



Configure Collection

This section contains the following topics:

- [Collection Service Overview, on page 1](#)
- [Collection Modes, on page 1](#)
- [Prerequisites for Device Telemetry, on page 2](#)
- [List of Supported MIBs and MDT Model, on page 4](#)

Collection Service Overview

Networks maintain a large amount of data that spans thousands of devices. The Cisco Crosswork Optimization Engine Collection Service collects and manages that flow of data in a multi-vendor environment. The Collection Service leverages existing collection agents and open-source solutions to collect and store data and provides a real-time publish/subscribe model infrastructure to Cisco Crosswork Network Automation applications. The Collection Service is highly scalable in order to meet the performance demands of the Cisco Crosswork Optimization Engine applications.

The Collection Service generates collection orchestration containers that collect streaming endpoint data from devices and push that data to the message bus. The Collection Service is comprised of the following services/processes that run in a collection container:

- Collector Controller—Services requests from applications and manages the collectors
- Telemetry Configuration Server—Interfaces with the devices

The Inventory Manager (also known as the Device Lifecycle Manager, or DLM) is the Cisco Crosswork Optimization Engine device inventory data store, which stores device details such as software version, OS type, device credentials, and capabilities.

Users with administrative privileges can monitor Collection Service status and performance, and start/stop/restart it or its underlying services, using the Cisco Crosswork Optimization Engine user interface. You can also collect logs and performance metrics for this service. For help with these tasks, see [Manage Cisco Crosswork Network Automation](#).

Collection Modes

You may choose one of the following modes for device management collection during installation.

Single Collection Mode

In single collection mode, only one MDT collector is used for devices. Consider the following information when choosing single collection mode:

- The maximum number of MDT capable devices that can be managed is 500.
- If you do not plan to use Cisco NSO, choose single collection mode. Devices cannot be mapped to Cisco NSO.
- Telemetry configuration will not be automatically pushed by Cisco Crosswork Optimization Engine to devices. You must push the telemetry configuration to devices (see [Prerequisites for Device Telemetry, on page 2](#)).
- The default MDT collector port is 31500.
- Changing from a single collection mode to a multiple collection mode requires the help from a Cisco service representative.

Multiple Collection Mode

In multiple collection mode, multiple MDT collectors are enabled depending on the number of MDT devices that are added. For the first 500 devices, default 31500 ports will be configured to reach the first MDT collector. The next 500 devices, 31503 ports will be configured to reach the second collector, and so on.



Note If devices are deleted and then added to Cisco Crosswork Optimization Engine again, then original port assignments will change.

Consider the following information when choosing multiple collection mode:

- More than 500 MDT capable devices can be managed.
- You must add a Cisco NSO provider and map devices to it.

Prerequisites for Device Telemetry

The Cisco Crosswork Optimization Engine Collection Service configures telemetry as needed on the devices enrolled within the service. Telemetry configuration must be done on PCCs or provider edge routers.



Note Cisco Crosswork Optimization Engine uses the Cisco-IOS-XR-infra-tc-oper YANG module for MDT collection.

If an operator configures telemetry directly on the same devices either manually or through some mechanism outside of the Collection Service, the commands must not contain the keyword `cw`. The keyword `cw` is reserved for use by the Collection Service. In particular, the following commands must not contain the keyword `cw` when configured outside of the Collection Service:

```
destination-group
sensor-group
subscription
```

```

sensor-group-id
destination-id

```

For example (invalid telemetry configuration):

```

telemetry model-driven
destination-group CW_1b4ac245d863cf3e787d42bae97f1d18dd300d5e

```

For more information, see the telemetry configuration documentation for your particular device (for example: [Telemetry Configuration Guide for Cisco ASR 9000](#))

If using single collection mode, use only port 31500. If managing more than 500 MDT capable devices and using multiple provider collection mode, you can use other ports. See [Collection Modes, on page 1](#).

Valid Telemetry Configuration

The following sample output shows a *valid* telemetry configuration on a device when configured outside of the Collection Service. If using a single interface network, then the IP address is the management IP address. In a dual interface network, then the IP address should be the data IP address.

```

telemetry model-driven
destination-group OE_43dc8a5ea99529715899b4f5218408a785e40fce
vrf default
address-family ipv4 192.168.0.3 port 31500
encoding self-describing-gpb
protocol tcp
!
!
destination-group OE_4b3c69a200668b0a8dc155caff295645c684a8f8
vrf default
address-family ipv4 192.168.0.3 port 31500
encoding self-describing-gpb
protocol tcp
!
!
sensor-group OE_43dc8a5ea99529715899b4f5218408a785e40fce
sensor-path Cisco-IOS-XR-infra-tc-oper:traffic-collector/afs/af/counters/tunnels/tunnel
!
sensor-group OE_4b3c69a200668b0a8dc155caff295645c684a8f8
sensor-path
Cisco-IOS-XR-infra-tc-oper:traffic-collector/vrf-table/default-vrf/afs/af/counters/prefixes/prefix
!
subscription OE_43dc8a5ea99529715899b4f5218408a785e40fce
sensor-group-id OE_43dc8a5ea99529715899b4f5218408a785e40fce sample-interval 30000
destination-id OE_43dc8a5ea99529715899b4f5218408a785e40fce
!
subscription OE_4b3c69a200668b0a8dc155caff295645c684a8f8
sensor-group-id OE_4b3c69a200668b0a8dc155caff295645c684a8f8 sample-interval 30000
destination-id OE_4b3c69a200668b0a8dc155caff295645c684a8f8
!

```



Note The **sample-interval** can be changed depending on the size of your network. It is defined in milliseconds and determines how fast you want the data to be pushed out.

Confirm that all PCCs or provider edge routers have telemetry configured and report data to Crosswork Optimization Engine. For example, routers should report prefix and tunnel counters:

```
RP/0/RP0/CPU0:PE1#show traffic-collector ipv4 counters prefix
Thu Jul 11 08:32:32.993 UTC
Prefix Label Base rate TM rate State
(Bytes/sec) (Bytes/sec)
-----
192.168.0.1/32 16001 1 0 Active
192.168.0.2/32 16002 1 0 Active
192.168.0.3/32 16003 1 0 Active
192.168.0.4/32 16004 2 0 Active
192.168.0.6/32 16006 501023 501021 Active
192.168.0.7/32 16007 17320774 17320772 Active
192.168.0.8/32 16008 3737825 3737823 Active
192.168.0.9/32 16097 3 0 Active
192.168.0.10/32 16096 2 0 Active
```

```
RP/0/RP0/CPU0:PE1#show traffic-collector ipv4 counters tunnel
Thu Jul 11 08:32:20.746 UTC
Interface Base rate Base rate State
(Packet/sec) (Bytes/sec)
-----
srte_c_102_ep_192.168.0.7 0 0 Active
```

Cisco IOS XR devices that are onboarded through telemetry must have the following configuration settings on the device to ensure that NETCONF and SSH work correctly:

```
ssh server v2
ssh server vrf default
ssh server netconf vrf default
ssh server rate-limit 600
ssh server session-limit 1024
netconf-yang agent ssh
```

Cisco IOS XR devices that are onboarded through SNMP must have SNMP enabled on the device. The following is an example of an SNMP configuration on a Cisco IOS XR device:

```
snmp-server community public RO
```

Please note that, currently, Cisco Crosswork Optimization Engine does not itself support execution of EXEC privilege commands, such as **enable**, on devices. These types of commands must be executed using the device console or other means.

List of Supported MIBs and MDT Model

The following MIBs are supported:

- IF-MIB
- IP-MIB
- SNMPv2-MIB

The following YANG MDT model is supported:

- Cisco-IOS-XR-infra-tc-oper