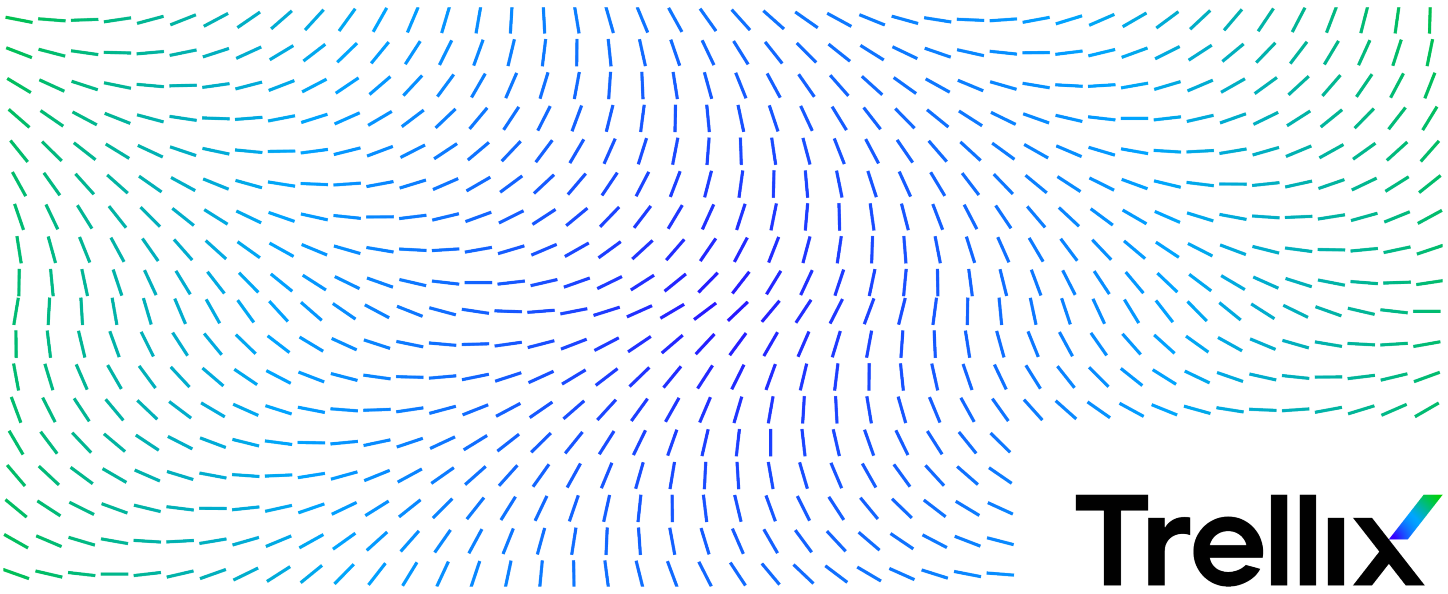
McAfee Data Exchange Layer 6.0.x Product Guide



Trellix

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Product overview

Overview

The McAfee® Data Exchange Layer (DXL) framework allows bidirectional communication between endpoints on a network. It connects multiple products and applications, shares data, and orchestrates security tasks using a real-time application framework called the Data Exchange Layer fabric.

DXL receives and sends encrypted messages over the fabric to track activity, risks, and threats and take action in real time. The DXL framework:

- Shortens the workflow for finding and responding to threats. The nearly instant information sharing reduces the time it takes to detect, contain, and correct newly identified threats.
- Uses OpenDXL to connect products from different vendors with your own applications and tools, reducing integration challenges and complexities. It allows communication between multiple products so they can quickly share the threat data they generate, increasing the value of the applications you deploy.

Key features

DXL provides several key features that enable communication throughout the network.

The DXL broker fabric

At the center of DXL is the DXL broker fabric, or framework. This is the backbone that enables the communication of events and tasks throughout your environment. Each DXL client installed on managed endpoints connects to a DXL broker, and brokers form the fabric that sends and receives information.

Unlike typical security products where different applications do not communicate with each other, multiple applications and products connect to the DXL broker fabric to immediately share information. When a threat is found and stopped on one managed endpoint, products on the DXL fabric can send that information in real time to all other endpoints on the fabric to stop the threat from spreading.

Reduced time to detect and manage threats

The time it takes to detect, contain, and correct newly identified threats is reduced because the DXL broker fabric constantly shares the latest data and tasks occurring in your environment. Problems are identified and stopped quickly with less intervention from your security team. There is no need to check and update settings in several products as you react to a threat; information and tasks are shared automatically throughout your network.

OpenDXL

OpenDXL is a software development kit (SDK) that allows developers to create or connect applications that use the DXL broker fabric. This allows a secure way to share data and actions across multiple applications from different vendors, as well as applications developed internally. OpenDXL provides one integration process instead of multiple methods that must be managed

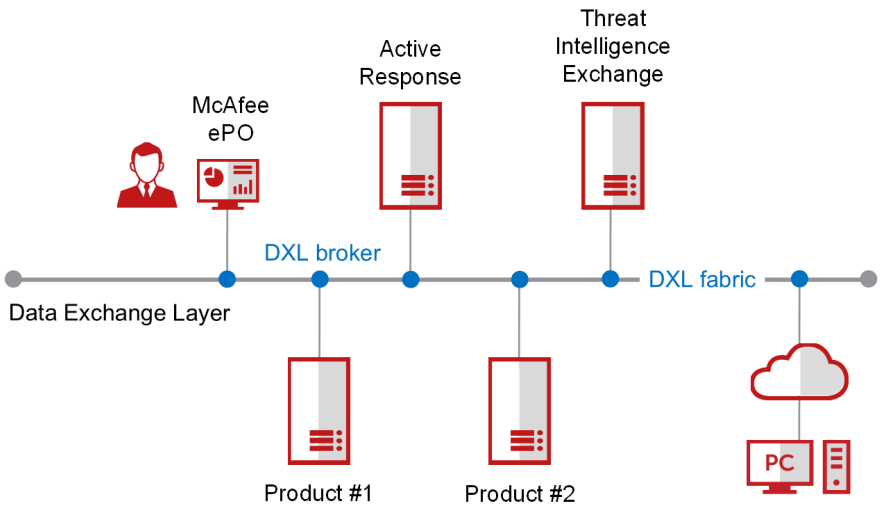
separately. Just as your McAfee products can connect to a broker on the DXL fabric, other products used in your company can too.

How it works

DXL communicates with services, databases, endpoints, and applications. The DXL client is installed with McAfee® Agent on each managed endpoint, and connects to a DXL broker.

The connected brokers create a fabric, or framework, so that information can be shared immediately with all other services and devices. For example:

- If a security administrator stops a threat using McAfee® Active Response, the threat information is sent in real time via DXL to all connected clients, isolating and stopping it from spreading.
- If a security administrator changes the reputation of a file or process using McAfee® Threat Intelligence Exchange (TIE), that change can be applied to a single system, or sent to all connected clients to take effect immediately.



Brokers

DXL brokers are installed on managed systems and route messages between connected clients, effectively allowing the client to connect to the DXL. Examples of connected clients are the Threat Intelligence Exchange module, the Active Response server, or third-party products using OpenDXL. Brokers can be installed on a virtual appliance through an .ova file or any Linux system running Red Hat or CentOS.

The network of brokers tracks active consumers (clients that use DXL) and dynamically adjusts the message routing as needed. When a client requests a service, or when an update is broadcast, brokers relay these messages to listeners or receivers. Brokers can be organized into hubs and service zones to provide failover protection and message routing preferences.

DXL clients maintain a persistent connection to their brokers regardless of their location. Even if a managed endpoint running the DXL client is behind a NAT (network address translation) boundary, it can receive updated threat information from its broker located outside the NAT.

DXL Fabric

The DXL fabric consists of connected DXL clients and brokers. It enables bidirectional communication, allowing connected security components to share relevant data between endpoint, network, and other security systems. It also allows automated responses, greatly reducing response time and improving containment of threats.

To share information and services across separate fabrics, you can bridge DXL fabrics that are managed by different McAfee® ePolicy Orchestrator® (McAfee® ePO™) servers.

Broker hubs

A broker hub is a configuration of one or two brokers that provides failover protection in a multi-broker environment. If a hub has two brokers, both act simultaneously. If one is unavailable, the other continues to function.

Clients

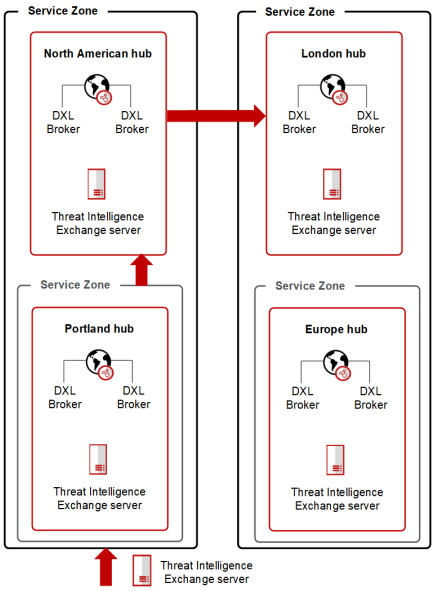
A client is any device that connects to the DXL fabric that is not routing messages (such as a broker). Clients receive and process messages from the brokers. Examples of clients are the Threat Intelligence Exchange module and Active Response.

Service zones

Service zones are groups of brokers that allow you to control how requests are routed on the fabric. You can organize brokers and hubs into service zones to determine how services are used.

For example, if you have multiple TIE servers and brokers in different geographical locations, you can create service zones that contain brokers and services. Clients connected to a broker in a service zone access services in that zone first. If those services are not available, the broker routes the request to services in other zones. If you don't use service zones, client requests are sent to any service at any location across the fabric.

In the following example, service zones are organized into locations. When the TIE client sends a file or certificate reputation request, it tries to find a TIE server in the Portland service zone first. If a server is not available in that zone, it looks in the North America service zone, because the Portland hub is part of the North America zone. Without specifying service zones, requests might be sent to the Europe or London hub first.



DXL Topics

Topics are like the URLs of DXL. They are where a service publishes its specific methods. When a client connects to DXL, it notifies the broker of the topics it is interested in. This allows for de-coupled topic-based communication where messages are sent to topics, not specific hosts.

DXL Cloud Databus

The DXL Cloud Databus facilitates the connection of on-premise McAfee ePO servers with McAfee Cloud Bridge, which provides cloud storage and services.

DXL brokers can be configured using the **DXL Broker Management Extension** to send data via the DXL Cloud Databus to the Cloud Bridge to support products that use this component.

For example, McAfee Active Response clients send trace data from managed endpoints via DXL and the DXL Cloud Databus to the McAfee Cloud Bridge. The trace data on the Cloud Bridge is then made available to an on-premise instance of Active Response where an endpoint administrator analyzes the data, identifies issues, and remediates threats.

Managing the Data Exchange Layer

Organizing and configuring brokers

The Data Exchange Layer brokers can be organized into hubs and service zones to determine how brokers are accessed.

Brokers are installed on managed systems and communicate messages between security products that are integrated with the DXL fabric. The network of brokers tracks active clients and dynamically adjusts the message routing as needed.

Organizing brokers

Brokers can be organized into hubs that manage how brokers are accessed and provide failover protection in a multi-broker environment. If a hub has two brokers, both act simultaneously. If one is unavailable, the other continues to function. You can create as many hubs as needed. A broker, however, can be assigned to only one hub.

You can also organize brokers and hubs into service zones, which are groups of brokers that allow you to control how requests are routed on the fabric. For example, if you have multiple TIE servers and brokers in different geographical locations, you can create service zones that contain brokers and services. Clients connected to a broker in a service zone access services in that zone first. If those services are not available, the broker routes the request to services in other zones.

Tools for working with brokers

- Arrange the brokers in the **DXL Topology** page to organize them the way you want. On the left side of the page is a list of brokers and hubs. Drag and drop the brokers and hubs to create the topology you need for your environment.
- You can add new brokers at any time as needed by deploying them on a managed system. A new broker is automatically added as a child to the top-level broker or hub in the broker topology.
- Use the **Data Exchange Layer Fabric** feature to view the broker topology in your environment. You can quickly see how brokers are connected and managed. You can also see the number of clients that are connected to a specific broker. This can help you determine if you need more brokers in your environment.
- Use the **DXL Client** policy to determine which broker an endpoint connects to, or to restrict specific brokers from an endpoint.
- To increase or decrease the number of clients that can connect to a broker, change the **Client Connection Limit** settings in the **McAfee DXL Broker Management policy**.

Configure DXL client policies

DXL policy settings are used by the DXL client on managed systems where the policy is assigned. The DXL client is installed and deployed with McAfee Agent.

The policy settings allow you to determine a specific broker or hub that the DXL client connects to. Policies enable you to control which DXL brokers that managed systems connect to. If a direct connection is not available, the DXL client will use the proxy settings as configured in the McAfee Agent policy.

Task

1. Select **Menu** → **Policy** → **Policy Catalog**.
2. From the **Products** list, select **McAfee DXL Client**.
3. Click **New Policy** to create a new policy, or **Edit** to change or duplicate an existing policy.
4. If creating or duplicating a new policy, enter a name and a brief description for the new policy, then click **OK**.
5. Complete the fields on the **Policy Catalog** page, then click **Save**.

Option	Definition
Self Protection	Prevents users on managed endpoints from changing DXL settings. (Windows only)
Broker Keepalive Interval	Determines how often the DXL client pings the broker. The default is every 30 minutes.
Client Log Settings	Enables debug logging for the C++ client. This option is not available for DXL clients managed by other products such as Threat Intelligence Exchange. **Enable debug logging** — Enable debug log files for the client. The files are on the managed system at ProgramData\McAfee\Data_Exchange_Layer\dxl_service.log on Windows systems, and at /var/McAfee/dxl on Linux systems.
Client Broker Connections	Determines a specific broker or hub that the DXL client connects to. You can specify one broker or hub. **Enable client broker preference** — Specify the brokers that the client connects to. If not selected, the client can connect to any broker or hub in the broker topology. • **Restrict to the selected broker or hub** — The DXL client connects only to the broker or hub selected in the **DXL Topology** list. If this option is not selected and the selected broker or hub in the **DXL Topology** list is not available, the client connects to another available broker. • **Include all descendants of the broker or hub** — The client can connect to any broker under the selected broker or hub. • **DXL Topology** — Shows the current DXL broker topology in your environment. Select one broker or hub that you want the DXL client to connect to.

Results

After you create a policy, assign it to managed systems to control how the DXL client on those systems communicates with brokers and hubs.

Configure DXL broker management policies

Use the broker management policy to increase or decrease the number of clients that can connect to a broker.

Task

1. Select **Menu** → **Policy** → **Policy Catalog**.
2. From the **Products** list, select **McAfee DXL Broker Management**.
3. Click **New Policy** to create a new policy, or **Edit** to change or duplicate an existing policy.
4. If creating a new policy, enter a name and a brief description for the new policy, then click **OK**.
5. Complete the fields on the **Policy Catalog** page, then click **Save**.

    - **Broker Keepalive Interval** — How often a ping occurs between brokers. The default is 1 minute.
    - **Client Connection Limit** — The number of clients that can connect to the brokers that use this policy. The default is 50,000 clients.

Configure brokers

If you installed DXL brokers on more than one system, you can create a hierarchy of brokers to provide failover protection if any brokers are unavailable.

Task

1. Select **Menu** → **Configuration** → **Server Settings** → **DXL Topology**.
2. Select **Edit** to create hubs, service zones, and assign brokers.
   The options on the page depend on whether you selected a broker or a hub. Unassigned brokers are listed below the hubs.
3. Select an item from the **Actions** menu to create or delete a hub, or to detach a broker from its current hub.

Option definitions if a broker is selected

Option	Definition
DXL Broker/Hub list	Lists the hubs and brokers. Hubs are *logical* groups of brokers (not actual hardware). Hubs are associated with one or two brokers.

Option	Definition
	You can add new brokers at any time using the DXL installation wizard. A new broker is automatically added as a child to the top-level broker or hub in the broker topology.
System Name	The system name where the broker is installed.
Published System Name	The published system name changes the host name used by all DXL fabric components to connect to the selected broker. Creating a published name allows DXL clients and brokers to connect to each other in a demilitarized zone (DMZ). If a published name is not entered in the field, the **System Name** is used.
IP Address	The system's IP address.
Published IP Address	The published system name changes the IP address used by all DXL fabric components to connect to the selected broker. Creating a published IP address allows DXL clients and brokers to connect to each other in a DMZ. If you don't enter an IP address in this field, the system's IP address is used.
Port	The port used by the broker.
Broker UID	The broker's unique identifier. The identifier is automatically assigned and cannot be changed.
Service Zone	Makes the broker a service zone, which determines how a request is routed to the client. When clients that are connected to this broker request reputation information, the request goes to this broker instead of a broker in a different location. If this broker is unavailable, the request is then routed to a different broker.
Registered Services	Services available to the broker. Click **Details** to see information about the supported services.
Bridged to	Bridging DXL fabrics allows DXL clients to access services that are available on other fabrics. This field shows the brokers that are bridged to the selected broker. Click **Details** to see information about the bridged brokers.
Broker Extensions	Broker extensions are additional features that can be enabled on a DXL broker to add new functionality. Other managed products that use DXL brokers create and make these extensions available.

Option	Definition
	The available broker extensions are listed. Select one or more extensions to enable them on the selected broker.
Actions	**Create Hub** — Create a hub of one or two brokers. **Detach** — Detach the hub from the topology tree with all descendants. This action does not delete the hub.

Option definitions if a hub is selected

Option	Definition
DXL Broker/Hub list	Lists the hubs and brokers. Hubs are *logical* groups of brokers (not actual hardware). Hubs are associated with one or two brokers.
Hub Name	The hub's name.
Hub UID	The hub's unique identifier, which is automatically assigned and can't be changed.
Broker 1, **Broker 2**	The brokers assigned to the hub.
Service Zone	Enables a service zone at the selected hub which includes the entire subtree under this hub. When clients that are connected to this hub or any broker under it request reputation information, the request goes to services registered with the hub or its descendants. If the brokers in the hub and all child brokers are unavailable, the request is routed to services in the next service zone higher in the tree. If there are no other service zones, services across the whole fabric are used.
Broker 1, Broker 2 Published System Name	The published system name for the brokers, if used.
Broker 1, Broker 2 Published IP Address	The published IP address for the brokers, if used.
Broker 1, Broker 2 Extension	Shows the extensions associated with the broker.

Option	Definition
	Broker extensions are additional features that can be enabled on a DXL broker to add new functionality. Other managed products that use DXL brokers create and make these extensions available.
Broker 1, Broker 2 Details	Shows details about the broker.
Actions	**Create Outgoing Bridge - Remote ePO Hub** — If the top-level hub is selected, bridge the local brokers under that hub to a remote hub managed by a different instance of McAfee ePO. This allows the bridged brokers to share information. **Create Incoming Bridge - Remote ePO Hub** — Create an incoming bridge where local brokers on your system are bridged to a remote hub and its brokers. Select a hub in your hierarchy that you want to bridge to the remote hub, then select this option. The hub on your local system does not have to be a top-level hub.
Import Remote Hub Information	When bridging from a remote hub to your local hub, click this to import the file with the remote hub's broker information. Browse to the remote hub's file to import it.
Export Local Hub Information	When bridging from your local hub to a remote hub, click this to create a file with information about your local hub's brokers. Make this file available to the remote hub so that it can create an incoming bridge and import it.

Add brokers

You might want to install more brokers throughout your environment as you add new endpoints and systems. A new broker is automatically added as a child to the top-level broker or hub in the broker topology.

Task

1. Run the DXL appliance installation, or install the brokers on a Linux system.
2. If adding brokers using the appliance, on the **Service Selection** page, select **DXL Broker** and complete the broker installation.

Add brokers to a DMZ

You can install Data Exchange Layer brokers in a demilitarized zone (DMZ) where publicly accessible servers are not allowed.

For managed endpoints that are in the DMZ to communicate with the DXL fabric, a broker must be established inside the DMZ. DMZ brokers must have their publicly exposed System Name (Published System Name) and publicly exposed IP address (Published IP address) configured on the DXL Topology page. When both the Published System Name and Published IP address have been set, all connections made to these brokers use these values instead of the reported internal values. It is recommended that DMZ brokers not have any children in the topology unless it is intended that they connect through the external Published System Name and external Published IP address.

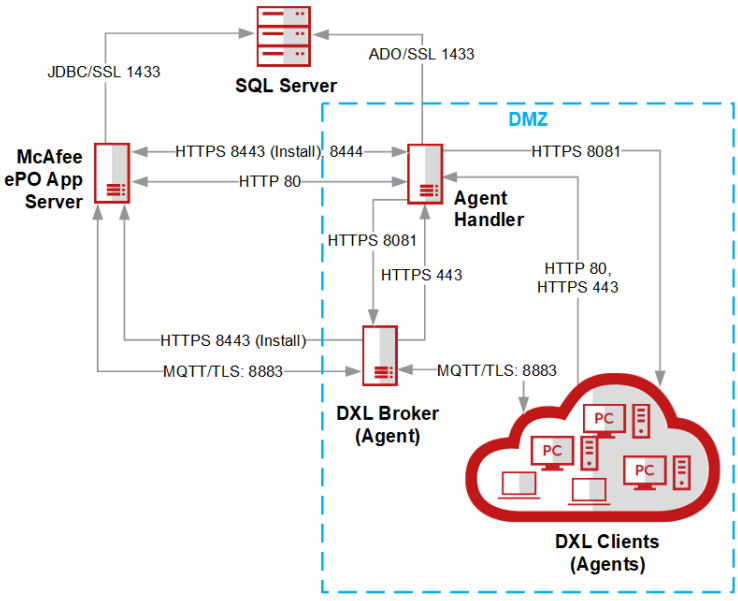
Additional DXL Client configuration is not needed to use of DMZ brokers. External endpoints are unable to see any internal brokers aside from the DMZ brokers and will connect to the closest available DMZ broker.

The **DXL Topology** page enables you to create this structure. (To access the **DXL Topology** page, select **Menu** → **Configuration** → **Server Settings** → **DXL Topology**.)

Important

You must have an Agent Handler in the DMZ and your network must be configured to support this. McAfee ePO communicates with the DXL broker to share configuration, policy, and performance information via the agent on the broker.

This diagram shows the default ports used in a DMZ environment.



The DXL fabric

Quickly see all DXL brokers in your environment. You can see their status, how they are connected, clients they support, and other details.

There are several views to see the broker fabric in different ways:

- The current connection status for all brokers
- Brokers managed by different instances of McAfee ePO
- Brokers by hub
- Brokers by connected clients

For all brokers in the fabric, you can see detailed properties, bridging information, registered services, and more.

View the DXL fabric

View all brokers in your environment and see connection, status, and detailed information.

Before you begin

The DXL fabric page is view-only and requires permissions to access it. To set permissions to access the fabric, use the **McAfee DXL Fabric** permission set in McAfee ePO.

Task

1. Select **Menu** → **Systems** → **Data Exchange Layer Fabric**.
2. Use the **View** drop-down list to select how you want the information to be organized.
    - To resize the items on the page to zoom in our out, use the mouse wheel.
    - To fit all items on the fabric view on the page, double-click the mouse.
3. Use the **Label** drop-down list to select the type of labels that you want to see.
4. For brokers that are part of a bridged hub, select **Display Bridge Direction** to display the direction of the bridge connection; whether it's an incoming or outgoing bridge. The arrows point from the outgoing broker to the incoming broker.
5. Click a broker to see detailed information about it on the **Properties**, **Bridges**, **Services**, and **Extensions** tabs.

    Note

    Extensions are additional features that can be enabled on a DXL broker to add functionality from other managed products. The **Extensions** tab shows details about enabled extensions for the broker.

Bridging Data Exchange Layer fabrics

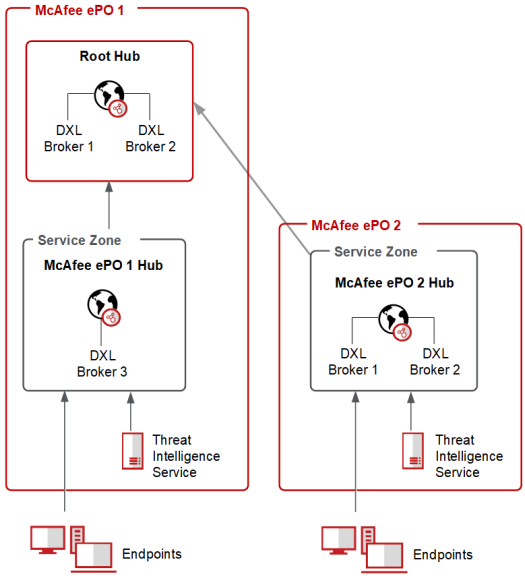
Bridging DXL fabrics allows DXL brokers that are managed by different McAfee ePO servers to communicate with each other to share clients and services.

For example, if you have Threat Intelligence Exchange and at least one DXL broker managed by multiple instances of McAfee ePO, you can connect the brokers by bridging their fabrics. You can then see the files that are running at all locations and share their reputation information.

To connect DXL broker fabrics, you create incoming and outgoing bridges to and from the brokers that are managed by different McAfee ePO servers.

Process for bridging DXL fabrics

Bridging DXL fabrics is a multi-step process to ensure that the DXL brokers that are managed by different McAfee ePO servers can connect and communicate with each other. The bridged systems must export and import each other's broker information.



In this example, McAfee ePO 1 has a top-level hub with two brokers. It also has a broker used by the TIE service, where managed endpoints connect. McAfee ePO 2 has a hub with two brokers that are used by the TIE service and managed endpoints. To bridge the brokers so that they can share clients and services, you create an incoming bridge on McAfee ePO 1 and an outgoing bridge on McAfee ePO 2.

Bridging must be completed at the hub level. You cannot create a bridge from an individual broker.

Create an outgoing bridge

When you designate a DXL hub as an outgoing bridge, brokers in that hub can connect to the brokers that are managed by a different McAfee ePO server.

Each McAfee ePO server can have only one hub that is designated as an outgoing bridged hub. And that hub must be the top-level hub in the DXL topology with at least one broker assigned to it.

Task

1. Select **Menu** → **Configuration** → **Server Settings** → **DXL Topology**.

2. On the **DXL Topology** page, select **Edit**.
3. From the topology tree, select the top-level hub, and from the **Actions** menu, select **Create Outgoing Bridge - Remote ePO Hub**.
   The hub is highlighted in red (invalid state) until it is bridged with a hub on a remote system.
4. Click **Export Local Hub Information** to create a file that contains information about the hub's brokers. Save this file in a location that's available to remote systems.
5. On the remote McAfee ePO server where you are bridging to:
   a. From the **Actions** menu, select **Create Incoming Bridge - Remote ePO Hub**.
   b. Select a hub to bridge to the outgoing hub, then click **Import Remote Hub Information** and navigate to the file. This creates an incoming bridge.
   c. Click **Export Local Hub Information** to create a file containing information about the brokers.
6. On the local system, click **Import Remote Hub Information** and navigate to the file created by the remote system.

Results

The local and remote hubs have now exchanged broker certificate authorities and connection information needed to bridge the fabrics and share information via the DXL framework.

Create an incoming bridge

Designating a hub as an incoming bridge enables brokers that are managed by a remote McAfee ePO system to connect its brokers to local DXL brokers.

Task

1. Select **Menu** → **Configuration** → **Server Settings** → **DXL Topology**.
2. On the **DXL Topology** page, click **Edit**.
3. From the topology tree, select the top-level hub, and from the **Actions** menu, select **Create Incoming Bridge - Remote ePO Hub** to create an empty hub under the top-level hub.
   This is a placeholder for the broker topology information that will come from remote McAfee ePO systems when they are bridged with the local system. The hub is highlighted in red (invalid state) until the information from a remote system is uploaded.
4. Click **Import Remote Hub Information** and navigate to the outgoing bridge file created by the remote McAfee ePO server. This file contains information about its brokers.
5. Click **Export Local Hub Information** to create a file that contains information about the brokers in the local hub. The remote system (outgoing bridge) imports this file.
   Both hubs now have the broker information necessary to communicate and share information via the DXL fabric.
6. To complete the bridge, run the **Send DXL State Event** server task on both the incoming and outgoing systems.

Managing certificates used with OpenDXL clients

You can now import a Certificate Signing Request (CSR) to generate a certificate which allows OpenDXL clients to connect to the DXL fabric.

For information about OpenDXL, see the OpenDXL website

The DXL Certificates (McAfee ePO Managed) Server Settings page or the OpenDXL Configuration page in MVISION ePO enable you to do the following:

- Import a CSR to generate an OpenDXL client certificate to be managed in McAfee ePO.
- Export a previously generated OpenDXL client certificate.
- Revoke a previously generated OpenDXL client certificate, preventing it from being used to communicate on the fabric.
- Export a client configuration package with all certificates and configuration files needed to connect an OpenDXL client.

Import a certificate

When using a third-party certificate with DXL clients, you must import a certificate authority, or self-signed certificate, for those clients. The DXL brokers use certificates to recognize and validate clients. After a certificate is created, import it into McAfee ePO.

Task

1. Select **Menu** → **Configuration** → **Server Settings** → **DXL Certificates**.
2. On the **Client Certificates** page, click **Edit**.
3. Click **Import** to browse to the certificate, then click **OK**.

Results

The certificate is added to the **Client Certificates** list used by DXL.

Create a list of certificates used by DXL

Create a file that lists the certificates used by DXL clients.

You can create a list of the broker certificate authorities (CA) currently in use, or a list of the managed DXL brokers that show broker connection information.

Task

1. Select **Menu** → **Configuration** → **Server Settings** → **DXL Certificates**.
2. On the **Client Certificates** page, click **Edit**.
3. Create a file:
    - For a list of broker certificate authorities currently in use, click **Export All** next to **Broker Certificates**. The file created is brokercert.crt. It contains all broker certificate authority information in PEM (Privacy-enhanced Electronic Mail) format.
    - For a list of managed brokers, click **Export All** next to **Broker List**. The file created is brokerlist.properties with broker information shown in the following format: broker guid=broker guid;port;host name;ipaddress. This list can be passed to a client when connecting to the DXL broker fabric.

Data Exchange Layer certificate authorization

Python-based DXL clients are identified by their certificates. Client-specific certificates and certificate authorities (CAs) can be used to limit which clients can send and receive messages on particular topics.

A client certificate can also be used to establish a restriction for a single client, whereas a certificate authority can be used to establish a restriction for all clients that are signed by that particular authority.

Examples for using certificate authorization

- Restricting which clients can provide DXL services. When providing a service, for example, Threat Intelligence Exchange, a restriction can be added to ensure that only clients that are providing the service are able to receive request messages on the service-related topics. Without this protection, other clients could masquerade as the service.
- Restricting which clients can invoke DXL services. You can limit the clients that can send messages on the service-related topics. For example, you can limit the clients that initiate McAfee Active Response queries using topic authorization.
- Restricting which clients can send event messages. For example, only authorized clients should be able to inform that a TIE reputation has changed by sending a DXL event.

Using OpenDXL to enable certificate authorization

Use the OpenDXL Python Client SDK to authorize third-party certificates. For details about the SDK, see the OpenDXL website.

Migrating certificates in McAfee ePO

Keep certificates up to date with the latest hash algorithm using the **Certificate Manager** in McAfee ePO.

Many organizations are no longer using TLS/SSL certificates signed by an older SHA algorithm. DXL installs the latest hash algorithm certificates. If you have upgraded DXL from an older version that uses older DXL certificates, you can migrate those certificates to the latest hash algorithm.

Note

This a McAfee ePO platform certificate manager and is not part of certificate management in DXL and OpenDXL.

To migrate certificates to the latest hash algorithm:

- All DXL brokers and DXL extensions must be at version 3.1.0 or later. This includes any bridged brokers to multiple McAfee ePO instances.
- The DXL fabric should be in a stable and connected state before migrating certificates. Use the **Data Exchange Layer Fabric** page to verify that all brokers are connected and communicating. Do not add or delete brokers from the DXL fabric until the migration is complete.
- In a bridged environment, migrate the certificates on each instance of McAfee ePO independently to minimize changes in the environment. Complete the migration on one instance of McAfee ePO before beginning a migration on a difference instance.

Migrate certificates to a newer hash algorithm

Migrate your existing certificates to more secure algorithm certificates or regenerate them to remediate vulnerabilities in your DXL environment.

Use the **Certificate Manager** in McAfee ePO to migrate certificates. It allows you to:

- Migrate certificates that are signed by an older signing algorithm to the new algorithm such as SHA-1 to SHA256.
- Regenerate your certificates when your existing certificates are compromised due to vulnerabilities in your environment.
- Migrate or regenerate certificates for managed products that are derived from McAfee ePO root CA.

Troubleshoot the certificate migration

If you experience issues with the DXL client or brokers, review these issues and solutions.

Note

If you experience issues, check the log file for details. The log files are on the McAfee ePO server at \Program Files\McAfee \ePolicy Orchestrator\Server\Logs.

The brokers no longer bridge after the migration

The brokers might not have regenerated. Force an agent wake-up in McAfee ePO with full properties on the broker and wait at least 15 minutes. Check to see if the broker is connected.

The DXL Java client no longer connects after the migration

The brokers might not have regenerated. Force an agent wake-up in McAfee ePO with full properties on the broker and wait at least 15 minutes. Check to see if the broker is connected.

If the client is still not connected, delete the dxlClient.jks KeyStore file and restart the service containing the DXL client. The location of the KeyStore depends on the service running the client.

The DXL C++ client no longer connects after the migration

The DXL C++ client staggers certificate regeneration over a 24-hour period. If the client disconnects during this process, force a certificate regeneration (available on Windows systems only):

1. Disable the **Self Protection** option for the system in the DXL client policy.
2. Delete the certificate files located in %PROGRAMDATA%\McAfee\Data_Exchange_Layer (DxlBrokerCertChain.pem, DxlClientCert.pem, and DxlPrivateKey.pem).
3. Restart the DXL Service.
4. Enable the **Self Protection** option in the DXL client policy.

McAfee ePO bridged brokers no longer connect after the migration

In a bridged broker environment, the new certificates for the migrating McAfee ePO instance might have already been sent to the bridged McAfee ePO system but not delivered to the individual brokers in the policy. On the remote McAfee ePO system, force an agent wake-up to deliver the new certificates and wait at least 15 minutes.

If the DXL fabrics are still unable to bridge, re-export the information from the migrating McAfee ePO system into the remote McAfee ePO system to deliver the new certificate information. After importing the .zip file into the remote McAfee ePO system, force an agent wake-up and wait for at least 15 minutes.

The DXL client in McAfee ePO is no longer connected after the migration

See the log files to verify that the errors are certificate-related. Delete the DXL client KeyStore at \Program Files\McAfee\ePolicy Orchestrator\Server\keystore\dxlClient.keystore. The DXL client will detect this and regenerate the KeyStore.

Using DXL with Cisco Platform Exchange Grid (pxGrid)

DXL includes an extension that enables bridging a DXL broker fabric and Cisco Platform Exchange Grid (pxGrid) infrastructure.

Cisco pxGrid is a fabric that products can integrate with, such as Cisco ISE, just as DXL allows access to McAfee ePO, Threat Intelligence Exchange, Active Response. DXL-integrated technologies can share system information between Cisco ISE and DXL. For example, system information about malware identified by McAfee technologies on managed endpoints can be shared via DXL to the Cisco pxGrid infrastructure, allowing Cisco ISE to quarantine the affected endpoints.

To configure Cisco pxGrid to work with DXL, follow these tasks. Before starting, make sure the DXL Cisco pxGrid Integration extension is installed.

Provision certificates in Cisco ISE for use with DXL brokers

Using the Cisco ISE web user interface, generate certificates for use with the DXL brokers. See KB89737 for detailed steps.

Make the Cisco ISE certificates available to DXL

Copy the Cisco ISE certificates to one or more DXL brokers you want to bridge to Cisco pxGrid. See KB89737 for detailed steps.

Configure the Cisco pxGrid settings in DXL

Provide the necessary information for DXL brokers to connect to the Cisco pxGrid fabric.

1. Select **Menu** → **Configuration** → **Server Settings** → **DXL Cisco pxGrid**, then click **Edit**.
2. Complete the settings on the **Edit DXL Cisco pxGrid** page.

pxGrid Hosts	Enter the host name or IP address for the pxGrid controllers that the DXL brokers are connecting to.
Client Name Prefix	This field identifies the name of the client connection from the DXL brokers to the pxGrid fabric in the Cisco ISE console. You can change this name if you like and it is updated in the pxGrid user interface.
Client Description	This field identifies the description of the client connection from the DXL brokers to the pxGrid fabric in the Cisco ISE console. You can change this description if you like and it is updated in the pxGrid user interface.
Client Groups	This specifies the group capabilities for which the DXL brokers bridging to Cisco pxGrid are requesting access. If you do not want a capability to be available via the bridge between DXL and Cisco pxGrid, click the minus icon to remove it. To enter a new capability, click the plus icon.
Certificate Password	The password used to create the certificate in Cisco ISE for use with DXL.
Notifications	Notifications are received via the pxGrid fabric. Select the types of notifications to bridge from the pxGrid fabric to DXL.
Session Notification Subnet Filter	Receive session notifications from specific subnets. Leave this field empty to receive session notifications for all subnets, or enter a comma-separated subnet address to receive notifications only from those subnets. For example: 1.0.0.0/255.0.0.0,1234::/16

Configure the DXL brokers to use with Cisco pxGrid

Select which DXL brokers to bridge with the Cisco pxGrid fabric. Perform the following steps for each broker that is used with Cisco pxGrid.

1. Select **Menu** → **Configuration** → **Server Settings** → **DXL Topology**, then click **Edit**.
2. Select a broker to use with Cisco pxGrid.
3. Select one or more broker extensions to use. You can have several DXL brokers that query Cisco pxGrid providers, but only one broker should receive notifications to reduce redundancy and to prevent performance issues.

Make approvals in Cisco ISE

Approve the Cisco pxGrid client connecting from a DXL broker in the Cisco pxGrid part of the Cisco ISE interface. See KB89737 for detailed steps.

Set up automatic responses

You can create an automatic response to send a mitigation action to Cisco pxGrid, or to apply an adaptive network control (ANC) endpoint policy when a threat event occurs. ANC policies are created in Cisco ISE.

For example, if you created an automatic response rule with quarantine as the mitigation action for a system, when a threat event occurs, the system the threat event was for is quarantined in Cisco ISE.

Automatic responses are created in McAfee ePO using the **Automatic Responses** feature. In the Actions page of the **Response Builder**, select **Execute pxGrid Query** and then select the query type, system identifier, and either the action to take or the policy to apply.

Creating DXL queries

You can create queries in McAfee ePO to see property information for DXL broker systems and client systems.

Use the **Queries and Reports** feature in McAfee ePO to create managed systems queries. You can then select column headings from the **DXL Broker Systems** and **DXL Client Systems** categories to include in the query.

DXL automatic responses

Automatic responses are created in McAfee ePO so that notifications and actions are taken when a condition is met.

You can create an automatic response rule to broadcast a McAfee ePO Threat Event over DXL as a DXL Event on the topic "/mcafee/event/epo/threat/response". Then, use an OpenDXL Python Client to subscribe to that topic. When the Automatic Response rule is triggered, you receive the McAfee ePO Threat Event data via DXL.

In the **Automatic Responses** feature in McAfee ePO, select the **Send DXL Event** in the Actions page as the action to be taken when the threat event occurs.

DXL server tasks

Server tasks are configurable actions that run on McAfee ePO at scheduled times or intervals.

Use the **Server Tasks** feature in McAfee ePO to automate repetitive tasks. Each task has actions and can be scheduled to occur at specific intervals.

DXL includes these server tasks.

Server task	Description
Manage DXL Brokers	Assigns the DXLBROKER tag to all fully configured DXL brokers and updates the DXL broker policies. Use this task if you install a new broker and want to immediately identify it in the DXL fabric.
Send DXL State Event	Sends the current DXL State Event to the DXL fabric. Use this task when you make changes to bridged brokers to incorporate those changes on the DXL fabric page.
Update DXL Client Status	Updates the DXL Client connection status for all systems where DXL is installed. It runs once a day by default.
Send DXL Certificate Revocations	Sends the current list of revoked certificates to the DXL brokers.

Invoking remote commands over DXL

You can authorize OpenDXL clients to invoke remote commands that are available in McAfee ePO over DXL. Use this feature if you are developing Python-based clients with OpenDXL or using clients that were developed with OpenDXL.

Invoking remote commands over DXL is useful with automation tasks, whether they are user-driven (orchestrated), or performed without user involvement (automated). All remote commands that are available from the McAfee ePO core.help command output can be invoked over DXL.

You select a single command or group of commands to associate with a user and authorize that user to invoke the command over McAfee ePO system tags or OpenDXL certificates. You can authorize one or more users for a single command or several commands. This also adds the authorization on the broker level. When you create an authorization to invoke a command, the DXL Topic Authorization is updated to allow a DXL request to be sent for that command from the client.

If you are using the External Certificate Authority (CA) Provisioning approach to manage your DXL client certificates, you must manually import your client certificates into McAfee ePO to create a remote command authorization. For more information about importing client certificates into McAfee ePO, see the Certificate Authority (CA) Import topic in the OpenDXL Python Client SDK documentation.

Example for using remote commands

When you select **system** → **applyTag** from the list of remote commands in the **Edit DXL Commands** list, you see in its description that the **system.applyTag** command needs 2 parameters: `names` and `tagName`. These parameters are needed to invoke the command and must be sent in the DXL request's payload.

For example, creating an authorization to send a DXL request to the topic /mcafee/service/epo/command/{057d4edf-9da6-4ec2-80fe-14adc4f2f625}/remote/system/applyTag enables it to run the command. The request's payload must be a map for the parameters, so a valid payload to apply a tag name "Quarantine" to the 2 systems would be:

```
 {
"names":"system_name1,system_name2",
 "tagName":"Quarantine"
 }
```

Authorize users to invoke remote commands over DXL

Set up authorization for OpenDXL clients to invoke remote commands that are available in McAfee ePO over DXL.

Task

1. Select **Menu** → **Configuration** → **Server Settings** → **DXL Commands**.
2. Click **Edit**, then select a command group or individual command for which you want to create a user authorization.
   If you select a command group, the user can invoke all commands within that group. For example, if a certificate is granted authorization at a group level, the certificate can be used to run each of the commands with the group's subtree.
3. Click **Create Authorization**.
4. Select the McAfee ePO user that will be invoking the command.
5. Specify on which systems or clients the user can invoke the commands, either by McAfee ePO server, system tag, or client certificates, then click **OK**.
   Choose as many system tags or certificates as you like, but you must choose at least one system tag or certificate for each user. We recommend creating authorizations for the least privileged user account and the minimal set of client certificates needed to perform the selected remote commands.
6. Click **Save** when finished.

Edit or delete a user authorization

You can view, edit, or delete the information associated with a user authorization used to invoke remote commands over DXL.

Task

1. Select **Menu** → **Server Settings** → **DXL Commands**.
2. Click **Edit**.
3. Select an authorization from the list, then click **Actions** and click **Delete Authorization** to delete it, or **Edit Authorization** to view and edit the authorization information.
4. Click **Save** when finished.

Creating custom topics for remote commands

Custom topics enable you to use your own topic mapping to invoke a remote command instead of using the default topic for the command, like creating a shorter alias for a long complex topic.

For example, instead of invoking a remote command to mcafee/service/epo/command/{057d4edf-9da6-4ec2-80fe-14adc4f2f625}/remote/system/applyTag, you could eliminate the GUID and long topic name by naming the topic /mcafee/epo/applyTag while still sending the same payload. You can further customize it by sending a different JSON format in the request instead of using the default mapping.

If you had the output from a system scan and didn't want to change that, you could add an element to specify the tag, and then use JSONPath to parse the system names. The payload would be:

```
{
  "tag": "Quarantine",
  "scanReport":
  {
    "systems":
    {
      "names": "system_name1,system_name2",
      "Detections": "...",
      ...
    }
  }
}
```

In the Add Custom Topic dialog, you would enter `/mcafee/epo/applyTag` as the **Topic** name. The command parameters and Payload JSONPath settings would be:

- The first **Command Parameter** is `tagName`; **Payload JSONPath** is `tag`
- The second **Command Parameter** is `names`; **Payload JSONPath** is `$.scanReport.systems.names`

When you send the request to the topic /mcafee/epo/applyTag, it parses the custom elements into the mapped parameters.

Add a custom topic to a remote command

You can map one or more custom topics to a remote command authorization. You can't map a custom topic to an authorization for a group of commands.

Each of the parameters of the command can be mapped from the JSON payload of the incoming event using JSONPath syntax. For example, an IP address from the incoming JSON payload can be mapped to the appropriate parameter of the tag command.

Task

1. In the **Edit DXL Commands** page, select an authorization for a command, then click **Actions** → **Add Custom Topics**.
2. Enter the topic name.
3. To add a custom JSON format in the request instead of the default mapping, click **Enable custom mappings**, then enter the command parameter and payload information for the mapping.
4. Click **OK** when finished, then click **Save**.

Edit or delete a custom topic

You can view, edit, or delete the custom topic information associated with a user authorization used to invoke remote commands over DXL.

Task

1. Select **Menu** → **Server Settings** → **DXL Commands**.
2. Click **Edit**.
3. Select an authorization from the list that has the custom topic you want to edit or delete, then click **Actions** → **Edit Custom Topic**.
4. Select a custom topic to see its details and do one of the following:
    - Edit the information.
    - Select **Delete Custom Topic** to delete it.
5. Click **OK** when finished, then click **Save**.

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