template based on your app name and select **Next**.
 - c. Select **All IPs** for the IP Address Range. (Even if you add a segment, it is not saved.) Select **Next**.
 - d. In the Main Rule pane, select properties and actions, and then select **Next**.
 - e. (Optional) In the Sub-Rules pane, select properties and actions, and then select **Next**.
 - f. Select **Finish**.
5. When the custom policy template is created, it is displayed in the Policy Manager. Select it and then select **Export**. Select the .xml file format.
6. Once you have the .xml file, put it in the app under the policies/nptemplates folder. See [App Folder Paths](#).
7. (Optional) Add an icon for the policy template group and policy template. See [Define Icons in Connect](#).
8. Return to the property.conf file to define the policy template. See [Define Policy Templates in Connect](#).
9. **Import** the app into Connect and select **Apply**.

Write Python Scripts for Connect

You can write scripts to accomplish tasks with Connect such as resolve properties, take actions, or poll for endpoints. Scripts communicate with the third-party vendor.

Name a script by prepending the name of the third-party vendor to what the script does. For example, if the app name is cylance and there is a polling script, poll.py, the script must be named cylance_poll.py.

The name of the script must be included in the property.conf file. See [Map Scripts in property.conf](#).

Examples of the scripts that can be written are:

- Testing. See [Test Script for Connect](#).
- Polling/host discovery. See [Polling Script for Connect](#).
- Actions. See [Action Script for Connect](#).
- Property resolve. See [Property Resolve Script for Connect](#).
- Authorization. See [Authorization Script for Connect](#) and [Token-Based Authorization](#).

Examples of using predefined fields in scripts are:

- App instance cache. See [Use App Instance Cache in Connect Scripts](#).
- Validate Certification. See [Use Certificate Validation in Connect Scripts](#).

An app must have at least one script in it. For sample scripts, see [Sample Connect Script Files](#).

About Python Scripting for Connect

See the following sections for information about Python scripting:

- [Libraries](#)
- [Python Debug Levels](#)
- [Python Log Location](#)
- [Script Not Found](#)

Libraries

The Python version that is installed with Connect is 3.6.3. It has built-in libraries that you can import. Due to security implications, do not import other libraries.

The following link contains the standard built-in libraries that can be imported into scripts:

<https://docs.python.org/3.6/library/>

The list of third-party libraries that are installed and ready to use are:

- cryptography
- httpsig
- prometheus_client
- pyjwt (imported as jwt)
- requests

The list of built-in libraries that are not permitted are:

- _dummy_thread
- _thread
- cmd
- ctypes
- dnspython
- dns
- dummy_threading
- eval
- exec
- fcntl
- glob

- io
- multiprocessing
- open
- os
- pathlib
- shutil
- subprocess
- sys
- threading
- trace
- traceback
- tracemalloc

The list of built-in functions that are not permitted are:

- eval
- exec
- open

You cannot import an app into the Forescout Console if it contains a script that uses an unsupported library.

Note the following:

- Calling one Python script from another Python script is not supported.
- Every script has a response object.
- All scripts are run with non-root permissions.

Library Files

You can put your own Python files to serve as library files within an app. Other scripts can use the methods and/or objects in these files.

In the property.conf file, under "scripts", you must name the file and set "library_file" to be true. See [Map Scripts in property.conf](#).

Scripts that use library files defined in the property.conf file must not include the import statement that refers to these library files because they have already been dynamically loaded when the app was imported.

Python Debug Levels

The Python debug levels match the five debug levels set in the Forescout platform using the `fstool` command. The five debug levels are: critical, error, warning, info, and debug, which have values 1 to 5 respectively.

For example:

```
fstool connect_module debug 5
```

A level higher than five will default to five. Any change to the log levels takes a few minutes to propagate.

Log level settings apply to all Connect apps.

Python Log Location

The Python server logs are located in the following path:

```
/usr/local/forescout/plugin/connect_module/python_logs
```

Script Not Found

The Python scripts included in the "scripts" section of the property.conf file must be present in the app. If a script is not found, there will be an exception in the Python server log.

Test Script for Connect

For the **Test** button in the **System Description** dialog box, you can write what you want to test in a script. The script can leverage input parameters from the user interface, such as a URL.

To create a test script:

1. Write the test script and put it in the top level of the zip file of the app.
2. Specify the test script name in the property.conf file. See [Map Scripts in property.conf](#).
3. Specify "testEnable":true in the system.conf file.

The app must be saved before selecting **Test** in the user interface. Select **OK** in the **System Description** dialog box and then select **Apply** in the **Connect** pane to save the system description configuration.

For example, the Cylance testing script displays success when it gets the JSON authorization token. Test scripts for other apps may have different criteria for success or failure.

See [Sample Test Script for Connect](#).

Response Objects

The response objects for test scripts are as follows.

Mandatory Fields

"succeeded": boolean to denote if the test succeeded

"result_msg" (only mandatory if "succeeded" is false) : string message to display test results

Optional Fields

"result_msg" (optional for if succeeded is True)

Examples

```
response = {"succeeded" : True}
```

```
response = {"succeeded" : False, "result_msg" : "Test failed due to
connection error."}
```

Polling Script for Connect

You can write a script in which an app polls a third-party integration to get regular updates, such as for host discovery. The poll can take place at a scheduled frequency.

The polling script needs to include a JSON array of endpoints.

The properties object for polling scripts can have scalar, list, composite, or list of composite properties.

See [Sample Polling Script for Connect](#).

Response Objects

The response objects for polling/discovery scripts are as follows.

Mandatory Fields

"endpoints": a list that will contain information about new endpoints

"error" : Error message if polling script fails for a known reason

Mandatory Sub-Fields for Endpoints

"mac" and/or "ip": Must contain MAC and/or IP address as a string

Optional Sub-Fields for Endpoints

"properties": a map/dictionary that contains host properties; the key will be the property name and the value will be the property value

Examples

```
response =
{"endpoints":
  [
    {"mac": "001122334455",
      "properties":
        {"property1": "property_value", "property2": "property_value2"}
    },
    {"ip": "10.1.1.1",
      "properties":
        {"property1": "property_value"}
    },
    {"mac": "112233445566",
      "ip": "10.2.2.2",
      "properties":
        {"property1": "property_value"}
    }
  ]
}
```

```

    ]
}

```

Action Script for Connect

You can write action scripts for both one-time actions and continuous actions.

If actions are used in a script, the action names must be listed in the property.conf file under "scripts".

For a continuous action, such as adding a user, a cookie object persists over the action request. If the continuous action is to add a user, then the corresponding cancel action is to delete a user. The cookie object stores the string.

To define the scripts related to a continuous action, map the script name to the continuous action, then map the cancel script name to the cancel continuous action and specify "is_cancel": true.

```

{
  "name": "cylance_add_user.py",
  "actions": [
    "connect_cylance_add_user"
  ]
},
{
  "name": "cylance_delete_user.py",
  "is_cancel": true,
  "actions": [
    "connect_cylance_add_user"
  ]
}

```

See [Sample Add a User Action Script for Connect](#) and [Sample Delete a User Action Script for Connect](#).

In an action script, you can use the properties object response field to update property values, whether the action succeeded or failed. See [Sample Add a User Action Script for Connect](#).

Response Objects

The response objects for action scripts are as follows.

Mandatory Fields

"succeeded": boolean to denote if the action succeeded

"troubleshooting" (only mandatory if "succeeded" is false) : string message to display error message if action failed

Optional Field for Cookie

"cookie": Optional field for continuous actions to store information that can be used later in the undo script.

Optional Field for Properties

"properties": a map/dictionary that contains host properties; the key will be the property name and the value will be the property value.

Examples for Cookie

```
response = {"succeeded" : True}
```

```
response = {"succeeded" : True, "cookie" : 13452829256}
response = {"succeeded" : False, "troubleshooting" : "Action failed.
Response code: 402."}
```

Examples for Properties

```
response = {"succeeded" : True,
"properties":
    "property1": "property_value1",
    "property2": ["value1", "value2", "value3"]
    "property3":
        {
            "property3_subfield1": "value1",
            "property3_subfield2": "value2"
        }
    "property4": [
        {
            "property4_subfield1": "value1",
            "property4_subfield2": "value2"
        },
        {
            "property5_subfield1": "value1",
            "property5_subfield2": "value2"
        }
    ]
}
```

Property Resolve Script for Connect

You can write a script that handles host property resolve requests.

If properties are used in a script, the property tags must be listed in the property.conf file under "scripts".

It is recommended that the property resolve script contain a mapping of the API response fields to the Forescout platform properties, for example:

```
cylance_to_ct_props_map = {
    "state": "connect_cylance_state",
```

The property resolve script can also have dependencies defined in the property.conf file. For example, if a MAC address is needed to resolve a property, you can define a dependency on the Forescout platform's MAC address property.

If a property is not resolved after the Python script is called, the property will be set to irresolvable.

The properties object for property resolve scripts can have scalar, list, composite, or list of composite properties.

See [Sample Resolve Script for Connect](#).

Response Objects

The response objects for property resolve scripts are as follows.

Mandatory Fields

"properties": a map/dictionary that contains host properties; the key will be the property name and the value will be the property value.

"error": Error message if script fails for a known reason

Examples

```
response = {"error" : "Script failed due to server failure."}
```

```
response =
```

```
{"properties":
  "property1": "property_value1",
  "property2": ["value1", "value2", "value3"]
  "property3":
    {
      "property3_subfield1": "value1",
      "property3_subfield2": "value2"
    }
  "property4": [
    {
      "property4_subfield1": "value1",
      "property4_subfield2": "value2"
    },
    {
      "property5_subfield1": "value1",
      "property5_subfield2": "value2"
    }
  ]
}
```

Authorization Script for Connect

You can write a script to get one authorization per configuration. Authorizations are stored globally. You can retrieve the authorization from the configuration parameter "connect_authorization_token" whenever you want to use it in scripts. For example:

```
jwt_token = params["connect_authorization_token"]
```

An authorization script can leverage input parameters from the user interface, such as a URL.

See [Sample Authorization Script for Connect](#).

Response Objects

The response objects for authorization scripts are as follows.

Mandatory Fields

`"token"`: a string of authorization token. If the authorization is failed, put an empty string "" here.

Token-Based Authorization

There are two approaches to using token-based authorization in scripts.

One approach is to use the authorization feature provided by Connect, which gets the authorization token from the `"connect_authorization_token"` field whenever you want to use it in scripts. See [Authorization Script for Connect](#).

For a test script, you can check if the token is empty or not. If it is empty, the connection has failed. The sample test script uses this approach. See [Sample Test Script for Connect](#).

The second approach is to get authorization each time a script is called. See the comments in the other sample scripts, for example, see [Sample Polling Script for Connect](#).

Use App Instance Cache in Connect Scripts

You can write a script to get non-endpoint data at the per configuration instance of the app. The data is stored as a system description field and is available for that app.

You can retrieve the data from the configuration parameter `"connect_app_instance_cache"` whenever you want to use it in scripts.

In the script, the field for the response object is `"connect_app_instance_cache"`. Put the value to be saved in this field. If there is any error, put `"error"` in the response object. For an example, see [Sample App Instance Cache Script for Connect](#).

To use this field value in other scripts, use `params.get("connect_app_instance_cache")`. For an example, see [Sample Add a User Action Script for Connect](#).

Use Certificate Validation in Connect Scripts

If you have defined a checkbox for Validate Server Certificate in the `system.conf` file, you need to use a built-in SSL object in your Python script.

When using `urllib`, use the keyword `"ssl_context"` in the HTTP request. For example:

```
response = urllib.request.urlopen(request, context=ssl_context)
```

For other examples of `"ssl_context"`, see [Sample Connect Script Files](#).

When using the requests library, use the keyword "ssl_verify" in the HTTPS request. For example:

```
response = requests.get('https://github.com', verify=ssl_verify)
```

To use the certificate validation feature, upload the entire certificate chain to the Forescout platform.

- 📖 *Certificate validation works with certificates with a Certificate Revocation List (CRL). If the certificates have been uploaded to the Forescout platform, they do not have to be signed by a Certificate Authority (CA).*

Use the Connect Web Service

The Connect web service APIs provide an interface to access eyeExtend Connect functions. Using the Connect RESTful APIs, a third-party vendor can get or update host information. You can query and update the properties defined in a Connect app through Connect RESTful APIs in a script or through Swagger or curl commands.

To use the Connect web service to invoke an API:

1. Enable the web service in the system.conf file for the app. See [Define Name, Version, and Author in system.conf](#).
2. Enable the property values that you want to update through the APIs in the property.conf file for the app. See [Define Properties in property.conf](#).
3. Configure the username and password in the Connect Plugin in the Authentication dialog box. See [Configure Authentication for Connect Web Service](#).
4. Obtain a JWT token. The RESTful API uses the username, password, and app name to validate the app. The obtained token can only be used by this app. The JWT token, with the Bearer token format, is then used for subsequent API requests to authenticate with the Connect Plugin.
5. Call RESTful APIs to get or update host information.

You can use Swagger to obtain a JWT token and then use the **Authorize** button in Swagger to include the JWT token with the Bearer token format. See [Access Swagger User Interface](#), [Obtain JWT Token from Swagger](#), and [Set Authorization in Swagger](#).

You can also use curl or POSTMAN to call the APIs, but then you will need to put the JWT token with the Bearer token format in the API request Authorization header. See [Curl Examples](#).

Access Swagger User Interface

Swagger (OpenAPI) documents the Connect web API and lets you run the RESTful APIs by using the **Try it out** button. You can browse Swagger to look at the available APIs, their parameters, response definitions, and data model, as well as to learn how the APIs work with request and response. Swagger provides a user-friendly interface to invoke APIs.

You do not need to authenticate to access the Connect web service Swagger user interface (UI), however, you will need to authorize to run any API via Swagger.

To view a static version of the Swagger UI, see [Appendix B: Swagger User Interface](#).

To access the live version of Swagger, in a supported browser, substitute the hostname or IP address of your Enterprise Manager (EM) in the following URL:

```
https://<EM hostname or IP address>/connect/swagger-ui/index.html#/
```

Swagger is supported in the latest versions of Chrome, Safari, Firefox, and Edge available at the time of this release.

About the Connect APIs

The following Connect APIs are available:

- POST /connect/v1/authentication/token: Use this API to get a JWT token to authenticate API requests. The required parameters are username, password, and app_name. The following is a sample:

```
{
  "username": "username",
  "password": "password",
  "app_name": "cylance",
  "expiration": "15"
}
```

- GET /connect/v1: Use this API to test the connection to Connect. There are no parameters.
- GET /connect/v1/hosts/{id}: Use this API to get properties for a single host. To GET host properties, the endpoint called must be the EM or managing appliance. The required parameters are IP address or MAC address. Properties are optional. If no properties are specified, all the properties in the app are returned. An example of a single property is: connect_cylance_is_safe. An example of multiple properties is: connect_cylance_is_safe, connect_cylance_last_logged_in_user (use a comma separated list).
- POST /connect/v1/hosts/: Use this API to update one or more properties for a host. Each of the properties to be updated must have "web_enable" set to true. The required parameters are an IP or MAC address as well as the properties to be updated. The parameters must be in the body of the POST request. For this release, only one host update per request is supported. If both the IP and MAC addresses are provided in the body, the MAC address takes precedence over the IP address. If the IP address is different from the existing IP address, the IP address of the host is updated to the IP address provided in the request body. The following is a sample request body:

```
{
  "mac": "009027390a7c",
  "properties": {
    "connect_cylance_is_safe": false,
    "connect_cylance_last_logged_in_user": "admin"
  }
}
```

You can try out the APIs in Swagger, you can use the **Try it out** button. You will need to set up the Authentication in Swagger before calling the APIs. See [Obtain JWT Token from Swagger](#) and then [Set Authorization in Swagger](#).

After setting up authentication in Swagger, you can edit the required fields in the API request and then select **Execute**.

You can view the response codes and values in Swagger. See [API Response Table](#) for a response code reference.

API Details

The following are some details for the APIs:

- HTTPS is required for requests.
- All API requests need authentication:
 - To obtain the JWT token, the username and password are used in the request.
 - For subsequent API requests, the JWT token in Bearer format is used in the request.
- The bearer token format is the word Bearer, followed by a single space and the JWT token.
- The context type accepted in the request and response body is application/json.
- The response structure is always in JSON format.
- The JWT token default expiration is 15 minutes. The range is from 1 minute to 1440 minutes. A shorter expiration period makes a token more secure.

Obtain JWT Token from Swagger

Use Swagger to obtain a JWT token.

To obtain a JWT token from Swagger:

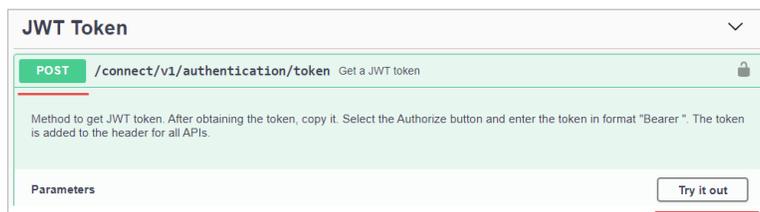
1. Go to Swagger, substituting the hostname or IP address of your Enterprise Manager in the following URL:

```
https:// <EM hostname or IP address>/connect/swagger-ui/index.html#/
```

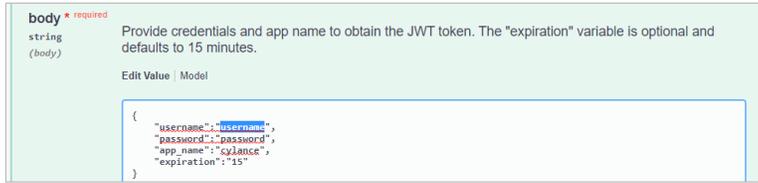
2. Expand the JWT Token section.



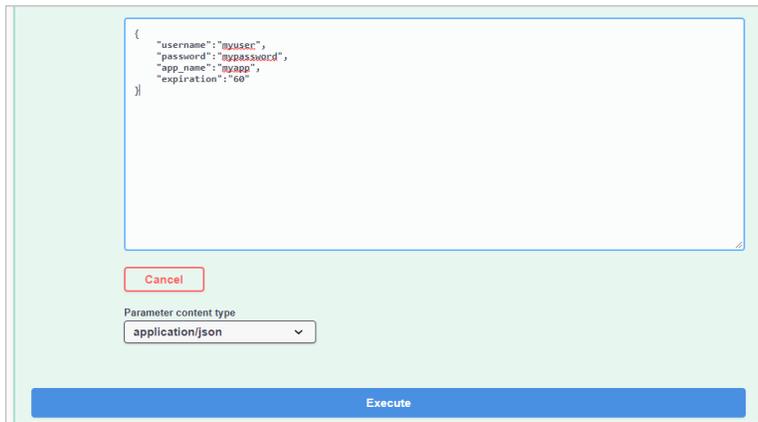
3. Select POST and then select **Try it out**.



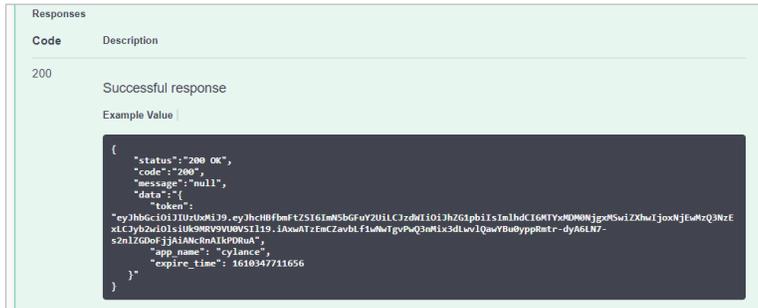
- In the sample body in JSON format, enter the required values from your Connect app for username, password, and app_name. You can enter a value for expiration, but it is optional. The default expiration is 15 minutes, the maximum is 1440 minutes.



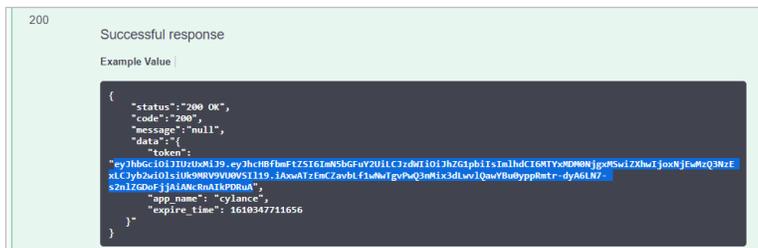
- After entering your values, select **Execute**.



- Scroll to the Successful response (Code 200).



- Copy the JWT token, without the quotation marks.



Set Authorization in Swagger

Use Swagger to set authorization to run other APIs.

To set authorization in Swagger:

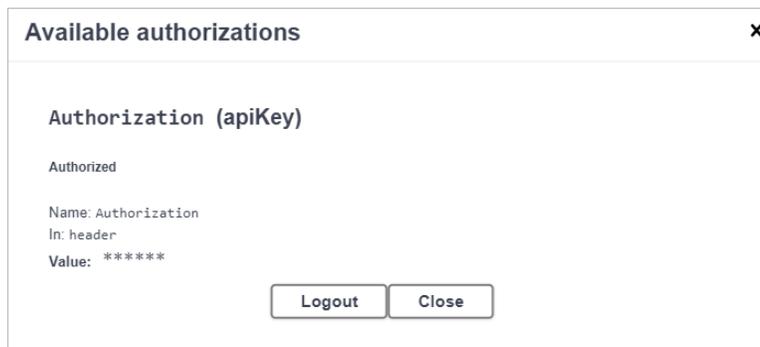
1. Scroll to the **Authorize** button and select it.



2. Type the word Bearer, a single space, and then paste the JWT token into the Value field.



3. Select **Authorize**.



4. Select **Close**.

With authorization set, you can now run other APIs in Swagger. For example, go to GET /connect/v1, select **Try it out**, and then select **Execute** and view the response.

Curl Examples

The following is a curl example to get the JWT token. Substitute your EM hostname or IP address for <EM hostname or IP>.

```
curl -X POST "https://<EM hostname or IP>/connect/v1/authentication/token"
-H "accept: application/json" -H "Content-Type: application/json" -d
"{\"username\": \"username\", \"password\": \"password\",
\"app_name\": \"cylance\", \"expiration\": \"15\"}"
```

The following is a curl example to use the JWT token in a request:

```
curl -X GET "https://ca-s9-em1/connect/v1" -H "accept: application/json" -k
-H "Authorization: Bearer
eyJhbGciOiJIUzUxMiJ9.eyJhcHBfbmFtZSI6ImN5bGFuY2UiLCJzdWIiOiJjaGFyYmG1lIiwiaWF0IjoxNjEzNDg3LzUyMjE2MTM3NzIzODcsInJvbCI6WyJST0xjYXVTRVl1XX0.aXmhX
Y4B_1V5RSDhUphuOch6Y8QSsxB47FCWwDNXo-SVh2ssK8nVBTqE-
5UpziFyYFuagpu8KlpZlOSP4fLYKQ"
{"status": "OK", "code": 200, "message": null, "data": "Connect"}
```

API Response Structure

API responses are always in JSON format.

Successful Response

A successful response has the following structure:

- "status": The HTTP status, in string, such as OK.
- "code": The HTTP status code, in integer.
- "message": A message if there is any, in string. Otherwise, null.
- "data": The data returned, in JSON format.

The following is an example of a successful response:

```
{
  "status": "OK",
  "code": 200,
  "message": null,
  "data": {
    "token":
    "eyJhbGciOiJIUzUxMiJ9.eyJhcHBfbmFtZSI6ImN5bGFuY2UiLCJzdWIiOiJjaGFyYmG1lIiwiaWF0IjoxNjEzNDg3LzUyMjE2MTM3NzIzODcsInJvbCI6WyJST0xjYXVTRVl1XX0.BufP
f-gtgVT8zWMxUqnQ-BxdKWm2HUDv8dErukIojqd_G0voscweZ48Wod4PN17H3et-eZ5oX2-
NJ6aU5GyFw",
    "app_name": "cylance",
    "expire_time": 1610157684367
  }
}
```

Failed Response

A failed response has the following structure, which is similar to the successful response, but there is no data parameter:

- "status": The HTTP status, in string, such as UNAUTHORIZED, or other error.
- "code": The HTTP status code, in integer.
- "message": An error message if there is any, in string. Otherwise, null.

The following is an example of a failed response:

```
{
  "status": "UNAUTHORIZED",
```

```

    "code": 401,
    "message": "Bad credentials"
  }

```

See [API Response Table](#) for a response code reference.

API Response Table

The following table lists API response error messages.

Condition	Status	Code	Message	Data
GET https://EM_IP/connect/v1				
Succeed	OK	200	null	
Missing Authorization header	UNAUTHORIZED	401	Cannot find authorization header info.	
Not using Bearer token	UNAUTHORIZED	401	JWT token does not begin with Bearer format.	
Invalid token format	UNAUTHORIZED	401	Request to parse invalid JWT token failed: <exception message>	
Expired token	UNAUTHORIZED	401	Request to parse expired JWT token failed: <exception message>	
Invalid token signature	UNAUTHORIZED	401	Request to parse JWT token with invalid signature: <token> failed: <exception message>	
unsupported token format	UNAUTHORIZED	401	Request to parse unsupported JWT token failed: <exception message>	
Server failed to respond	INTERNAL_SERVER_ERROR	500	Message varies depending on the failure.	

Condition	Status	Code	Message	Data
POST https://EM_IP/connect/v1/token				
Succeed	OK	200	null	{ "token": "eyJhbGciOiJIUzUxMiJ9.eyJhcHBfmFtZSI6ImN5bGFuY2UiLCJzdWIiOiJhZG1pbWVhbnRlYXN0IiwiaWF0IjoiMTYxMjM0NTYwNTgwNDk1MywiZXhwIjoiMTYxMjM0NTUzLCJybz2wiOiUk9MRV9VU0VSIl19.1C-pxOhIzaHhuvSeqKEFjD9x-M_cBhGAXiH8j_LF2Q Sq4bBUEjlqcinWMIG3SOvplz41anXbhYkFsNY5IYV6Jg","app_name": "cylance","expire_time": 1605808553963}
Using Get	BAD_REQUEST	400	Use POST instead of GET.	
Missing 'username' in body	BAD_REQUEST	400	Username is missing.	
Missing 'password' in body	BAD_REQUEST	400	Password is missing.	
Missing 'app_name' in body	BAD_REQUEST	400	App name is missing.	
Invalid JSON body	BAD_REQUEST	400	JsonParseException message. For example: Unexpected character ('\"' (code 34)): was expecting comma to separate Object entries\n at [Source:(forescout.plugin.connect_module.web.security.jwt.CachedBodyServletInputStream); line: 4, column: 6]"	
Credential not correct	UNAUTHORIZED	401	Bad credentials	

Condition	Status	Code	Message	Data
GET https://<EM_IP>/connect/v1/hosts/<id>				
Succeed	OK	200	null	{ "hosts": [{ "mac": "005056a83dfc", "ip": "24.0.224.4", "fields": { "connect_cylance_id": "f5552f2f-d8d8-4e4b-b4a5-b95255253a23", "connect_cylance_state": "Offline", "connect_cylance_mac_addresses": ["00-50-56-A8-3D-FC"] } }] }
Missing Authorization header	UNAUTHORIZED	401	Cannot find authorization header info.	
Not using Bearer token	UNAUTHORIZED	401	JWT token does not begin with Bearer format.	
Invalid token format	UNAUTHORIZED	401	Request to parse invalid JWT token failed: <exception message>	
Expired token	UNAUTHORIZED	401	Request to parse expired JWT token failed: <exception message>	
Invalid token signature	UNAUTHORIZED	401	Request to parse JWT token with invalid signature: <token> failed: <exception message>	
unsupported token format	UNAUTHORIZED	401	Request to parse unsupported JWT token failed: <exception message>	
Invalid mac or ip address	BAD_REQUEST	400	Host id <id> is not in correct format. Provide IP or MAC address.	
Host not exist	NOT_FOUND	404	Host not found by IP/MAC address <id>.	

Condition	Status	Code	Message	Data
Unable to get properties' names for the given app	INTERNAL_SERVER_ERROR	500	Unable to get property names for apps: [app_name]	
Exception when get host properties on the infra side	INTERNAL_SERVER_ERROR	500	Unable to get host properties. Exception: <exception message>	
POST				
https://EM_IP/connect/v1/hosts				
Succeed	OK	200	null	{ "hosts": [{ "mac": "005056a83dfc", "ip": "24.0.224.4", "fields": { "connect_cylance_id": "f5552f2f-d8d8-4e4b-b4a5-b95255253a23", "connect_cylance_state": "Offline", "connect_cylance_mac_addresses": ["00-50-56-A8-3D-FC"] } }] }
Invalid mac or ip address	BAD_REQUEST	400	MAC address or IP address is not in a correct format.	
Missing mac and ip	BAD_REQUEST	400	Missing IP and MAC address in the request body. At least one of them is required.	
Request body is not a valid json	BAD_REQUEST	400	Request body is not in a valid JSON format.	
Updating a property that does not have web_enable set	BAD_REQUEST	400	Failed to update a property that does not have web_enable set: <property name>	
value for the property is in wrong type	BAD_REQUEST	400	Value for <property name> is not in correct format, expecting <right type>	
property doesn't exist	BAD_REQUEST	400	Failed to update an undefined property: <property name>	

Condition	Status	Code	Message	Data
update property belongs to other app	FORBIDDEN	403	Failed to update a property that is not authorized in the JWT token.	
unknown exception when updating property	INTERNAL_SERVER_ERROR	500	Failed to resolve host properties. Exception: <exception message>	
plugin is not responding	INTERNAL_SERVER_ERROR	500	Plugin is not responding.	
unknown error	INTERNAL_SERVER_ERROR	500	Failed to update host properties.	
Failed to send request to plugin	INTERNAL_SERVER_ERROR	500	Failed to submit request to plugin.	

Connect Web Service Logs

Tomcat is shipped with the Forescout platform as a web server.

The Connect web service logs are located in the following path:

```
/usr/local/tomcat/webapps/logs/connect-tomcat.log
```

The Tomcat-related logs are located in the following path:

```
/usr/local/tomcat/logs
```

Change Log Level

There are two methods to change the log level.

The first method is to modify the logback-spring.xml file located in the following path:

```
/usr/local/forescout/webapps/connect/WEB-INF/classes/logback-spring.xml
```

In the .xml file, change the following variable to the desired debug level: ERROR, WARN, INFO, DEBUG, or TRACE.

```
logging.level.forescout.plugin.connect_module.web=INFO
```

After changing the log level, restart the Tomcat web server for the log level to take effect.

The second method to change the log level is through the Spring Boot logger APIs. This does not require a web server restart. You must include the Bearer token in the API.

The following is a curl example to get the connect web service log. Substitute your hostname or IP address for <hostname or IP>.

```
curl -H "Authorization: Bearer
eyJhbGciOiJIUzUxMiJ9.eyJhcHBfmFtZSI6ImN5bGFuY2UiLCJzdWIiOiJjaGFyYmGllIiwiaWF0IjoxNjExMTA3NzIwLCJleHAiOjE2MTEwMDg2MjAsInJvbmCI6WyJST0xkX1VTRVl1XX0.UjVWDFeBqN6jGH-
w_nolvYKIEVebRgHeQUXSdbdCKpmGpiJFytJNulYEcNo4EnRn4HQFyx1PNfOa1ONc-JruQ" -k
-X GET https://<hostname or
IP>/connect/actuator/loggers/forescout.plugin.connect_module.web
```

The following is a curl example to set the connect web service log to the debug level. Substitute your hostname or IP address for <hostname or IP>.

```
curl -k -X POST -H "Authorization: Bearer
eyJhbGciOiJIUzUxMiJ9.eyJhcHBfmFtZSI6ImN5bGFuY2UiLCJzdWIiOiJjaGFyYmGllIiwiaWF0IjoxNjExMTA3NzIwLCJleHAiOjE2MTEwMDg2MjAsInJvbmCI6WyJST0xkX1VTRVl1XX0.UjVWDFeBqN6jGH-
w_nolvYKIEVebRgHeQUXSdbdCKpmGpiJFytJNulYEcNo4EnRn4HQFyx1PNfOa1ONc-JruQ" -d
'{"configuredLevel": "DEBUG"}' https://<hostname or
IP>/connect/actuator/loggers/forescout.plugin.connect_module.web
```

Create a Connect App

To create an app, place files in a zip file.

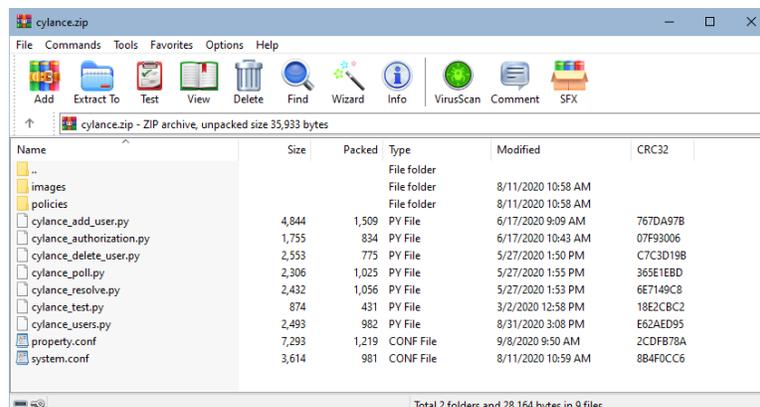
At a minimum, an app must contain three files:

- system.conf
- property.conf
- one Python script

The zip file of the app can be named for the third-party vendor, for example, cylance.zip.

Contents of a Zip File

In every zip file of an app, the system.conf file, property.conf file, and one or more Python scripts must be located at the top level. There can also be two folders.



This sample zip file contains the following:

- property configuration (property.conf or property.json) file (with a .conf or .json suffix). See [Define system.conf File](#).
- system configuration (system.conf or system.json) file (with a .conf or .json suffix). See [Define property.conf File](#).
- Python scripts (each with a .py suffix). See [Write Python Scripts for Connect](#).
- folder for **images**, for icons in the user interface, such as icons for actions, action groups, property groups, and policy templates. See [Define Icons in Connect](#).
- folder for **policies**, for policy templates. See [Define Policy Templates in Connect](#).

 *The suffixes of the property configuration file and system configuration file do not have to match, for example, an app can have a property.conf and a system.json file.*

File Size Maximum

The maximum size of the zip file is 10MB. Any single file within the zip file can have a maximum size of 5MB. The maximums are enforced when an app is imported.

App Folder Paths

In an app, the files and folders must be as follows:

- All .conf (or .json) and all .py files are under /
- All policy template files are under /policies/nptemplates
- Icon files are in the following folders:
 - Action group icon files are under /images/np_ng/action_groups
 - Action icon files are under /images/np_ng/actions
 - Property group icon files are under /images/np_ng/field_groups
 - Policy template icon files are under /images/np_ng/templatedirs

Zip a Connect App Using a Mac

If you are using the Mac GUI Compress tool to zip the files in an app, you will need to use a workaround.

The Mac GUI Compress tool produces a `__MACOSX` metadata folder as well as a `.DS_store` file that are not compliant with the contents of the zip file, which is restricted to the `.conf` and `.py` files, and the **policies** and **images** folders.

The workaround is to use the Terminal (or command line interface) `zip` command and not the Mac GUI Compress tool to create the zip file for an app. For example:

```
zip -r dir.zip
```

If you already have a zip file with a `__MACOSX` metadata folder, you can remove it as follows:

```
zip -d foo.zip __MACOSX .DS_Store
```

If a __MACOSX folder exists in your directory (because you previously used unzip to create it), use the -x option to prevent it from being included in the app.

Deploy an App with Connect

This topic describes how to deploy an app with Connect. It is intended for app users and describes downloading and installing an app, licensing, and configuring. Each app has their own configuration details. Refer to the Readme files for each app and also see the following:

- [Download a Connect App from GitHub](#)
- [Install Connect Plugin](#)
- [Connect Add-On Optional Module](#)
- [Connect User Interface Details](#)

Download a Connect App from GitHub

eyeExtend Connect Apps can be found on the Forescout eyeExtend Connect GitHub page located as follows:

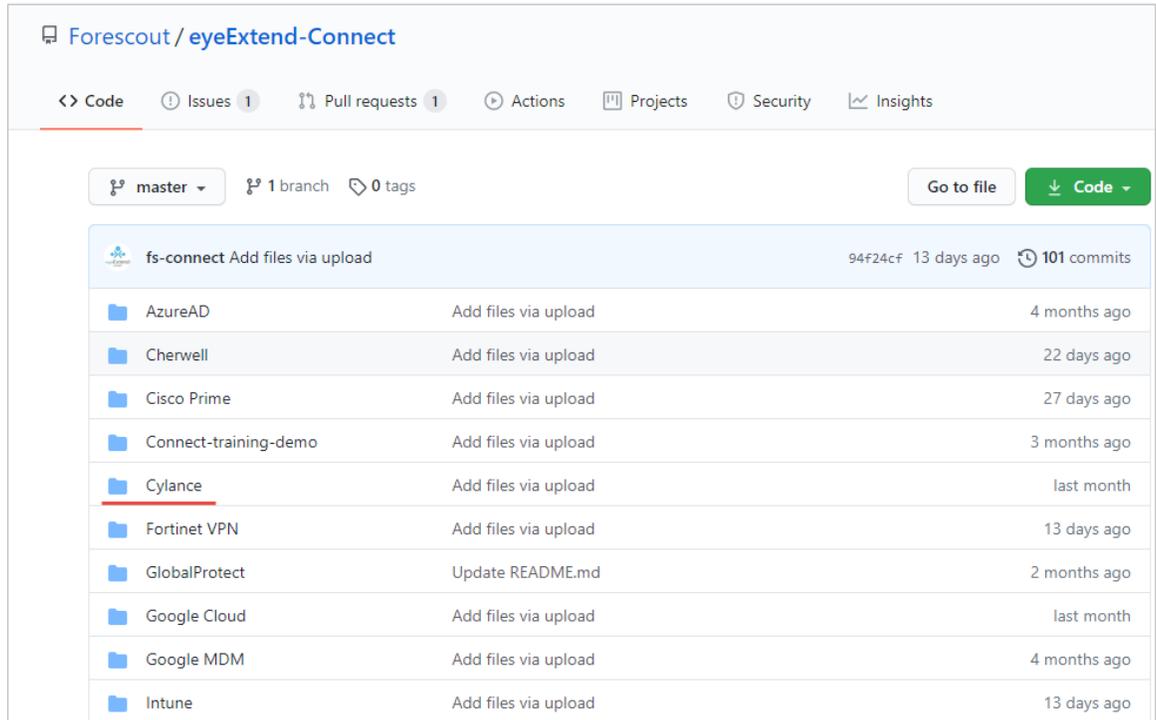
<https://github.com/Forescout/eyeExtend-Connect>

Apps signed by Forescout are in .eca format and are downloaded from GitHub as a .eca image file.

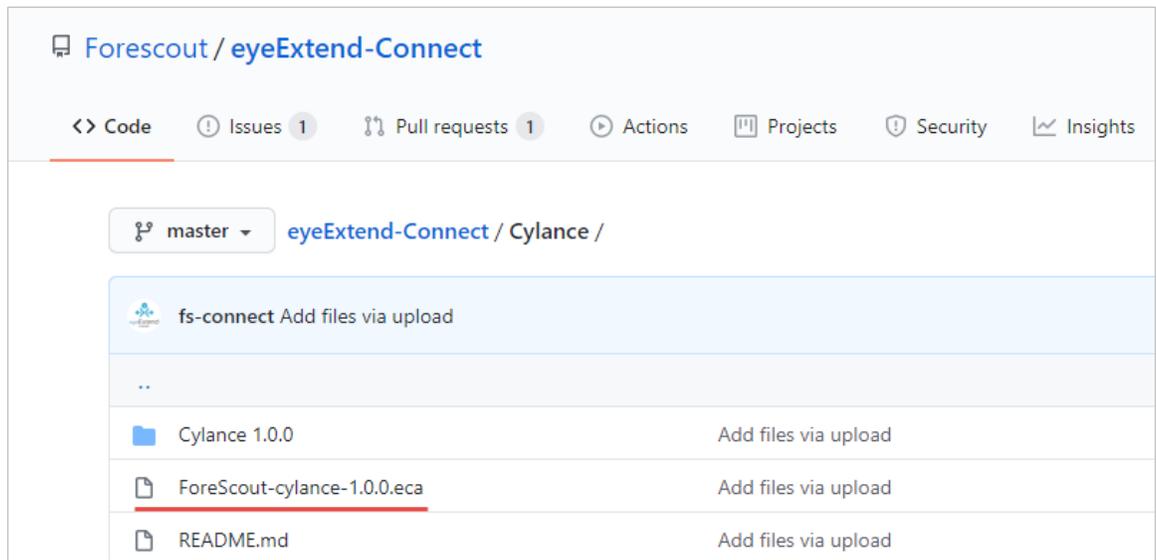
To download a .eca image file for a Connect App from GitHub:

1. Go to the Forescout eyeExtend Connect GitHub page.

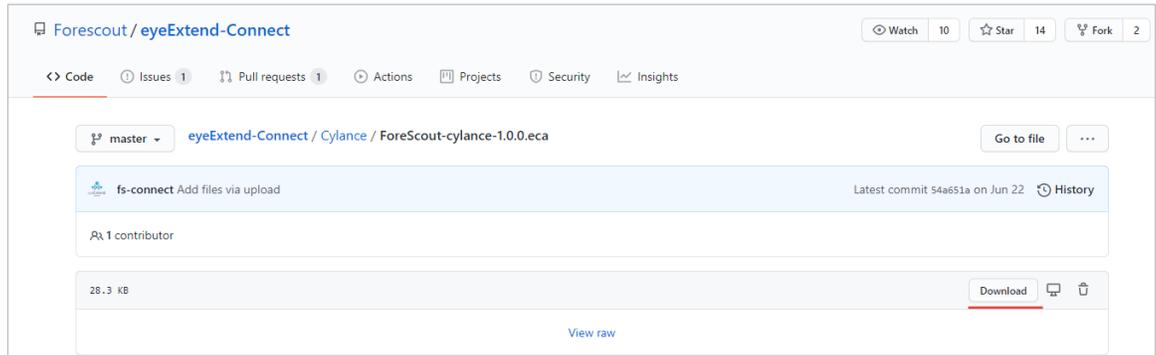
2. Select an app, for example, Cylance.



3. Select the .eca image file for that app.



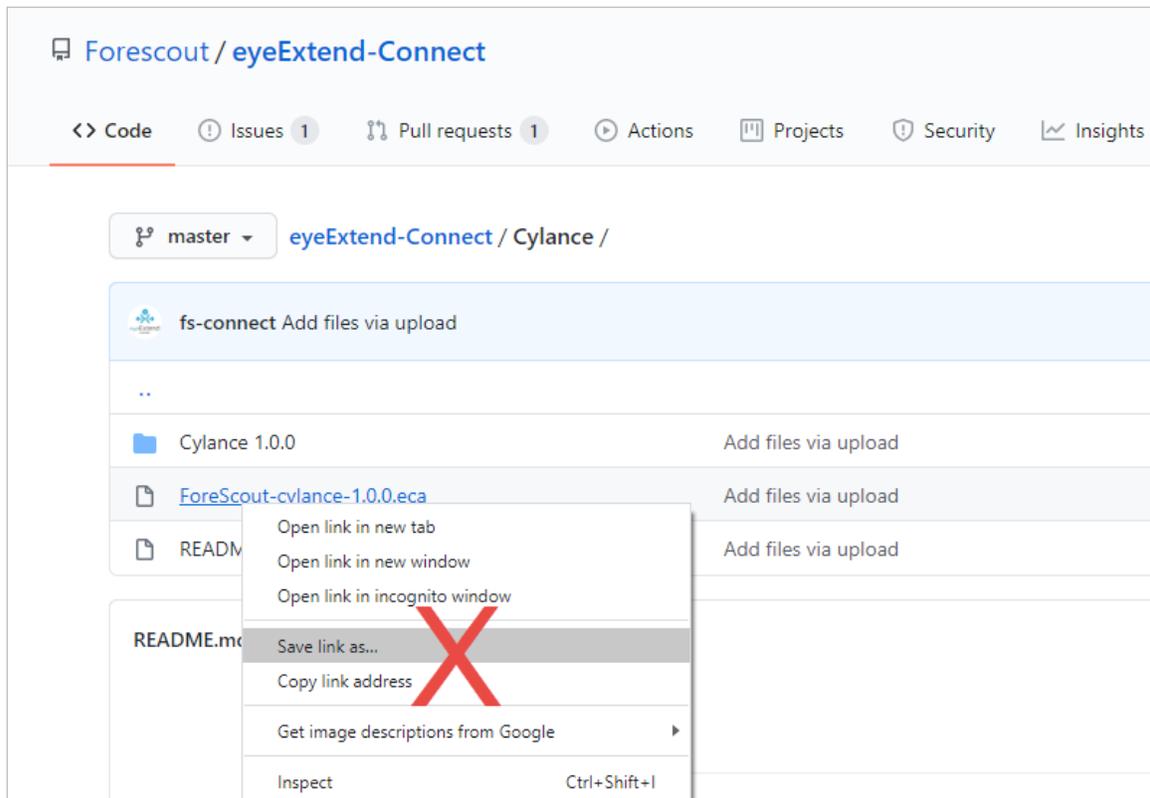
4. Select **Download**.



App Download Issue

If there is an *Invalid Signature* error when a downloaded app is imported into Connect, the correct procedure in might not have been followed.

For example, it is not correct in Step 3 to right-click on the .eca image file and select **Save link as...** This will result in the *Invalid Signature* error when the app is imported into Connect.



Install Connect Plugin

This topic describes how to install the Connect Plugin.

To install the module:

1. Navigate to the Downloads page on the [Forescout Customer Support Portal](#).
2. Download the module .`fpi` file.
3. Save the file to the machine where the Console is installed.
4. Log into the Console and select **Options** from the **Tools** menu.
5. Select **Modules**. The Modules pane opens.
6. Select **Install**. The Open dialog box opens.
7. Browse to and select the saved module .`fpi` file.
8. Select **Install**. The Installation screen opens.
9. Select **I agree to the License Agreement** to confirm that you have read and agree to the terms of the License Agreement and select **Install**. The installation cannot proceed unless you agree to the license agreement.

 *The installation begins immediately after selecting Install and cannot be interrupted or canceled.*

 *In modules that contain more than one component, the installation proceeds automatically one component at a time.*

10. When the installation completes, select **Close** to close the window. The installed module is displayed in the Modules pane.

 *Some components are not automatically started following installation.*

Ensure That the Connect Plugin Is Running

After installing the Connect Plugin (and configuring it, if necessary), ensure that it is running.

To verify:

1. Select **Tools > Options > Modules**.
2. In the *Modules* pane, hover over the Connect Plugin name to view a tooltip indicating if it is running on Forescout devices in your deployment.
The name is preceded by one of the following icons:
 -  - The Connect Plugin is stopped on all Forescout devices.
 -  - The Connect Plugin is stopped on some Forescout devices.
 -  - The Connect Plugin is running on all Forescout devices.
3. If the Connect Plugin is not running, select **Start**, and then select the relevant Forescout devices.
4. Select **OK**.

Install/Uninstall Connect Web Service

The Connect web service is installed and deployed with the Connect Plugin.

Note that it may take a minute or two after deployment for the web service to be fully running and accept web requests.

When Connect is uninstalled, the Connect web service is removed.

Connect Add-On Optional Module

The Connect Add-On Module is an optional module that can be installed, which is dependent on the installation of the Connect Plugin. It provides licensing of an additional 20 apps. Two apps are included with the Connect Plugin license, for a total of 22 apps.

If you need to run more than two apps, install the Connect Add-On Module and request a license. Licenses can be for either the Per-Appliance Licensing Mode (PALM) or the Flexx Licensing Mode.

Refer to the *Connect Add-On Module How-to Guide* for more information.

Without Connect Add-On Module Installed

If you do not have the Connect Add-On Module installed, you are entitled to two apps with the Connect Plugin license. The Entitlement Status is displayed in the **Connect** pane.

Signature	Name	Version	Author	Last Date Modified	File Name	Import Date	Configured	Web Service Enabled	Status
BlackBerry Protect	1.0.0	Forescout	December 04 202...	bb_protect.zip	December 04 2...	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Running	
ArubaCentral	1.0.0	SME Orchestration	September 22 202...	ForeScout-arubacentral-1.0.0.eca	December 04 2...	<input type="checkbox"/>	<input type="checkbox"/>	Running	
AzureAD	1.0.0		March 31 2020 10:...	ForeScout-azuread-1.0.0.eca	November 25 2...	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Running	
Cytlance	1.0.0	Forescout	June 22 2020 10:5...	ForeScout-cytlance-1.0.0 (1).eca	January 28 202...	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Running	

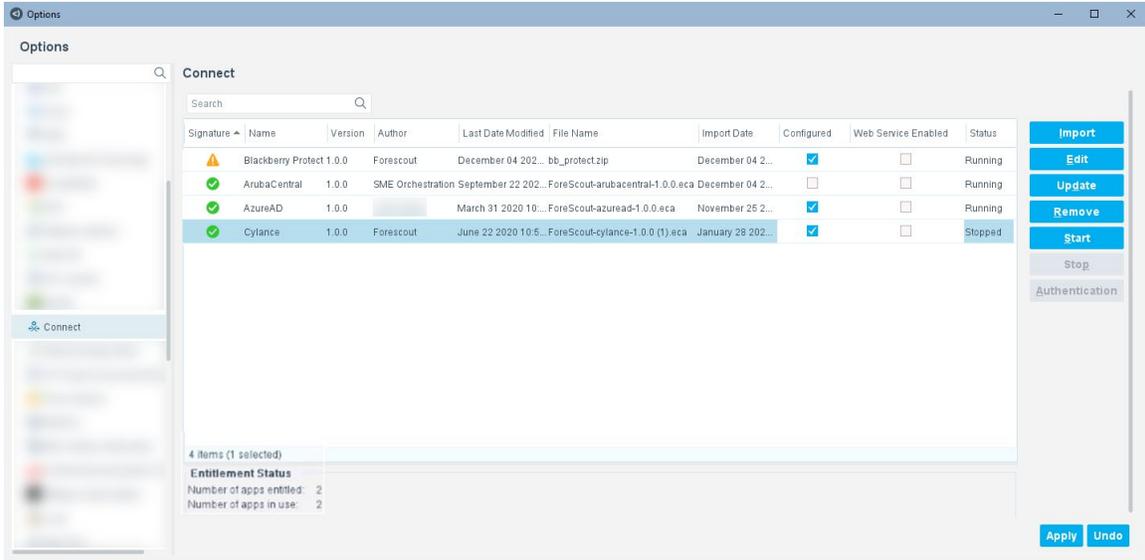
4 items (0 selected)

Entitlement Status
 Number of apps entitled: 2
 Number of apps in use: 3 **Out of compliance**

If you run more than two apps with the Connect Plugin license, the Entitlement Status displays *Out of compliance*.

If an app is not in the Configured state or the Running state, it is not counted as *in use*. The example shows four apps, but only three are both Configured and Running (one app is not Configured), so the count of the number of apps in use is three.

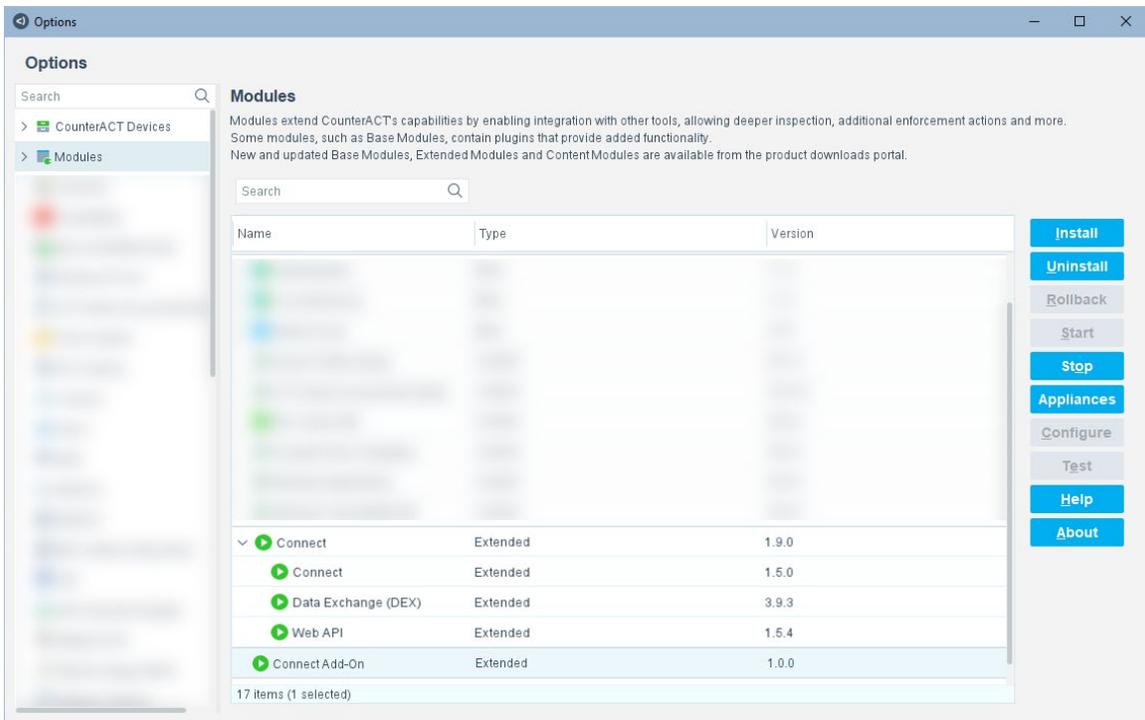
If you stop one app, the number of apps *in use* is two (one app is not Configured and one app is Stopped). The Entitlement Status no longer displays *Out of compliance*.



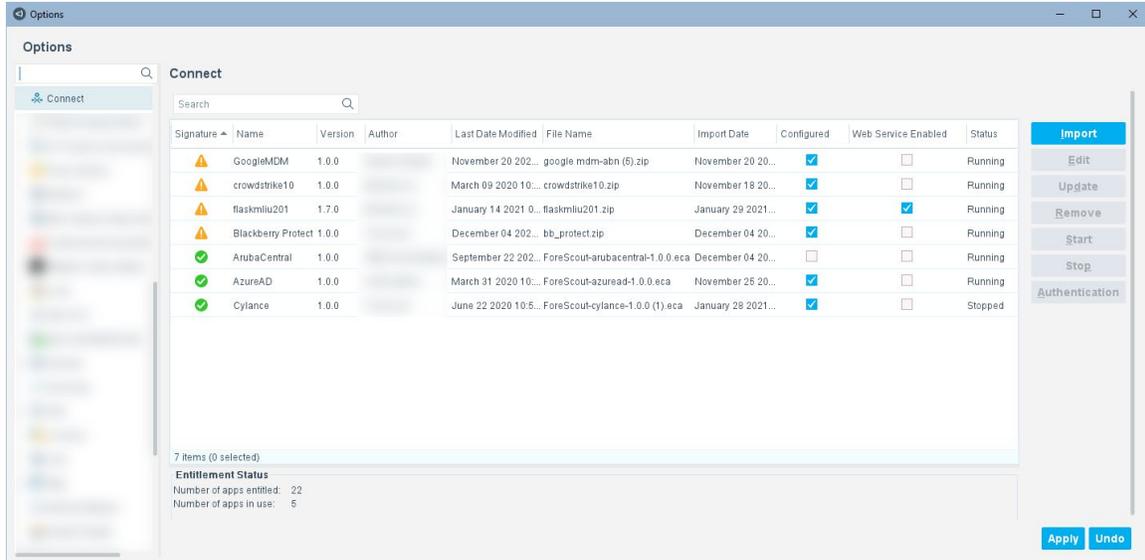
With Connect Add-On Module Installed

The Connect Plugin and the Connect Add-On Module are installed under **Options > Modules**.

The Connect Add-On Module does not require any configuration, nor does it have to be running.



The Entitlement Status is displayed in the **Connect** pane.



If an app is not in the Configured state or the Running state, it is not counted as *in use*. The example shows seven apps, but only five are both Configured and Running (one is not Configured and one is Stopped), so the count of the number of apps in use is five.

The entitlement status will be in compliance as long as the number of apps does not exceed 22.

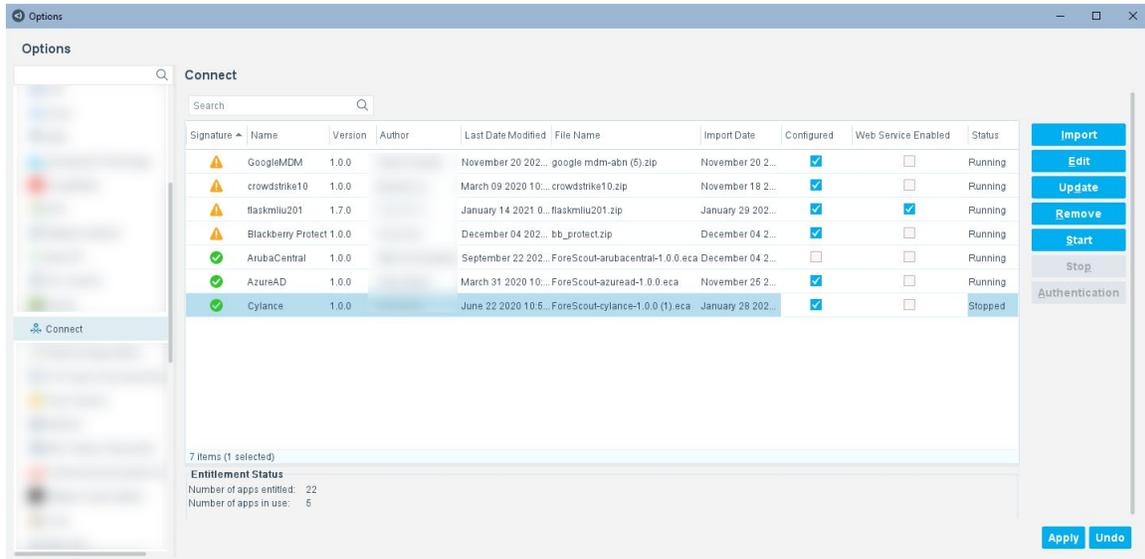
Connect User Interface Details

This topic provides details of the user interface. See the following:

- [Connect Pane Details](#)
- [System Description Dialog Box Details](#)
- [Configure Policy Templates in Connect](#)

Connect Pane Details

The **Connect** pane displays existing apps that have been imported and system descriptions that have been configured. There can be multiple apps displayed in this pane.



Columns in Connect Pane

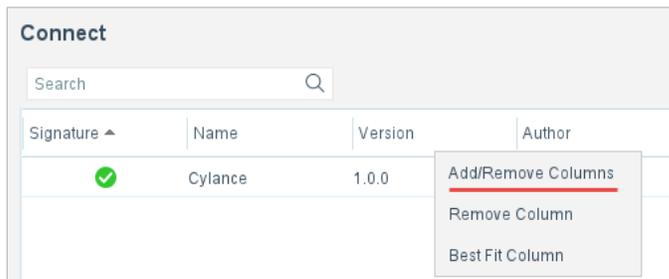
There are several default columns in the **Connect** pane as follows:

- **Signature:** The signature of the imported app, which has a green checkmark if the signature is valid or an orange caution sign if the signature is not valid or is missing. Apps from Forescout are signed after their creation to ensure their authenticity and integrity. See [Import a Signed App](#).
- **Name:** The name of the third-party integration app, such as Cylance, defined in the system.conf file.
- **Version:** The version of the app, defined in the system.conf file.
- **Author:** The author of the app, defined in the system.conf file.
- **Last Date Modified:** The date that any file in the app was last modified.
- **File Name:** The file name of the app.
- **Import Date:** The date the app was imported.
- **Configured:** The configuration flag, which has a checkmark if the system description is configured. If an app has been imported, but not configured, there will not be a checkmark in this column. To configure the system description, see [Add a System Description](#).
- **Web Service Enabled:** The web service flag, which has a checkmark if the Connect web service is enabled.
- **Status:** The status of the app. The valid values are Running and Stopped.

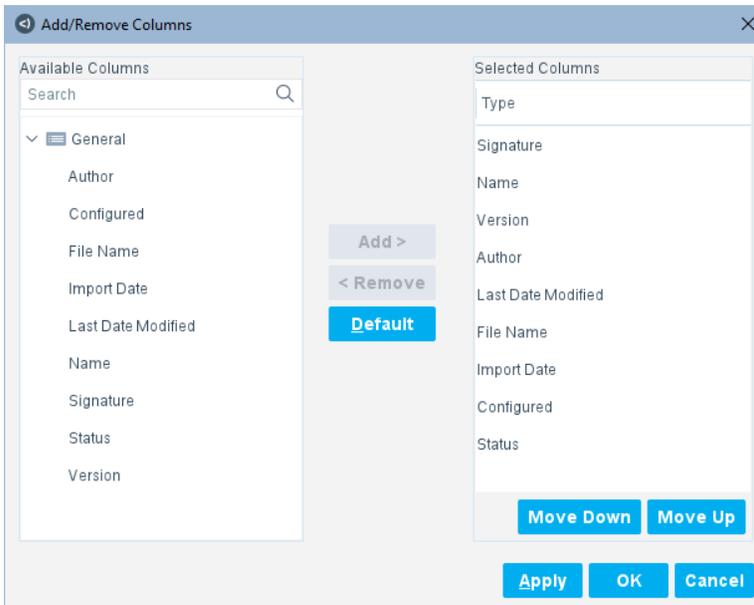
At the bottom of the **Connect** pane is the Entitlement Status:

- **Number of apps entitled:** The number of apps to which you are entitled, based on licensing, which can be either 2 or 22. The Connect Plugin license provides two apps. The Connect Add-On Module provides another 20 apps for a total of 22. See [Connect Add-On Optional Module](#). If there is no valid Connect Plugin license, it will be 0.
- **Number of apps in use:** The number of apps that are Configured and Running. Apps that are not configured and apps that are stopped are not counted as apps in use.

When you right-click on the column titles in the **Connect** pane, a menu for adding and removing columns is displayed.



To add, remove, or reorder the columns on the **Connect** pane, select **Add/Remove Columns**. You can expand the General folder.



Move columns in the lists for **Available Columns** and **Selected Columns** and use the **Move Up** and **Move Down** buttons to reorder the columns in the **Add/Remove Columns** dialog box.

To delete a column, select it and select **Remove Column** in the **Connect** pane.

To select the best fit for a column, right-click a column title and select **Best Fit Column** in the **Connect** pane.

Buttons in Connect Pane

There are several buttons on the **Connect** pane for apps as follows:

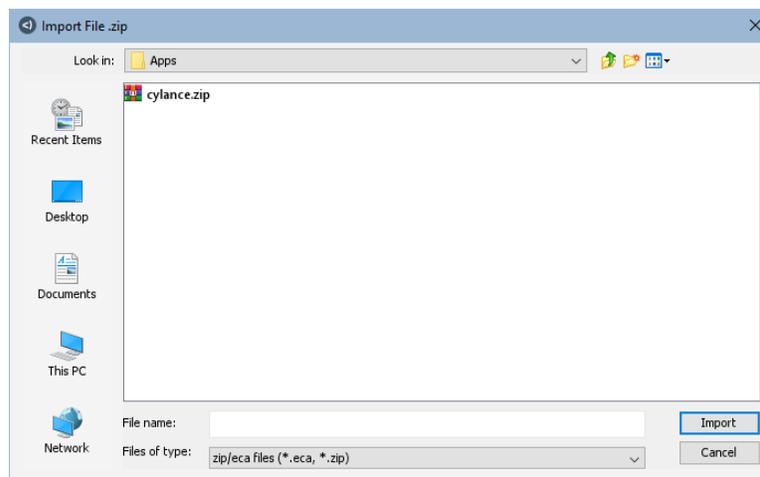
Button	Description
Import	Import an App
Edit	Edit an App
Update	Update an App
Remove	Remove an App
Start	Start an App
Stop	Stop an App
Authentication	Configure Authentication for Connect Web Service

There are also **Apply** and **Undo** buttons on the **Connect** pane as follows:

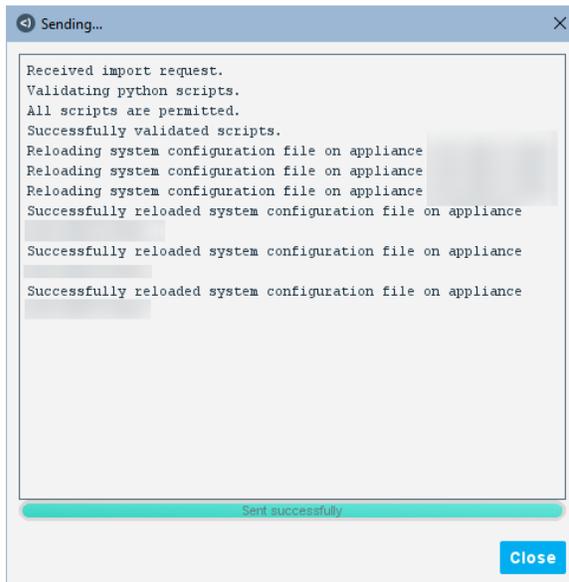
Button	Description
Apply	Save the Connect configuration to the CounterACT Appliance. See Apply Changes .
Undo	Undo the previous action performed in Connect.

Import an App

Select the **Import** button to import apps into Connect in zip or eca format. See also [Import a Signed App](#).



Messages are displayed as the app is imported.

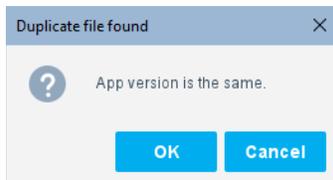


If the app has been imported successfully, a message is displayed at the bottom of the **Sending** dialog box.

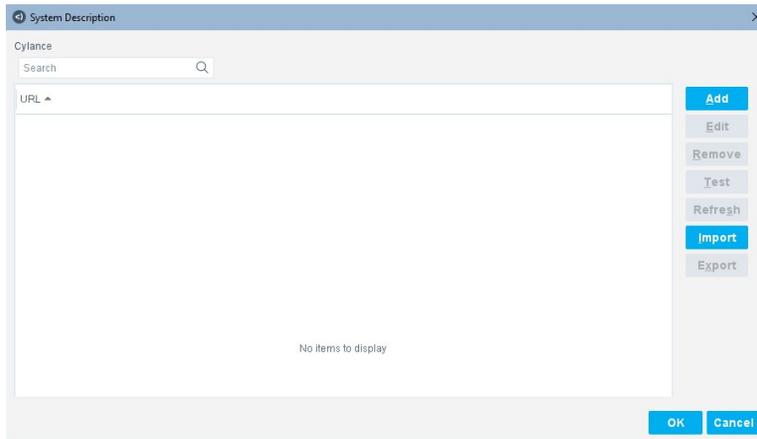
If the app has not been imported successfully, error messages are displayed in the **Sending** dialog box with a reason, such as an invalid script.

Select **Close** when the import has finished. If you select **Close** before the import has finished, it will fail.

An error message is displayed if you try to import a duplicate app with the same name and version as an existing app.



The **System Description** dialog box opens. In this example, there is one column: URL, which has been defined in the system description (in the system.conf file).



The maximum number of apps that can be imported is 22.

If a device has not been configured and you select **OK** in the **System Description** dialog box, a warning message is displayed.

To configure a system description, select **Add**. See [Add a System Description](#).

Import a Signed App

Select the **Import** button to import apps in eca format into Connect. Apps from Forescout are signed after their creation to ensure their authenticity and integrity.

 *Unsigned apps might cause negative impacts on hosting CounterACT Appliances.*

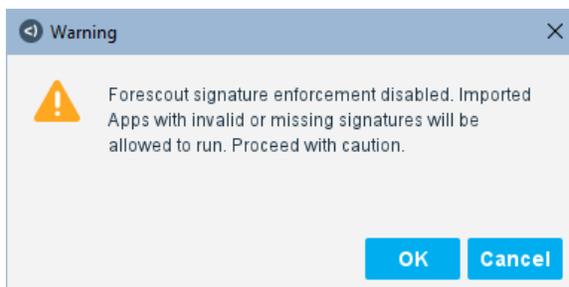
When you import an app, the signature of the app is validated to see if it has a valid Forescout signature. If the validation succeeds, the app is imported.

If the validation fails, an *Invalid Signature* error message is displayed and the app is not imported. See [App Download Issue](#).

To allow an app with an invalid signature to be imported use the following command on the Enterprise Manager:

```
fstool allow_unsigned_connect_app_install true
```

This is a global command. It disables the enforcement of signature validation for all apps that are imported after the command is run, including apps with invalid or missing signatures. The following warning is displayed. Proceed with caution.



Update an App

Select the **Update** button to update an app in a limited way.

If the system.conf and property.conf files have changed, you must upgrade the app. See [Upgrade an App](#).

But if you made the following changes, you can use the **Update** button to update an app:

- “version” change only (to a higher or a lower version) in the system.conf file
- Any content change in existing scripts

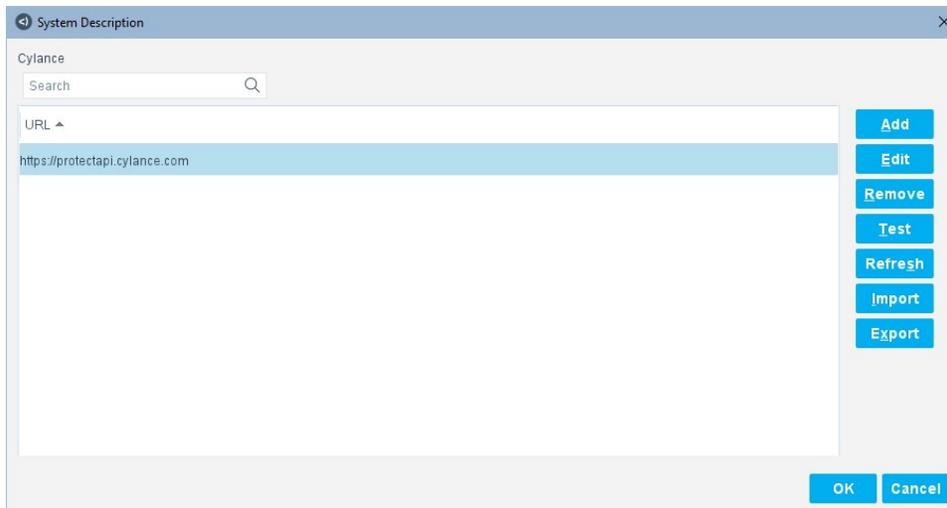
An error message is displayed if you select an app to update but then select the zip file of another app.

Configured policies are not affected by the update.

Select **Apply** in the **Connect** pane to complete the update.

Edit an App

Select an existing app in the **Connect** pane and select **Edit** or double-click the existing app to open the system description for it.

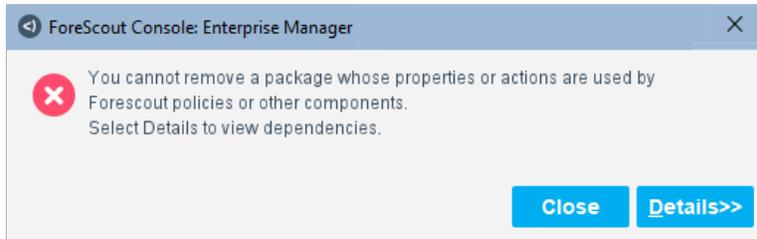


Remove an App

Remove an existing app before replacing it with an update of the same app.

Select an existing app in the **Connect** pane, select **Remove** to delete it, and confirm the removal.

Before an app is removed, dependencies for properties and actions are checked. An error message is displayed if there are properties or actions configured in a policy when you try to remove the app.



Select **Details** to view the specific properties and actions that are configured. You may have to remove the policy

Select **Close** and then select **Apply** in the **Connect** pane.

Start an App

Select the **Start** button to start a selected app when it is not in the Running state. Starting an app enables host discovery, property resolves, and actions (if applicable and configured).

When a selected app is running, the **Start** button is disabled. After an app is started, a status of Running is displayed in the **Connect** pane.

If an app is not selected, both the **Start** and **Stop** buttons are disabled.

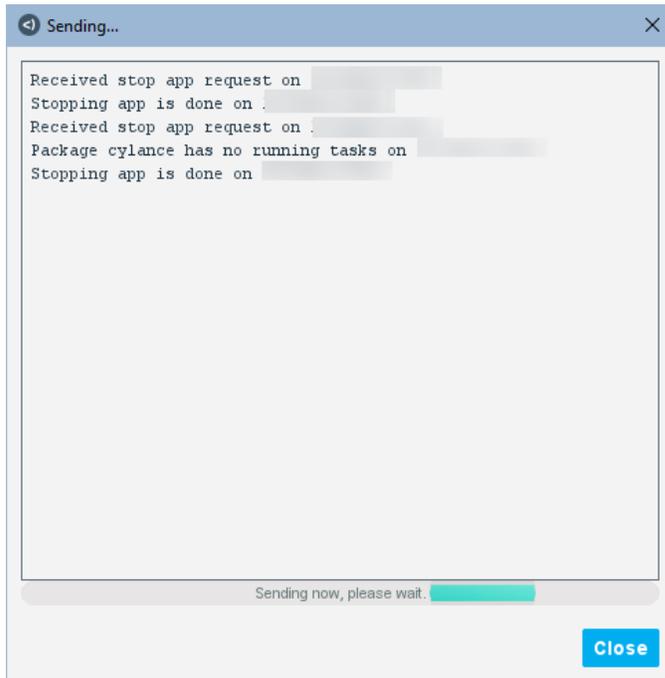
If the configuration has not been saved, select **Apply** and then select **Start**.

Stop an App

Select the **Stop** button to stop a selected app when it is in the Running state.

For example, if one app has issues, select it and select **Stop**, and then investigate it. The other apps continue running.

When an app is in the Stopped state, host discovery, property resolves, and actions, (if applicable and configured), are stopped.



When a selected app is not running, the **Stop** button is disabled. After an app is stopped, a status of Stopped is displayed in the **Connect** pane.

If an app is not selected, both the **Start** and **Stop** buttons are disabled.

If the configuration has not been saved, select **Apply** and then select **Stop**.

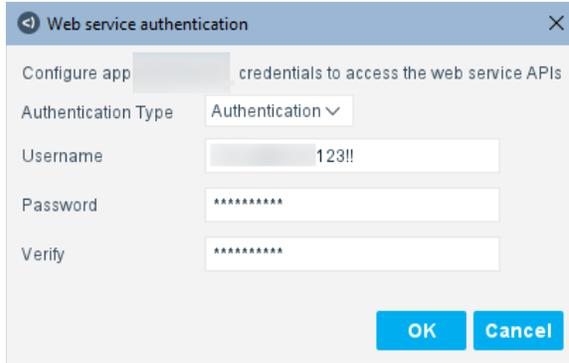
Configure Authentication for Connect Web Service

Configure authentication for the Connect web service. The configuration includes the authentication type as well as the username and password used by the Connect web service APIs.

Authentication is configured for each app. The username and password configured for the app will be used to obtain a JWT token through the Connect web service API. The JWT token will then be sent with subsequent Connect web service API requests. See [Use the Connect Web Service](#) for details.

The Web service authentication dialog box is launched as follows:

- When you import an app in which the web service is enabled in the system.conf file. You are prompted automatically for the Web service authentication in the **System Description** dialog box.
- When you select an app in the **Connect** pane in which the web service is enabled and then select the **Authentication** button.



Web service authentication dialog box. The title bar reads "Web service authentication" with a close button. The main text says "Configure app [app name] credentials to access the web service APIs". There are four input fields: "Authentication Type" (a dropdown menu showing "Authentication"), "Username" (containing "123!!"), "Password" (masked with asterisks), and "Verify" (masked with asterisks). At the bottom right are "OK" and "Cancel" buttons.

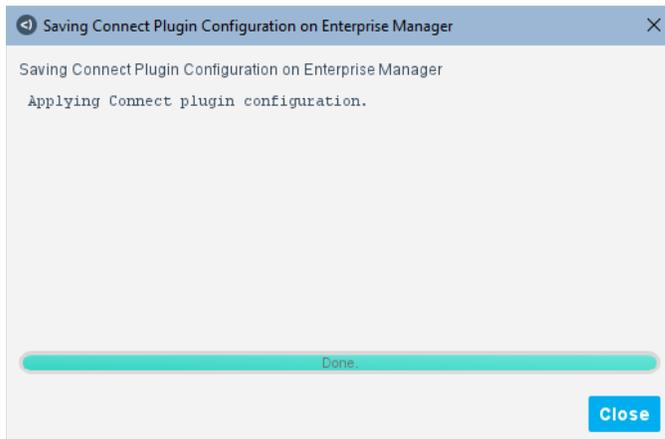
The fields of the Authentication dialog box are as follows:

Fields	Description
Authentication Type	Select the type of authentication. The valid type is Authentication.
Username	(Required) Enter a username.
Password	(Required) Enter a password.
Verify Password	Re-enter the password to verify it.

After configuring web service authentication, select **OK** and then select **Apply** in the **Connect** pane to save the configuration.

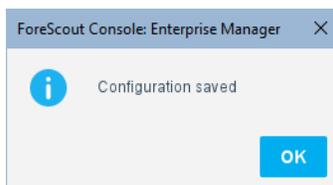
Apply Changes

Select the **Apply** button to save the changes to the configuration.



"Saving Connect Plugin Configuration on Enterprise Manager" dialog box. The title bar reads "Saving Connect Plugin Configuration on Enterprise Manager" with a close button. The main text says "Saving Connect Plugin Configuration on Enterprise Manager" and "Applying Connect plugin configuration." Below the text is a progress bar that is fully filled and labeled "Done". At the bottom right is a "Close" button.

Select **Close**.



"ForeScout Console: Enterprise Manager" notification dialog box. The title bar reads "ForeScout Console: Enterprise Manager" with a close button. The main text says "Configuration saved" next to an information icon. At the bottom right is an "OK" button.

Select **OK**.

Upgrade an App

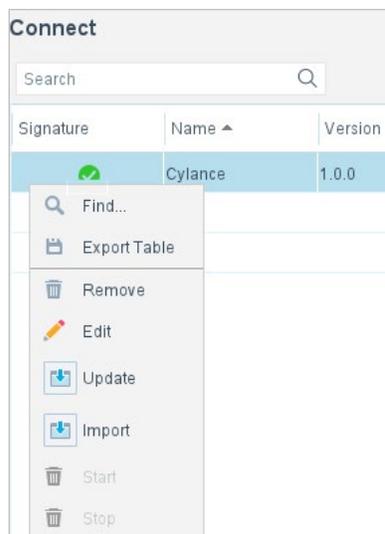
To upgrade an app when the `system.conf` and `property.conf` files have changed, you can **Remove** it, **Import** the newer app, and then **Add** the configuration for the system description. See [Remove an App](#), [Import an App](#), and [Add a System Description](#).

Since removing an app removes all configuration, you can also **Export** the system description before removing the app, then **Import** the app and **Import** the system description. See [Export a System Description](#), [Import an App](#), and [Import a System Description](#).

The upgrade steps listed above are needed when the `system.conf` and `property.conf` files have changed. If only the content in existing scripts or only the version in the `system.conf` file have changed, you can update an app. See [Update an App](#).

Menu in Connect Pane

There is a menu available when you right-click an existing app in the **Connect** pane. For **Remove**, **Edit**, **Update**, **Import**, **Start**, and **Stop**, see [Buttons in Connect Pane](#).



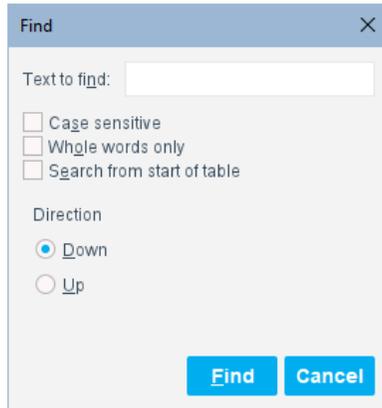
For **Find** and **Export Table**, see [Find Dialog Box](#) and [Export Table Dialog Box](#).

Find Dialog Box

Find a string on the window.

To find a string:

1. Select **Find**.



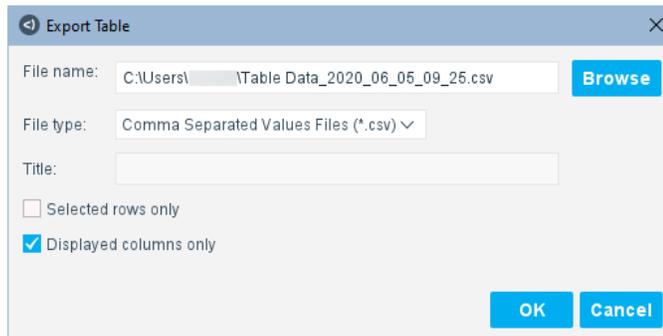
2. Enter the text to find, select options or direction, and then select **Find**.

Export Table Dialog Box

Export the window contents to a spreadsheet.

To export a table:

1. Select **Export Table**.



2. You can:
 - Export the **Selected rows only** and/or the **Displayed columns only**
 - Change the **File type** to either Comma Separated Values Files (*.csv) or Acrobat Reader Files (*.pdf)
 - Change the folder location using **Browse**
 - 📄 *You cannot enter anything in the **Title** field.*

3. Select **OK**. A confirmation is displayed.

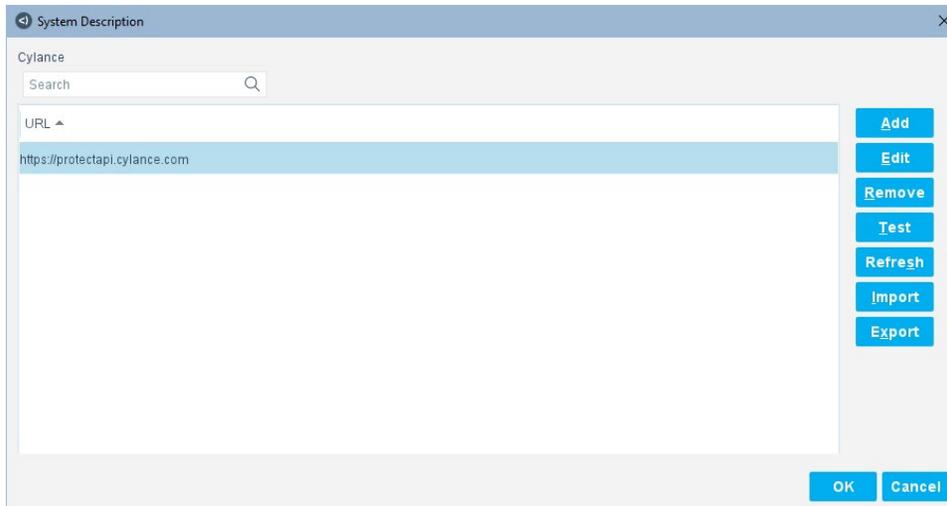


4. Select **Yes**. The table data opens in an Excel spreadsheet. The spreadsheet has a default name based on the date and time, for example, TableData_2020_06_05_09_25.csv-Excel.

	A	B	C	D	E	F	G	H	I
1	Signature	Name	Version	Author	Last Date Modified	File Name	Import Date	Configure	Status
2	Valid Forescout signature	Cylance	1.0.0	Concert Masters	May 27 2020 02:03:32 PM	cylance.zip	June 05 2020 09:07:36 AM	TRUE	Running
3	Valid Forescout signature	Intune	1.0.0	Concert Masters	June 01 2020 10:06:08 AM	intune.zip	June 04 2020 10:45:24 AM	TRUE	Running
4									

System Description Dialog Box Details

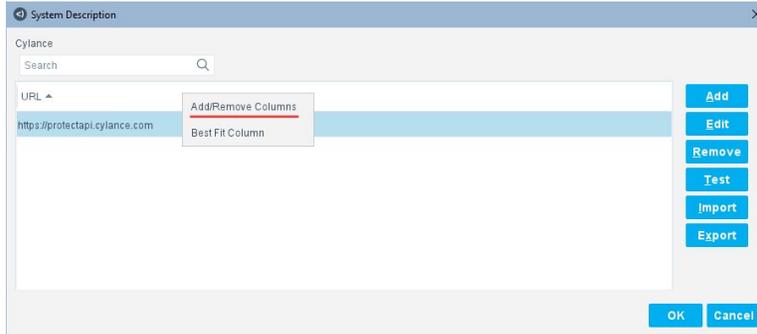
After a system description is configured, it is displayed in the **System Description** dialog box.



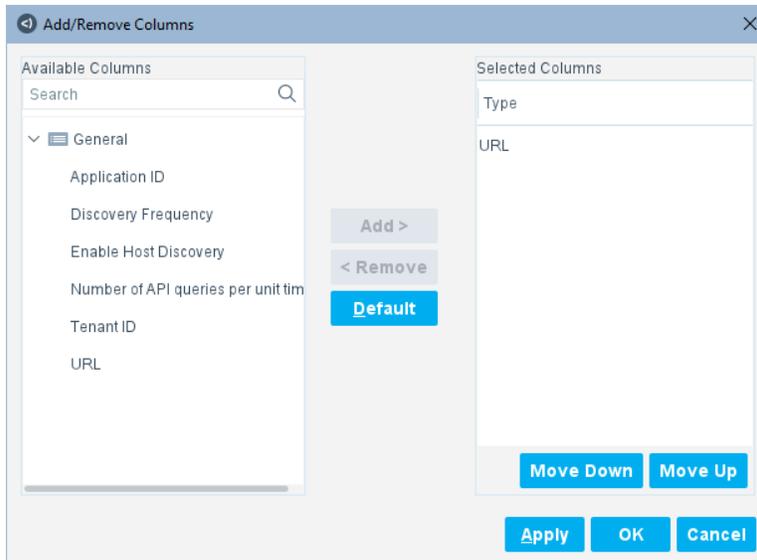
Columns in System Description Dialog Box

The columns in the **System Description** dialog box are defined in the system.conf file with the “add to column” parameter

When you right-click the column titles, a menu for adding and removing columns is displayed.



To add, remove, or reorder the columns on the **System Description** dialog box, select **Add/Remove Columns**. You can expand the General folder.



Move columns in the lists for **Available Columns** and **Selected Columns** and use the **Move Up** and **Move Down** buttons to reorder the columns in the **Add/Remove Columns** dialog box.

To delete a column, select it and select **Remove Column** in the **System Description** dialog box.

 *If there is only one column, you cannot remove it.*

To select the best fit for a column, right-click a column title and select **Best Fit Column** in the **System Description** dialog box.

Buttons in System Description Dialog Box

There are several buttons for an integration on the **System Description** dialog box as follows:

Button	Description
Add	Add a System Description
Edit	Edit a System Description
Remove	Remove a System Description
Test	Test a System Description (Optional)
Refresh	Refresh App Features
Import	Import a System Description
Export	Export a System Description

There are also **OK** and **Cancel** buttons on the **System Description** dialog box:

Button	Description
OK	Save the system description changes to the CounterACT Appliance.
Cancel	Cancel the previous action performed in Connect.

Add a System Description

Select **Add** to display the first configuration panel. The number of panels in the system description are defined in the system.conf file.

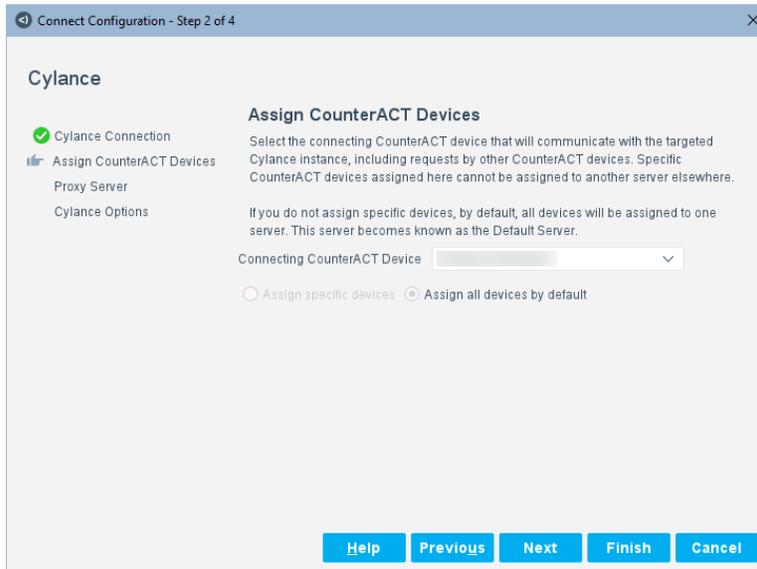
The screenshot shows a configuration window titled "Connect Configuration - Step 1" for "Cylance". The main heading is "Cylance Connection". Below this, there are several input fields and a checkbox:

- URL:
- Tenant ID:
- Application ID:
- Application Secret:
- Verify Application Secret:
- Validate Server Certificate:
- Custom configuration refresh interval (in minutes):
- Authorization Interval(in minutes):

At the bottom of the dialog, there are five buttons: "Help", "Previous", "Next", "Finish", and "Cancel".

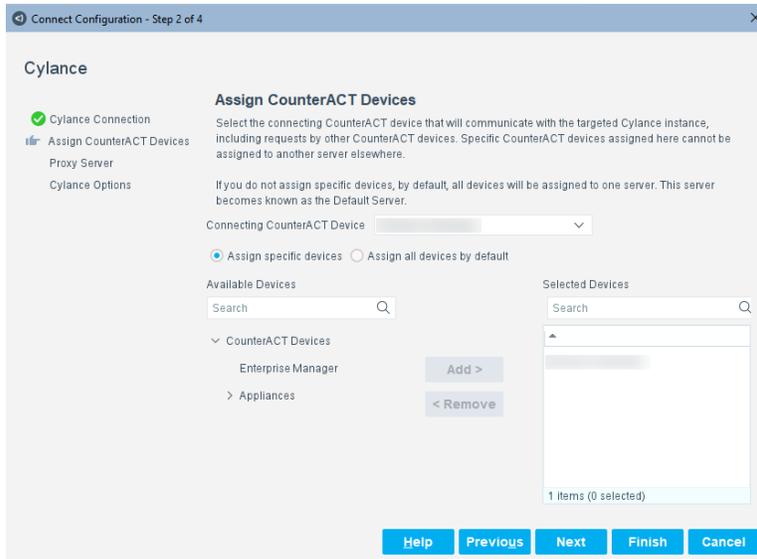
The user configuring the system description enters the information on the panel.

Select **Next** to display the next configuration panel that is defined in the system.conf file, such as, the predefined Assign CounterACT Devices panel.



At first, the Assign CounterACT Devices panel has only one option, **Assign all devices by default**, and it is selected so that one device is added.

If you want to add a second device, the Assign CounterACT Devices panel has more options.



The user configuring the system description enters the following information for the predefined fields on the panel:

- **Connecting CounterACT Device:** Select Enterprise Manager or an IP address of the connecting CounterACT device. In an environment where more than one CounterACT device is assigned to a single third-party instance, the connecting CounterACT Appliance functions as a middleman between the third-party instance and the CounterACT Appliance. The connecting CounterACT Appliance forwards all queries and requests to and from the third-party instance.

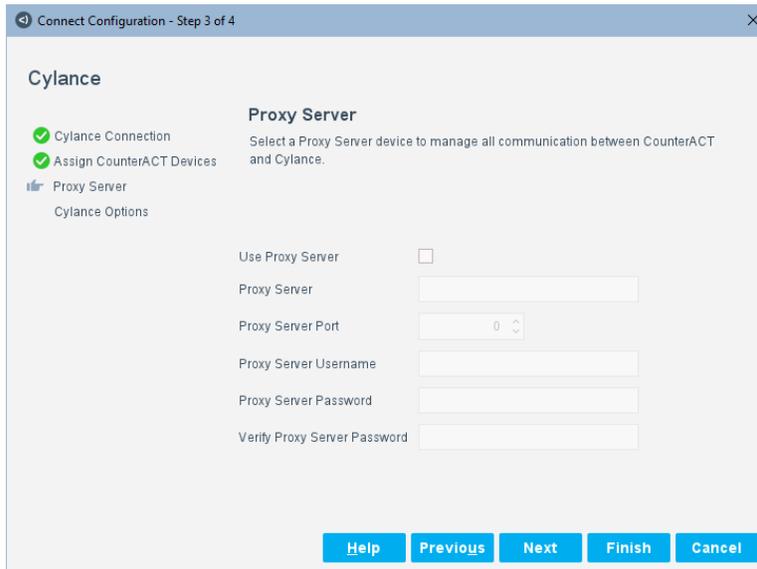
In general, it is not recommended to use the Enterprise Manager as the connecting CounterACT device. But if you must, make sure that it is not used to discover MAC-only hosts.

- **Assign specific devices:** This CounterACT Appliance is assigned to a third-party instance, but it does not communicate with it directly. All communication between the third-party instance and its assigned CounterACT Appliance is handled by the connecting CounterACT Appliance defined for the third-party instance. All the IP addresses handled by an assigned Appliance must also be handled by the third-party instance to which the Appliance is assigned.
 - Select **Available Devices** and then select an IP address or Appliance name from the Available Devices list.
 - Select **Add**. The selected device will send its requests to the third-party instance through the connecting Appliance.
- **Assign all devices by default:** This is the connecting Appliance to which CounterACT Appliances are assigned by default if they are not explicitly assigned to another connecting Appliance. Select this option to make this connecting Appliance the middleman for all CounterACT Appliances not assigned to another connecting device.

Note the following:

- An error message is displayed if you try to add a device that is already used.
- The focal appliance must be the managing appliance for overlapping IPs.
- If you have apps that discover 50,000 or more endpoints, distribute the apps in such a way so that only up to two of the apps share the same focal (connecting) appliance. An alternative is to split the endpoints across multiple user accounts on multiple servers.

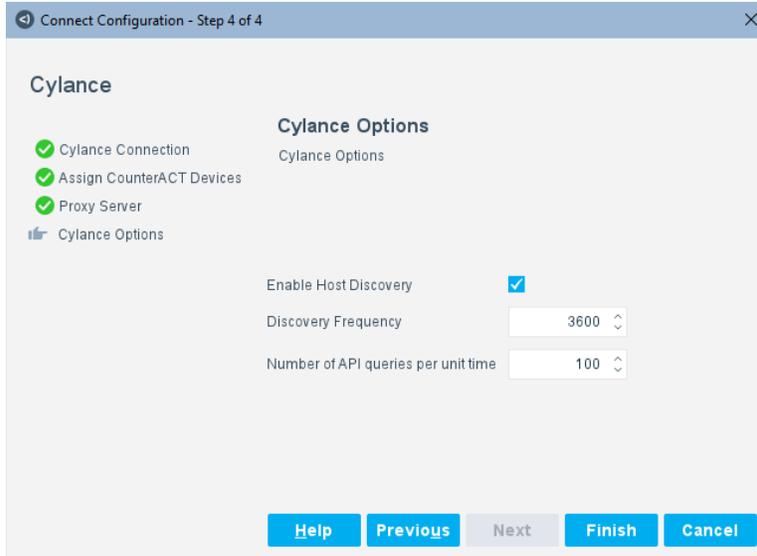
Select **Next** to display the next configuration panel that is defined in the system.conf file, such as, the predefined Proxy Server panel.



The user configuring the system description enters the following information for the predefined fields on the panel:

- **Use Proxy Server:** Select this option if your environment routes Internet communications through proxy servers.
- **Proxy Server:** Enter the Fully Qualified Domain Name (FQDN) of the proxy server or the IPv4 address.
- **Proxy Server Port:** Select the port number of the proxy server.
- **Proxy Server Username:** Enter the administrator username used to access the proxy server.
- **Proxy Server Password:** Enter the administrator password used to access the proxy server.
- **Verify Password:** Re-enter the administrator password to verify it.

Select **Next** to display the next configuration panel that is defined in the system.conf file, such as, the Cylance Options panel.

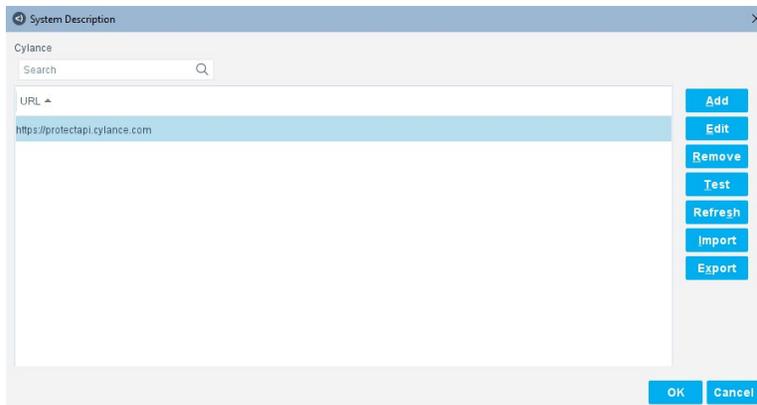


The user configuring the system description enters the following information for the predefined fields on the panel:

- **Enable Host Discovery:** Select the checkbox to enable or disable the **Discovery Frequency** field.
- **Discovery Frequency:** Select a value for the host discovery field. See ["host discovery" Field](#).
- **Number of API queries per unit time:** Select a value for the rate limiter field. See ["rate limiter" Field](#).

Select **Finish** after the last panel.

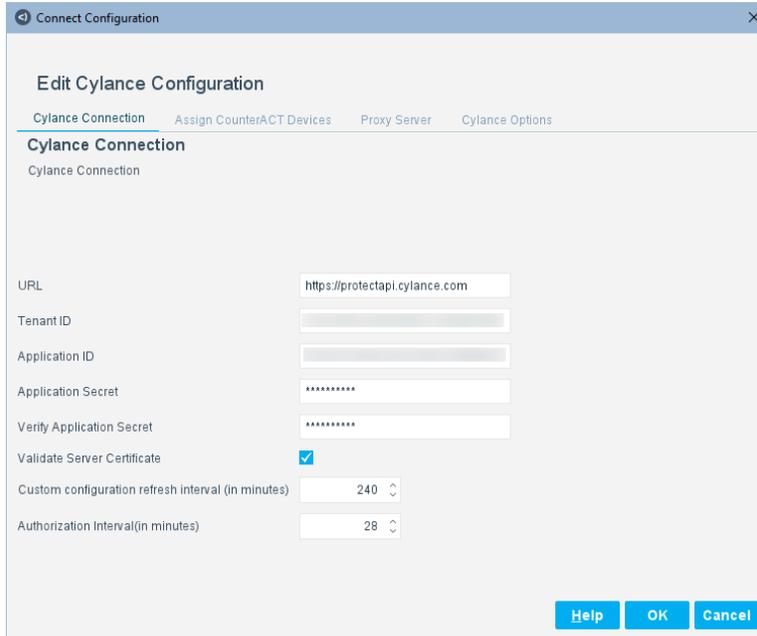
The configured system description is displayed in the **System Description** dialog box.



You can create multiple system descriptions. To add another system description, select **Add** and repeat [Add a System Description](#).

Edit a System Description

Select an existing system description in the **System Description** dialog box and select **Edit** to open it. There are tabs for each panel.



Select **OK** to close the dialog box.

Remove a System Description

Select an existing system description in the **System Description** dialog box and select **Remove** to remove it. A confirmation is displayed.



Select **More** for details or select **Ok**.

Scenarios for Remove

The following table describes different scenarios for removing a system description:

Description	Result
The system description being removed has the connecting appliance as the default appliance.	If there is only one system description and it is the default, the remove is allowed.
	If there are two system descriptions, the remove is allowed and the connecting appliance is assigned as the default appliance.
	If there are more than two system descriptions, the remove is not allowed. You must select a new default before removing the system description.

Test a System Description (Optional)

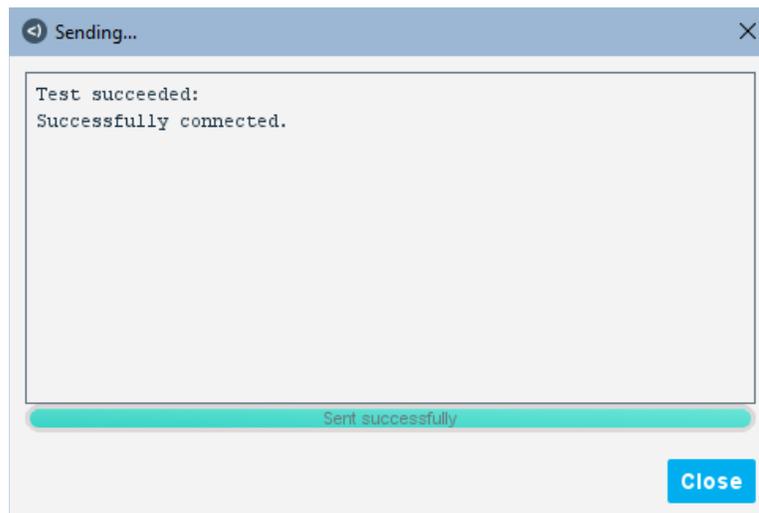
To display a **Test** button in the System Description dialog box, you must have the following defined in the system.conf file:

```
"testEnable": true,
```

Select a system description and select **Test** to call a Python script, for example, to test the connectivity of an app. The app must be in the Running state.

Also, the app must be saved before selecting **Test**. Select **OK** in the **System Description** dialog box and then select **Apply** in the **Connect** pane to save the system description configuration.

When you select **Test**, the Sending dialog box opens.



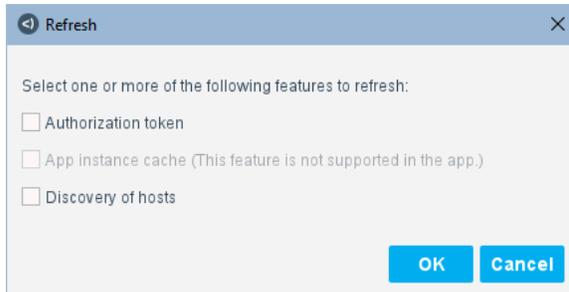
If the connectivity of the system description has been tested successfully, a success message is displayed.

If the test failed, a failure message is displayed with a reason, such as:

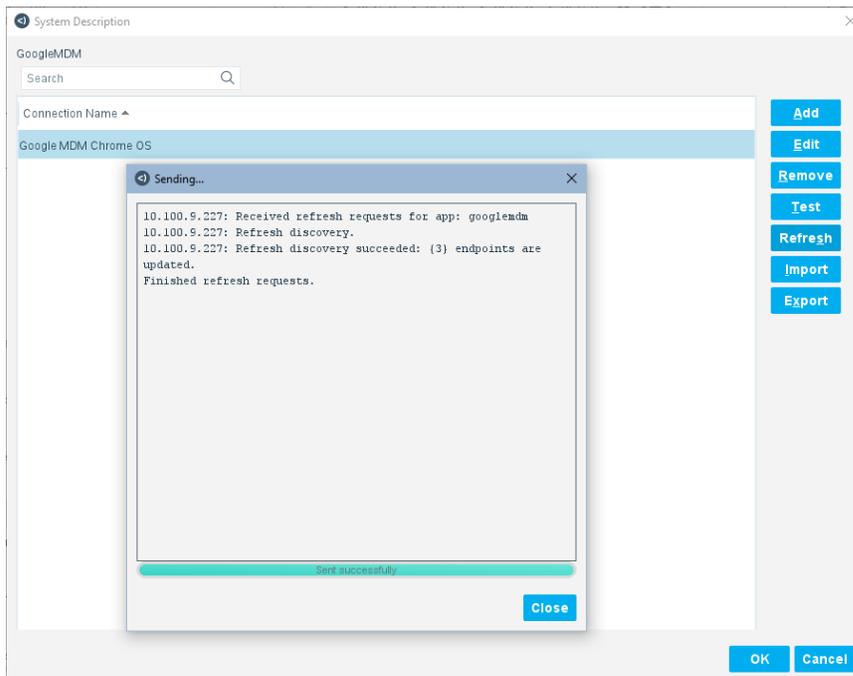
- the app is not in Running status
- the script was unable to obtain the JSON authorization token

Refresh App Features

Select a system description in the **System Description** dialog box and select **Refresh** to refresh selected app features.



Select one or more app features to refresh and then select **OK**. For example, select Discovery of hosts to manually refresh host discovery.



Depending on the app, up to three features can be selected to be refreshed:

- Authorization token
- App instance cache
- Discovery of hosts

If a feature is not supported by the app, the Refresh dialog box will show the following text: (This feature is not supported in the app.)

If a feature is not enabled in the configuration of the app, the Refresh dialog box will show the following text: (This feature is not enabled in the configuration.)

If none of the features are supported by the app, the **Refresh** button is not enabled in the **System Description** dialog box.

If your app has all three features and you select all of them to refresh, the refresh occurs in the order listed above. Discovery of hosts is the last feature to refresh as it may take the most time. If you frequently refresh, the results of one refresh may not have completed before the next refresh is triggered.

Use the **Refresh** button to do a manual refresh separate from any schedule, such as a scheduled refresh of an authorization token or polling for host discovery. After a manual refresh, the timer is reset, so the next scheduled refresh will be postponed to the next refresh interval. For example, when polling is scheduled for every four hours and the next scheduled discovery is expected to be at 8:00 AM, if there is a manual refresh two hours before at 6:00 AM, the next poll will occur four hours later, at 10:00 AM.

 *A manual refresh of app instance cache does not impact its schedule.*

To enable Authorization token, you must have the following defined in the system.conf file for the app:

```
"authorization": true,
```

To enable App instance cache, you must have the following defined in the system.conf file for the app:

```
"app_instance_cache": true,
```

To enable Discovery of hosts, you must have the following defined in the system.conf file for the app:

```
"host_discovery": true,
```

In addition, for Discovery of hosts, the Enable Host Discovery checkbox must be selected when the system description for the app is configured.

For details, see:

- ["authorization" Field](#)
- ["app instance cache" Field](#)
- ["host discovery" Field](#)

Import a System Description

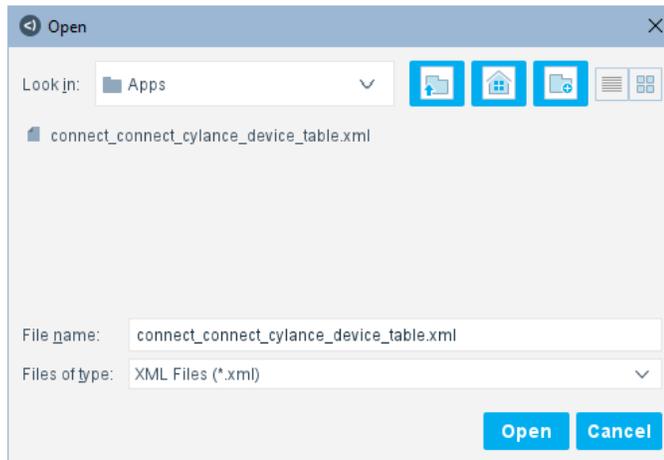
Select **Import** to import a saved backup of the configuration. The only supported format is .xml.

To import a system description:

1. Select **Import**.



2. To change the folder location, select **Browse**.



3. Select **Open**.
4. Select **OK** in the **Import** dialog box.
 - a. If the device to be imported contains encrypted fields for passwords, the **Import/Export Password** dialog box opens and prompts you to enter a password with which to encrypt the data.

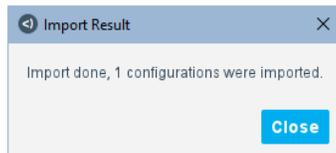


- b. Enter the password that you used when you exported the configuration and select **OK**. See [Export a System Description](#).
5. If the system description already exists, you have the option to **Skip**, **Duplicate**, or **Overwrite** it.



The **Duplicate** button is inactive if there is an "identifier" field set to true in the system.conf file. This is because only one "identifier" is allowed in a system.conf file and creating a duplicate would result in two. If you want to duplicate a system description, you can delete the "identifier" or set the value to false in the system.conf file.

6. The result of the import is displayed.



7. Select **Close**.

Scenarios for Import

The following table describes different scenarios for importing a system description:

Description	Result
The imported system description is the first configuration of this app.	The import is allowed and the imported focal appliance is set as the default.
The imported system description will overwrite the default appliance because the user selected Overwrite during the import.	The import is allowed and the imported focal appliance is set to the default.
The imported system description has the default appliance assigned, the default is correct, and is not a duplicate appliance.	If no system description has been configured yet, the import is allowed.
	If more than one system description is configured, the import is allowed and the imported focal appliance is switched to a specific appliance.
The imported system description has the default appliance assigned, but the default appliance is not found. For example, the system description might have originated elsewhere.	If no system description has been configured yet, the import is allowed and the Enterprise Manager is set as the default appliance. A warning message is displayed.
	If more than one system description is configured and if all other appliances have been assigned to other devices, the import is not allowed.
	If more than one system description is configured and if an appliance is available, one is selected at random.

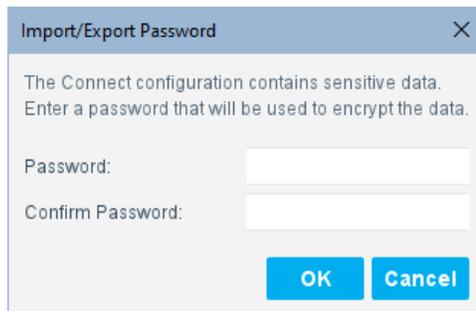
Description	Result
The imported system description has one or more specific appliances assigned, but the appliances are not found. For example, the system description might have originated elsewhere.	If all the specific appliances are not found and if all other appliances have been assigned to other system descriptions, the import is not allowed.
	If all the specific appliances are not found and an appliance is available, one is selected at random.
	If some of the specific appliances are found, the import of the correct specific appliances is allowed.
	If some of the specific appliances are found and if all other appliances have been assigned to other system descriptions, the import is not allowed.

Export a System Description

Select **Export** to save a backup of the configuration. The only supported format is .xml.

To export a system description:

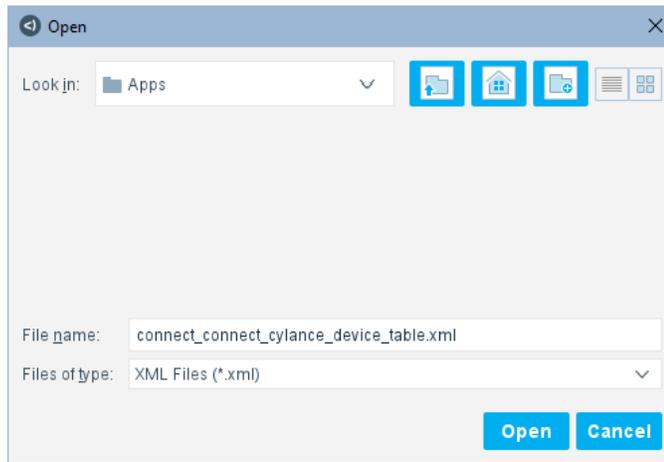
1. Select **Export**.
 - a. If the devices contain encrypted fields for passwords, the **Import/Export Password** dialog box opens and prompts you to enter a password with which to encrypt the data.



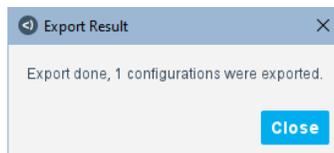
- b. Enter the password.
2. The **Export Table** dialog box opens. You can select to export the **Selected rows only**.



3. To change the folder location, select **Browse**.



4. Select **Open**.
5. Select **OK** in the **Export Table** dialog box.



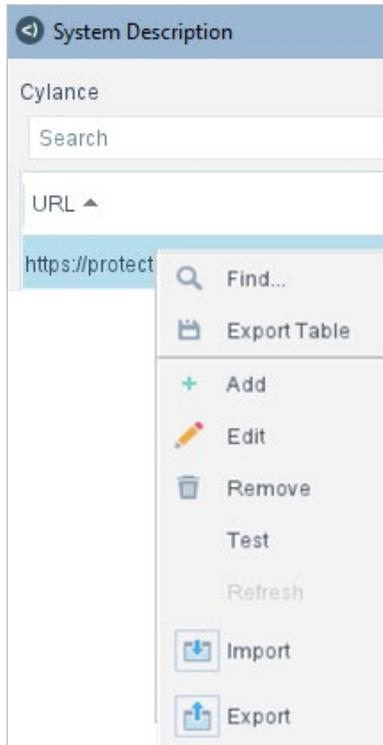
6. Select **Close**.

 *There is no Export for an app.*

Menu in System Description Dialog Box

There is a menu available when you right-click an existing system description in the **System Description** dialog box.

For **Add**, **Edit**, **Remove**, **Test**, **Refresh**, **Import**, and **Export**, see [Buttons in System Description Dialog Box](#).



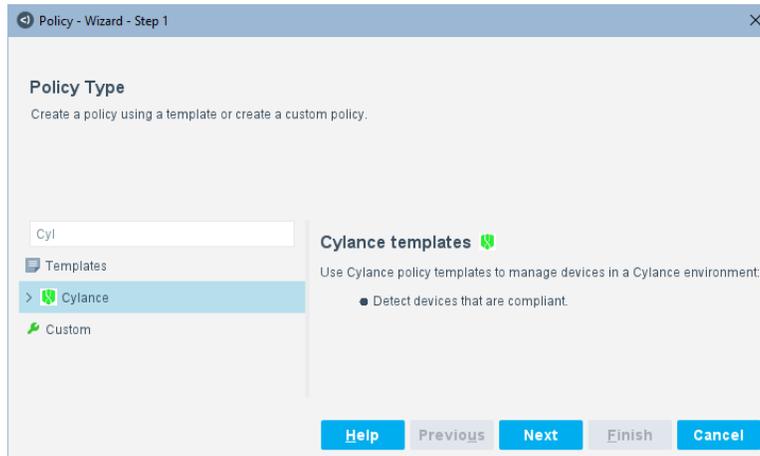
For **Find** and **Export Table**, see [Find Dialog Box](#) and [Export Table Dialog Box](#). They work the same as in the **Connect** pane.

Configure Policy Templates in Connect

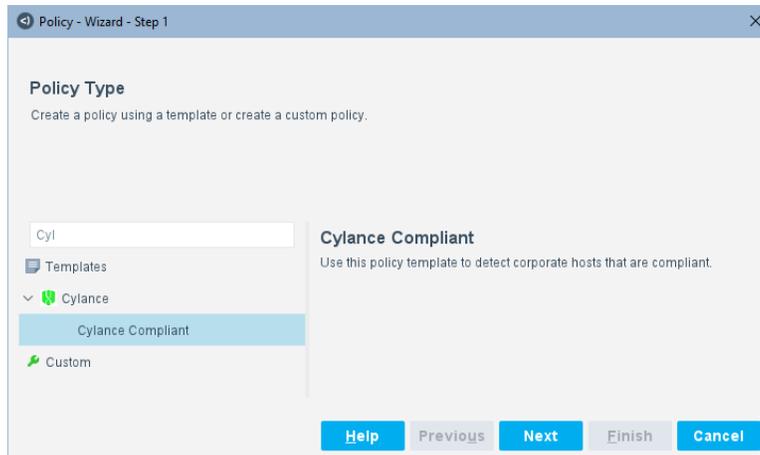
Policies can be configured from a policy template.

To configure a policy template:

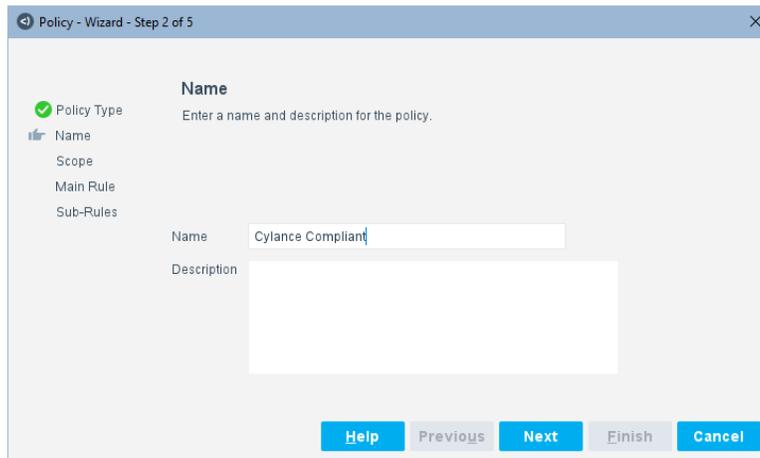
1. In the Forescout Console, select **Policy**.
2. Select **Add** and search for the app name.



3. Expand the folder and select a policy template.

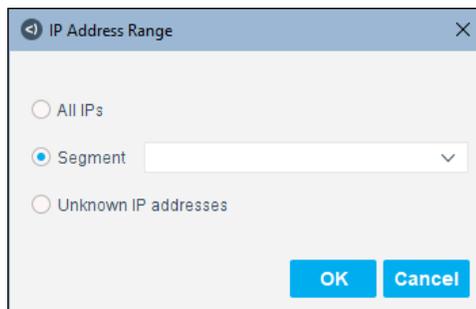


4. Select **Next**.



The screenshot shows a dialog box titled "Policy - Wizard - Step 2 of 5". On the left, a vertical list of steps is shown: "Policy Type" (checked with a green circle), "Name" (selected with a blue bar), "Scope", "Main Rule", and "Sub-Rules". The main area is titled "Name" and contains the instruction "Enter a name and description for the policy." Below this, there are two input fields: "Name" with the text "Cylance Compliant" and "Description" which is empty. At the bottom, there are five buttons: "Help", "Previous", "Next" (highlighted in blue), "Finish", and "Cancel".

5. Enter a name for the policy. Optionally, enter a description.
6. Select **Next**. Both the IP Address Range dialog box and the Scope pane open.
7. Use the IP Address Range dialog box to define which endpoints are inspected.

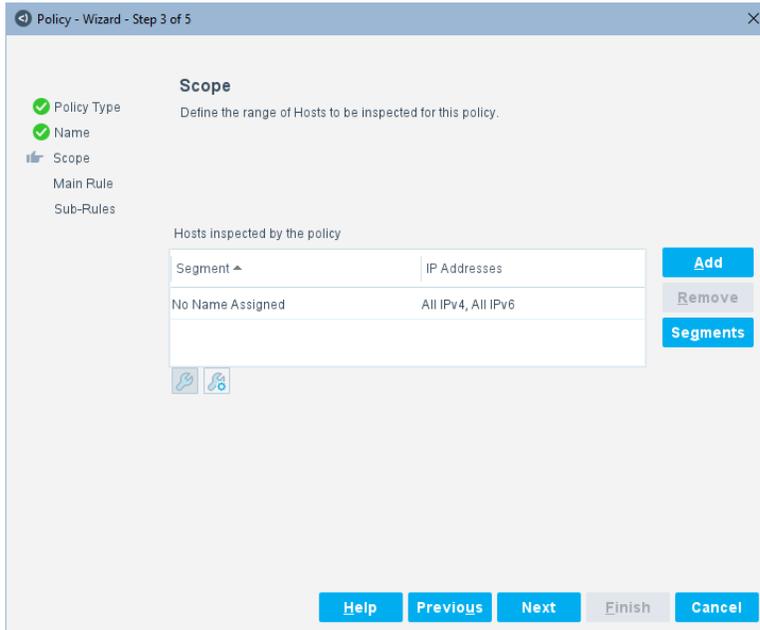


The screenshot shows a dialog box titled "IP Address Range". It has three radio button options: "All IPs", "Segment" (which is selected), and "Unknown IP addresses". The "Segment" option has a dropdown menu next to it. At the bottom, there are two buttons: "OK" and "Cancel".

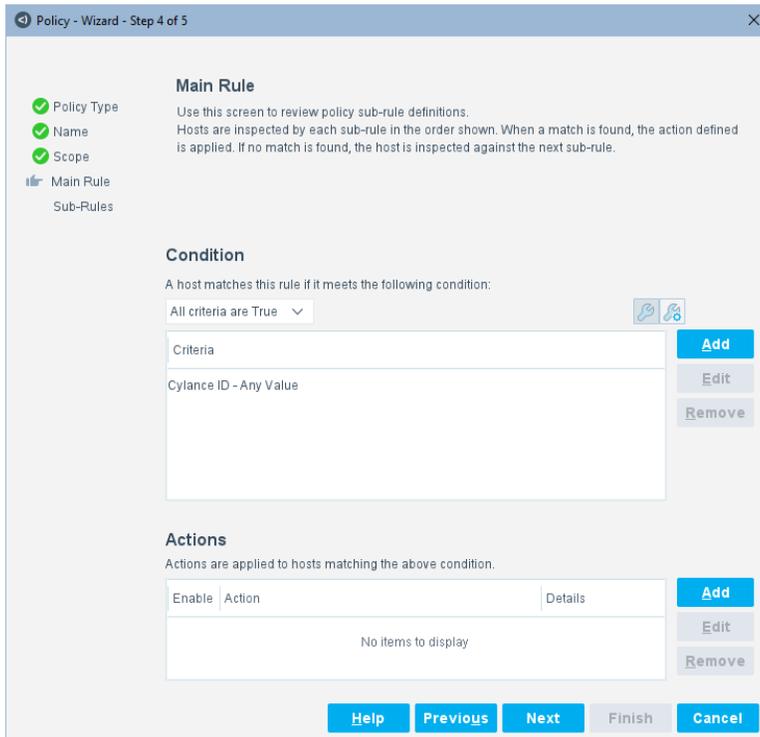
The following options are available:

- a. **All IPs**: Include all IP addresses in the Internal Network.
- b. **Segment**: Select a previously defined segment of the network. To specify multiple segments, select **OK** or **Cancel** to close this dialog box, and select **Segments** from the Scope pane.
- c. **Unknown IP addresses**: Apply the policy to endpoints whose IP addresses are not known. Endpoint detection is based on the endpoint MAC address.

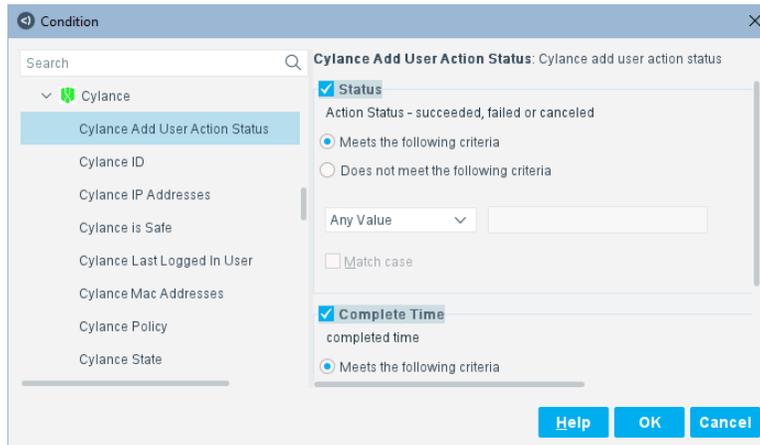
8. Select **OK**. The added range is listed in the Scope pane.



9. Select **Next**.

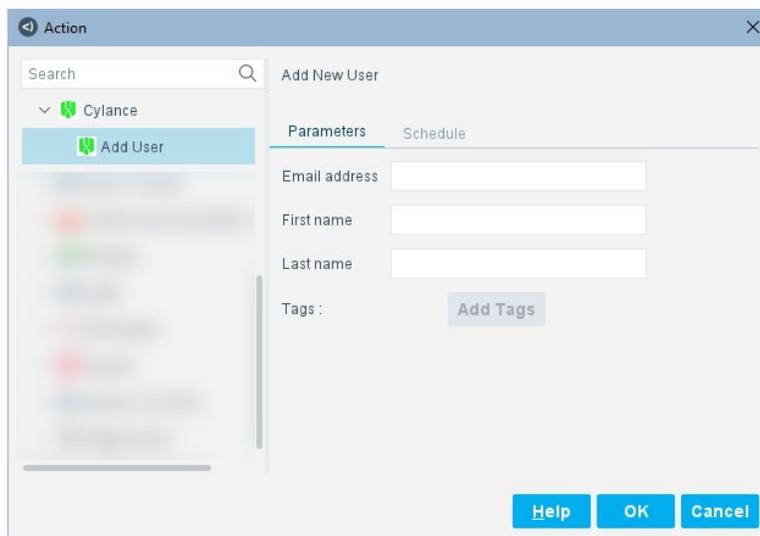


- 10.** To add a condition, select **Add** in the Condition section and search for the app name to see the properties associated with that app.



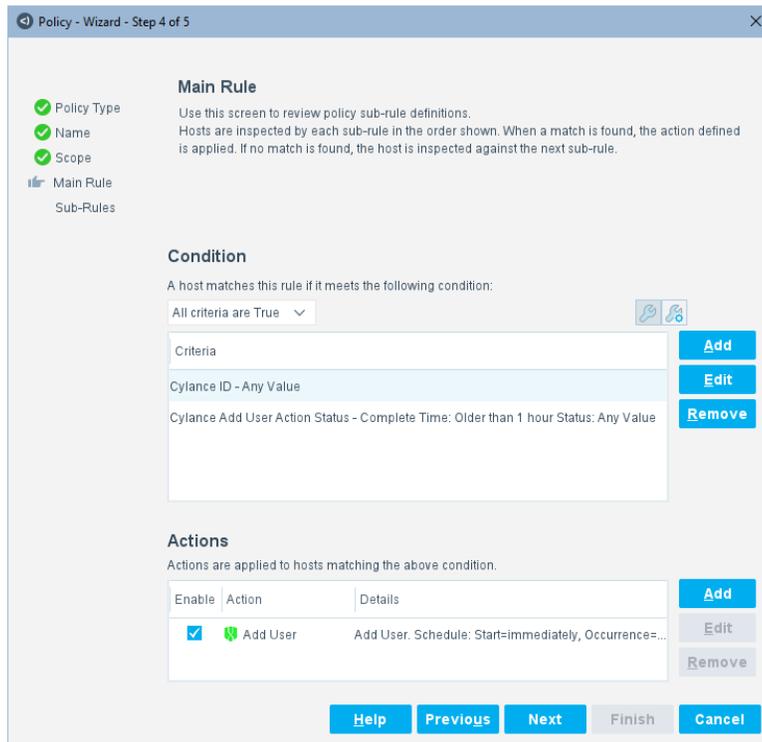
- 11.** Configure conditions for the policy and then select **OK**.

- 12.** To add an action, select **Add** in the Actions section and search for the app name to see the actions associated with that app.

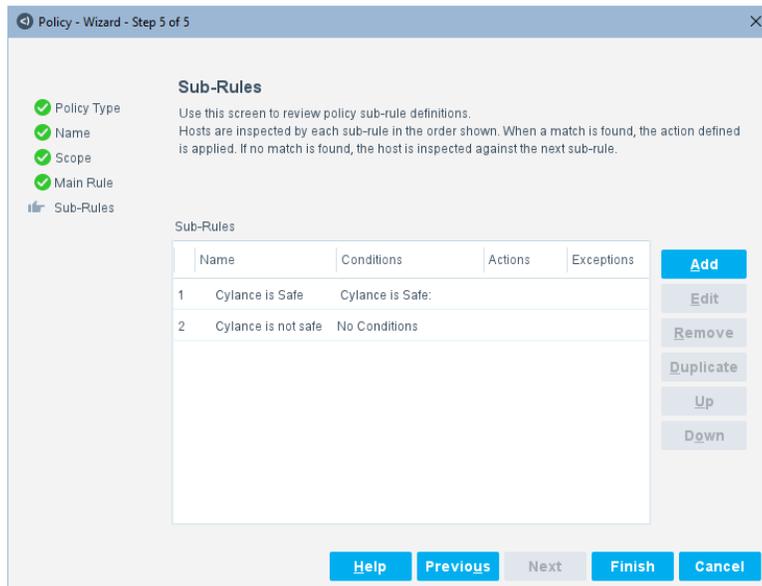


- 13.** Configure actions for the policy and then select **OK**.

14.The configured conditions and actions are displayed in the Main Rule.



15.To configure sub-rules, select **Next**.



16.To add a sub-rule, select **Add** and give the sub-rule a name.

17.Configure conditions and actions for the sub-rule and select **OK**.

18.Select **Finish**. The configured policy is displayed in the Policy Manager.

Name	Category	Status	User Scope	Segments	Groups	Exceptions	Conditions	Actions
▼ Cylance Compliant	None	Complete	All IPv4,All IPv6				Cylance ID: Any Value AND Cylance A...	[Add] [Edit] [Categorize] [Remove] [Duplicate]
Cylance is Safe							Cylance is Safe:	
Cylance is not safe							No Conditions	

Appendix A: Sample Connect Files

The following sample files are available:

- [Sample system.conf File](#)
- [Sample property.conf File](#)
- [Sample Policy Template .xml File for Connect](#)
- [Sample Connect Script Files](#)

Sample system.conf File

```
{
  "name": "Cylance",
  "version": "1.0.0",
  "author": "Concert Masters",
  "testEnable": true,
  "web service": true,
  "panels": [
    {
      "title": "Cylance Connection",
      "description": "Cylance Connection",
      "fields": [
        {
          "display": "URL",
          "field ID": "connect_cylance_url",
          "type": "shortString",
          "mandatory": "true",
          "add to column": "true",
          "show column": "true",
          "identifier": "true",
          "tooltip": "URL"
        },
        {
          "display": "Tenant ID",
          "field ID": "connect_cylance_tenant_id",
          "type": "shortString",
          "mandatory": "true",
          "add to column": "true",
          "show column": "false",
```

```

        "tooltip": "Tenant ID"
      },
    {
      "display": "Application ID",
      "field ID": "connect_cylance_application_id",
      "type": "shortString",
      "mandatory": "true",
      "add to column": "true",
      "show column": "false",
      "tooltip": "Application ID"
    },
    {
      "display": "Application Secret",
      "field ID": "connect_cylance_application_secret",
      "type": "encrypted",
      "mandatory": "true",
      "tooltip": "Application Secret"
    },
    {
      "certification validation": true
    },
    {
      "app_instance_cache": true,
      "display": "Custom configuration refresh interval (in
minutes)",
      "min": 5,
      "max": 2400,
      "value": 240
    },
    {
      "authorization": true,
      "display": "Authorization Interval(in minutes)",
      "min": 1,
      "max": 100,
      "value": 28
    }
  ]
},
{

```

```

        "focal appliance":true,
        "title":"Assign CounterACT Devices",
        "description":"<html>Select the connecting CounterACT device that
will communicate with the targeted Cylance instance, including requests by
other CounterACT devices. Specific CounterACT devices assigned here cannot
be assigned to another server elsewhere.<br><br>If you do not assign
specific devices, by default, all devices will be assigned to one server.
This server becomes known as the Default Server.</html>"
    },
    {
        "proxy server":true,
        "title":"Proxy Server",
        "description":"<html>Select a Proxy Server device to manage all
communication between CounterACT and Cylance.</html>"
    },
    {
        "title":"Cylance Options",
        "description":"Cylance Options",
        "fields": [
            {
                "host discovery": true,
                "display":"Discovery Frequency",
                "max":300000,
                "add to column":"true",
                "show column":"false",
                "value":3600
            },
            {
                "rate limiter": true,
                "display":"Number of API queries per unit time",
                "unit":1,
                "min": 1,
                "max":1000,
                "add to column":"true",
                "show column":"false",
                "value":100
            }
        ]
    }
}
]

```

```
}
```

Sample property.conf File

```
{  
  "name": "Cylance",  
  "groups": [  
    {  
      "name": "connect_cylance_cylance",  
      "label": "Cylance"  
    }  
  ],  
  "properties": [  
    {  
      "tag": "connect_cylance_state",  
      "label": "Cylance State",  
      "description": "Cylance State",  
      "type": "string",  
      "web_enable": true,  
      "options": [  
        {  
          "name": "Online",  
          "label": "Online"  
        },  
        {  
          "name": "Offline",  
          "label": "Offline"  
        }  
      ],  
      "group": "connect_cylance_cylance",  
      "resolvable": true,  
      "require_host_access": false,  
      "inventory": {  
        "enable": true,  
        "description": "Inventory of Cylance State"  
      },  
      "asset_portal": true,  
      "track_change": {  
        "enable": true,  

```

```
    "label": "Cylance State Changed",
    "description": "Track Change property for cylance state"
  },
  "dependencies": [
    {
      "name": "mac",
      "redo_new": true,
      "redo_change": true
    }
  ]
},
{
  "tag": "connect_cylance_last_logged_in_user",
  "label": "Cylance Last Logged In User",
  "description": "Cylance Last Logged In User",
  "type": "string",
  "web_enable": true,
  "group": "connect_cylance_cylance",
  "dependencies": [
    {
      "name": "mac",
      "redo_new": true,
      "redo_change": true
    }
  ]
},
{
  "tag": "connect_cylance_mac_addresses",
  "label": "Cylance Mac Addresses",
  "description": "Cylance Mac Addresses",
  "type": "string",
  "group": "connect_cylance_cylance",
  "list": true,
  "web_enable": false,
  "dependencies": [
    {
      "name": "mac",
      "redo_new": true,
```

```
        "redo_change": true
    }
]
},
{
    "tag": "connect_cylance_ip_addresses",
    "label": "Cylance IP Addresses",
    "description": "Cylance IP Addresses",
    "type": "string",
    "group": "connect_cylance_cylance",
    "list": true,
    "overwrite": true,
    "web_enable": false,
    "dependencies": [
        {
            "name": "mac",
            "redo_new": true,
            "redo_change": true
        }
    ]
},
{
    "tag": "connect_cylance_is_safe",
    "label": "Cylance is Safe",
    "description": "Cylance is Safe",
    "type": "boolean",
    "group": "connect_cylance_cylance",
    "web_enable": true,
    "dependencies": [
        {
            "name": "mac",
            "redo_new": true,
            "redo_change": true
        }
    ]
},
{
    "tag": "connect_cylance_id",
```

```
"label": "Cylance ID",
"description": "Cylance ID",
"type": "string",
"group": "connect_cylance_cylance",
"dependencies": [
  {
    "name": "mac",
    "redo_new": true,
    "redo_change": true
  }
],
},
{
  "tag": "connect_cylance_policy",
  "label": "Cylance Policy",
  "description": "Cylance Policy",
  "type": "composite",
  "group": "connect_cylance_cylance",
  "web_enable": true,
  "inventory": {
    "enable": true,
    "description": "Inventory of Cylance Policy"
  },
  "subfields": [
    {
      "tag": "id",
      "label": "ID",
      "description": "Policy ID",
      "type": "string",
      "inventory": true
    },
    {
      "tag": "name",
      "label": "Name",
      "description": "Policy Name",
      "type": "string",
      "inventory": true
    }
  ]
}
```

```
    ],
    "dependencies": [
      {
        "name": "mac",
        "redo_new": true,
        "redo_change": true
      }
    ]
  },
  {
    "tag": "connect_cylance_add_user_action",
    "label": "Cylance Add User Action Status",
    "description": "Cylance add user action status",
    "type": "composite",
    "resolvable": false,
    "group": "connect_cylance_cylance",
    "subfields": [
      {
        "tag": "status",
        "label": "Status",
        "description": "Action Status - succeeded, failed or canceled",
        "type": "string"
      },
      {
        "tag": "time",
        "label": "Complete Time",
        "description": "completed time",
        "type": "date"
      }
    ]
  },
  "dependencies": [
    {
      "name": "mac",
      "redo_new": true,
      "redo_change": true
    }
  ]
}
```

```
],
"action_groups": [
  {
    "name": "connect_cylance_cylance",
    "label": "Cylance"
  }
],
"actions": [
  {
    "name": "connect_cylance_add_user",
    "label": "Add User",
    "group": "connect_cylance_cylance",
    "description": "Add New User",
    "ip_required": false,
    "threshold_percentage": 1,
    "params": [
      {
        "name": "cylance_email",
        "label": "Email address",
        "description": "Cylance email address",
        "type": "string"
      },
      {
        "name": "cylance_first_name",
        "label": "First name",
        "description": "Cylance first name",
        "type": "string"
      },
      {
        "name": "cylance_last_name",
        "label": "Last name",
        "description": "Cylance last name",
        "type": "string"
      }
    ],
    "dependencies": [
      {
        "name": "mac",
```

```
        "redo_new": true,
        "redo_change": true
    }
],
"undo": {
    "label": "Cancel Cylance Add User",
    "description": "Remove Added User"
}
},
],
"scripts": [
    {
        "name": "cylance_resolve.py",
        "properties": [
            "connect_cylance_state",
            "connect_cylance_last_logged_in_user",
            "connect_cylance_mac_addresses",
            "connect_cylance_is_safe",
            "connect_cylance_id"
        ]
    },
    {
        "name": "cylance_add_user.py",
        "actions": [
            "connect_cylance_add_user"
        ]
    },
    {
        "name": "cylance_delete_user.py",
        "is_cancel": true,
        "actions": [
            "connect_cylance_add_user"
        ]
    },
    {
        "name": "cylance_test.py",
        "test": true
    },
],
```

```

    {
      "name": "cylance_poll.py",
      "discovery": true
    },
    {
      "name": "cylance_authorization.py",
      "authorization": true
    },
    {
      "name": "cylance_users.py",
      "app_instance_cache": true
    }
  ],
  "policy_template": {
    "policy_template_group": {
      "name": "connect_cylance",
      "label": "Cylance",
      "display": "Cylance",
      "description": "Cylance templates",
      "full_description": "<html>Use Cylance policy templates to manage devices in a Cylance environment:<ul><li>Detect devices that are compliant.</li></ul></html>",
      "title_image": "connect_cylance.png"
    },
    "policies": [
      {
        "name": "connect_cylance_compliant",
        "label": "Cylance Compliant",
        "display": "Cylance Compliant",
        "help": "Cylance Compliant Policy",
        "description": "Creates Cylance compliant policies",
        "file_name": "CylanceCompliance.xml",
        "full_description": "<html>Use this policy template to detect corporate hosts that are compliant.</html>",
        "title_image": "connect_cylance.png"
      }
    ]
  }
}

```

Sample Policy Template .xml File for Connect

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<RULES>
  <RULE APP_VERSION="8.2.0-260" CACHE_TTL="259200"
  CACHE_TTL_SYNCED="true" CLASSIFICATION="REG_STATUS" DESCRIPTION=""
  ENABLED="true" ID="-62618880823091844" NAME="Cylance Compliance"
  NOT_COND_UPDATE="true" UPGRADE_PERFORMED="true">
    <GROUP_IN_FILTER/>
    <INACTIVITY_TTL TTL="0" USE_DEFAULT="true"/>
    <ADMISSION_RESOLVE_DELAY TTL="0" USE_DEFAULT="true"/>
    <MATCH_TIMING RATE="28800" SKIP_INACTIVE="true">
      <ADMISSION ALL="true"/>
    </MATCH_TIMING>
    <EXPRESSION EXPR_TYPE="SIMPLE">
      <!--Rule expression. Rule name is: Cylance Compliance-->
      <CONDITION EMPTY_LIST_VALUE="false"
      FIELD_NAME="connect_cylance_id" LABEL="Cylance ID" LEFT_PARENTHESIS="0"
      LOGIC="AND" PLUGIN_NAME="Integration connect" PLUGIN_UNIQUE_NAME="connect"
      PLUGIN_VESRION="1.0.0" PLUGIN_VESRION_NUMBER="24"
      RET_VALUE_ON_UNKNOWN="IRRESOLVED" RIGHT_PARENTHESIS="0">
        <FILTER CASE_SENSITIVE="false" FILTER_ID="-
        7121200522400372370" TYPE="any">
          <VALUE VALUE2="Any"/>
        </FILTER>
      </CONDITION>
    </EXPRESSION>
    <EXCEPTION NAME="ip" UNKNOWN_EVAL="UNMATCH"/>
    <EXCEPTION NAME="mac" UNKNOWN_EVAL="UNMATCH"/>
    <EXCEPTION NAME="nbthost" UNKNOWN_EVAL="UNMATCH"/>
    <EXCEPTION NAME="user" UNKNOWN_EVAL="UNMATCH"/>
    <EXCEPTION NAME="group" UNKNOWN_EVAL="UNMATCH"/>
    <ORIGIN NAME="CUSTOM"/>
    <UNMATCH_TIMING RATE="28800" SKIP_INACTIVE="true">
      <ADMISSION ALL="true"/>
    </UNMATCH_TIMING>
    <SEGMENT ID="-8382841726644142831" NAME="CALAB-network-vlan4">
      <RANGE FROM="10.100.4.0" TO="10.100.4.255"/>
    </SEGMENT>
  </RULE_CHAIN>
  <INNER_RULE APP_VERSION="8.2.0-260" CACHE_TTL="259200"
  CACHE_TTL_SYNCED="true" CLASSIFICATION="REG_STATUS" DESCRIPTION=""
```

```

ID="1521177796609562553" NAME="Cylance is Safe" NOT_COND_UPDATE="true"
RECHECK_MAIN_RULE_DEF="true">
    <MATCH_TIMING RATE="28800" SKIP_INACTIVE="true">
        <ADMISSION ALL="true"/>
    </MATCH_TIMING>
    <EXPRESSION EXPR_TYPE="SIMPLE">
        <!--Rule expression. Rule name is: Cylance is Safe-->
        <CONDITION EMPTY_LIST_VALUE="false"
FIELD_NAME="connect_cylance_is_safe" LABEL="Cylance is Safe"
LEFT_PARENTHESIS="0" LOGIC="AND" PLUGIN_NAME="Integration connect"
PLUGIN_UNIQUE_NAME="connect" PLUGIN_VESRION="1.0.0"
PLUGIN_VESRION_NUMBER="24" RET_VALUE_ON_UNKNOWN="UNMATCH"
RIGHT_PARENTHESIS="0">
            <FILTER FILTER_ID="-7261535076996746710"
VALUE="true"/>
        </CONDITION>
    </EXPRESSION>
</INNER_RULE>
    <INNER_RULE APP_VERSION="8.2.0-260" CACHE_TTL="259200"
CACHE_TTL_SYNCED="true" CLASSIFICATION="REG_STATUS" DESCRIPTION=""
ID="2234868120810677044" NAME="Cylance is not safe" NOT_COND_UPDATE="true"
RECHECK_MAIN_RULE_DEF="true">
        <MATCH_TIMING RATE="28800" SKIP_INACTIVE="true">
            <ADMISSION ALL="true"/>
        </MATCH_TIMING>
    </INNER_RULE>
</RULE_CHAIN>
<REPORT_TABLES/>
</RULE>
</RULES>

```

Sample Connect Script Files

The following sample Python scripts, with commenting, are available:

- [Sample Test Script for Connect](#)
- [Sample Polling Script for Connect](#)
- [Sample Resolve Script for Connect](#)
- [Sample App Instance Cache Script for Connect](#)
- [Sample Add a User Action Script for Connect](#)
- [Sample Delete a User Action Script for Connect](#)
- [Sample Authorization Script for Connect](#)

Sample Test Script for Connect

```
import jwt # PyJWT version 1.6.1 as of the time of authoring
import uuid
import json
import urllib.request
import time
from time import gmtime, strftime, sleep
from datetime import datetime, timedelta

# CONFIGURATION
# All server configuration fields will be available in the 'params'
dictionary.
jwt_token = params["connect_authorization_token"] # auth token

response = {}
# Like the action response, the response object must have a "succeeded"
field to denote success. It can also optionally have
# a "result_msg" field to display a custom test result message.
if "connect_authorization_token" in params and
params["connect_authorization_token"] != "":
    response["succeeded"] = True
    response["result_msg"] = "Successfully connected."
else:
    response["succeeded"] = False
    response["result_msg"] = "Could not connect to Cylance server."
```

Sample Polling Script for Connect

```
import jwt # PyJWT version 1.6.1 as of the time of authoring
import uuid
import time
from time import gmtime, strftime, sleep
from datetime import datetime, timedelta

# Mapping between Cylance API response fields to CounterACT properties
cylance_to_ct_props_map = {
    "state": "connect_cylance_state",
    "mac_addresses": "connect_cylance_mac_addresses",
    "id": "connect_cylance_id"
}

# CONFIGURATION
url = params["connect_cylance_url"] # Server URL

response = {}
endpoints=[]

# Check if we have valid auth token or not before processing.
if "connect_authorization_token" in params and
params["connect_authorization_token"] != "":
    # ***** PART 2 - QUERY FOR DEVICES ***** #
    jwt_token = params["connect_authorization_token"]
    GETMAC_URL = url + "/devices/v2/"
    device_headers = {"Content-Type": "application/json; charset=utf-8",
"Authorization": "Bearer " + str(jwt_token)}

    # Get MAC data
    request = urllib.request.Request(GETMAC_URL, headers=device_headers)
    try:
        r = urllib.request.urlopen(request, context=ssl_context)
        request_response = json.loads(r.read())

        # For polling, the response dictionary must contain a list
        called "endpoints", which will contain new endpoint information. Each
        endpoint
        # must have a field named either "mac" or "ip". The endpoint
        object/dictionary may also have a "properties" field, which contains
        property information in the format
```

```

        # {"propert_name": "property_value"}. The full response object,
for example would be:
        # {"endpoints":
        #   [
        #     {"mac": "001122334455",
        #      "properties":
        #        {"property1": "property_value", "property2":
"property_value2"}
        #     }
        #   ]
        #}
for endpoint_data in request_response["page_items"]:
    endpoint = {}
    mac_with_dash = endpoint_data["mac_addresses"][0]
    mac = "".join(mac_with_dash.split("-"))
    endpoint["mac"] = mac
    properties = {}
    for key, value in endpoint_data.items():
        if key in cylance_to_ct_props_map and key is not
"mac_addresses":
            properties[cylance_to_ct_props_map[key]] =
value

            endpoint["properties"] = properties
            endpoints.append(endpoint)
    response["endpoints"] = endpoints
except:
    response["error"] = "Could not retrieve endpoints."
else:
    response["error"] = "Unauthorized"

```

Sample Resolve Script for Connect

```

import jwt # PyJWT version 1.6.1 as of the time of authoring
import uuid
import time

from time import gmtime, strftime, sleep
from datetime import datetime, timedelta

# Mapping between Cylance API response fields to CounterACT properties
cylance_to_ct_props_map = {

```

```

    "state": "connect_cylance_state",
    "last_logged_in_user": "connect_cylance_last_logged_in_user",
    "mac_addresses": "connect_cylance_mac_addresses",
    "is_safe": "connect_cylance_is_safe",
    "id": "connect_cylance_id"
}

# CONFIGURATION
# All server configuration fields will be available in the 'params'
dictionary.
url = params["connect_cylance_url"] # Server URL

response = {}
# Check if we have valid auth token or not before processing.
if "connect_authorization_token" in params and
params["connect_authorization_token"] != "":
    # For properties and actions defined in the 'property.conf' file,
CounterACT properties can be added as dependencies. These values will be
    # found in the params dictionary if CounterACT was able to resolve
the properties. If not, they will not be found in the params dictionary.
    jwt_token = params["connect_authorization_token"]
    if "mac" in params:
        mac = '-'.join(params["mac"][i:i+2] for i in range(0,12,2))
        GETMAC_URL = url + "/devices/v2/macaddress/" + mac
        device_headers = {"Content-Type": "application/json;
charset=utf-8", "Authorization": "Bearer " + str(jwt_token)}

        # Get MAC data
        request = urllib.request.Request(GETMAC_URL,
headers=device_headers)
        try:
            r = urllib.request.urlopen(request, context=ssl_context)
            request_response = json.loads(r.read())

            # All responses from scripts must contain the JSON
object 'response'. Host property resolve scripts will need to populate a
            # 'properties' JSON object within the JSON object
'response'. The 'properties' object will be a key, value mapping between
the
            # CounterACT property name and the value of the
property.

            properties = {}

```

```

        if request_response:
            return_values = request_response[0]
            for key, value in return_values.items():
                if key in cylance_to_ct_props_map:

properties[cylance_to_ct_props_map[key]] = value

            response["properties"] = properties
        except Exception as e:
            response["error"] = "Could not resolve properties:
{}".format(str(e))
        else:
            response["error"] = "No mac address to query the endpoint for."
    else:
        response["error"] = "Unauthorized"

```

Sample App Instance Cache Script for Connect

```

import jwt # PyJWT version 1.6.1 as of the time of authoring
import uuid
import time
from time import gmtime, strftime, sleep
from datetime import datetime, timedelta
from urllib.request import HTTPError, URLError

# CONFIGURATION
url = params["connect_cylance_url"] # Server URL

response = {}
# Check if we have valid auth token or not before processing.
if "connect_authorization_token" in params and
params["connect_authorization_token"] != "":
    # ***** PART 2 - QUERY FOR USERS ***** #
    jwt_token = params["connect_authorization_token"]
    try:
        GETUSERS_URL = url + "/users/v2/"
        device_headers = {"Content-Type": "application/json; charset=utf-
8", "Authorization": "Bearer " + str(jwt_token)}

        # Get users to save as app instance cache

```

```
    request = urllib.request.Request(GETUSERS_URL,
headers=device_headers)

    r = urllib.request.urlopen(request, context=ssl_context)
    request_response = json.loads(r.read())
    response_obj = {}
    for user_data in request_response["page_items"]:
        user = {}
        email = user_data["email"]
        user["id"] = user_data["id"];
        user["first_name"] = user_data["first_name"]
        user["last_name"] = user_data["last_name"]
        response_obj[email] = user

    # For app instance cache, use the 'connect_app_instance_cache' to
    be the response key.

    # The value needs to be a string. It can be a json string
    containing different fields or any other format,

    # depending on how you want to use the data in other scripts.
    response["connect_app_instance_cache"] = json.dumps(response_obj)
    logging.debug("response: {}".format(response))

except HTTPError as e:
    response["error"] = "Could not connect to Cylance. Response code:
{}".format(e.code)

except URLError as e:
    response["error"] = "Could not connect to Cylance.
{}".format(e.reason)

except Exception as e:
    response["error"] = "Could not connect to Cylance.
{}".format(str(e))

else:
    # In the response, put 'error' to indicate the error message.
    # 'connect_app_instance_cache' is optional when it has error.
    # if connect_app_instance_cache is in the response object, it will
    overwrite previous cache value.

    # Otherwise, the previous cache value will remain the same.
    response["connect_app_instance_cache"] = "{}"
    response["error"] = "No authorization token found"
```

Sample Add a User Action Script for Connect

```
import jwt # PyJWT version 1.6.1 as of the time of authoring
import uuid
import time

from time import gmtime, strftime, sleep
from datetime import datetime, timedelta
from urllib.request import HTTPError, URLError

# CONFIGURATION

# All server configuration fields will be available in the 'params'
dictionary.

url = params["connect_cylance_url"] # Server URL

response = {}
properties = {}
action_status = {}

# Check if we have valid auth token or not before processing.
if "connect_authorization_token" in params and
params["connect_authorization_token"] != "":
    # ***** Execute add user action ***** #
    jwt_token = params["connect_authorization_token"]
    # connect_app_instance_cache data is available when you enable
app_instance_cache feature in system.conf
    # the data is available in the 'params' dictionary.
    # In this example, we are getting the existing users.
    user_list = params.get("connect_app_instance_cache")
    user_email = params["cylance_email"]
    if user_list is not None and user_email in user_list:
        # return action failed if user already exists
        logging.debug("User {} already exists. ".format(user_email))
        response["succeeded"] = False
        response["troubleshooting"] = "User already exists."
        action_status["status"] = "Failed. User already exists."
        action_status["time"] = int(time.time())
        # Add properties dictionary to response to resolve properties.
It is optional
        properties["connect_cylance_add_user_action"] = action_status
        response["properties"] = properties
    else:
```

```

ADD_USER_URL = url + "/users/v2/"
device_headers = {"Content-Type": "application/json;
charset=utf-8", "Authorization": "Bearer " + str(jwt_token)}
body = dict()

# For actions, you can specify user inputted parameters that
must be defined in the 'property.conf' file. These parameters will take in
user input

# from the CounterACT console and will be available in the
'params' dictionary.
body["email"] = params["cylance_email"]
body["user_role"] = "00000000-0000-0000-0000-000000000001"
body["first_name"] = params["cylance_first_name"]
body["last_name"] = params["cylance_last_name"]
zones = dict()
zone_array = list()
zones["id"] = "0927bf62-83f4-4766-a825-0b5d2e9749d0"
zones["role_type"] = "00000000-0000-0000-0000-000000000002"
zones["role_name"] = "User"
zone_array.append(zones)
body["zones"] = zone_array
json_body = json.dumps(body).encode('utf-8')

request = urllib.request.Request(ADD_USER_URL,
headers=device_headers, data=json_body)
try:
    r = urllib.request.urlopen(request, context=ssl_context)
    # For actions, the response object must have a field
named "succeeded" to denote if the action succeeded or not.
    # The field "troubleshooting" is optional to display
user defined messages in CounterACT for actions. The field
    # "cookie" is available for continuous/cancellable
actions to store information for the same action. For this example,
    # the cookie stores the id of the user, which will be
used to delete the same user when this action is cancelled.
    response["succeeded"] = True
    request_response = json.loads(r.read())
    id = request_response['id']
    logging.debug("The cookie content is {}".format(id))
    response["cookie"] = id
    action_status["status"] = "Succeeded"

```

```

        action_status["time"] = int(time.time())
        properties["connect_cylance_add_user_action"] =
action_status
        properties["connect_cylance_last_logged_in_user"] =
params["cylance_email"]
        response["properties"] = properties
    except HTTPError as e:
        response["succeeded"] = False
        response["troubleshooting"] = "Failed action. Response
code: {}".format(e.code)
        action_status["status"] = "Failed. HTTPError."
        action_status["time"] = int(time.time())
        properties["connect_cylance_add_user_action"] =
action_status
        response["properties"] = properties
    except URLError as e:
        response["troubleshooting"] = "Failed action.
{}".format(e.reason)
        response["succeeded"] = False
        action_status["status"] = "Failed. URLError."
        action_status["time"] = int(time.time())
        properties["connect_cylance_add_user_action"] =
action_status
        response["properties"] = properties
    except Exception as e:
        response["troubleshooting"] = "Failed action.
{}".format(str(e))
        response["succeeded"] = False
        action_status["status"] = "Failed. Exception."
        action_status["time"] = int(time.time())
        properties["connect_cylance_add_user_action"] =
action_status
        response["properties"] = properties
else:
    response["succeeded"] = False
    response["troubleshooting"] = "Unauthorized"
    action_status["status"] = "Failed. Unauthorized."
    action_status["time"] = int(time.time())
    properties["connect_cylance_add_user_action"] = action_status
    response["properties"] = properties

```

Sample Delete a User Action Script for Connect

```

import jwt # PyJWT version 1.6.1 as of the time of authoring
import uuid
import time

from time import gmtime, strftime, sleep
from datetime import datetime, timedelta
from urllib.request import HTTPError, URLError

# CONFIGURATION

# All server configuration fields will be available in the 'params'
dictionary.

url = params["connect_cylance_url"] # Server URL

response = {}
properties = {}
action_status = {}

# Check if we have valid auth token or not before processing.
if "connect_authorization_token" in params and
params["connect_authorization_token"] != "":
    # ***** PART 2 - DELETE USER ***** #
    # Here, the cookie that was set in adding the user is being used. The
    user id is used to delete the user.

    jwt_token = params["connect_authorization_token"]
    DELETE_USER_URL = url + "/users/v2/" + params["cookie"]
    device_headers = {"Authorization": "Bearer " + str(jwt_token)}

    request = urllib.request.Request(DELETE_USER_URL,
headers=device_headers, method='DELETE')

    try:

        r = urllib.request.urlopen(request, context=ssl_context)

        response["succeeded"] = True
        action_status["status"] = "Succeeded"
        action_status["time"] = int(time.time())
        properties["connect_cylance_add_user_action"] = action_status
        response["properties"] = properties

    except HTTPError as e:

        response["troubleshooting"] = "Failed action. Response code:
{}".format(e.code)

        response["succeeded"] = False
        action_status["status"] = "Failed. HTTPError."
        action_status["time"] = int(time.time())

```

```

        properties["connect_cylance_add_user_action"] = action_status
        response["properties"] = properties
    except URLError as e:
        response["troubleshooting"] = "Failed action.
{}".format(e.reason)
        response["succeeded"] = False
        action_status["status"] = "Failed. URLError."
        action_status["time"] = int(time.time())
        properties["connect_cylance_add_user_action"] = action_status
        response["properties"] = properties
    except Exception as e:
        response["troubleshooting"] = "Failed action.
{}".format(str(e))
        response["succeeded"] = False
        action_status["status"] = "Failed. Exception."
        action_status["time"] = int(time.time())
        properties["connect_cylance_add_user_action"] = action_status
        response["properties"] = properties
else:
    response["succeeded"] = False
    response["troubleshooting"] = "Unauthorized"
    action_status["status"] = "Failed. Unauthorized."
    action_status["time"] = int(time.time())
    properties["connect_cylance_add_user_action"] = action_status
    response["properties"] = properties

```

Sample Authorization Script for Connect

```

import jwt # PyJWT version 1.6.1 as of the time of authoring
import uuid
import json
import urllib.request
import time
from time import gmtime, strftime, sleep
from datetime import datetime, timedelta

# CONFIGURATION
# All server configuration fields will be available in the 'params'
dictionary.
url = params["connect_cylance_url"] # Server URL

```

```
tenant = params["connect_cylance_tenant_id"] # Tenant ID
app = params["connect_cylance_application_id"] # Application ID
secret = params["connect_cylance_application_secret"] # Application Secret

# ***** START - AUTH API CONFIGURATION ***** #
timeout = 1800 # 30 minutes from now
now = datetime.utcnow()
timeout_datetime = now + timedelta(seconds=timeout)
epoch_time = int((now - datetime(1970, 1, 1)).total_seconds())
epoch_timeout = int((timeout_datetime - datetime(1970, 1,
1)).total_seconds())
jti_val = str(uuid.uuid4())
claims = {
    "exp": epoch_timeout,
    "iat": epoch_time,
    "iss": "http://cylance.com",
    "sub": app,
    "tid": tenant,
    "jti": jti_val,
}

encoded = jwt.encode(claims, secret, algorithm='HS256')
payload = {"auth_token": encoded.decode("utf-8")}
headers = {"Content-Type": "application/json; charset=utf-8"}

# Making an API call to get the JWT token
request = urllib.request.Request(url + "/auth/v2/token", headers=headers,
data=bytes(json.dumps(payload), encoding="utf-8"))
response = {}
try:
    # To use the server validation feature, use the keyword 'ssl_context'
    in the http request
    resp = urllib.request.urlopen(request, context=ssl_context)
    jwt_token = json.loads(resp.read())['access_token'] # access_token to
    be passed to GET request
    response["token"] = jwt_token
except:
    response["token"] = ""
```

Appendix B: Swagger User Interface

eyeExtend Connect App APIs

[Base URL: 10.100.1.214]

<https://10.100.1.214/connect/v2/api-docs?group=v1>

The eyeExtend Connect App inbound APIs enable access to the Connect App framework.

Schemes

HTTPS

Authorize



Host Host Info Controller



POST

/connect/v1/hosts Update host info



Parameters

Try it out

Name

Description

body * required

string
(body)

Host's MAC and/or IP address and properties to update

Example Value | Model

```
{
  "ip": "10.100.1.63",
  "mac": "009027390a7c",
  "properties": {
    "connect_cylance_is_safe": false,
    "connect_cylance_last_logged_in_user": "admin"
  }
}
```

Parameter content type

application/json

Responses

Response content type

application/json

Code**Description**

200

Request succeeded

Example Value | Model

```
{
  "status": "OK",
  "code": 200,
  "message": null,
  "data": {
    "hosts": [
      {
        "mac": "005056a83dfc",
        "ip": "1.1.1.1",
        "properties": {
          "connect_cylance_is_safe": "true",
          "connect_cylance_last_logged_in_user": "CA-S8-W7-1\\Administrator",
        }
      }
    ]
  }
}
```

400

Bad request. Request parameter or body may not in correct format. Check actual message.

Example Value |

```
{
  "status": "BAD_REQUEST",
  "code": 400,
  "message": "Error message"
}
```

401

Unauthorized. JWT token provided is not authorized. Check actual message.

Example Value |

```
{
  "status": "UNAUTHORIZED",
  "code": 401,
  "message": "Error message"
}
```

403

Forbidden. The app is not authorized in provided JWT token. Check actual message.

Example Value |

```
{
  "status": "FORBIDDEN",
  "code": 403,
  "message": "Error message"
}
```

Code**Description**

500

Internal server error. No expected response from Forescout. Check actual message.

Example Value |

```
{
  "status": "INTERNAL_SERVER_ERROR",
  "code": 500,
  "message": "Error message"
}
```

GET

/connect/v1/hosts/{id} Get single host properties for a specified app

**Parameters****Try it out****Name****Description****id** * requiredstring
(path)

IP or MAC address

1.1.1.1 or 112233445566

properties

string
(query)

Names of properties to return

propertyName1,propertyName2

Responses

Response content type

application/json

**Code****Description**

Code**Description**

200

Request succeeded

Example Value | Model

```
{
  "status": "OK",
  "code": 200,
  "message": null,
  "data": {
    "hosts": [
      {
        "mac": "005056a83dfc",
        "ip": "1.1.1.1",
        "properties": {
          "connect_cylance_is_safe": "true",
          "connect_cylance_last_logged_in_user": "CA-S8-W7-1\\Administrator",
          "connect_cylance_id": "f5552f2f-d8d8-4e4b-b4a5-b95255253a23",
          "connect_cylance_state": "Offline",
          "connect_cylance_mac_addresses": ["00-50-56-A8-3D-FC"]
        }
      }
    ]
  }
}
```

400

Bad request. Request parameter or body may not in correct format. Check actual message.

Example Value |

```
{
  "status": "BAD_REQUEST",
  "code": 400,
  "message": "Error message"
}
```

401

Unauthorized. JWT token provided is not authorized. Check actual message.

Example Value |

```
{
  "status": "UNAUTHORIZED",
  "code": 401,
  "message": "Error message"
}
```

404

Not found. Host with this IP or MAC address is not found. Check actual message.

Example Value |

```
{
  "status": "NOT_FOUND",
  "code": 404,
  "message": "Error message"
}
```

Code**Description**

500

Internal server error. No expected response from Forescout. Check actual message.

Example Value |

```
{
  "status": "INTERNAL_SERVER_ERROR",
  "code": 500,
  "message": "Error message"
}
```

Index Web Controller**GET**

/connect/v1 Default page

**Parameters**[Try it out](#)

No parameters

Responses

Response content type

application/json

**Code****Description**

200

Request succeeded

Example Value | Model

```
{
  "status": "OK",
  "code": 200,
  "message": null,
  "data": "Connect"
}
```

401

Unauthorized. JWT token provided is not authorized. Check actual message.

Example Value | Model

```
{
  "status": "UNAUTHORIZED",
  "code": 401,
  "message": "Error message"
}
```

Code**Description**

500

Internal server error. No expected response from Forescout. Check actual message.

Example Value | Model

```
{
  "status": "INTERNAL_SERVER_ERROR",
  "code": 500,
  "message": "Error message"
}
```

JWT Token

**POST**`/connect/v1/authentication/token` Get a JWT token

Method to get JWT token. After obtaining the token, copy it. Select the Authorize button and enter the token in format "Bearer ". The token is added to the header for all APIs.

Parameters[Try it out](#)**Name****Description****body** * required

string
(body)

Provide credentials and app name to obtain the JWT token. The "expiration" variable is optional and defaults to 15 minutes.

Example Value | Model

```
{
  "username": "username",
  "password": "password",
  "app_name": "cylance",
  "expiration": "15"
}
```

Parameter content type

application/json

**Responses**

Response content type

application/json

**Code****Description**

ConnectApiResponse ▼ {

```
  description:
    Response from a successful API call.

  code
    integer($int32)
    Status code of the API call. Use HttpStatus value.

  data
    ▼ {
      description:
        Data returned in JSON format. Can be empty.
    }
  message
    string
    Message for the API call. Used commonly for error messages. Do not use
    this field to check if the API is successful.

  status
    string
    Status of the API call. Use HttpStatus.

    Enum:
    ▼ [ ACCEPTED, ALREADY_REPORTED, BAD_GATEWAY, BAD_REQUEST,
    BANDWIDTH_LIMIT_EXCEEDED, CHECKPOINT, CONFLICT, CONTINUE, CREATED,
    DESTINATION_LOCKED, EXPECTATION_FAILED, FAILED_DEPENDENCY, FORBIDDEN,
    FOUND, GATEWAY_TIMEOUT, GONE, HTTP_VERSION_NOT_SUPPORTED, IM_USED,
    INSUFFICIENT_SPACE_ON_RESOURCE, INSUFFICIENT_STORAGE,
    INTERNAL_SERVER_ERROR, I_AM_A_TEAPOT, LENGTH_REQUIRED, LOCKED,
    LOOP_DETECTED, METHOD_FAILURE, METHOD_NOT_ALLOWED, MOVED_PERMANENTLY,
    MOVED_TEMPORARILY, MULTIPLE_CHOICES, MULTI_STATUS,
    NETWORK_AUTHENTICATION_REQUIRED, NON_AUTHORITATIVE_INFORMATION,
    NOT_ACCEPTABLE, NOT_EXTENDED, NOT_FOUND, NOT_IMPLEMENTED, NOT_MODIFIED,
    NO_CONTENT, OK, PARTIAL_CONTENT, PAYLOAD_TOO_LARGE, PAYMENT_REQUIRED,
    PERMANENT_REDIRECT, PRECONDITION_FAILED, PRECONDITION_REQUIRED,
    PROCESSING, PROXY_AUTHENTICATION_REQUIRED,
    REQUESTED_RANGE_NOT_SATISFIABLE, REQUEST_ENTITY_TOO_LARGE,
    REQUEST_HEADER_FIELDS_TOO_LARGE, REQUEST_TIMEOUT, REQUEST_URI_TOO_LONG,
    RESET_CONTENT, SEE_OTHER, SERVICE_UNAVAILABLE, SWITCHING_PROTOCOLS,
    TEMPORARY_REDIRECT, TOO_EARLY, TOO_MANY_REQUESTS, UNAUTHORIZED,
    UNAVAILABLE_FOR_LEGAL_REASONS, UNPROCESSABLE_ENTITY,
    UNSUPPORTED_MEDIA_TYPE, UPGRADE_REQUIRED, URI_TOO_LONG, USE_PROXY,
    VARIANT_ALSO_NEGOTIATES ]
}
```

ConnectApiResponse«Hosts» ▾ {

description: Response from a successful API call.

code `integer($int32)`
Status code of the API call. Use `HttpStatus` value.

data ▾ {
 description: Data returned in JSON format. Can be empty.
}

message `string`
Message for the API call. Used commonly for error messages. Do not use this field to check if the API is successful.

status `string`
Status of the API call. Use `HttpStatus`.
Enum:
 > Array [68]

}

ConnectErrorResponse ▾ {

description: Response from a failed API call.

code `integer($int32)`
Status code of the API call. Use `HttpStatus` value.

message `string`
Message for the API call. Used commonly for error messages. Do not use this field to check if the API is successful.

status `string`
Status of the API call. Use `HttpStatus`.
Enum:
 > Array [68]

}

```

Host ▾ {
  description:           Host as an endpoint on the Forescout platform

  ip                    string
                       example: 1.1.1.1
                       IP address

  mac                   string
                       example: 112233445566
                       MAC address

  properties            ▾ {
                       description:           Properties
                       }
}

```

```

Hosts ▾ {
  description:           Collection of hosts

  hosts                ▾ [
                       Collection of hosts

                       Host ▾ {
                         description:           Host as an endpoint on the Forescout platform

                         ip                    string
                                               example: 1.1.1.1
                                               IP address

                         mac                   string
                                               example: 112233445566
                                               MAC address

                         properties            > {...}
                       }
                       ]
}

```

JwtAuthToken ▾ {

description:

Content of JWT token

app_name

string

App name that the token is generated for.

expire_time

integer(\$int64)

Epoch time when the token will expire.

token

string

JWT token. Use 'Bearer token' format in Authorization.

}