Forescout

Open Integration Module: Data Exchange

Configuration Guide

Version 3.8

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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/
- Have feedback or questions? Write to us at documentation@forescout.com

Legal Notice

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About the Data Exchange Module

Forescout Open Integration Module: Data Exchange (DEX) lets the Forescout platform use the following methods to communicate with external entities:

- SQL®, Oracle®, and LDAP servers: The Forescout platform queries (pull) and updates (push).
- Web services: The Forescout platform queries external services, and receives updates via the CounterACT® web service hosted by the module.

Install this module on Enterprise Manager or standalone Appliances to work with the CounterACT web service.

This module is part of the Forescout Open Integration Module. See Open Integration Module Information for details.

To use the module, you should have a solid understanding of User Directory, SQL database and/or web services concepts, functionality, and terminology, and understand how Forescout policies and other basic features work.

About Certification Compliance Mode

Forescout Open Integration Module: Data Exchange supports Certification Compliance mode. For information about this mode, refer to the *Forescout Installation Guide*. See Additional Forescout Documentation for information on how to access this guide.

About Support for Dual Stack Environments

The Forescout platform detects endpoints and interacts with network devices based on both IPv4 and IPv6 addresses. However, ***IPv6 addresses are not yet supported by this module.*** The functionality described in this document is based only on IPv4 addresses. IPv6-only endpoints are typically ignored or not detected by the properties, actions, and policies provided by this module.

Requirements

This section describes:

- Forescout Requirements
- Connectivity Requirements
- Forescout eyeExtend (Extended Module) Licensing Requirements

Forescout Requirements

The module requires the following Forescout releases and other components:

- Forescout version 8.2.

- Authentication Module version 1.2, with the User Directory Plugin component.
- A module license for the Open Integration Module. See Forescout eyeExtend (Extended Module) Licensing Requirements for details.

Connectivity Requirements

Verify that the Forescout platform has permission to connect to external servers.

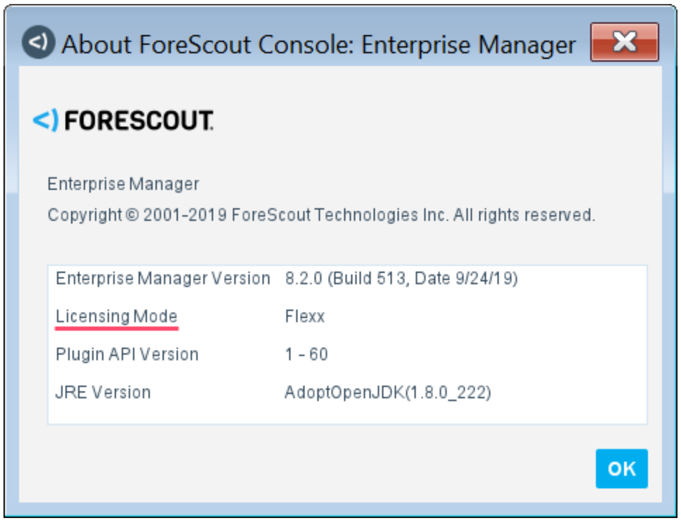
Forescout eyeExtend (Extended Module) Licensing Requirements

This Forescout eyeExtend product requires a valid license. Licensing requirements differ based on which licensing mode your deployment is operating in:

- Per-Appliance Licensing Mode
- Flexx Licensing Mode

To identify your licensing mode:

- From the Console, select **Help > About Forescout**.



About ForeScout Console: Enterprise Manager

Enterprise Manager

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Enterprise Manager Version	8.2.0 (Build 513, Date 9/24/19)
Licensing Mode	Flexx
Plugin API Version	1 - 60
JRE Version	AdoptOpenJDK(1.8.0_222)

Per-Appliance Licensing Mode

When installing the module, you are provided with a 90-day demo license.

If you would like to continue exploring the module before purchasing a permanent license, you can request a demo license extension. Consult with your Forescout representative before requesting the extension. You will receive email notification and alerts at the Console before the demo period expires.

To continue working with the module after the demo period expires, you must purchase a permanent module license.

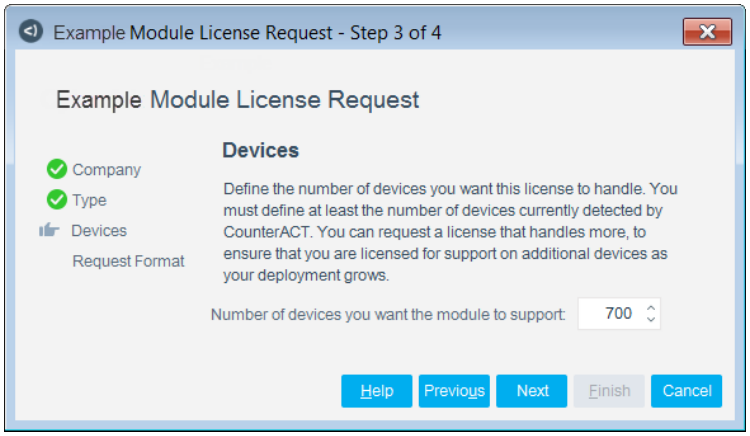
Demo license extension requests and permanent license requests are made from the Console.

> *This module may have been previously packaged as a component of an Integration Module which contained additional modules. If you already installed this module as a component of an Integration Module, you can continue to use it as such. Refer to the section about module packaging in the Forescout Administration Guide for more information.*

Requesting a License

When requesting a demo license extension or permanent license, you are asked to provide the device *capacity* requirements. This is the number of devices that you want this license to handle. You must define at least the number of devices currently detected by the Forescout platform. You can request a license that handles more to ensure that you are licensed for support on additional devices as your deployment grows.

Enter this number in the **Devices** pane of the Module License Request wizard, in the Console Modules pane.


Example Module License Request - Step 3 of 4
Example Module License Request
✓ Company
✓ Type
Devices
Request Format
Help
Previous
Next
Finish
Cancel

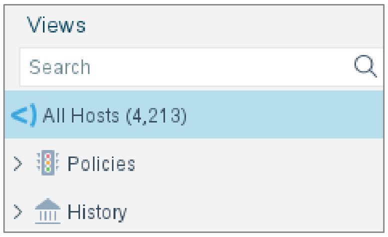
Devices

Define the number of devices you want this license to handle. You must define at least the number of devices currently detected by CounterACT. You can request a license that handles more, to ensure that you are licensed for support on additional devices as your deployment grows.

Number of devices you want the module to support: 700

To view the number of currently detected devices:

1. Select the **Home** tab.
2. In the Views pane, select the **All Hosts** folder. The number in parentheses displayed next to the **All Hosts** folder is the number of devices currently detected.



Flexx Licensing Mode

When you set up your Forescout deployment, you must activate a license file containing valid licenses for each feature you want to work with in your deployment, including eyeExtend products. After the initial license file has been activated, you can update the file to add additional eyeExtend licenses or change endpoint capacity for existing eyeExtend products. For more information on obtaining eyeExtend licenses, contact your Forescout sales representative.

> 🗎 *No demo license is automatically installed during system installation.*

License entitlements are managed in the Forescout Customer Portal. After an entitlement has been allocated to a deployment, you can activate or update the relevant licenses for the deployment in the Console.

Each eyeExtend license has an associated capacity, indicating the number of endpoints the license can handle. The capacity of each eyeExtend license varies by module but does not exceed the capacity of the Forescout eyeSight license.

> 🗎 *Integration Modules, which package together groups of related licensed modules, are not supported when operating in Flexx Licensing Mode. Only eyeExtend products, packaging individual licensed modules are supported. T*he Open Integration Module is an *eyeExtend* product even though it packages more than one module*.*

More License Information

For more information on eyeExtend (Extended Module) licenses:

- **Per-Appliance Licensing**. Refer to the *Forescout Administration Guide*.
- **Flexx Licensing**. Refer to the *Flexx Licensing How-to Guide*.

You can also contact your Forescout sales representative for more information.

Install the Module

Perform the following procedure to install the module.

To install the module:

1. Navigate to one of the following Forescout download portals, depending on the licensing mode your deployment is using:
   - Product Updates Portal - ***Per-Appliance Licensing Mode***
   - Customer Portal, Downloads Page - ***Flexx Licensing Mode***

   To identify your licensing mode, select **Help > About ForeScout** from the Console.
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.*

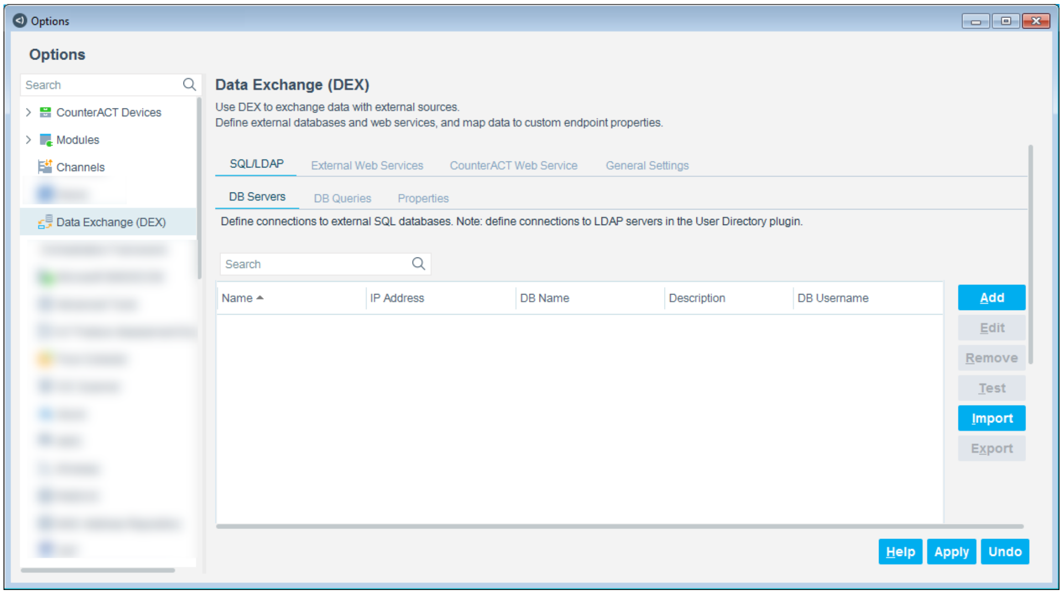
   🗎 *In modules that contain more than one component, the installation proceeds automatically one component at a time.*

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.*

Configure the Module

To access the module configuration pane, select **Options** in the Console, then, select **Data Exchange**.



Data Exchange (DEX)

Use DEX to exchange data with external sources.
Define external databases and web services, and map data to custom endpoint properties.

Define connections to external SQL databases. Note: define connections to LDAP servers in the User Directory plugin.

Name ▲	IP Address	DB Name	Description	DB Username

The module supports interaction with several types of external data sources, which are completely independent of each other. For example, configuration settings let you define external SQL database servers, but these settings are only relevant if you are defining properties that are populated from a SQL database. You need not define a SQL server if you are working with another external data source, such as an external web source.

See Integration Scenarios for configuration procedures required for working with data sources.

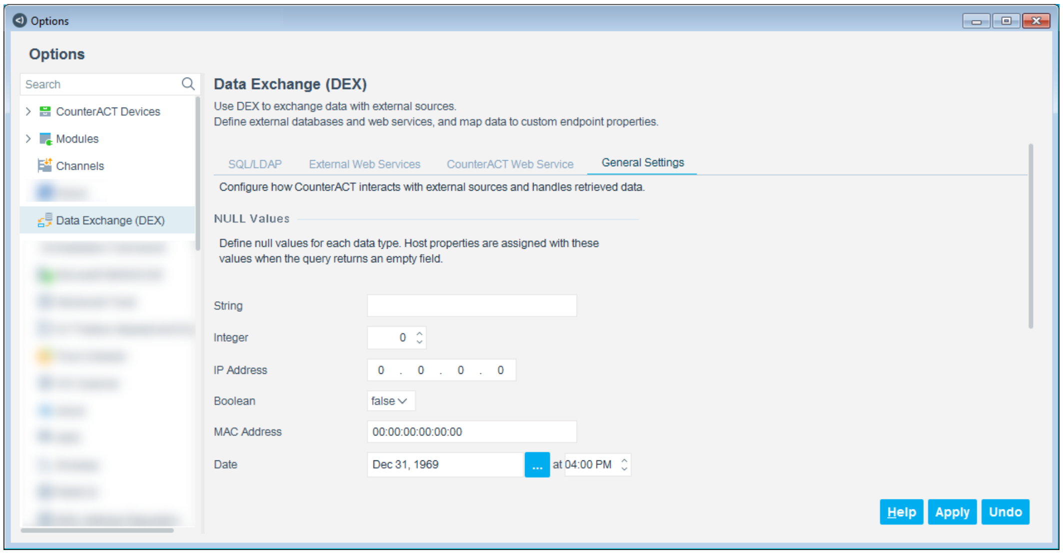
> *The DEX Open Integration Module automatically reboots when you define new data sources or host properties, or if you change any configuration settings.*

The general configuration settings described in this section are common to all implementation scenarios.

Define Null Values

When the Forescout platform receives information from external sources, some fields may not have values. External sources may indicate an empty field value in different ways. To let you define conditions that identify empty fields, null values must be represented in a uniform way in Forescout properties. You can define how the Forescout platform represents empty fields in properties populated by external data.

In the Data Exchange pane, select the General Settings tab. In the **NULL Values** section, you can define how the Forescout platform represents empty data fields when it maps received data to corresponding host properties.



Data Exchange (DEX)

Use DEX to exchange data with external sources.
Define external databases and web services, and map data to custom endpoint properties.

Configure how CounterACT interacts with external sources and handles retrieved data.

NULL Values

Define null values for each data type. Host properties are assigned with these values when the query returns an empty field.

String	
Integer	0
IP Address	0 . 0 . 0 . 0
Boolean	false
MAC Address	00:00:00:00:00:00
Date	Dec 31, 1969 at 04:00 PM

Integration Scenarios

This section links you to implementation roadmaps for specific integration scenarios.

- Working with external SQL and LDAP databases:
  - Create a Forescout Host Property Based on an External Database
  - Update an External SQL Database

- Working with External Web Services:
  - Update a Forescout Property List
  - Create a Forescout Host Property Based on an External Web Service
  - Update an External Web Service
- Working with the CounterACT Web Service:
  - Define CounterACT Web Service Accounts
  - Create a Forescout Host Property Based on the CounterACT Web Service
  - CounterACT Web Service Security Settings

Create a Forescout Host Property Based on an External Database

In this scenario, a custom host property is created in the Forescout platform. The Forescout platform populates the property value by polling an external server. For example, the *Last Logon* Active Directory attribute is retrieved using an LDAP query statement, and mapped to a new *Last Logon Time* custom Forescout property.

Implemented by:

- Forescout administrator
- External server administrator

To retrieve data from external databases:

1. Define a user account for the Forescout platform on each external DB server you want to work with.
2. Install the module. See Install the Module.
3. Configure the module's connection with external DB servers. See Define Connections to External Servers.
4. Define a custom Forescout property that holds retrieved fields or attributes.
   - Define queries that retrieve data from external servers. See Define LDAP or SQL Query Statements.
   - Map retrieved data to custom properties. See Define Host Properties Based on External Server Data.
5. Include the new property in Forescout policies.

   The Forescout platform periodically queries the external DB server, and updates the host property based on retrieved data.

For general information, see Work with SQL and LDAP Databases.

Update an External SQL Database

Update values in an external database by sending a custom update statement to an external server. For example, you can update a database table value from *not compliant* to *compliant* when a Forescout policy detects endpoint Anti-virus compliance status.

Implemented by:

- Forescout administrator
- External server administrator

To update external SQL databases:

1. Define a user account for the Forescout platform on the external DB servers you want to work with. The user account must have write permission for the database tables you want to modify.
2. Configure the module connection with external databases.
3. Use the DEX Update External Databases action in a policy. The Forescout platform updates records in external SQL databases for hosts that match policy conditions.

For details, see The DEX Update External Database Action and About Update Statements.

Create a Forescout Host Property Based on the CounterACT Web Service

In this scenario, a custom host property is created in the Forescout platform. An external application or service platform can then update the property value using the CounterACT Web Service. For example, service call records from a central help desk can be added to host information in the Forescout platform.

Implemented by:

- Forescout administrator
- External application/service programmer

To implement this scenario, perform the following steps:

1. Configure and test web service connectivity to the Forescout platform.
2. Define access credentials for the CounterACT Web Service. See Work with the CounterACT Web Service for details.
3. Create a new host property in the Forescout platform. See Define Host Properties For Web Service Interaction and Appendix 1: Forescout Property and Data Types for details.
4. Program the web service call on the external application. See Appendix 4: Submit Data with the Forescout Web API for details.
5. Test the interaction.

Update a Forescout Property List

In this scenario, a custom Property List is created in the Forescout platform. An external application or service platform can then update the Forescout Property List using the CounterACT Web Service. For example, employee IDs can be added to the Property List in the Forescout platform.

Implemented by:

- Forescout administrator
- External application/service programmer

To update a Forescout property list:

1. Configure and test web service connectivity to the Forescout platform.
2. Define access credentials for the CounterACT Web Service. See Work with the CounterACT Web Service for details.
3. Create a new Property List in the Forescout platform. For more information, refer to the Defining and Managing Lists section in the *Forescout Administration Guide*. See Additional Forescout Documentation for information on how to access this guide.
4. Program the web service call on the external application. See Appendix 4: Submit Data with the Forescout Web API for details.
5. Test the interaction.

Create a Forescout Host Property Based on an External Web Service

In this scenario, a custom host property is created in the Forescout platform. The Forescout platform populates the property value by polling an external web service.

Implemented by:

- Forescout administrator
- External application/service programmer

To implement this scenario:

1. Define a user account for the Forescout platform in the external web service you want to work with.
2. Define a custom Forescout property that holds retrieved fields or attributes.
   - Define a query message that retrieves data from the external web service. See Define Requests to External Web Services for details.
   - Map retrieved data to custom properties. See Define Host Properties Based on Data from External Web Services for details.
3. Include the new property in Forescout policies.

   To resolve the custom property, the Forescout platform queries the external web service and updates the host property based on retrieved data.

For general information, see Work with External Web Services.

Update an External Web Service

Send values to an external web service by submitting a custom request message to the service.

Implemented by:

- Forescout administrator
- External service administrator

To update external SQL databases:

1. Define a user account for the Forescout platform in the external service you want to work with. The user account must have write permission.
2. Use the DEX Send Web Service Request action in a policy. The Forescout platform sends the web request to the service for hosts that match policy conditions.

   See DEX Send Web Service Request Action.

Use External Web Server Certificate Validation

You can configure the DEX Open Integration Module to set up the connection to the server using common commercial Certificate Authority certificates. Alternately, you can un-check the Validate Server Certificate option so that the DEX Open Integration Module always sets up the connection.

Implemented by:

- Forescout administrator
- External service administrator

To validate a web server certificate:

1. Define requests to external web services.
2. In the Add External Web Service Request wizard's Authentication pane, you can select **Validate Web Server Certificate**.

   By default, this option is not selected, meaning that the DEX Open Integration Module always sets up the connection, regardless of whether the server certificate is a common commercial Certificate Authority issued certificate.

   If you select this option, certificate validation is performed.

   – If the server certificate is a common commercial Certificate Authority issued certificate, the DEX Open Integration Module sets up the connection to the server.

   – If the server certificate is not a common commercial Certificate Authority issued certificate, the Open Integration Module does not set up the connection to the server.

Work with SQL and LDAP Databases

The Data Exchange Module supports LDAP user directory servers and SQL database servers. You can work with both types of server simultaneously.

LDAP Directory Servers

LDAP directory servers can be used as your external data source. These include any of the following servers you defined in the CounterACT User Directory plugin:

- Microsoft Active Directory®
- Novell® eDirectory
- Sun Directory
- IBM® Notes® (formerly IBM Lotus® Notes)
- Open LDAP Directory

LDAP over SSL/TLS, also known as Secure LDAP (LDAPS), is supported.

The servers you defined in the CounterACT User Directory plugin are automatically available as external data sources, and do not need to be redefined in this module.

SQL Database Servers

The following SQL database servers are supported:

- Oracle® MySQL™– version 5.5 and above
- Microsoft® SQL Server®
  - SQL Server 2005
  - SQL Server 2008
  - SQL Server 2008R2
  - SQL Server 2012
- Oracle versions 10 and above
- PostgreSQL

Depending on the desired Integration Scenarios, perform the following procedures:

- Define Connections to External Servers. You must configure the Forescout platform's communication with external servers to use the features of this module.
- Define LDAP or SQL Query Statements. A *Query Statement* is a SQL statement or LDAP filter string that the Forescout platform sends to the external server to retrieve host information.
- Define Host Properties Based on External Server Data. Define new Forescout host properties that hold data values retrieved from the external server.

In some cases, it is useful and more efficient to edit existing definitions. See Map External Data to Host Properties for details on exporting configured query, update, and property definitions.

Define Connections to External Databases

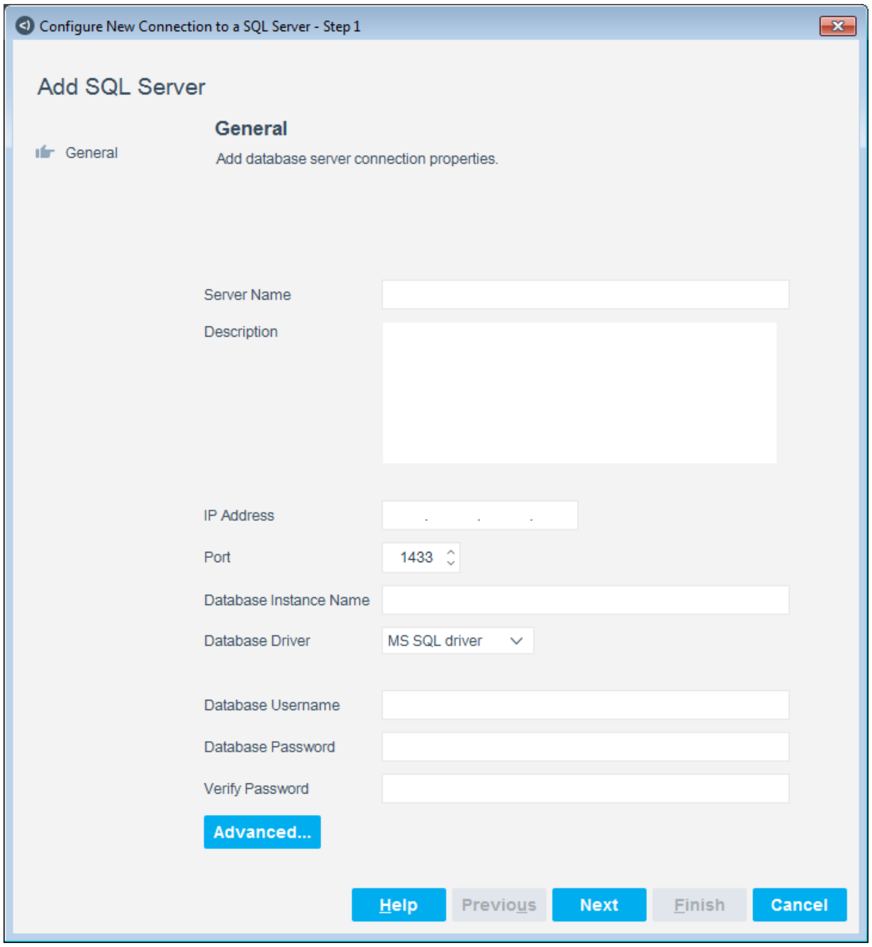
To retrieve data from an external server, you must configure how the Forescout platform connects and logs into the server.

This module works with LDAP directory servers and SQL database servers:

- Define the connection to LDAP servers in the User Directory plugin configuration pane. The Base Domain Name used for data queries is part of this definition.
- Define the connection to SQL databases in the Data Exchange configuration pane.

To define connection to SQL database servers:

1. In the Data Exchange configuration pane, select the SQL/LDAP tab and select the DB Servers tab. Then select **Add**.



Configure New Connection to a SQL Server - Step 1

Add SQL Server

General

General

Add database server connection properties.

Server Name

Description

IP Address . . .

Port 1433

Database Instance Name

Database Driver MS SQL driver

Database Username

Database Password

Verify Password

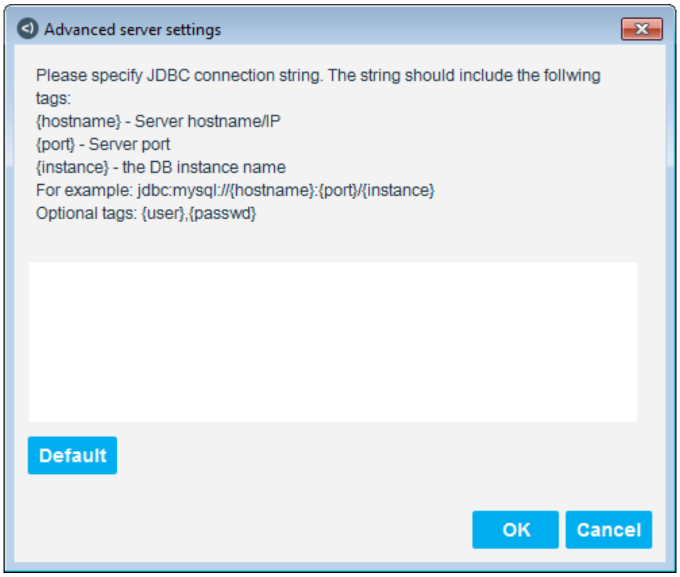
2. Define the following database server parameters in the General pane.

Server Name	Enter a name for this connection.
Description	Enter a description of this connection.
IP Address	Enter the server IP address.
Port	Enter the server port.
Database Instance Name	Specify a database on the server.

Database Driver	Select a database driver from the **Database Driver** drop-down menu.
Database Username	Enter the name of a user who can access the database in the **Database Username** field. The module does not support users defined as "sys" users (system administrators). If your environment uses NTLMv2 authentication, use the standard `domain\user` format.
Database Password **Verify Password**	Enter the password of the specified user in the **Database Password** field. Re-enter the password to verify it.

If you want to update information on SQL databases, the user you specify must have write permission for the database tables you want to update.

3. (Optional) To define additional connection attributes in the Java Database Connectivity (JDBC) connection string, select **Advanced**.



Advanced server settings

Please specify JDBC connection string. The string should include the follwing tags:
{hostname} - Server hostname/IP
{port} - Server port
{instance} - the DB instance name
For example: jdbc:mysql://{hostname}:{port}/{instance}
Optional tags: {user},{passwd}

The JDBC protocol represents the database connection as a URL string with attributes. The default string displayed reflects the selected database driver, and includes placeholder tags for the configuration fields you specified earlier.

The default URL string used by the Forescout platform to connect to all SQL servers is shown. Edit this string to add optional configuration attributes. For example, the following string adds the *SSL* attribute to a connection that uses the *PostgreSQL* database driver:

```
jdbc:postgresql://{hostname}:{port}/{dbname}?user={user}&password={passwd}&ssl=true
```

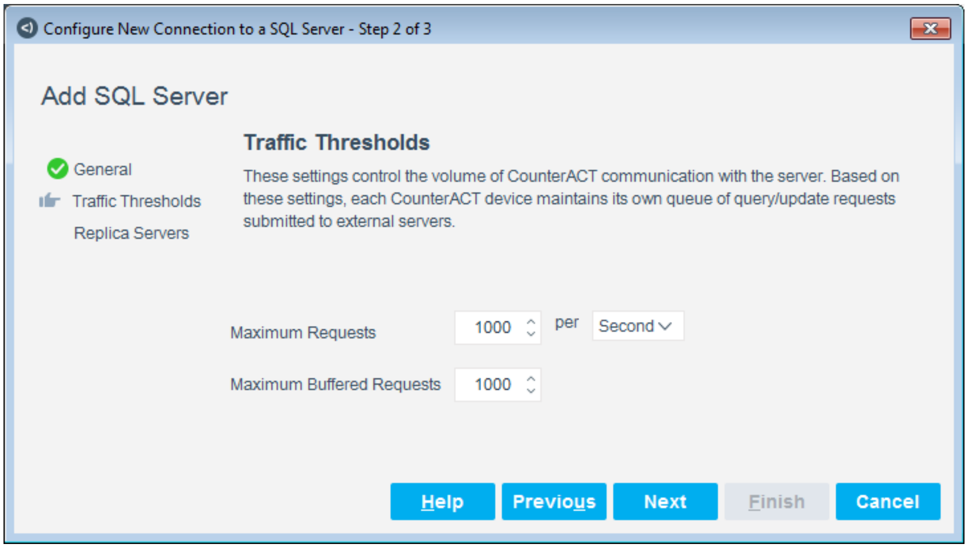
Add only attributes supported by the database driver you specify. The Forescout platform does not validate these optional attributes.

a. Select **Default** to clear your modifications and restore the default URL string.

b. Select **OK** to save the URL string. The Forescout platform uses the customized string to connect to this SQL server.

🗎 *The customized string is only used with this SQL server.*

4. Select **Next**.



Configure New Connection to a SQL Server - Step 2 of 3

Add SQL Server

Traffic Thresholds

These settings control the volume of CounterACT communication with the server. Based on these settings, each CounterACT device maintains its own queue of query/update requests submitted to external servers.

Maximum Requests 1000 per Second

Maximum Buffered Requests 1000

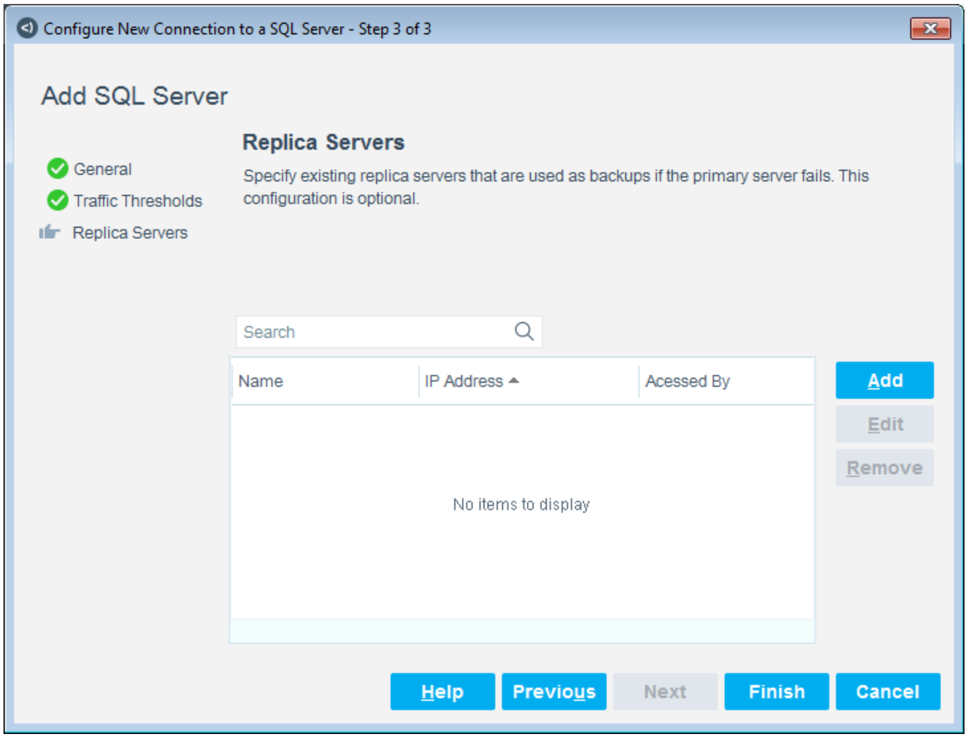
5. Define the following parameters to control traffic to the database server:

Maximum Requests	Specify a maximum number of requests that the module sends to the server in the selected time period. If the module generates more requests, they are queued to a buffer.
Maximum Buffered Requests	Enter the maximum number of requests that are queued for submission. When the buffer is full, new requests are dropped, and related host properties are evaluated as Irresolvable.

Specify values in this pane depending on the resources available on the database server.

🗎 *Additional settings are available to monitor and control traffic with external servers. See Manage Communication with Database Servers for details.*

6. Select **Next**.



Configure New Connection to a SQL Server - Step 3 of 3

Add SQL Server

✓ General
✓ Traffic Thresholds
Replica Servers

Replica Servers

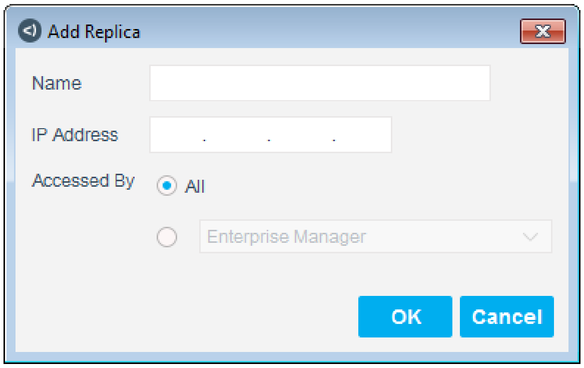
Specify existing replica servers that are used as backups if the primary server fails. This configuration is optional.

Search

Name	IP Address ▲	Acessed By
No items to display		

This pane lists the organizational replica servers that are used if the server defined in the General pane fails.

7. (Optional) To add a replica server, select **Add**.



Add Replica

Name

IP Address . . .

Accessed By ● All

○ Enterprise Manager

8. Define the following parameters:

Name	Enter a name for the replica server.
IP Address	Enter the IP address of the replica server.
Accessed By	Specify whether this replica server can be accessed by all CounterACT devices, or by one particular Appliance or Enterprise Manager. If you select **All**, verify that all Appliances have access to the server. This option is recommended as it enables faster resolution.

9. Select **OK**. The server you defined is added to the replica server table. Repeat for additional replica servers as required.

10. Select **Finish**. The database and server information is added to the table in the DB Servers tab.
11. Select **Apply**.
12. (Optional) Repeat this procedure to define additional SQL server connections.

Test SQL Server Connections

Use the following procedure to test connections to external SQL servers.

To test server connections:

1. In the Data Exchange pane, select the DB Servers tab.
2. Select the servers you want to test.
3. Select **Test**. The Configuration Test dialog box opens.

   Each CounterACT device attempts to log in to each server. The results are listed in the dialog box.

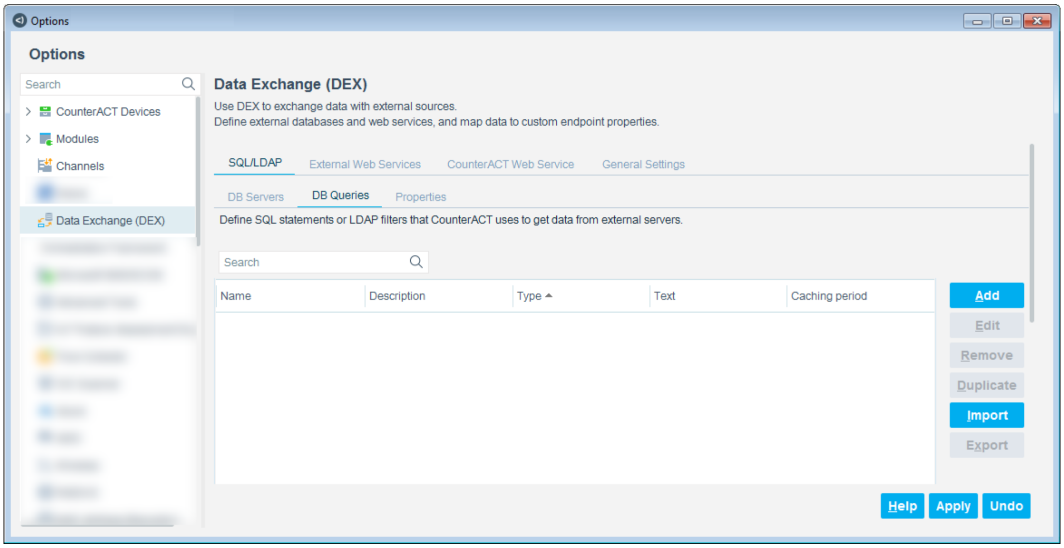
Define LDAP or SQL Query Statements

A *Query Statement* is a set of SQL statements or User Directory filter strings that the Forescout platform submits to the external server to retrieve host information.

Before you perform this procedure, see About Query Statements. If you are working with a SQL database, see Tips for SQL Query Statements.

To define a query statement:

1. In the Data Exchange pane, select the SQL/LDAP tab and then select the DB Queries tab.

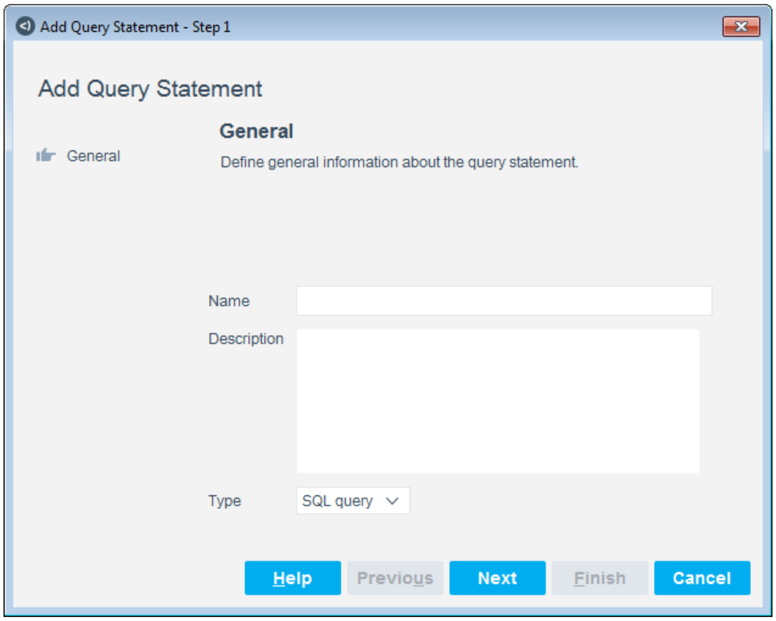


Data Exchange (DEX)

Use DEX to exchange data with external sources.
Define external databases and web services, and map data to custom endpoint properties.

Define SQL statements or LDAP filters that CounterACT uses to get data from external servers.

2. Select **Add**.

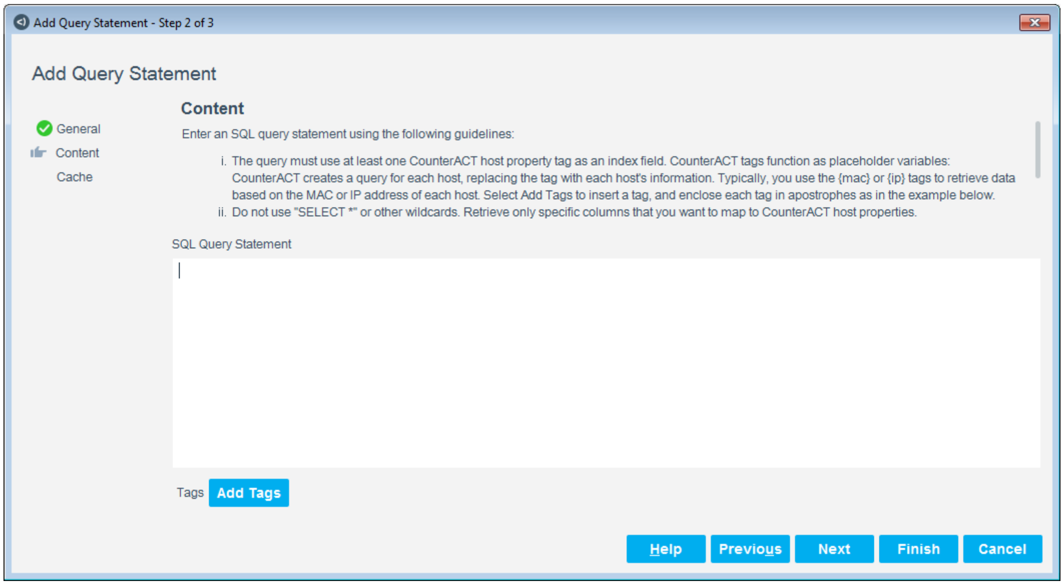


Define general information about the query statement.

3. Define the following query statement parameters:

Name	Enter a name for the query.
Description	Enter a description.
Type	From the **Type** drop-down menu, set the type of server (SQL or LDAP) to which the query statement is directed. ***This value cannot be edited later***.

4. Select **Next**.



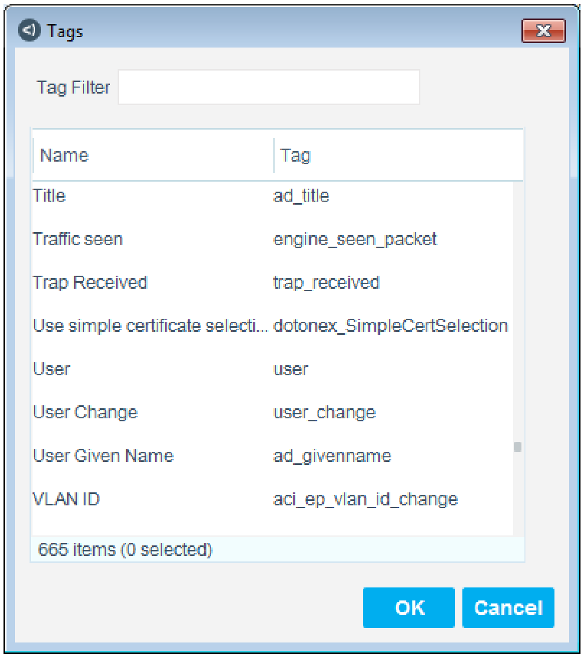
Enter an SQL query statement using the following guidelines:

i. The query must use at least one CounterACT host property tag as an index field. CounterACT tags function as placeholder variables: CounterACT creates a query for each host, replacing the tag with each host's information. Typically, you use the {mac} or {ip} tags to retrieve data based on the MAC or IP address of each host. Select Add Tags to insert a tag, and enclose each tag in apostrophes as in the example below.

ii. Do not use "SELECT *" or other wildcards. Retrieve only specific columns that you want to map to CounterACT host properties.

5. Enter a SQL query statement or LDAP filter string.

6. To insert property tags that resolve to host property values, select **Add Tags**.

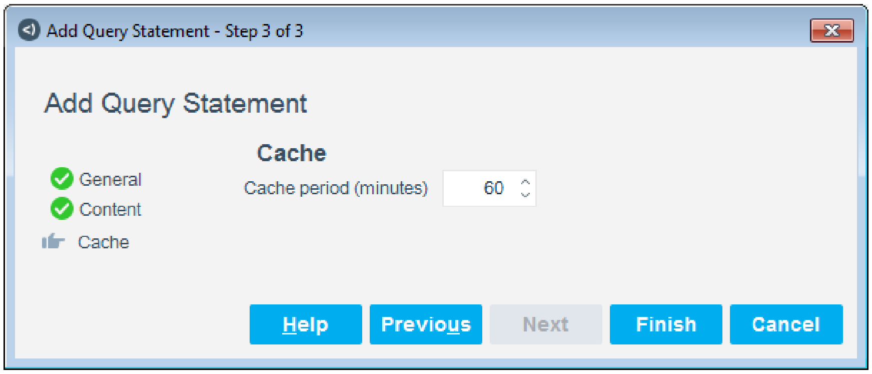


Tag Filter

Name	Tag
Title	ad_title
Traffic seen	engine_seen_packet
Trap Received	trap_received
Use simple certificate selecti...	dotonex_SimpleCertSelection
User	user
User Change	user_change
User Given Name	ad_givenname
VLAN ID	aci_ep_vlan_id_change

665 items (0 selected)

7. Scroll through the list or use the **Tag Filter** field to search for a specific tag. Select the tag and then select **OK**.
8. In the Content pane, select **Next**.



Cache

Cache period (minutes) 60

9. The **Cache period** defines how long the values returned by this query are valid and are kept in the DEX Open Integration Module's memory. Within the cache period, queries are answered using the value stored in memory. Queries are not sent to the external server.
10. Select **Finish**. The query statement is added to the Query Statements list.
11. In the Data Exchange (DEX) pane, select **Apply**.

Tips for SQL Query Statements

Consider the following points when you write a SQL query statement:

- If your SQL syntax requires it, insert an apostrophe before and after the tag.

- Avoid using the * syntax or other wildcards. These queries can generate significant unnecessary communication overhead. It is more efficient to specify column names that are used in host properties.
- You can write a statement that retrieves information from several linked database tables.
- Use REPLACE or regular expression (REGEXP) terms to translate from external database formats. For example, the following statements translate the colon-format MAC address supported by the Forescout platform to a dot-format MAC address (`01.23.45.ab.cd.ef`).

  ```
  SELECT column FROM table
  WHERE mac = REPLACE ('{eds_mac_fmt_colon}', ':', '.');
  ```

  ```
  SELECT column FROM table
  WHERE mac = REGEXP_REPLACE ({mac}, '(..)(..)(..)(..)(..)(..)',
  '\\1.\\2.\\3.\\4.\\5.\\6');
  ```

Define Host Properties

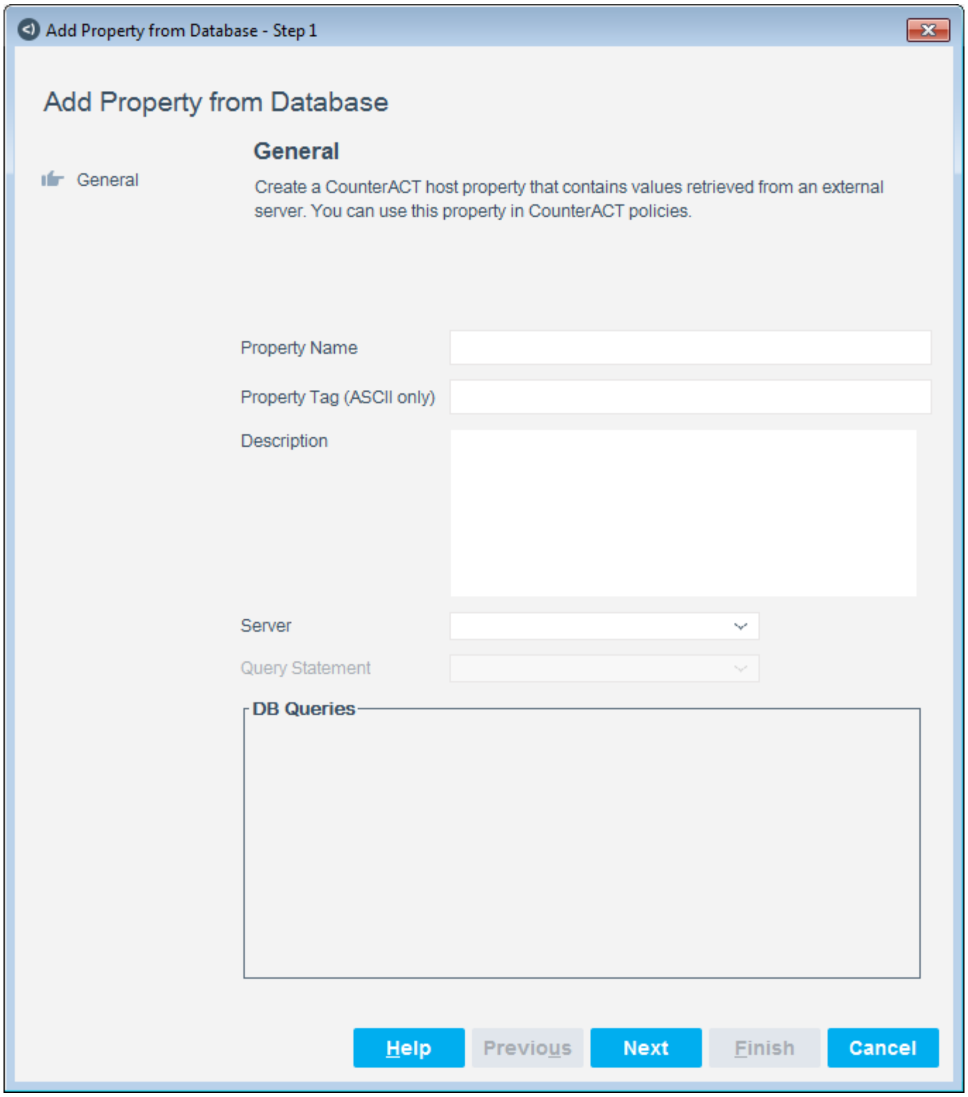
Host properties store information that the Forescout platform discovers for each endpoint. When you work with this module, you create new Forescout host properties to hold data extracted by querying external servers. This makes retrieved data available for use in Forescout policies. Before you perform this procedure, see Appendix 1: Forescout Property and Data Types.

Define a Host Property Based on Data from External Databases

You can define host properties based on data from external databases.

To create a host property:

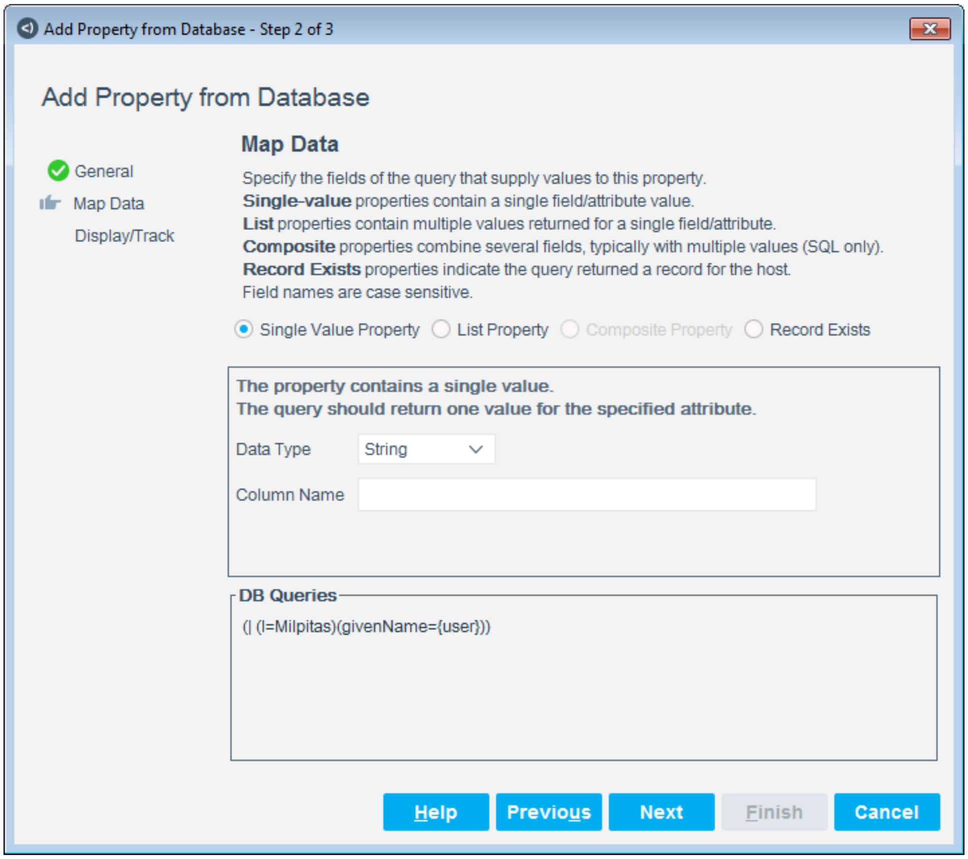
1. In the Data Exchange pane, select the SQL/LDAP tab and then select the Properties tab.
2. Select **Add**.


Add Property from Database - Step 1
Add Property from Database
General
General
Create a CounterACT host property that contains values retrieved from an external server. You can use this property in CounterACT policies.
Property Name
Property Tag (ASCII only)
Description
Server
Query Statement
DB Queries
Help
Previous
Next
Finish
Cancel

3. Configure the property values:

Property Name	Enter a name for the property. This name is used wherever the property is displayed in the Console, for example, in the Properties tree.
Property Tag (ASCII only)	Enter a unique text string using ASCII characters. The Forescout platform references the property using this unique identification string. You cannot use spaces in the string.
Description	Enter a description of the property. This description is used for the property in the Conditions dialog box.
Server	Select a server from the drop-down menu. Your selection is displayed in the **DB Queries** field at the bottom of the pane.
Query Statement	Depending on what is selected in this field, the Query Statement is populated and the details of the statement are displayed in the **DB Queries** field.

4. Select **Next**.



Add Property from Database - Step 2 of 3

Add Property from Database

Map Data

Specify the fields of the query that supply values to this property.
Single-value properties contain a single field/attribute value.
List properties contain multiple values returned for a single field/attribute.
Composite properties combine several fields, typically with multiple values (SQL only).
Record Exists properties indicate the query returned a record for the host.
Field names are case sensitive.

● Single Value Property ○ List Property ○ Composite Property ○ Record Exists

The property contains a single value.
The query should return one value for the specified attribute.

Data Type: String

Column Name:

DB Queries

```
(| (l=Milpitas)(givenName={user}))
```

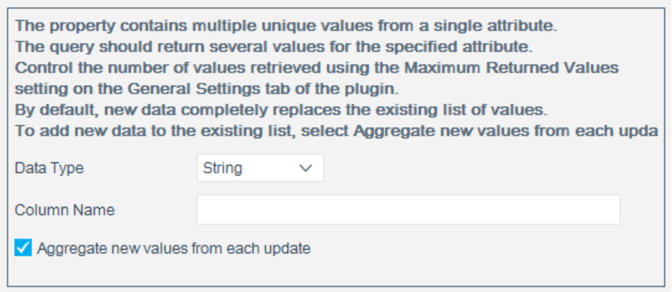
5. Select the type of property you want to create:
   - **Single property**: Contains one retrieved value. This is the default setting. To create a Single Property, go to step 6.
   - **List property**: Contains a list of unique values. To create a List property, go to step 6.
   - **Composite property**: Contains several retrieved database columns. To activate this property, a SQL server you must be set as the server in the General tab. To create a Composite property, go to step 8.
   - **Record Exists** property: Indicates that data was returned for a host. To create a Record Exists property, go to step 9.
6. To define a Single Value or List property:
   - From the **Data Type** drop-down menu, select the type of data the property contains. See Appendix 1: Forescout Property and Data Types for details.
   - In the **Column Name** field, specify the column or attribute that is mapped to the property. This column must be retrieved by the query statement.

     For a *Single* property, the query must return a single value for the field/attribute.

For a *List* property, the query can return multiple values for the field/attribute.

🗎 *The Query Statements field is Read-only and is a reflection of the Query Statement selection in the previous pane.*

7. For a List property, select **Aggregate new values from each update** to retain existing values when the property is updated. New property values are appended to the list. If you clear this option, the entire list stored by the property is overwritten by each update.



The property contains multiple unique values from a single attribute.
The query should return several values for the specified attribute.
Control the number of values retrieved using the Maximum Returned Values setting on the General Settings tab of the plugin.
By default, new data completely replaces the existing list of values.
To add new data to the existing list, select Aggregate new values from each upda

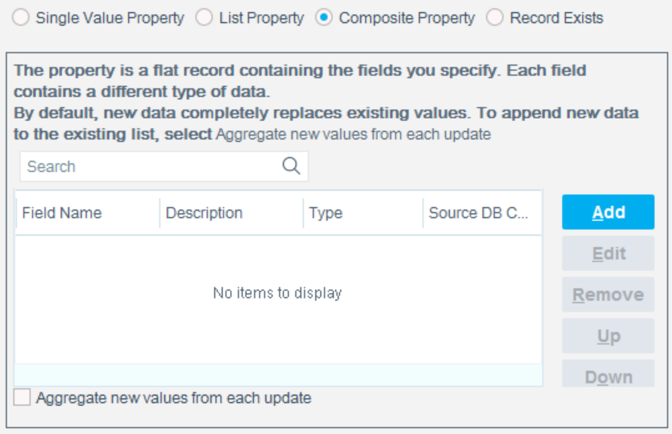
Data Type: String

Column Name:

☑ Aggregate new values from each update

Continue to step 10.

8. To define a Composite property:



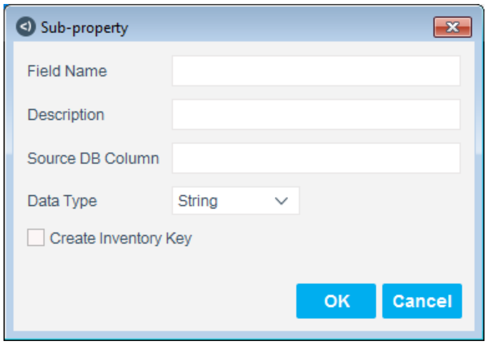
○ Single Value Property ○ List Property ● Composite Property ○ Record Exists

The property is a flat record containing the fields you specify. Each field contains a different type of data.
By default, new data completely replaces existing values. To append new data to the existing list, select Aggregate new values from each update

Field Name	Description	Type	Source DB C...
No items to display			

□ Aggregate new values from each update

a. Select **Add**.



Sub-property

Field Name:

Description:

Source DB Column:

Data Type: String

□ Create Inventory Key

b. Configure the Sub-property parameters:

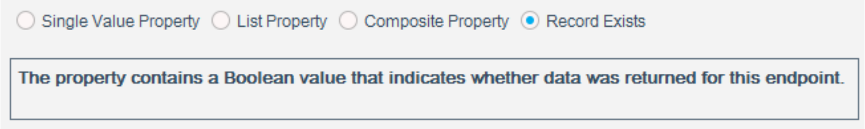
Field Name	Enter the name of the composite property.
Description	Enter a short description of its content.
Source DB Column	Enter the name of the column from the external database that is mapped to the property. This column must be retrieved by the query statement, and can contain a single value or multiple values.
Data Type	From the drop-down menu, select the type of data the property contains. See Appendix 1: Forescout Property and Data Types for details.
Create Inventory Key	Select this option to let administrators list hosts based on this field in the Asset Inventory view. When this option is selected, the property is displayed as an index key in the Views pane of the Asset Inventory view.

c. Select **OK**. The field is displayed in the composite property table.

d. Repeat these steps to define additional composite property fields.

e. In the Map Data pane, select **Aggregate new values from each update** to retain existing values when the property is updated. New property values are appended as a new row in the composite property table. If you clear this option, the entire table stored by the property is completely overwritten by each update.

9. To define a Record Exists property, select **Record Exists**.

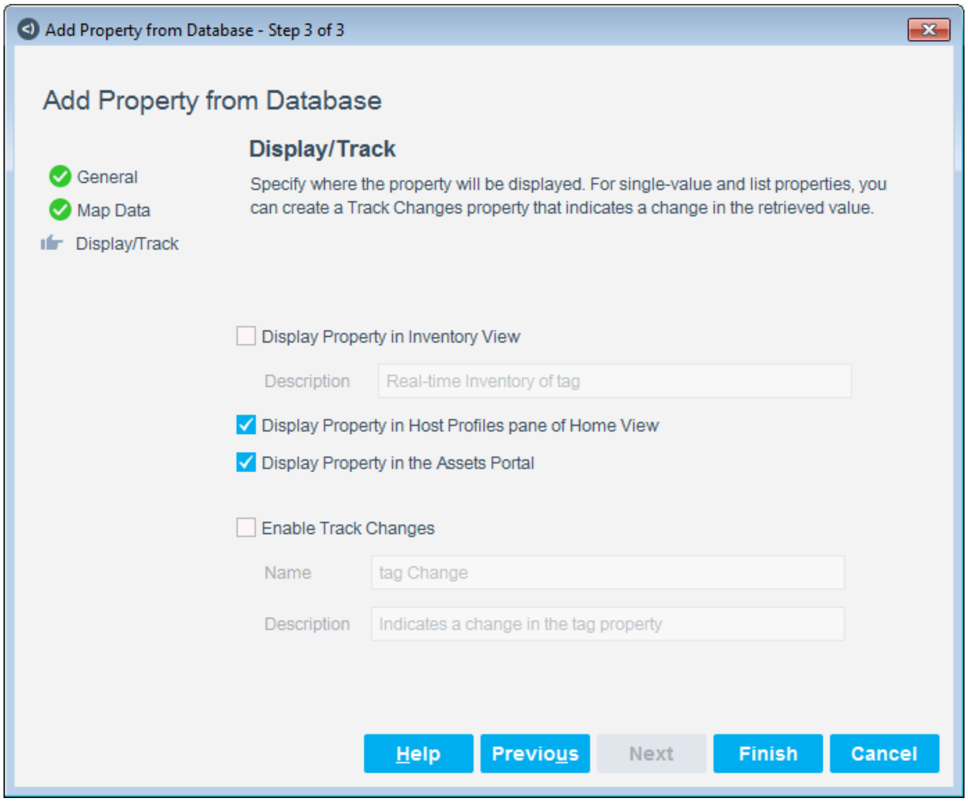


○ Single Value Property ○ List Property ○ Composite Property ● Record Exists

The property contains a Boolean value that indicates whether data was returned for this endpoint.

Select the Record Exists option if you only want to know of the existence of the data and not about the content of the data.

10. Select **Next**.



Add Property from Database - Step 3 of 3

Add Property from Database

Display/Track

Specify where the property will be displayed. For single-value and list properties, you can create a Track Changes property that indicates a change in the retrieved value.

□ Display Property in Inventory View

Description: Real-time Inventory of tag

☑ Display Property in Host Profiles pane of Home View

☑ Display Property in the Assets Portal

□ Enable Track Changes

Name: tag Change

Description: Indicates a change in the tag property

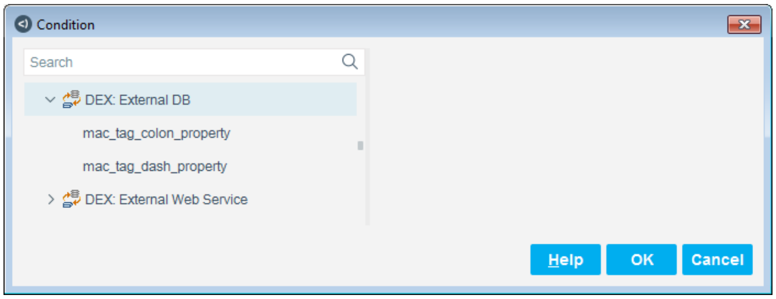
11. Define the following parameters to specify where the property is displayed in the Console.

Display Property in Inventory View	Select this option to list this property in the Inventory.
Description	This field is enabled when **Display Property in Inventory View** is selected. Enter the title of the Inventory item for this property.
Display Property in Host Profiles pane of Home View	Select this option to list this property in the Profiles tab of the Home View.
Display Property in the Assets Portal	Select this option to display this property in the Assets Portal.
Enable Track Changes	(For Single, Composite and List properties only) Select this option to create a second, parallel *change* property under the Track Changes folder of the Properties tree. Use the change property in policies to identify changes in the property values retrieved from the external server.
Name	This field is enabled when **Enable Track Changes** is selected. Enter a name of the Track Change for this property or accept the default name that is pulled from the Property Name field.
Description	This field is enabled when **Enable Track Changes** is selected. Enter a description describing the change in the selected property or accept the default description.

12. Select **Finish**. The property is added to the table in the Property tab.

When you create policy conditions, your properties are displayed in the Properties tree under the **DEX: External DB** folder. Related change tracking properties are displayed in the Track Changes folder.

🗎 *The Forescout platform only retrieves data and updates values for properties that are referenced by an active policy.*



Define a Property Based on an Existing Property

You can define a property by duplicating an existing property and editing its settings as required.

To duplicate a property:

1. In the Data Exchange pane, select the SQL/LDAP tab, then select the External Web Services tab or the CounterACT Web Service tab, and then select the Properties tab.
2. Select an existing property, and select **Duplicate**.
3. The Edit Property wizard opens. Fields in this wizard are identical to the Add Property wizard, and contain the values of the existing property you selected.

   The **Property Name** field contains the following dummy value based on the existing property:

   `Copy of` *<existing_property_name>*

   The **Property Tag** field contains a unique string generated by the Forescout platform.

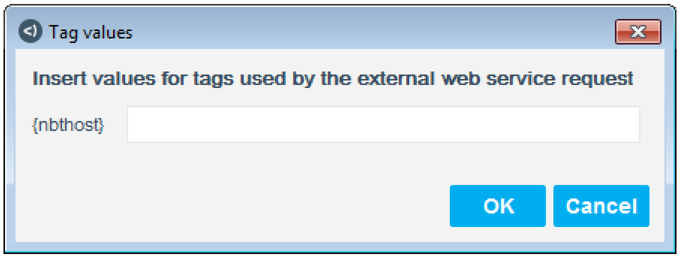
   Edit these values to create unique identifiers for the new property.
4. Modify any additional settings in the Edit Property Wizard.
5. Select **OK**. The property is added to the table in the Properties tab.

Test the Property

The property test verifies the definition of the property and the query that uses it. Because the query uses Forescout tags, you must enter a property value for tags in the query statement when running a test.

To test a custom host property:

1. In the Data Exchange pane, select a Properties tab.
2. Select an item and then select **Test**.



Insert values for tags used by the external web service request

{nbthost}

3. The field names in the Tag values dialog box correlate to the query statement selected within that property. Enter test values for the property tags and then select **OK**.

   Using the property tag values you enter, the Forescout platform submits a test query statement referenced by the new host property to the external server.

4. Verify that the correct data is retrieved, and that the new host property is assigned the correct value from the retrieved data.

Map External Data to Host Properties

🗎 *To map information submitted through the CounterACT Web Service to host properties, see Create a Forescout Host Property Based on the CounterACT Web Service.*

To assign values to properties based on external database information, you map the results of a *query statement* to the property. The query statement is submitted to the external server, and determines the data fields that are retrieved. The query statement must return single, list, or composite data values corresponding to the target host property. For example:

- To populate a Single property, use a query statement that retrieves a single field or attribute value from the external server. If you specify a query that returns multiple values, the property is evaluated as *irresolvable*.
- To populate a List property, use a query that retrieves several rows from a column of a SQL database, or an LDAP attribute with multiple values.

The Forescout platform limits the number of values that can be retrieved for List or Composite properties. When the query statement retrieves a column or attribute with more values than this maximum, the Forescout platform evaluates the corresponding property as *irresolvable*. Define the **Maximum Values Retrieved** setting in the General Settings tab to control this limit. See Manage Communication with Database Servers for details.

About Query Statements

A *Query Statement* is a set of SQL statements or User Directory filter strings that the Forescout platform submits to the external server to retrieve host information.

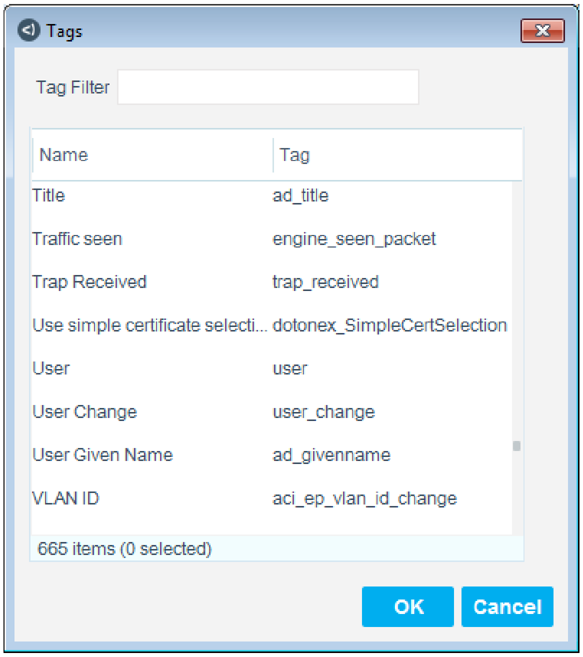
Query statements are server independent. The same query statement can be used with several different external servers that use the same query syntax.

To increase efficiency, it is recommended to compose one query statement that supports several Forescout properties. You define a query statement that returns several related data fields, and map them to different Forescout properties.

One Query Statement, Many Endpoints

The Forescout platform maps the data retrieved by the query to host properties. Typically, data is retrieved for each host, and is mapped to the host properties of that host. This means that each query sent to the external server must select data for a single host, based on a unique key value, such as the MAC or IP address.

To do this, the query statement must include at least one *property tag* that specifies host-specific key values. Property tags are placeholder parameters that represent endpoint property values. When the Forescout platform evaluates the query statement string, it replaces the tags with actual property values.



Name	Tag
Title	ad_title
Traffic seen	engine_seen_packet
Trap Received	trap_received
Use simple certificate selecti...	dotonex_SimpleCertSelection
User	user
User Change	user_change
User Given Name	ad_givenname
VLAN ID	aci_ep_vlan_id_change

665 items (0 selected)

For example, the following SQL statement uses the {ip} property tag:

```
select NAME,PHONE from MGRS where IP='{ip}’
```

To retrieve data, the Forescout platform submits multiple queries, replacing the {ip} property tag with the IP address of each host:

```
select NAME,PHONE from MGRS where IP='120.40.40.12’
```

```
select NAME,PHONE from MGRS where IP='100.30.30.10’
```

Similarly, the following LDAP filter uses the {hostname} property tag:

```
(name={hostname})
```

To retrieve data, the Forescout platform submits a query for each host, replacing the {hostname} property tag with the host name of the host:

```
(name=QA_TOSHIBA_1)
(name=SALES_LAPTOP2132)
```

Data is retrieved for each host, and can be mapped to the properties of that host.

> 🗎 *For more information about Property Tags, refer to the Forescout Administration Guide. See [Additional Forescout Documentation]() for information on how to access this guide.*

> 🗎 *You cannot use tags that resolve to lists as index keys.*

Because the MAC address is often used as an index key, this module provides property tags to support additional MAC address formats:

- **`{eds_mac_fmt_colon}`** resolves to the MAC address in colon-separated format.
- **`{eds_mac_fmt_dash}`** resolves to the MAC address in dash-separated format.
- **`{eds_mac_lc_fmt_colon}`** resolves to the MAC address in lowercase colon-separated format.
- **`{eds_mac_lc_fmt_dash}`** resolves to the MAC address in lowercase dash-separated format.
- **`{eds_mac}`** resolves to the MAC address in uppercase.

Query Statements Without Endpoint Values

In some cases, you may want to compose a query statement that does not use a host property as an index key, for example, to verify connectivity or return an external database parameter that is not endpoint-specific for use in a policy condition. These queries return a uniform value for all hosts.

> 🗎 *The Forescout platform only retrieves data and updates values for properties that are referenced by an active policy.*

Import and Export Definitions

It is sometimes useful and more efficient to copy and edit existing query statements or property definitions. For example:

- To quickly duplicate settings on all CounterACT devices
- To retrieve similar information from Directory Servers with slightly different naming conventions

You can export query statements and properties, edit them, and import the new definitions.

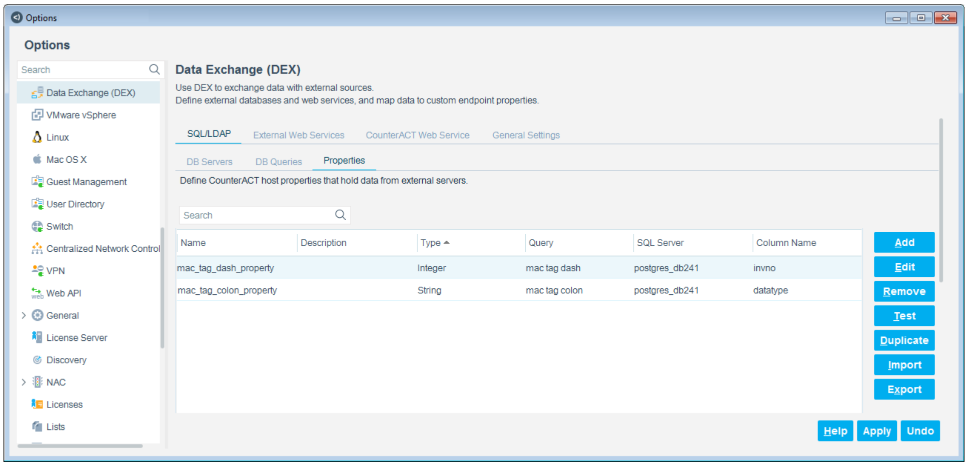
The Forescout platform uses a simple XML format to represent query statements and property definitions:

- Each query statement or property is represented as an XML element. Attribute flags correspond to data fields and options you set when you defined the statement or property.
- A composite property is represented as an XML element containing sub-property child elements.
- Each property and sub-property is assigned an internal label used by the Forescout platform.

Remember to import and export SQL server definitions specified by the properties you want to work with.

To export definitions:

1. In the Data Exchange pane, select the SQL/LDAP, External Web Services or CounterACT Web Service tab and then select a sub-tab.
2. (Optional) To export a subset of defined elements, select them in the list. For example, in the SQL/LDAP tab, you can select only LDAP query statements for export.



Data Exchange (DEX)

Use DEX to exchange data with external sources.
Define external databases and web services, and map data to custom endpoint properties.

Define CounterACT host properties that hold data from external servers.

Name	Description	Type ▲	Query	SQL Server	Column Name
mac_tag_dash_property		Integer	mac tag dash	postgres_db241	invno
mac_tag_colon_property		String	mac tag colon	postgres_db241	datatype

3. Select **Export**. The Import/Export Password dialog box opens.
4. To encrypt data, enter the password. Confirm the password and then select **OK**. The Export Table dialog box opens.
5. (Optional) Edit the default path name. If you are exporting a subset of the defined elements, select the **Selected rows only** option.
6. Select **OK**. The elements are exported to the specified file.

To import definitions:

1. In the Data Exchange pane, select the SQL/LDAP, External Web Services or CounterACT Web Service tab.

   🗎 *If you are importing properties and their related query statements, first import the SQL servers and query statements referenced by the properties, and apply changes. Next, import the properties.*

2. Select **Import**. The Import dialog box opens.

3. Browse to and select the source XML file you want to import, and then select **OK.**
4. Elements of the type listed in the selected tab are imported from the source file. They are added after existing elements of the list. When imported elements have the same name as existing items, the label `(duplicate` *n*`)` is appended to their name.
5. Select **Apply**. New imported elements are created, and imported changes are applied to existing elements.

🗎 *Apply changes to query statements before you import properties.*

About Update Statements

An *Update Statement* is a set of SQL statements that the Forescout platform sends to the external server to modify the external database. You specify an update statement when you use the DEX Update External Database action in a policy.

Typically, update statements write host-specific information to the external database. This means that each statement sent to the external server must reference a single host, based on a unique key value, such as the MAC or IP address. To do this, the update statement must use at least one Forescout property tag to specify host-specific key values.

For example, the following SQL statement uses the {mac} and {user} property tags:

```
INSERT INTO mactable VALUES('{mac}','{user}’);
```

When this update statement is used in a policy, the Forescout platform submits multiple statements to the external database. For each host that matches the policy conditions, the Forescout platform creates a statement by replacing the property tags with the MAC address and user name of the host:

```
INSERT INTO mactable VALUES(' 00:A0:C9:14:C8:29','admin’);
```

The update statement modifies the external database record for the specified host.

See Update an External SQL Database for details.

Manage Communication with Database Servers

Policies that interact with external database and directory servers can generate significant communications between the Forescout platform and external servers. The module provides tools and options that let you monitor traffic with external servers, and tune behavior to match available bandwidth and resources.

You can also use standard Forescout options, such as policy recheck schedules, to control the volume of communication with external servers.

- For tools to control all module interaction with external servers, see General Tools.
- For tools to control traffic for specific queries or servers, see Tools to Manage Individual Entities.

General Tools

The tools described in this section apply to all query/update communication with external servers using this module. These general tools are available on the General Settings tab of the Data Exchange pane.

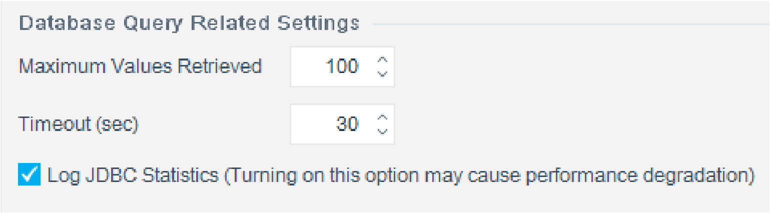
- To use the JDBC statistics log, select **Log JDBC Statistics**.

  CounterACT devices record external server interactions in the following file:

  `usr/local/forescout/log/plugin/eds/stats.log`

  New records are appended to any existing records in the file.

  To stop recording JDBC statistics, clear the **Log JDBC Statistics** option.
- Set the following options to control communication with external servers:
  - The **Maximum Values Retrieved** setting limits the results the Forescout platform accepts in response to a query statement. When the query statement retrieves a column or attribute with more values than this maximum, the Forescout platform evaluates the corresponding property as *Unresolvable*.
  - The **Timeout** setting determines how long the Forescout platform waits after submitting a request to the external server. If the external server does not respond within the timeout period, the Forescout platform evaluates related host properties as Irresolvable. If **Log JDBC Statistics** is selected, an error is recorded for this session in the log.



Database Query Related Settings

Maximum Values Retrieved 100

Timeout (sec) 30

☑ Log JDBC Statistics (Turning on this option may cause performance degradation)

Tools to Manage Individual Entities

Use these tools to fine-tune traffic to a specific external server, or traffic generated by an individual query statement.

- To control traffic for a specific external server, select the SQL Servers tab. Select the server, and select **Edit**. Modify the **Maximum Requests** and **Maximum Buffered Requests** settings to limit the volume of requests from the Forescout platform to the SQL server. See Define Connections to External Servers for details.

Similar settings are available for LDAP servers. Refer to the Forescout Authentication Module: User Directory Plugin Server and Guest Management Configuration Guide for details. See Additional Forescout Documentation for information on how to access this guide.

- To control traffic for a specific query statement, select the Query Statement tab. Select the query statement, and select **Edit**. Modify the **Cache** setting to change the validity period for values retrieved with that query. This setting affects how often the Forescout platform sends the query to the external server. See Define LDAP or SQL Query Statements for details.

The JDBC Statistics Log

This module uses the Java Database Connectivity API to implement connectivity with external servers. Using the JDCB log option, you can record all requests the Forescout platform submits to external servers. This information is useful in fine-tuning the performance of the module.

The Forescout platform records the following data for each request submitted to external servers:

- The type of request submitted to the server. Valid values include:
  - QUERY: A query statement was submitted to retrieve information.
  - UPDATE: An update statement was submitted to write information.
- The name of the query or update statement.
- The name of the property that caused the interaction. The Forescout platform submitted the query request to resolve the value of this property. This field is not defined for update interactions.
- The time when the request was sent to the external server, in Unix epoch time format.
- The time when the complete results were received from the external servers, in Unix epoch time format.
- The number of rows/values in the request. For a query statement, this is the number of rows or values received. For an update statement, this is the number of rows inserted or updated.
- Total time to process the statement, measured as the elapsed time between submission and response.
- Bytes received in response to a query statement, up to the maximum row/value cutoff. This field is not defined for update interactions.
- Text of the SQL/LDAP statement as it was submitted to the external server, after property tags are resolved to actual host values.
- JDBC URL: The request as it was transmitted in URL format.

The following example shows typical log entries.

🗎 *<Server_IP>:<Port>/<User_Name> is written as a substitute for the actual value that was in the example.*

```
UPDATE
     “insert statement"
     “undef"
     “1,358,332,479,503"
     “1,358,332,479,512"
     “9"
     “1"
     “undef"
     “insert into statustable values ('160.0.0.2','no_antivirus')"
     “root@jdbc:mysql://<Server_IP>:<Port>/<User_Name>"
QUERY
     “eds ip"
     “value exist"
     “1,358,332,518,504"
     “1,358,332,518,505"
     “1"
     “0"
     “0"
     “select FULLNAME from userstable where ip='160.0.0.2'"
root@jdbc:mysql://<Server_IP>:<Port>/<User_Name>
```

Work with External Web Services

Data exchange between the Forescout platform and external APIs and web services is a REST interaction based on HTTP messaging.

Exchanged data typically uses an XML or JSON data structure. When you submit a request message to retrieve data, the returned payload is parsed to yield Forescout property values. When you submit a request message with data to an external service, the message header should conform to the required structure.

> *In addition to requests initiated by the Forescout platform, external platforms can submit REST messages to the CounterACT web service. See Work with the CounterACT Web Service for details.*

Depending on the desired Integration Scenarios, perform the following procedures:

- Define Requests to External Web Services
- Define Host Properties Based on Data from External Web Services

Define Requests to External Web Services

You can define an HTTP request message that the Forescout platform submits to an external web service. To let the DEX Open Integration Module support more REST APIs that expect a body in the request, you can configure the *POST Method* and the *HTTP Request Body* fields in REST format. You can also use a JSON Web Token or other standard tokens for authentication purposes.

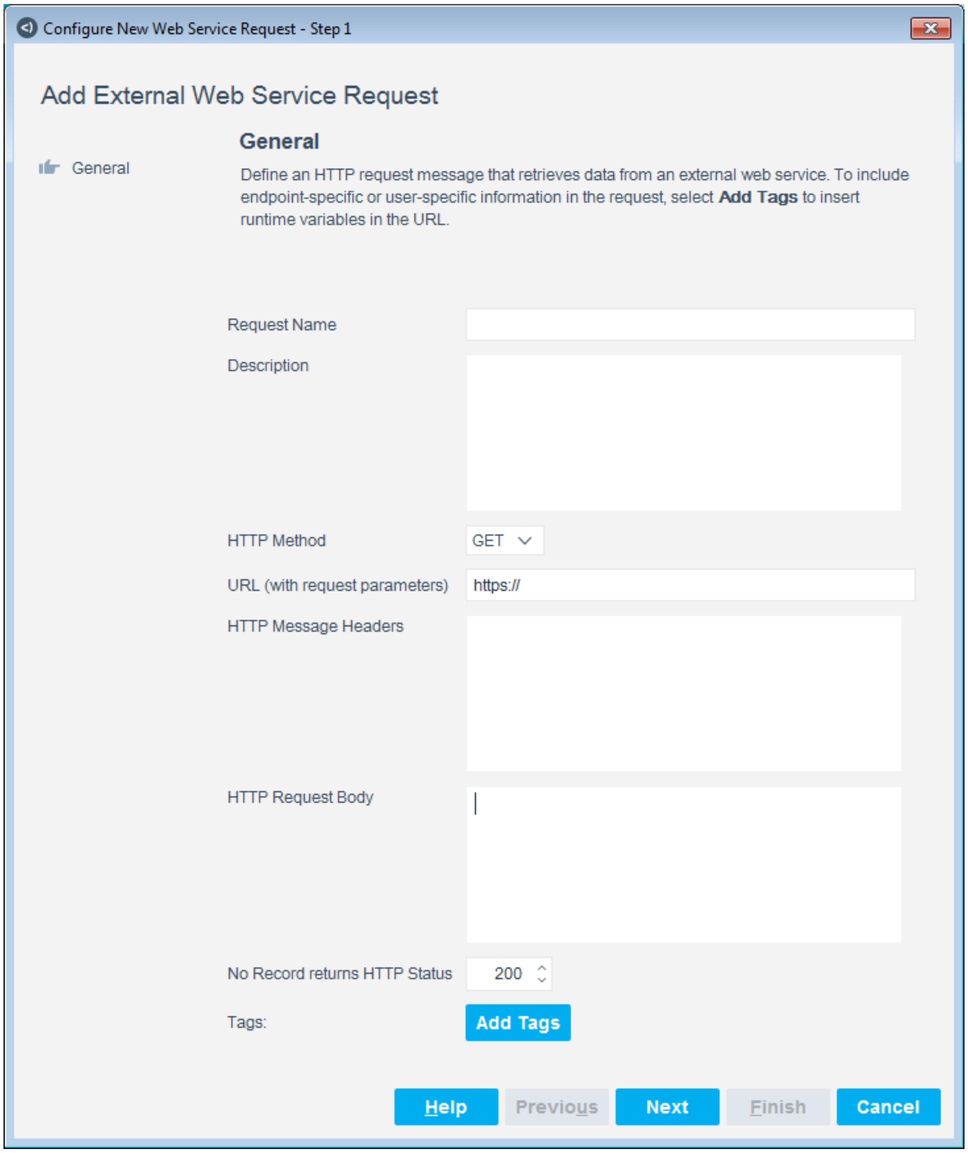
Typically, this message requests structured data from the web service. The Forescout platform parses the returned payload to update a custom endpoint property with data from the web service.

Several optional settings let you tune the volume of requests that the Forescout platform sends to the web service, and specify which CounterACT Appliance(s) contact the web service.

🗎 *The maximum number of HTTP request messages that can be configured is 10; a cluster of the same HTTP request message is counted as one message.*

To define an HTTP request message to an external web service:

1. In the Data Exchange pane, select the External Web Services tab and then select the Web Service Requests tab.
2. Select **Add**.



Configure New Web Service Request - Step 1

Add External Web Service Request

General

Define an HTTP request message that retrieves data from an external web service. To include endpoint-specific or user-specific information in the request, select **Add Tags** to insert runtime variables in the URL.

Request Name

Description

HTTP Method: GET

URL (with request parameters): https://

HTTP Message Headers

HTTP Request Body

No Record returns HTTP Status: 200

3. In the General pane, define the following parameters:

Request Name	Enter the name of this request. For example: *My Request.*
Description	Enter a brief description of the purpose of this request, and its target service.
HTTP Method	Select the HTTP method for retrieving data from an external web service. ▪ **GET**: Retrieves information from the external web service. Using the same parameters gives the same results. ▪ **POST**: Creates or updates the external web service.
URL (with request parameters)	Enter the request URL. Typically, this is the URL exposed by the web service, plus query parameters. Because returned data is parsed into endpoint properties, the IP or MAC address should be an index used to select returned data. Select **Add Tags** to insert runtime variables that are replaced by the IP/MAC address of the endpoint. This occurs when the request is submitted. Example URL: **`https://123.123.123.123:3000/endpoints/{ip}`**

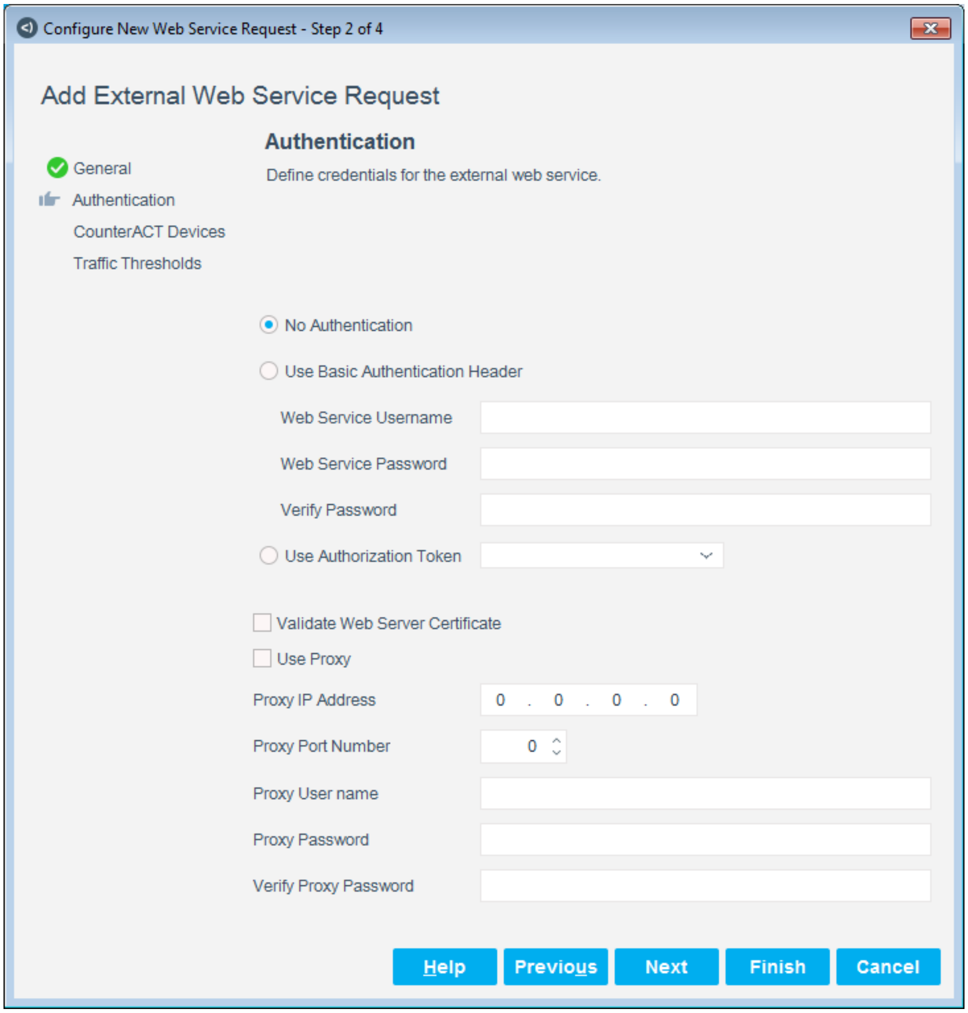
HTTP Message Headers	Enter the HTTP headers included in the message.
	Example message header:
	`Authorization: Bearer {eds_ext_web_auth_token}`
	`Content-type: Application/json`

HTTP Request Body	Enter the actual HTTP request data. The default limit is set to 5 KB.
	Example request body:
	`{`
	`  “time”:{eds_time_epoch},`
	`  “mac”:{mac},`
	`  “hostname”:{nbtab}`
	`}`

No Record Returns HTTP Status	Select the HTTP status code that this service returns when no record matches the query parameters.

Tags	To insert runtime variables, put the cursor in a text field and select **Add Tags**. These variables are replaced with: **1.** Actual endpoint property values. Refer to the *Forescout Administration Guide* for details. See Additional Forescout Documentation for information on how to access this guide. **2.** Non-endpoint-related information. These special tags are as follows: - **`{eds_time_epoch}`**: The current time in epoch format. - **`{eds_time_utc}`**: The current time in UTC format. - **`{eds_ext_web_auth_token}`**: The authorization token that refers to the authorization token selected in the Authentication step. This tag can be placed in URL/Headers/Body. Note: when the token is in the form of an HTTP cookie, there is no need to add this tag, because the HTTP request uses the cookie for authorization. - **`{eds_mac}`**, **`{eds_mac_fmt_colon}`**, **`{eds_mac_fmt_dash}`**, **`{eds_mac_lc_fmt_colon}`**, **`{eds_mac_lc_fmt_dash}`**: The MAC address in uppercase, colon-separated format, dash-separated format, lowercase colon-separated format, or lowercase dash-separated format. - **`{eds_user_xxx}`**, **`{eds_user_xxx_password}`**: The username and password to be used in external web service requests, URLs, and actions, where xxx is the user-defined username.

4. Select **Next**.



Configure New Web Service Request - Step 2 of 4

Add External Web Service Request

- ✓ General
- Authentication
- CounterACT Devices
- Traffic Thresholds

Authentication

Define credentials for the external web service.

● No Authentication

○ Use Basic Authentication Header

Web Service Username

Web Service Password

Verify Password

○ Use Authorization Token

□ Validate Web Server Certificate

□ Use Proxy

Proxy IP Address: 0 . 0 . 0 . 0

Proxy Port Number: 0

Proxy User name

Proxy Password

Verify Proxy Password

5. In the Authentication section, define the following parameters:

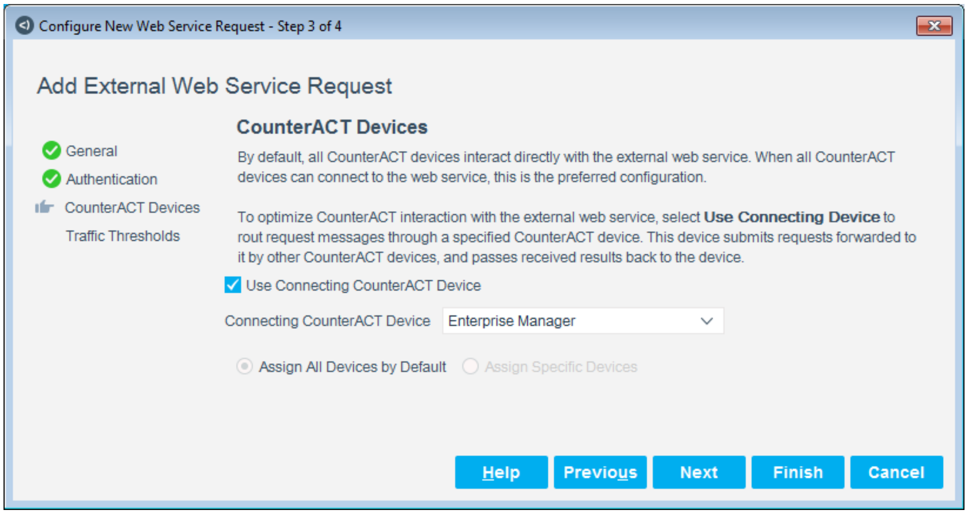
No Authentication	Select this option if you do not want to use a web service username/password or an Authorization Token.
Use Basic Authentication Header	Select this option if you want to use the basic authentication header.
Web Service Username	Enter the username for authorizing credentials for the request message. This is sent as part of the message header.
Web Service Password **Verify Password**	Enter the password for authorizing credentials for the request message that is sent as part of the message header. Re-enter the password to verify it.
Use Authorization Token	Select this option to use an Authorization Token, and then select the token name from the drop-down menu. The available Authorization Tokens are taken from the External Web Services tab, Authorization Token sub-tab.

Validate Web Server Certificate	By default, this option is not selected, meaning that the DEX Open Integration Module always sets up the connection, regardless of whether the server certificate is a common commercial Certificate Authority issued certificate. If you select this option, you are adding certificate validation. ▪ If the server certificate is a common commercial Certificate Authority issued certificate, the DEX Open Integration Module sets up the connection to the server. ▪ If the server certificate is not a common commercial Certificate Authority issued certificate, the DEX Open Integration Module does not set up the connection to the server.

6. In the Proxy section, define the following parameters:

Use Proxy	Select this option to access the web service via a proxy.
Proxy IP Address	Enter the IP address of the proxy server.
Proxy Port Number	Specify the port on the proxy server to which the HTTP request is sent.
Proxy User name	Enter the username for authorizing the Forescout platform to access the proxy server.
Proxy Password **Verify Proxy Password**	Enter the password for authorizing the Forescout platform to access the proxy server. Re-enter the password to verify it.

7. Select **Next**.



Add External Web Service Request

CounterACT Devices

By default, all CounterACT devices interact directly with the external web service. When all CounterACT devices can connect to the web service, this is the preferred configuration.

To optimize CounterACT interaction with the external web service, select **Use Connecting Device** to rout request messages through a specified CounterACT device. This device submits requests forwarded to it by other CounterACT devices, and passes received results back to the device.

☑ Use Connecting CounterACT Device

Connecting CounterACT Device: Enterprise Manager

● Assign All Devices by Default ○ Assign Specific Devices

8. By default, all CounterACT devices interact directly with the external web service. Each Appliance submits a request message to the service when it must resolve a property that contains web service data for an endpoint it manages. When all CounterACT devices can access the web service in the network, this is the preferred working method.

Sometimes, it may be necessary to route request messages through a designated CounterACT device. For example:

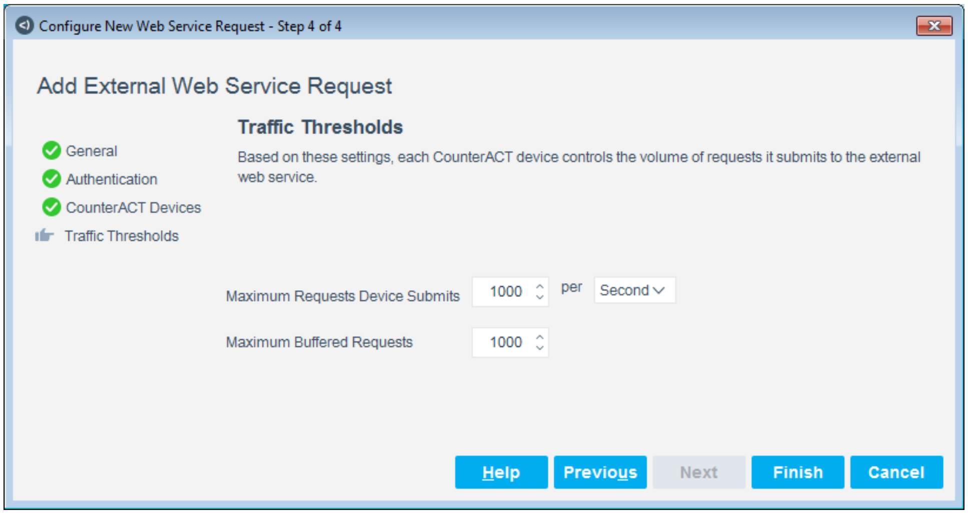
- When some Appliances cannot directly contact the web service.
- To optimize the traffic between the Forescout platform and the web service.

In such cases, select **Use Connecting CounterACT Device**. From the **Connecting CounterACT Device** drop-down menu, select the CounterACT device that submits this request message to the external web service. This device handles all communication with the external service. It forwards requests submitted to it by the other CounterACT devices, and it returns responses to CounterACT devices.

🗎 *It is a best practice to assign a maximum of five URLs to one connecting CounterACT device.*

You can define clusters of CounterACT devices that use a different connecting device. For example, CounterACT devices in each region or network segment can send requests through a local CounterACT device. See Define a Cluster of CounterACT Devices for details.

9. Select **Next**.



Configure New Web Service Request - Step 4 of 4

Add External Web Service Request

Traffic Thresholds

Based on these settings, each CounterACT device controls the volume of requests it submits to the external web service.

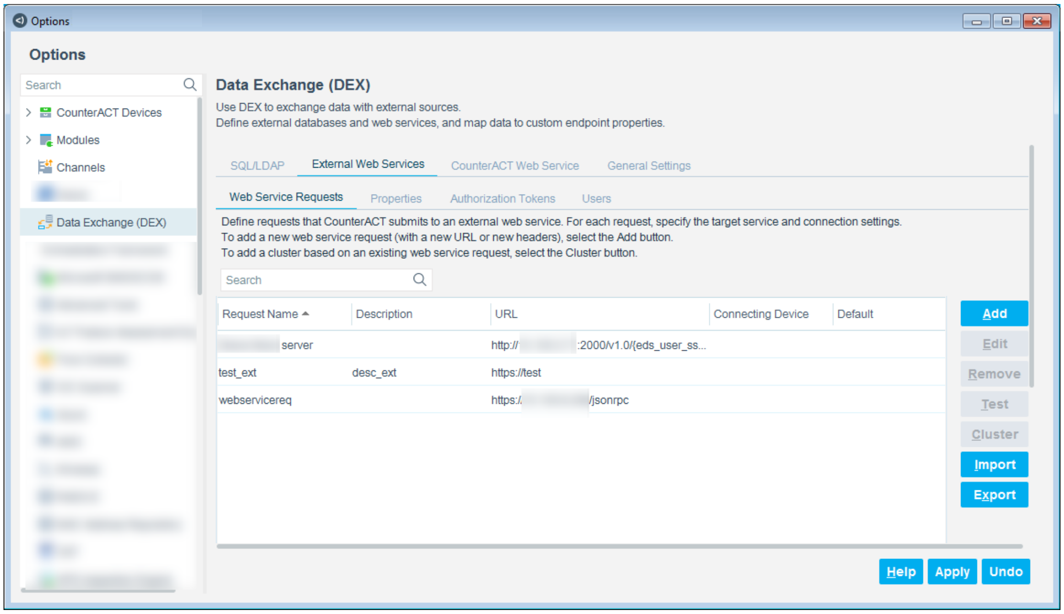
Maximum Requests Device Submits: 1000 per Second

Maximum Buffered Requests: 1000

10. Define the following parameters:

Maximum Requests Device Submits **per**	Select the maximum number of instances of this web service request message that each CounterACT device submits to the external web service during the specified time interval (second, minute, hour, or day).
Maximum Buffered Requests	Select the maximum number of request messages that are queued when the CounterACT device is already handling the maximum number of concurrent requests.

11. Select **Finish**. The request is added to the table in the Web Service Requests tab.



Data Exchange (DEX)

Use DEX to exchange data with external sources.
Define external databases and web services, and map data to custom endpoint properties.

Define requests that CounterACT submits to an external web service. For each request, specify the target service and connection settings.
To add a new web service request (with a new URL or new headers), select the Add button.
To add a cluster based on an existing web service request, select the Cluster button.

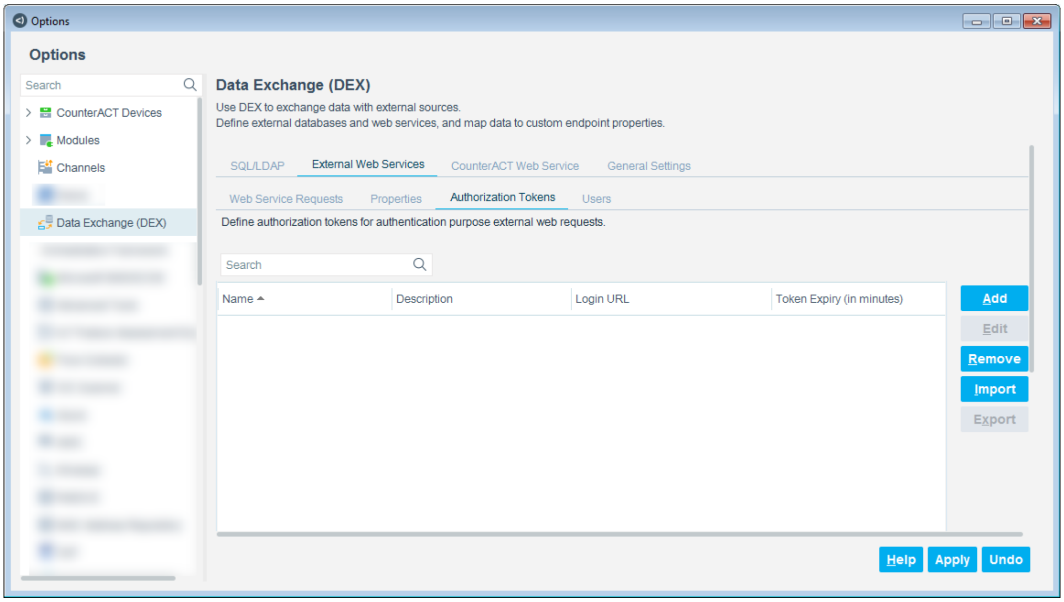
Request Name	Description	URL	Connecting Device	Default
[redacted] server		http://[redacted]:2000/v1.0/{eds_user_ss...		
test_ext	desc_ext	https://test		
webservicereq		https:/[redacted]/jsonrpc		

Authentication Tokens

You can configure the DEX Open Integration Module to integrate with the APIs of third-party solutions that implement JSON web tokens or other standard tokens. This lets you integrate with third-party web services.

To add an authentication token:

1. In the Data Exchange pane, select the External Web Services tab and then select the Authentication Tokens tab.



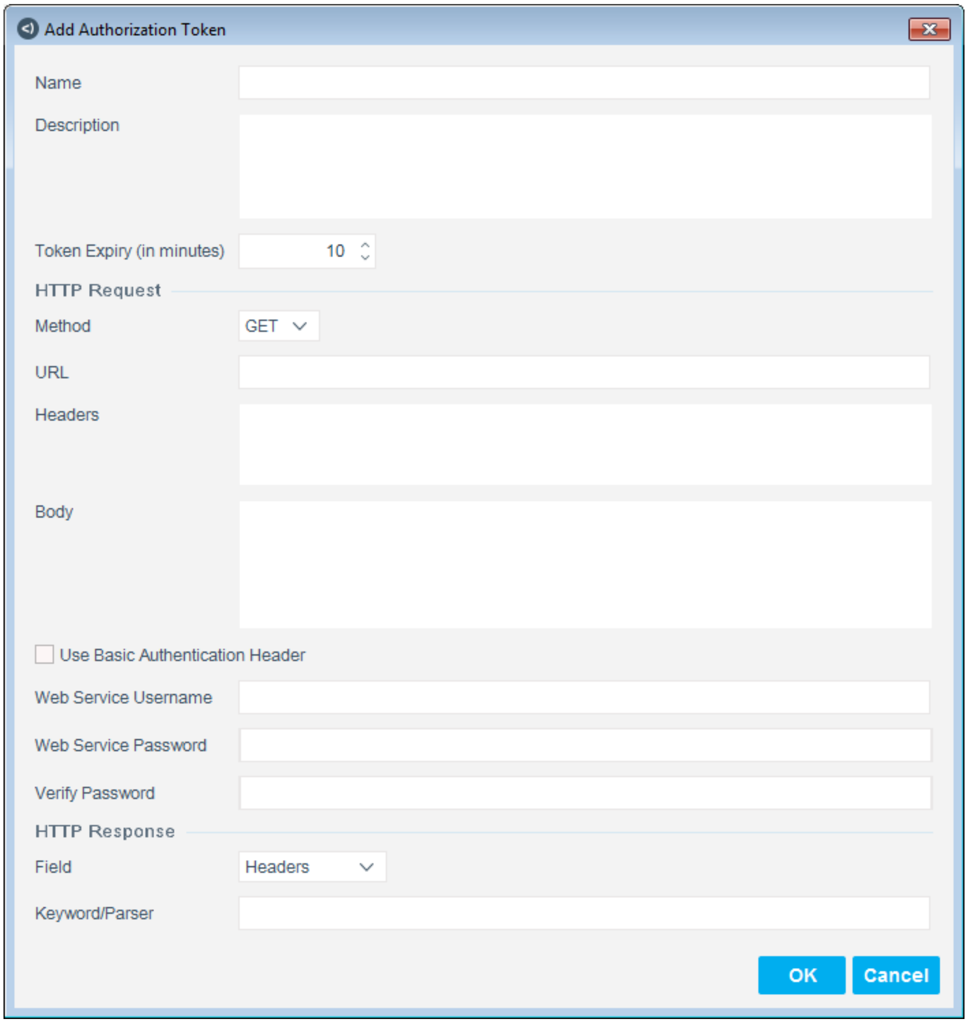
Data Exchange (DEX)

Use DEX to exchange data with external sources.
Define external databases and web services, and map data to custom endpoint properties.

Define authorization tokens for authentication purpose external web requests.

Name	Description	Login URL	Token Expiry (in minutes)

2. Select **Add**.



Token Expiry (in minutes): 10

Method: GET

Field: Headers

3. Define the following parameters:

Name	Enter the name of your Authentication Token.
Description	Enter a brief description of the authentication token, if needed.
Token Expiry (in minutes)	Select the number of minutes the token lasts after it is issued. The minimum is 10 minutes (default). The frequency at which the DEX Open Integration Module refreshes the token is 3 minutes less than what is configured in this field. In practice, there is a delay between the time that the DEX Open Integration Module sends a request using the token and the time the web service begins processing the request.

Method	Select the HTTP method for retrieving data from an external web service. ▪ **GET**: Retrieves information from the external web service. Using the same parameters gives the same results. ▪ **POST**: Creates or updates the external web service.
URL	Enter a URL to submit a request for a JSON Web Token or other standard token to be generated. For example: `https://{company IP}/companyapi/login`
Headers	Enter the HTTP headers included in the message.
Body	Enter the actual HTTP request data.
Use Basic Authentication Header	Select this option if you want to use the basic authentication header.
Web Service Username	Enter the username for authorizing credentials for the request message. This is submitted as part of the message header.
Web Service Password **Verify Password**	Enter the password for authorizing credentials for the request message that is submitted as part of the message header. Re-enter the password to verify it.
HTTP Response Field	Select the field that the HTTP Response should look up for the authorization token. ▪ **Headers**: The authorization token is in one of the headers. ▪ **Entire Content**: The authorization token is the entire content. ▪ **Content: XML**: The authorization token is in content that is in XML format. ▪ **Content: JSON**: The authorization token is in content that is in JSON format. ▪ **In Cookie**: The Authorization token is in the form of an HTTP cookie.
Keyword/Parser	Enter the keyword or parser needed to extract the token from the HTTP response based on the HTTP Response Field. ▪ **Headers**: The name of one header that indicates the authorization token. ▪ **Entire Content**: Parser is not required. ▪ **Content: XML**: The parsing pattern of XML Path. See Appendix 5: External Web Service Parser Construction for details. ▪ **Content: JSON**: The parsing pattern of JSON Path. See Appendix 5: External Web Service Parser Construction for details. ▪ **In Cookie**: Parser is not required.

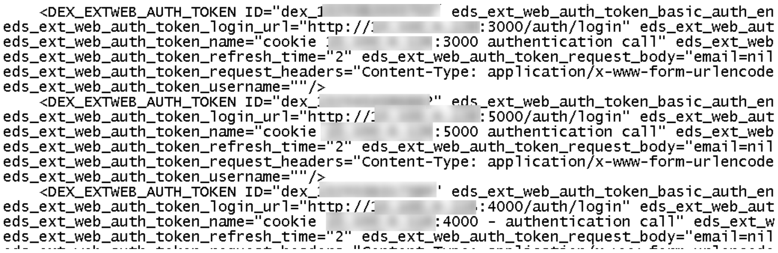
4. Select **OK**.

🗎 *The proxy configuration that the DEX Open Integration Module uses for the token refreshment call depends on the external web service request that uses the token. If multiple external web service requests use the same token but different proxies, upon refreshing the token, the proxy for the token refreshment call is based on the most recent external web service request that used the token.*

Import Authentication Token

You can import your own XML-based Authentication Token.

1. In the Data Exchange pane, select the External Web Services tab and then select the Authentication Tokens tab.
2. Select **Import**. The Import dialog box opens.
3. Select **Browse** and select the XML file to run on web services.



```
    <DEX_EXTWEB_AUTH_TOKEN ID="dex_[redacted] eds_ext_web_auth_token_basic_auth_en
eds_ext_web_auth_token_login_url="http://[redacted]:3000/auth/login" eds_ext_web_aut
eds_ext_web_auth_token_name="cookie [redacted]:3000 authentication call" eds_ext_web
eds_ext_web_auth_token_refresh_time="2" eds_ext_web_auth_token_request_body="email=nil
eds_ext_web_auth_token_request_headers="Content-Type: application/x-www-form-urlencode
eds_ext_web_auth_token_username=""/>
    <DEX_EXTWEB_AUTH_TOKEN ID="dex_[redacted]" eds_ext_web_auth_token_basic_auth_en
eds_ext_web_auth_token_login_url="http://[redacted]:5000/auth/login" eds_ext_web_aut
eds_ext_web_auth_token_name="cookie [redacted]:5000 authentication call" eds_ext_web
eds_ext_web_auth_token_refresh_time="2" eds_ext_web_auth_token_request_body="email=nil
eds_ext_web_auth_token_request_headers="Content-Type: application/x-www-form-urlencode
eds_ext_web_auth_token_username=""/>
    <DEX_EXTWEB_AUTH_TOKEN ID="dex_[redacted]' eds_ext_web_auth_token_basic_auth_en
eds_ext_web_auth_token_login_url="http://[redacted]:4000/auth/login" eds_ext_web_aut
eds_ext_web_auth_token_name="cookie [redacted]:4000 - authentication call" eds_ext_w
eds_ext_web_auth_token_refresh_time="2" eds_ext_web_auth_token_request_body="email=nil
```

4. Select **OK**. The file is imported and is displayed in the Authentication Tokens tab.

Export Authentication Token

If you want to duplicate the configuration of a DEX Open Integration Module setup, you can export the Authentication Token.

1. In the Data Exchange pane, select the External Web Services tab and then select the Authentication Tokens tab.
2. Select **Export**. The Import/Export Password dialog box opens.
3. Enter the password in the **Password** and **Confirm Password** fields, and then select **OK**. The Export Table dialog box opens.
4. Select **Browse** to and select a location for the XML file. Select **Open**.
5. Select **OK**. In the Export Table dialog box, select **OK**.
6. If prompted to create a directory on the computer, select **Yes**.

   The XML file is exported.

Usernames and Passwords as Tags

You can configure usernames and passwords as tags to use within the DEX Open Integration Module. These tags can be used in external web service requests, URLs, and actions. Multiple usernames and passwords can be added as tags.

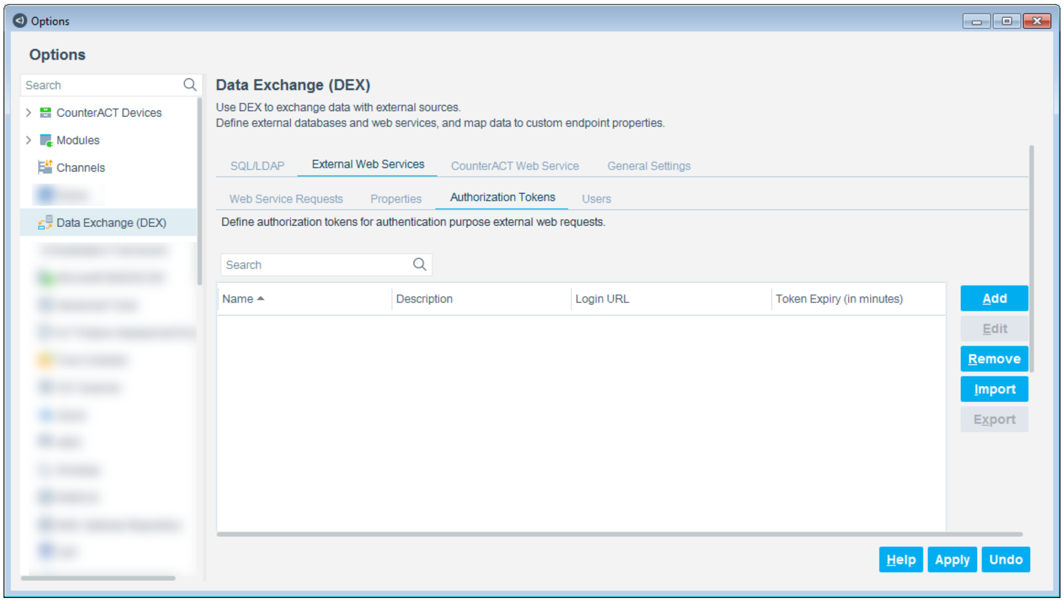
The benefits of using tags are:

- Passwords do not appear as clear text in the DEX configuration.

- Usernames and passwords do not need to be entered multiple times in Web Service Requests. Define them once and then use the tags multiple times.

To add usernames and passwords as tags:

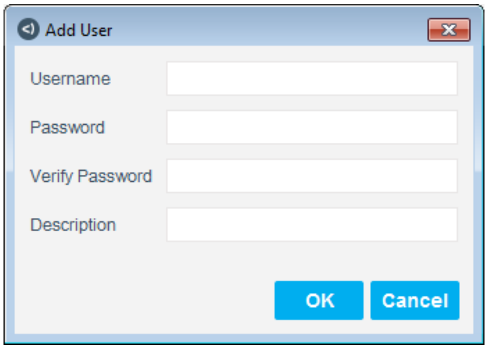
1. In **Options,** Data Exchange pane, select the External Web Services tab and then select the Users tab.



Use DEX to exchange data with external sources.
Define external databases and web services, and map data to custom endpoint properties.

Define authorization tokens for authentication purpose external web requests.

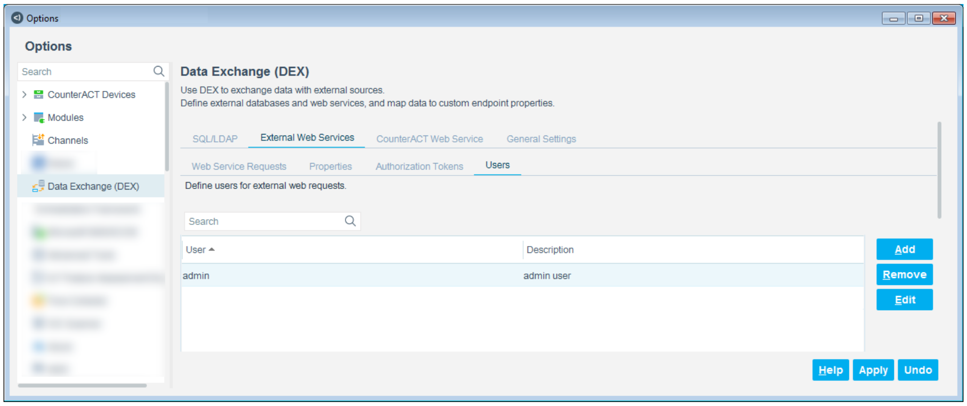
2. Select **Add**.



3. Define the following parameters:

Username	Enter the username.
Password	Enter the password. An empty password is not allowed.
Verify Password	Re-enter the password to verify it.
Description	(Optional) Enter a description of the username or password.

4. Select **OK**. The new user is displayed in the Data Exchange (DEX) pane.



Data Exchange (DEX)

Use DEX to exchange data with external sources.
Define external databases and web services, and map data to custom endpoint properties.

Define users for external web requests.

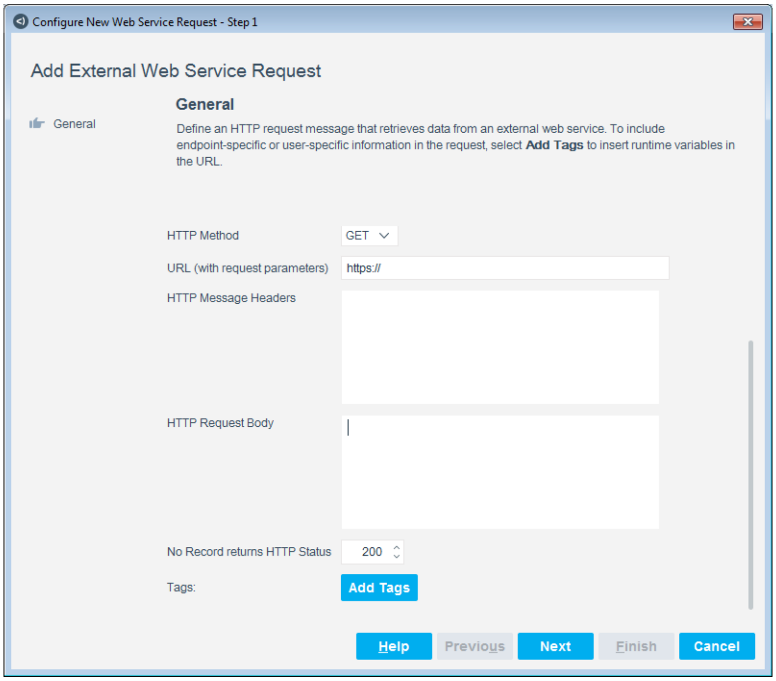
User ▲	Description
admin	admin user

5. Select **Apply**.
6. To add another user, select **Add** and repeat the steps.
7. To edit a username, password, or description, select a defined user and then select **Edit**.
8. To remove a user, select a defined user and then select **Remove**.

Example 1: Use Tag in Web Service Request

To use a username and password tag in a Web Service Request:

1. In **Options,** Data Exchange pane, select the External Web Services tab and then select the Web Service Requests tab.
2. Select **Add**.
3. Put the cursor in a text field to activate **Add Tags**.



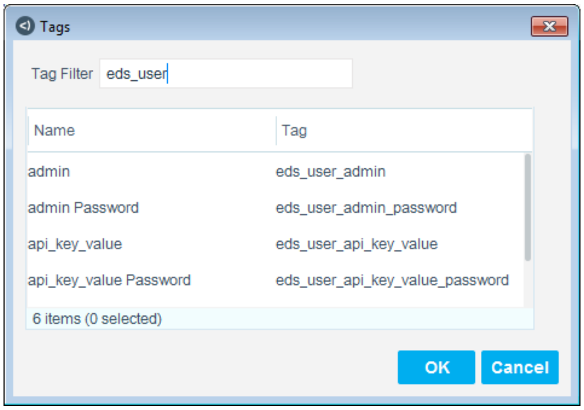
Configure New Web Service Request - Step 1
Add External Web Service Request
General
Add Tags
Help
Previous
Next
Finish
Cancel

General

Define an HTTP request message that retrieves data from an external web service. To include endpoint-specific or user-specific information in the request, select **Add Tags** to insert runtime variables in the URL.

HTTP Method: GET
URL (with request parameters): https://
HTTP Message Headers:
HTTP Request Body:
No Record returns HTTP Status: 200
Tags:

4. Select **Add Tags**.
5. In **Tag Filter**, you can search on either **Name** or **Tag**:
   - Type the username you defined, or
   - Type eds_user



Tags

Tag Filter: eds_user

Name	Tag
admin	eds_user_admin
admin Password	eds_user_admin_password
api_key_value	eds_user_api_key_value
api_key_value Password	eds_user_api_key_value_password

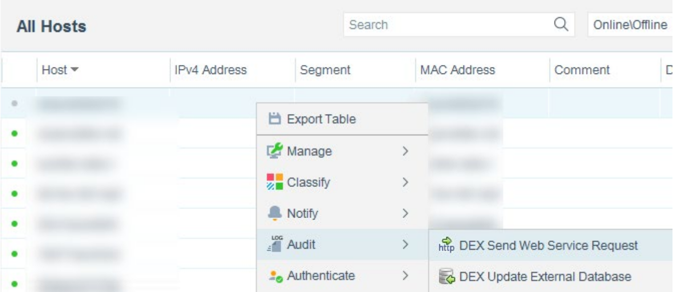
6 items (0 selected)

6. The tags for the username and password you defined are in the list. They are named eds_user_<username> and eds_user_<username>_password.
7. Select the tags that you want to use in the Web Service Request and select **OK**.
8. Complete the configuration of the Web Service Request and select **Next**. See Define Requests to External Web Services for details.

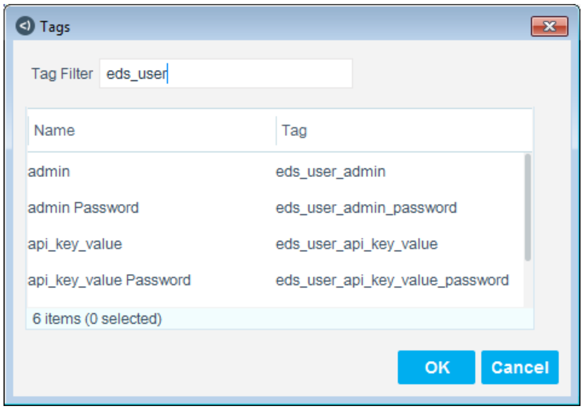
Example 2: Use Tag in Action

To use a username and password tag in an action:

1. In the Console, select **Home**.
2. In the All Hosts pane, right-click an endpoint and select **Audit > DEX Send Web Service Request**.



3. Put the cursor in a text field to activate **Add Tags**.
4. Select **Add Tags**.
5. In **Tag Filter**, search on either **Name** or **Tag**:
   - Type the username you defined, or
   - Type eds_user



Tag Filter eds_user

Name	Tag
admin	eds_user_admin
admin Password	eds_user_admin_password
api_key_value	eds_user_api_key_value
api_key_value Password	eds_user_api_key_value_password

6 items (0 selected)

6. The tags for the username and password you defined are in the list. They are named eds_user_<username> and eds_user_<username>_password.
7. Select the tags that you want to use in the action and select **OK**.
8. Complete the configuration of the action and select **OK**. See DEX Send Web Service Request Action for details.

Define a Cluster of CounterACT Devices

Each CounterACT device must query the external web service to resolve a property that contains web service data for an endpoint it manages. Request messages can be routed from CounterACT devices to the web service in several ways:

- All CounterACT devices interact directly with the external web service. When all CounterACT devices can access the web service in the network, this is probably the simplest, and most preferred, method.
- Define a single, default Connecting CounterACT Device for the request message. This device handles all communication with the external service. It forwards requests submitted to it by the other CounterACT devices, and it returns responses to CounterACT devices. You specify this device when you create or edit the request message. All CounterACT devices are automatically assigned to this connecting device.
- In addition to defining a single Connecting CounterACT Device, you can define one or more clusters of CounterACT devices that route request messages through the cluster's Connecting CounterACT device.

  To define a cluster:

  - Specify a group of CounterACT devices.
  - Specify a Connecting CounterACT Device for the cluster.

  All devices in the cluster route request messages through the cluster's Connecting CounterACT device. For example, CounterACT devices in each region or segment can send requests through a local CounterACT device.

This section describes how to define CounterACT device clusters to handle web service request messages.

🗎 *Before you perform this procedure, you must define a default CounterACT Connecting Device for the request message, as described in [Define Requests to External Web Services](). If not assigned to a cluster, devices route their request messages through this default Connecting Device.*

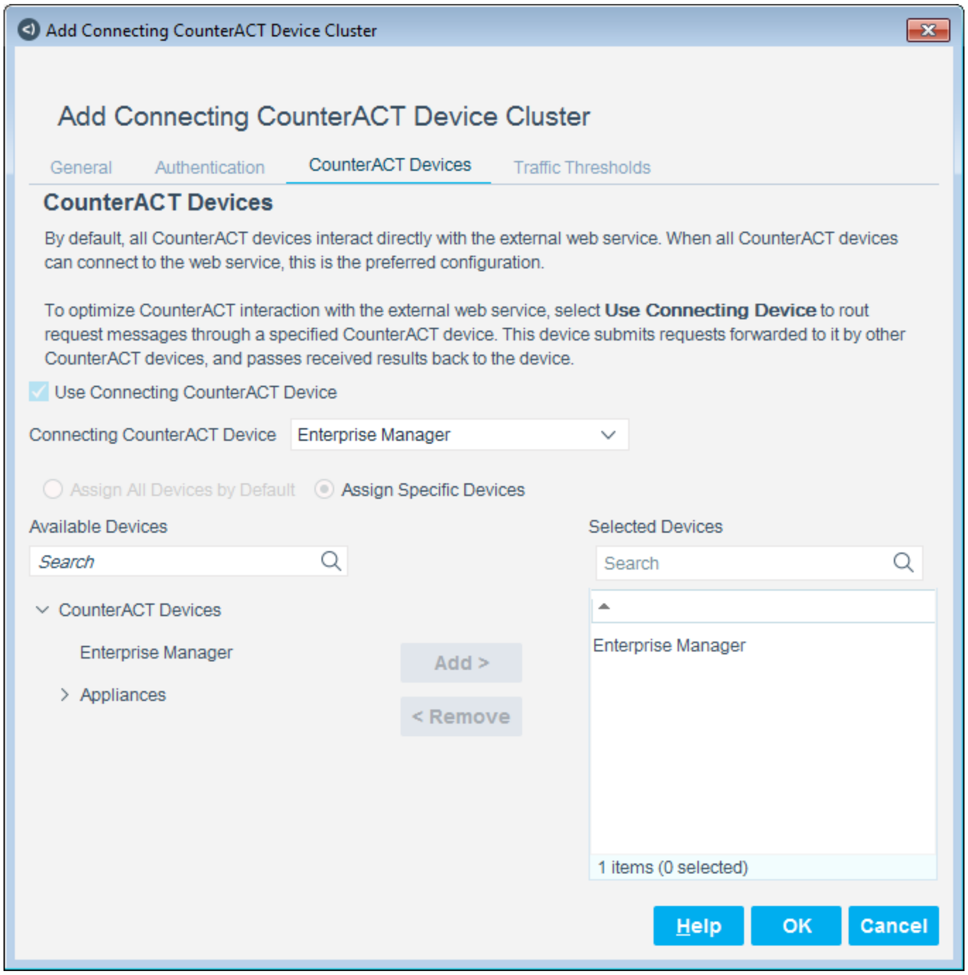
To define a cluster of CounterACT devices:

1. In the Data Exchange pane, select the External Web Services tab and then select the Web Service Requests tab.
2. Select an existing web service request and then select **Cluster**. The Add Connecting CounterACT Device Cluster dialog box opens.

   This dialog box duplicates the Web Service Request definition and adds the suffix _*cluster* to the Request Name. Only the following fields can be edited:

   – The **Description** field in the General tab. It is recommended that the word "cluster" be used in the description field.

   – The fields of the CounterACT Devices tab, which are used to specify the CounterACT device that handles the request.
3. Select the CounterACT Devices tab.


Add Connecting CounterACT Device Cluster
Add Connecting CounterACT Device Cluster
General
Authentication
CounterACT Devices
Traffic Thresholds

CounterACT Devices

By default, all CounterACT devices interact directly with the external web service. When all CounterACT devices can connect to the web service, this is the preferred configuration.

To optimize CounterACT interaction with the external web service, select **Use Connecting Device** to rout request messages through a specified CounterACT device. This device submits requests forwarded to it by other CounterACT devices, and passes received results back to the device.

☑ Use Connecting CounterACT Device

Connecting CounterACT Device: Enterprise Manager

○ Assign All Devices by Default ● Assign Specific Devices

4. **Use Connecting CounterACT Device** is selected by default. Define the cluster in the following fields:

Connecting CounterACT Device	Select the CounterACT device that handles this request message for all devices in the cluster. Only this device connects to the external web service. It forwards requests submitted to it by the other members of the cluster, and it returns the responses it receives from the external web service.
Available Devices **Selected Devices**	To specify the CounterACT devices that submit this request message through the specified connecting device: **1.** Select an item in the Available Devices list. **2.** Select **Add**. The selected device is displayed in the Selected Devices list. Devices in the Selected Devices list send the request message to the cluster's connecting device. They do not interact directly with the external web service, and they do not use the default Connecting Device defined for the request message.

5. Select **OK**. The new request message is displayed in the Web Service Requests tab.

Define Host Properties Based on Data from External Web Services

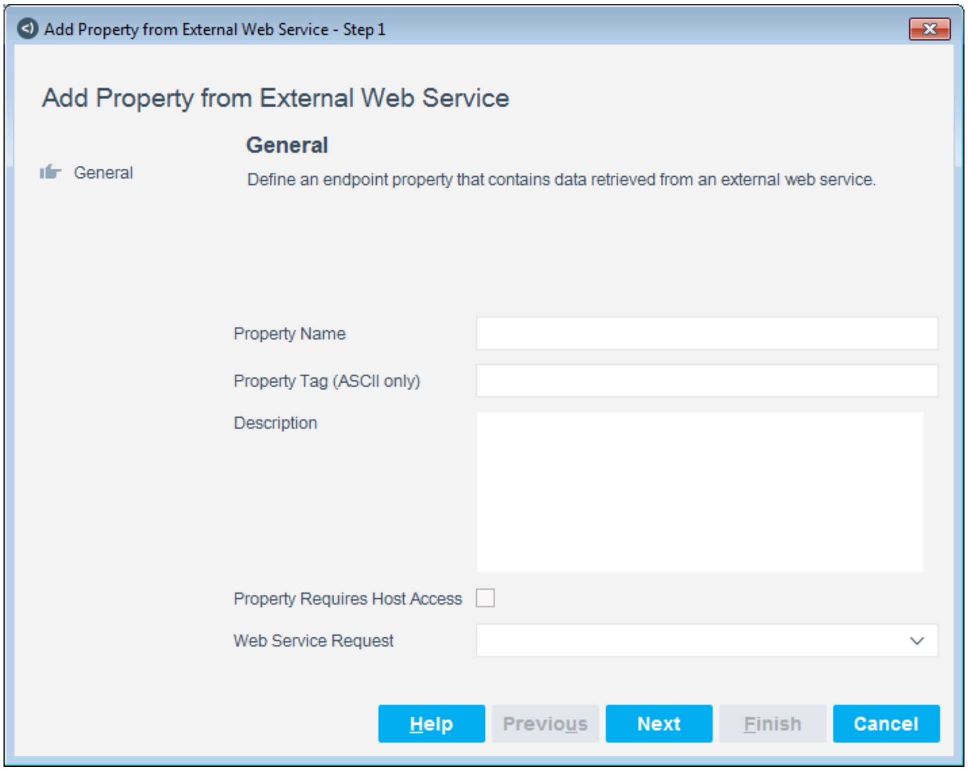
Properties store information that the Forescout platform discovers for each endpoint. You can create new Forescout properties to hold data retrieved from external services. This makes retrieved data available for use in Forescout policies.

Before you perform this procedure, define a request message that retrieves structured data from an external web service. This data is parsed to populate the property you create.

See Appendix 1: Forescout Property and Data Types for details.

To create a property from external web service data:

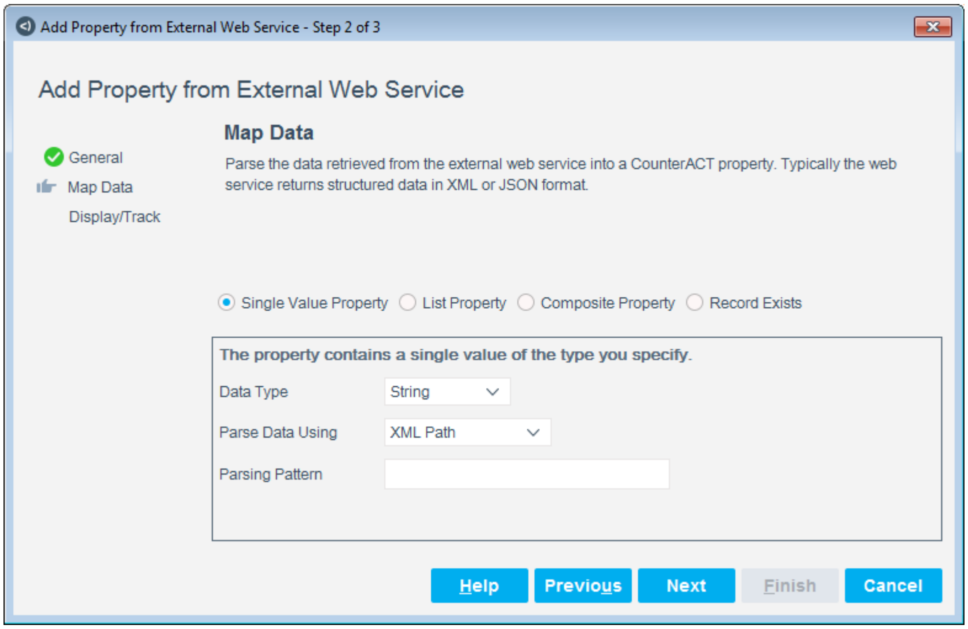
1. In the Data Exchange pane, select the External Web Services tab and then select the Properties tab.
2. Do one of the following:
   - To create a property based on an existing property, select the already defined property, and then select **Duplicate**. The Forescout platform creates a copy of the property in the Properties tab. Select the duplicate, and then select **Edit**.
   - To create a new property, select **Add**. The General pane of the Add Property from External Web Service wizard opens.


Add Property from External Web Service - Step 1
Add Property from External Web Service
General
General
Define an endpoint property that contains data retrieved from an external web service.
Property Name
Property Tag (ASCII only)
Description
Property Requires Host Access
Web Service Request
Help
Previous
Next
Finish
Cancel

3. Define the following parameters:

Property Name	Enter the name of the property.
Property Tag (ASCII only)	Enter the internal runtime tag of the property. The Forescout platform references the property using this unique identification string. Do not use spaces in the string.
Description	Enter a brief description of the purpose of this property, and its source web service.
Property Requires Host Access	Select this option if the property requires Host Access. For this property to be resolved, the Forescout platform requires access to the endpoint.
Web Service Request	Enter the name of the web service request that retrieves the data contained in this property.

4. Select **Next**.


Add Property from External Web Service - Step 2 of 3
Add Property from External Web Service
General
Map Data
Display/Track
Help
Previous
Next
Finish
Cancel

Map Data

Parse the data retrieved from the external web service into a CounterACT property. Typically the web service returns structured data in XML or JSON format.

● Single Value Property ○ List Property ○ Composite Property ○ Record Exists

The property contains a single value of the type you specify.

Data Type: String

Parse Data Using: XML Path

Parsing Pattern:

5. Select the type of property you want to create:
   - ***Single Value Property*** contains one retrieved value.
   - ***List Property*** contains a list of unique values.
   - ***Composite Property*** contains a flat record of several data types, similar to a database row. To define a Composite property, continue to step 7.
   - ***Record Exists*** properties contain a Boolean value that indicates whether data was returned for this endpoint. Select this option if you only want to know that the data exists, not what the data content is.

6. To define a **Single Value Property** or **List Property**, define the following parameters:

Data Type	Select the type of data the property contains. See Appendix 1: Forescout Property and Data Types for details.
Parse Data Using	Select the type of format of the expression used to extract data from the payload returned by the external web service. The options are XML Path, JSON Path, and Regular Expression. See **Parsing Pattern** or Appendix 5: External Web Service Parser Construction for details.
Parsing Pattern	Enter the expression used to extract data. ▪ For XML Path, the Parsing Pattern could look like: **`/response/result/serial_number/text()`** ▪ For JSON Path, the Parsing Pattern could look like: **`$..serial_number`** ▪ Regular Expression, the Parsing Pattern could look like: **`Begin(.*)End`** See Appendix 5: External Web Service Parser Construction for details.

Aggregate new values from each update	(Applies to List Property only) By default, the entire list is overwritten each time new data is received from the external web service. Select this option to add new, unique values to the existing list.

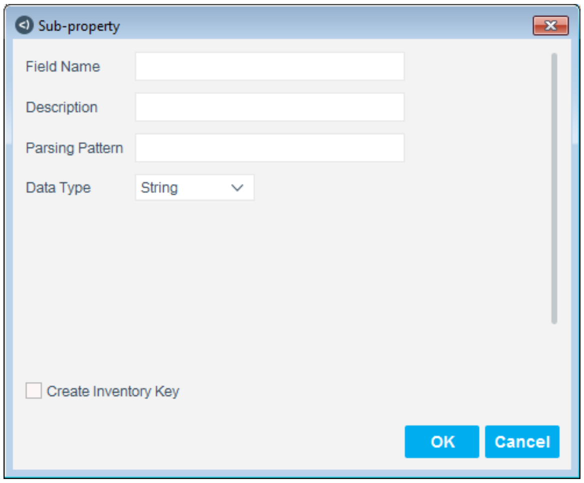
Continue to step 9.

7. To define a **Composite Property**:

   a. Define the following parameters:

Parse Data Using	Select the format of the expression used to extract data from the payload returned by the external web service. The options are XML Path and JSON Path. See Appendix 5: External Web Service Parser Construction for details.
Aggregate new values from each update	By default, the entire record is overwritten each time new data is received from the external web service. Select this option to add new, unique records to the existing values.

   b. Select **Add**.



   c. Define the following parameters:

Field Name	Enter the name of the Sub-property.
Description	Enter a description of the data contained in this Sub-property.
Parsing Pattern	Enter the expression used to extract data. See Appendix 5: External Web Service Parser Construction for details.
Data Type	Select the type of data the property contains. See Appendix 1: Forescout Property and Data Types for details.
Create Inventory Key	Select this option to display the property as an index key in the Views pane of the Inventory view.

   d. Select **OK**. The field is displayed in the composite property table. Repeat these steps to define additional fields of the composite property.

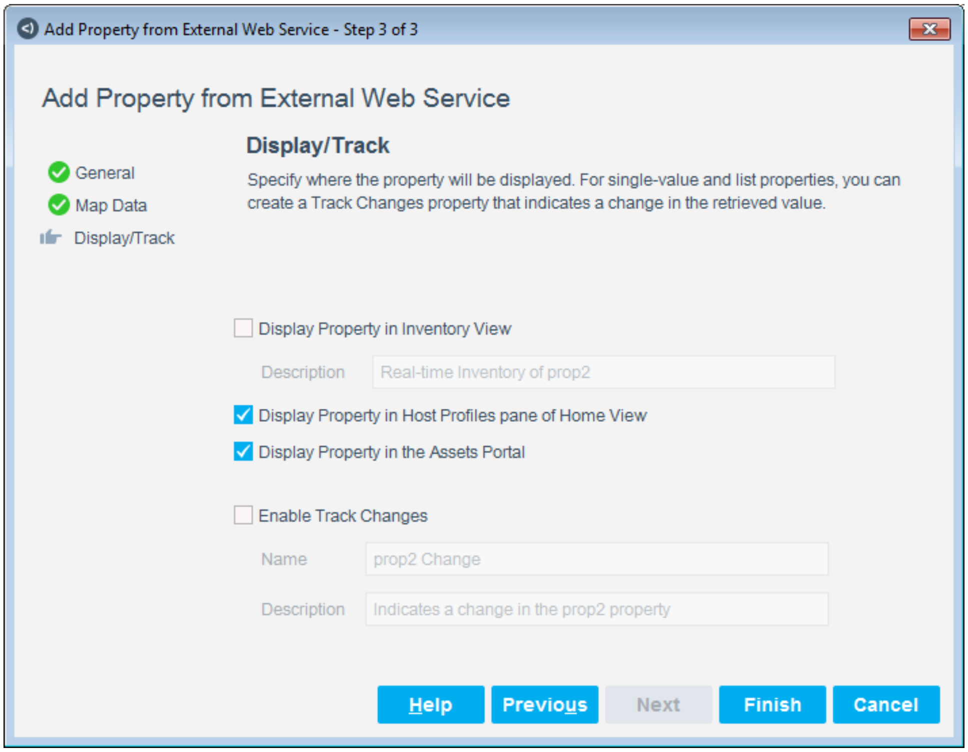
   e. Continue to step 9.

8. To define a **Record Exists Property**:

a. Define the following parameters:

Parse Data Using	Select the format of the expression used to extract data from the payload returned by the external web service. The options are XML Path, JSON Path and Regular Expression. See Appendix 5: External Web Service Parser Construction for details.
Parsing Pattern	Enter the expression used to extract data.

9. Select **Next**.



Add Property from External Web Service - Step 3 of 3

Add Property from External Web Service

✓ General
✓ Map Data
Display/Track

Display/Track

Specify where the property will be displayed. For single-value and list properties, you can create a Track Changes property that indicates a change in the retrieved value.

□ Display Property in Inventory View

Description: Real-time Inventory of prop2

☑ Display Property in Host Profiles pane of Home View

☑ Display Property in the Assets Portal

□ Enable Track Changes

Name: prop2 Change

Description: Indicates a change in the prop2 property

10. In the Display/Track pane, specify where the property is displayed in the Console:

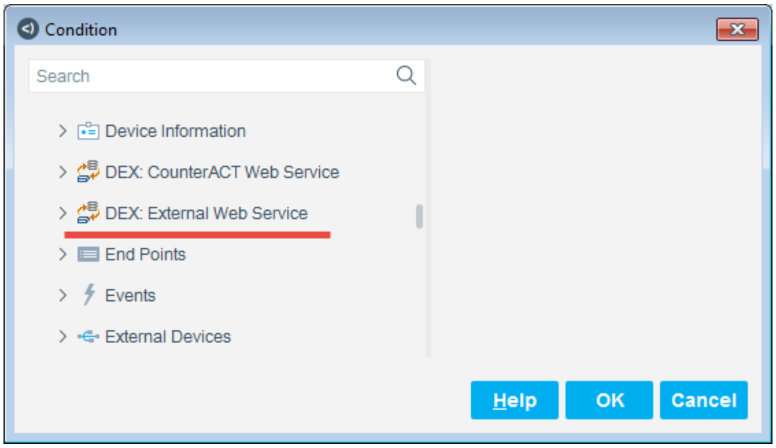
Display Property in Inventory View	Select this option to show this property in the Inventory.
Description	This field is enabled when **Display Property in Inventory View** is selected. Enter the title of the Inventory item for this property.
Display Property in Host Profiles Pane of Home View	Select this option to list this property in the Profiles tab of the Home view.
Display Property in the Assets Portal	Select this option to display this property in the Assets Portal.

Enable Track Changes	(For Single Value and List Properties only) Create a second, parallel change property under the Track Changes folder of the Properties tree. Use the change property in policies to identify changes in the property values retrieved from the external server.
Name	This field is enabled when **Enable Track Changes** is selected. Enter a name of the Track Change for this property or accept the default name that is pulled from the **Property Name** field.
Description	This field is enabled when **Enable Track Changes** is selected. Enter a description describing the change in the selected property or accept the default description.

11. Select **Finish**. The property is added to the table in the Properties tab.

When you create policy conditions, these properties are displayed in the Properties tree under the **DEX: External Web Service** folder. Related change tracking properties are displayed in the Track Changes folder.

🗎 *The Forescout platform only retrieves data and updates values for properties that are referenced by an active policy.*



Work with the CounterACT Web Service

Data exchange between the Forescout platform and external APIs and web services is a REST/SOAP interaction based on HTTP messaging.

🗎 *In addition to requests submitted to the CounterACT web service, the Forescout platform can initiate messaging to external platforms. See [Working with External Web Services](#).*

Depending on the desired Integration Scenarios, perform the following procedures:

- Define CounterACT Web Service Accounts. Define authorization credentials that grant access to the CounterACT Web Service.
- Define Host Properties For Web Service Interaction. Define new Forescout host properties that hold data submitted via the CounterACT Web Service.

Define CounterACT Web Service Accounts

This module supports the CounterACT Web Service, which lets external platforms and services interact with the Forescout platform by submitting web service request messages. Typically, the web server on the Enterprise Manager hosts the CounterACT Web Service.

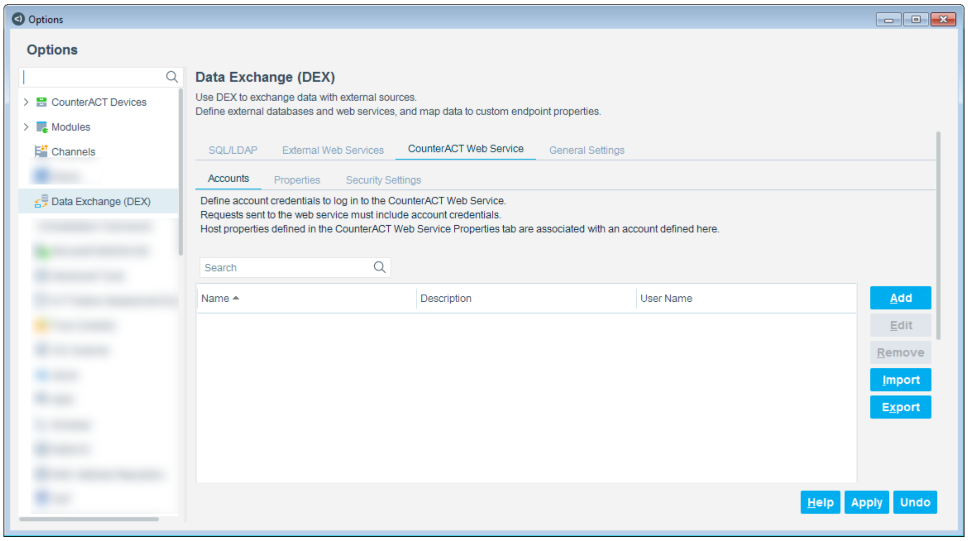
Use this procedure to define authorization credentials for the web service. Request messages sent to the CounterACT Web Service must include valid account credentials.

See Appendix 4: Submit Data with the Forescout Web API for details.

Each account grants unique permissions in the web service. When you define custom web service properties, you associate each property with an account. To modify a property, the web service request message must use the authorization credentials of the account associated with the property. You are limited to ten external web service accounts.

To define a CounterACT web service account:

1. In the Data Exchange pane, select the CounterACT Web Service tab, and then select the Accounts tab.

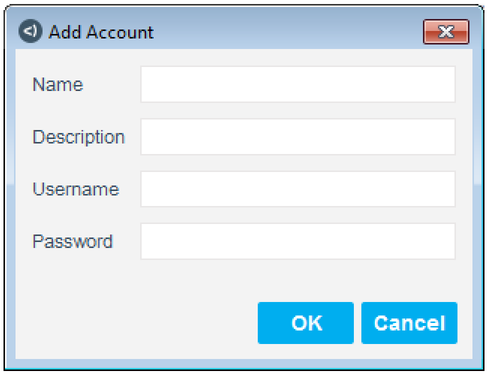


Data Exchange (DEX)

Use DEX to exchange data with external sources.
Define external databases and web services, and map data to custom endpoint properties.

Define account credentials to log in to the CounterACT Web Service.
Requests sent to the web service must include account credentials.
Host properties defined in the CounterACT Web Service Properties tab are associated with an account defined here.

2. Select **Add**.

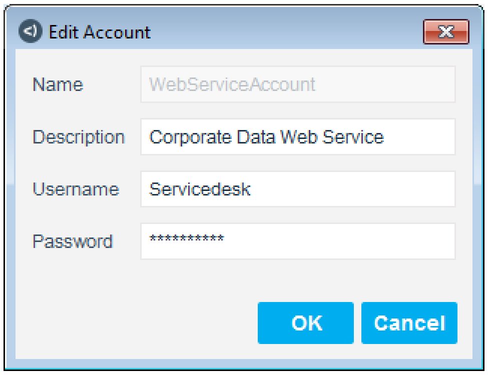


3. Define the following parameters:

Name	Enter a name for the CounterACT web service account.
Description	Enter a brief description of the purpose of this web service account.
Username	Enter the username for authorizing the Forescout platform to access this web service account.
Password	Enter the password for authorizing the Forescout platform to access this web service account.

4. Select **OK**. The account is displayed in the Accounts tab.

   Web service clients include this login information in the web service request message header. Your login target for the web service is *username@account.* In the following example, the login target is ***Servicedesk@Corporate Data Web Server***.



Name WebServiceAccount
Description Corporate Data Web Service
Username Servicedesk
Password **********

Define Host Properties from the CounterACT Web Service

Host properties store information that the Forescout platform discovers for each endpoint. When you work with the CounterACT Web Service, you create new Forescout host properties to hold data submitted by external platforms. This makes submitted data available for use in Forescout policies.

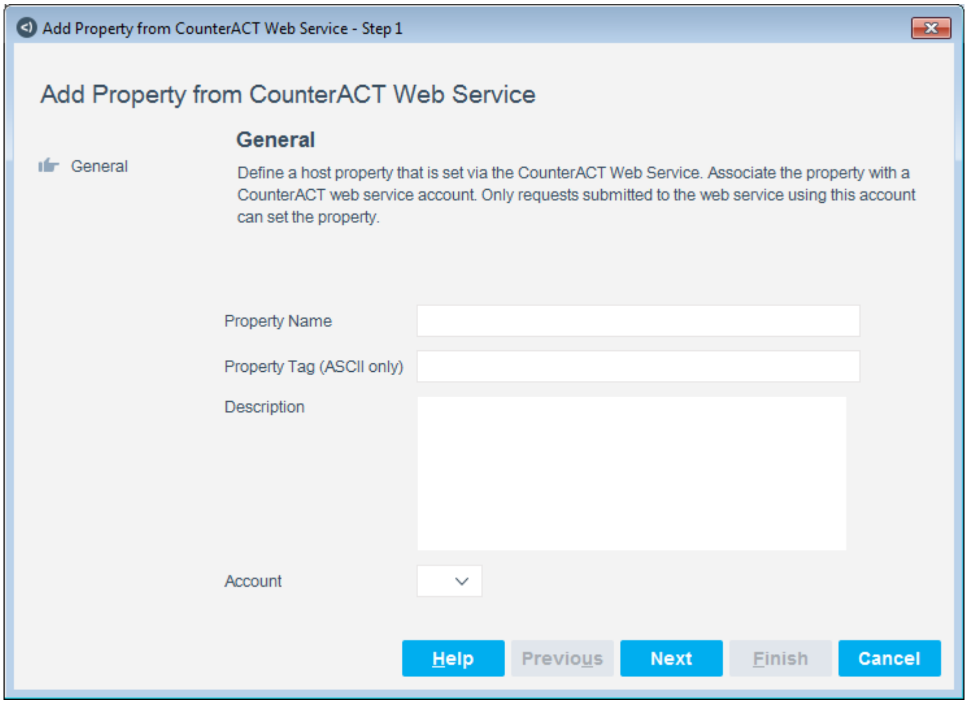
For more information about the CounterACT Web Service, see Appendix 4: Submit Data with the Forescout Web API and the *Forescout Open Integration Module: Web*

API Configuration Guide. See Additional Forescout Documentation for information on how to access this guide.

Before you perform this procedure, see Appendix 1: Forescout Property and Data Types for detailed information about Forescout host property data structures.

To create a property:

1. In the Data Exchange pane, select the CounterACT Web Service tab and then select the Properties tab.
2. Select **Add**.



Add Property from CounterACT Web Service - Step 1

Add Property from CounterACT Web Service

General

Define a host property that is set via the CounterACT Web Service. Associate the property with a CounterACT web service account. Only requests submitted to the web service using this account can set the property.

Property Name

Property Tag (ASCII only)

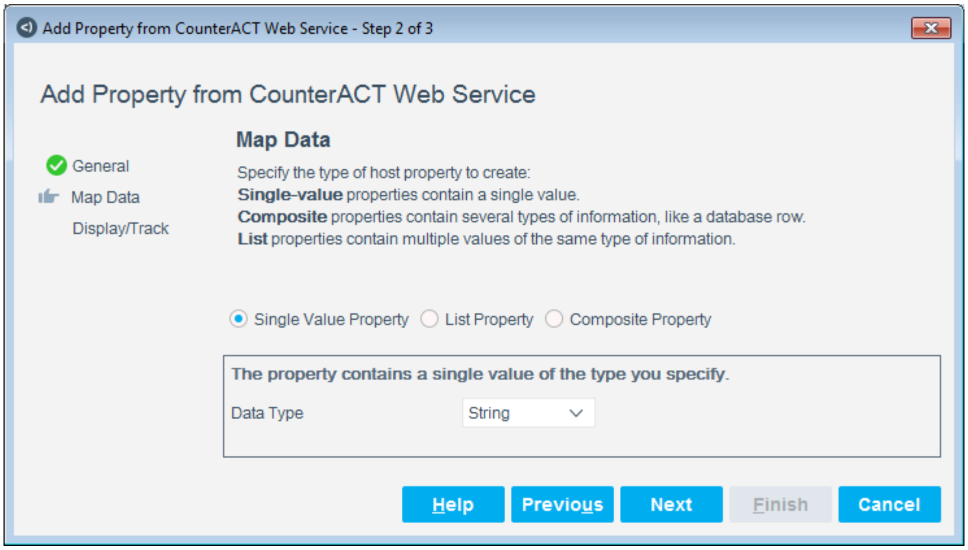
Description

Account

3. Define the following parameters:

Property Name	Enter the name of the host property.
Property Tag (ASCII only)	Enter the internal runtime tag of the property. The Forescout platform references the property using this unique identification string. Do not use spaces in the string.
Description	Enter a brief description of the purpose of this property, and its source CounterACT web service.
Account	Select the name of the CounterACT web service account to which this property is mapped.

4. Select **Next**.



Add Property from CounterACT Web Service - Step 2 of 3

Add Property from CounterACT Web Service

Map Data

Specify the type of host property to create:
Single-value properties contain a single value.
Composite properties contain several types of information, like a database row.
List properties contain multiple values of the same type of information.

● Single Value Property ○ List Property ○ Composite Property

The property contains a single value of the type you specify.

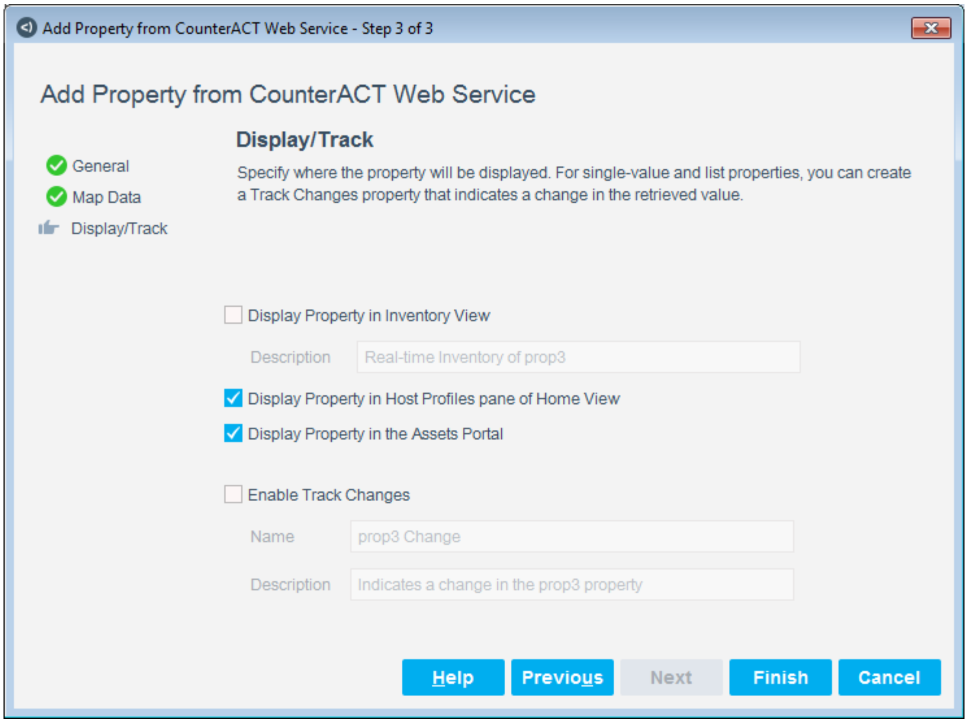
Data Type: String

5. Select the type of host property you want to create.

Single Value Property	Contains one retrieved value. To define a single value property, select the type of data the property contains from the **Data Type** drop-down list. See Appendix 1: Forescout Property and Data Types for details. Continue to step 6.
List Property	Contains a list of unique values. To define a List property, select the **Aggregate new values from each update** option to retain existing values when the property is updated. New property values are appended to the list. If you clear this option, the entire list stored by the property is completely overwritten by each update. Continue to step 6.

Composite Property	Contains several retrieved database columns. To define a Composite property: **1.** Select **Add**. The Add Subproperty dialog box opens. **2.** In the **Field Name** and **Description** fields, enter the field name of the composite property and a short description of its content. **3.** From the **Data Type** drop-down menu, select the type of data the property contains. See Appendix 1: Forescout Property and Data Types for details. **4.** Select the **Create Inventory Key** option to let administrators list hosts based on this field in the Inventory view. When this option is selected, the property is displayed as an index key in the Views pane of the Inventory view. **5.** Select **OK**. The field is displayed in the composite property table. **6.** Repeat these steps to define additional fields of the composite property. **7.** In the Map Data pane, select the **Aggregate new values from each update** option to retain existing values when the property is updated. New property values are appended as a new row in the composite property. If you clear this option, the entire table stored by the property is completely overwritten by each update.

6. Select **Next**.



Add Property from CounterACT Web Service - Step 3 of 3

Add Property from CounterACT Web Service

Display/Track

Specify where the property will be displayed. For single-value and list properties, you can create a Track Changes property that indicates a change in the retrieved value.

☐ Display Property in Inventory View

Description: Real-time Inventory of prop3

☑ Display Property in Host Profiles pane of Home View

☑ Display Property in the Assets Portal

☐ Enable Track Changes

Name: prop3 Change

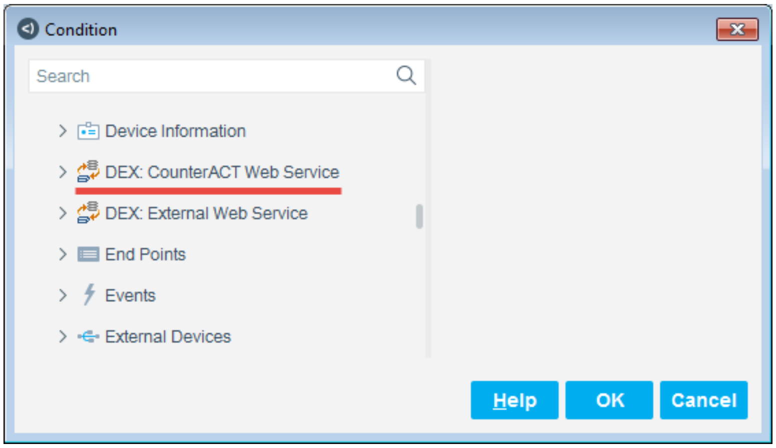
Description: Indicates a change in the prop3 property

7. In the Display/Track pane, specify where the property is displayed in the Console.

Display Property in Inventory View	Select this option to show this property in the Inventory. In the **Description** field, enter the title of the Inventory item for this property.
Display Property in Host Profiles Pane of Home View	Select this option to list this property in the Profiles tab of the Home view.
Display Property in the Assets Portal	Select this option to show this property in the Assets Portal.
Enable Track Changes	(For Single Value and List Properties only) Select this option to create a second, parallel change property under the Track Changes folder of the Properties tree. Use the change property in policies to identify changes in the property values retrieved from the external server.

8. Select **Finish**. The property is added to the table in the Property tab.

   When you create policy conditions, your properties are displayed in the Properties tree under the **DEX: CounterACT Web Service** folder. Related change tracking properties are displayed in the Track Changes folder.



CounterACT Web Service Security Settings

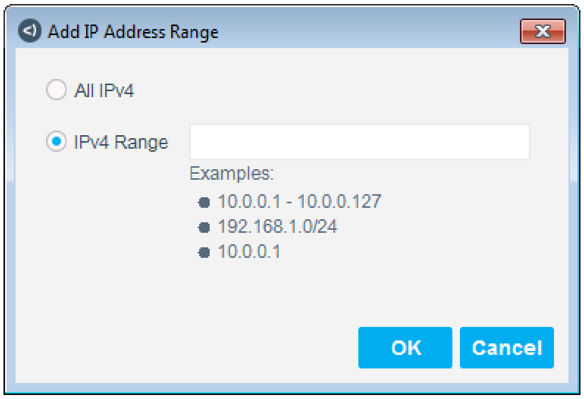
This section describes security settings for the CounterACT web service.

A white list is used to grant access to the CounterACT web service. Perform the following procedure to let users contact the CounterACT web service and to define login protection settings.

To define security settings for the CounterACT web service:

1. In the Data Exchange pane, select the CounterACT Web Services tab, and then select the Security Settings tab.
2. A white list of IP addresses is used to grant access to the CounterACT web service. To add a network range:

   a. Select **Add**.



Add IP Address Range

○ All IPv4

● IPv4 Range

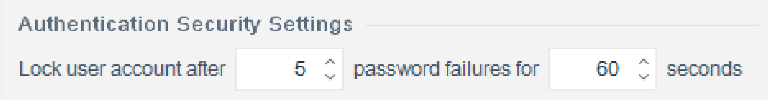
Examples:

- 10.0.0.1 - 10.0.0.127
- 192.168.1.0/24
- 10.0.0.1

b. Select **All IPv4** or enter an **IPv4 Range**.

c. Select **OK**. The IP range is displayed in the IP Address Range list.

3. To configure Authentication Security Settings, scroll to the bottom of the Security Settings tab. In the Authentication Security Settings section, set the parameters for account lock-out after a specific number of password failures.



Authentication Security Settings

Lock user account after 5 password failures for 60 seconds

4. In the Data Exchange pane, select **Apply**.

Actions and Properties for Data Integration

In addition to the custom properties you define, the DEX Open Integration Module provides the following actions and properties that support integration with external databases and servers. See:

- DEX Update External Database Action
- DEX Send Web Service Request Action

DEX Update External Database Action

Use the DEX Update External Database action to update values in an external database. This action sends an update statement you define to an external server you specify. For example, you can update a database table value from *not compliant* to *compliant* when a Forescout policy detects endpoint Antivirus compliance status.

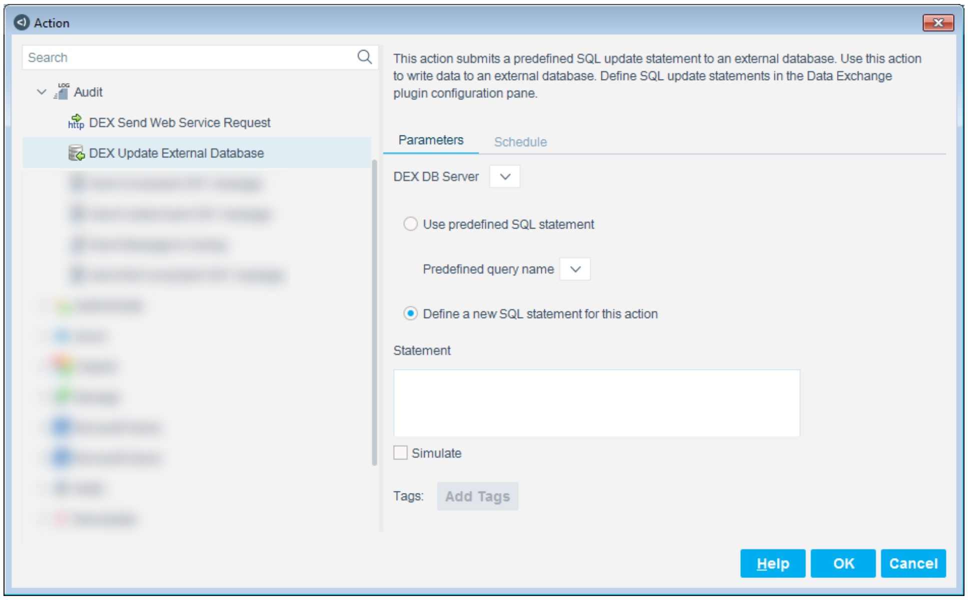
When you use the DEX Update External Database action in a policy, the Forescout platform updates external database records for hosts that match the conditions of the policy.

Because update statements modify external databases, it is important to test the statement before you include it in a policy. Use this action as follows:

1. First, compose and verify update statements using the **Simulate** option of the action. The Forescout platform generates actual SQL statements *without submitting them to the external database.*
2. When the update statement works as desired, apply the action without the **Simulate** option. The Forescout platform generates actual SQL statements *and submits them to the external database.*

To use the DEX Update External Database action:

1. Using a text editor, plan the SQL statement you want to submit. Use dummy values or placeholders for host property values.
2. Create a policy with conditions that select endpoints for which you want to send the update statement.
3. Add a new action. In the Actions tree, expand the Audit group and select **DEX Update External Database**.



This action submits a predefined SQL update statement to an external database. Use this action to write data to an external database. Define SQL update statements in the Data Exchange plugin configuration pane.

DEX DB Server

○ Use predefined SQL statement

Predefined query name

● Define a new SQL statement for this action

Statement

□ Simulate

Tags: Add Tags

4. In the Parameters tab, configure the following:

DEX DB Server	From the drop-down menu, select the target external server. The update statement is submitted to this server.
Use predefined SQL statement	Select this option to use a predefined SQL statement. From the drop-down menu, select a **Predefined query name**.
Define a new SQL statement for this action	Select this option to define a new SQL statement for this action.

Statement	Enter the SQL statement that the Forescout platform submits to the external database. Select **Add Tags** to insert Forescout property tags that resolve to host property values. For the index key of the query, you cannot use tags that resolve to a list.
Simulate	Select this option to generate SQL statements without submitting them to the external database.

5. Select **OK** and save the policy. Select **Apply**.

   For each host that satisfies the conditions of the policy, the Forescout platform replaces property tags in the update statement with actual host property values. The result is the actual SQL statement that the Forescout platform would submit to the external server.

6. In the Views tree of the Home view, select **Policy** and go to the results of the simulated update statement. Select an endpoint that was discovered by the policy. To view the SQL statement generated for this host, do one of the following:

   – Double-click the host to open the Host Details dialog box. Select the Policy Actions tab.

   – Hover over the Actions column. When the tooltip is displayed, press <F2>.

   🗎 *If the generated SQL statement is very long, it may be truncated in tooltip or Policy Actions views.*

7. Verify the update statement:

   – Check that Forescout tags resolved to host property values as expected.

   – Copy the SQL statement for a host and manually submit it to the external SQL server. Verify that the statement affects the database as desired.

   If necessary, edit the update statement in the policy action and retest it.

8. When the update statement is finalized, edit the policy. Select the DEX Update External Database action and edit it. Clear the **Simulate** option and save the changes. The action generates SQL statements for each host selected by policy conditions and submits these statements to the external database.

   When a host satisfies the conditions of the policy, the Forescout platform updates values in the corresponding record of the external database according to the statement defined for the action.

DEX Send Web Service Request Action

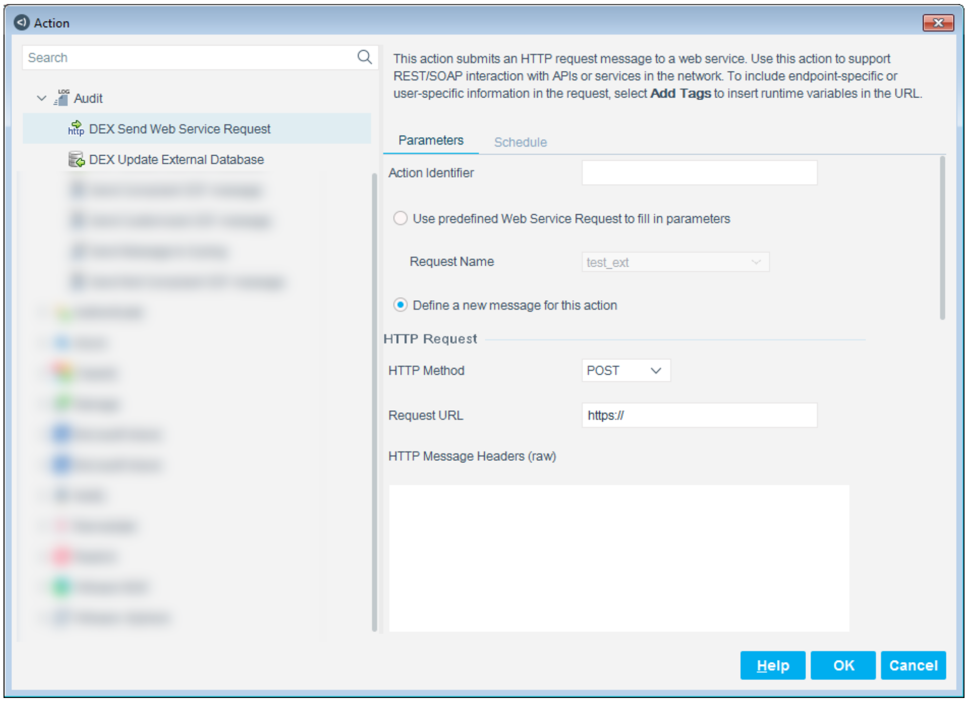
Use the DEX Send Web Service Request action to generate a raw HTTP message and send it to an external target. Use this action to submit request messages to external web services that use the REST protocol.

When you use this action in a policy, the Forescout platform submits a request message for each endpoint that matches the conditions of the policy. You can use Property Tags to include host-specific property values in the request message.

Test the request message thoroughly to verify that it triggers the desired response at the external service.

To use the DEX Send Web Service Request action:

1. In a policy, add a new action. In the Actions tree, expand the **Audit** group and select **DEX Send Web Service Request**.



This action submits an HTTP request message to a web service. Use this action to support REST/SOAP interaction with APIs or services in the network. To include endpoint-specific or user-specific information in the request, select **Add Tags** to insert runtime variables in the URL.

Action Identifier

○ Use predefined Web Service Request to fill in parameters

Request Name: test_ext

● Define a new message for this action

HTTP Request

HTTP Method: POST

Request URL: https://

HTTP Message Headers (raw)

2. In the Parameters tab, define the following parameters:

Action Identifier	Set the identifier that identifies requests submitted when this action is applied to an endpoint.
Use predefined Web Service Request to fill in parameters	Select this option to base the action on a request message you previously defined, as described in Define Requests to External Web Services. From the **Request Name** drop-down menu, select a pre-defined web service request. Parameters reflect settings of the web request.
Define a new message for this action	Define an HTTP request message from scratch.

3. In the HTTP Request section, define the following components of the HTTP message:

HTTP Method	Select the appropriate HTTP message method.
Request URL	Enter the URL of the target web service.
HTTP Message Headers(raw)	Enter any additional message headers in this area. To include endpoint-specific data, select **Add Tags** and add Property Tags that resolve to host property values when the message is created.

HTTP Message Body	Enter the body of the request message. To include endpoint-specific data, select **Add Tags** and add Property Tags that resolve to host property values when the message is created. Only add tags that reference Single Value properties. You cannot add tags that refer to list or composite properties.
Upload Body as File	Select this option to append the contents of the Message Body field to the request message as a text file.
Tags	To insert runtime variables, put the cursor in a text field and select **Add Tags**. These variables are replaced with: **1.** Actual endpoint property values. Refer to the *Forescout Administration Guide* for details. See Additional Forescout Documentation for information on how to access this guide. **2.** Non-endpoint-related information. These special tags are as follows: - **`{eds_time_epoch}`**: The current time in epoch format. - **`{eds_time_utc}`**: The current time in UTC format. - **`{eds_ext_web_auth_token}`**: The authorization token that refers to the authorization token selected in the Authentication step. This tag can be placed in URL/Headers/Body. Note: when the token is in the form of an HTTP cookie, there is no need to add this tag, because the HTTP request uses the cookie for authorization. - **`{eds_mac}`**, **`{eds_mac_fmt_colon}`**, **`{eds_mac_fmt_dash}`**, **`{eds_mac_lc_fmt_colon}`**, **`{eds_mac_lc_fmt_dash}`**: The MAC address in uppercase, colon-separated format, dash-separated format, lowercase colon-separated format, or lowercase dash-separated format. - **`{eds_user_xxx}`**, **`{eds_user_xxx_password}`**: The username and password to be used in external web service requests, URLs, and actions, where xxx is the user-defined username.

4. In the Authentication section, define the following parameters:

No Authentication	Select this option if you do not want to use a web service username/password or an Authorization Token.
Use Basic Authentication Header	Select this option if you want to use the basic authentication header.

Username	Enter the username for authorizing credentials for the request message. This is submitted as part of the message header.
Password **Confirm Password**	Enter the password for authorizing credentials for the request message that is submitted as part of the message header. Re-enter the password to confirm it.
Use Authorization Token	**1.** Select this option to use an Authorization Token. **2.** Select the token name from the drop-down menu. This Authorization Token is from the External Web Services tab, Authorization Token sub-tab.
Validate Web Server Certificate	By default, this option is not selected, meaning that the DEX Open Integration Module always sets up the connection, regardless of whether the server certificate is a common commercial Certificate Authority issued certificate. If you select this option, you are adding certificate validation. ▪ If the server certificate is a common commercial Certificate Authority issued certificate, the DEX Open Integration Module sets up the connection to the server. ▪ If the server certificate is not a common commercial Certificate Authority issued certificate, the DEX Open Integration Module does not set up the connection to the server.

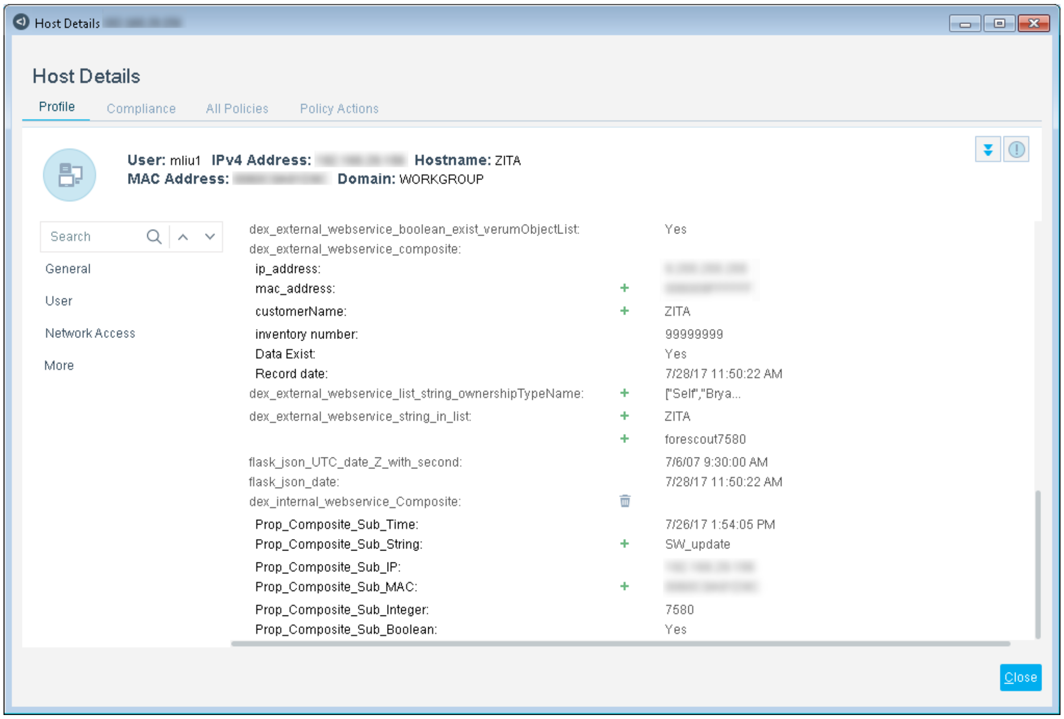
5. In the Proxy section, define the following parameters:

Use HTTP Proxy	Select this option to access the web service via a proxy.
Proxy IP Address	Enter the IP Address of the proxy server.
Proxy Port Number	Enter the port number on the proxy server where the HTTP request is sent.
Proxy Username	Enter the username for authorizing the Forescout platform to access the proxy server.
Proxy Password **Confirm Proxy Password**	Enter the password for authorizing the Forescout platform to access the proxy server. Re-enter the password to confirm it.

6. Select **OK** and save the policy. Select **Apply**.

   For each host that matches the conditions of the policy, the Forescout platform replaces property tags in the request message with actual host property values, and submits the request to the specified URL.

7. View the results of the action in the Home view. The HTTP return code and any message body returned by the external service are included in the status report for the action, as shown in the following example. The Forescout platform interprets all HTTP *2xx* return codes as action success. All other HTTP return codes are interpreted as action failure.



User: mliu1 **IPv4 Address:** [redacted] **Hostname:** ZITA
MAC Address: [redacted] **Domain:** WORKGROUP

dex_external_webservice_boolean_exist_verumObjectList:		Yes
dex_external_webservice_composite:		
ip_address:		[redacted]
mac_address:	+	[redacted]
customerName:	+	ZITA
inventory number:		99999999
Data Exist:		Yes
Record date:		7/28/17 11:50:22 AM
dex_external_webservice_list_string_ownershipTypeName:	+	["Self","Brya...
dex_external_webservice_string_in_list:	+	ZITA
	+	forescout7580
flask_json_UTC_date_Z_with_second:		7/6/07 9:30:00 AM
flask_json_date:		7/28/17 11:50:22 AM
dex_internal_webservice_Composite:	🗑	
Prop_Composite_Sub_Time:		7/26/17 1:54:05 PM
Prop_Composite_Sub_String:	+	SW_update
Prop_Composite_Sub_IP:		[redacted]
Prop_Composite_Sub_MAC:	+	[redacted]
Prop_Composite_Sub_Integer:		7580
Prop_Composite_Sub_Boolean:		Yes

Open Integration Module Information

The Open Integration Module contains the Data Exchange Module, which supports bidirectional query and update interactions with external SQL, Oracle, and LDAP servers.

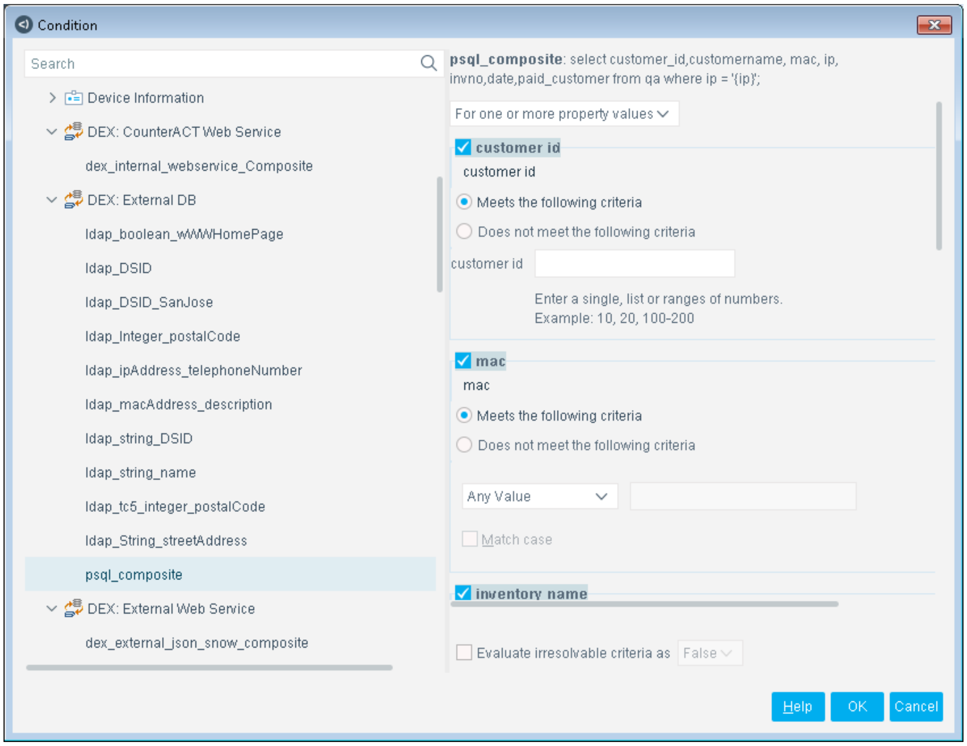
In addition, it contains other components that support the CounterACT Web Service, which lets external entities communicate with the Forescout platform.

Information can be retrieved from the Forescout platform using simple, yet powerful web service requests based on HTTP interaction.

Information can be submitted to the Forescout platform using web service requests with an XML data body. The CounterACT Web Service parses the data to update Forescout host properties.

Appendix 1: Forescout Property and Data Types

Host properties store information that the Forescout platform discovers for each endpoint. When you work with this module, you create new Forescout host properties to hold data extracted by querying external servers. This makes retrieved data available for use in Forescout policies.


Condition
Search
Device Information
DEX: CounterACT Web Service
dex_internal_webservice_Composite
DEX: External DB
ldap_boolean_wWWHomePage
ldap_DSID
ldap_DSID_SanJose
ldap_Integer_postalCode
ldap_ipAddress_telephoneNumber
ldap_macAddress_description
ldap_string_DSID
ldap_string_name
ldap_tc5_integer_postalCode
ldap_String_streetAddress
psql_composite
DEX: External Web Service
dex_external_json_snow_composite
Help
OK
Cancel

psql_composite: select customer_id,customername, mac, ip, invno,date,paid_customer from qa where ip = '{ip}';

For one or more property values

☑ **customer id**

customer id

● Meets the following criteria

○ Does not meet the following criteria

customer id

Enter a single, list or ranges of numbers.
Example: 10, 20, 100-200

☑ **mac**

mac

● Meets the following criteria

○ Does not meet the following criteria

Any Value

□ Match case

☑ **inventory name**

□ Evaluate irresolvable criteria as False

You can create the following types of properties:

A ***Single Value*** property contains one value. For example:

- A string property that contains the GUID of the endpoint

A ***List*** property contains a list of unique values. All items in the list are the same type of data. For example, a list property can contain:

- A list of all users in a directory group
- A list of previous host logins

Single Value and List properties are represented in requests to CounterACT Web Service using the **<PROPERTY>** element and, optionally, the **<VALUE>** element. The following example specifies the value *sales* for the *Prop_String* property.

```
<PROPERTY NAME="Prop_String">
      <VALUE>Sales</VALUE>
</PROPERTY>
```

The following example specifies the *Prop_Time* property for a web transaction such as deletion. In this case, no **<VALUE>** element is needed:

```
<PROPERTY NAME="Prop_Time" />
```

For a List property, the **<PROPERTY>** element can contain several **<VALUE>** elements.

```
<PROPERTY NAME="Prop_List">
      <VALUE>1377526368</VALUE>
      <VALUE>1377663124</VALUE>
</PROPERTY>
```

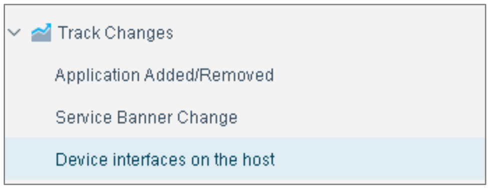
Composite properties are like database tables, with several rows and columns. For example, a composite property can contain data from a help desk server listing recent service calls for a host. Retrieved columns would include:

- Date
- Contact
- Severity
- Status
- Description

Composite properties are represented in requests to CounterACT Web Service using the **<TABLE_PROPERTY>** and **<ROW>** elements. The **<CPROPERTY>** and **<CVALUE>** elements parallel the **<PROPERTY>** and **<VALUE>** elements used to describe non-composite properties. The following example describes a record in a composite property.

```
<TABLE_PROPERTY NAME="Prop_Composite">
<ROW>
      <CPROPERTY NAME="Prop_Composite_Sub_Time">
            <CVALUE>1377526368</CVALUE>  <!-- Epoch time -->
      </CPROPERTY>
      <CPROPERTY NAME="Prop_Composite_Sub_String">
            <CVALUE>SW_update</CVALUE>
      </CPROPERTY>
</ROW>
</TABLE_PROPERTY>
```

Track Changes properties let you define policy conditions that identify changes in the value of custom properties you define. You can define track changes properties for Single Value, List, or Record Exists properties that you create.



You do not directly populate or modify Track Changes properties using the web service, but their values reflect web service activity. For example, if you define the web service property MoreAccountInfo, the corresponding Track Changes property, MoreAccountInfo Change, is updated each time you submit request messages that modify the base MoreAccountInfo property.

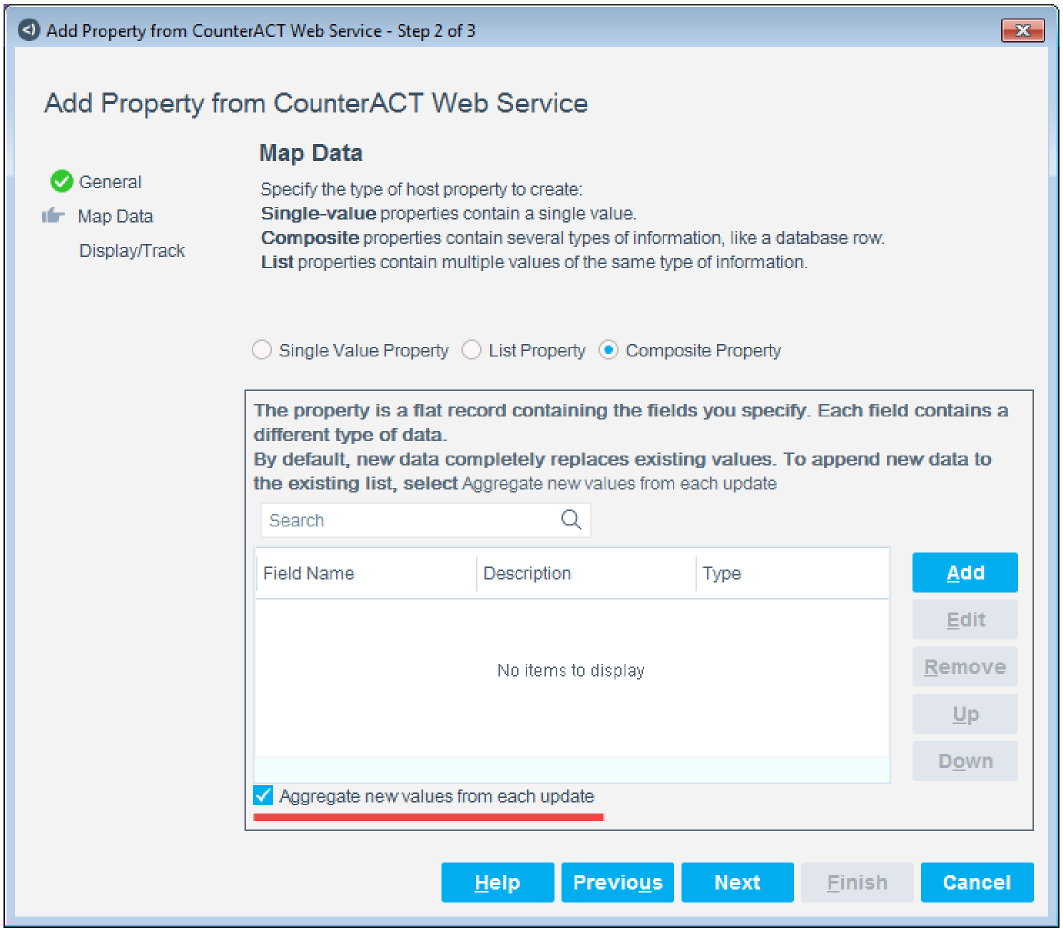
For more information, refer to the *Forescout Administration Guide*. See Additional Forescout Documentation for information on how to access this guide.

About Aggregate Properties

When you create list or composite properties for use with the CounterACT Web Service, select the **Aggregate new values from each update** option to create a property that retains existing values when the property is updated.

- For a List property, new property values submitted via the web service are appended to the existing list of values.
  - If this option is not enabled when the property is created, an `update` request message overwrites the entire list stored by the property.
- For a Composite property, new property values submitted via the web service are appended as new rows in the table.
  - If this option is not enabled when the property is created, an `update` request message overwrites the entire table stored by the property.

For both aggregate and non-aggregate properties, the `delete` request message deletes the entire list or table stored in the property.


Add Property from CounterACT Web Service - Step 2 of 3
Add Property from CounterACT Web Service
General
Map Data
Display/Track

Map Data

Specify the type of host property to create:
Single-value properties contain a single value.
Composite properties contain several types of information, like a database row.
List properties contain multiple values of the same type of information.

○ Single Value Property ○ List Property ● Composite Property

The property is a flat record containing the fields you specify. Each field contains a different type of data.
By default, new data completely replaces existing values. To append new data to the existing list, select Aggregate new values from each update

Field Name	Description	Type
No items to display		

☑ Aggregate new values from each update

About Data Types

Forescout host properties can contain various types of data. When you define a property, you specify the type of data that the property contains. This determines the available matching options when you use the property in a policy condition. For example, the Forescout platform offers *Segment* and *IP range* options to match IP address values, and *Older Than* and *Before* options to match Date values.

The following table lists the data types your custom property can hold, and typical external data sources.

Forescout Property Data Type	Typical Expected SQL Data Types	Typical Expected LDAP Syntaxes	Typical Expected External Web Service Data Type
String	CHAR, VARCHAR, TEXT, LONGTEXT, TINYTEXT MEDIUMTEXT	Unicode String Distinguished Name	Plain text
MAC Address	Standard notation with period (.) or colon (:) separators		Plain text.
IP Address	Standard IPv4 notation: xxx.xxx.xxx.xxx		Plain text.
Integer	INTEGER	Integer Octet String	Plain text
Date	NUMBER type with Epoch Time in seconds, or DATE, DATETIME, TIMESTAMP	UTC Coded Timestamp	Plain Text To let the DEX Open Integration Module know the correct meaning of the plain text retrieved from the external web service that represents a date/time, select a date format when configuring the property. There are three available formats: ▪ ***Epoch time***: Also known as Unix/POSIX time. ▪ ***UTC format in the form of %Y-%m-%dT%H:%M:%SZ***: A date format according to the ISO-8601 with the time zone being UTC (Coordinated Universal Time). An example of date string matching this format is 2017-06-19T15:13:11Z ▪ ***Customized format***: See Format the Date for details.
Boolean	TRUE, FALSE, BIT, BINARY	Boolean	Plain text

Format the Date

When writing the date in customized format, the following tokens are available:

%a	Day of the week, abbreviated with only three characters (for example, Mon, Tue, Wed, Thu, Fri, Sat, Sun)
%A	Day of the week, full name (for example, Monday)
%b	Month, abbreviated (for example, Jan)
%B	Month, full name (for example, January)
%d	Numeric day of the month (1-31). It is acceptable to have a leading zero before a single number, for example, 01.
%H	Hour, 24 hour clock (0-23)
%I	Hour, 12 hour clock (1-12)
%j	Day of the year (1-366). It is acceptable to have a leading zero before a single number, for example, 01.
%m	Month number (1-12). It is acceptable to have a leading zero before a single number, for example, 01.
%M	Minute (0-59)
%p	AM/PM or am/pm
%s	Seconds since the Epoch
%S	Seconds (0-59)
%y	Year (2 digits)
%Y	Year (4 digits)
%z	Time zone in format +/-0000

Example:

Consider a date string “10/01/12”. You, as a module user, are aware of its meaning and what you need to do is give the format of the string to the module. The module then understands the meaning of the string as well.

Assuming you interpret the string in this way:

- 10 is for year
- 01 is for month
- 12 is for day

When writing the format, refer to the available tokens. The following three tokens can serve the purpose:

%d	Numeric day of the month (1-31). It is acceptable to have a leading zero before a single number, for example, 01.
%m	Month number (1-12). It is acceptable to have a leading zero before a single number, for example, 01.
%y	Year (2 digits)

At this point, the format is very simple to generate by replacing 10 with %y, 01 with %m and 12 with %d, and you get “%y/%m/%d” as the format of the original date string.

There is no need to replace the “/”s (they are just separators that have no meaning with respect to the date).

🗎 *If the date string contains no time zone information, the DEX Open Integration Module considers the time zone as GMT+0000.*

Appendix 2: Use Advanced JDBC Attributes

You can define additional connection attributes by directly editing the Java Database Connectivity (JDBC) connection string that the Forescout platform uses to define connection to SQL databases.

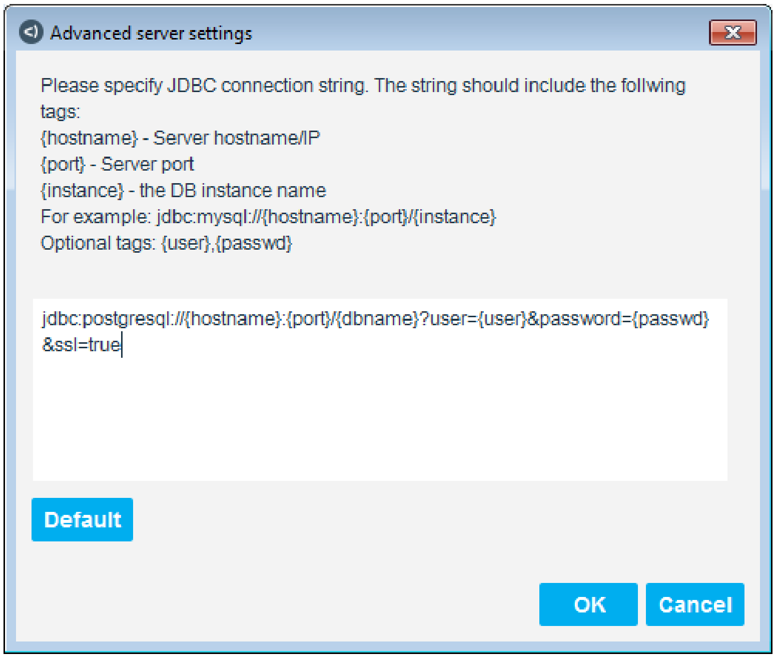
To use advanced JDBC attributes:

1. In the Data Exchange configuration pane, select the SQL/LDAP tab and select the DB Servers tab. Then select **Add**.
2. In the General pane of the Add/Edit SQL Server wizard, select **Advanced**. The Advanced server settings dialog box opens.

   The JDBC protocol represents the database connection as a URL string with attributes. The default URL string displayed reflects the database driver you selected, and includes placeholder tags for the configured fields.
3. Edit the URL string to add optional configuration attributes. For example, the following string adds the *SSL* attribute to a connection that uses the *PostgreSQL* database driver.

   ```
   jdbc:postgresql://{hostname}:{port}/{dbname}?user={user}&password={pa
   sswd}&ssl=true
   ```

🗎 *Add only attributes supported by the database driver you specify. The Forescout platform does not validate these optional attributes.*



Please specify JDBC connection string. The string should include the follwing tags:
{hostname} - Server hostname/IP
{port} - Server port
{instance} - the DB instance name
For example: jdbc:mysql://{hostname}:{port}/{instance}
Optional tags: {user},{passwd}

```
jdbc:postgresql://{hostname}:{port}/{dbname}?user={user}&password={passwd}
&ssl=true
```

4. Select **OK** to save the URL string and return to the wizard. Complete the server definition and apply changes.

Appendix 3: Map Information from External Servers Example

The following example demonstrates the creation of custom host properties based on an external SQL database. The external database includes the GUESTS_BY_MAC table, with the following columns:

- MAC – The Guest MAC-Address
- ID – The Guest ID
- APPROVE – Is the MAC approved as a guest (True/False)
- EXPIRATION_DATE – A date for expiration date

MAC	**ID**	**APPROVE**	**EXPIRATION_DATE**
001122aabbcc	1001	TRUE	31/12/2012

1. Create the following query to retrieve data from the GUESTS_BY_MAC table:

```
SELECT ID,APPROVE,EXPIRATION_DATE FROM dbo.GUESTS_BY_MAC WHERE
mac='{mac}'
```

The MAC Address tag *{mac}* is inserted in the query syntax to ensure that the query retrieves information for a specific host.

2. Create the following properties that contain data from columns in the GUEST_BY_MAC table:
   - ***GUESTS_BY_MAC – MAC Address Exists***
     This is a Result Exists property that indicates whether the MAC address exists in the GUESTS_BY_MAC table.
   - ***GUESTS_BY_MAC – ID***
     This Single Value property contains the value of the ID column, formatted as a String data type.
   - ***GUESTS_BY_MAC – APPROVE***
     This Single Value property holds a Boolean value based on the APPROVE column.
   - ***GUESTS_BY_MAC – EXPIRATION_DATE***
     This Single Value property holds a Date data value based on the EXPIRATION_DATE column.
3. The ***GUESTS_BY_MAC – ID*** property you created from the GUESTS_BY_MAC table can, in turn, be used as a key to retrieve data from related data tables.

   For the data table GUESTS_BY_ID, the table columns are:

   - ID – The Guest ID
   - USER – The Guest user name

ID	**USER**
1001	Alice

   You can create a new query that uses the *GUESTS_BY_MAC – ID Column* property as the key field. Select **Add Tags** and add the property tag for the ***GUESTS_BY_MAC – ID*** property.

   The query definition is:

   ```
   SELECT USER FROM dbo.GUESTS_BY_ID WHERE ID='{eds_GUESTS_BY_MAC_ID}'
   ```

   Define a property named *GUESTS_BY_ID – User Column* to store the retrieved value.
4. Create policies using the properties you defined. Policies are evaluated for a host based on values the Forescout platform retrieves for that host from the external database.

Appendix 4: Submit Data with the Forescout Web API

The CounterACT Web Service lets external entities communicate with the Forescout platform using simple, yet powerful web service requests based on HTTP interaction.

The CounterACT Web Service lets you communicate with the Forescout platform using web service requests. You create web service requests that reference Forescout host properties and Forescout Property List values. These messages contain property information in an XML data body. The CounterACT Web Service parses the data to update Forescout host properties and Property List values.

🗎 *For information about retrieving information from the Forescout platform using the web service, refer to the Forescout Open Integration Module: Web API Configuration Guide. See Additional Forescout Documentation for information on how to access this guide.*

Web Service Implementation Overview

Typically, web service integration includes the following steps:

- For updating host properties: Plan and create custom host properties based on the structure of the data to be submitted to the Forescout platform. For details, see Define Host Properties from the CounterACT Web Service.
- Properties and accounts are related, and should be planned with the third-party user who will interact with the web service. The Forescout administrator can define several accounts for the web service. Each account allows modification of a specified set of host properties.
- For updating Forescout Property List values: Plan and create custom Property Lists based on the structure of the data that will be submitted to the Forescout platform. For more information, refer to the Defining and Managing Lists section in the *Forescout Administration Guide*. See Additional Forescout Documentation for information on how to access this guide.
- Each CounterACT Web Service account allows modification of all the Forescout Property Lists.
- Create third-party login credentials for the web service. For details, see Define CounterACT Web Service Accounts.
- Third-party users must receive accounts that let them modify the custom properties relevant to their integration.
- Third-party users of the web service define and test the commands or routines that generate and submit messages to the web service. They can refer to this appendix for descriptions of the fields and attributes used in a typical web service request.

🗎 *Some configuration steps must be performed on the Forescout platform to support integration. Work with your Forescout administrator on these steps.*

Web Service Interaction

This section provides an overview of the HTTP request and response messages exchanged by external platforms and the CounterACT Web Service.

Request Messages

All CounterACT Web Service requests use the same URI. The requested action is declared in the data section of the request. This means that the HTTP header is identical for all web service transactions.

The URI has the following format:

https://*<EM.IP>***/FSAPI/niCore**/*<Purpose>*

where:

<EM.IP> is the IP address of the Forescout Enterprise Manager in the network. Verify that this target is accessible from any clients that send requests to the CounterACT Web Service.

<Purpose> is the purpose of the request. There are two options: *Hosts* for updating host properties and *Lists* for updating Forescout Property List values.

The following example shows the format of a typical request header submitted to the CounterACT Web Service. The Enterprise Manager IP address is *10.0.0.1*.

```
POST https://10.0.0.1/fsapi/niCore/Hosts HTTP/1.1
Host: 10.0.0.1
Authorization: Basic aGFtZWVkQGZvcmVzY291dC5jb206aGFtZW291dC5jb20=
Accept: application/xml
Content-type: application/xml
```

Note the following:

- All requests to the CounterACT Web Service use secured HTTP (HTTPS).
- All requests to the CounterACT Web Service use the HTTP POST request method.
- All requests to the CounterACT Web Service use standard Basic authorization. Use the credentials provided to you by the Forescout administrator.
- Endpoint/Property List data is submitted to the CounterACT Web Service in XML format, therefore the following header is specified:

  Content-type: application/xml
- The CounterACT Web Service uses basic HTTP authorization.

The body of the request message represents task information in XML format. The following example calls the Update task, and writes a new value to the host property *Prop_String* for the endpoint with IP address *10.0.0.101*.

```
<FSAPI TYPE="request" API_VERSION="1.0">
<TRANSACTION TYPE="update">
      <OPTIONS CREATE_NEW_HOST="true"/>
      <HOST_KEY NAME="ip" VALUE="10.0.0.101"/>
            <PROPERTIES>
                  <PROPERTY NAME="Prop_String">
                        <VALUE>Sales</VALUE>
                  </PROPERTY>
            </PROPERTIES>
/TRANSACTION>
</FSAPI>
```

The elements **<FSAPI> <TRANSACTION> <OPTIONS>** specify the requested task, target endpoint, and other processing options.

The nested elements **<HOST_KEY> <PROPERTIES> <PROPERTY NAME> <VALUE>** relate to the host properties modified by the task.

Response Messages

The CounterACT Web Service replies to request messages with a response message. The header of the message reflects the original request message header.

The body of the message has the following XML structure.

```
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="response" API_VERSION="1.0">
      <STATUS>
            <CODE>FSAPI_OK</CODE>
                  <MESSAGE>Successfully updated 1 properties for host
                  ip=10.0.0.101</MESSAGE>
      </STATUS>
</FSAPI>
```

The **<STATUS>** element is an envelope for feedback information about submitted request messages.

The **<CODE>** element contains feedback codes that correspond to HTTP status codes.

CODE: Valid Values	HTTP Status Code	Description
FSAPI_OK	200	Requested tasks were completed successfully.
FSAPI_BAD_SECRET	401	Authorization failed.
FSAPI_BAD_XML_SYNTAX	400	XML error in the body of the request.
FSAPI_BAD_REQUEST_STRUCTURE	400	The body of the request contained XML that did not correspond to expected data structure.
FSAPI_BAD_REQUEST_DATA	400	Data in a **<VALUE>** element could not be parsed.
FSAPI_NOT_IMPLEMENTED	501	The request specified a transaction type or feature that is not yet supported by the web service.

Examples: Submit Request Messages with Curl

The examples in this guide use the popular curl utility to generate and submit request messages to the CounterACT Web Service. If curl is installed in your environment, you can copy, paste, and edit these examples.

Example 1: To Update Host Properties

The following example shows a curl command that can be used to create and submit the request message described above:

```
curl -u "{username}@{account}:{password}" -k \
     -H "Content-Type:application/xml" -d @/tmp/update.xml \
     -X POST https://{EM.IP}/fsapi/niCore/Hosts
```

Note the following:

- The entire command is a single line. Backslash characters \ indicate line continuation, as in most Unix environments.

- Replace the *{username} {account}* and *{password}* placeholders with the web service account credentials you received from the Forescout administrator.
- Replace the *{EM.IP}* placeholder with the IP address of the Forescout Enterprise Manager that hosts the web service. In this guide, the placeholder value *10.0.0.1* is used.
- The previously generated **update.xml** file contains the message body. This file is appended to the HTTP POST message.
- The curl **-k** option allows connections to SSL sites without certificates.

The full interaction is shown below. The **update.xml** file is listed.

```
# /tmp/update.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="1.0">
   <TRANSACTION TYPE="update">
   <OPTIONS CREATE_NEW_HOST="true"/>
   <HOST_KEY NAME="ip" VALUE="10.0.0.101"/>
      <PROPERTIES>
         <PROPERTY NAME="Prop_String">
            <VALUE>Sales</VALUE>
         </PROPERTY>
      </PROPERTIES>
   </TRANSACTION>
</FSAPI>
```

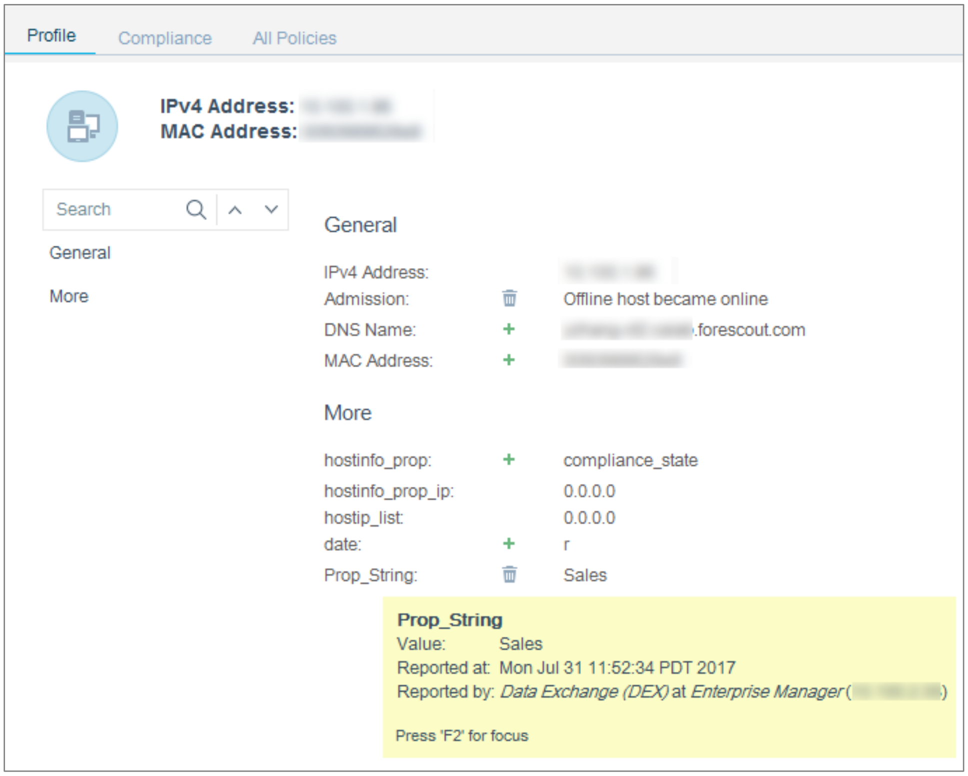
The **update.xml** file is added to the body of an HTTPS POST message, which is submitted to the web service. The following statement uses the curl utility to generate and submit the message.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Hosts
```

The following response message indicates that the request succeeded.

```
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="response" API_VERSION="1.0">
   <STATUS>
      <CODE>FSAPI_OK</CODE>
      <MESSAGE>Successfully updated 1 properties for host
       ip=10.0.0.101</MESSAGE>
   </STATUS>
</FSAPI>
```

The updated value of the *Prop_String* property is displayed in the Home view of the Console.



IPv4 Address: [redacted]
MAC Address: [redacted]

General

IPv4 Address:		[redacted]
Admission:	🗑	Offline host became online
DNS Name:	+	[redacted].forescout.com
MAC Address:	+	[redacted]

More

hostinfo_prop:	+	compliance_state
hostinfo_prop_ip:		0.0.0.0
hostip_list:		0.0.0.0
date:	+	r
Prop_String:	🗑	Sales

Prop_String
Value: Sales
Reported at: Mon Jul 31 11:52:34 PDT 2017
Reported by: *Data Exchange (DEX)* at *Enterprise Manager* ([redacted])

Press 'F2' for focus

Example 2: To Update Forescout Property List Values

The following example shows a curl command that can be used to create and submit the request message described in the previous section:

```
curl -u "{username}@{account}:{password}" -k \
     -H "Content-Type:application/xml" -d @/tmp/update.xml \
     -X POST https://{EM.IP}/fsapi/niCore/Lists
```

Note the following:

- The entire command is a single line. Backslash characters \ indicate line continuation, as in most Unix environments.
- Replace the *{username}* *{account}* and *{password}* placeholders with the web service account credentials you received from the Forescout administrator.
- Replace the *{EM.IP}* placeholder with the IP address of the Forescout Enterprise Manager that hosts the web service. In this guide, the placeholder value *10.0.0.1* is used.
- The previously generated **update.xml** file contains the message body. This file is appended to the HTTP POST message.
- The curl **-k** option allows connections to SSL sites without certificates.

The full interaction is shown below. The **update.xml** file is listed.

```
# /tmp/update.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="2.0">
   <TRANSACTION TYPE="add_list_values">
```

```
      <LISTS>
         <LIST NAME=”sales_employee_id”>
            <VALUE>A001</VALUE>
            <VALUE>A002</VALUE>
         </LIST>
         <LIST NAME=”support_employee_id”>
            <VALUE>B001</VALUE>
            <VALUE>B002</VALUE>
         </LIST>
      </LISTS>
   </TRANSACTION>
</FSAPI>
```

The **`update.xml`** file is added to the body of an HTTPS POST message, which is submitted to the web service. The following statement uses the curl utility to generate and submit the message.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Lists
```

The following response message indicates that the request succeeded.

```
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="response" API_VERSION="2.0">
   <STATUS>
      <CODE>FSAPI_OK</CODE>
      <MESSAGE>Successfully added values to the [2] lists.</MESSAGE>
   </STATUS>
</FSAPI>
```

The updated lists, *sales_employee_id* and *support_employee_id* are displayed in **Options > Lists**.

CounterACT Web Service Transactions

Transactions are the tasks you perform using web service message requests. This section lists the transactions provided by the CounterACT Web Service, and describes how they are implemented.

Different API versions have different sets of transaction types. The request XML file should specify the correct *API_VERSION* to make the transaction work. Typically, when working with Forescout Property Lists, the *API_VERSION* should be *2.0.*

Transaction Type	API Version	
	1.0	2.0
update	√	√
delete	√	√
add_list_values		√
delete_list_values		√
delete_all_list_values		√

Update: Write Property Values to the Forescout Platform

The request message for the Update transaction specifies the following information:

- The target host, identified by its IP address.
- Host properties and corresponding values for this host.

The CounterACT Web Service updates the properties with the supplied values.

> 🗎 *The specified host properties must be defined in the Forescout platform before you submit the request message.*

In the CounterACT Web Service, the requested action is declared in the **`<TRANSACTION>`** element in the data section of the request. For update tasks, the Transaction Type attribute has the value **`update`**. This essential setting differentiates this request message from other tasks.

The data section of the message should reflect the structure of the referenced host property. See Appendix 1: Forescout Property and Data Types for details.

Example: Basic Update

The following example shows the basic request message to update a host property with a new value. The **`update.xml`** file is listed.

```
# /tmp/update.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="1.0">
   <TRANSACTION TYPE="update">
   <OPTIONS CREATE_NEW_HOST="true"/>
   <HOST_KEY NAME="ip" VALUE="10.0.0.101"/>
      <PROPERTIES>
         <PROPERTY NAME="Prop_String">
            <VALUE>Sales</VALUE>
         </PROPERTY>
      </PROPERTIES>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Hosts
```

XML Schema for the Update Transaction

This section describes the following elements that can be used when you construct an Update request message.

- Forescout API Element: Web Service Envelope
- TRANSACTION Element: Specify a Web Service Task
- OPTIONS Element: Task Options
- HOST_KEY Element: Identify the Target Endpoint
- PROPERTIES Element: Host Property Data Section

- PROPERTY Element: Specify a Single Value or List Host Property
- TABLE_PROPERTY, CPROPERTY, and ROW Elements: Specify a Composite Property
- VALUE and CVALUE Element: Host Property Values

Forescout API Element: Web Service Envelope

The **<FSAPI>** element identifies the XML payload as CounterACT Web Service request content, and provides basic information about the request content.

Usage:

```
<FSAPI TYPE="request" API_VERSION="1.0">
```

Attribute	Description	Valid Values
TYPE	The type of web service message.	Request: web service request message
API_VERSION	The version of the API that is used to process the request.	1.0 (default)

TRANSACTION Element: Specify a Web Service Task

The **<TRANSACTION>** element specifies the action you want to apply to a specific host property. This element is the external envelope of the request message body, enclosing all other elements.

A single request message contains only one transaction element. This means it can perform one type of task using data relevant to a single endpoint.

You can submit several similar tasks for an endpoint in a single request message. For example, a single transaction can update several properties for one endpoint.

The **TYPE** attribute determines the action requested by the message. For the Update task, this attribute should be set to **update**, as in the following example:

```
<TRANSACTION TYPE="update">
```

OPTIONS Element: Task Options

Use the **<OPTIONS>** element to enable processing options for the transaction. Options are listed as attributes of the element, and can be independently enabled and disabled.

Usage:

```
<OPTIONS CREATE_NEW_HOST="true"/>
```

Attribute	Description	Valid Values
CREATE_NEW_HOST	If the <HOST_KEY> element specifies an endpoint not known to the Forescout platform, create a new endpoint based on the <HOST_KEY> value.	True/False Default: False

HOST_KEY Element: Identify the Target Endpoint

The **<HOST_KEY>** element specifies the endpoint to which the task is applied. The endpoint can be specified using its IP address.

Use one of the following statements:

<HOST_KEY NAME="ip" VALUE="*10.0.0.101*"/>

Attribute	Description	Valid Values
NAME	Type of identifier used to specify the endpoint.	**IP**: Host is identified by its IP address. The VALUE attribute must contain a valid IP address.
VALUE	Actual identifier value used to specify the endpoint.	IP address in dot-separated format: *10.0.0.101*

PROPERTIES Element: Host Property Data Section

The **<PROPERTIES>** element is an envelope for the detailed host property information included in the message. In this section of the message, you specify the host property values that will be modified for the endpoint.

The request can contain only one **<PROPERTIES>** element, which must contain at least one **<PROPERTY>** or **<TABLE_PROPERTY>** child element.

When one request modifies several host properties for an endpoint, the **<PROPERTIES>** element contains several child **<PROPERTY>** or **<TABLE_PROPERTY>** elements. In the following example, the **<PROPERTIES>** element contains a composite property and a Single Value string property.

```
<PROPERTIES>
      <TABLE_PROPERTY NAME="Prop_Composite">
            . . .
      </TABLE_PROPERTY>
      <PROPERTY NAME="Prop_String">
            . . .
      </PROPERTY>
</PROPERTIES>
```

PROPERTY Element: Specify a Single Value or List Host Property

Use the **<PROPERTY>** element to specify a property to be modified. The **<PROPERTY>** element contains all modification information for a host property containing a single data value or a list.

For a Single Value property, the **<PROPERTY>** element contains a single **<VALUE>** element. If more than one **<VALUE>** element is specified, the last value is used for the Update task.

```
<PROPERTY NAME="Prop_Time">
      <VALUE>1377526368</VALUE>  <!-- Epoch time -->
</PROPERTY>
```

For a list property, the **<PROPERTY>** element can contain several **<VALUE>** elements.

```
<PROPERTY NAME="Prop_List">
      <VALUE>1377526368</VALUE>  <!-- Epoch time -->
      <VALUE>1377668342</VALUE>  <!-- Epoch time -->
</PROPERTY>
```

- If the list property was defined as an *aggregate* property, existing values are retained when the property is updated. Property values submitted in the request message are appended as new values to the list.

- If the list property is not an aggregate property, the values in the request message completely replace the list stored by the property.

See Appendix 1: Forescout Property and Data Types for details.

TABLE_PROPERTY, CPROPERTY, and ROW Elements: Specify a Composite Property

When you work with a composite property containing multiple fields, the **<TABLE_PROPERTY>** element contains several **<ROW>** elements, which contain multiple **<CPROPERTY>** elements. Each **<CPROPERTY>** element contains modification information for a single field of the composite property.

In the example shown, each row of the composite property represents a service desk record. The *Prop_Composite_Sub_Time* property contains the date and time of the service call and the *Prop_Composite_Sub_String* property identifies the type of service provided.

```
<TABLE_PROPERTY NAME="Prop_Composite">
<ROW>
      <CPROPERTY NAME="Prop_Composite_Sub_Time">
            <CVALUE>1377526368</CVALUE>  <!-- Epoch time -->
      </CPROPERTY>
      <CPROPERTY NAME="Prop_Composite_Sub_String">
            <CVALUE>SW_update</CVALUE>
      </CPROPERTY>
</ROW>
<ROW>
      <CPROPERTY NAME="Prop_Composite_Sub_Time">
            <CVALUE>1377668342</CVALUE>  <!-- Epoch time -->
      </CPROPERTY>
      <CPROPERTY NAME="Prop_Composite_Sub_String">
            <CVALUE>HW_maint</CVALUE>
      </CPROPERTY>
</ROW>
</TABLE_PROPERTY>
```

The **<TABLE_PROPERTY>** element can contain several **<ROW>** elements.

- If the property was defined as an *aggregate* property, existing rows are retained when the property is updated. Rows submitted in the request message are appended as new rows to the table.
- If the property is not an aggregate property, the rows in the request message completely replace the table stored by the property.

See Appendix 1: Forescout Property and Data Types for details.

Attribute	Description	Valid Values
NAME	The name of the host property or sub-property to be modified. ***This attribute is required.***	The name of a custom host property, or a sub-property of a custom composite property. This property must already exist in the Forescout platform before a request is submitted to the web service.

VALUE and CVALUE Element: Host Property Values

The **<VALUE>** element contains the value of a host property. Depending on the type of property you are modifying, the **<PROPERTY>** element can contain one or more **<VALUE>** elements.

Similarly, the **<CVALUE>** element contains the value of an individual field in a composite property.

Data must conform to valid formats accepted by the Forescout platform. The following example shows an EPOCH timestamp value, a format accepted by the Forescout platform.

<VALUE>1377526368</VALUE>

Similarly, null values should correspond to configured values in the Forescout platform. See Define Null Values for details.

Update Transaction Examples

All CounterACT Web Service requests use the same URI. The requested action is declared in the data section of the request. This means that the HTTP header is identical for all web service transactions.

Update Multiple Properties

In the following example, several properties are updated. The message body is saved to the **update_multiple.xml** file.

```
# /tmp/update_multiple.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="1.0">
   <TRANSACTION TYPE="update">
   <OPTIONS CREATE_NEW_HOST="true"/>
   <HOST_KEY NAME="ip" VALUE="10.0.0.101"/>
      <PROPERTIES>
         <PROPERTY NAME="Prop_String">
             <VALUE>Login</VALUE>
         </PROPERTY>
         <PROPERTY NAME="Prop_Time">
             <CVALUE>1377526368</CVALUE>  <!-- Epoch time -->
         </PROPERTY>
      </PROPERTIES>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update_multiple.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Hosts
```

Update a Composite Property

In the following example several sub-properties of a composite property are updated. The message body is saved to the **update_composite.xml** file.

```
# /tmp/update_composite.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="1.0">
```

```
   <TRANSACTION TYPE="update">
   <OPTIONS CREATE_NEW_HOST="true"/>
   <HOST_KEY NAME="ip" VALUE="10.0.0.101"/>
      <PROPERTIES>
         <TABLE_PROPERTY NAME="Prop_Composite">
            <ROW>
               <CPROPERTY NAME="Prop_Composite_Sub_Time">
                  <CVALUE>1377526368</CVALUE>  <!-- Epoch time -->
               </CPROPERTY>
               <CPROPERTY NAME="Prop_Composite_Sub_String">
                  <CVALUE>SW_update</CVALUE>
               </CPROPERTY>
            </ROW>
            <ROW>
               <CPROPERTY NAME="Prop_Composite_Sub_Time">
                  <CVALUE>1377668342</CVALUE>  <!-- Epoch time -->
               </CPROPERTY>
               <CPROPERTY NAME="Prop_Composite_Sub_String">
                  <CVALUE>HW_maint</CVALUE>
               </CPROPERTY>
            </ROW>
         </TABLE_PROPERTY>
      </PROPERTIES>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update_composite.xml -k \
     -X POST https://10.0.0.1/fsapi/niCore/Hosts
```

Create New Host on Update

In the following example, the **CREATE_NEW_HOST** option is enabled. If the endpoint with IP address 10.0.0.101 is not known to the Forescout platform, it is added.

The message body is saved to the **update_create_new.xml** file.

```
# /tmp/update_create_new.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="1.0">
   <TRANSACTION TYPE="update">
   <OPTIONS CREATE_NEW_HOST="true"/>
   <HOST_KEY NAME="ip" VALUE="10.0.0.101"/>
      <PROPERTIES>
         <PROPERTY NAME="Prop_String">
            <VALUE>Sales</VALUE>
         </PROPERTY>
      </PROPERTIES>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update_create_new.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Hosts
```

The following response message indicates that the request succeeded.

```
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="response" API_VERSION="1.0">
   <STATUS>
      <CODE>FSAPI_OK</CODE>
      <MESSAGE>Successfully updated 1 properties for new host
       ip=10.0.0.101</MESSAGE>
   </STATUS>
</FSAPI>
```

🗎 *By default, the value of the CREATE_NEW_HOST attribute is false. If the message body omits the attribute (as shown in the following example), this default value is used.*

```
# /tmp/update_create_new.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="1.0">
   <TRANSACTION TYPE="update">
   <HOST_KEY NAME="ip" VALUE="10.0.0.102"/>
      <PROPERTIES>
         <PROPERTY NAME="Prop_String">
            <VALUE>Sales</VALUE>
         </PROPERTY>
      </PROPERTIES>
   </TRANSACTION>
</FSAPI>
```

In this case, if the endpoint with IP address 10.0.0.102 is not known to the Forescout platform, the following error is returned.

```
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="response" API_VERSION="1.0">
   <STATUS>
      <CODE>FSAPI_BAD_REQUEST_DATA</CODE>
      <MESSAGE>/Prop_String: Cannot create host ip=10.0.0.102;
       resubmit with CREATE_NEW_HOST="true"</MESSAGE>
   </STATUS>
</FSAPI>
```

Delete: Clear Host Property Values

The request message for the Delete task specifies host properties for an endpoint. The CounterACT Web Service clears the values of these properties.

🗎 *The target host property must be defined in the Forescout platform before you submit the request message.*

In the CounterACT Web Service the requested action is declared in the **`<TRANSACTION>`** element in the data section of the request. For update tasks, the Transaction Type attribute has the value **Delete**. This essential setting differentiates this request message from other tasks.

The data section of the message should reflect the structure of the referenced host property. See Appendix 1: Forescout Property and Data Types for details.

Basic Delete Example

The following example shows the basic request message to clear a host property. The existing value of the *Manager* host property is deleted for endpoint 10.0.0.201. The message body is saved to the **delete_prop_value.xml** file.

```
# /tmp/delete_prop_value.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="1.0">
   <TRANSACTION TYPE="delete">
      <HOST_KEY NAME="ip" VALUE="10.0.0.101"/>
         <PROPERTIES>
            <PROPERTY NAME="Prop_String" />
         </PROPERTIES>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/delete_prop_value.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Hosts
```

XML Schema for the Delete Task

This section describes the following elements that can be used when you construct a Delete request message.

- Forescout API Element
- TRANSACTION Element: Specify a Web Service Task
- HOST_KEY Element
- PROPERTIES Element
- PROPERTY Element
- TABLE_PROPERTY Element

Forescout API Element

The **<FSAPI>** element identifies the XML payload as CounterACT Web Service request content. For usage details, see Forescout API Element: Web Service Envelope.

TRANSACTION Element: Specify a Web Service Task

The **<TRANSACTION>** element specifies the action you want to apply to a specific host property. This element is the external envelope of the request message body, enclosing all other elements.

A single request message contains only one transaction element. This means it can perform one type of task using data relevant to a single endpoint.

You can submit several similar tasks for an endpoint in a single request message. For example, a single transaction can delete several properties for a single endpoint.

The **TYPE** attribute determines the action requested by the message. For the Delete task, this attribute should be set to **delete**, as in the following example:

<TRANSACTION TYPE="delete">

HOST_KEY Element

- The **<HOST_KEY>** element specifies the endpoint to which the task is applied. For usage details, see HOST_KEY Element: Identify the Target Endpoint.

PROPERTIES Element

The **<PROPERTIES>** element is an envelope for the detailed host property information included in the message. For usage details, see PROPERTIES Element: Host Property Data Section.

PROPERTY Element

Use the **<PROPERTY>** element to specify a Single Value or list property to be cleared. The **delete** transaction deletes all values in a list property.

Usage:

<PROPERTY NAME="*prop_name***" />** clears all values of the *prop_name* host property for the specified endpoint.

TABLE_PROPERTY Element

When you work with a composite property containing multiple fields, the **<TABLE_PROPERTY>** element is used to specify the property to be cleared. The **delete** transaction deletes the entire table stored in the specified composite property.

Usage:

<TABLE_PROPERTY NAME="*cprop_name***" />** clears all values of the *cprop_name* property for the specified endpoint.

Delete Transaction Examples

All CounterACT Web Service requests use the same URI and HTTP header for all transactions. The requested action is declared in the data section of the request.

Delete Multiple Properties

In the following example, several properties are deleted. The message body is saved to the **delete_multiple.xml** file.

```
# /tmp/delete_multiple.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="1.0">
   <TRANSACTION TYPE="delete">
      <HOST_KEY NAME="ip" VALUE="10.0.0.101"/>
         <PROPERTIES>
            <PROPERTY NAME="Prop_String_1" />
            <PROPERTY NAME="Prop_String_2" />
            <PROPERTY NAME="Prop_Boolean" />
         </PROPERTIES>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/delete_multiple.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Hosts
```

Add List Values to Forescout Property Lists

The request message for the **`Add_list_value`** transaction specifies the following information:

- The target Forescout Property Lists are identified by their names.
- Values to be added to the Forescout Property Lists.

The CounterACT Web Service updates the Forescout Property Lists with the supplied values.

> 🗎 *The specified Forescout Property Lists must be defined in the Forescout platform before you submit the request message.*

In the CounterACT Web Service, the requested action is declared in the **`<TRANSACTION>`** element in the data section of the request. For the Add_list_values task, the Transaction Type attribute has the value **`add_list_values`**. This essential setting differentiates this request message from other tasks.

The data section of the message should contain the name of the Forescout Property List and the values to be added to it. Multiple Forescout Property Lists can be included in one message.

Example: Basic Add_list_values

The following example shows the basic request message to add values to Forescout Property Lists. The **`update.xml`** file is listed.

```
# /tmp/update.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="2.0">
   <TRANSACTION TYPE="add_list_values">
      <LISTS>
         <LIST NAME=”sales_employee_id”>
            <VALUE>A001</VALUE>
            <VALUE>A002</VALUE>
         </LIST>
         <LIST NAME=”support_employee_id”>
            <VALUE>B001</VALUE>
            <VALUE>B002</VALUE>
         </LIST>
      </LISTS>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Lists
```

XML Schema for the Update Transaction

This section describes the following elements that can be used when you construct an Update request message.

- Forescout API Element: Web Service Envelope

- TRANSACTION Element: Specify a Web Service Task
- LISTS Element: Forescout Property Lists Data Section
- LIST Element: Specify a Single Forescout Property List
- VALUE Element: Forescout Property List Value

Forescout API Element: Web Service Envelope

The **<FSAPI>** element identifies the XML payload as CounterACT Web Service request content, and provides basic information about the request content.

Usage:

<FSAPI TYPE="request" API_VERSION="2.0">

Attribute	Description	Valid Values
TYPE	The type of web service message.	Request: web service request message
API_VERSION	The version of the API that is used to process the request.	2.0

TRANSACTION Element: Specify a Web Service Task

The **<TRANSACTION>** element specifies the action you want to apply to specific Forescout Property Lists. This element is the external envelope of the request message body, enclosing all other elements.

A single request message contains only one transaction element. This means it can perform one type of task using data relevant to the Forescout Property Lists.

A single transaction can add values to multiple Forescout Property Lists.

The **TYPE** attribute determines the action requested by the message. For the Add_list_values task, this attribute should be set to **add_list_values**, as in the following example:

<TRANSACTION TYPE="add_list_values ">

LISTS Element: Forescout Property Lists Data Section

The **<LISTS>** element is an envelope for the detailed Forescout Property List information included in the message. In this section of the message, you specify the values that are added to the Forescout Property List.

The request can contain only one **<LISTS>** element, which must contain at least one **<LIST>** child element.

When one request updates several Forescout Property Lists, the **<LISTS>** element contains several child **<LIST>** elements. In the following example, the **<LISTS>** element contains two Forescout Property Lists to be updated.

```
<LISTS>
      <LISTS>
         <LIST NAME=”list1”>
            …
         </LIST>
         <LIST NAME=”list2”>
            …
         </LIST>
      </LISTS>
</LISTS>
```

LIST Element: Specify a Single Forescout Property List

Use the **<LIST>** element to specify a Forescout Property List to be updated. The NAME attribute is the identifier of the specified Forescout Property List. The **<LIST>** element can contain multiple **<VALUE>** element. In the following example, the **<LIST>** element contains two values to be added to the Forescout Property List.

```
<LIST NAME=”list1”>
      <VALUE>value1</VALUE>
      <VALUE>value2</VALUE>
</LIST>
```

In a Forescout Property List, each value is unique. This means if a value to be added to the Forescout Property List already exists in the list, it will not be added.

For more information about Forescout Property List, refer to the Defining and Managing Lists section in the *Forescout Administration Guide*. See Additional Forescout Documentation for information on how to access this guide.

VALUE Element: Forescout Property List Value

The **<VALUE>** element contains the value of a Forescout Property List. The **<LIST>** element can contain one or more **<VALUE>** elements.

Example: Add_list_values Transaction

All CounterACT Web Service requests use the same URI. The requested action is declared in the data section of the request. This means that the HTTP header is identical for all web service transactions.

In the following example, several Forescout Property Lists are updated. The message body is saved to the **update.xml** file, which is listed.

```
# /tmp/update.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="2.0">
   <TRANSACTION TYPE="add_list_values">
      <LISTS>
         <LIST NAME=”sales_employee_id”>
            <VALUE>A001</VALUE>
            <VALUE>A002</VALUE>
         </LIST>
         <LIST NAME=”support_employee_id”>
            <VALUE>B001</VALUE>
            <VALUE>B002</VALUE>
         </LIST>
      </LISTS>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Lists
```

Delete List Values in Forescout Property Lists

The request message for the **`Delete_list_values`** transaction specifies the following information:

- The target Forescout Property Lists are identified by their names.
- Values to be deleted in the Forescout Property Lists.

The CounterACT Web Service deleted the specified values in the specified Forescout Property Lists.

> 🗎 *The specified Forescout Property Lists must be defined in the Forescout platform before you submit the request message.*

In the CounterACT Web Service the requested action is declared in the **`<TRANSACTION>`** element in the data section of the request. For the Delete_list_values task, the Transaction Type attribute has the value **`delete_list_values`**. This essential setting differentiates this request message from other tasks.

The data section of the message should contain the name of the Forescout Property List and the values to be deleted in it. Multiple Forescout Property Lists can be included in one message.

Example: Basic Delete_list_values

The following example shows the basic request message to delete values in Forescout Property Lists. The **`update.xml`** file is listed.

```
# /tmp/update.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="2.0">
   <TRANSACTION TYPE="delete_list_values">
      <LISTS>
         <LIST NAME=”sales_employee_id”>
            <VALUE>A001</VALUE>
            <VALUE>A002</VALUE>
         </LIST>
         <LIST NAME=”support_employee_id”>
            <VALUE>B001</VALUE>
            <VALUE>B002</VALUE>
         </LIST>
      </LISTS>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Lists
```

XML Schema for the Update Transaction

This section describes in detail the following elements that can be used when you construct an Update request message.

- Forescout API Element: Web Service Envelope

- TRANSACTION Element: Specify a Web Service Task
- LISTS Element: Forescout Property Lists Data Section
- LIST Element: Specify a Single Forescout Property List
- VALUE Element: Forescout Property List Value

Forescout API Element: Web Service Envelope

The **<FSAPI>** element identifies the XML payload as CounterACT Web Service request content, and provides basic information about the request content.

Usage:

<FSAPI TYPE="request" API_VERSION="2.0">

Attribute	Description	Valid Values
TYPE	The type of web service message.	Request: web service request message
API_VERSION	The version of the API that is used to process the request.	2.0

TRANSACTION Element: Specify a Web Service Task

The **<TRANSACTION>** element specifies the action you want to apply to specific Forescout Property Lists. This element is the external envelope of the request message body, enclosing all other elements.

A single request message contains only one transaction element. This means it can perform one type of task using data relevant to the Forescout Property Lists.

A single transaction can delete values in multiple Forescout Property Lists.

The **TYPE** attribute determines the action requested by the message. For the Delete_list_values task, this attribute should be set to **delete_list_values**, as in the following example:

<TRANSACTION TYPE="delete_list_values">

LISTS Element: Forescout Property Lists Data Section

The **<LISTS>** element is an envelope for the detailed Forescout Property List information included in the message. In this section of the message, you specify the values that will be added to the Forescout Property List.

The request can contain only one **<LISTS>** element, which must contain at least one **<LIST>** child element.

When one request updates several Forescout Property Lists, the **<LISTS>** element contains several child **<LIST>** elements. In the following example, the **<LISTS>** element contains two Forescout Property Lists to be updated.

```
<LISTS>
      <LISTS>
         <LIST NAME=”list1”>
            …
         </LIST>
         <LIST NAME=”list2”>
            …
         </LIST>
      </LISTS>
</LISTS>
```

LIST Element: Specify a Single Forescout Property List

Use the **<LIST>** element to specify a Forescout Property List to be updated. The NAME attribute is the identifier of the specified Forescout Property List. The **<LIST>** element can contain multiple **<VALUE>** element. In the following example, the **<LIST>** element contains two values to be deleted in the Forescout Property List.

```
<LIST NAME=”list1”>
      <VALUE>value1</VALUE>
      <VALUE>value2</VALUE>
</LIST>
```

The delete action proceeds even if the value to be deleted does not exist in the Forescout Property List.

For more information about Forescout Property List, refer to the Defining and Managing Lists section in the *Forescout Administration Guide*. See Additional Forescout Documentation for information on how to access this guide.

VALUE Element: Forescout Property List Value

The **<VALUE>** element contains the value of a Forescout Property List. The **<LIST>** element can contain one or more **<VALUE>** elements.

Example: Delete_list_values Transaction

All CounterACT Web Service requests use the same URI. The requested action is declared in the data section of the request. This means that the HTTP header is identical for all web service transactions.

In the following example, several Forescout Property Lists are updated. The message body is saved to the **update.xml** file, which is listed.

```
# /tmp/update.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="2.0">
   <TRANSACTION TYPE="delete_list_values">
      <LISTS>
         <LIST NAME=”sales_employee_id”>
            <VALUE>A001</VALUE>
            <VALUE>A002</VALUE>
         </LIST>
         <LIST NAME=”support_employee_id”>
            <VALUE>B001</VALUE>
            <VALUE>B002</VALUE>
         </LIST>
      </LISTS>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Lists
```

Delete All List Values in Forescout Property Lists

The request message for the **`Delete_all_list_values`** transaction specifies the following information:

- The target Forescout Property Lists are identified by their names.

The CounterACT Web Service deletes all the values in the specified Forescout Property Lists.

The specified Forescout Property Lists must be defined in the Forescout platform before you can submit the request message.

In the CounterACT Web Service, the requested action is declared in the **`<TRANSACTION>`** element in the data section of the request. For the Delete_all_list_values task, the Transaction Type attribute has the value **`delete_all_list_values`**. This essential setting differentiates this request message from other tasks.

The data section of the message should contain the name of the Forescout Property List. Multiple Forescout Property Lists can be included in one message.

Example: Basic Delete_all_list_values

The following example shows the basic request message to delete values in Forescout Property Lists. The **`update.xml`** file is listed.

```
# /tmp/update.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="2.0">
   <TRANSACTION TYPE="delete_all_list_values">
      <LISTS>
         <LIST NAME=”list1”/>
         <LIST NAME=”list2”/>
      </LISTS>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Lists
```

XML Schema for the Update Transaction

This section describes in detail the following elements that can be used when you construct an Update request message.

- Forescout API Element: Web Service Envelope
- TRANSACTION Element: Specify a Web Service Task
- LISTS Element: Forescout Property Lists Data Section
- LIST Element: Specify a Single Forescout Property List

Forescout API Element: Web Service Envelope

The **`<FSAPI>`** element identifies the XML payload as CounterACT Web Service request content, and provides basic information about the request content.

Usage:

`<FSAPI TYPE="request" API_VERSION="2.0">`

Attribute	Description	Valid Values
TYPE	The type of web service message.	Request: web service request message
API_VERSION	The version of the API that is used to process the request.	2.0

TRANSACTION Element: Specify a Web Service Task

The **`<TRANSACTION>`** element specifies the action you want to apply to specific Forescout Property Lists. This element is the external envelope of the request message body, enclosing all other elements.

A single request message contains only one transaction element. This means it can perform one type of task using data relevant to the Forescout Property Lists.

A single transaction can delete all the values for multiple Forescout Property Lists.

The **`TYPE`** attribute determines the action requested by the message. For the Delete_all_list_values task, this attribute should be set to **`delete_all_list_values`**, as in the following example:

`<TRANSACTION TYPE="delete_all_list_values">`

LISTS Element: Forescout Property Lists Data Section

The **`<LISTS>`** element is an envelope for the detailed Forescout Property List information included in the message. In this section of the message, you specify the Forescout Property Lists that will have all their values deleted.

The request can contain only one **`<LISTS>`** element, which must contain at least one **`<LIST>`** child element.

When one request updates several Forescout Property Lists, the **`<LISTS>`** element contains several child **`<LIST>`** elements. In the following example, the **`<LISTS>`** element contains two Forescout Property Lists to be updated.

```
<LISTS>
      <LISTS>
         <LIST NAME=”list1”/>
         <LIST NAME=”list2”/>
      </LISTS>
</LISTS>
```

LIST Element: Specify a Single Forescout Property List

Use the **`<LIST>`** element to specify a Forescout Property List to be updated. The NAME attribute is the identifier of the specified Forescout Property List. It can have no child element.

```
<LIST NAME=”list1”/>
```

The delete action proceeds even if the value to be deleted does not exist in the Forescout Property List.

For more information about Forescout Property List, refer to the Defining and Managing Lists section in the *Forescout Administration Guide*. See Additional Forescout Documentation for information on how to access this guide.

Example: Delete_all_list_values Transaction

All CounterACT Web Service requests use the same URI. The requested action is declared in the data section of the request. This means that the HTTP header is identical for all web service transactions.

In the following example, several Forescout Property Lists are updated. The message body is saved to the **update.xml** file, which is listed.

```
# /tmp/update.xml
<?xml version="1.0" encoding="UTF-8"?>
<FSAPI TYPE="request" API_VERSION="2.0">
   <TRANSACTION TYPE="delete_all_list_values">
      <LISTS>
         <LIST NAME=”sales_employee_id”/>
         <LIST NAME=”support_employee_id”/>
      </LISTS>
   </TRANSACTION>
</FSAPI>
```

The following statement uses the curl utility to create and submit an HTTPS request message with the XML file in the message body.

```
curl -u "user@account:password" -k -H "Content-Type:application/xml" \
     -d @/tmp/update.xml \
     -X POST https://10.0.0.1/fsapi/niCore/Lists
```

Appendix 5: External Web Service Parser Construction

The DEX Open Integration Module lets users configure a parsing pattern to map HTTP response content (typically in JSON/XML format) to a property as part of External Web Service Property definition. The module supports three types of parser: JSON Path, XML Path, and REGEX.

Exchanged data typically uses an XML or JSON data structure. When you submit a request message to retrieve data, the returned payload is parsed to yield Forescout property values. When you submit a request message with data to an external service, the message header should conform to the required structure.

> 🗎 *In addition to requests initiated by the Forescout platform, external platforms can submit REST messages to the CounterACT web service. See Work with the CounterACT Web Service for details.*

The purpose of the table below is to provide a basic impression of how the parsing patterns map the HTTP response content to the External Web Service properties. The parsing patterns in the table are presented in the simplest way.

In order to write more complex and powerful parsing patterns, you should have a good understanding of the JSON Path/XML Path/REGEX. Note the following:

- REGEX can only be used to parse data for Single Value or Record Exists properties.
- REGEX can be used to parse data returned in JSON or XML format. However, JSON Path and XML Path are more efficient, and it is highly recommended to use one of these parsing methods instead of REGEX.

HTTP Response Content Type	Forescout property type	Example of HTTP Response Content (bold is the value of the Forescout property)	Parse Data Using	Parsing Pattern

JSON	Single	{
		“result” : {
		“update_by” : “***abc123***”,
		“update_ip” : “10.10.10.10”
		},
		“error” : “none”
		}
			JSON Path	$.result.update_by

JSON	List	{
		“softwares” : [
		{“name” : “***AAA***” , “vendor” : “B”},
		{“name” : “***CCC***” , “vendor” : “D”}
		]
		}
			JSON Path	$.softwares[*].name

JSON	Composite	{
		“result” : {
		“update_by” : “***abc123***”,
		“update_ip” : “10.10.10.10”
		},
		“error” : “***none***”
		}
			JSON Path	*Sub property1:*
				$.result.update_by
				Sub property2:
				$.error

JSON	Record Exist	{
		“result” : {
		“update_by” : “abc123”,
		“update_ip” : “***10.10.10.10***”
		},
		“error” : “none”
		}
			JSON Path	$.result.update_ip

HTTP Response Content Type	Forescout property type	Example of HTTP Response Content (bold is the value of the Forescout property)	Parse Data Using	Parsing Pattern
XML	Single	<response> <result> <update_by>***abc123***<update_by> <update_ip>10.10.2.3<update_ip> </result> <error>none</error> <response>	XML Path	/response/result/update_by /text()
XML	List	<softwares> <software vendor=”CompanyA”> <name>***AAA***</name > </software> <software vendor=”CompanyA”> <name>***BBB***</name > </software> <software vendor=”CompanyB”> <name>CCC</name > </software> </softwares>	XML Path	/softwares/software[@vendor=’CompanyA']/name/text()
XML	Composite	<response> <result> <update_by>***abc123***<update_by> <update_ip>10.10.2.3<update_ip> </result> <error>***none***</error> <response>	XML Path	*Sub property1:* /response/result/update_by /text() *Sub property2:* /response/error/text()
XML	Record Exist	<response> <result> <update_by>***abc123***<update_by> <update_ip>10.10.2.3<update_ip> </result> <error>none</error> <response>	XML Path	/response/result/update_by /text()
Other	Single / Record Exist	update_by=***abc123***,update_ip=10.1.1.1	REGEX	update_by=(.*),update_ip=

Additional Forescout Documentation

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

- Documentation Downloads
- Documentation Portal
- Forescout Help Tools

Documentation Downloads

Documentation downloads can be accessed from the Forescout Technical Documentation Page, and one of two Forescout portals, depending on which licensing mode your deployment is using.

- ***Per-Appliance Licensing Mode*** – Product Updates Portal
- ***Flexx Licensing Mode*** – Customer Support Portal

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

To identify your licensing mode:

- From the Console, select **Help > About Forescout**.

Forescout Technical Documentation Page

The Forescout Technical Documentation Page provides access to a searchable, web-based Documentation Portal as well as PDF links to the full range of technical documentation.

To access the Technical Documentation Page:

- Go to https://www.Forescout.com/company/technical-documentation/

Product Updates Portal

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

To access the Product Updates Portal:

- Go to https://updates.forescout.com/support/index.php?url=counteract and select the version you want to discover.

Customer Support Portal

The Downloads page on the Forescout Customer Support Portal provides links to purchased Forescout version releases, Base and Content Modules, and eyeExtend products, as well as related documentation. Software and related documentation will only appear on the Downloads page if you have a license entitlement for the software.

To access documentation on the Customer Support Portal:

- Go to https://Forescout.force.com/support/ and select **Downloads**.

Documentation Portal

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

To access the Documentation Portal:

- Go to https://updates.forescout.com/support/files/counteract/docs_portal/

Forescout Help Tools

Access information directly from the Console.

Console Help Buttons

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

Forescout Administration Guide

- Select **Administration Guide** from the **Help** menu.

Plugin Help Files

- After the plugin is installed, select **Tools** > **Options** > **Modules**, select the plugin and then select **Help**.

Documentation Portal

- Select **Documentation Portal** from the **Help** menu to access the Documentation Portal.