Manage Cisco Crosswork Data Gateway

Networks maintain a large amount of data that spans thousands of devices. Cisco Crosswork Change Automation and Health Insights Collection Service collects and manages this data through its integral component - Cisco Crosswork Data Gateway.

This section contains the following topics:

Overview of Cisco Crosswork Data Gateway

When Cisco Crosswork Change Automation and Health Insights and Cisco Crosswork Data Gateway are deployed together, Cisco Crosswork Change Automation and Health Insights acts as the **controller application** for the Cisco Crosswork Data Gateway instance. You can use the UI to add and manage additional instances of Cisco Crosswork Data Gateway no matter if they are forwarding data to Cisco Crosswork Change Automation and Health Insights or other compatible data consumers. The number of Cisco Crosswork Data Gateway you need depends on the number of devices being supported, the amount of data being processed and your network architecture.

Cisco Crosswork Data Gateway can also be deployed with other Crosswork products and in that case, will have a different controller application.

Note This chapter explains only the Cisco Crosswork Data Gateway features that can be accessed via Cisco Crosswork Change Automation and Health Insights UI.

For more information about Cisco Crosswork Data Gateway VM and how to manage it, see **Appendix B:** Configure Cisco Crosswork Data Gateway Base VM.

We also recommended that you read about components of Cisco Crosswork Data Gateway at Cisco Crosswork Data Gateway Components before moving further.

Manage Cisco Crosswork Data Gateway Instances

Cisco Crosswork Data Gateway is initially deployed with just a basic VM called the Base VM (containing only enough software to register itself with its controller).

It follows the instructions from Crosswork - collects data as requested and sends it to the defined output destination.

Depending on your private network's size and configuration, you may require one or more Cisco Crosswork Data Gateway instances for collection. It may be necessary to deploy multiple Cisco Crosswork Data Gateway instances to address the requirements for:

1. Geo-separated regions
2. Massive scale

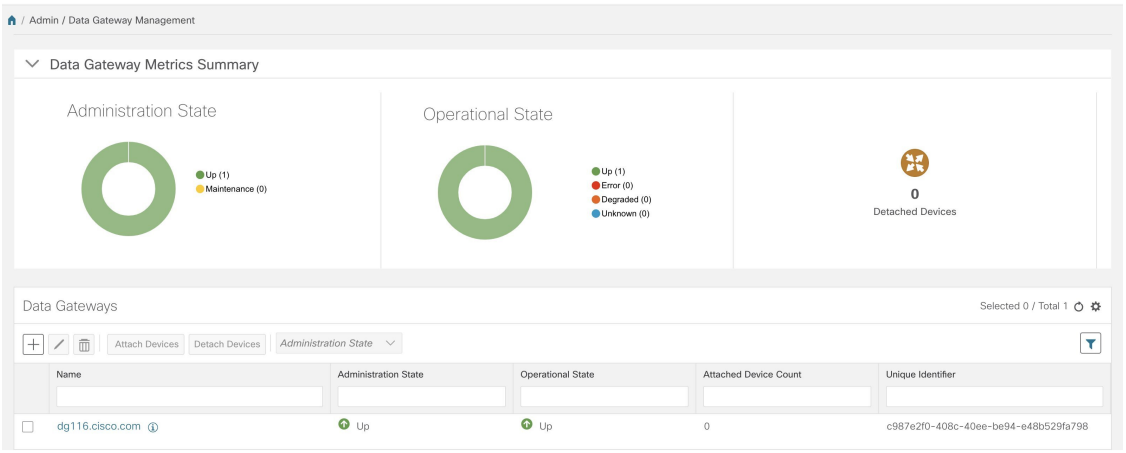
Cisco recommends the simplest approach of a fixed configuration of devices to a particular instance (such as x to y for CDG1 and (y+1) to z for CDG2).

Note More complicated approaches for resource optimization and dynamic assignment of tasks are possible and if desired, we recommend working with Cisco Customer Experience team to design the behavior.

Cisco Crosswork Data Gateway features can be accessed via Crosswork Network Automation UI.

To open Cisco Crosswork Data Gateway management view, choose **Admin** > **Data Gateway Management** from the left navigation bar in the Crosswork Network Automation UI.

Figure 1: Data Gateway Management View



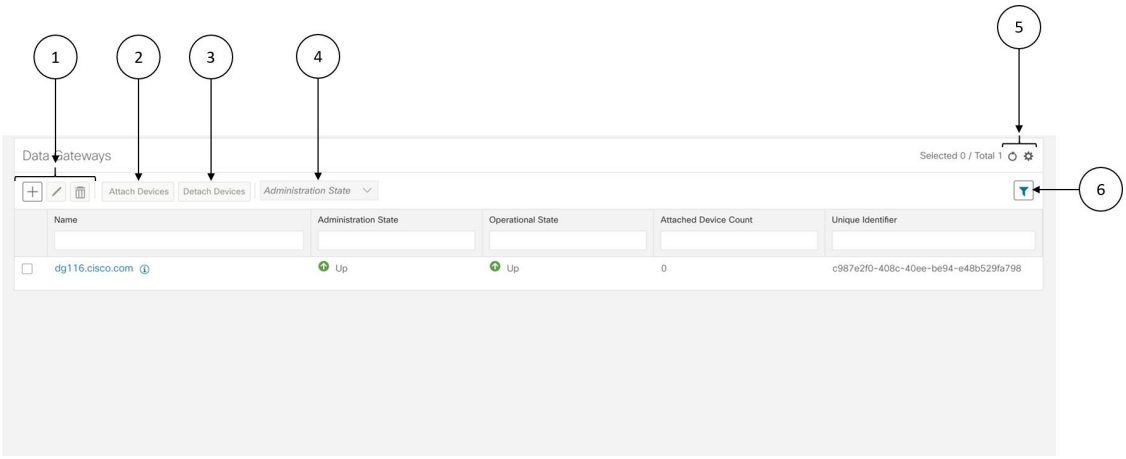
Item	Description
Data Gateway Metrics Summary Pane	Summarizes the overall metrics of all Cisco Crosswork Data Gateway instances currently enrolled with Crosswork: • **Administration State Tile**: shows the number of Cisco Crosswork Data Gateway instances in each adminstration state i.e., Up and Maintenance. • **Operational State Tile**: shows the number of Cisco Crosswork Data Gateway instances in each operational state i.e., Up, Error, Degraded, and Unknown. • **Detached Devices Tile**: Shows the number of devices that are currently not attached to any Cisco Crosswork Data Gateway instance.

Item	Description

Data Gateways Pane	Provides options to add, edit, and delete Cisco Crosswork Data Gateway VMs, attach/detach devices, change administration state, and filter options.
	
	It also displays the following details for the individual Cisco Crosswork Data Gateway instances:
	
	• **Name**: Name of the Cisco Crosswork Data Gateway VM.
	
	• **Administration State**: Adminstration state of the Cisco Crosswork Data Gateway VM. A Cisco Crosswork Data Gateway VM has either of the two states at a time:
	
	  • **Up**: The VM is currently active.
	
	  • **Maintenance**: The VM is not operational ("down") and has been set to "Maintenance" mode by the user. No new jobs are submitted to Cisco Crosswork Data Gateway while it is in this mode. However, the currently running collection jobs do not stop.
	
	• **Operational State**: Operational state of the Cisco Crosswork Data Gateway VM. A Crosswork Data Gateway VM has either of the four states at a time:
	
	  • **Up**: The VM is operational and all individual components are "OK".
	
	  • **Error**:
	
	  The VM's operational state is in an error condition. It is either not reachable or all the critical components on the VM are "not OK".
	
	  • **Degraded**:
	
	  The VM's operational state is degraded as one or more critical components on the VM are "not OK".
	
	  • **Unknown**:
	
	  The VM's operational state is unknown as it has enrolled itself with Crosswork, but hasn't established a session yet.

From the **Data Gateways** pane, you can add a new Cisco Crosswork Data Gateway instance, update the settings configured for an existing instance, de-enroll an instance, attach devices to an instance, detach devices from a instance, or change adminstration state of an instance.

Figure 2: Data Gateways Pane



Item	Description
1	Click ⊞ to add a Cisco Crosswork Data Gateway VM. See Add a Cisco Crosswork Data Gateway Instance, on page 6.
	Click ✎ to edit the settings for the selected Cisco Crosswork Data Gateway VM. See Update Cisco Crosswork Data Gateway Instance Enrollment Settings, on page 6.
	Click 🗑 to de-enroll the selected Cisco Crosswork Data Gateway VM. See De-enroll a Cisco Crosswork Data Gateway Instance, on page 10.
2	Click **Attach Devices** to attach devices to the selected Cisco Crosswork Data Gateway VM. See Attach a Device to a Cisco Crosswork Data Gateway Instance, on page 11.
3	Click **Detach Devices** to detach devices from the selected Cisco Crosswork Data Gateway VM. See Detach a Device From a Cisco Crosswork Data Gateway Instance, on page 13.
4	Click **Adminstration State** to switch administration state of the selected Data Gateway VM. See Change the Administration State of a Cisco Crosswork Data Gateway Instance, on page 9.
5	Click ↻ to refresh the **Data Gateways** window.
	Click ⚙ to choose the columns to make visible in the **Data Gateways** window (see Set, Sort and Filter Table Data).
6	Click ▼ to show/hide the quick filters.
	Click the **Clear All Filters** link to clear any filter criteria you may have set.

The **Data Gateways** pane displays the following details of the enrolled Cisco Crosswork Data Gateway instances:

Field	Description
Name	Name of the Cisco Crosswork Data Gateway.
Administration State	Adminstration state of the Cisco Crosswork Data Gateway instance.
Operational State	Operational state of the Cisco Crosswork Data Gateway instance.
Attached Device Count	Number of devices attached to the Cisco Crosswork Data Gateway instance.
Unique Identifier	Unique identifier of the Cisco Crosswork Data Gateway instance.

Add a Cisco Crosswork Data Gateway Instance

After installing Cisco Crosswork Data Gateway, you must enroll it with Cisco Crosswork Change Automation and Health Insights.

Steps to enroll a Cisco Crosswork Data Gateway instance is described in *Cisco Crosswork Change Automation and Health Insights 3.2 Installation Guide* in Section: **Enroll Cisco Crosswork Data Gateway With Cisco Crosswork Change Automation and Health Insights**

After enrolling, you must verify that the operational state of the Cisco Crosswork Data Gateway instance is **Up** before beginning to use it.

Note Watch out for "alerts" at the top of the **Data Gateway** page while the Cisco Crosswork Data Gateway is not operationally up.

Update Cisco Crosswork Data Gateway Instance Enrollment Settings

If there's an update for the Cisco Crosswork Data Gateway VM, you can regenerate a new enrollment package and upload it to Crosswork by following these steps:

Before you begin

Ensure that you have manually copied the new enrollment package to your local PC as per the procedure described in the *Cisco Crosswork Change Automation and Health Insights 3.2 Installation Guide* in Section: *Export Enrollment Package*.

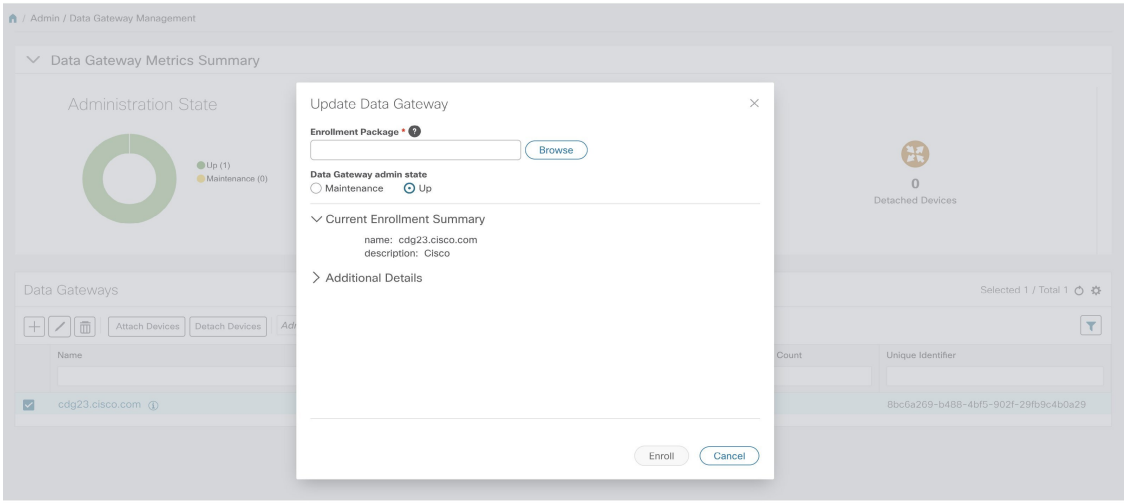
Step 1 From the main menu, choose **Admin** > **Data Gateway Management**. The **Data Gateway Management** view opens.

Step 2 From the **Data Gateways** window, select the Cisco Crosswork Data Gateway instance you want to update.

Step 3 Click  to edit the settings for the selected Cisco Crosswork Data Gateway instance.

Step 4 In the **Update Data Gateway** pop up, click **Browse** to select the new enrollment package.

Select the admin state in which you want to bring up the Cisco Crosswork Data Gateway instance.

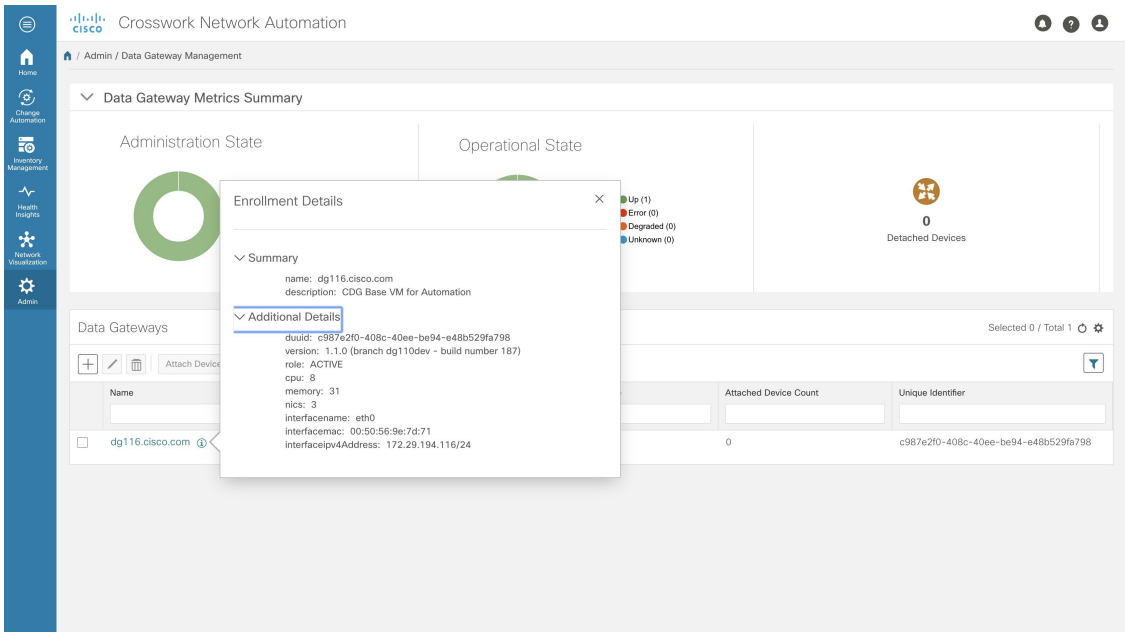


Step 5 Click **Enroll**.

View Enrollment Details

To view enrollment details of a Cisco Crosswork Data Gateway instance, in the **Data Gateways** pane, click icon next to the Cisco Crosswork Data Gateway name as shown in the following figure.

Note Some of these details are the OVF parameters that were configured in the OVA Template while installing Cisco Crosswork Data Gateway. For description of these parameters, see Section: **Install Crosswork Data Gateway** in *Cisco Crosswork Change Automation and Health Insights 3.2 Installation Guide*.



Following enrollment details are displayed:

Field	Description
Summary	
name	Name of the Cisco Crosswork Data Gateway instance.
description	User-friendly description to be displayed in the controller i.e., Crosswork.
Additional Details	
duuid	Unique identifier for the Cisco Crosswork Data Gateway instance.
version	Currently installed version of Cisco Crosswork Data Gateway.
role	Is the Cisco Crosswork Data Gateway instance active or in maintenance mode.
cpu	Number of vCPUs.

Field	Description
memory	Amount of total memory. **Note** The value shown for *memory* represents the usable amount for user processes, not the total VM amount. The Cisco Crosswork Data Gateway operating system reserves about 700MB from the total VM memory for itself, which is excluded from memory reporting tools. It is expected for the *memory* value reported here to be 1GB less than the full amount allocated to the VM due to operating system reservation and rounding.
nics	Number of NICs being used by Cisco Crosswork Data Gateway. This is 3 in case of on-premise installation i.e., for Cisco Crosswork Change Automation and Health Insights.
interfacename	Name of the interface.
interfacemac	MAC address of the interface
interfaceIPv4address/interfaceIPv6address	IPv4/IPv6 address of the interface.
cert_chain	Certificate used for handshake between Cisco Crosswork Data Gateway instance and Cisco Crosswork Change Automation and Health Insights.

Change the Administration State of a Cisco Crosswork Data Gateway Instance

You can change the adminstration state of a Cisco Crosswork Data Gateway instance via Crosswork UI.

Note If the maintenance activities are affecting the communication between Crosswork and Cisco Crosswork Data Gateway, the collection is interrupted and resumes when the communication is restored.

While an instance is in in **Maintenance** mode, no new jobs are submitted to it. During downtime, admin can do modifications to Cisco Crosswork Data Gateway, such as updating the certificates, changing management address, etc.

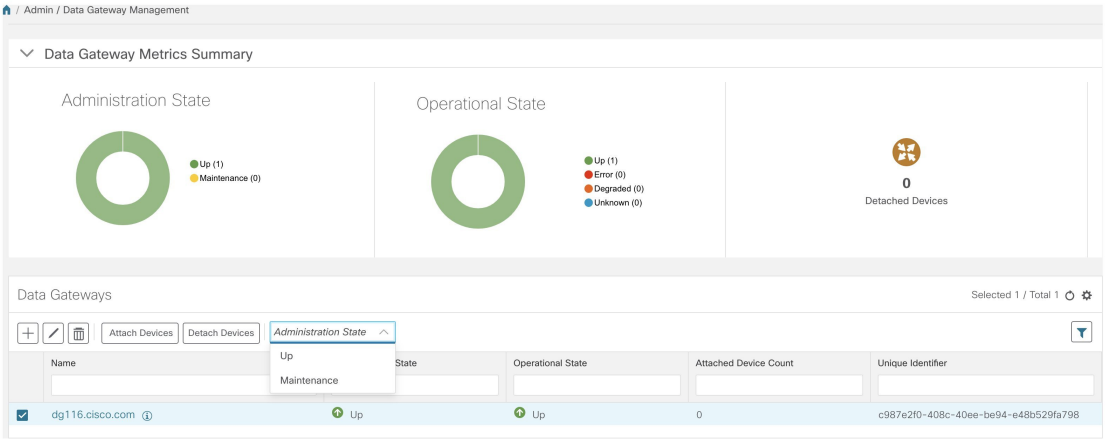
Once changes are done, Admin can change the administration state to **Up**. Once the Cisco Crosswork Data Gateway is up, Crosswork resumes sending jobs to it.

Follow the steps below to change the administration state of a Cisco Crosswork Data Gateway instance.

Step 1 From the main menu, choose **Admin** > **Data Gateway Management**. The **Data Gateway Management** view opens.

Step 2 From the **Data Gateways** window, select the Cisco Crosswork Data Gateway instance whose administration state you want to change.

Step 3 From the **Administration State** dropdown, select the state to which you want to switch to.



De-enroll a Cisco Crosswork Data Gateway Instance

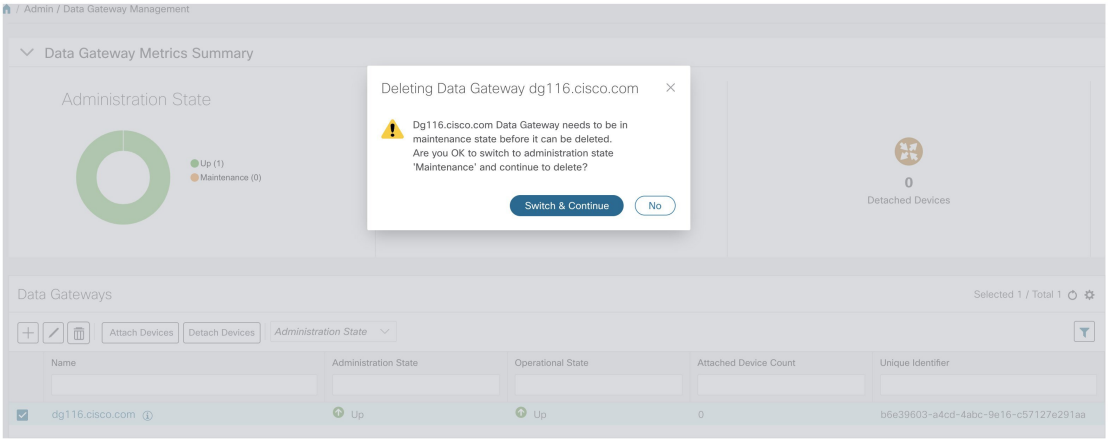
Follow the steps below to de-enroll a Cisco Crosswork Data Gateway instance.

Step 1 From the main menu, choose **Admin** > **Data Gateway Management**. The **Data Gateway Management** view opens.

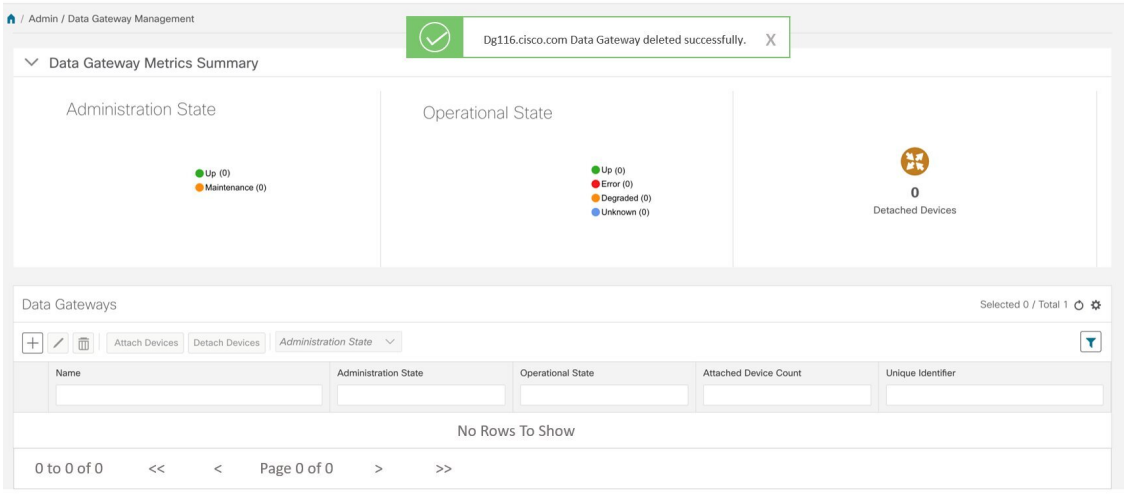
Step 2 From the **Data Gateways** window, select the Cisco Crosswork Data Gateway instance you want to delete.

Step 3 Click .

Step 4 A Cisco Crosswork Data Gateway instance must be in maintenance mode to be deleted. Click **Switch & Continue** when prompted to switch to **Maintenance** mode.



The selected Cisco Crosswork Data Gateway instance is deleted.



Attach a Device to a Cisco Crosswork Data Gateway Instance

Note A device can only be attached to one Cisco Crosswork Data Gateway instance.

Follow the steps below to attach a device to a Cisco Crosswork Data Gateway instance.

Before you begin

1. For optimal performance, it is recommended that device attaching to Cisco Crosswork Data Gateway instance should be done in batches of no more than 300 devices.

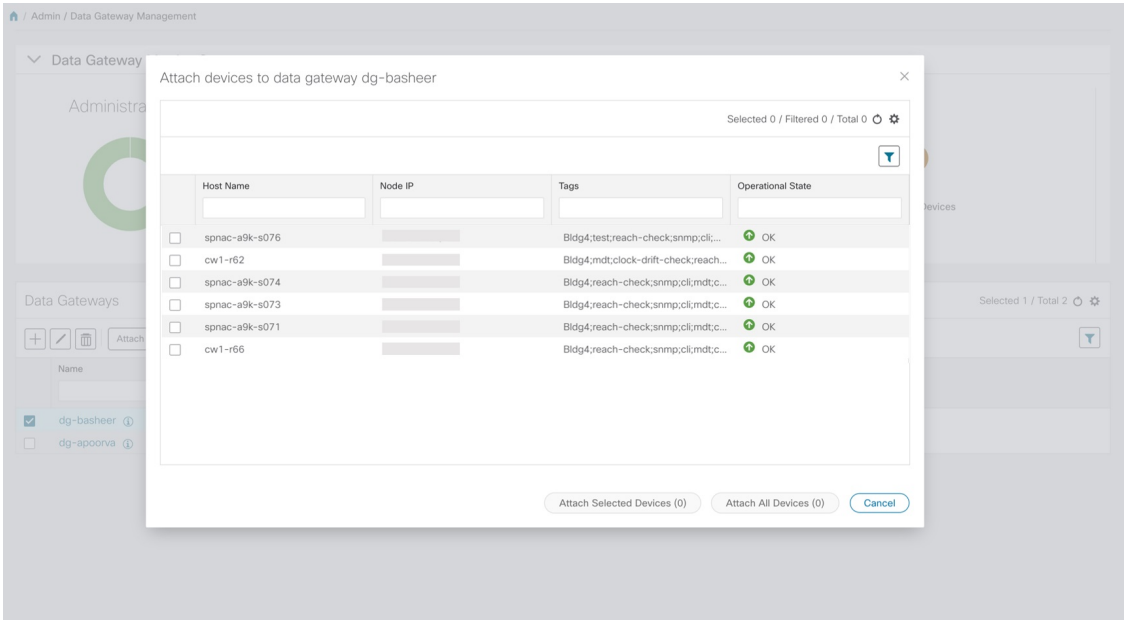
   You can add more than 300 devices. However, doing so may cause a performance impact.

2. Ensure that both the adminstration state and operational state of the Cisco Crosswork Data Gateway instance to which you want to attach devices is "Up". Only then proceed with attaching devices.

Step 1 From the main menu, choose **Admin** > **Data Gateway Management**. The **Data Gateway Management** view opens.

Step 2 From the **Data Gateways** window, select the Cisco Crosswork Data Gateway instance to which you want to attach devices.

Step 3 Click **Attach Devices**. The **Attach Devices** window opens. It lists all the devices available for attaching.

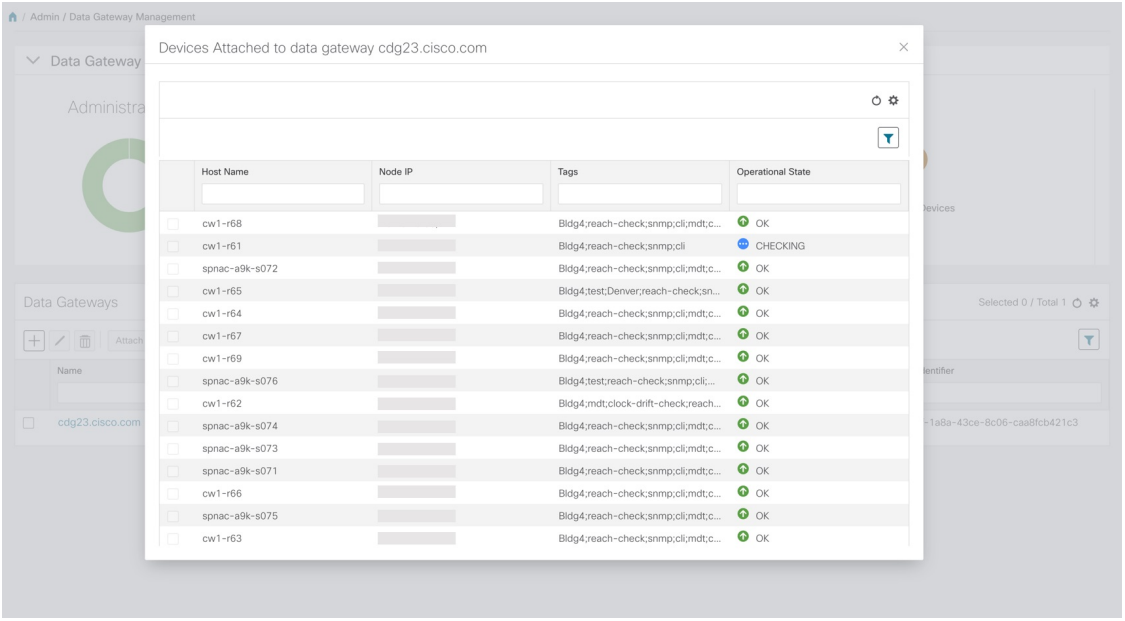


Step 4 To attach all the devices, click **Attach All Devices**. Otherwise, select the devices you want to attach and click **Attach Selected Devices**.

What to do next

To verify if the devices were attached to the VM, check the **Attached Device Count** under the **Data Gateways** pane. The count would have increased.

Click on the icon next to the attached device count to see the list of all devices attached to the selected instance, as shown in the following figure.



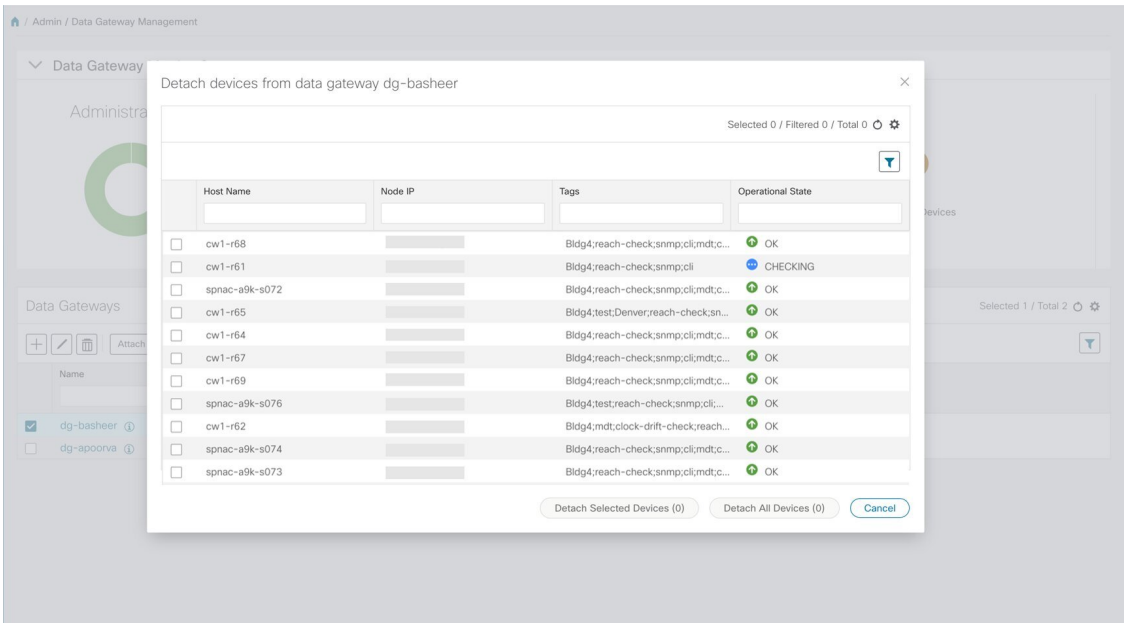
Detach a Device From a Cisco Crosswork Data Gateway Instance

Follow the steps below to detach a device from a Cisco Crosswork Data Gateway instance.

Step 1 From the main menu, choose **Admin** > **Data Gateway Management**. The **Data Gateway Management** view opens.

Step 2 From the **Data Gateways** window, select the Cisco Crosswork Data Gateway instance from which you want to detach devices.

Step 3 Click **Detach Devices**. The **Detach Devices** window opens. It lists all the devices attached to the selected Cisco Crosswork Data Gateway instance.



Step 4 To detach all the devices click **Detach All Devices**. Otherwise, select the devices you want to detach and click **Detach Selected Devices**.

What to do next

To verify if the devices were detached from the VM, check the **Attached Device Count** under **Data Gateways** window. The count would have decreased.

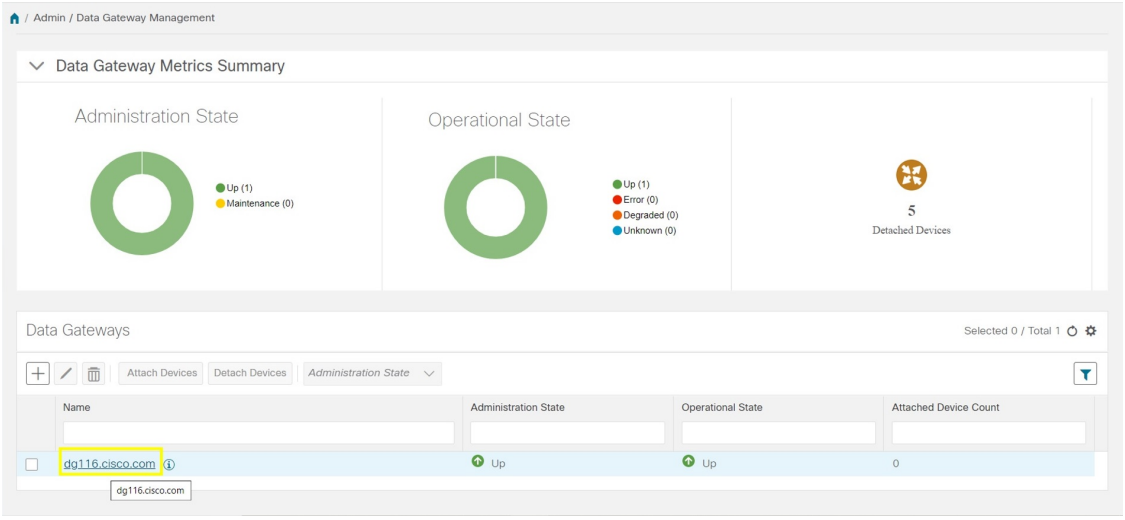
View Cisco Crosswork Data Gateway Instance Health

Cisco Crosswork Data Gateway comprises of various containerized services running on an Ubuntu VM. Its overall health depends on health of each containerized service.

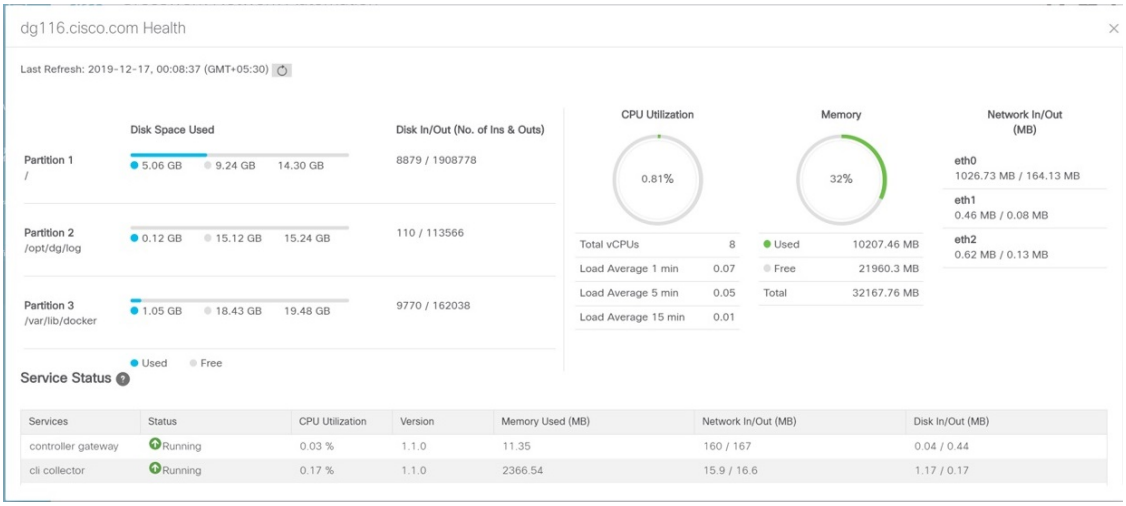
Cisco Crosswork Data Gateway collects host and container metrics and writes them to a container mounted path in vitals.json file and sends it to the Crosswork.

Vitals also contains the health information of individual container services running on the Cisco Crosswork Data Gateway instance and their resource consumption.

To view health of a Cisco Crosswork Data Gateway instance, in the **Data Gateways** window, click the name of the Cisco Crosswork Data Gateway instance whose health you want to view as shown in the following figure.



The **Health** pop up displays the following details:



Field	Description
Host VM	
Last Refresh	Date and time of the last refresh. Click ↻ to refresh the **Data Gateway Health** pop up.
Disk Space Used	Percentage of the disk space used for partitions: / /opt/dg/log /var/lib/docker

Field	Description
Disk In/Out	Number of read/write or input/output operations involving a disk for the partitions: / /opt/dg/log /var/lib/docker **Note** This is a cumulative counter, not a delta time series.
CPU Utilization	Amount of actively used CPU and total number of vCPUs.
Load	Load average – is the average system load over a given period of time of 1, 5, and 15 minutes.
Memory	Amount of memory used and available memory.
Network In/Out	The amount of data sent/received in MB for NIC interfaces: eth0 eth1 eth2 **Note** This is a cumulative counter, not a delta time series.
Service Status	
Service	Name of the Cisco Crosswork Data Gateway service.
Status	Status of the service: • Running • Degraded • Error
CPU Utilization	Percentage of actively utilized CPU by the service.
Version	Version of the service deployed.
Memory Used (MB)	Amount of memory being used by the service.
Network In/Out	The amount of data sent/received in MB by the service over its interface. **Note** This is a cumulative counter, not a delta time series.

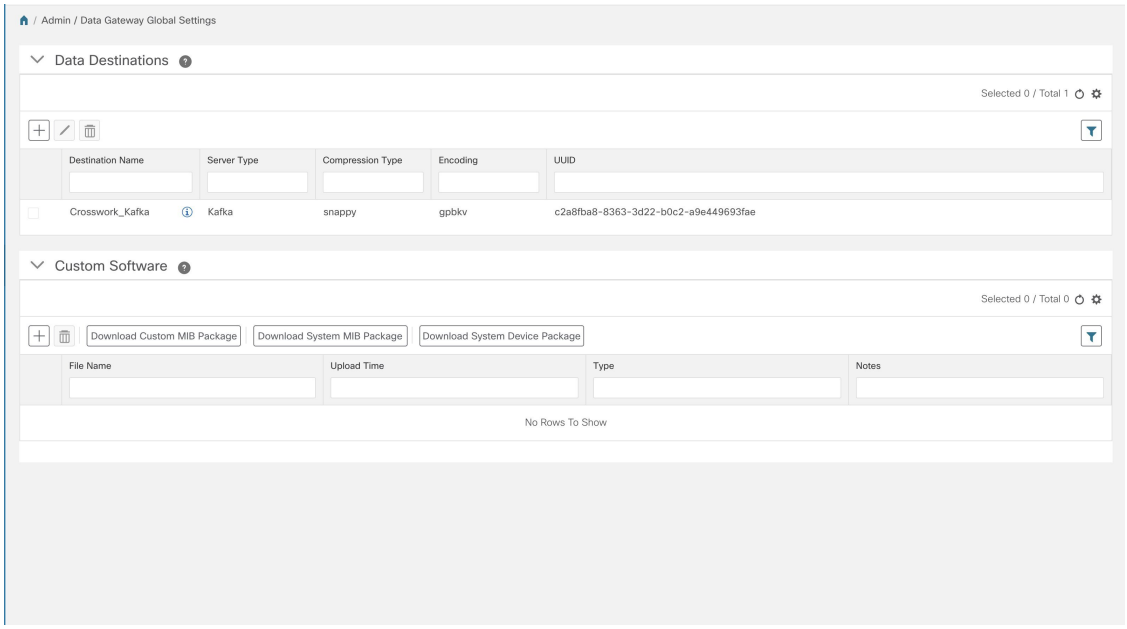
Field	Description
Disk In/Out	Number of read/write or input/output operations that the service has done involving a disk. **Note** This is a cumulative counter, not a delta time series.

Configure Cisco Crosswork Data Gateway Settings

This section describes how to configure global settings for Cisco Crosswork Data Gateway i.e., managing data destinations and custom software packages.

To open Cisco Crosswork Data Gateway global settings view, choose **Admin** > **Data Gateway Global Settings** from the left navigation bar in the Cisco Crosswork Change Automation and Health Insights window.

Figure 3: Data Gateway Global Settings View



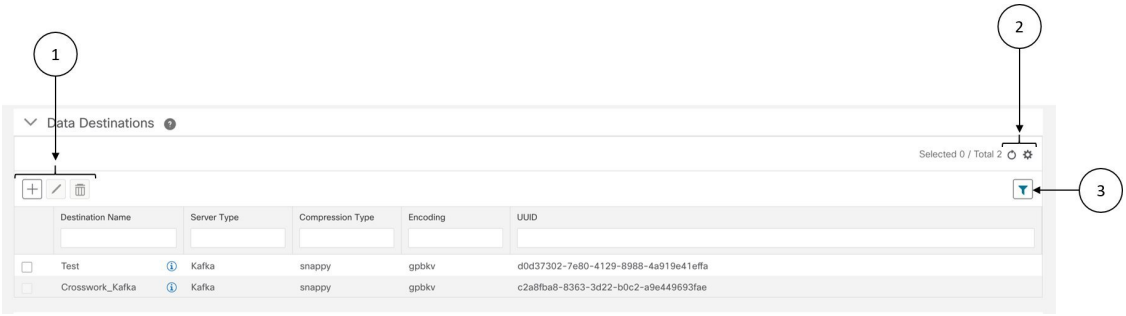
Item	Description
Data Destinations Pane	Shows approved external data destinations that can be used by collection jobs to deposit their data and provides options to add, edit, and delete data destinations.
Custom Software Pane	Provides options to: • add and delete custom MIBs and device packages • download custom MIBs, system MIBs, and device packages

Manage Data Destinations

From the **Data Destinations** pane, you can add a new data destination, update the settings configured for an existing data destination, and delete a data destination.

Note The **Crosswork_Kafka** data destination in the below figure is Cisco Crosswork Change Automation and Health Insights's internal data destination and hence, it cannot be updated or deleted.

Figure 4: Data Destinations Pane



Item	Description
1	Click to add a data destination. See Add a Data Destination, on page 19.
	Click to edit the settings for the selected data destination. See Update a Data Destination, on page 23.
	Click to delete the selected data destination. See Delete a Data Destination, on page 25.
2	Click to refresh the **Data Destinations** window.
	Click to choose the columns to make visible in the **Data Destinations** window (see Set, Sort and Filter Table Data).
3	Click to show/hide the quick filters.
	Click the **Clear All Filters** link to clear any filter criteria you may have set.

Data Destination pane displays the following details of the data destinations:

Field	Description
Destination Name	Name of the data destination
Server Type	Server type of the data destination i.e., external Kafka or gRPC server.

Field	Description
Compression Type	Compression type being used for the data destination. Crosswork
Encoding	Encoding type being used for the data destination.
UUID	Unique identifier for the data destination. This ID is automatically generated by Crosswork when an external data destination is created and is a required parameter for collection job creation.

Add a Data Destination

Note

- If you reinstall an already existing external Kafka data destination with the same IP address, then the collectors need to be restarted for changes to take place .
- You can secure communication channel between Cisco Crosswork Data Gateway and the specified data destination i.e., either Cisco Crosswork Change Automation and Health Insights or external Kafka. **Steps 7 - 8** of the below procedure explain how to do that.

  However, enabling security can impact performance.

  - If your external data destination requires a TLS connection, keep the public certificate ready or if it requires client authentication, keep the client certificate and key files ready. The client key might be password-encrypted which will need to be configured as part of the data destination provisioning. Currently, Cisco Crosswork Data Gateway supports IP-based certificates only.
  - Ensure that the certificates are PEM encoded and the key file is in PKCS#8 format when generating them with your Certificate Authority.

Follow the steps below to add a new data destination. You can then use this data destination for data collection. You can also add multiple data destinations.

Before you begin

If you are using an external Kafka server for data collection, ensure the following:

- You have configured the following properties on the external Kafka server:

  Note Refer your Kafka documentation for description and usage of these properties as this explanation is out of scope of this document.

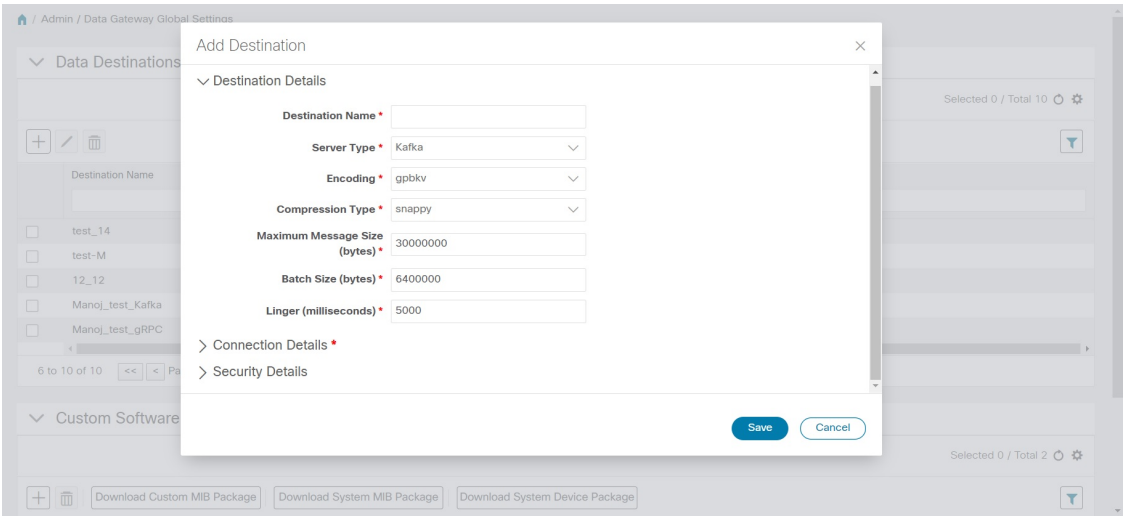
  - `num.io.threads = 8`
  - `num.network.threads = 3`
  - `message.max.bytes= 30000000`

- Create Kafka topics that you want to be used for data collection.

Step 1 From the main menu, choose **Admin** > **Data Gateway Global Settings**.

Step 2 From **Data Destinations** pane, choose +.

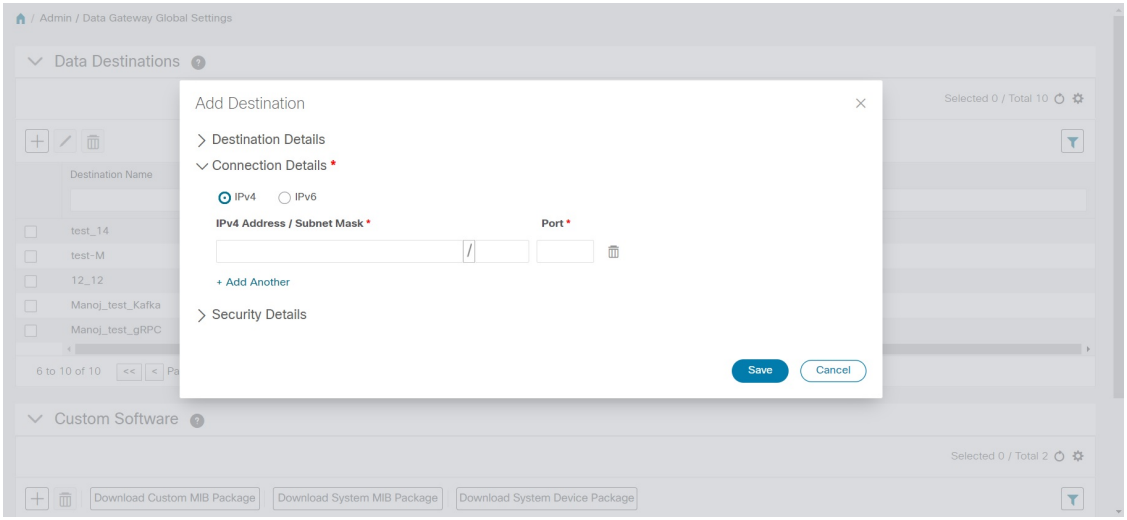
Step 3 In the **Add Destination** pop-up, enter the **Destination Details** as per the table below:



Field	Value
Destination Name	Enter a descriptive data destination name. The name can contain a maximum of 128 alphanumeric characters, plus underscores ("_") or hyphens ("-"). No other special characters are allowed. If you will have many data destinations, make the name as informative as possible to be able to distinguish later.
Server Type	From the drop down, select the server type of your data destination (Kafka/gRPC).
Encoding	From the drop down, select the encoding (json/gpbkv).
Compression Type	From the drop down, select the compression type: Compression types supported for Kafka are snappy, gzip, lz4, zstd, and none) **Note** zstd compression type is supported only for Kafka 2.0 or higher. Compression types supported for gRPC are snappy, gzip, and deflate.

Field	Value
Maximum Message Size (bytes) (Kafka-only)	Enter the maximum message size in bytes. • **Default Value**: 30000000 bytes/ 30 MB • **Min**: 1000000 bytes/1 MB • **Max**: 30000000 bytes/ 30 MB For `Maximum Message Size` property, you can input a value lesser than the default, but not more.
Batch Size (bytes) (Kafka-only)	Enter the required batch size in bytes. • **Default Value**: 6400000 bytes/6.4 MB • **Min**: 16384 bytes/ 16.38 KB • **Max**: 6400000 bytes/6.4 MB **Note** For `Batch Size` property, you can input a value lesser than the default, but not more.
Linger (milliseconds) (Kafka-only)	Enter the required linger time in milliseconds. • **Default Value**: 5000 ms • **Min**: 0 ms • **Max**: 5000 ms

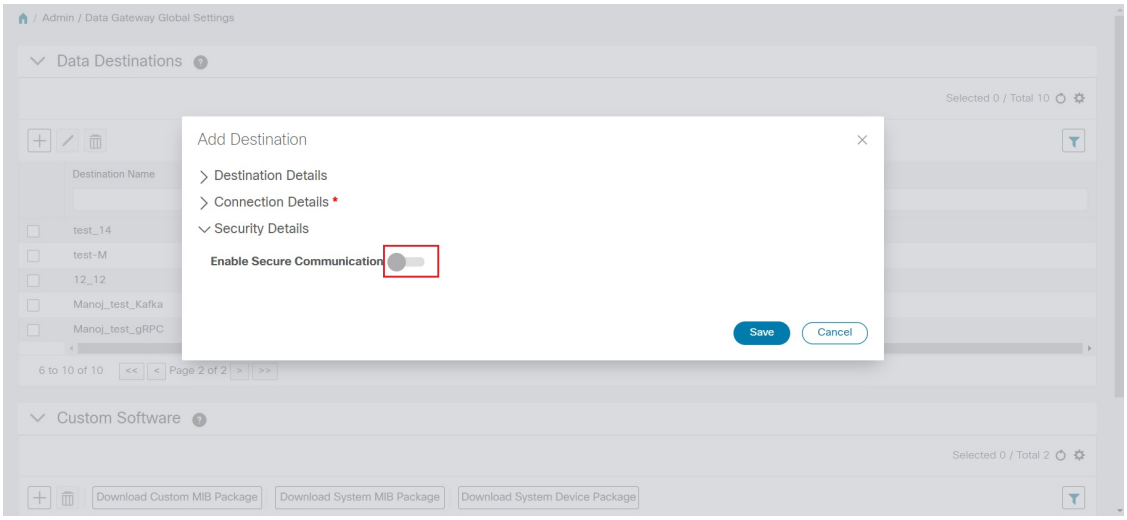
Step 4 Select a protocol from the **Connection Details** options. Cisco Crosswork Data Gateway supports both IPv4 and IPv6.



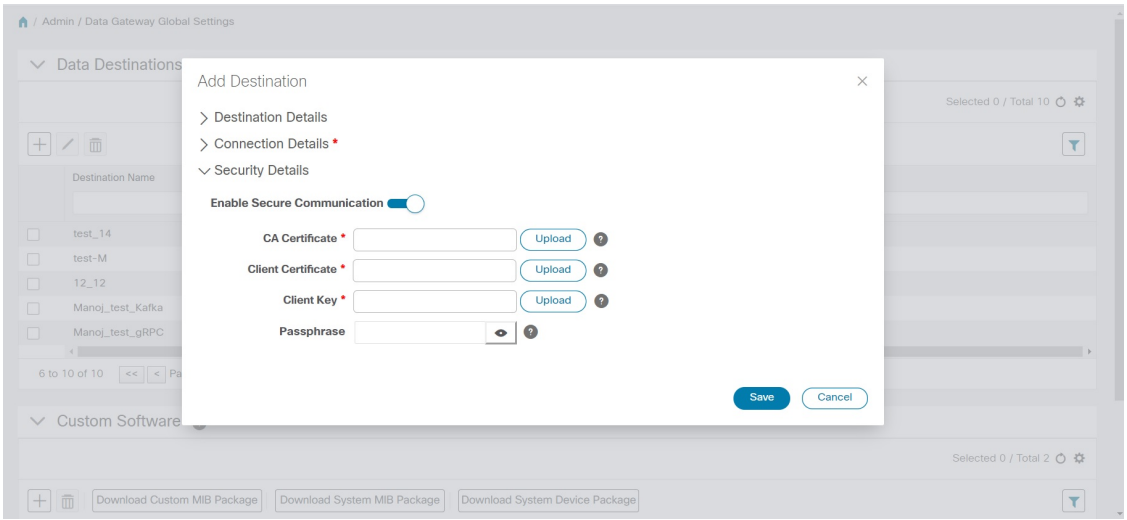
Step 5 Complete the **Connection Details** fields as described in the following table. The fields displayed will vary with the connectivity type you chose. The values you enter must match the values configured on the device.

Connectivity Type	Fields
IPv4	Enter the required **IPv4 Address/ Subnet Mask**, and **Port**. You can add multiple IPv4 addresses by clicking **+ Add Another**
IPv6	Enter the required **IPv6 Address/ Subnet Mask**, and **Port**. You can add multiple IPv6 addresses by clicking **+ Add Another**.

Step 6 If required, enable security by turning on **Enable Secure Communication** option under **Security Details**.



Step 7 Complete the **Security Details** fields as described in the following table.



Cisco Crosswork Data Gateway supports certificate-based authentication.

Note Currently, Cisco Crosswork Data Gateway supports IP-based certificates only. Hostname-based certificates are not supported in this release.

Field	Description
CA Certificate	Specify the PEM encoded trusted CA certificate i.e., the `.PEM` file to be used for secure communication between Cisco Crosswork Data Gateway and the specified data destination (Crosswork Kafka/ external Kafka/gRPC).
Client Certificate	Specify the PEM encoded client certificate i.e., `.PEM`, `.CRT`, or `.CER` file to be used for client authentication.
Client Key	Specify the `PKCS#8` or `.KEY` file. This is the private key for the specified client certificate.
Passphrase	Enter the passphrase if the client key is passphrase encrypted.

Step 8 Click **Save**.

What to do next

Create the Kafka topics prior to submitting the job to Crosswork. Depending on external Kafka and how topics are managed in that external Kafka, Cisco Crosswork Data Gateway logs may show the exception listed when and if the topic does not exist at the time of dispatching the collected data to that specific external Kafka / topic. This could be either due to the topic is not yet created or topic got deleted prior to the completion of the requested collection job and dispatching the collected data.

```
destinationContext: topicmdt4
org.apache.kafka.common.errors.UnknownTopicOrPartitionException: This server does not host
 this topic-partition.
```

Update a Data Destination

Note Updating a data destination causes the Cisco Crosswork Data Gateway instance using it to re-establish a session with that data destination. Thus, the data collection is paused and resumes once the session is re-established.

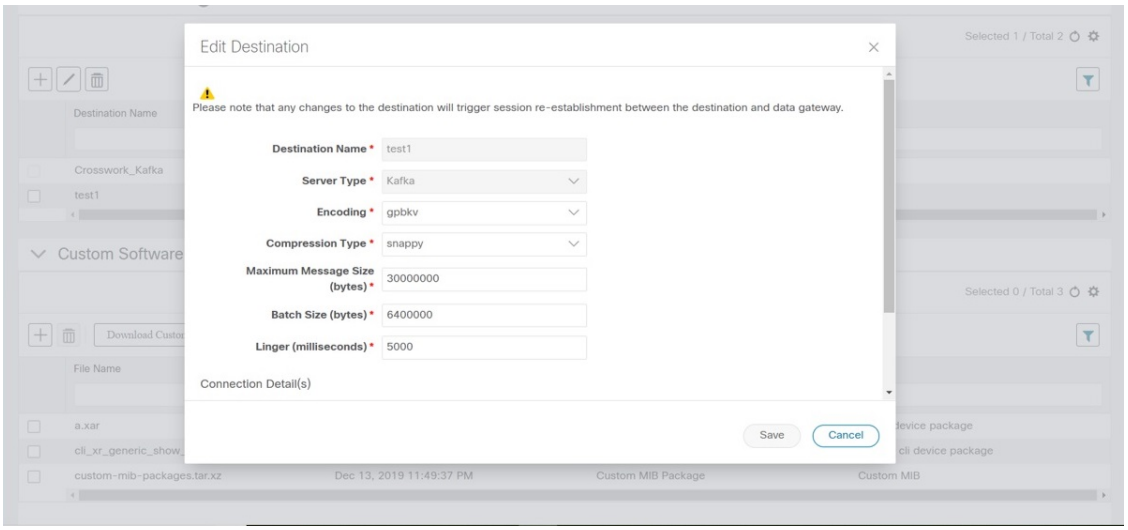
Follow the steps below to update a data destination.

Step 1 From **Data Destinations** window, select the destination you want to update.

Step 2 Click  .

Step 3 In the **Edit Destination** pop up, make the required changes.

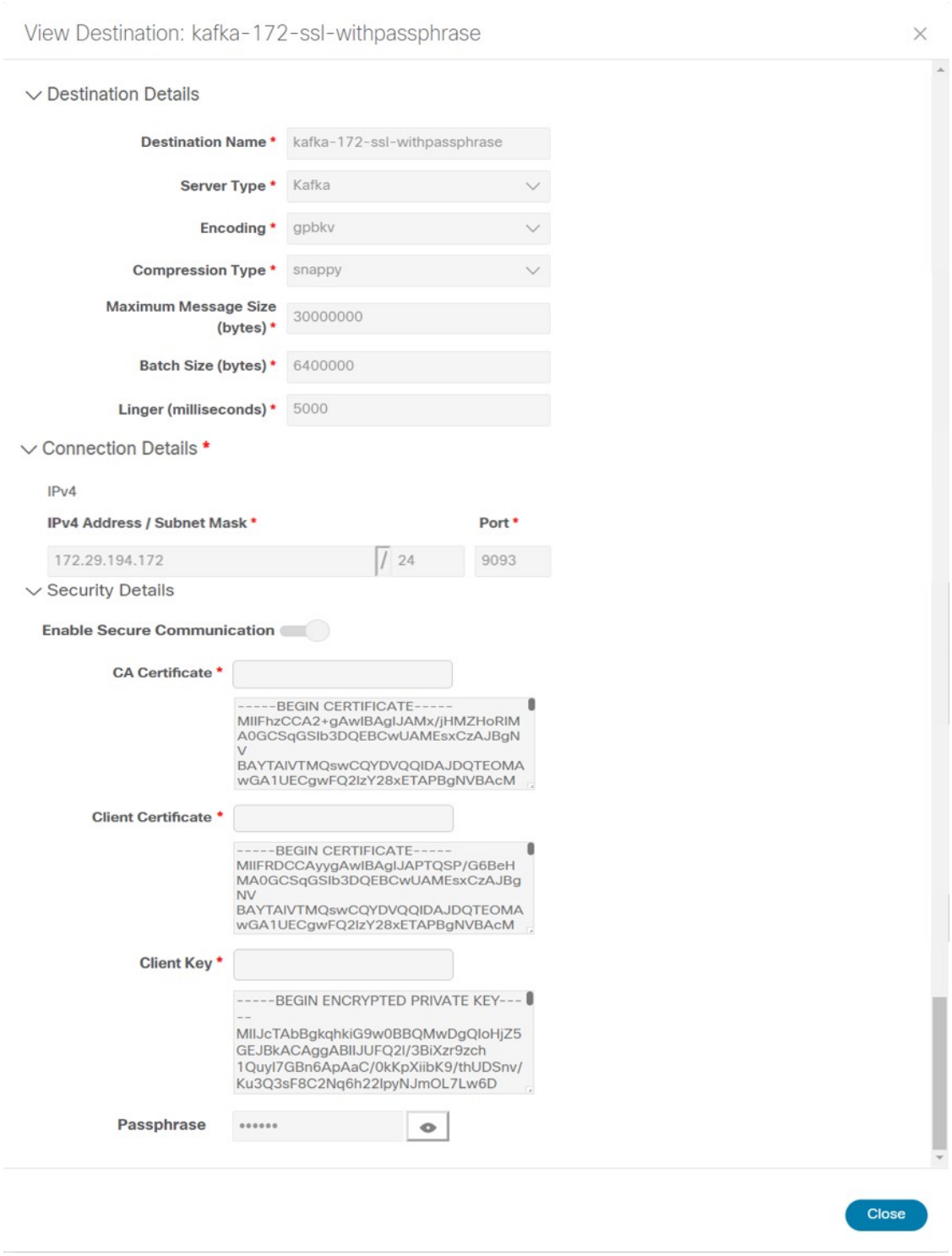
Note In **Edit** mode, you cannot update **Destination Name** and **Server Type**.



Step 4 Click **Save**.

View Data Destination Details

To view details of a data destination, in the **Data Destinations** pane, click icon next to the data destination name whose details you want to see. Cisco Crosswork Data Gateway displays the details as shown in the following figure.



Delete a Data Destination

Follow the steps below to delete a data destination.

Before you begin

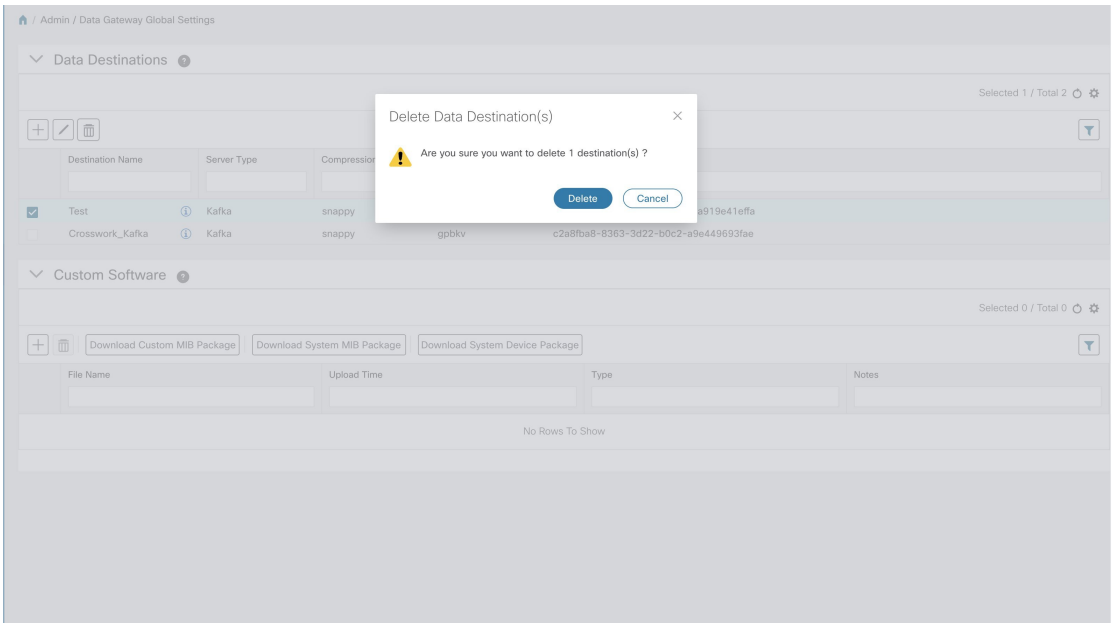
A data destination can only be deleted if it is not associated with any collection job. We recommend to check in the **Collection Jobs** view to see if any collection jobs are using the data destination. See Monitoring Collection Jobs.

Step 1 From the main menu, choose **Admin** > **Data Gateway Global Settings**.

Step 2 From the **Data Destinations** pane, select the Data destination(s) you want to delete.

Step 3 Click .

Step 4 In **Delete Data Destination(s)** pop up, click **Delete** to confirm.



Manage Custom Software Packages

To support third party device CLI and SNMP MIBs, Cisco Crosswork Data Gateway allows you to import the device packages and MIBs to the collectors. Device packages can be imported to allow Cisco Crosswork Data Gateway to retrieve CLI and SNMP data and convert it into xml for third party devices. You can extend the SNMP coverage of Cisco Crosswork Change Automation and Health Insights by uploading Custom MIB Packages with any additional MIB and YANG descriptions you require. If you only wish raw SNMP data, no additional files are needed, the system will fold the entire data package into the the Cisco Crosswork Data Gateway data payload.

Note MIBs are required only if the collection request references MIB TABLE names or SCALAR names. However, if the requests are OID-based, then MIBs are not required.

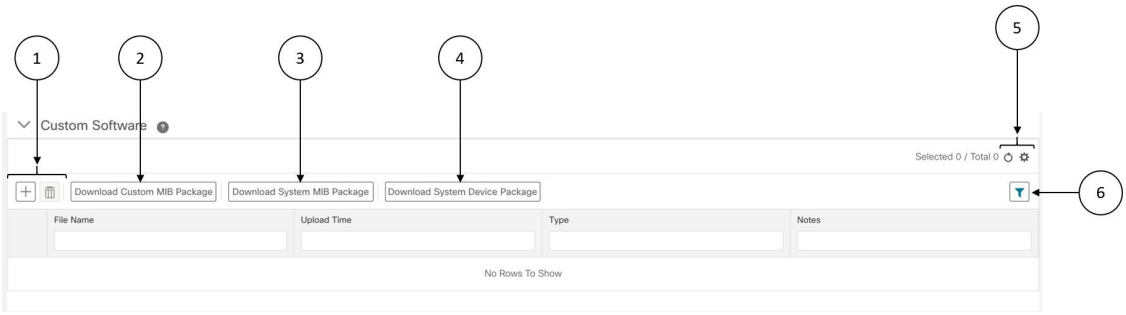
Cisco Crosswork Data Gateway allows you to register and deploy three types of custom software packages:

1. **CLI Device Package**: provides instructions for how to speak to a device using CLI and parse the results into the desired xml.
2. **Custom MIB Packages**: Custom MIBs and device packages can be specific to third party devices or be used to filter the collected data or format it differently for Cisco devices. These are editable by the user.
3. **SNMP Device Package**: provides instructions for how to speak to a device using SNMP and parse the results into the desired xml.

Cisco Crosswork Data Gateway also allows you to download Custom MIB package, System MIB package, and System Device package.

System Device and MIB Packages are bundled in the Crosswork software and are automatically downloaded to the Cisco Crosswork Data Gateway instances. These are NOT modifiable by the user. Custom Device Packages can be downloaded when required for interfacing with third-party devices.

From the **Custom Software** pane, you can add a new custom package, delete a custom package, and download custom packages.



Item	Description
1	Click + to add a new custom package. See Add a Custom Software Package, on page 28.
	Click 🗑 to delete a custom package. See Delete a Custom Software Package, on page 29.
2	Click **Download Custom MIB Package** to download custom MIB packages. See Download Custom or System MIBs and Packages, on page 30.
3	Click **Download System MIB Package** to download system MIB packages. See Download Custom or System MIBs and Packages, on page 30.
4	Click **Download System Device Package** to download system device packages. See Download Custom or System MIBs and Packages, on page 30.
5	Click ↻ to refresh the **Custom Software** window.
	Click ⚙ to choose the columns to make visible in the **Custom Software** window (see Set, Sort and Filter Table Data).

Item	Description
6	Click  to show/hide the quick filters.
	Click the **Clear All Filters** link to clear any filter criteria you may have set.

Custom Software pane displays the following details for the available custom software packages:

Field	Description
File Name	Name of the custom software package.
Upload Time	Time of the file upload.
Type	Type of the custom software package.
Notes	Notes related to the custom software package entered by the user while importing the package.

Add a Custom Software Package

Crosswork allows you to upload Custom Device Packages in case you want to filter/format the collected raw data differently.

There are two types of upload:

1. Custom MIB Package upload (a single file custom-mib-packages.tar.xz): which is archive of all custom MIBs/YANGs file
2. Individual Device Package Upload

When uploading new MIBs as a part of Custom MIB Package, it's required that those new MIBs files are loadable within collectors along with existing System MIB files i.e., all dependencies in the files get resolved properly. An offline tool steps are provided for you to ensure that their new MIBs gets parsed and uploaded properly. Accordingly, you can prepare the Custom MIB Package and upload.

For information on how to validate custom MIBs and Yangs i.e., to check if they can be uploaded to Crosswork, see Use Custom MIBs and Yangs on Cisco DevNet.

Note Crosswork doesn't allow Custom MIB package files to overwrite the System MIB Package files. It results in a failed upload attempt.

Using UI, Admin can upload CLI device packages, custom MIB packages, and SNMP device packages. This gets downloaded on the Cisco Crosswork Data Gateway instance to mounted path of respective collectors.

Follow these steps to import a custom software package into Cisco Crosswork Data Gateway:

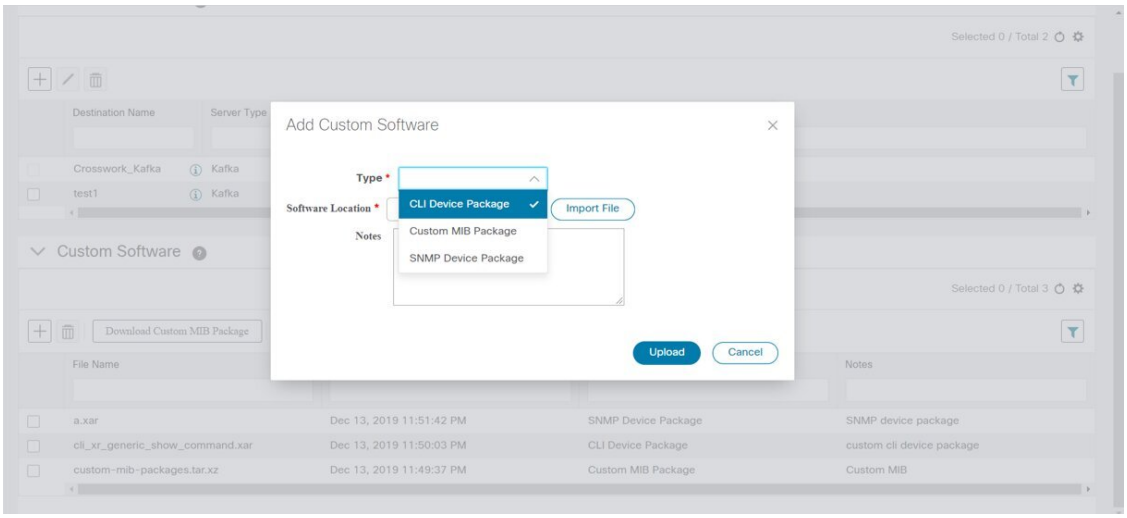
Note

- Ensure that the custom software package TAR file has just the device package folders and none of the parent folder or hierarchy of folders as part of the TAR file. If not imported properly, Cisco Crosswork Data Gateway throws exceptions when executing the job with custom device package.
- Crosswork does not implement any control on the files being uploaded other than checking the file extension.

Step 1 From the main menu, choose **Admin** > **Data Gateway Global Settings**.

Step 2 From **Custom Software** window, choose [+].

Step 3 From the **Add Custom Software** pop up, select the type of custom software package you want to import from the **Type** dropdown.



Step 4 Click in the blank field of **Software Location** to open the file browser window and select the custom software package to import and click **Import File**.

Step 5 Add a description of the custom software package in the **Notes** field. This is recommended if you have many packages, to be able to distinguish among them.

Step 6 Click **Upload**.

Delete a Custom Software Package

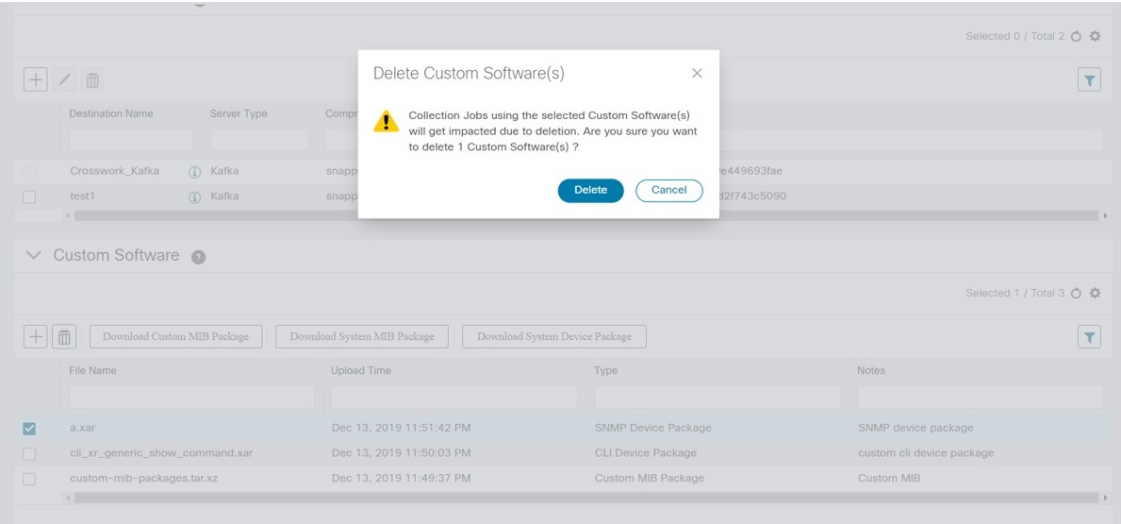
Follow the steps below to delete a custom software package.

Step 1 From the main menu, choose **Admin** > **Data Gateway Global Settings**.

Step 2 From the **Custom Software** pane, select the custom package you want to delete.

Step 3 Click [🗑].

Step 4 In the **Delete Custom Software** pop up, click **Delete** to confirm.



Download Custom or System MIBs and Packages

Cisco Crosswork Data Gateway has some pre-loaded MIBs and device packages. You can download them to obtain a tarball of the custom MIBs and device packages from the Crosswork UI, add more custom MIBs and device packages and re-upload them to the Crosswork. See List of Pre-loaded Traps and MIBs for SNMP Collection.

System MIB Packages and System Device Packages are downloadable only. This is only if you want to know the abilities that already exists in the system. These cannot be modified.

If you have a new version, you can delete the existing one and upload the new one.

Follow the below steps to download custom software packages from Crosswork UI.

Step 1 From the main menu, choose **Admin** > **Data Gateway Global Settings**.

Step 2 From **Custom Software** pane, choose based on the following table:

If you want to download	Click...
Custom MIB Package	Download Custom MIB Package
System MIB Package	Download System MIB Package
System Device Package	Download System Device Package

Step 3 In the download window, navigate to the location where you want to download the file and click **Save**.

What to do next

To add new MIBs/Yangs, follow the steps:

1. Extract the package and add new files.

2. Run the package through the offline tool as explained at Use Custom MIBs and Yangs on Cisco DevNet to ensure that it can be uploaded to Crosswork.
3. Tar it back as custom-mib-packages.tar
4. Run XZ utility to compress it to custom-mib-packages.tar.xz
5. Upload the package back into Crosswork by following the steps described at Add a Custom Software Package, on page 28.