White Paper

Public

The bridge to possible

Deploying Nexus Fabrics with Telemetry on Cisco Nexus Dashboard

Contents

Introduction

Cisco Nexus Dashboard 4.1 is a unified platform for configuring, automating, monitoring, visualization, troubleshooting and analytics, that not only helps with the configuration and automation of data center fabrics, but also helps reduce the mean time to detect (MTTD) and mean time to resolve (MTTR) network issues by providing comprehensive visibility into the infrastructure. Cisco Nexus Dashboard processes and analyzes telemetry data continuously streamed from all the devices in the infrastructure to provide network operators with real-time monitoring and analytics of the network. It also offers lifecycle management suggestions and foresight into infrastructure change management.

This paper details the best deployment configurations, and settings to implement Cisco Nexus Dashboard (ND) for telemetry and operations for your managed or monitored NX-OS network sites. To enable streaming telemetry data from all the devices on the sites, specific configurations and pre-requisite settings are required on Cisco Nexus Dashboard and devices. You use a typical two-tier (spine and leaf) VXLAN-EVPN network fabric as an example in this white paper to illustrate the necessary configuration on the Cisco Nexus Dashboard side and the switches to prepare the sites for streaming telemetry. As a network site can be fully managed or only monitored by Cisco Nexus Dashboard, the white paper discusses the configuration for both the Cisco Nexus Dashboard managed mode and monitored mode.

This document is focused on providing the best approach with various design options for enabling and streaming telemetry to Cisco Nexus Dashboard for VXLAN-EVPN fabrics.

Software and Hardware Product Versions

The example in this white paper has the following product software versions:

- Cisco Nexus Dashboard version - 4.1.1g

For more information about supported software versions and compatibilities of related products, refer to the Cisco Nexus Dashboard and Services Compatibility Matrix at the following link - https://www.cisco.com/c/dam/en/us/td/docs/dcn/tools/nd-sizing/index.html.

For support of the required features, you are using all cloud-scale and silicon one switches.

Terminology and Architecture Definitions

Out of band (management port)

Management port of a switch, which is under the management VRF. This is typically the physical mgmt0 interface of a switch. This does not refer to the management network of the Cisco Nexus Dashboard nodes, which is explained below.

In-band (front panel port)

Refers to a front panel Ethernet port on a Nexus device that is used for in-band management. Unlike the traditional out-of-band (OOB) management port (mgmt0), which is dedicated for management traffic, in-band management allows the device to be managed through its regular data network interfaces (front panel ports), initially part of the default VRF. This does not refer to the data network of the Cisco Nexus Dashboard nodes, which is explained below.

Loopbacks

Logical interfaces (virtual IPs) configured on network devices, used as stable endpoints for control-plane communication, telemetry, or routing protocols.

Routed ports

Physical interfaces configured to operate as Layer 3 interfaces (not part of a VLAN). Each port has an IP address and participates directly in IP routing.

Cisco Nexus Dashboard Data Ports

Network Interfaces are dedicated to Cisco Nexus Dashboard node clustering connectivity, communicating with, and configuring NX-OS switches, and handling telemetry traffic from onboarded fabrics.

Cisco Nexus Dashboard Management Ports

Network Interfaces are dedicated to accessing the Cisco Nexus Dashboard GUI and CLI via SSH, supporting DNS and NTP communication, handling firmware uploads, enabling Cisco Intersight device connector communication, and carrying AAA (Authentication, Authorization, and Accounting) traffic.

Cisco Nexus Dashboard Persistent IP address (PIPs)

These are IP addresses that are used for various controller and telemetry functions within the Cisco Nexus Dashboard cluster. The use of persistent IP addresses ensures that even with the failure of a specific node within Cisco Nexus Dashboard cluster, the service IP does not change when moved to a different node. PIPs can be configured in the management or data subnets, but the PIPs used for telemetry collectors and receivers are always configured in the data network. The use case for when to configure them will be explained in the coming examples.

VXLAN-EVPN fabric

An overlay network technology combining VXLAN (Virtual Extensible LAN) for encapsulation and EVPN (Ethernet VPN) as the control plane enabling scalable, multi-tenant Layer 2/Layer 3 connectivity across data centers.

Classic LAN fabric

A classic LAN fabric deployment is a traditional three-tier deployment with core, aggregation, and access layer switches, where aggregation layer switches function as the Layer 2/Layer 3 boundary. It is also possible to have a two-tier design with a collapsed core (by combining the aggregation and core layers).

Cisco Nexus Dashboard Co-Located Deployment

A co-located deployment refers to a design where multiple Cisco Nexus Dashboard clusters are deployed to manage the same data center fabrics, but each cluster runs different services.

Cisco Nexus Dashboard Co-Hosted Deployment

A co-hosted deployment refers to running multiple Cisco Nexus Dashboard services on the same Cisco Nexus Dashboard cluster. Cisco Nexus Dashboard 4.1 is the first release where all use cases including ACI Multi-site orchestration, NX-OS controller, and telemetry for all fabric types are supported on a single cluster. Always refer to the capacity planning tool for supported deployments based on hardware and cluster size: https://www.cisco.com/c/dam/en/us/td/docs/dcn/tools/nd-sizing/index.html.

Deploy Cisco Nexus Dashboard at Layer 2

Cisco Nexus Dashboard nodes within the cluster are Layer 2 adjacent. This means that all Cisco Nexus Dashboard nodes share the same management and data subnet, respectively. In this case, persistent IP addresses need to be on the same network as the data network or management network. Since the nodes are operating at Layer 2, the upstream switches that the nodes connect to provide the appropriate VLAN access and gateway routing for the nodes.

Deploy Cisco Nexus Dashboard at Layer 3

Cisco Nexus Dashboard nodes within the cluster are Layer 3 adjacent. In other words, each Cisco Nexus Dashboard node in the cluster has its own unique management and data subnets, and the data interfaces use BGP to peer with the upstream Layer 3 network and advertise local IP and persistent IPs. There needs to be IP reachability between the nodes to form the cluster. In this case persistent IP addresses cannot be from a subnet that belongs to any of the Cisco Nexus Dashboard nodes' Data or Management interface subnets. In this case, LAN Device Management Connectivity must be set to Data and cannot be changed. Layer 3 deployment mode is used when the ND cluster nodes are distributed in different location which have Layer 3 network connectivity and do not stretch Layer 2.

Note: All nodes must operate in the same mode (Layer 2 or Layer 3).

Pre-Requisites for Cisco Nexus Dashboard Sites Configuration

Types of Interfaces & pre-requisites for Cisco Nexus Dashboard

Cisco Nexus Dashboard nodes provide the following two interfaces for connectivity:

- Management Interface
- Data Interface

Cisco Nexus Dashboard nodes require one IP each for the above two interface types. Management and data interfaces must be placed in different subnets. Configuration of those IP addresses happens during the Cisco Nexus Dashboard bootstrap.

Layer 2 deployment is the most straight forward. However, if Layer 3 deployment is required (see terminology for reference), you must configure BGP during the bootstrap process.

As management network interfaces do not support the BGP protocol, when deployed in Layer 3 mode, the user needs to make sure management subnets are routable from the upstream management network from their respective gateways and subnets.

Below is the summary of pre-requisites to prepare Cisco Nexus Dashboard, and its managed or monitored network sites for onboarding onto Cisco Nexus Dashboard and for enabling telemetry for exporting fabric data to Cisco Nexus Dashboard. For streaming telemetry to Cisco Nexus Dashboard, the user has a choice to use either the out-of-band or in-band interfaces of the Nexus switches as telemetry sources, based on deployment design. Both the options are discussed in this whitepaper. Whether out-of-band or in-band is used, telemetry is always sent to the data interfaces.

1. The Cisco Nexus Dashboard cluster is connected and deployed (bootstrapped). For more information about deploying Cisco Nexus Dashboard in various form factors, refer to the deployment guide: https://www.cisco.com/c/en/us/td/docs/dcn/nd/4x/deployment/cisco-nexus-dashboard-deployment-guide-41x/nd-prerequisites-41x.html#concept_fdf_fxg_4mb.

2. The round-trip time (RTT) between the Cisco Nexus Dashboard cluster and the fabric switches must not exceed 150ms for network site telemetry to run properly.

3. The round-trip time (RTT) between the Cisco Nexus Dashboard cluster nodes must not exceed 50ms.

4. Enable and configure NTP (Network Time Protocol) in the network. NTP is an essential clock service that synchronizes all the elements of the network site. The NTP service is not only required for setting up the ND cluster and managing network site switches, but also for software telemetry to work. It maintains the consistency and coherence of logs between the switches and Cisco Nexus Dashboard. NTP configurations and verifications for monitored and managed modes are discussed in further sections.

5. If Flow Telemetry or Traffic Analytics is enabled to collect flow records from the monitored fabrics, you must configure PTP (Precision Time protocol) in the network. Cisco Nexus Dashboard requires a microsecond-level accurate PTP clock for the network site to perform flow analytics across the site and calculate the end-to-end network latency of the flows. The PTP grandmaster needs to be an external device that can provide at least a microsecond-level clock. The PTP configurations and verifications are discussed in the next sections for both Cisco Nexus Dashboard managed and monitored network sites.

6. Configure persistent IPs as discussed in detail in the following section below. By default, you will configure these when the cluster is deployed (bootstrapped).

7. Prepare the routing of the fabrics for telemetry streaming to Cisco Nexus Dashboard based on the design – either through a Layer 3 network, or by using an out-of-band management network for the connectivity. This is discussed in further detail later in this whitepaper.

8. For streaming telemetry through out-of-band network:

    a. IP reachability should be established between the Cisco Nexus Dashboard Data interfaces and the out-of-band management interfaces (mgmt0) of the switches.

9. For streaming telemetry through in-band network:

    a. Configure routable loopback interfaces on switches to source the telemetry and send it to the data network interfaces. If the fabric is deployed and managed through Cisco Nexus Dashboard, loopbacks will be auto provisioned using the template and can be used for streaming telemetry as illustrated in the example in the in-band section. You could also configure a dedicated loopback interface on the switches, although it is simply more configuration than using the existing ones. Configuring or usage of a loopback interface for both monitored and managed modes are discussed in further sections.

    b. Cisco Nexus Dashboard data network needs IP reachability for the NX-OS fabric and the loopback addresses. A routable loopback interface is used on the network site switches for this connectivity and to source telemetry data. The following sections discuss in detail the configuration and verification of persistent IP requirements.

Configuring persistent IP addresses in Cisco Nexus Dashboard

Depending on the Cisco Nexus Dashboard cluster size and the services enabled, a different number of persistent IPs are required. Follow this link to understand the number of persistent IPs required for your deployment – https://www.cisco.com/c/en/us/td/docs/dcn/nd/4x/deployment/cisco-nexus-dashboard-deployment-guide-41x/nd-prerequisites-41x.html#concept_zkj_3hj_cgc.

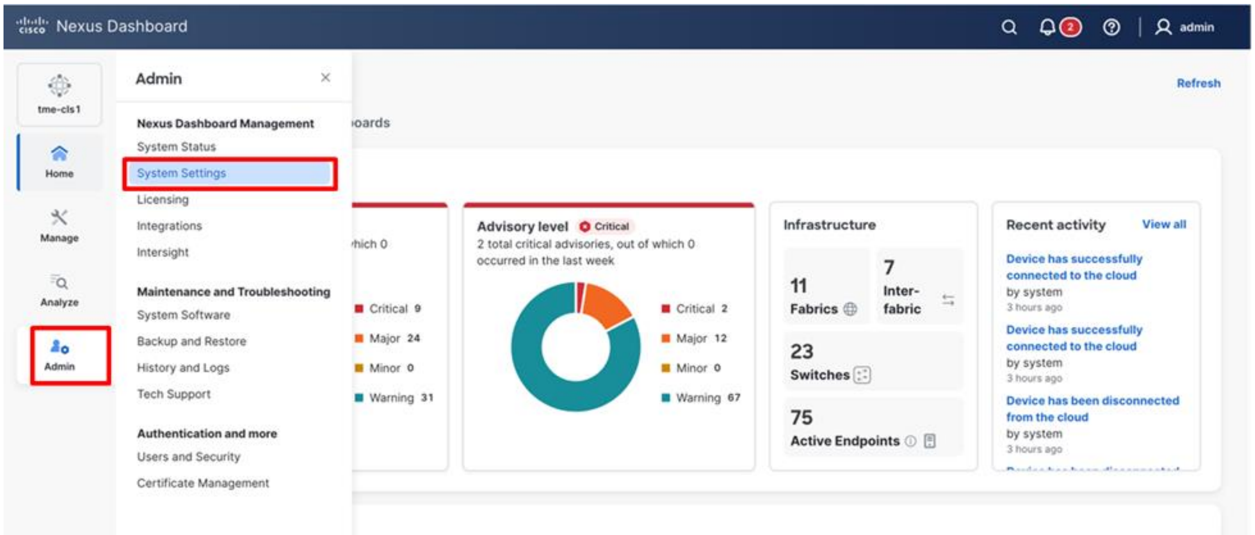
For a typical 3-node cluster, Cisco Nexus Dashboard requires 5 mandatory persistent IP addresses for software and hardware telemetry services for a Cisco Nexus Dashboard managed or monitored network site. All 5 persistent IPs can be placed in the data network if the connectivity between Cisco Nexus Dashboard and the fabrics is over the data network itself. Alternatively, out of the 5 persistent IP addresses, 3 can be placed in the data network and 2 can be placed in the management network This depends on the deployment option that will be illustrated below. After bootstrapping, you may need to add additional persistent IP addresses as needed, depending on scenarios highlighted in the user guide (link provided below). Depending on the deployment mode, the configuration of the persistent IPs varies as shown below.

Layer 2: Here the Cisco Nexus Dashboard nodes within the cluster are Layer 2 adjacent. This means that all Cisco Nexus Dashboard nodes share the same management and data subnet, respectively. Persistent IP addresses need to be on the same network as the data network or management network.

Layer 3 BGP: In this mode, the Cisco Nexus Dashboard nodes within the cluster are Layer 3 adjacent. In other words, unique management and data subnets are associated with each Cisco Nexus Dashboard node in the cluster. There needs to be IP reachability between the nodes to form the cluster. Persistent IP addresses cannot be from a subnet that belongs to any of the Cisco Nexus Dashboard nodes' Data or Management interface subnets. In this case, LAN Device Management Connectivity must be set to Data and cannot be changed.

For more information on persistent IPs, please refer to the Cisco Nexus Dashboard deployment guide following this link - https://www.cisco.com/c/en/us/td/docs/dcn/nd/4x/deployment/cisco-nexus-dashboard-deployment-guide-41x.html.

1. The telemetry collector persistent IP addresses are in the Cisco Nexus Dashboard Data Network subnet by default when the cluster is bootstrapped for the first time. Post cluster deployment, additional Ips can be added or modified in the **System Settings**. On the Cisco Nexus Dashboard UI, navigate to **Admin > System Settings**.



Advisory level — 2 total critical advisories, out of which 0 occurred in the last week

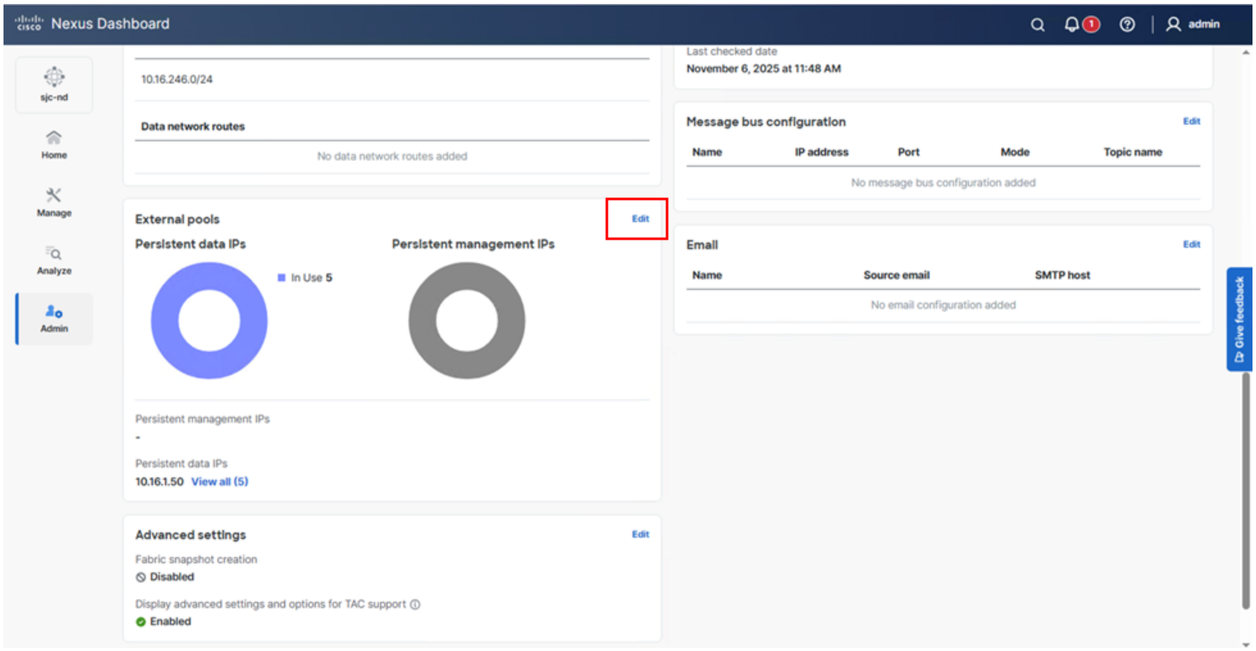
Device has successfully connected to the cloud
by system
3 hours ago

Device has successfully connected to the cloud
by system
3 hours ago

Device has been disconnected from the cloud
by system
3 hours ago

Figure 1.
Cisco Nexus Dashboard System Settings Navigation

2. On the **System settings** page, scroll down **External pools**.



10.16.246.0/24

Data network routes

No data network routes added

External pools — Edit

Persistent data IPs — In Use 5

Persistent management IPs

Persistent management IPs
-

Persistent data IPs
10.16.1.50 View all (5)

Advanced settings — Edit

Fabric snapshot creation
Disabled

Display advanced settings and options for TAC support
Enabled

Last checked date
November 6, 2025 at 11:48 AM

Message bus configuration — Edit

Name	IP address	Port	Mode	Topic name

No message bus configuration added

Email — Edit

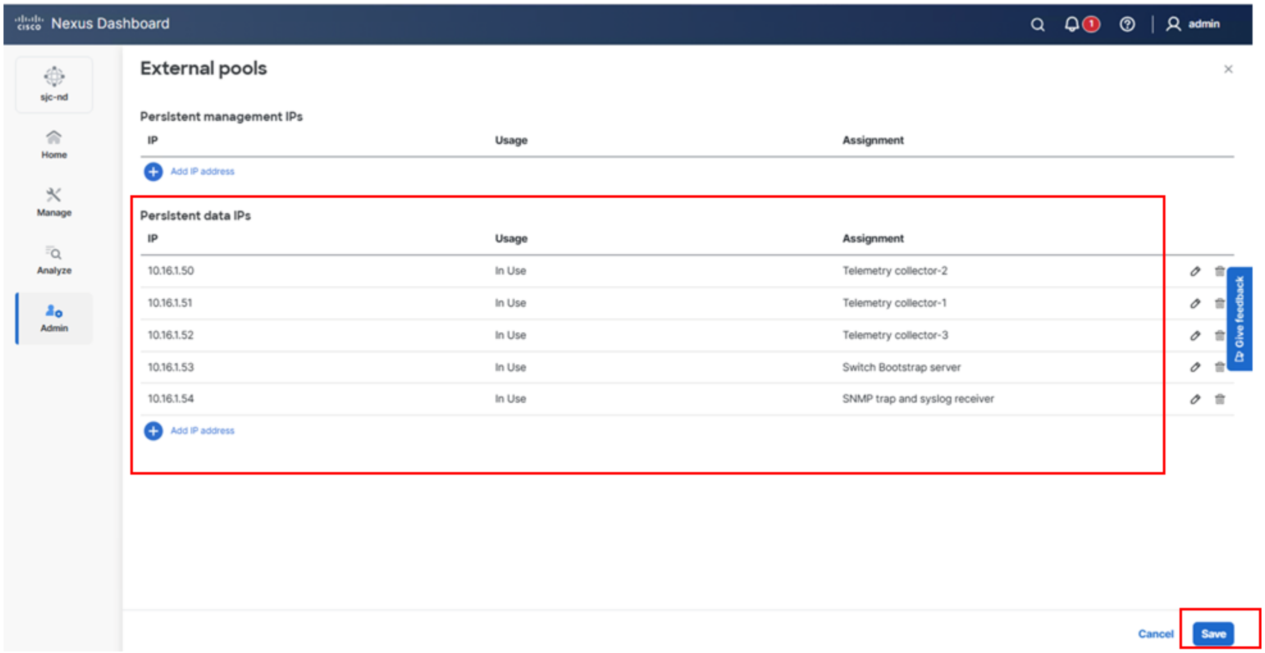
Name	Source email	SMTP host

No email configuration added

Figure 2.
Persistent IP address configuration (post bootstrap)

3. Click **Edit** in **External pools**.

4. Click **Add IP address** to add at least 5 IP addresses.



External pools

Persistent management IPs

IP	Usage	Assignment

Add IP address

Persistent data IPs

IP	Usage	Assignment
10.16.1.50	In Use	Telemetry collector-2
10.16.1.51	In Use	Telemetry collector-1
10.16.1.52	In Use	Telemetry collector-3
10.16.1.53	In Use	Switch Bootstrap server
10.16.1.54	In Use	SNMP trap and syslog receiver

Add IP address

Cancel Save

Figure 3.
Persistent IP address allocation. Assignment is done automatically after IPs are added.

Note: Additional Persistent IPs can be added based on feature requirements. For example, the Endpoint Locator (EPL) feature requires 1 additional persistent IP address on the data network per fabric where EPL is enabled. For further information, please refer to the deployment guide mentioned above.

5. Click **Save**.

Prepare Cisco Nexus Dashboard Managed Sites for Streaming Telemetry to Cisco Nexus Dashboard

In the following section, you will go through the options for streaming telemetry from the managed fabrics to Cisco Nexus Dashboard. Each fabric streaming mode can be configured independently. While the below scenarios will cover the end-to-end deployment, consider these rules for cluster networking design and behavior.

1. Cisco Nexus Dashboards ability to communicate to nodes in the fabric is based on routing. You can configure specific routes in the management and data subnets to specify the interface for communication with specific subnets. By default, the default route for switch communication is in the data network, and thus data will be used by default to communicate with the switches.
2. The LAN Device Connectivity Policy defined in **Admin > System Settings > Fabric Management > Advanced Settings > Admin > LAN Device Management Connectivity** exposes two modes, Data and Management. The default is Data. This knob determines if the 2 Persistent IP addresses for Syslog, SNMP, and POAP bootstrap will be defined in Data or Management networks, respectively. For example, if you changed this policy to Management, you would need to add the two persistent IP addresses to the management network in the System Settings. The use case for changing the defaults will be described in the appropriate deployment section.
3. Telemetry is always sourced from the switches and sent to the data interface. The Telemetry can be sourced from mgmt0 (out-of-band) or a loopback (in-band) but can never be sent to the management ports on the Cisco Nexus Dashboard nodes, only the data network and persistent IP addresses in the data network.

Recommended Option – Configuration and Telemetry via Out-of-Band Network

Considering that most deployments already have an out-of-band network setup for remote management and disaster recovery of the devices, you provide the option to use out-of-band network of fabric switches for streaming telemetry to Cisco Nexus Dashboard. In such a case, using this connection type does not require any additional connection configuration, making it easy to deploy.

The default function of the Cisco Nexus Dashboard interfaces and networks is depicted below in Table 1.

Table 1. External network purpose

Data network	Management network
▪ Cisco Nexus Dashboard node clustering ▪ Service to service communication ▪ Cisco Nexus Dashboard nodes to Cisco APIC and NX-OS controller capability communication ▪ Telemetry traffic for switches and on-boarded fabrics	▪ Accessing Cisco Nexus Dashboard GUI ▪ Accessing Cisco Nexus Dashboard CLI using SSH ▪ DNS and NTP communication ▪ Cisco Nexus Dashboard firmware upload ▪ Intersight device connector ▪ AAA traffic ▪ Multi-cluster connectivity

This means that by default, the system will try to use the data network to communicate with the switches to manage configuration and program the switches to send telemetry to the data network interfaces. When the Cisco Nexus Dashboard management network is in a different subnet than the switches mgmt0 network, this will work as intended and everything will be sent through the data network.

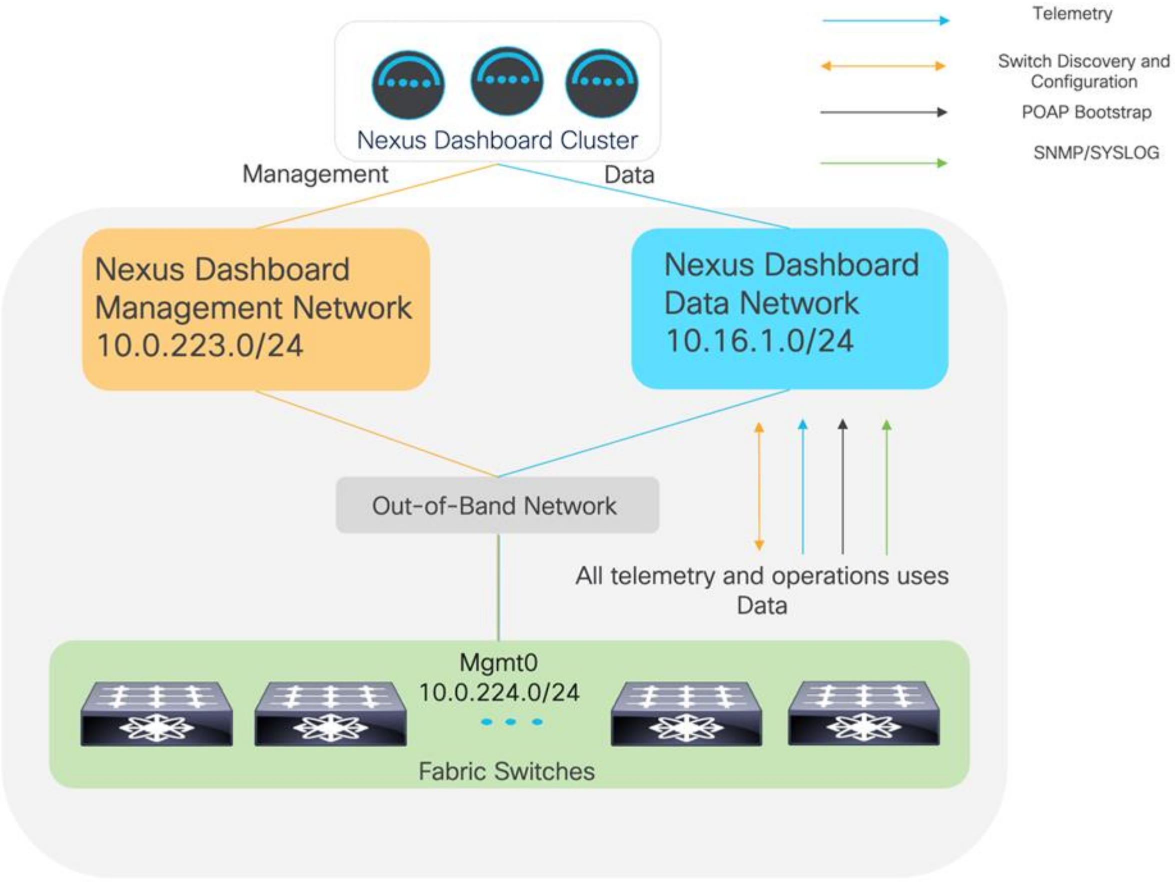

Telemetry
Switch Discovery and Configuration
POAP Bootstrap
SNMP/SYSLOG
Nexus Dashboard Cluster
Management
Data
Nexus Dashboard Management Network 10.0.223.0/24
Nexus Dashboard Data Network 10.16.1.0/24
Out-of-Band Network
All telemetry and operations uses Data
Mgmt0 10.0.224.0/24
Fabric Switches

Figure 4.
Logical network design for out-of-band management and telemetry. ND management and switch management are in different subnets.

However, when the Cisco Nexus Dashboard management network is in the same subnet as the switches mgmt0 network, it will still work natively, but the network path for the switch configuration will use the management network instead of data. This is because the routing table on the Cisco Nexus Dashboard cluster will always prefer its local subnet to reach the switches based on the IP addresses that were used to seed the switch to the fabric. Everything functionally will work, and as such this is more informative.

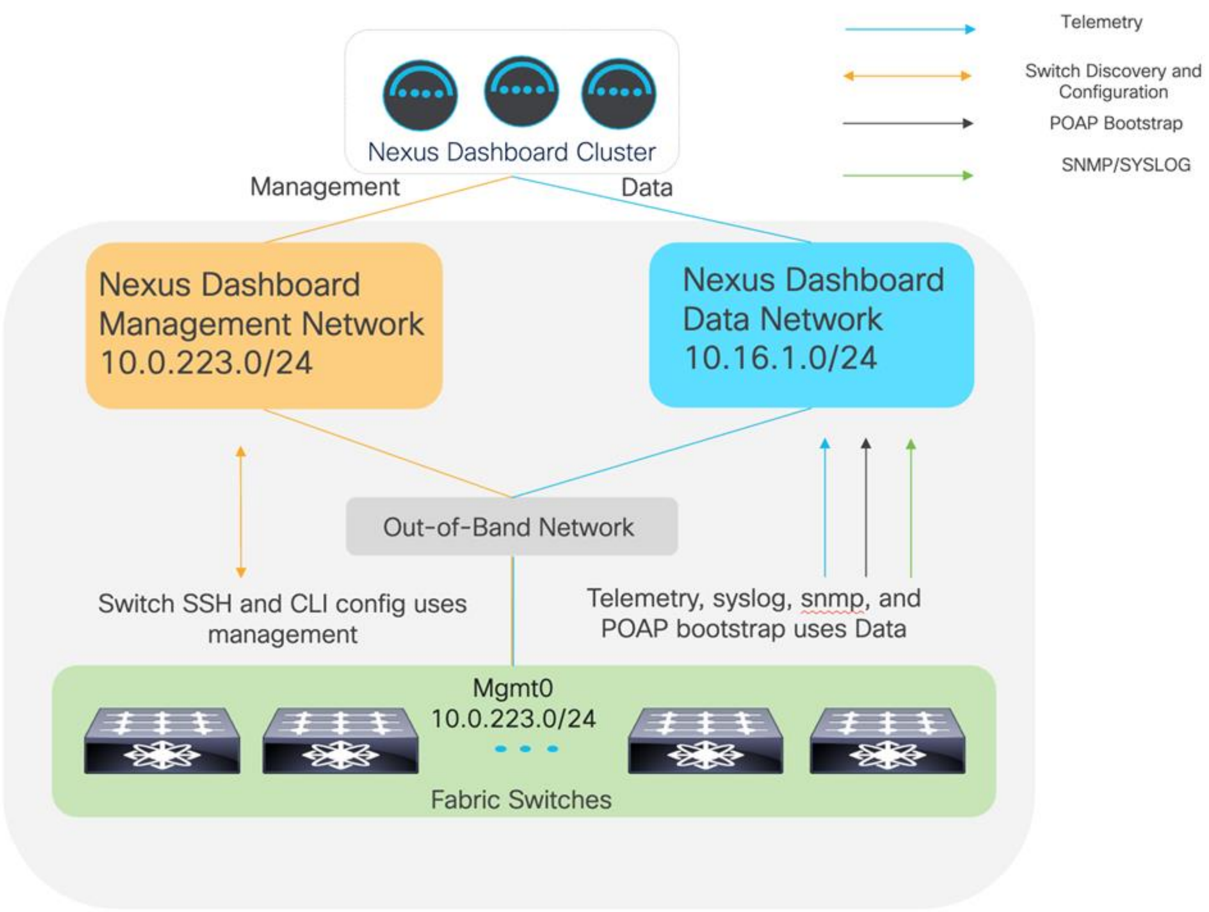
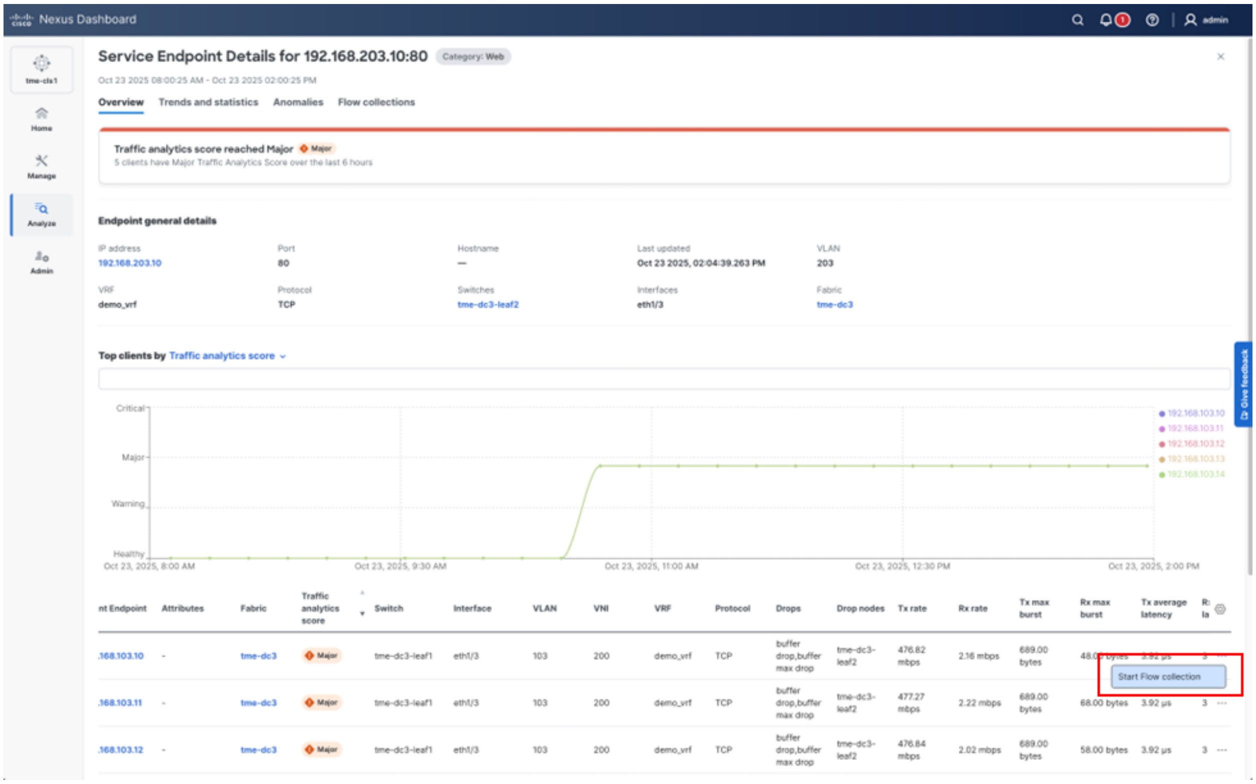

Telemetry
Switch Discovery and Configuration
POAP Bootstrap
SNMP/SYSLOG
Nexus Dashboard Cluster
Management
Data
Nexus Dashboard Management Network 10.0.223.0/24
Nexus Dashboard Data Network 10.16.1.0/24
Out-of-Band Network
Switch SSH and CLI config uses management
Telemetry, syslog, snmp, and POAP bootstrap uses Data
Mgmt0 10.0.223.0/24
Fabric Switches

Figure 5.
Logical network design for out-of-band management and telemetry. ND management and switch management are in the same subnet.

While Out-of-Band Telemetry streaming might be the simplest and most straight forward approach, there are few guidelines and limitations that must be considered:

- The management and data subnets must be separate subnets, and IP reachability between mgmt0 on the switches and the data subnet must be allowed. The persistent IPs will be placed in the data subnet by default when the cluster is initially bootstrapped. Refer to Figure 1.
- The telemetry will always be sent to the Cisco Nexus Dashboard data network and interfaces.
- Flow telemetry is not supported in this design; however, Traffic Analytics (TA) and Traffic Analytics compatibility mode are supported. Traffic Analytics is the current recommended mode providing you are running NX-OS release 10.4(2) or higher.
- On-demand flow troubleshooting for Traffic Analytics flows is available in NX-OS 10.5(2) and later when using out-of-band telemetry.
- This feature refers to the ability to collect 5-tuple flow information in real time as a user triggered workflow. It can be found under **Analyze > Traffic Analytics > Select Service Port > Click "…" > Start flow collection.**



Service Endpoint Details for 192.168.203.10:80 Category: Web

Oct 23 2025 08:00:25 AM - Oct 23 2025 02:00:25 PM

Traffic analytics score reached Major ◆ Major
5 clients have Major Traffic Analytics Score over the last 6 hours

Endpoint general details

IP address: 192.168.203.10
Port: 80
Hostname: —
Last updated: Oct 23 2025, 02:04:39.263 PM
VLAN: 203
VRF: demo_vrf
Protocol: TCP
Switches: tme-dc3-leaf2
Interfaces: eth1/3
Fabric: tme-dc3

Top clients by Traffic analytics score ⌄

nt Endpoint	Attributes	Fabric	Traffic analytics score	Switch	Interface	VLAN	VNI	VRF	Protocol	Drops	Drop nodes	Tx rate	Rx rate	Tx max burst	Rx max burst	Tx average latency	R: la
.168.103.10	-	tme-dc3	◆ Major	tme-dc3-leaf1	eth1/3	103	200	demo_vrf	TCP	buffer drop,buffer max drop	tme-dc3-leaf2	476.82 mbps	2.16 mbps	689.00 bytes	48.0[illegible] bytes	3.92 µs	3
.168.103.11	-	tme-dc3	◆ Major	tme-dc3-leaf1	eth1/3	103	200	demo_vrf	TCP	buffer drop,buffer max drop	tme-dc3-leaf2	477.27 mbps	2.22 mbps	689.00 bytes	68.00 bytes	3.92 µs	3
.168.103.12	-	tme-dc3	◆ Major	tme-dc3-leaf1	eth1/3	103	200	demo_vrf	TCP	buffer drop,buffer max drop	tme-dc3-leaf2	476.84 mbps	2.02 mbps	689.00 bytes	58.00 bytes	3.92 µs	3

Figure 6.
Starting a flow troubleshooting job from Traffic Analytics

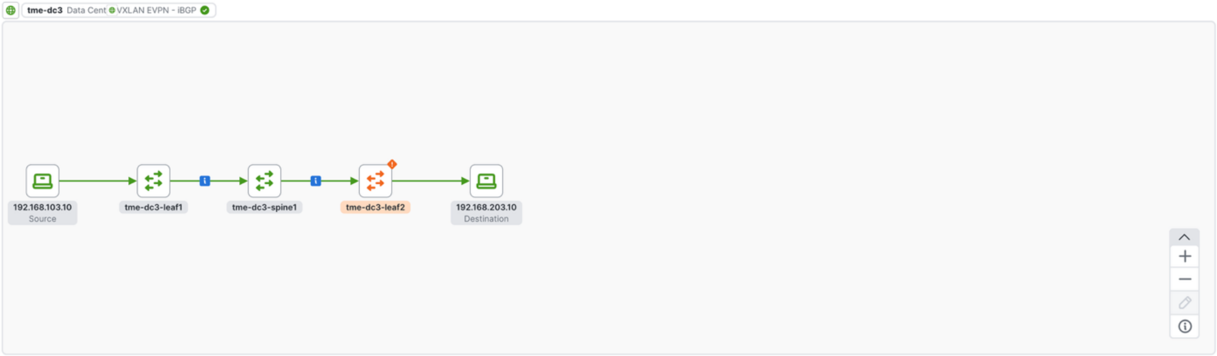


Figure 7.
Viewing a flow troubleshooting job from Traffic Analytics

Prepare a Cisco Nexus Dashboard managed network site for streaming telemetry. Follow these steps to complete the preparation:

- Create fabric
- Discover switches
- Configure NTP
- Configure PTP

Since the Cisco Nexus Dashboard management interfaces are RJ-45, and the data interfaces are SFP+, the upstream networking must support both. The following figures provide examples of physical topologies based on platform support for the interface form factors.

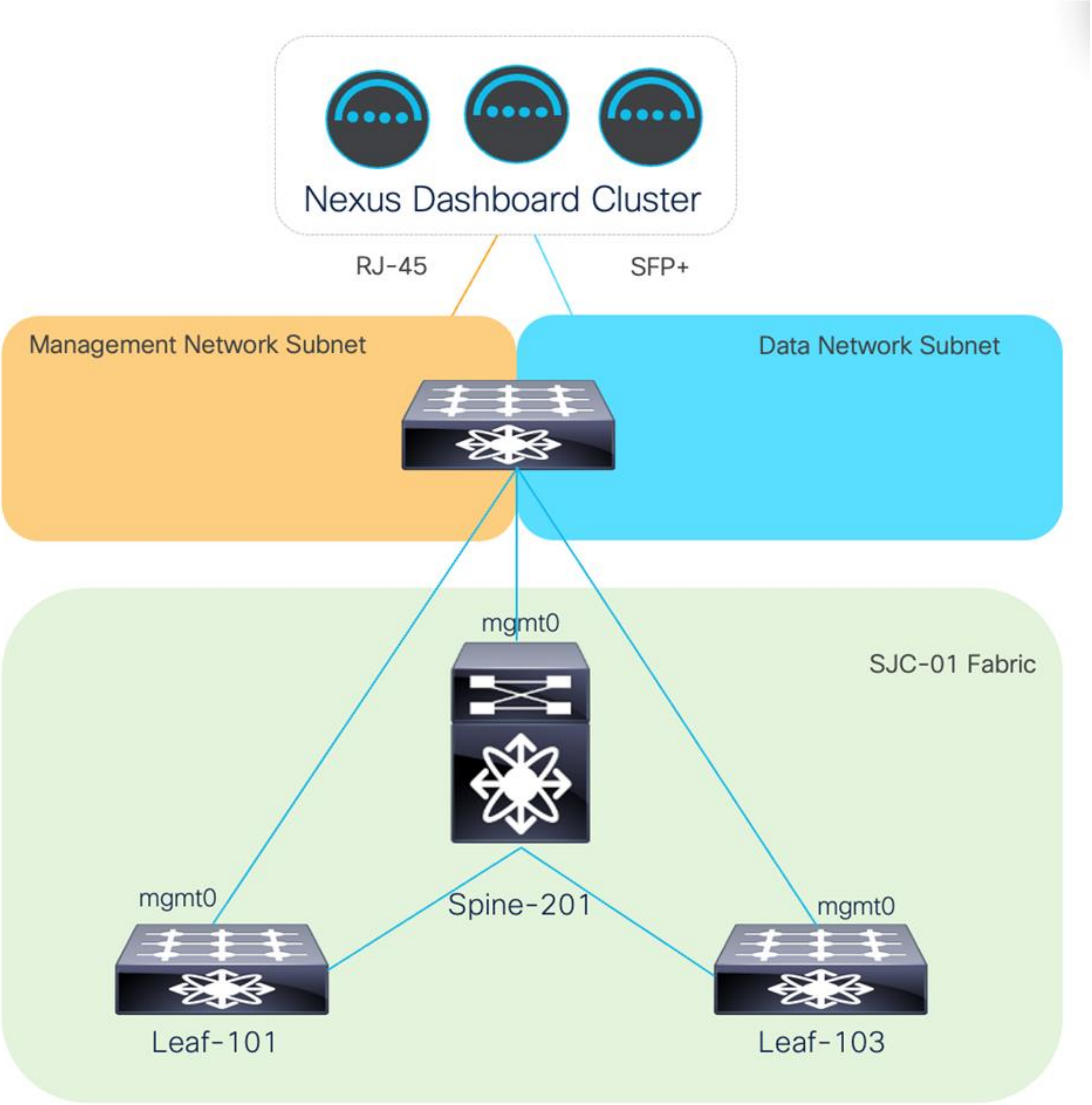


Figure 8.
Cisco Nexus Dashboard Management and Data are physically connected to the same switch(es). Management and Data Networks have IP reachability.

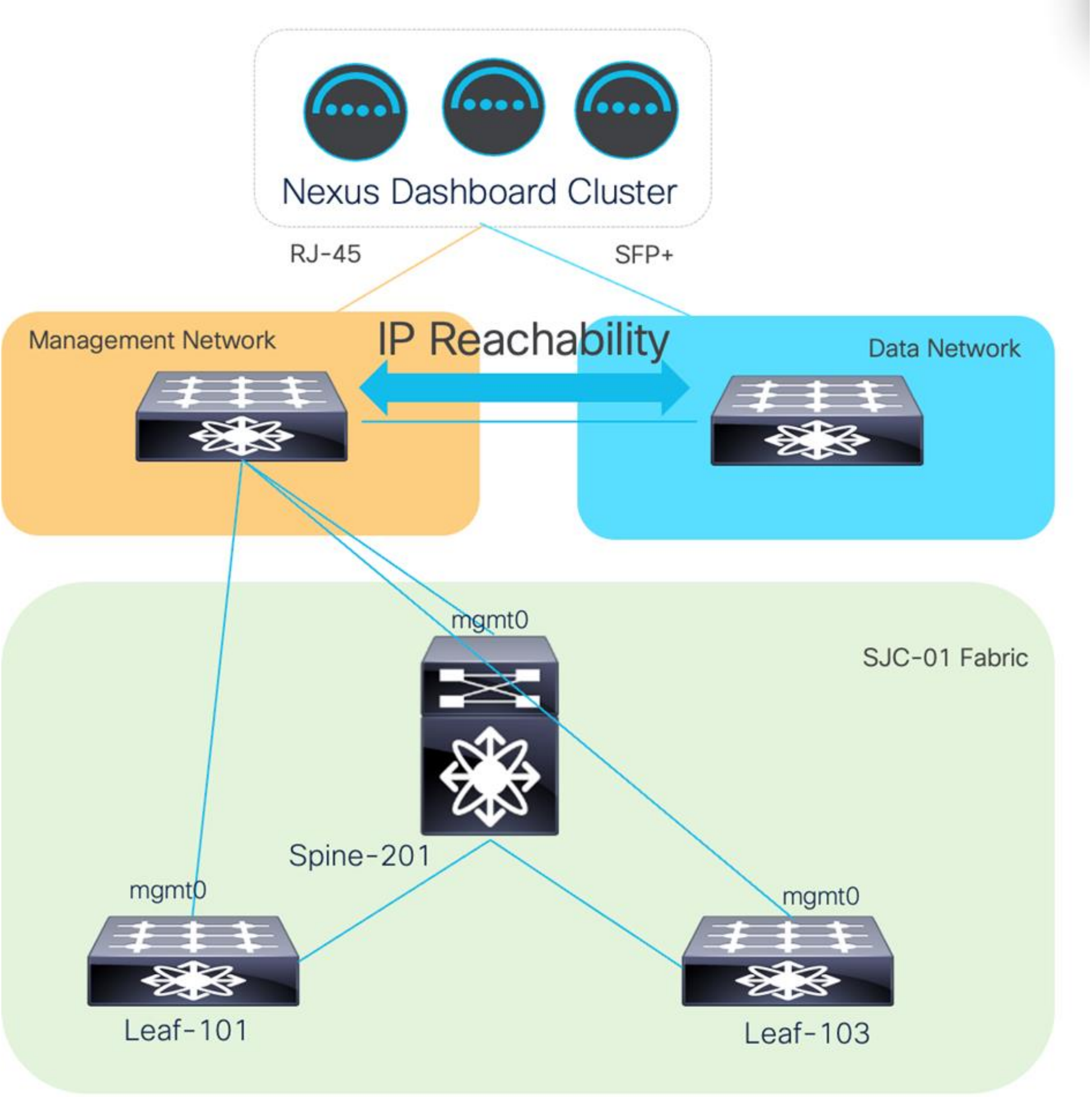
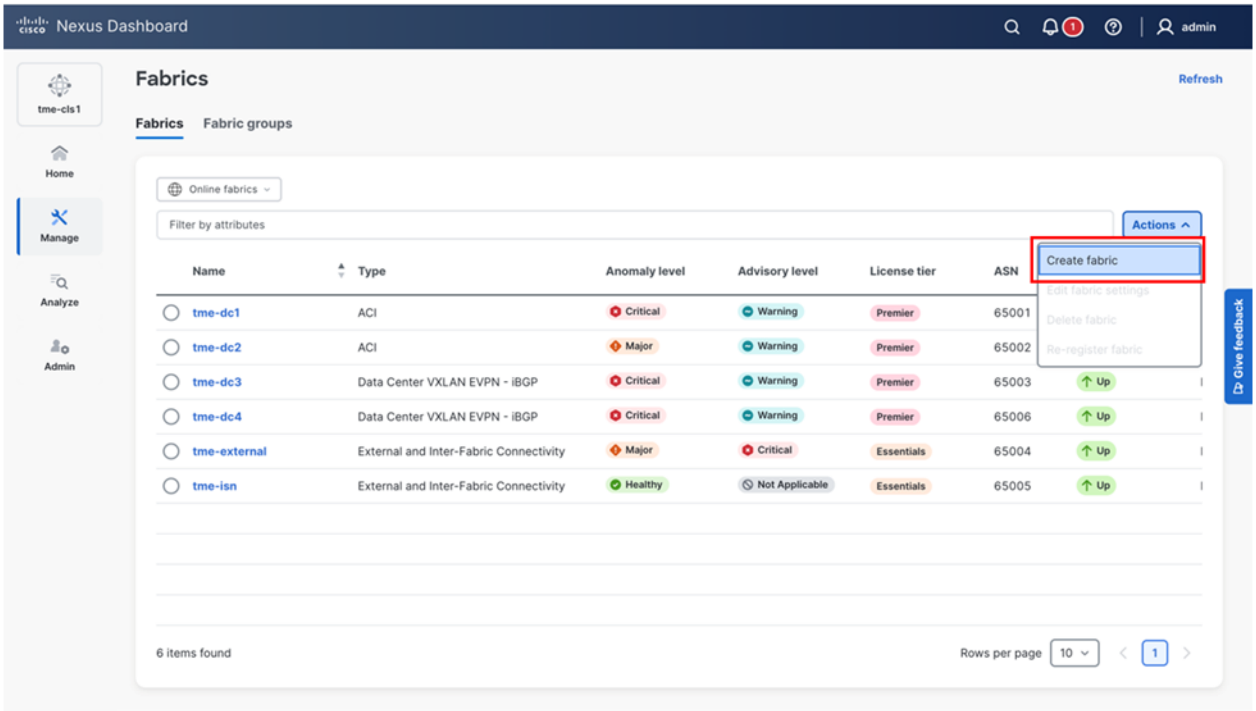


Figure 9.
Cisco Nexus Dashboard Management and Data are physically connected to different switches due to the form factor. Management and Data Networks have IP reachability.

Create Fabric

This section details how to create a controlled fabric that can be managed and monitored by Cisco Nexus Dashboard.

1. Navigate to **Manage > Fabrics**, click **Create fabric**.



Name	Type	Anomaly level	Advisory level	License tier	ASN	
tme-dc1	ACI	Critical	Warning	Premier	65001	
tme-dc2	ACI	Major	Warning	Premier	65002	
tme-dc3	Data Center VXLAN EVPN - iBGP	Critical	Warning	Premier	65003	Up
tme-dc4	Data Center VXLAN EVPN - iBGP	Critical	Warning	Premier	65006	Up
tme-external	External and Inter-Fabric Connectivity	Major	Critical	Essentials	65004	Up
tme-isn	External and Inter-Fabric Connectivity	Healthy	Not Applicable	Essentials	65005	Up

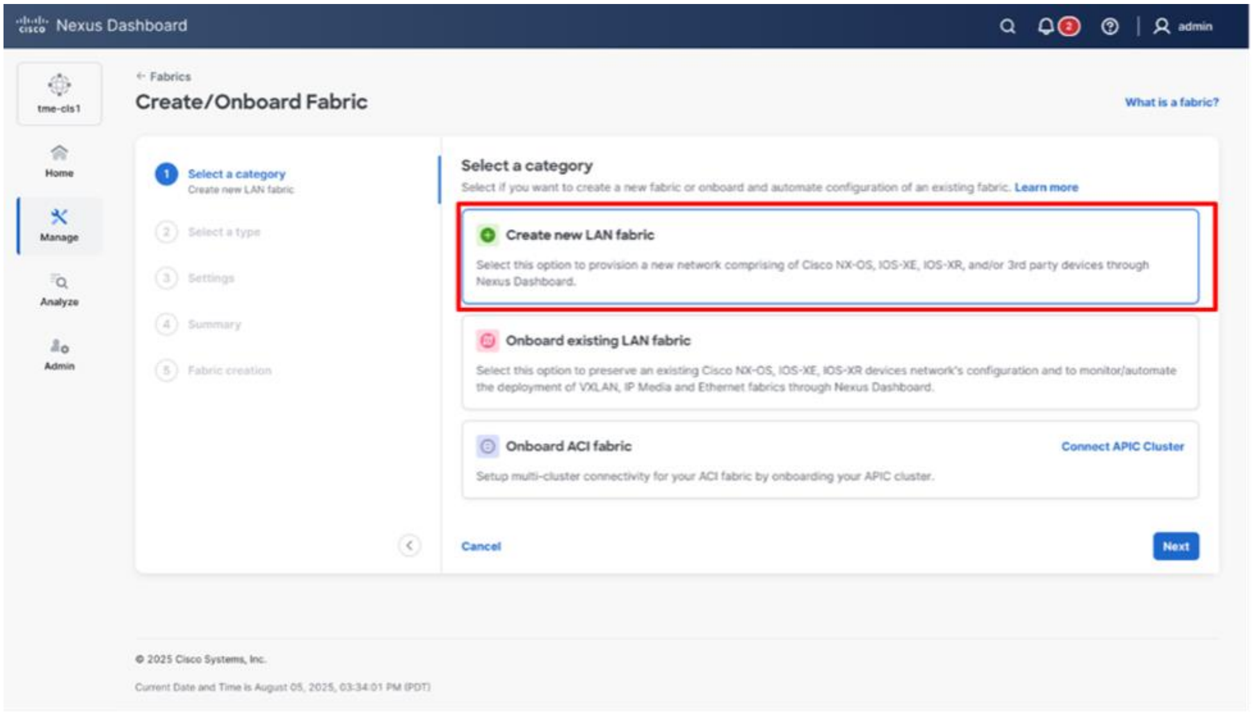
6 items found

Rows per page 10

Figure 10.

Creating a new fabric in Cisco Nexus Dashboard

2. From **Select a category**, select **Create new LAN fabric** and click **Next**.



Create/Onboard Fabric

Select a category

Select if you want to create a new fabric or onboard and automate configuration of an existing fabric. Learn more

Create new LAN fabric

Select this option to provision a new network comprising of Cisco NX-OS, IOS-XE, IOS-XR, and/or 3rd party devices through Nexus Dashboard.

Onboard existing LAN fabric

Select this option to preserve an existing Cisco NX-OS, IOS-XE, IOS-XR devices network's configuration and to monitor/automate the deployment of VXLAN, IP Media and Ethernet fabrics through Nexus Dashboard.

Onboard ACI fabric — Connect APIC Cluster

Setup multi-cluster connectivity for your ACI fabric by onboarding your APIC cluster.

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Current Date and Time is August 05, 2025, 03:34:01 PM (PDT)

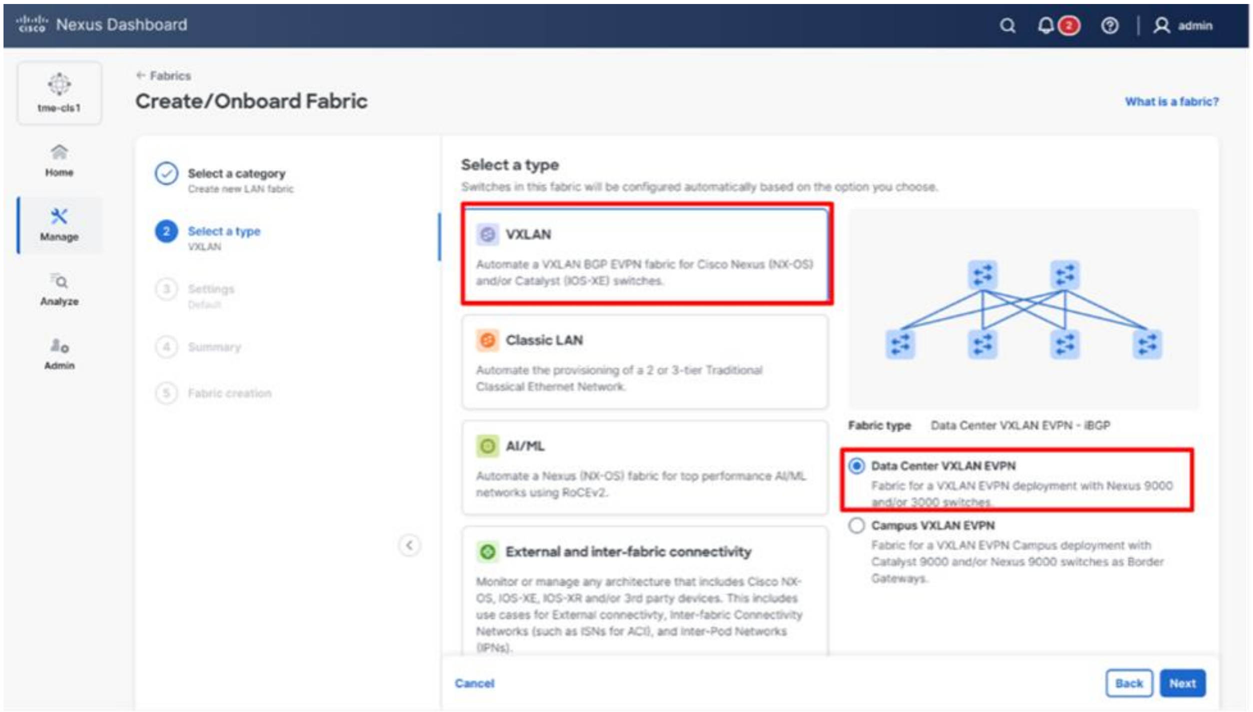
Figure 11.

Selecting the desired fabric type

3. Select the template of interest and click **Next**.

Cisco Nexus Dashboard supports multiple fabric types (for example: **Classic LAN**, **VXLAN** fabrics and so on).

For this example, choose **VXLAN > Data Center VXLAN EVPN** fabric.



Create/Onboard Fabric

Select a category
Create new LAN fabric

2 Select a type
VXLAN

3 Settings
Default

4 Summary

5 Fabric creation

Select a type

Switches in this fabric will be configured automatically based on the option you choose.

VXLAN
Automate a VXLAN BGP EVPN fabric for Cisco Nexus (NX-OS) and/or Catalyst (IOS-XE) switches.

Classic LAN
Automate the provisioning of a 2 or 3-tier Traditional Classical Ethernet Network.

AI/ML
Automate a Nexus (NX-OS) fabric for top performance AI/ML networks using RoCEv2.

External and inter-fabric connectivity
Monitor or manage any architecture that includes Cisco NX-OS, IOS-XE, IOS-XR and/or 3rd party devices. This includes use cases for External connectivty, Inter-fabric Connectivity Networks (such as ISNs for ACI), and Inter-Pod Networks (IPNs).

Fabric type Data Center VXLAN EVPN - iBGP

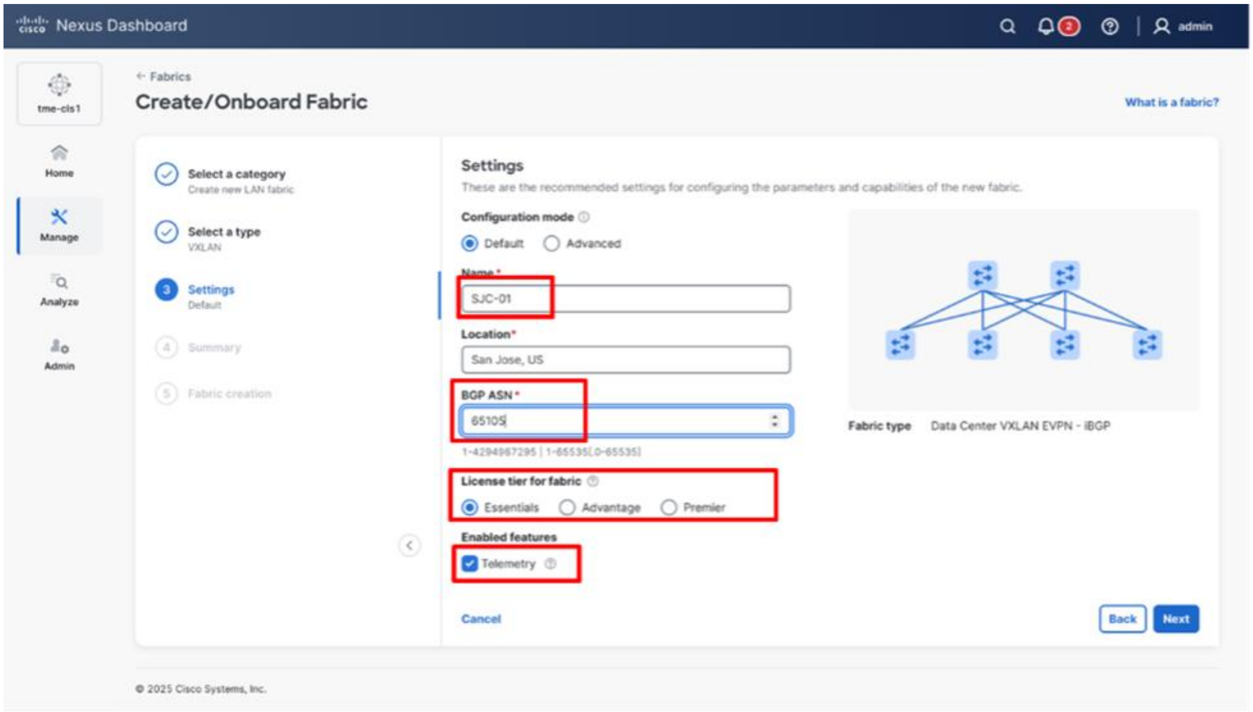
● Data Center VXLAN EVPN
Fabric for a VXLAN EVPN deployment with Nexus 9000 and/or 3000 switches.

○ Campus VXLAN EVPN
Fabric for a VXLAN EVPN Campus deployment with Catalyst 9000 and/or Nexus 9000 switches as Border Gateways.

Figure 12.
Selecting the desired fabric template

4. Enter basic details of the fabric such as the fabric **Name** and **BGP ASN**. Choose the appropriate license tier for your fabric. Cisco Nexus Dashboard 4.1 displays feature only based on the license tier that is selected.

5. From **Enabled features**, select **Telemetry** checkbox.



Create/Onboard Fabric

1. Select a category – Create new LAN fabric
2. Select a type – VXLAN
3. Settings – Default
4. Summary
5. Fabric creation

Settings

These are the recommended settings for configuring the parameters and capabilities of the new fabric.

Configuration mode: ● Default ○ Advanced

Name*: SJC-01

Location*: San Jose, US

BGP ASN*: 65105

1-4294967295 | 1-65535[.0-65535]

License tier for fabric: ● Essentials ○ Advantage ○ Premier

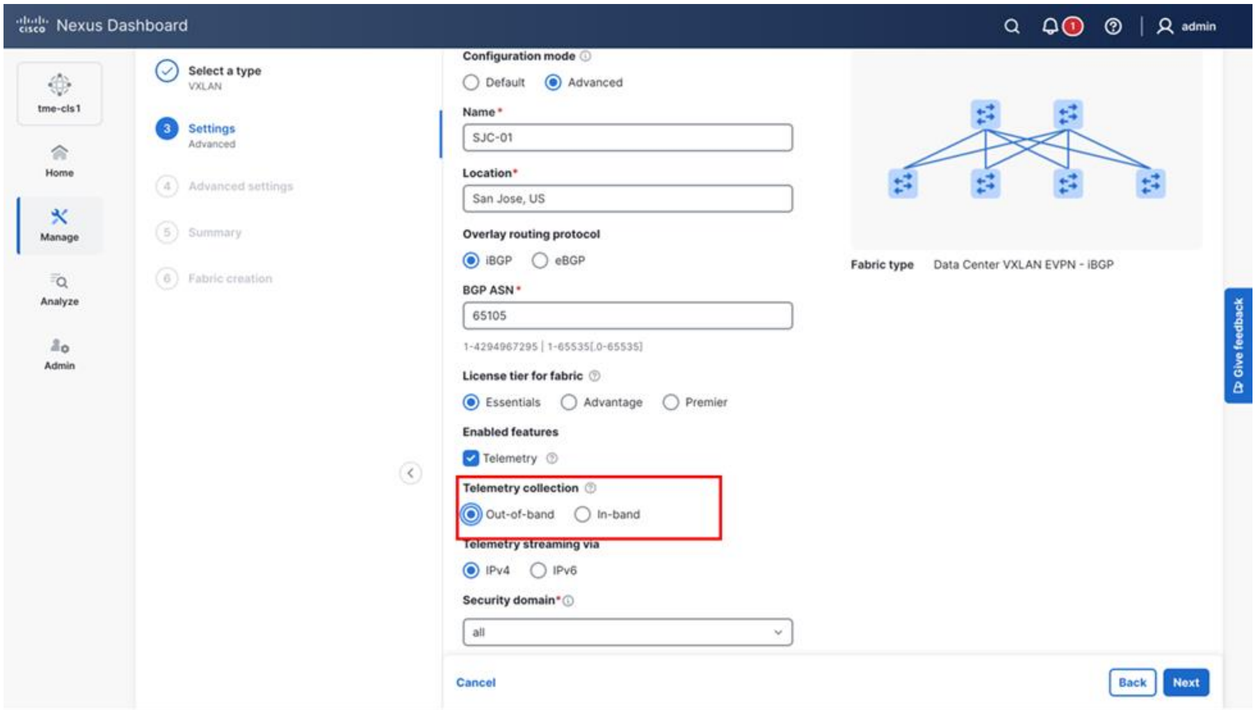
Enabled features: ☑ Telemetry

Fabric type: Data Center VXLAN EVPN - iBGP

Figure 13.

Entering the desired fabric configuration for BGP, licensing, and telemetry

6. With Cisco Nexus Dashboard, you have the option to stream telemetry from a fabric either using the in-band management or out-of-band management network in **Advanced Settings**. Here you choose out-of-band for configuring using this option. You specify the connection type in the GUI with the Telemetry Collection property. With out-of-band management, Cisco Nexus Dashboard and standalone NX-OS fabrics use the out-of-band management IP addresses of the switches. In this mode, there must be network connectivity from the out-of-band management addresses of the switches to the data subnet and persistent IP addresses in the data subnet of the Cisco Nexus Dashboard nodes.



Configuration mode
○ Default ● Advanced

Name*
SJC-01

Location*
San Jose, US

Overlay routing protocol
● iBGP ○ eBGP

BGP ASN*
65105
1-4294967295 | 1-65535[.0-65535]

License tier for fabric
● Essentials ○ Advantage ○ Premier

Enabled features
☑ Telemetry

Telemetry collection
● Out-of-band ○ In-band

Telemetry streaming via
● IPv4 ○ IPv6

Security domain*
all

Fabric type Data Center VXLAN EVPN - iBGP

Figure 14.
Entering the desired fabric configuration for BGP, licensing, and telemetry

7. Click **Next > Submit**.

Discover Switches in the Fabric

Cisco Nexus Dashboard uses a single seed or multiple IPs in the fabric and dynamically discovers the switches for a set number of hops defined in ‘Max Hops’ or also a list of all switch IPs in the fabric with a hop count ‘0’**.** It allows you to select the switches to be added to the fabric.

1. Navigate to **Manage > Fabrics.** Click the newly created Fabric name and then click **Inventory** tab. From the **Actions** drop-down list, select **Add Switches**

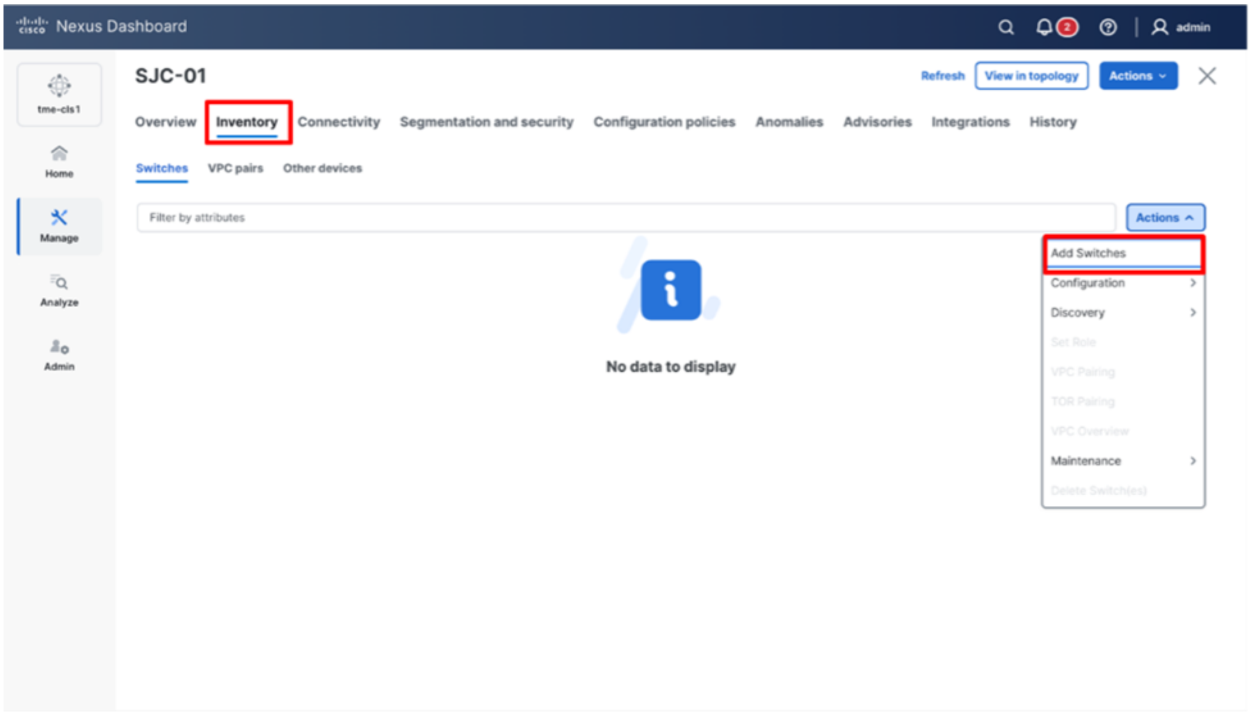
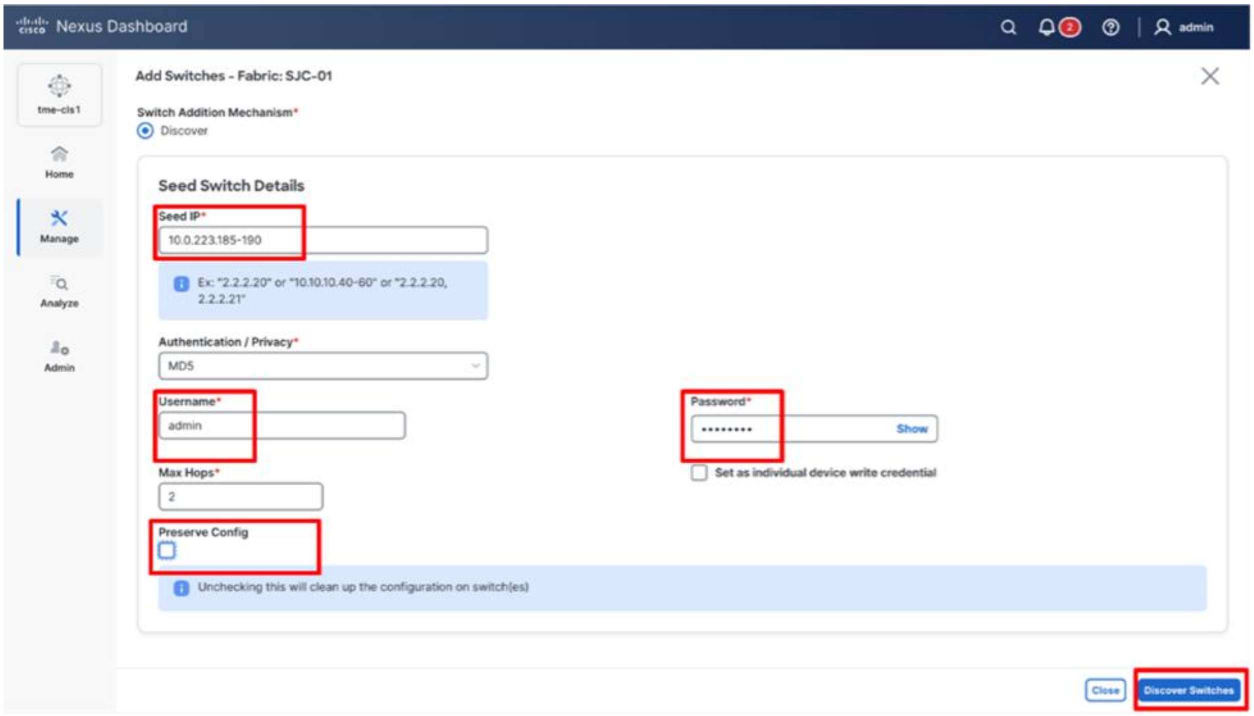


Figure 15.
Adding switches to the fabric

2. On the **Add Switches** screen, provide a **Seed IP** (IP address of mgmt0 interface) of any switch in the fabric to be discovered. Additionally, if you are discovering other switches through the seed switch, the other switch IP will be discovered through LLDP. It is also possible to discover each switch one by one.
3. Choose the **Authentication protocol** used to login to switches and provide **Username/Password**.
4. Select the **number of hops** from the seed to determine the detection boundary.
5. Check the **Preserve Config** check box to keep the existing configs on the switch (brownfield deployment) or uncheck the option to clean up the configuration on the switches (greenfield deployment).
6. Click **Discover Switches**.



Add Switches - Fabric: SJC-01

Switch Addition Mechanism*
● Discover

Seed Switch Details

Seed IP*: 10.0.223.185-190

Ex: "2.2.2.20" or "10.10.10.40-60" or "2.2.2.20, 2.2.2.21"

Authentication / Privacy*: MD5

Username*: admin

Password*: ••••••••• Show

□ Set as individual device write credential

Max Hops*: 2

Preserve Config
□

Unchecking this will clean up the configuration on switch(es)

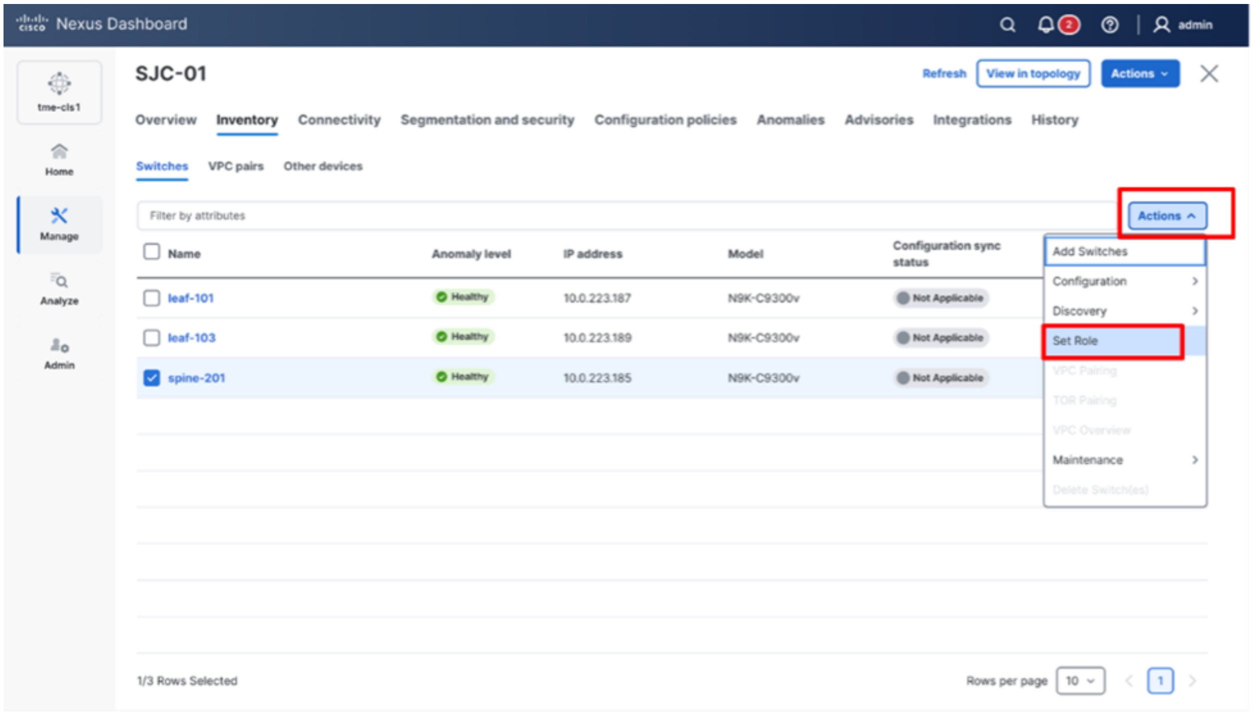
Figure 16.

Discovering switches for the fabric

7. Select all the switches intended to be part of the fabric and click on **Add Switches.** The switches will appear on the **Inventory > Switches** tab of the fabric.

NOTE: For more information on adding switches, refer to the Cisco Nexus Dashboard User Content: https://www.cisco.com/c/en/us/td/docs/dcn/nd/4x/articles-411/editing-fabric-settings-data-center-vxlan.html#_adding_switches_2

8. On the **Switches** page, click **Actions > Set Role** to assign roles to the switches. Alternatively, on the **Topology** page, right-click on the appropriate switch and assign roles.



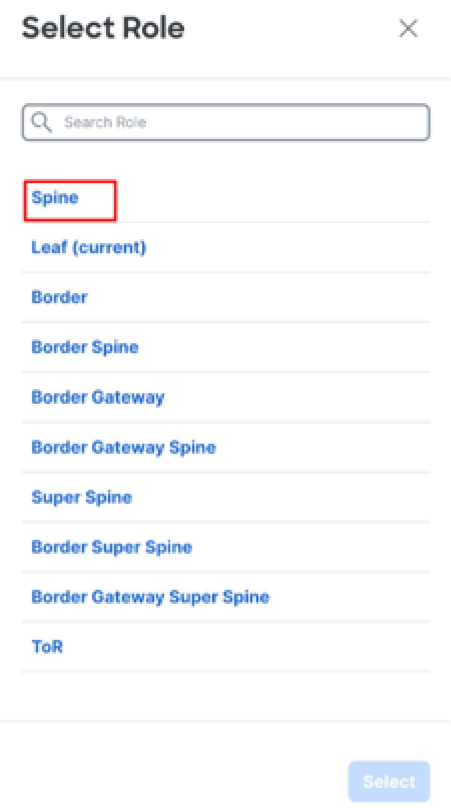
	Name	Anomaly level	IP address	Model	Configuration sync status
□	leaf-101	Healthy	10.0.223.187	N9K-C9300v	Not Applicable
□	leaf-103	Healthy	10.0.223.189	N9K-C9300v	Not Applicable
☑	spine-201	Healthy	10.0.223.185	N9K-C9300v	Not Applicable

1/3 Rows Selected

Figure 17.

Assigning switch roles

9. From the pop-up page, choose the intended role and click **Select**.



Select Role

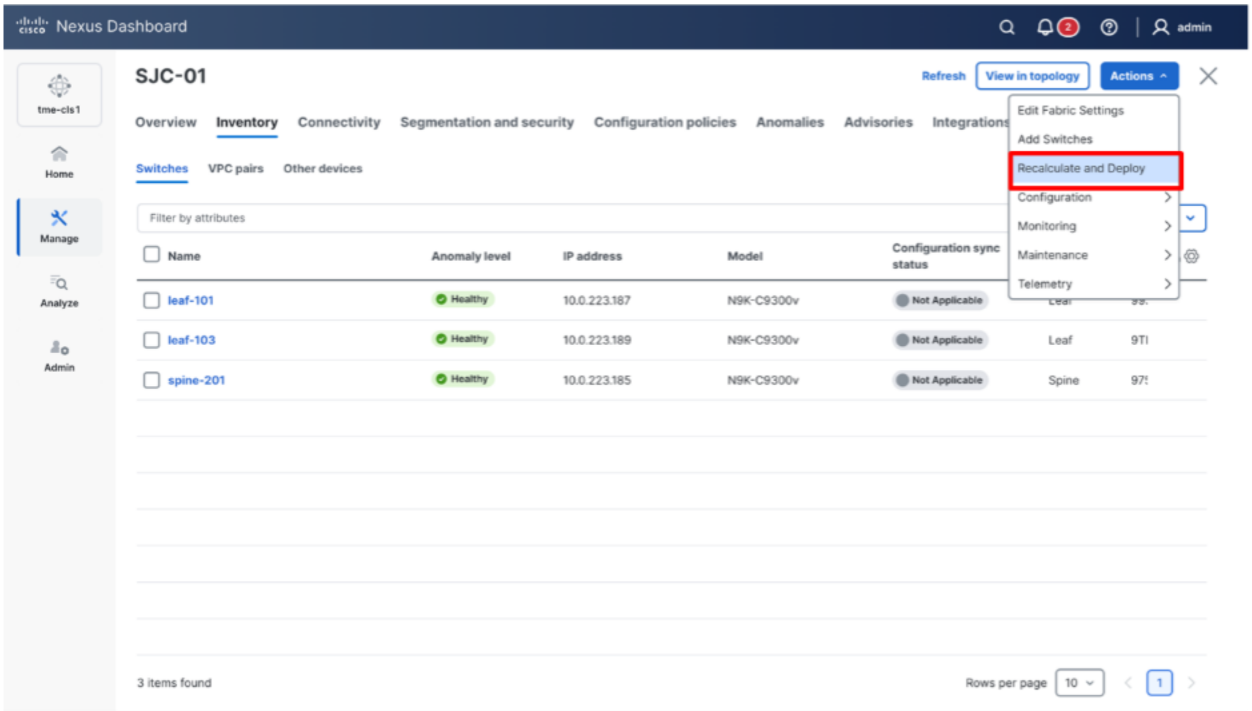
Search Role

- Spine
- Leaf (current)
- Border
- Border Spine
- Border Gateway
- Border Gateway Spine
- Super Spine
- Border Super Spine
- Border Gateway Super Spine
- ToR

Figure 18.

Choosing switch roles

10. After setting the role on the **Switches** page, select the switches, and from **Actions** drop-down list, select **Recalculate and Deploy**.



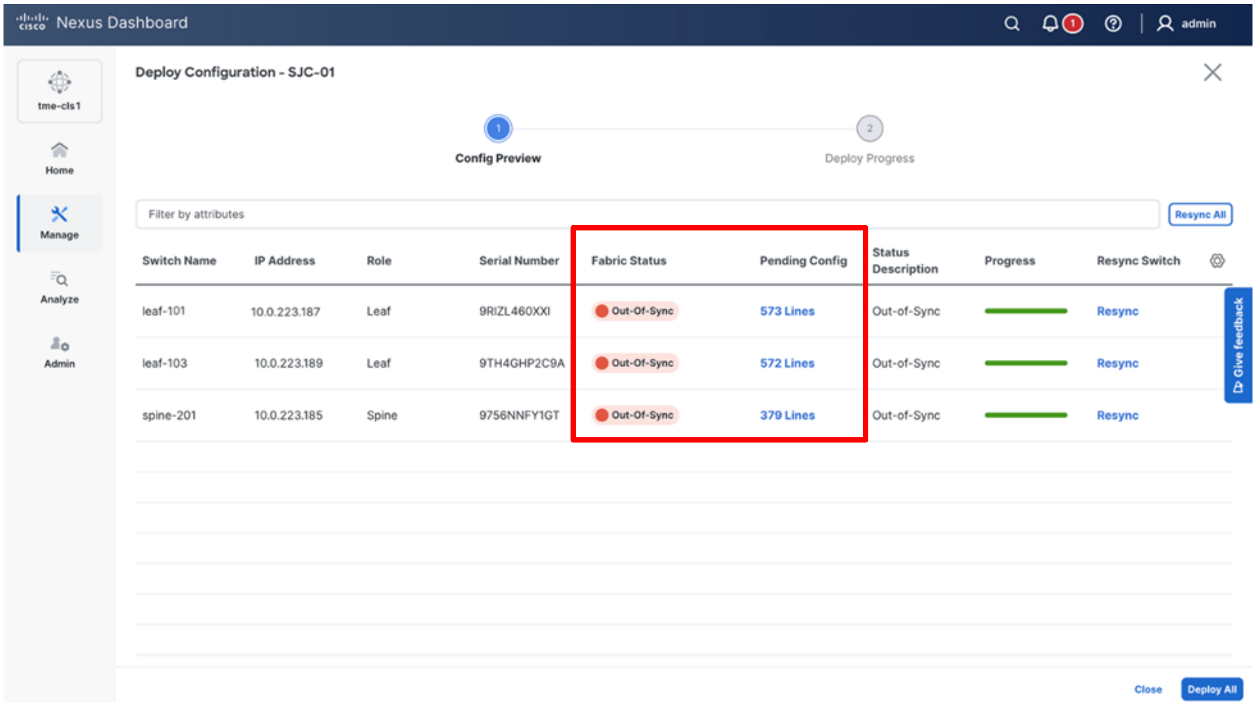
Name	Anomaly level	IP address	Model	Configuration sync status		
leaf-101	Healthy	10.0.223.187	N9K-C9300v	Not Applicable	Leaf	9S
leaf-103	Healthy	10.0.223.189	N9K-C9300v	Not Applicable	Leaf	9TI
spine-201	Healthy	10.0.223.185	N9K-C9300v	Not Applicable	Spine	97!

3 items found

Figure 19.

Performing a “Recalculate and Deploy” on the fabric

11. From the **Deploy Configuration** screen, preview the configurations by clicking on **Pending Config** and click **Deploy All** to be guided to the deployment progress screen.

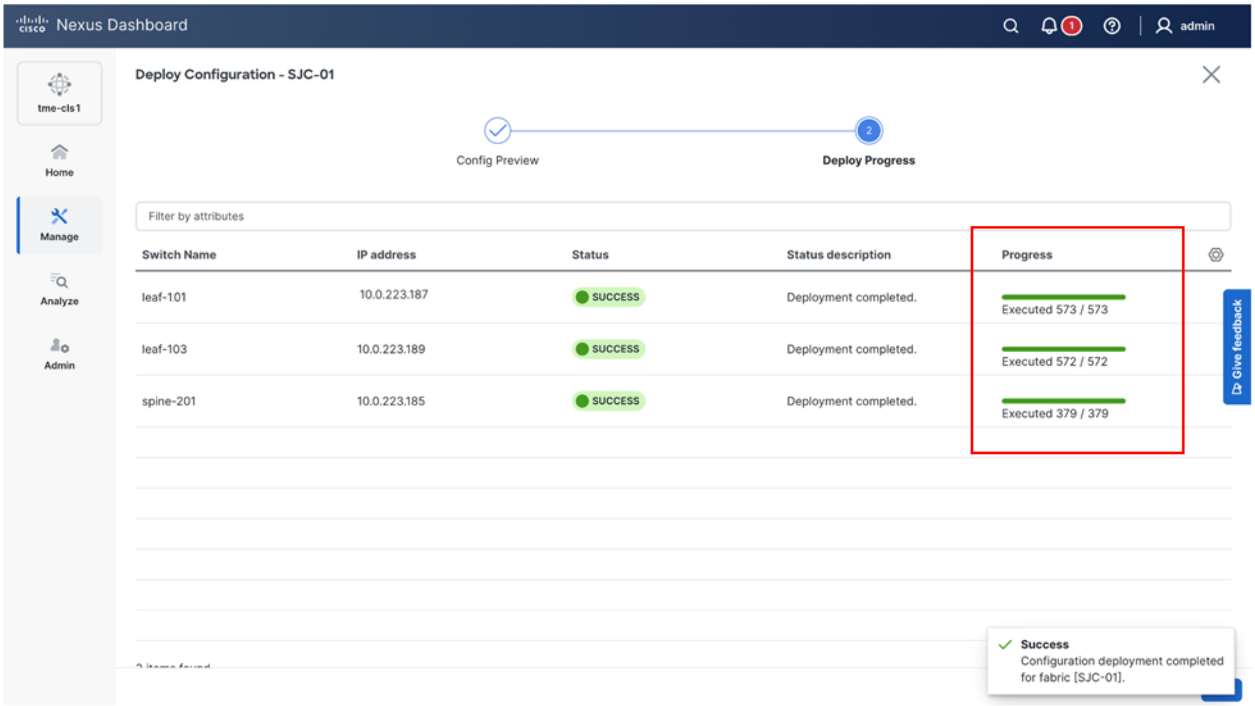


Switch Name	IP Address	Role	Serial Number	Fabric Status	Pending Config	Status Description	Progress	Resync Switch
leaf-101	10.0.223.187	Leaf	9RIZL460XXI	Out-Of-Sync	573 Lines	Out-of-Sync		Resync
leaf-103	10.0.223.189	Leaf	9TH4GHP2C9A	Out-Of-Sync	572 Lines	Out-of-Sync		Resync
spine-201	10.0.223.185	Spine	9756NNFY1GT	Out-Of-Sync	379 Lines	Out-of-Sync		Resync

Figure 20.

Verifying configuration and deploying to the fabric

12. Verify the **Progress** column to ensure the configuration is successfully deployed.



Deploy Configuration - SJC-01

Switch Name	IP address	Status	Status description	Progress
leaf-101	10.0.223.187	SUCCESS	Deployment completed.	Executed 573 / 573
leaf-103	10.0.223.189	SUCCESS	Deployment completed.	Executed 572 / 572
spine-201	10.0.223.185	SUCCESS	Deployment completed.	Executed 379 / 379

Success
Configuration deployment completed for fabric [SJC-01].

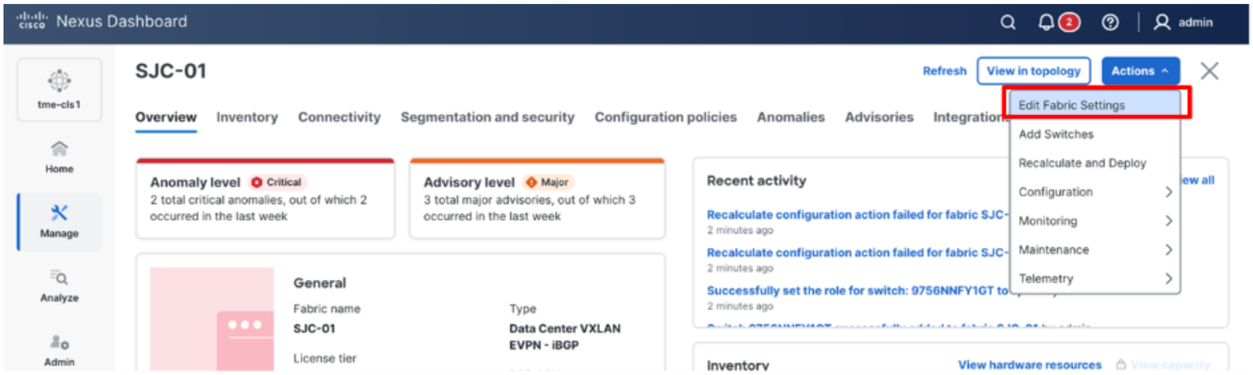
Figure 21.

Verifying successful deployment of the configuration

Network Time Protocol (NTP) Configuration

For a network site managed by Cisco Nexus Dashboard, enable and configure NTP on Cisco Nexus Dashboard. This will push the NTP configs to all the switches.

1. Navigate to **Manage > Fabrics** and select the **Fabric <*fabric-name*>**.
2. From **Actions** drop-down list, select **Edit fabric settings**.



Anomaly level Critical
2 total critical anomalies, out of which 2 occurred in the last week

Advisory level Major
3 total major advisories, out of which 3 occurred in the last week

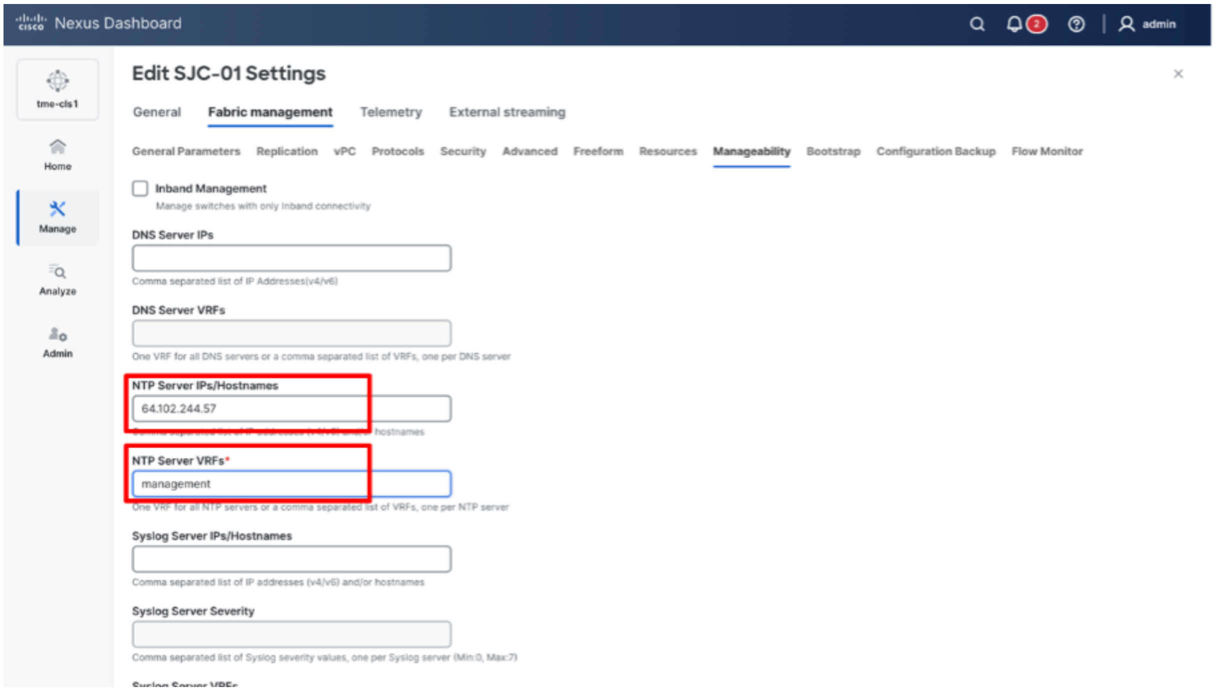
General
Fabric name: SJC-01
Type: Data Center VXLAN EVPN - iBGP
License tier

Recent activity
Recalculate configuration action failed for fabric SJC-
2 minutes ago
Recalculate configuration action failed for fabric SJC-
2 minutes ago
Successfully set the role for switch: 9756NNFY1GT to
2 minutes ago

Figure 22.

Editing fabric settings

3. Go to **Fabric management > Manageability** tab to fill in the NTP server IP and VRF details and click **Save**.



Edit SJC-01 Settings

□ Inband Management
Manage switches with only Inband connectivity

DNS Server IPs
Comma separated list of IP Addresses(v4/v6)

DNS Server VRFs
One VRF for all DNS servers or a comma separated list of VRFs, one per DNS server

NTP Server IPs/Hostnames: 64.102.244.57
Comma separated list of IP addresses (v4/v6) and/or hostnames

NTP Server VRFs*: management
One VRF for all NTP servers or a comma separated list of VRFs, one per NTP server

Syslog Server IPs/Hostnames
Comma separated list of IP addresses (v4/v6) and/or hostnames

Syslog Server Severity
Comma separated list of Syslog severity values, one per Syslog server (Min:0, Max:7)

Syslog Server VRFs

Figure 23.
Adding NTP server configuration

4. From the **Actions** drop-down list, select **Recalculate and Deploy**.

Precision Time Protocol (PTP) Configuration

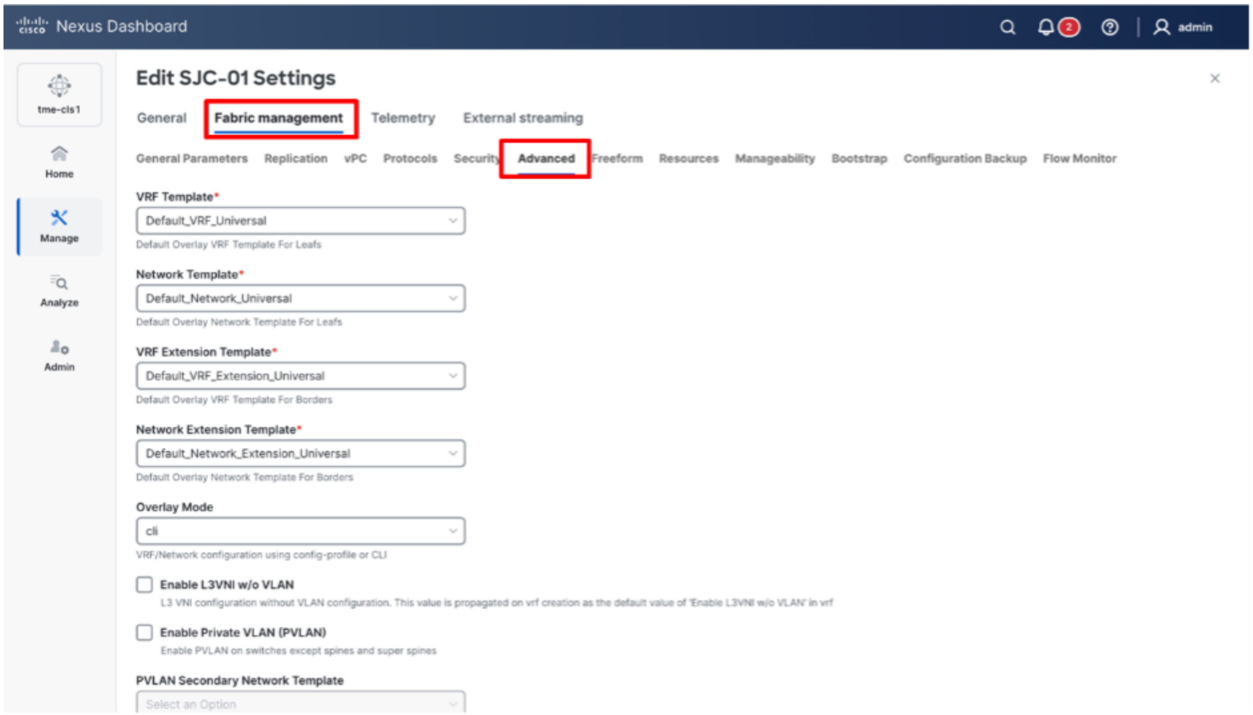
Note: PTP is only required for Traffic Analytics and Flow Telemetry

When PTP is enabled, it becomes the default clock even if NTP is enabled on the switches. PTP requires a source loopback used for exchanging PTP packets and a PTP domain ID that defines boundaries of the PTP messages. Once PTP is enabled on Cisco Nexus Dashboard, by default it uses loopback0 and the PTP domain ID as 0. This can be modified if the intent is to use a specific loopback or domain ID (different from loopback0 and domain ID 0) as well. If there is a specific SVI used for PTP source on top of rack switches (ToRs), the PTP source VLAN ID field can be updated in the PTP configuration on Cisco Nexus dashboard. These configuration parameters are shown in the configuration screenshot below. PTP grandmaster can be within the fabric for independent fabrics, but it is mandatory to have an external PTP grandmaster for multi-fabric deployments. To learn more about the role of PTP in Cisco Nexus Dashboard, follow this whitepaper - https://www.cisco.com/c/en/us/td/docs/dcn/whitepapers/precision-time-protocol-for-cisco-nd-insights.html.

Cisco Nexus Dashboard offers easy site setup for enabling PTP.

1. Navigate to **Manage > Fabrics** and select the **Fabric <*fabric-name*>**. From the drop-down list, select **Edit fabric settings**.

2. Click **Fabric management > Advanced** tab and check **Enable Precision Time Protocol (PTP)** check box.



Edit SJC-01 Settings

VRF Template*
Default_VRF_Universal
Default Overlay VRF Template For Leafs

Network Template*
Default_Network_Universal
Default Overlay Network Template For Leafs

VRF Extension Template*
Default_VRF_Extension_Universal
Default Overlay VRF Template For Borders

Network Extension Template*
Default_Network_Extension_Universal
Default Overlay Network Template For Borders

Overlay Mode
cli
VRF/Network configuration using config-profile or CLI

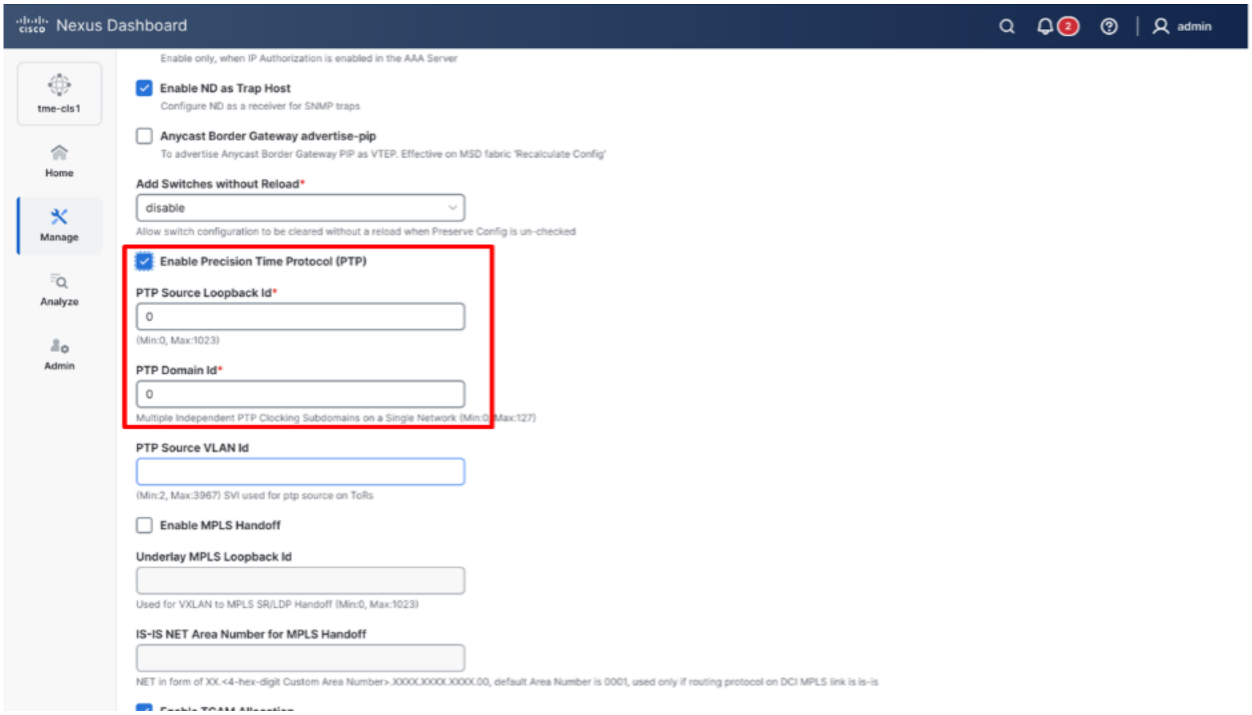
□ Enable L3VNI w/o VLAN
L3 VNI configuration without VLAN configuration. This value is propagated on vrf creation as the default value of 'Enable L3VNI w/o VLAN' in vrf

□ Enable Private VLAN (PVLAN)
Enable PVLAN on switches except spines and super spines

PVLAN Secondary Network Template
Select an Option

Figure 24.
Advanced tab

3. Provide the **PTP Source Loopback Id** and **PTP Domain Id** and click **Save**. This enables PTP globally and on the core-facing interfaces.



Enable only, when IP Authorization is enabled in the AAA Server

☑ Enable ND as Trap Host
Configure ND as a receiver for SNMP traps

□ Anycast Border Gateway advertise-pip
To advertise Anycast Border Gateway PIP as VTEP. Effective on MSD fabric 'Recalculate Config'

Add Switches without Reload*
disable
Allow switch configuration to be cleared without a reload when Preserve Config is un-checked

☑ Enable Precision Time Protocol (PTP)

PTP Source Loopback Id*
0
(Min:0, Max:1023)

PTP Domain Id*
0
Multiple Independent PTP Clocking Subdomains on a Single Network (Min:0, Max:127)

PTP Source VLAN Id
(Min:2, Max:3967) SVI used for ptp source on ToRs

□ Enable MPLS Handoff

Underlay MPLS Loopback Id
Used for VXLAN to MPLS SR/LDP Handoff (Min:0, Max:1023)

IS-IS NET Area Number for MPLS Handoff
NET in form of XX.<4-hex-digit Custom Area Number>.XXXX.XXXX.XXXX.00, default Area Number is 0001, used only if routing protocol on DCI MPLS link is is-is

☑ Enable TCAM Allocation

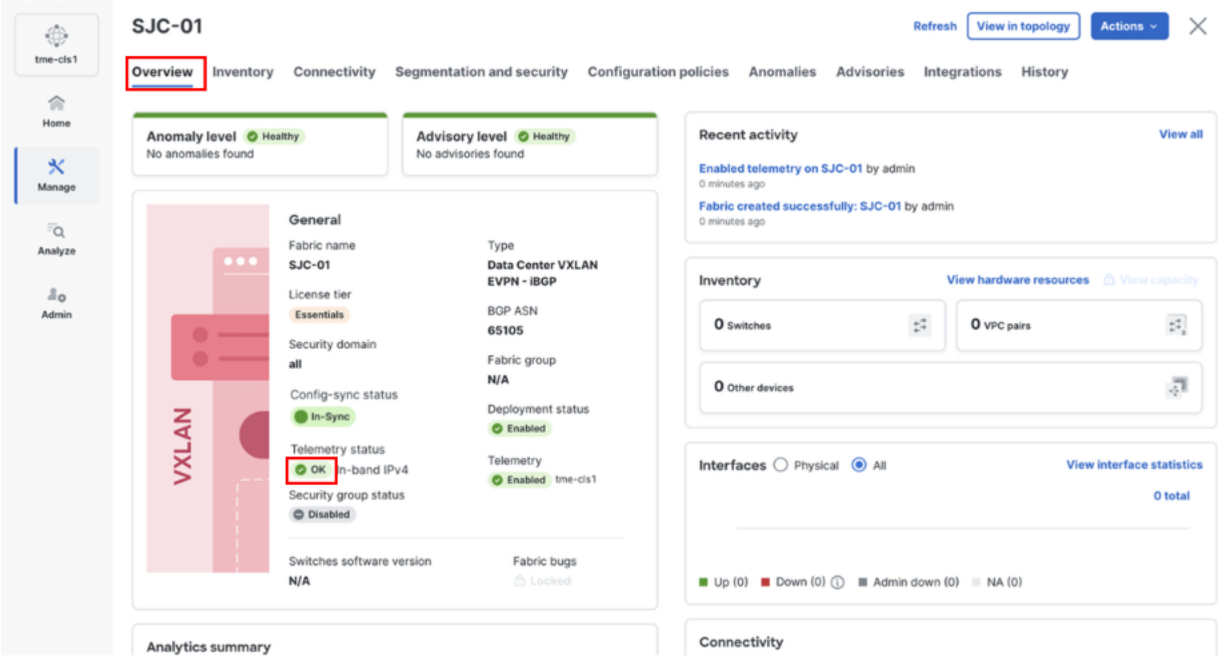
Figure 25.
Adding PTP server configuration

4. From the **Actions** drop-down list, select **Recalculate and Deploy** to ensure switches are configured with the required PTP settings as configured in Cisco Nexus Dashboard.

NTP and PTP verifications

To verify PTP status on Cisco Nexus Dashboard

1. To verify PTP, navigate to **Manage > Fabrics > <*fabric-name*>** (SJC-01 in this example) **> Overview > Telemetry Status > OK/Not OK**.



Anomaly level ✓ Healthy
No anomalies found

Advisory level ✓ Healthy
No advisories found

Recent activity

Enabled telemetry on SJC-01 by admin
0 minutes ago

Fabric created successfully: SJC-01 by admin
0 minutes ago

General

Fabric name: SJC-01

Type: Data Center VXLAN EVPN - iBGP

License tier: Essentials

BGP ASN: 65105

Security domain: all

Fabric group: N/A

Config-sync status: In-Sync

Deployment status: ✓ Enabled

Telemetry status: ✓ OK In-band IPv4

Telemetry: ✓ Enabled tme-cls1

Security group status: Disabled

Switches software version: N/A

Fabric bugs: Locked

Inventory

0 Switches

0 VPC pairs

0 Other devices

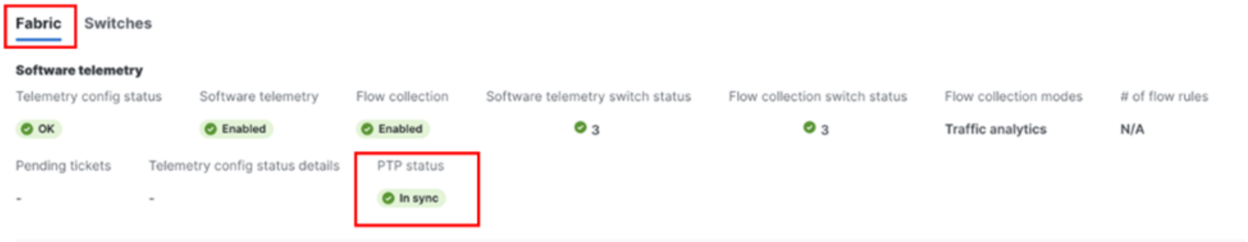
Interfaces ○ Physical ● All

0 total

🟩 Up (0) 🟥 Down (0) ■ Admin down (0) NA (0)

Figure 26.
Verifying Telemetry status “OK”

2. Click **Fabric**, check the PTP status. It should show **In sync**.



Software telemetry

Telemetry config status	Software telemetry	Flow collection	Software telemetry switch status	Flow collection switch status	Flow collection modes	# of flow rules
✓ OK	✓ Enabled	✓ Enabled	✓ 3	✓ 3	Traffic analytics	N/A

Pending tickets	Telemetry config status details	PTP status
-	-	✓ In sync

Figure 27.
Verifying PTP status “OK”

To verify the NTP and PTP status on the switches

With both managed and monitored mode fabrics, verifications on the switch remain the same.

- NTP verifications: SSH to the switches to confirm the configuration and clock settings. Verify using the commands below for NTP setup on the switch as the clock time source.

```
leaf-101(config)# show run ntp

!Command: show running-config ntp

!No configuration change since last restart

!Time: Sun Feb 6 21:54:40 2022

version 9.3(7) Bios:version 05.40

ntp server 64.102.244.57 use-vrf management -> Verify the configuration


leaf-101(config)# show clock

21:53:34.997 UTC Sun Nov 2 2025

Time source is NTP -> Verify NTP is the time source


leaf-101(config)# show ntp peers

----------------------------------------------------

     Peer IP Address          Serv/Peer

----------------------------------------------------

     64.102.244.57         Server (configured)  -> Verify the server is configured
```

- PTP Verifications: After enabling PTP either through Nexus Dashboard or CLI configurations, verify the status of PTP using the commands below for PTP.

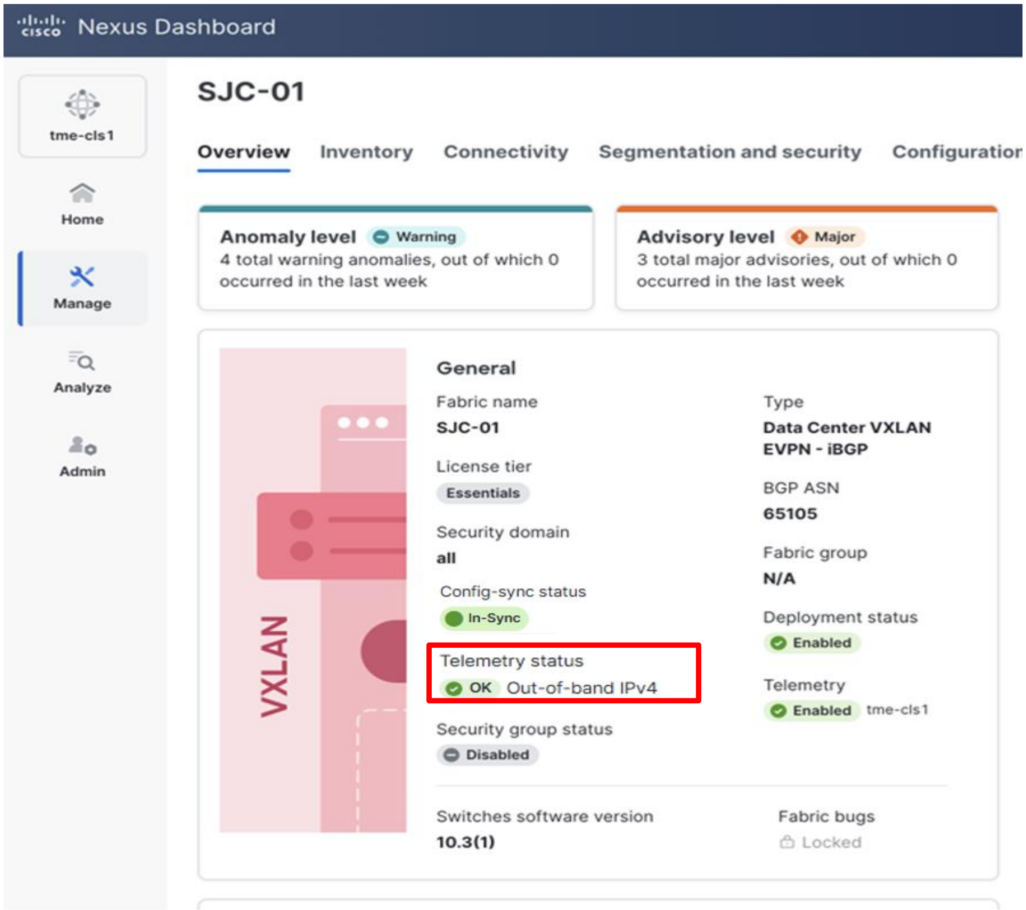
```
leaf-101# show run ptp

feature ptp. -> Verify that PTP is enabled and configured on the interfaces

ptp source 10.0.0.1

ptp domain 0

interface Ethernet1/1

    ptp

interface Ethernet1/33

    ttag

      ttag-strip


leaf-101# show clock

01:56:04.353 UTC Sun Nov 2 2025

Time source is PTP -> Verify PTP is the time source

leaf-101# show ptp clock foreign-masters record
```

```
P1=Priority1, P2=Priority2, C=Class, A=Accuracy,
OSLV=Offset-Scaled-Log-Variance, SR=Steps-Removed
GM=Is grandmaster

----------   -------------------   ---   ----   ----   ---   -----   ----------
Interface         Clock-ID         P1    P2     C      A     OSLV    SR
----------   -------------------   ---   ----   ----   ---   -----   ----------
Eth1/1    2c:4f:52:ff:fe:56:61:1f  255   255    248    254   65535   1

-> Verify if it can reach the grand master on its ptp configured interfaces

leaf-101# show ptp clock
PTP Device Type : boundary-clock
PTP Device Encapsulation : NA
PTP Source IP Address : 10.2.0.1  -> Verify if source loopback IP is as configured
Clock Identity : d4:78:9b:ff:fe:19:87:c3
Clock Domain: 0
Slave Clock Operation : Two-step
Master Clock Operation : Two-step
Clave-Only Clock Mode : Disabled
Number of PTP ports: 3
Priority1 : 255
Priority2 : 255
Clock Quality:
        Class : 248
                    Accuracy : 254
                    Offset (log variance) :
Offset From Master : 12
Mean Path Delay : 168
Steps removed : 2
Correction range : 100000
MPD range : 1000000000
```

```
Local clock time: Fri Aug 29 01:56:08 2025

PTP clock state              : Locked


leaf-101# show ptp parent

PTP PARENT PROPERTIES

Parent Clock:

Parent Clock Identity: 2c:4f:52:ff:fe:56:61:1f

Parent Port Number: 4

Observed Parent Offset (log variance): NA

Observed Parent Clock Phase Change Rate: N/A


Parent IP: 10.2.0.4

Grandmaster Clock:

Grandmaster Clock Identity: 00:ee:ab:ff:fe:3a:16:e7  -> Get the Grandmaster clock ID

Grandmaster Clock Quality

        Class : 248

                    Accuracy : 254

                    Offset (log variance) : 65535

                    Priority1: 255

                    Priority2: 255


spine-201# show ptp clock foreign-masters record

P1=Priority1, P2=Priority2, C=Class, A=Accuracy,

OSLV=Offset-Scaled-Log-Variance, SR=Steps-Removed

GM=Is grandmaster

----------   ---------------------   ---   ----   ----   ---   -----   ----------

Interface          Clock-ID          P1    P2     C      A     OSLV    SR

----------   ---------------------   ---   ----   ----   ---   -----   ----------

Eth1/4     00:ee:ab:ff:fe:3a:16:e7   255   255    248    254   65535   1      GM

-> Check the Grandmaster clock ID and confirm the right Grandmaster registration on the
clients
```

Verification of Successful Telemetry Deployment

1. After you deploy the configurations, the **Telemetry** displays "**Enabled**" and the **Telemetry status** displays "**OK**" on the fabric **Overview** page. This indicates that you successfully configured telemetry for the fabric.



SJC-01

Overview | Inventory | Connectivity | Segmentation and security | Configuratior

Anomaly level Warning
4 total warning anomalies, out of which 0 occurred in the last week

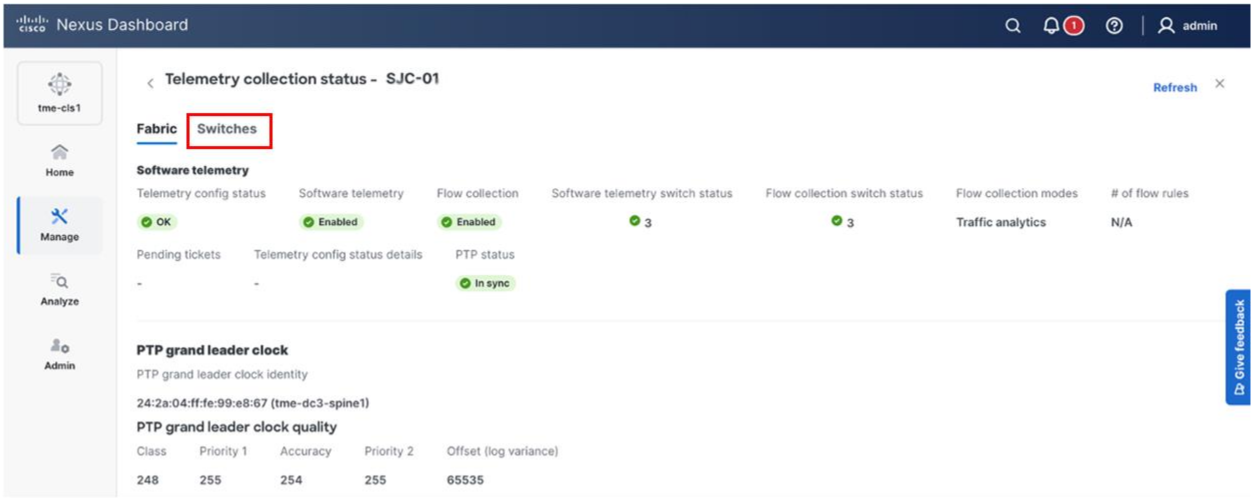
Advisory level Major
3 total major advisories, out of which 0 occurred in the last week

General

Fabric name SJC-01	Type Data Center VXLAN EVPN - iBGP
License tier Essentials	BGP ASN 65105
Security domain all	Fabric group N/A
Config-sync status In-Sync	Deployment status Enabled
Telemetry status OK Out-of-band IPv4	Telemetry Enabled tme-cls1
Security group status Disabled	
Switches software version 10.3(1)	Fabric bugs Locked

Figure 28.
Verification of Telemetry Status for a fabric on Cisco Nexus Dashboard

2. To know the deployed configuration, view **Telemetry Status** "**OK**," then click **Switches** tab.



Telemetry collection status - SJC-01

Fabric | Switches

Software telemetry

Telemetry config status	Software telemetry	Flow collection	Software telemetry switch status	Flow collection switch status	Flow collection modes	# of flow rules
OK	Enabled	Enabled	3	3	Traffic analytics	N/A

Pending tickets	Telemetry config status details	PTP status
-	-	In sync

PTP grand leader clock

PTP grand leader clock identity
24:2a:04:ff:fe:99:e8:67 (tme-dc3-spine1)

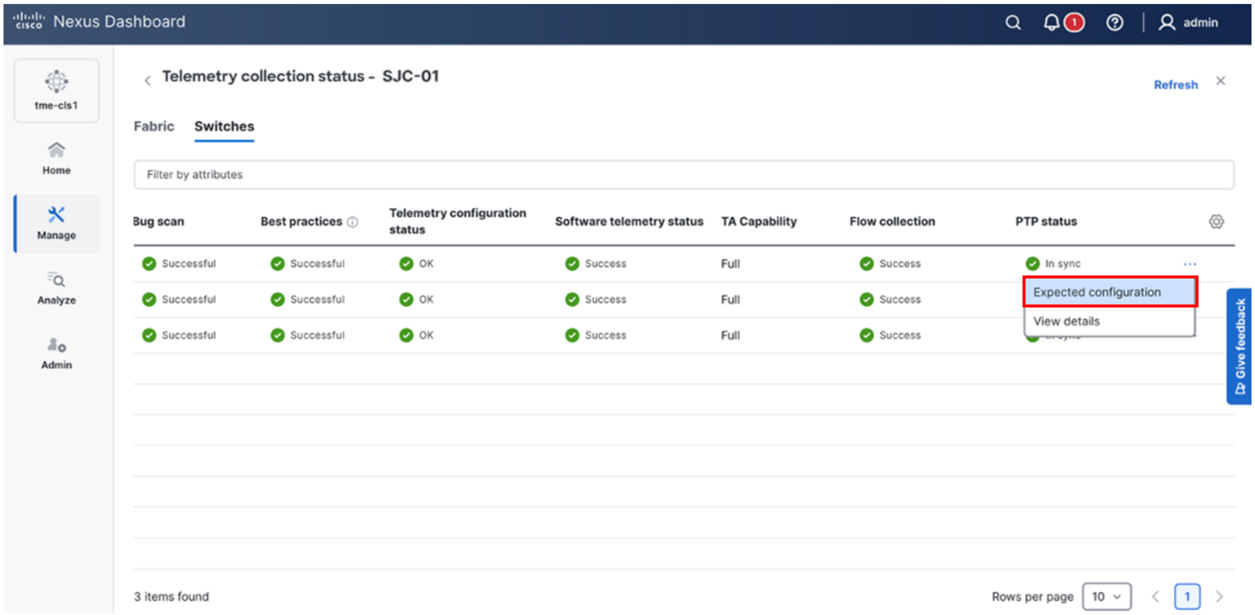
PTP grand leader clock quality

Class	Priority 1	Accuracy	Priority 2	Offset (log variance)
248	255	254	255	65535

Figure 29.

Navigating to Switches tab

3. Scroll to the right to the individual switches and click on the **Expected configuration** to view the configuration deployed on the switches.



Telemetry collection status - SJC-01

Fabric | **Switches**

Filter by attributes

Bug scan	Best practices	Telemetry configuration status	Software telemetry status	TA Capability	Flow collection	PTP status
Successful	Successful	OK	Success	Full	Success	In sync
Successful	Successful	OK	Success	Full	Success	
Successful	Successful	OK	Success	Full	Success	In sync

Expected configuration
View details

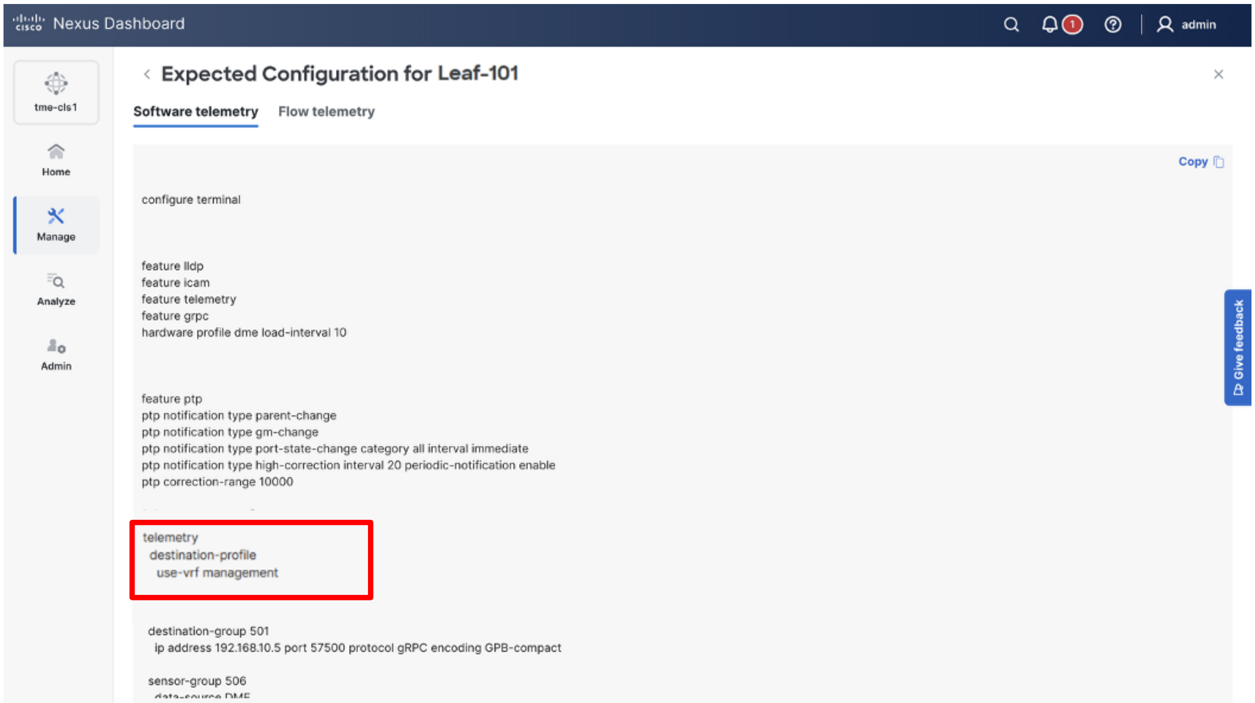
3 items found

Rows per page 10 | 1

Figure 30.

Viewing Expected configuration

4. Verify the **Software Telemetry** tab for the configuration deployed on the switches.



Expected Configuration for Leaf-101

Software telemetry | Flow telemetry

```
configure terminal


feature lldp
feature icam
feature telemetry
feature grpc
hardware profile dme load-interval 10


feature ptp
ptp notification type parent-change
ptp notification type gm-change
ptp notification type port-state-change category all interval immediate
ptp notification type high-correction interval 20 periodic-notification enable
ptp correction-range 10000


telemetry
 destination-profile
  use-vrf management


 destination-group 501
  ip address 192.168.10.5 port 57500 protocol gRPC encoding GPB-compact

 sensor-group 506
  data-source DME
```

Figure 31.

Reviewing the telemetry configuration

Option 2 – Configuration via Out-of-Band Network, Telemetry via In-band Network

Cisco Nexus Dashboard also supports streaming telemetry using an in-band network, and the primary drivers for choosing this method over out-of-band are the following:

1. The data and management subnets do not have IP reachability to each other. Some examples might be:
    a. This is a lab deployment, and the out-of-band network is a corporate network whereas the in-band network is an isolated Layer 3 network.
    b. The out-of-band network does not support 10/25G SFP+ interfaces that are provided on the Cisco Nexus Dashboard Data nodes, and IP connectivity cannot be established between the out-of-band network, and infrastructure that provides the SFP+ connectivity. In this case, you might plug these interfaces into a separate network that supports that form factor and leave it isolated from the out-of-band network.
2. Flow telemetry is a required feature for your environment, or the switches are not running 10.4(2) or later that supports Traffic Analytics (TA), or 10.5(2) that supports TA plus on-demand flow collection.
3. The environment already has Cisco Nexus Dashboard 3.2 or previous versions deployed, and telemetry is already being streamed using in-band network.
4. The intent is to use Cisco Nexus Dashboard management interface for controller functionalities, and Cisco Nexus Dashboard data interface for telemetry streaming.

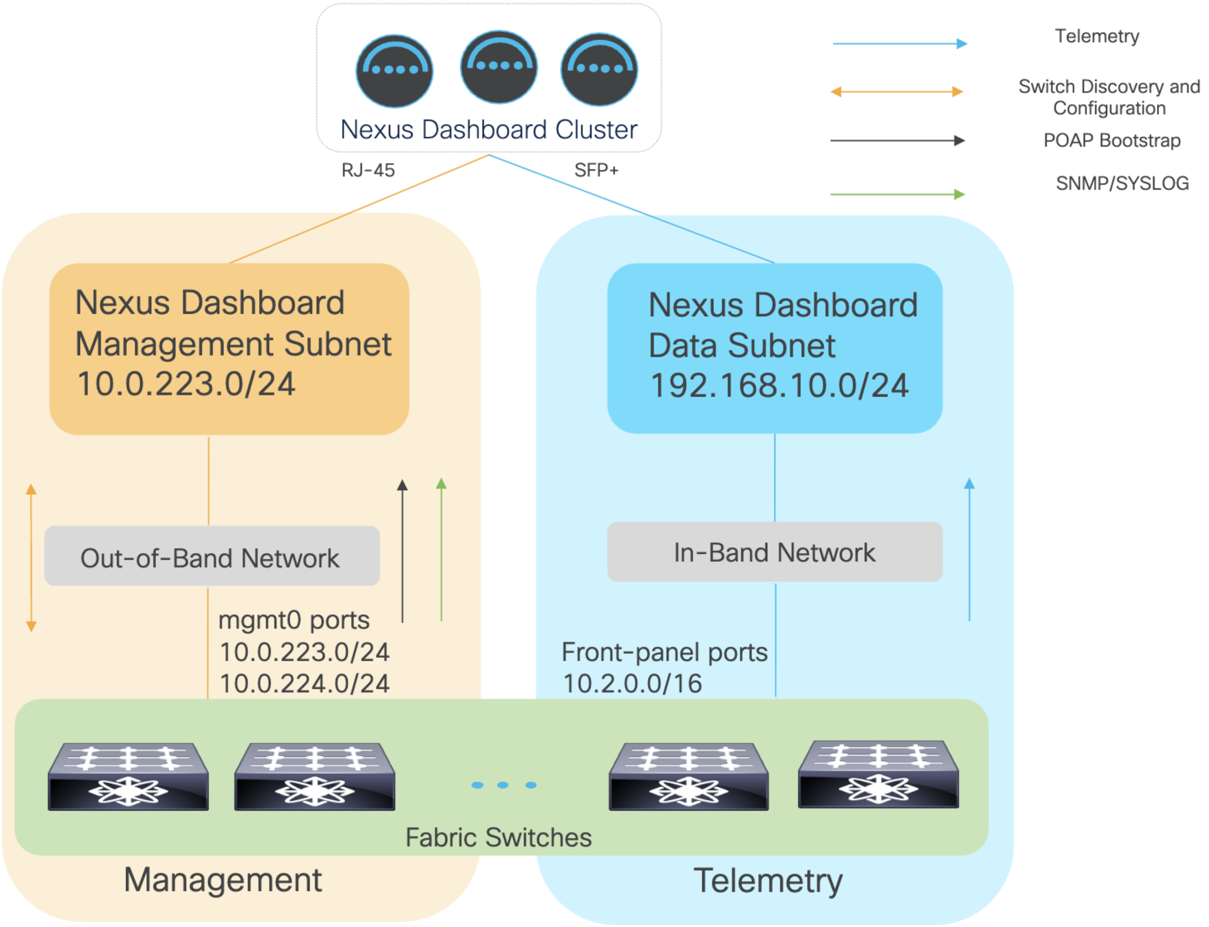


Figure 32.
Logical network topology shows Nexus Dashboard management and data networks connected to different switches and isolated from each other.

Note: If you have Cisco Nexus Dashboard 3.2 with telemetry enabled using the in-band network, upgrading to Cisco Nexus Dashboard 4.1 maintains the in-band telemetry functionality. You do not need to perform additional configuration unless you want to change the telemetry streaming network from in-band to out-of-band.

Using the in-band network requires additional fabric configuration to build Layer 3 (L3) connections on the front-panel interfaces and advertise Internet Protocol (IP) Loopback addresses from the fabric switches.

Prepare a Cisco Nexus Dashboard managed network site for streaming telemetry. Follow these steps:

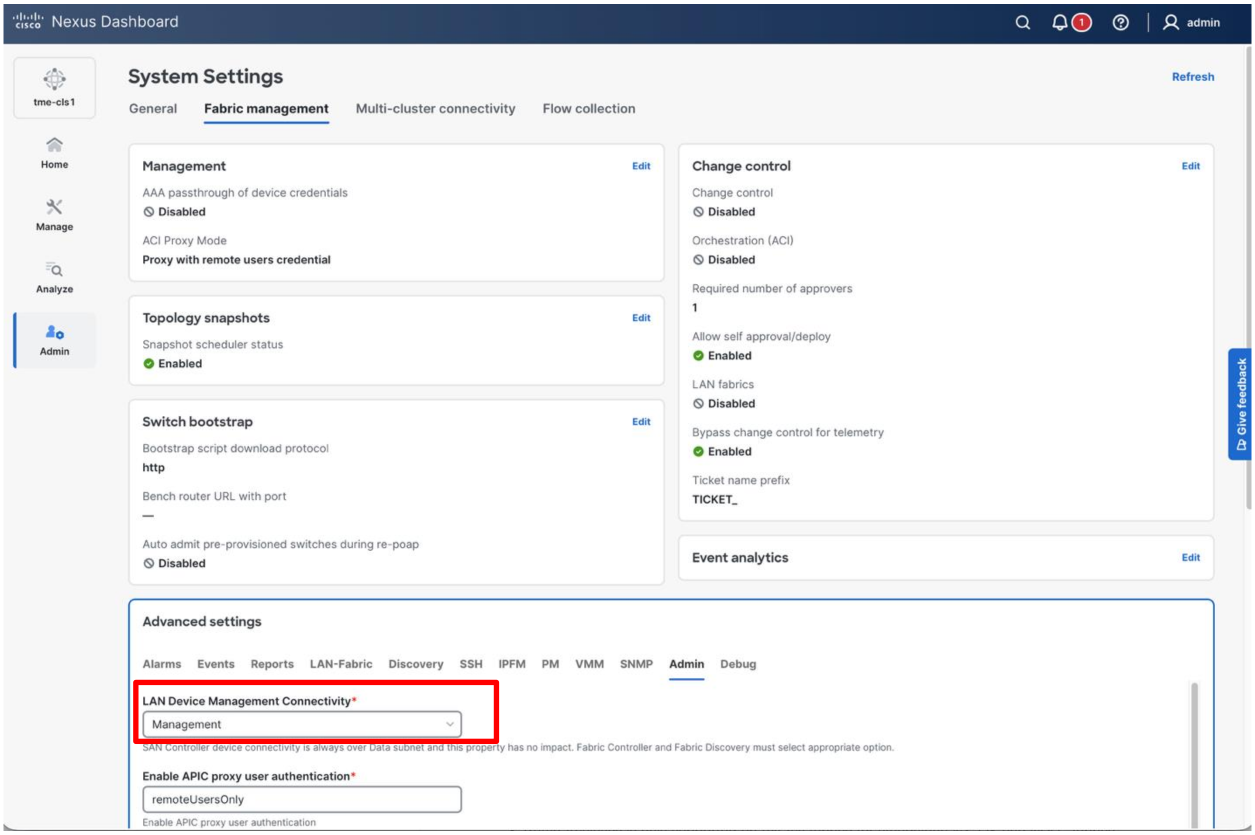
- Configure Routes and LAN Device Connectivity Policy
- Create fabric
- Discover switches
- Create Layer 3 routing for In-band Network and Loopbacks
- Configure NTP

- Configure PTP

Configure Routes and LAN Device Connectivity Policy

By default, Cisco Nexus Dashboard cluster will use the data network to provide syslog, SNMP, POAP bootstrap and telemetry access to and from the switches. In this example, since the networks are isolated, the desired outcome is to use the management network for communicating to the switches for controller functionality, while leveraging the data network for telemetry only. This is different from the out-of-band scenario, where both management and data are IP reachable.

To do this, you will need to change the LAN Device Connectivity Policy from the default value “Data” to “Management.” You can modify the settings from **Admin > System Settings > Fabric Management > Advanced Settings > Admin > LAN Device Management Connectivity**.



System Settings

Management

AAA passthrough of device credentials
Disabled

ACI Proxy Mode
Proxy with remote users credential

Topology snapshots

Snapshot scheduler status
Enabled

Switch bootstrap

Bootstrap script download protocol
http

Bench router URL with port
—

Auto admit pre-provisioned switches during re-poap
Disabled

Change control

Change control
Disabled

Orchestration (ACI)
Disabled

Required number of approvers
1

Allow self approval/deploy
Enabled

LAN fabrics
Disabled

Bypass change control for telemetry
Enabled

Ticket name prefix
TICKET_

Event analytics

Advanced settings

LAN Device Management Connectivity*
Management

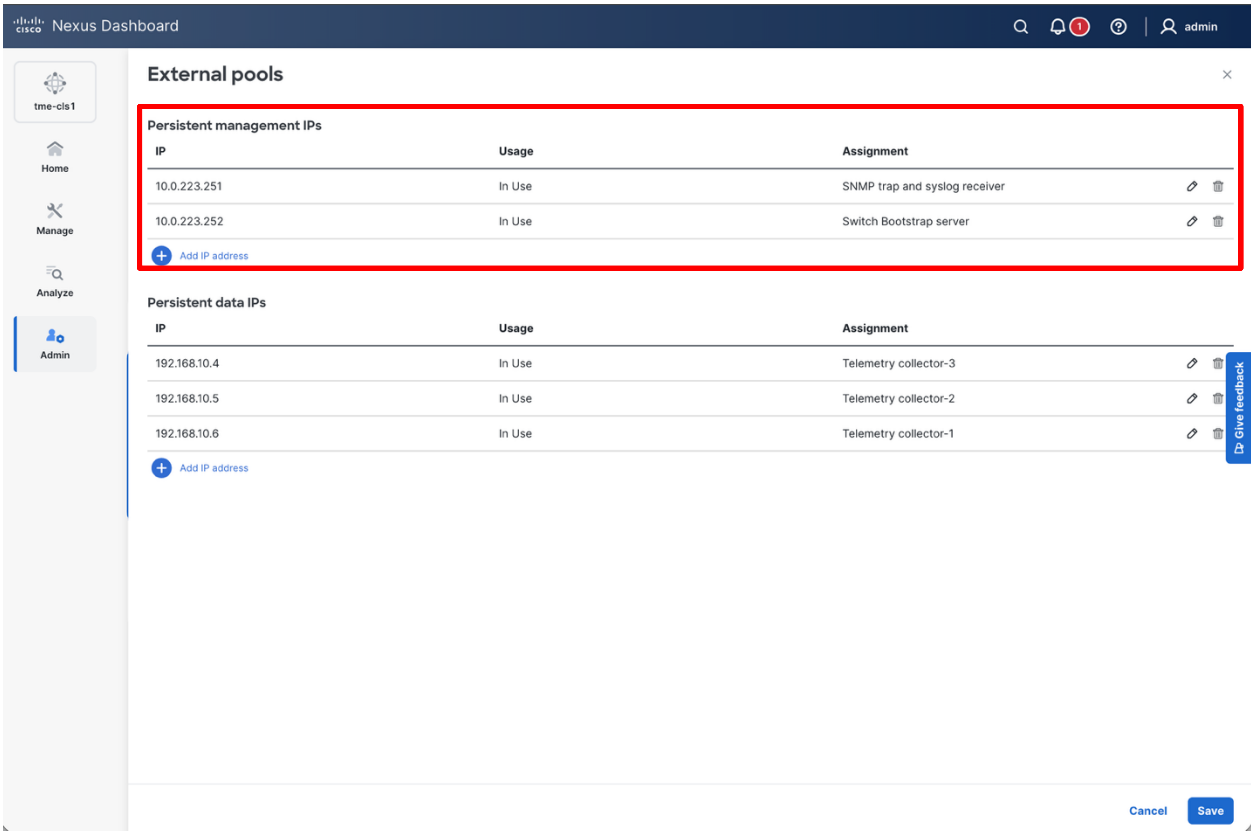
SAN Controller device connectivity is always over Data subnet and this property has no impact. Fabric Controller and Fabric Discovery must select appropriate option.

Enable APIC proxy user authentication*
remoteUsersOnly

Enable APIC proxy user authentication

Figure 33.
LAN Device Management Connectivity policy is set to Management

This policy requires that the persistent IP addresses used for SNMP trap and syslog, and switch bootstrap, are in the management IP address pool for the persistent IPs. After changing this setting, ensure there are two available PIPs in the management subnet.



External pools

Persistent management IPs

IP	Usage	Assignment
10.0.223.251	In Use	SNMP trap and syslog receiver
10.0.223.252	In Use	Switch Bootstrap server

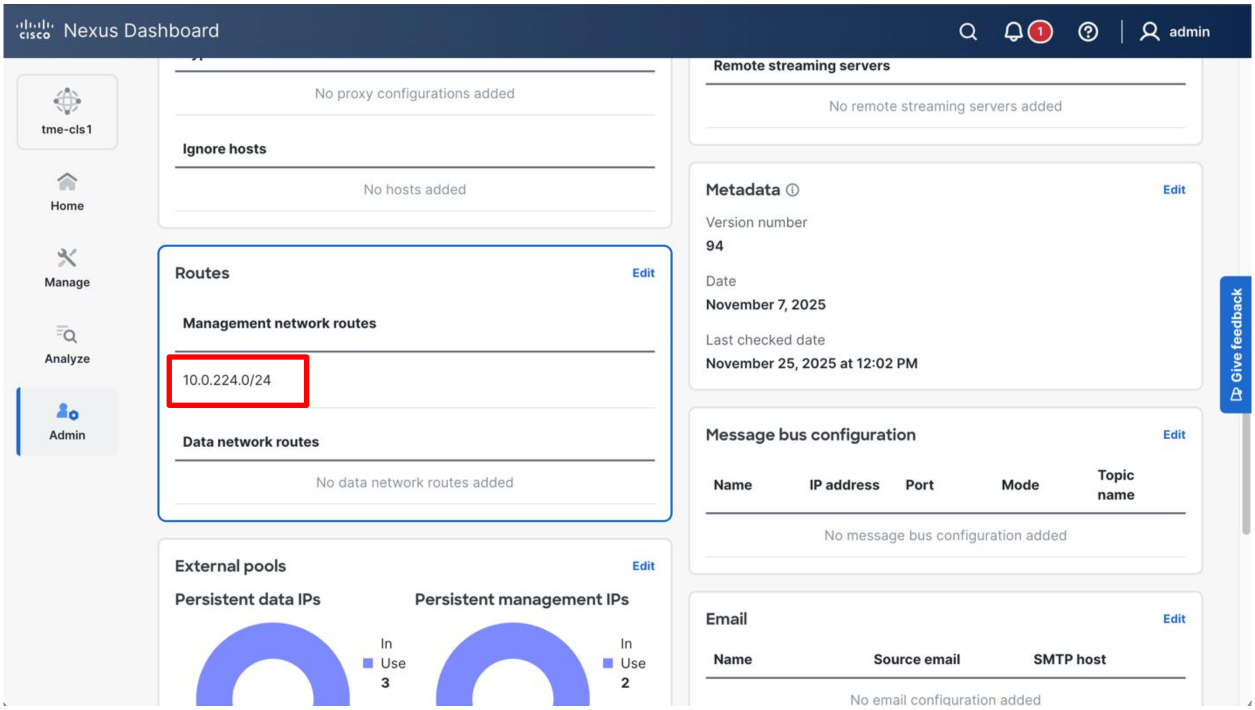
Persistent data IPs

IP	Usage	Assignment
192.168.10.4	In Use	Telemetry collector-3
192.168.10.5	In Use	Telemetry collector-2
192.168.10.6	In Use	Telemetry collector-1

Figure 34.

Verifying Persistent Ips in the management subnet

If switches are on a different subnet than the Cisco Nexus Dashboard management interface, you must configure a static route. Configure this route in the Cisco Nexus Dashboard management network to point to the switch mgmt0 subnet. This route allows Cisco Nexus Dashboard to discover and onboard the NX-OS switches. Without this route, the nodes attempt to communicate with the 192.0.2.0/24 subnet using the default route on the data interfaces. This fails because no Internet Protocol (IP) connectivity exists between the out-of-band and data network infrastructures. To add the route, navigate to **Admin > System Settings > Management Routes > Edit > Add Management Network Routes > Save**.



No proxy configurations added

Ignore hosts

No hosts added

Routes Edit

Management network routes

10.0.224.0/24

Data network routes

No data network routes added

External pools Edit

Persistent data IPs

In Use 3

Persistent management IPs

In Use 2

Remote streaming servers

No remote streaming servers added

Metadata Edit

Version number
94

Date
November 7, 2025

Last checked date
November 25, 2025 at 12:02 PM

Message bus configuration Edit

Name	IP address	Port	Mode	Topic name

No message bus configuration added

Email Edit

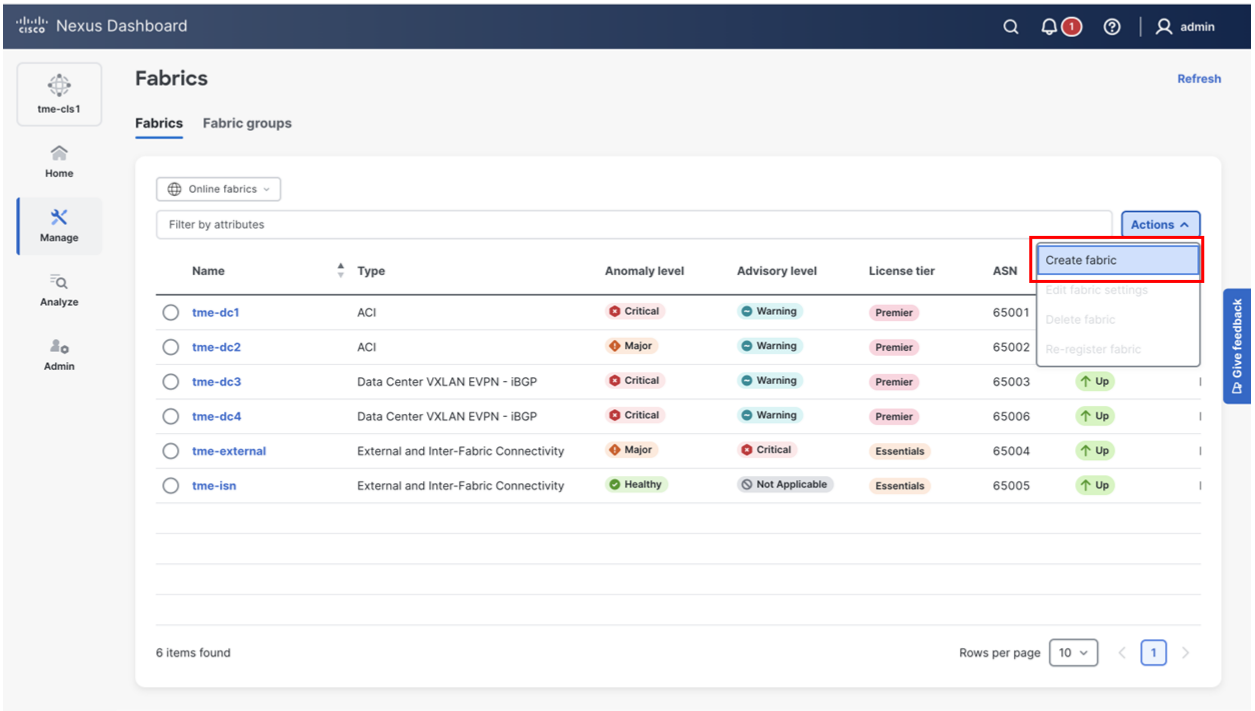
Name	Source email	SMTP host

No email configuration added

Figure 35.
Editing Management subnet routes

Create Fabric

1. Navigate to **Manage > Fabrics**, from **Actions** drop-down list, select **Create fabric**.



Fabrics

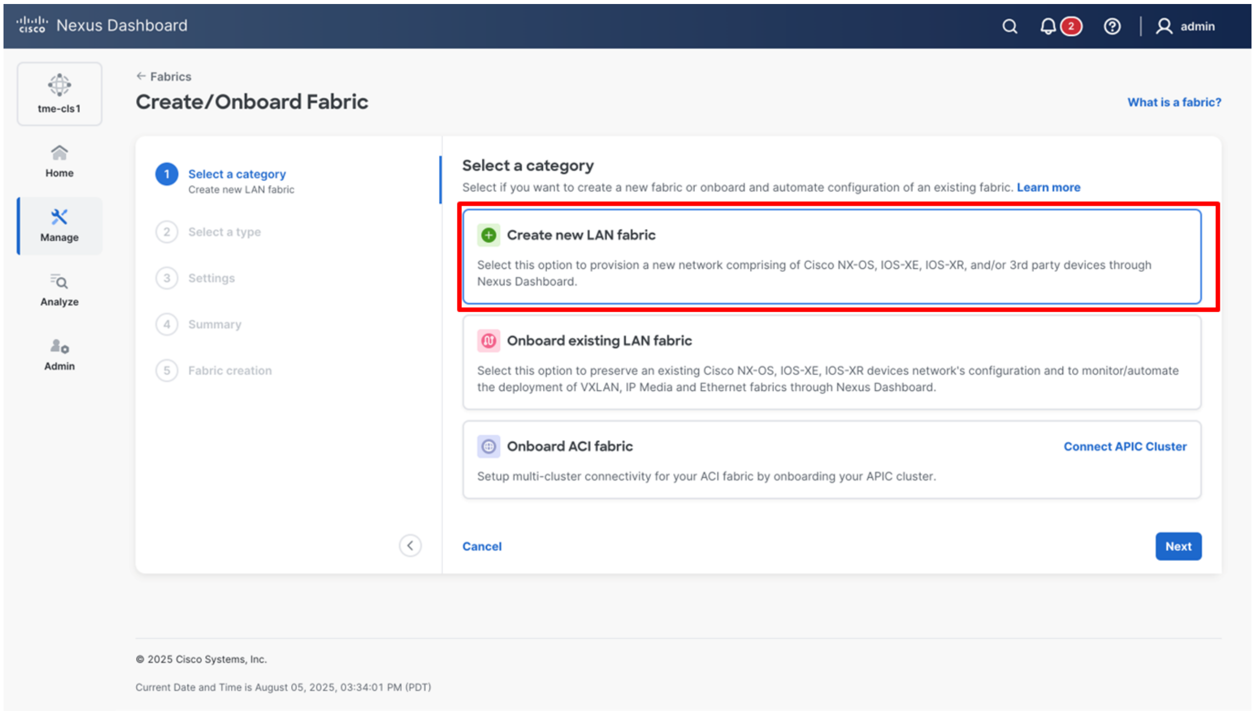
Name	Type	Anomaly level	Advisory level	License tier	ASN	
○ tme-dc1	ACI	Critical	Warning	Premier	65001	
○ tme-dc2	ACI	Major	Warning	Premier	65002	
○ tme-dc3	Data Center VXLAN EVPN - iBGP	Critical	Warning	Premier	65003	↑ Up
○ tme-dc4	Data Center VXLAN EVPN - iBGP	Critical	Warning	Premier	65006	↑ Up
○ tme-external	External and Inter-Fabric Connectivity	Major	Critical	Essentials	65004	↑ Up
○ tme-isn	External and Inter-Fabric Connectivity	Healthy	Not Applicable	Essentials	65005	↑ Up

6 items found

Rows per page 10

Figure 36.
Creating a new fabric

2. From **Select a category** select **Create new LAN fabric** and click **Next**



Create/Onboard Fabric

Select a category

Select if you want to create a new fabric or onboard and automate configuration of an existing fabric. Learn more

Create new LAN fabric

Select this option to provision a new network comprising of Cisco NX-OS, IOS-XE, IOS-XR, and/or 3rd party devices through Nexus Dashboard.

Onboard existing LAN fabric

Select this option to preserve an existing Cisco NX-OS, IOS-XE, IOS-XR devices network's configuration and to monitor/automate the deployment of VXLAN, IP Media and Ethernet fabrics through Nexus Dashboard.

Onboard ACI fabric — Connect APIC Cluster

Setup multi-cluster connectivity for your ACI fabric by onboarding your APIC cluster.

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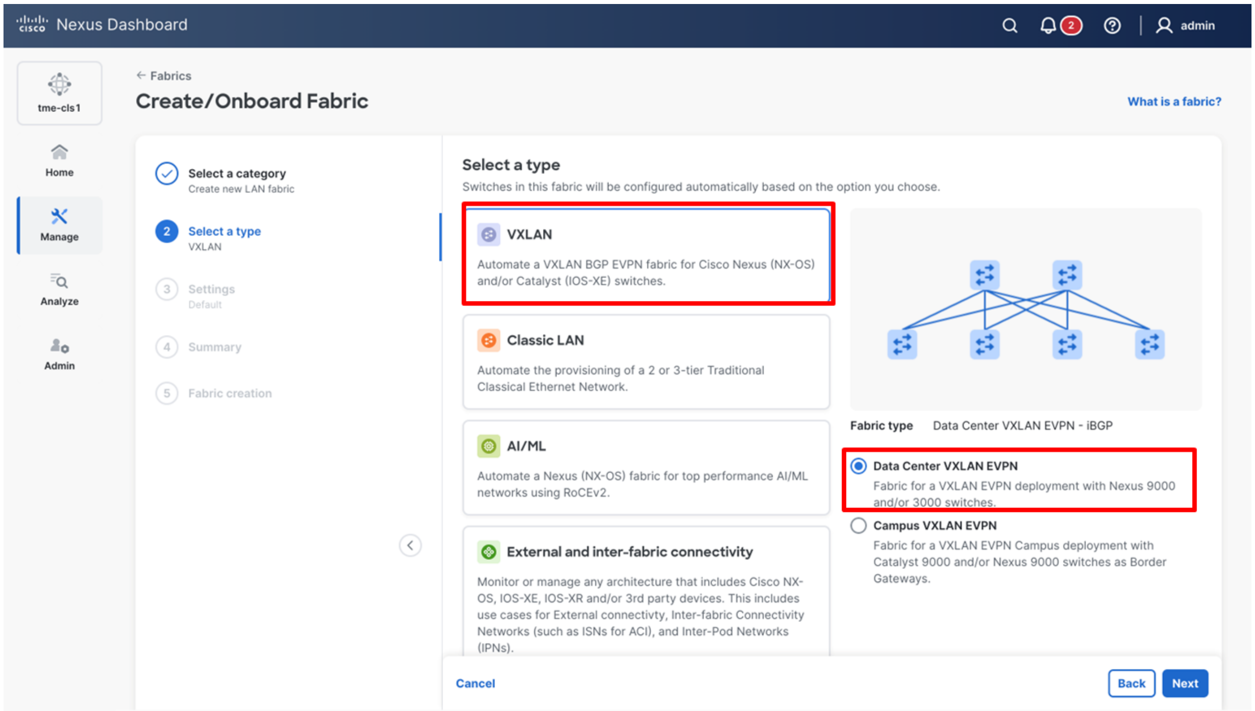
Current Date and Time is August 05, 2025, 03:34:01 PM (PDT)

Figure 37.
Creating a new LAN fabric

3. Select the template and click **Next**. Cisco Nexus Dashboard supports multiple fabric types (for example: **Classic LAN**, **VXLAN** fabrics and so on). For this whitepaper, you select **Data Center VXLAN EVPN** fabric.



Create/Onboard Fabric

1. Select a category – Create new LAN fabric
2. Select a type – VXLAN
3. Settings – Default
4. Summary
5. Fabric creation

Select a type

Switches in this fabric will be configured automatically based on the option you choose.

VXLAN – Automate a VXLAN BGP EVPN fabric for Cisco Nexus (NX-OS) and/or Catalyst (IOS-XE) switches.

Classic LAN – Automate the provisioning of a 2 or 3-tier Traditional Classical Ethernet Network.

AI/ML – Automate a Nexus (NX-OS) fabric for top performance AI/ML networks using RoCEv2.

External and inter-fabric connectivity – Monitor or manage any architecture that includes Cisco NX-OS, IOS-XE, IOS-XR and/or 3rd party devices. This includes use cases for External connectivty, Inter-fabric Connectivity Networks (such as ISNs for ACI), and Inter-Pod Networks (IPNs).

Fabric type Data Center VXLAN EVPN - iBGP

● Data Center VXLAN EVPN – Fabric for a VXLAN EVPN deployment with Nexus 9000 and/or 3000 switches.

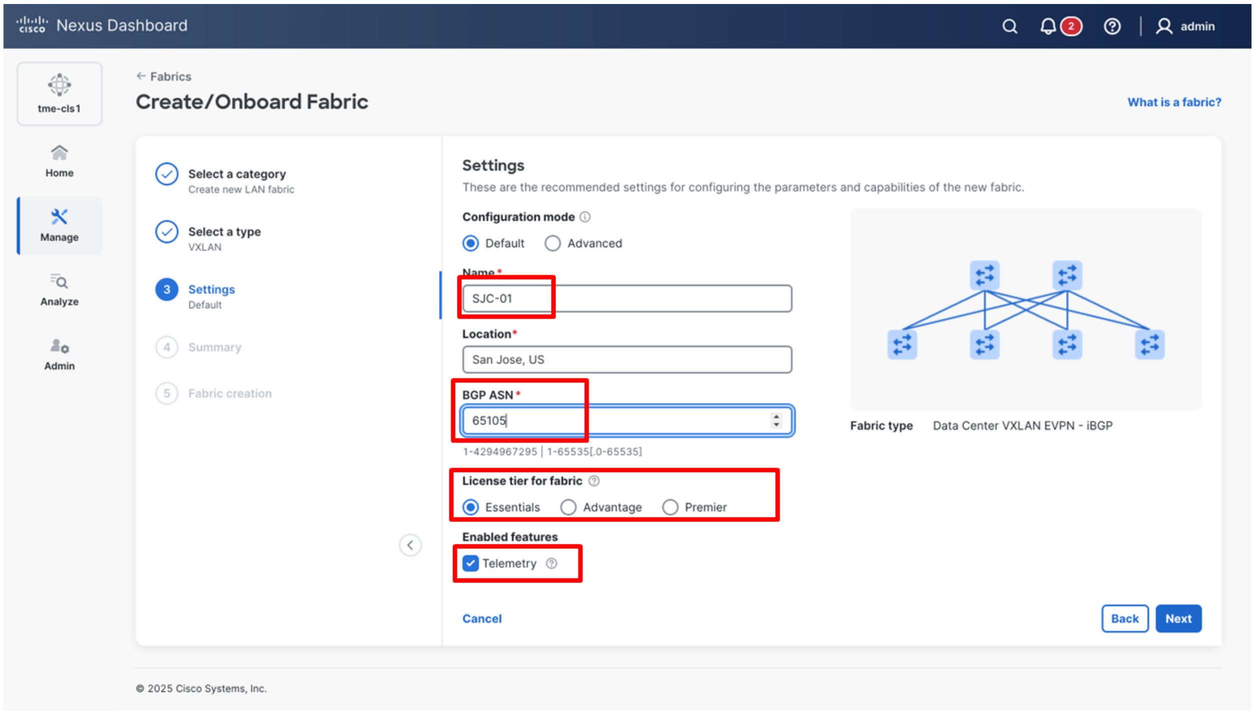
○ Campus VXLAN EVPN – Fabric for a VXLAN EVPN Campus deployment with Catalyst 9000 and/or Nexus 9000 switches as Border Gateways.

Figure 38.

Choosing the type of fabric

4. Enter basic details of the fabric, like the fabric **Name** and **BGP ASN** and choose the appropriate license tier for your fabric.

5. From **Enabled features**, select **Telemetry** check box.



Create/Onboard Fabric

1. Select a category – Create new LAN fabric
2. Select a type – VXLAN
3. Settings – Default
4. Summary
5. Fabric creation

Settings

These are the recommended settings for configuring the parameters and capabilities of the new fabric.

Configuration mode: ● Default ○ Advanced

Name*: SJC-01

Location*: San Jose, US

BGP ASN*: 65105

1-4294967295 | 1-65535[.0-65535]

License tier for fabric: ● Essentials ○ Advantage ○ Premier

Enabled features: ☑ Telemetry

Fabric type Data Center VXLAN EVPN - iBGP

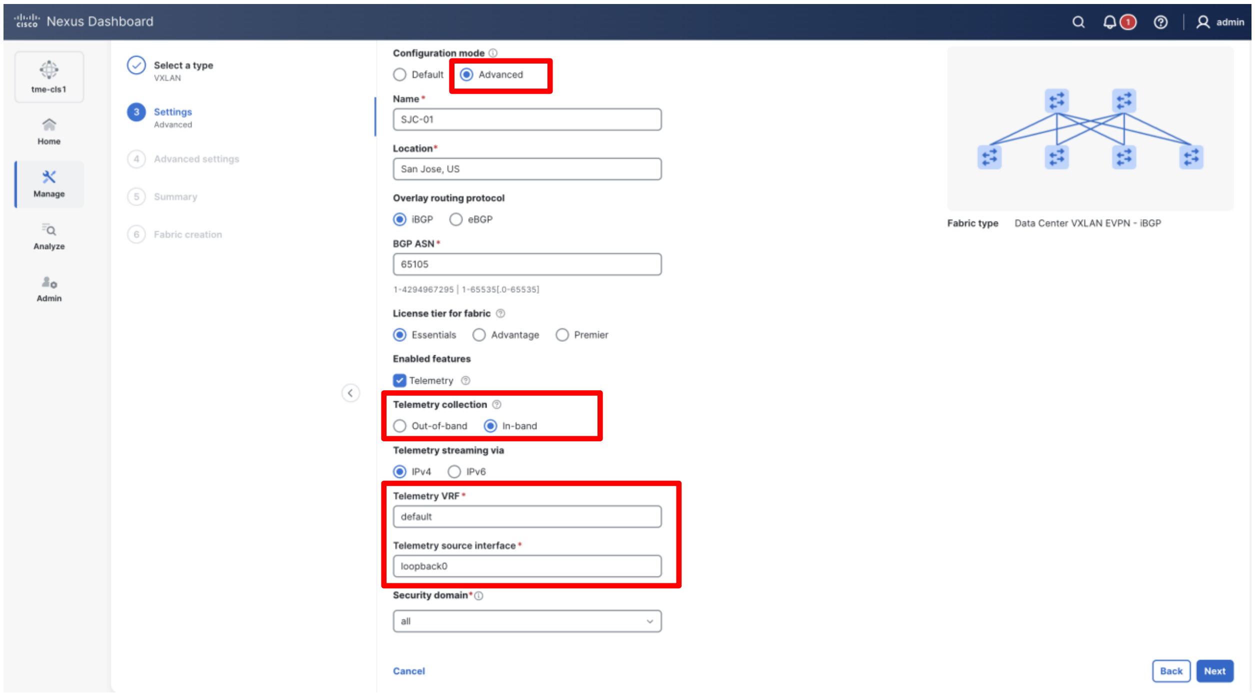
Figure 39.

Entering the desired fabric configuration for BGP, licensing, and telemetry

6. In **Advanced Settings**, select the in-band management network to stream telemetry from the fabric.

   Cisco Nexus Dashboard can stream telemetry from a fabric using either the in-band or out-of-band management network. Telemetry Virtual Routing and Forwarding (VRF) instance sources and manage telemetry data from Cisco Nexus devices. By default, telemetry is sourced through the Loopback0 interface in the “default” VRF. You can also define a dedicated telemetry VRF and telemetry loopbacks for more granular control.

   Use the default “default” VRF and “Loopback0” settings, and then click **Next**.



Configuration mode
○ Default ● Advanced

Name *
SJC-01

Location*
San Jose, US

Overlay routing protocol
● iBGP ○ eBGP

BGP ASN *
65105
1-4294967295 | 1-65535[.0-65535]

License tier for fabric
● Essentials ○ Advantage ○ Premier

Enabled features
☑ Telemetry

Telemetry collection
○ Out-of-band ● In-band

Telemetry streaming via
● IPv4 ○ IPv6

Telemetry VRF *
default

Telemetry source interface *
loopback0

Security domain*
all

Figure 40.
Choosing the telemetry collection method, in this example: in-band

7. Click **Submit.**

Discover Switches in the Fabric

Cisco Nexus Dashboard uses a single seed or multiple IPs in the fabric and dynamically discovers the switches for a set number of hops defined in ‘Max Hops.’ It allows you to select the switches to be added to the fabric. By default, the switch discovery process will show switches that are 2 hops away from the seed switch. You can change the default setting using the **Number of Hops** drop-down list.

1. Navigate to **Manage > Fabrics**. Click on the newly created Fabric name and click **Inventory > Switches**. From the **Actions** drop-down list, select **Add switches**.

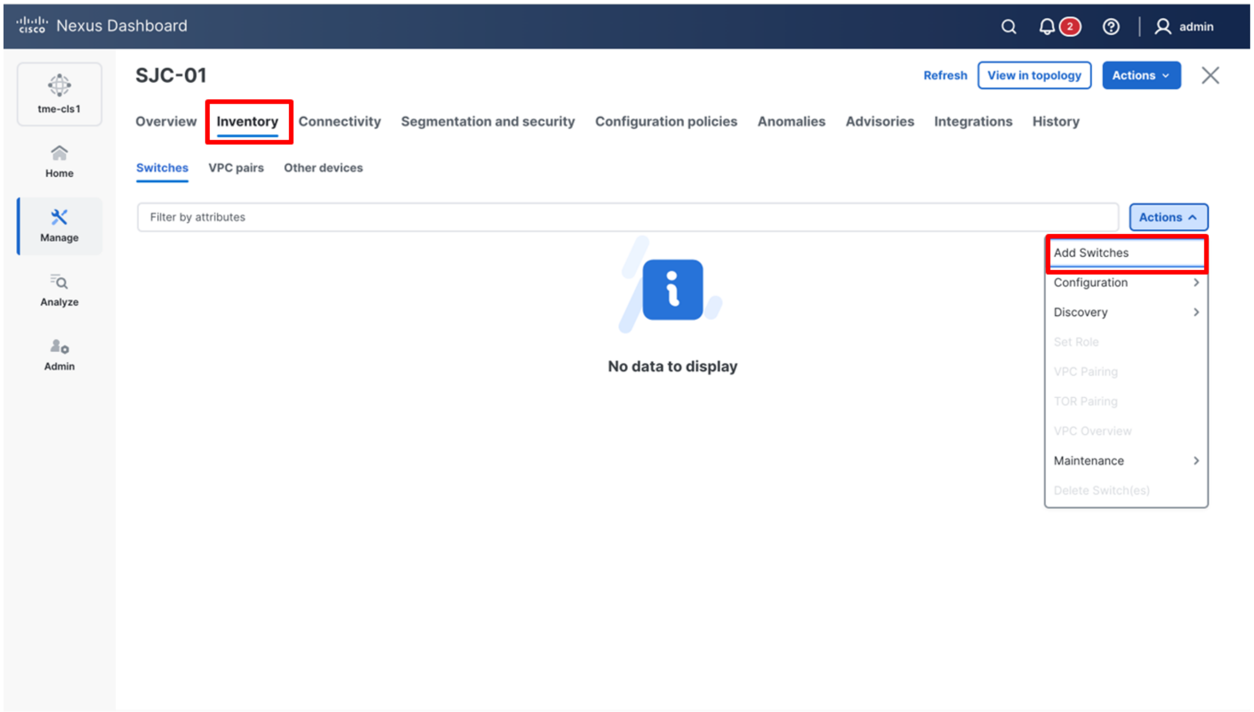
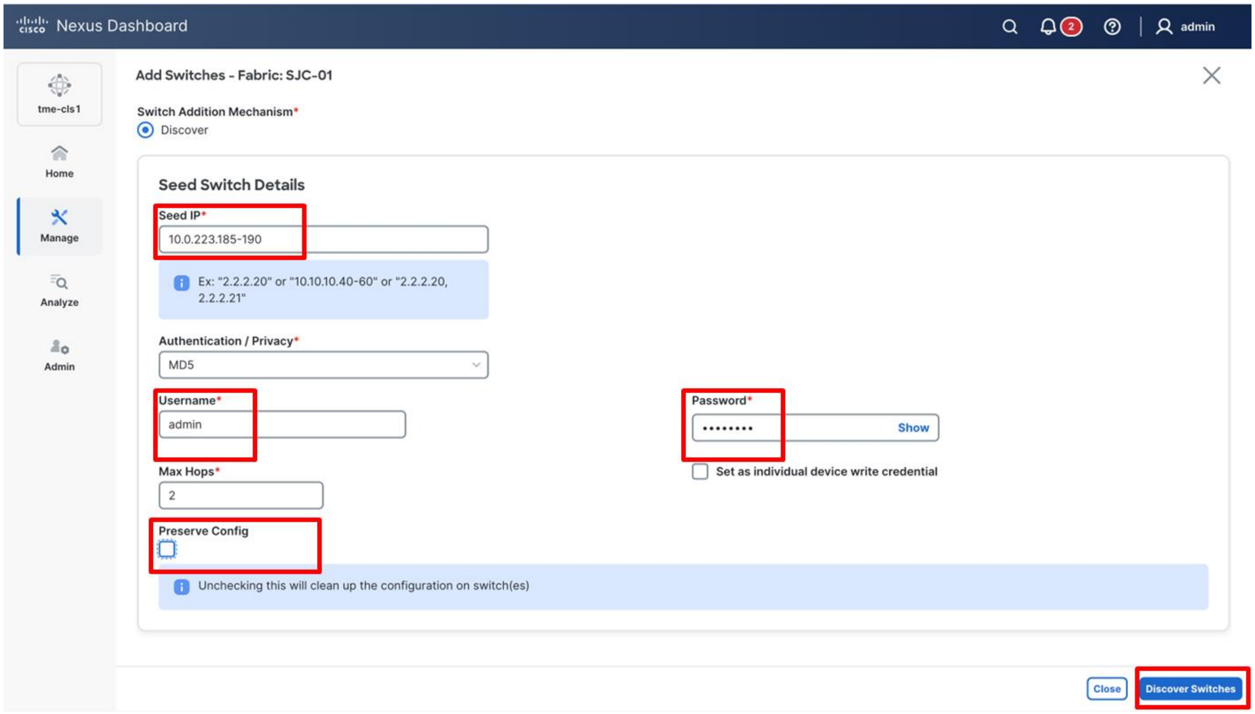


Figure 41.

Adding switches to the fabric

2. On the **Add switches** screen, provide a **Seed IP** (IP address of mgmt0 interface) of any switch in the fabric to be discovered. Additionally, if you are discovering other switches through the seed switch, the other switch IP will be discovered through LLDP. It is also possible to discover each switch one by one.



Add Switches - Fabric: SJC-01

Switch Addition Mechanism*
● Discover

Seed Switch Details

Seed IP*: 10.0.223.185-190

Ex: "2.2.2.20" or "10.10.10.40-60" or "2.2.2.20, 2.2.2.21"

Authentication / Privacy*: MD5

Username*: admin

Password*: ••••••••

□ Set as individual device write credential

Max Hops*: 2

Preserve Config
□

Unchecking this will clean up the configuration on switch(es)

Figure 42.
Discovering switches for the fabric

3. Choose the **Authentication / Privacy** used to login to switches and provide **Username** and **Password**.

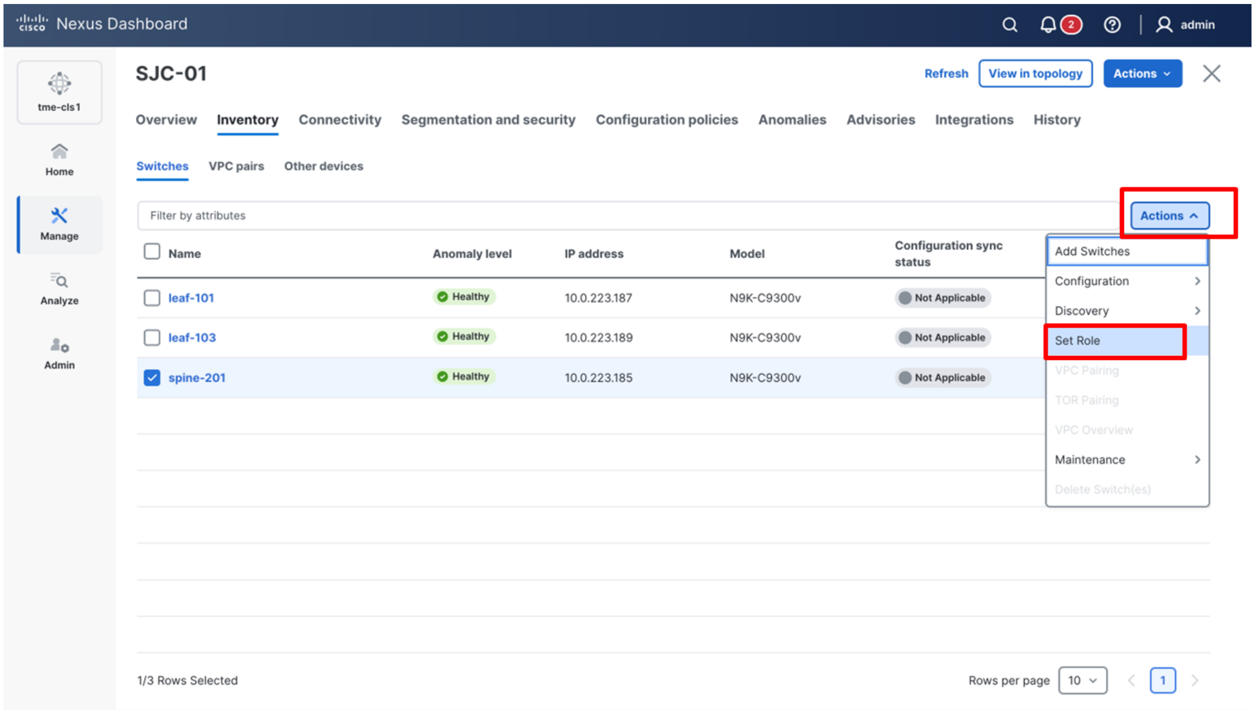
4. Select the **Max hops** from the seed to determine the detection boundary.

5. Check the **Preserve config** check box to keep the existing configs on the switch (brownfield deployment) or uncheck the option to clean up the configuration on the switches (greenfield deployment).

6. Click **Discover switches**.

7. Select all the switches intended to be part of the fabric and click **Add switches**. The switches will now show up on the **Inventory > Switches** tab of the fabric.

8. On the **Switches** page, click **Actions > Set Role** to assign roles to the switches. Alternatively, on the **Topology** page, right-click on the appropriate switch and assign roles.



	Name	Anomaly level	IP address	Model	Configuration sync status
□	leaf-101	Healthy	10.0.223.187	N9K-C9300v	Not Applicable
□	leaf-103	Healthy	10.0.223.189	N9K-C9300v	Not Applicable
☑	spine-201	Healthy	10.0.223.185	N9K-C9300v	Not Applicable

1/3 Rows Selected

Figure 43.
Set role for the switches

9. From the pop-up page, choose the intended role and click **Select**.

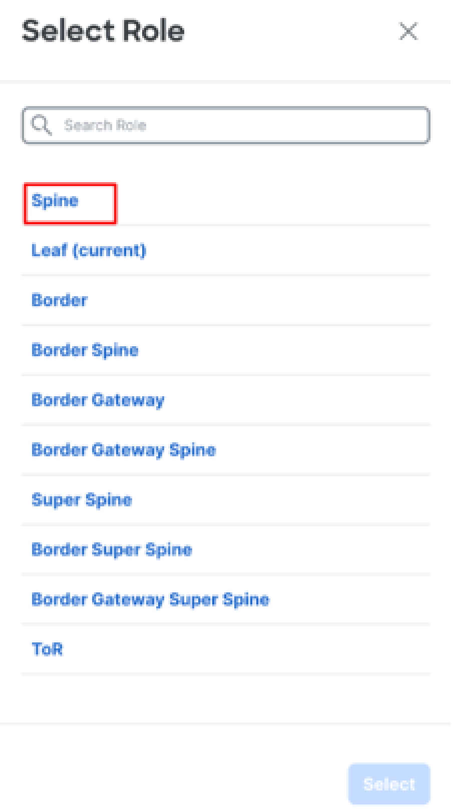
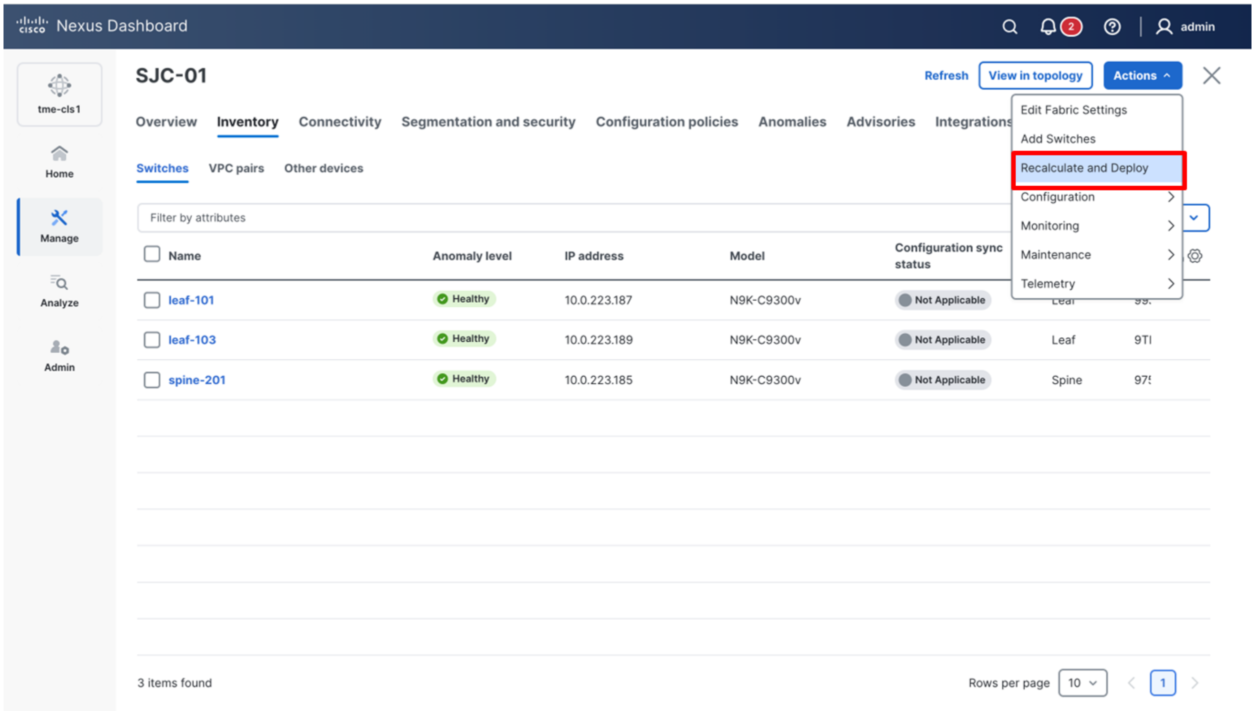


Figure 44.
Choosing switch roles

10. After setting the role, on the **Switches** page, select the switches, from **Actions** drop-down list, select **Edit fabric settings**.



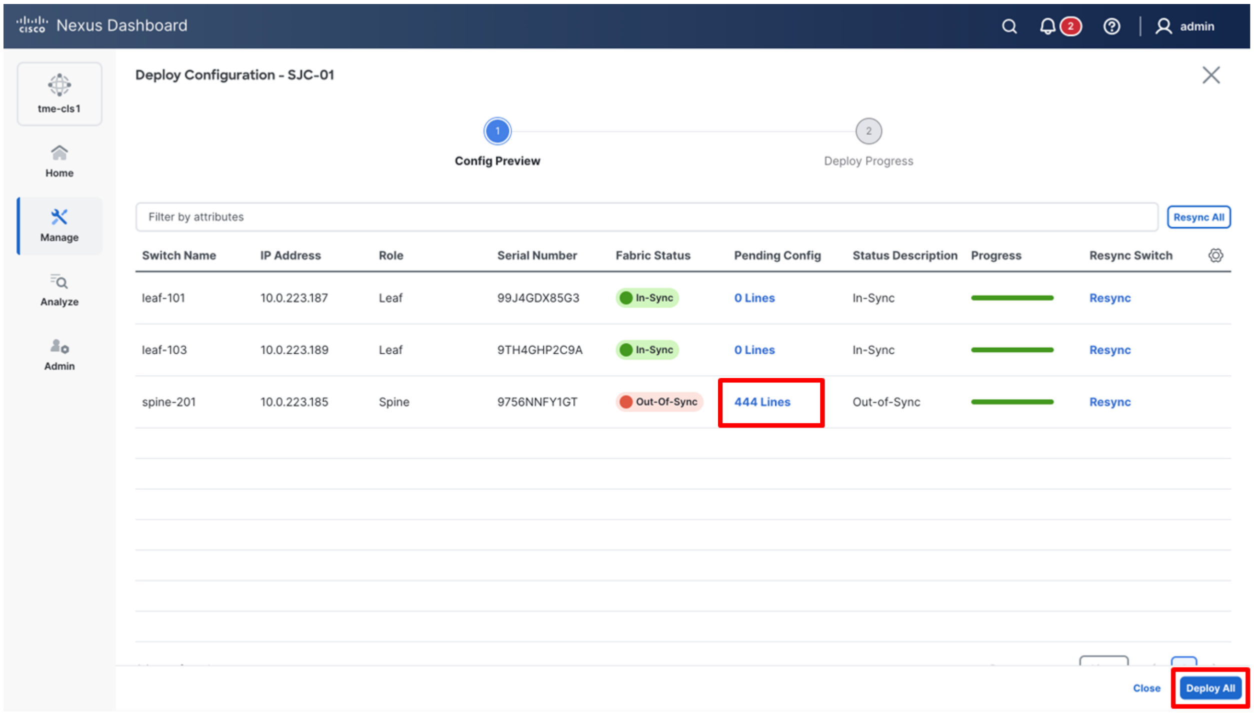
Name	Anomaly level	IP address	Model	Configuration sync status		
leaf-101	Healthy	10.0.223.187	N9K-C9300v	Not Applicable	Leaf	99
leaf-103	Healthy	10.0.223.189	N9K-C9300v	Not Applicable	Leaf	9TI
spine-201	Healthy	10.0.223.185	N9K-C9300v	Not Applicable	Spine	97!

3 items found

Figure 45.

Performing a Recalculate and Deploy

11. From the **Deploy Configuration** screen, preview the configurations by clicking on **Pending Config** and click **Deploy All** to be guided to the deployment progress screen.



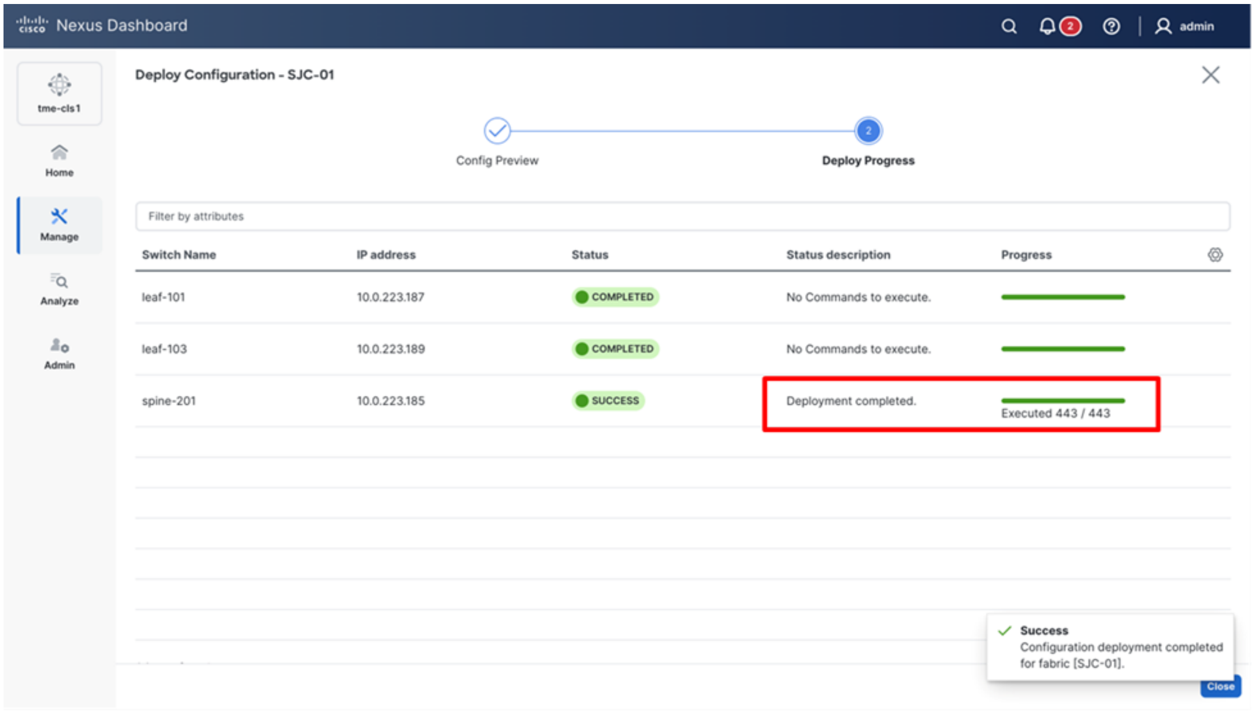
Deploy Configuration - SJC-01

Switch Name	IP Address	Role	Serial Number	Fabric Status	Pending Config	Status Description	Progress	Resync Switch
leaf-101	10.0.223.187	Leaf	99J4GDX85G3	In-Sync	0 Lines	In-Sync		Resync
leaf-103	10.0.223.189	Leaf	9TH4GHP2C9A	In-Sync	0 Lines	In-Sync		Resync
spine-201	10.0.223.185	Spine	9756NNFY1GT	Out-Of-Sync	444 Lines	Out-of-Sync		Resync

Figure 46.

Deploying the configuration

12. Verify the **Status description** for successful deployment.



Deploy Configuration - SJC-01

Switch Name	IP address	Status	Status description	Progress
leaf-101	10.0.223.187	COMPLETED	No Commands to execute.	
leaf-103	10.0.223.189	COMPLETED	No Commands to execute.	
spine-201	10.0.223.185	SUCCESS	Deployment completed.	Executed 443 / 443

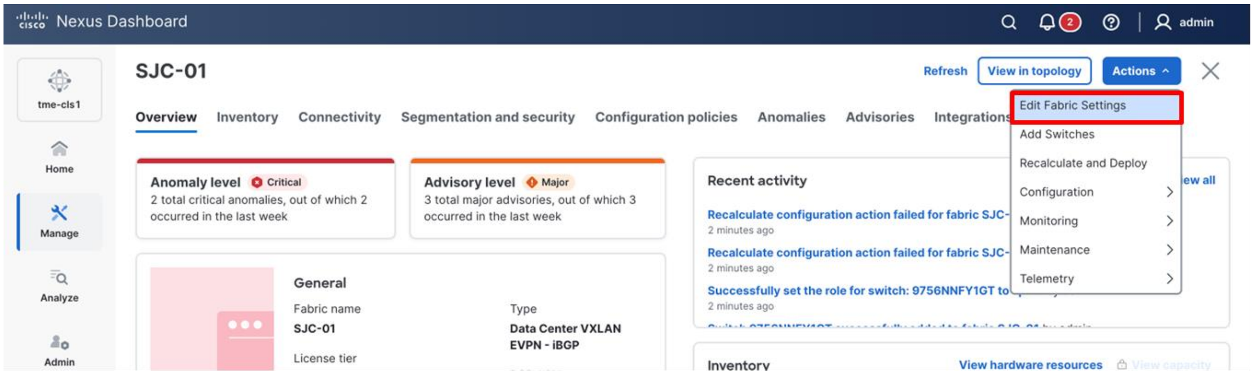
Success
Configuration deployment completed for fabric [SJC-01].

Figure 47.
Deployment completed successfully

Identify Loopback Interfaces

For managed fabrics, Cisco Nexus Dashboard deploys an underlay routing loopback and a Virtual Tunnel Endpoint (VTEP) loopback on the switches. To deploy in-band telemetry for the site, you can use either loopback. By default, Cisco Nexus Dashboard uses **Loopback0** (Border Gateway Protocol (BGP) loopback) when Internet Protocol (IP) reachability to the Cisco Nexus Dashboard cluster data network exists.

1. Navigate to **Manage > Fabrics**, click a fabric, from **Actions** drop-down list, choose **Edit fabric settings**.



Anomaly level Critical
2 total critical anomalies, out of which 2 occurred in the last week

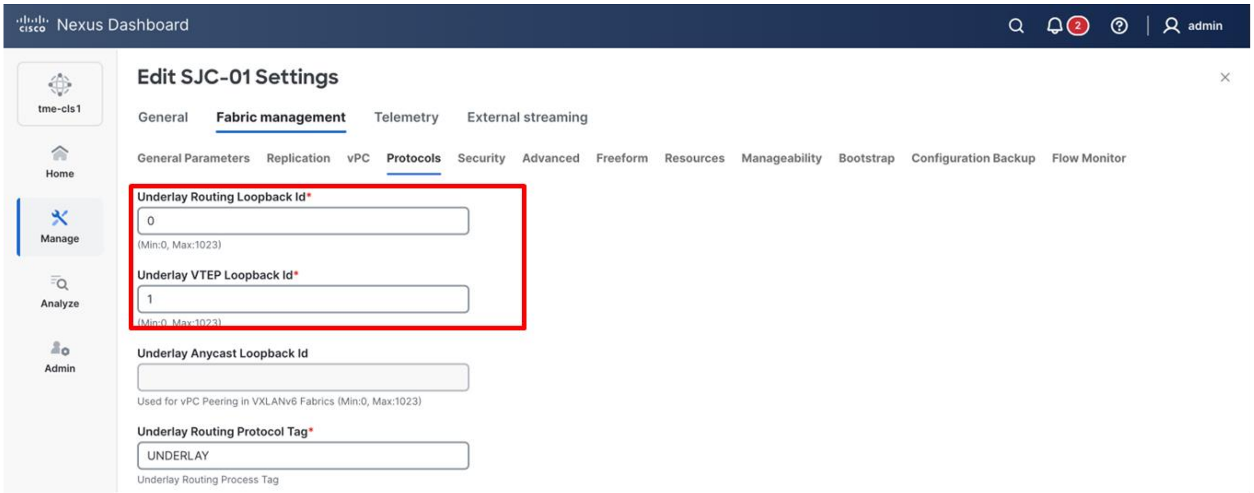
Advisory level Major
3 total major advisories, out of which 3 occurred in the last week

Recent activity
Recalculate configuration action failed for fabric SJC-
2 minutes ago
Recalculate configuration action failed for fabric SJC-
2 minutes ago
Successfully set the role for switch: 9756NNFY1GT to
2 minutes ago

General
Fabric name: SJC-01
Type: Data Center VXLAN EVPN - iBGP
License tier

Figure 48.
Edit Fabric Settings

2. Go to **Fabric management > Protocols**, update the value for **Underlay Routing Loopback Id** and click **Save**.



Underlay Routing Loopback Id*: 0
(Min:0, Max:1023)

Underlay VTEP Loopback Id*: 1
(Min:0, Max:1023)

Underlay Anycast Loopback Id:
Used for vPC Peering in VXLANv6 Fabrics (Min:0, Max:1023)

Underlay Routing Protocol Tag*: UNDERLAY
Underlay Routing Process Tag

Figure 49.
Viewing loopbacks for the fabric switches

Create Layer 3 Routing for In-Band Network and Loopbacks

Since you are using a dedicated in-band network to stream telemetry from the switches (front-panel) interface using a loopback, the switches and Cisco Nexus Dashboard data network should have routed network connectivity via the infrastructure. You have added an example of physical topology based on the example being used in this whitepaper.

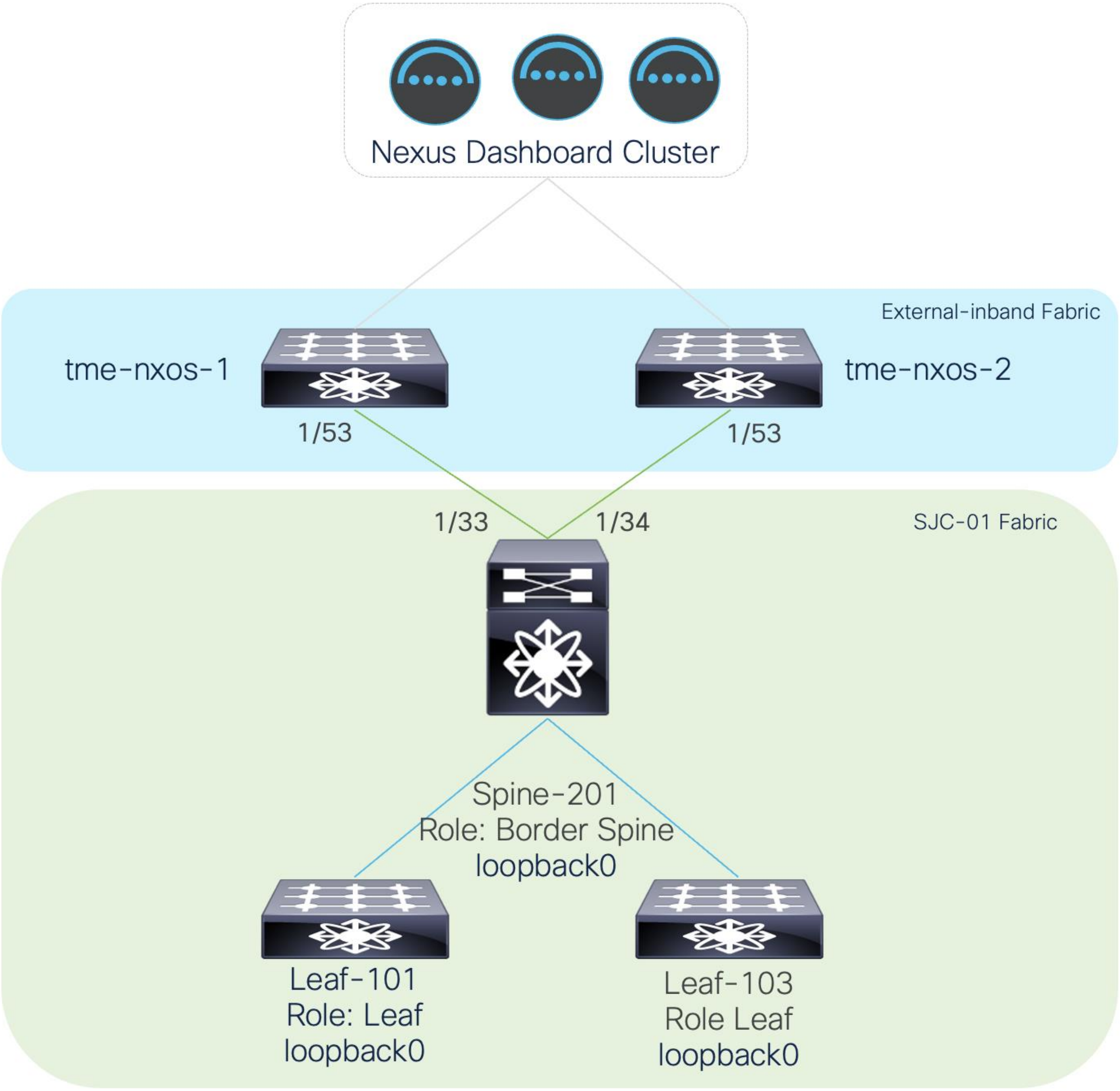


Figure 50.

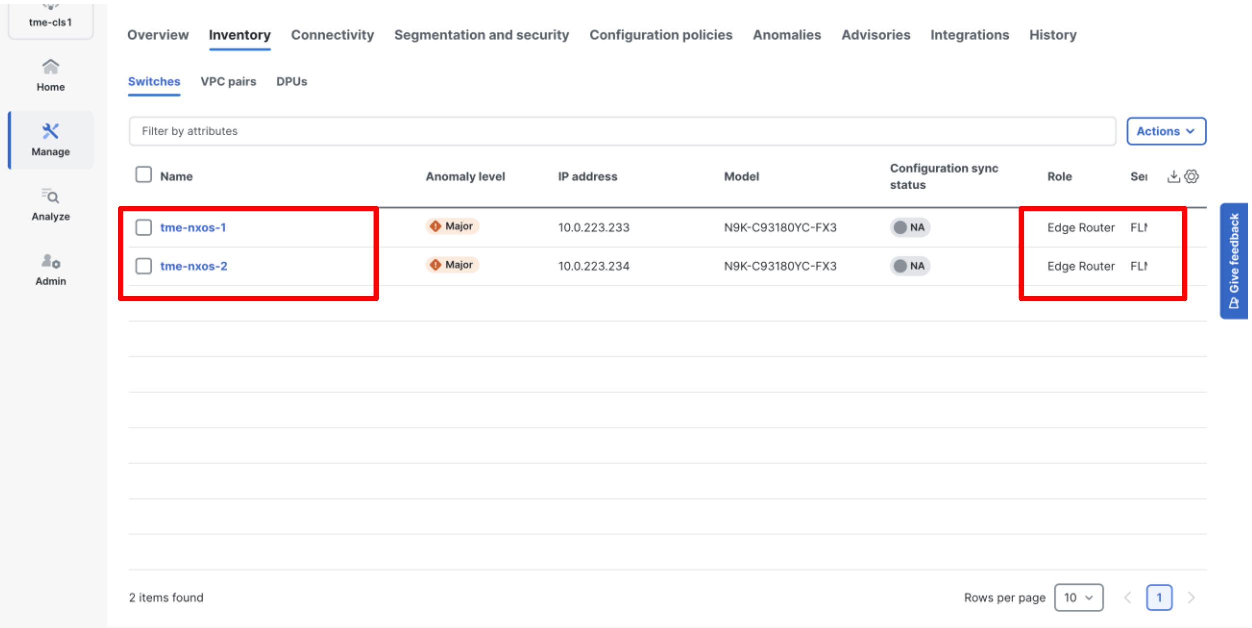
Example of physical topology for in-band telemetry to Cisco Nexus Dashboard

Note: In this example, you are using an external network that has been onboarded onto Cisco Nexus Dashboard in managed mode. (Verification of whether the external fabric being used is in managed or monitored mode can be found under **Manage > Fabrics > Fabric Name > Actions > Edit Fabric Management > Fabric Monitor** mode.) The external fabric as shown in the topology diagram is the fabric that acts as an external Layer 3 network between the VXLAN-EVPN fabric (SJC-01 in this example) and Cisco Nexus Dashboard.

Note: Cisco Nexus Dashboard uses the “border” role to represent switches that will have external Layer 3 connections to an edge or core external fabric. In this example, a border spine is used, however it is equally common to use border leaf nodes and have the external fabric connected to those leaf switches instead.

First verify the details on this external (external-in-band fabric in this example) fabric.

1. Navigate to **Manage > Fabrics > <*fabric name*>**(external-in-band in this example) **> Inventory**.



Name	Anomaly level	IP address	Model	Configuration sync status	Role	Se
tme-nxos-1	Major	10.0.223.233	N9K-C93180YC-FX3	NA	Edge Router	FL
tme-nxos-2	Major	10.0.223.234	N9K-C93180YC-FX3	NA	Edge Router	FL

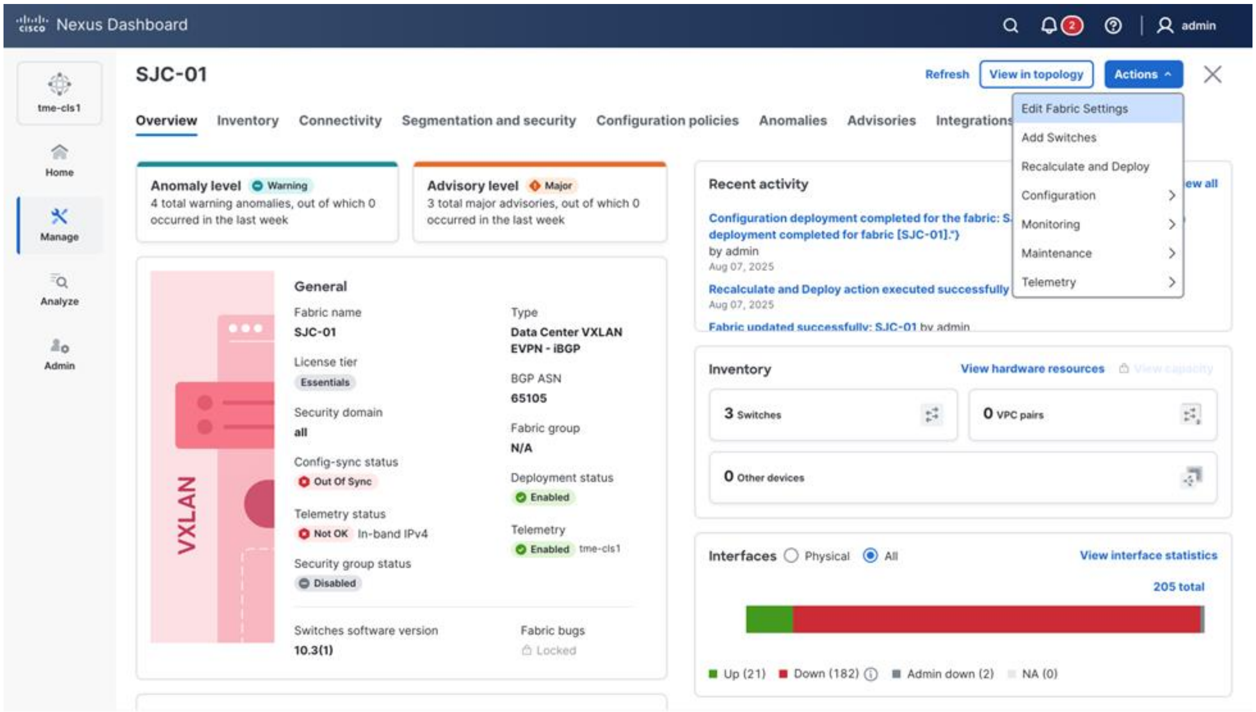
2 items found

Figure 51.
Viewing inventory for external fabric

2. Verify the displayed fabric switches that are onboard in the fabric. The **Role** column displays it as the “**Edge Router**.”

Establish connectivity between the Loopback0 interface on the VXLAN-EVPN (SJC-01) fabric switches and the Cisco Nexus Dashboard data network using the external Layer 3 network. Follow these steps to configure the connectivity.

1. After creating the fabrics and performing all the above steps, navigate to **Manage > Fabrics > <*fabric name*> > Edit fabric settings**.



Anomaly level Warning
4 total warning anomalies, out of which 0 occurred in the last week

Advisory level Major
3 total major advisories, out of which 0 occurred in the last week

Recent activity

Configuration deployment completed for the fabric: S... deployment completed for fabric [SJC-01].")
by admin
Aug 07, 2025

Recalculate and Deploy action executed successfully
Aug 07, 2025

Fabric updated successfully: SJC-01 by admin

General

Fabric name: SJC-01
Type: Data Center VXLAN EVPN - iBGP
License tier: Essentials
BGP ASN: 65105
Security domain: all
Fabric group: N/A
Config-sync status: Out Of Sync
Deployment status: Enabled
Telemetry status: Not OK In-band IPv4
Telemetry: Enabled tme-cls1
Security group status: Disabled
Switches software version: 10.3(1)
Fabric bugs: Locked

Inventory — View hardware resources — View capacity

3 Switches
0 VPC pairs
0 Other devices

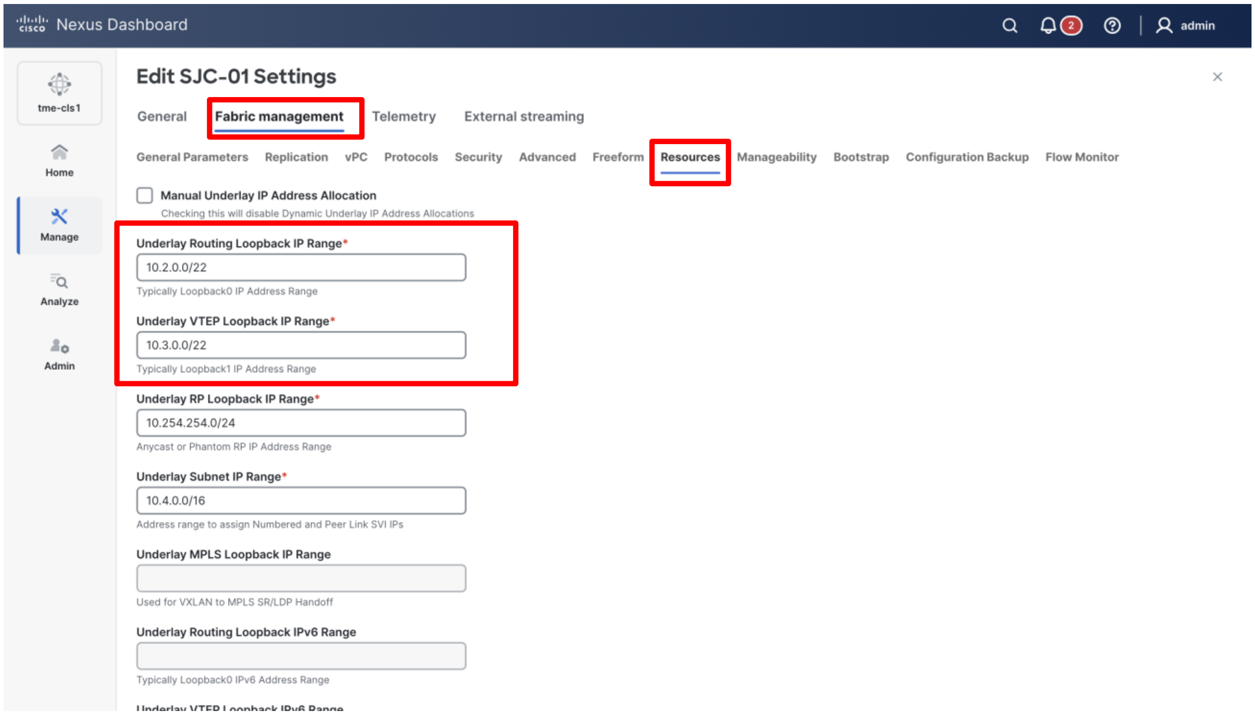
Interfaces ○ Physical ● All — View interface statistics

205 total

🟩 Up (21) 🟥 Down (182) ■ Admin down (2) ■ NA (0)

Figure 52.
Editing fabric settings

2. Navigate to **Fabric management > Resources**.



Edit SJC-01 Settings

□ Manual Underlay IP Address Allocation
Checking this will disable Dynamic Underlay IP Address Allocations

Underlay Routing Loopback IP Range*: 10.2.0.0/22
Typically Loopback0 IP Address Range

Underlay VTEP Loopback IP Range*: 10.3.0.0/22
Typically Loopback1 IP Address Range

Underlay RP Loopback IP Range*: 10.254.254.0/24
Anycast or Phantom RP IP Address Range

Underlay Subnet IP Range*: 10.4.0.0/16
Address range to assign Numbered and Peer Link SVI IPs

Underlay MPLS Loopback IP Range:
Used for VXLAN to MPLS SR/LDP Handoff

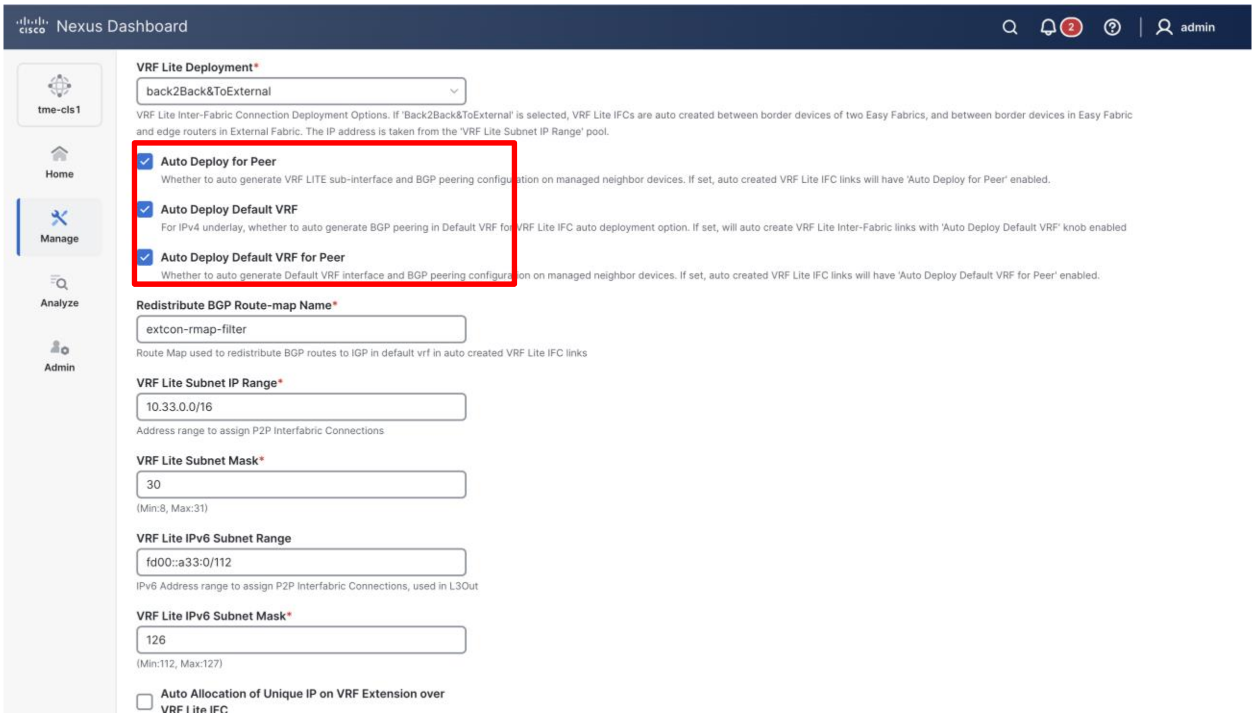
Underlay Routing Loopback IPv6 Range:
Typically Loopback0 IPv6 Address Range

Underlay VTEP Loopback IPv6 Range

Figure 53.
Viewing loopback IP ranges for the fabric switches

3. Use the default underlay IP address allocation automatically provided by Cisco Nexus Dashboard.

4. Scroll down to the **VRF Lite Deployment** drop-down list and select **back2BackAndToExternal**. When **back2BackAndToExternal** is selected, VRF-Lite inter fabric connections are automatically created between border devices of the VXLAN-EVPN (SJC-01 fabric in this example) fabric and the edge routers in the external fabric (external in-band fabric in this example).



VRF Lite Deployment*

back2Back&ToExternal

VRF Lite Inter-Fabric Connection Deployment Options. If 'Back2Back&ToExternal' is selected, VRF Lite IFCs are auto created between border devices of two Easy Fabrics, and between border devices in Easy Fabric and edge routers in External Fabric. The IP address is taken from the 'VRF Lite Subnet IP Range' pool.

☑ Auto Deploy for Peer

Whether to auto generate VRF LITE sub-interface and BGP peering configuration on managed neighbor devices. If set, auto created VRF Lite IFC links will have 'Auto Deploy for Peer' enabled.

☑ Auto Deploy Default VRF

For IPv4 underlay, whether to auto generate BGP peering in Default VRF for VRF Lite IFC auto deployment option. If set, will auto create VRF Lite Inter-Fabric links with 'Auto Deploy Default VRF' knob enabled

☑ Auto Deploy Default VRF for Peer

Whether to auto generate Default VRF interface and BGP peering configuration on managed neighbor devices. If set, auto created VRF Lite IFC links will have 'Auto Deploy Default VRF for Peer' enabled.

Redistribute BGP Route-map Name*

extcon-rmap-filter

Route Map used to redistribute BGP routes to IGP in default vrf in auto created VRF Lite IFC links

VRF Lite Subnet IP Range*

10.33.0.0/16

Address range to assign P2P Interfabric Connections

VRF Lite Subnet Mask*

30

(Min:8, Max:31)

VRF Lite IPv6 Subnet Range

fd00::a33:0/112

IPv6 Address range to assign P2P Interfabric Connections, used in L3Out

VRF Lite IPv6 Subnet Mask*

126

(Min:112, Max:127)

□ Auto Allocation of Unique IP on VRF Extension over VRF Lite IFC

Figure 54.

Fabric configuration options

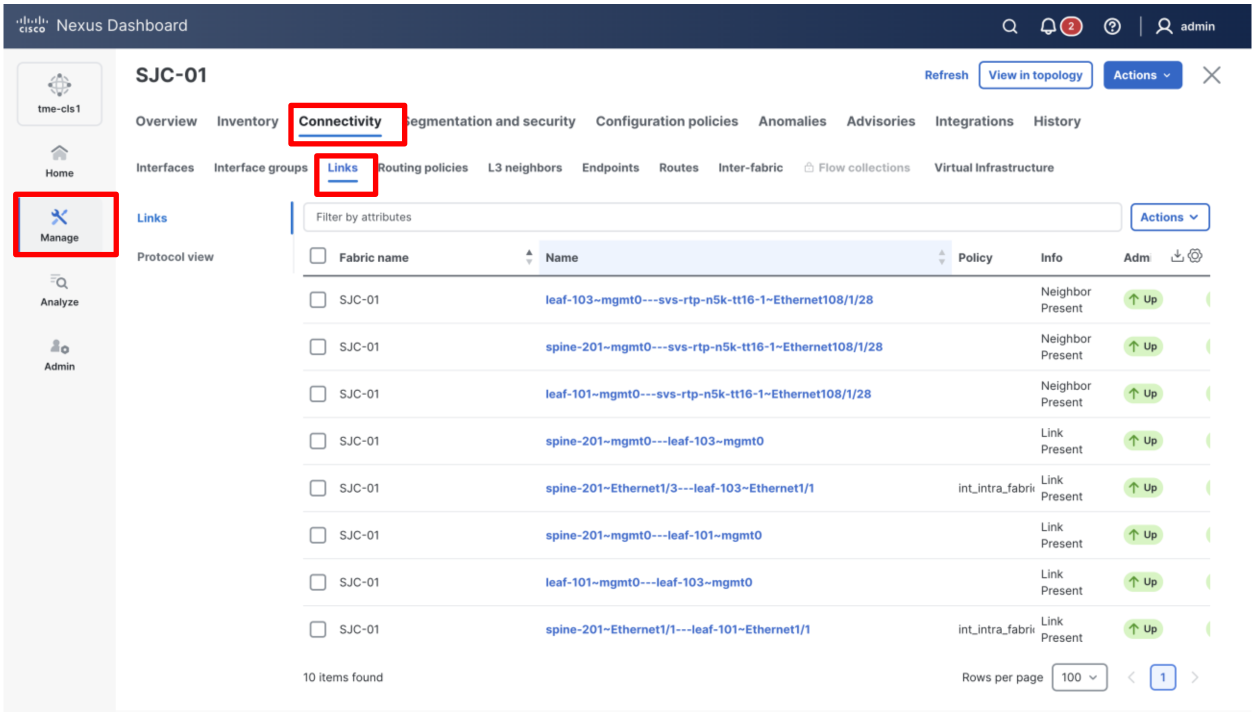
5. Check **Auto Deploy for Peer** check box to auto-generate the VRF-LITE sub-interface and BGP peering for the external fabric in managed mode.

6. Check **Auto Deploy Default VRF** check box to auto deploy the default VRF and BGP peering in the default VRF.

7. Check **Auto Deploy Default VRF for Peer** check box for Peer to auto deploy the default VRF and BGP peering in the default VRF for the external fabric in managed mode.

8. To create new links between the fabric and the external Layer 3 network, navigate to **Manage > Fabrics > <*fabric name*> > Connectivity > Links**.

Note: If you onboard the external fabric to Cisco Nexus Dashboard in "**Monitor**" mode, enable the **Auto Deploy Default VRF**.



Fabric name	Name	Policy	Info	Adm
SJC-01	leaf-103~mgmt0---svs-rtp-n5k-tt16-1~Ethernet108/1/28		Neighbor Present	Up
SJC-01	spine-201~mgmt0---svs-rtp-n5k-tt16-1~Ethernet108/1/28		Neighbor Present	Up
SJC-01	leaf-101~mgmt0---svs-rtp-n5k-tt16-1~Ethernet108/1/28		Neighbor Present	Up
SJC-01	spine-201~mgmt0---leaf-103~mgmt0		Link Present	Up
SJC-01	spine-201~Ethernet1/3---leaf-103~Ethernet1/1	int_intra_fabric	Link Present	Up
SJC-01	spine-201~mgmt0---leaf-101~mgmt0		Link Present	Up
SJC-01	leaf-101~mgmt0---leaf-103~mgmt0		Link Present	Up
SJC-01	spine-201~Ethernet1/1---leaf-101~Ethernet1/1	int_intra_fabric	Link Present	Up

10 items found

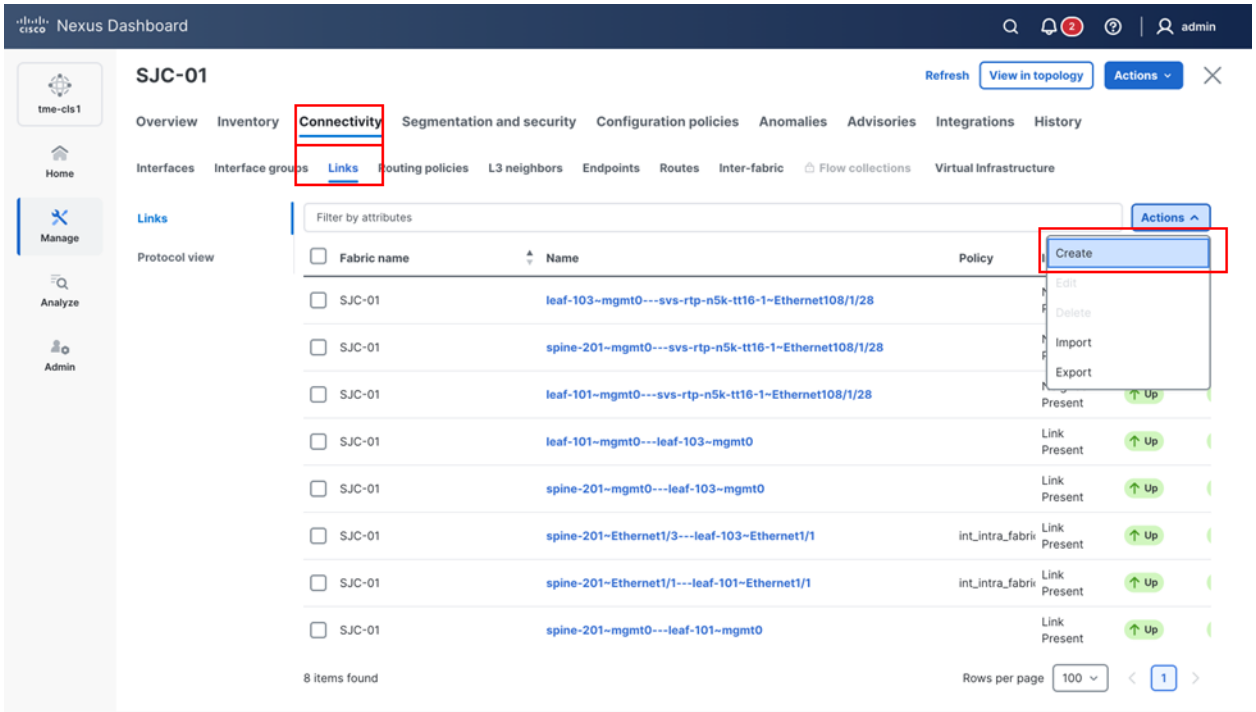
Rows per page 100 1

Figure 55.

Viewing links in the fabric

Note: By default, Cisco Nexus Dashboard automatically detects links that are physically connected and up between fabric devices using Cisco Discovery Protocol (CDP) or Link Layer Discovery Protocol (LLDP). You can edit these physical links with the required configuration. In this example, you create a new link to demonstrate the process

9. Click **Actions > Create Link**. The **Link management - create link** page appears.



Fabric name	Name	Policy	Info	Adm
SJC-01	leaf-103~mgmt0---svs-rtp-n5k-tt16-1~Ethernet108/1/28			
SJC-01	spine-201~mgmt0---svs-rtp-n5k-tt16-1~Ethernet108/1/28			
SJC-01	leaf-101~mgmt0---svs-rtp-n5k-tt16-1~Ethernet108/1/28		Present	Up
SJC-01	leaf-101~mgmt0---leaf-103~mgmt0		Link Present	Up
SJC-01	spine-201~mgmt0---leaf-103~mgmt0		Link Present	Up
SJC-01	spine-201~Ethernet1/3---leaf-103~Ethernet1/1	int_intra_fabric	Link Present	Up
SJC-01	spine-201~Ethernet1/1---leaf-101~Ethernet1/1	int_intra_fabric	Link Present	Up
SJC-01	spine-201~mgmt0---leaf-101~mgmt0		Link Present	Up

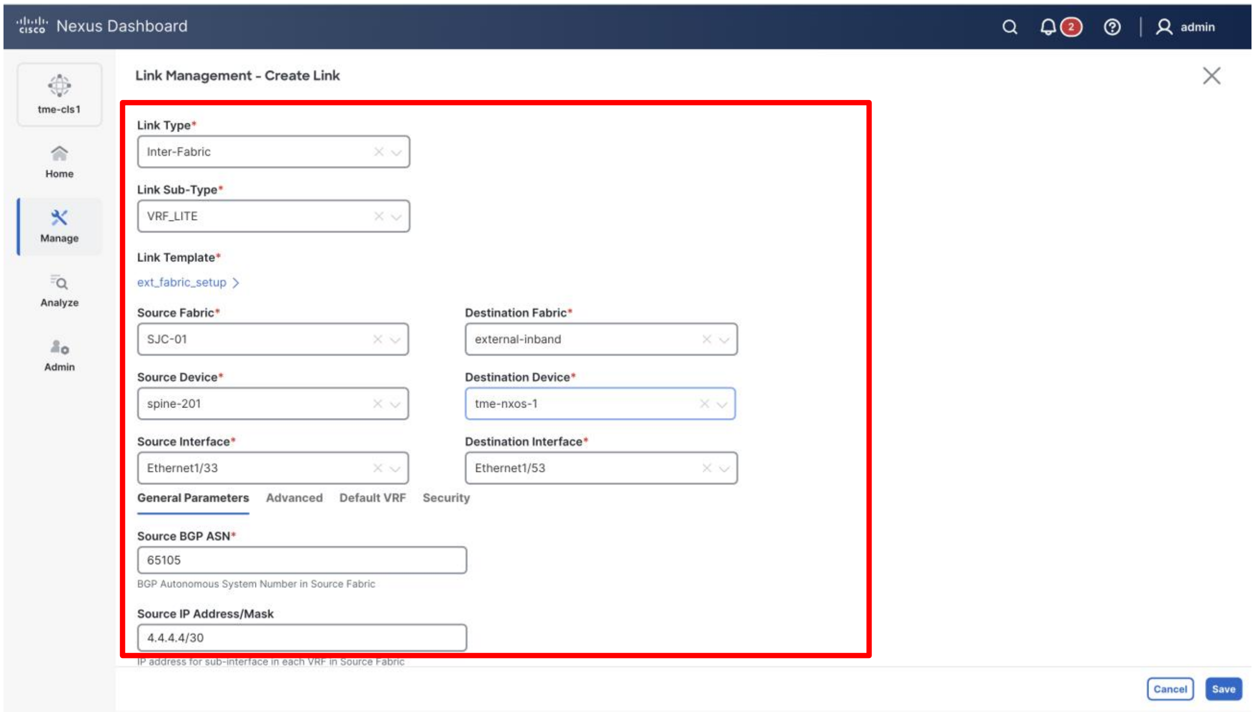
8 items found

Rows per page 100 1

Figure 56.
Creating a new link

10. Select the **Link type** as **Inter-Fabric** and select the **Link subtype** as **VRF_LITE**. Select **ext_fabric_setup** as the link template.

11. In this example, you are creating a link between the newly created VXLAN-EVPN fabric SJC-01 and your external in-band fabric as your Layer 3 network for establishing connectivity to Cisco Nexus Dashboard and for streaming telemetry. Provide the physical connectivity details by selecting the source device, destination device, source interface, and destination interface. Provide the **Source BGP ASN**, as well as the **Source IP Address/Mask**, along with the destination IP address.



Link Management - Create Link

Link Type* Inter-Fabric

Link Sub-Type* VRF_LITE

Link Template* ext_fabric_setup

Source Fabric* SJC-01

Destination Fabric* external-inband

Source Device* spine-201

Destination Device* tme-nxos-1

Source Interface* Ethernet1/33

Destination Interface* Ethernet1/53

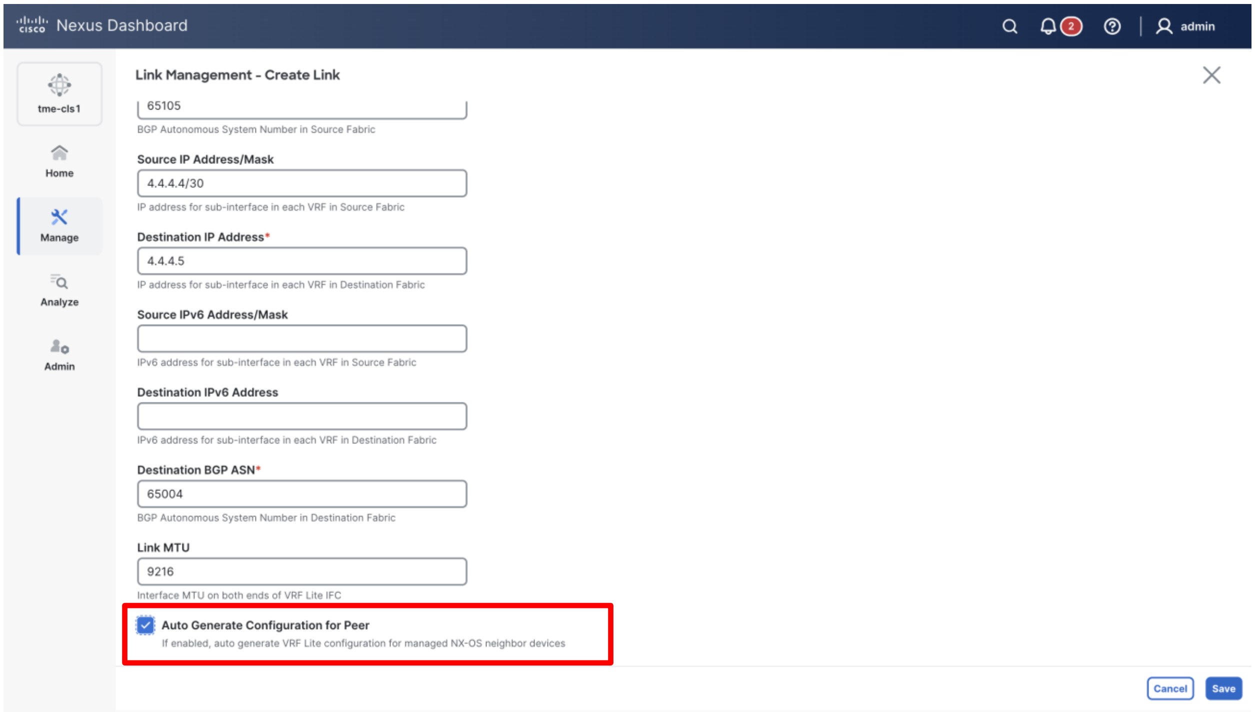
General Parameters | Advanced | Default VRF | Security

Source BGP ASN* 65105
BGP Autonomous System Number in Source Fabric

Source IP Address/Mask 4.4.4.4/30
IP address for sub-interface in each VRF in Source Fabric

Figure 57.
Providing the configuration parameters for the new link

12. Check **Auto Generate Configuration for Peer** check box and click **Save**. (By clicking this, Cisco Nexus Dashboard automates the configuration and deployment for the neighbor device provided the external fabric being managed by Cisco Nexus Dashboard as well.)



Link Management - Create Link

65105
BGP Autonomous System Number in Source Fabric

Source IP Address/Mask: 4.4.4.4/30
IP address for sub-interface in each VRF in Source Fabric

Destination IP Address*: 4.4.4.5
IP address for sub-interface in each VRF in Destination Fabric

Source IPv6 Address/Mask:
IPv6 address for sub-interface in each VRF in Source Fabric

Destination IPv6 Address:
IPv6 address for sub-interface in each VRF in Destination Fabric

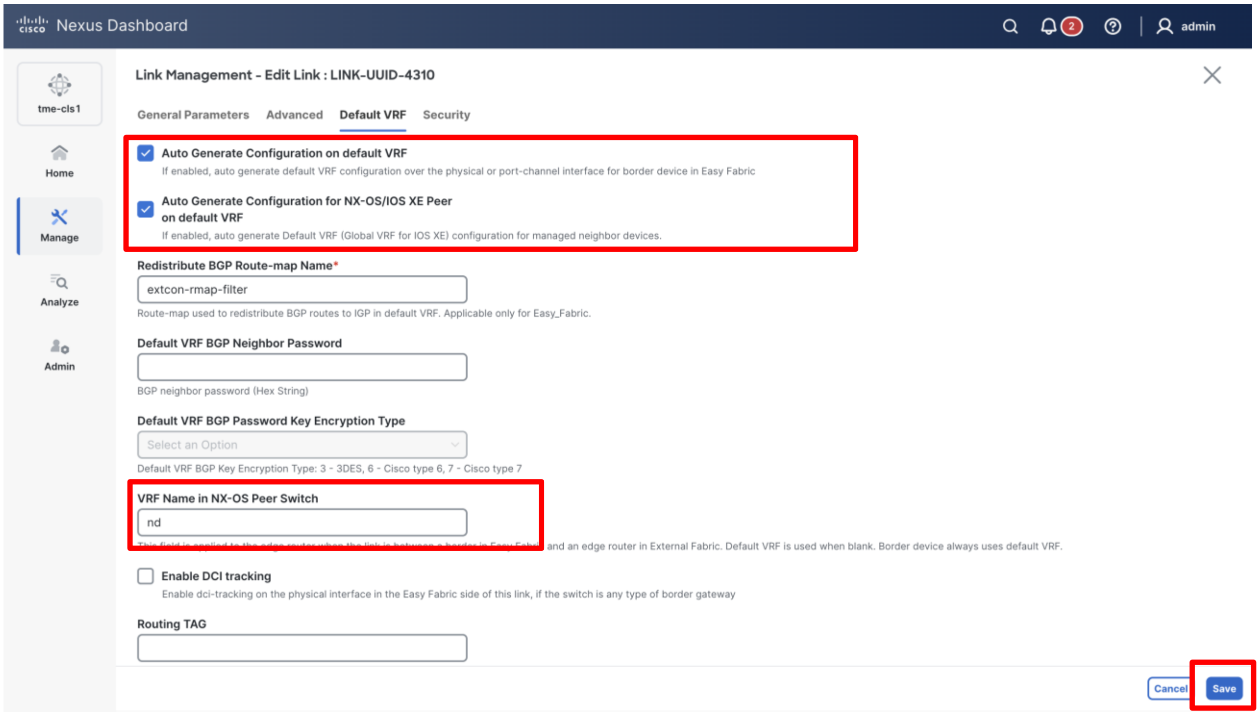
Destination BGP ASN*: 65004
BGP Autonomous System Number in Destination Fabric

Link MTU: 9216
Interface MTU on both ends of VRF Lite IFC

☑ Auto Generate Configuration for Peer
If enabled, auto generate VRF Lite configuration for managed NX-OS neighbor devices

Figure 58.
Providing the configuration parameters for the new link

13. Click **Default VRF** tab.



Link Management - Edit Link : LINK-UUID-4310

☑ Auto Generate Configuration on default VRF
If enabled, auto generate default VRF configuration over the physical or port-channel interface for border device in Easy Fabric

☑ Auto Generate Configuration for NX-OS/IOS XE Peer on default VRF
If enabled, auto generate Default VRF (Global VRF for IOS XE) configuration for managed neighbor devices.

Redistribute BGP Route-map Name*: extcon-rmap-filter
Route-map used to redistribute BGP routes to IGP in default VRF. Applicable only for Easy_Fabric.

Default VRF BGP Neighbor Password:
BGP neighbor password (Hex String)

Default VRF BGP Password Key Encryption Type: Select an Option
Default VRF BGP Key Encryption Type: 3 - 3DES, 6 - Cisco type 6, 7 - Cisco type 7

VRF Name in NX-OS Peer Switch: nd
This field is applied to the edge router when the link is between a border in Easy Fabric and an edge router in External Fabric. Default VRF is used when blank. Border device always uses default VRF.

☐ Enable DCI tracking
Enable dci-tracking on the physical interface in the Easy Fabric side of this link, if the switch is any type of border gateway

Routing TAG:

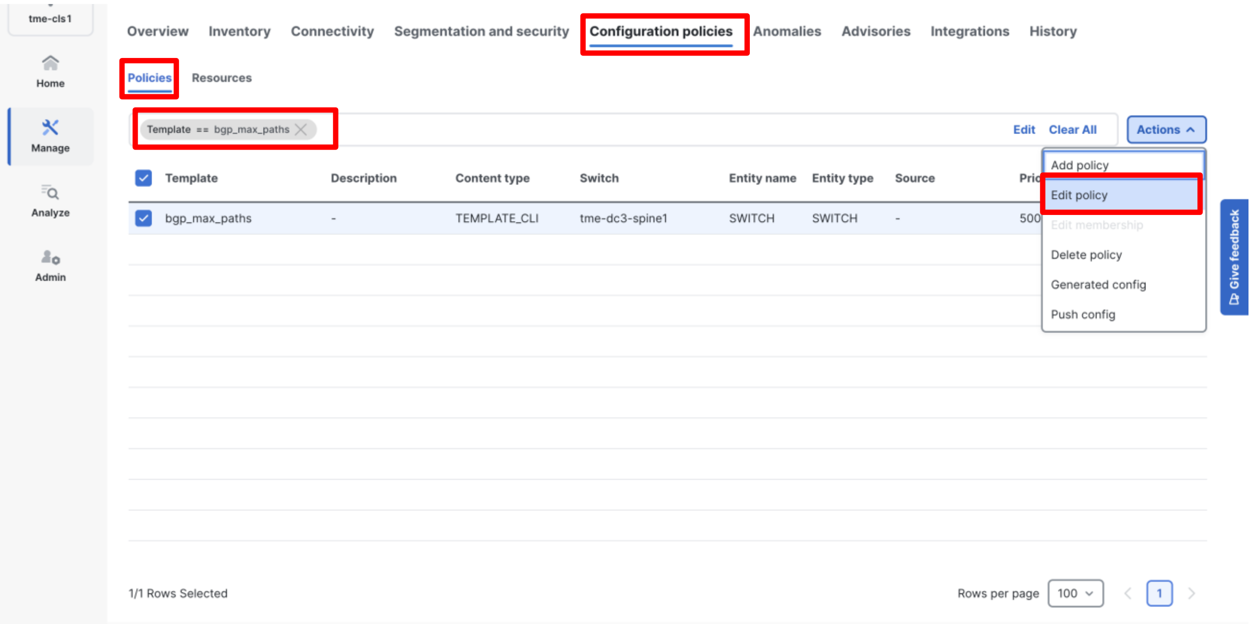
Figure 59.
Modifying default-VRF options for the link

14. Check the **Auto Generate Configuration on default VRF** check box. This enables the creation of default VRF configuration over the physical interface of the border devices in the fabric.

15. Check the **Auto Generate Configuration for NX-OS/IOS-XE Peer on default VRF** check box, provided the peer (external fabric) is being managed by Cisco Nexus Dashboard.

16. In the **VRF Name in NX-OS Peer Switch**, enter the custom VRF name if the neighboring device in the external fabric is an edge and you would like to use a custom VRF on that edge, provided the external fabric is being managed by Cisco Nexus Dashboard.

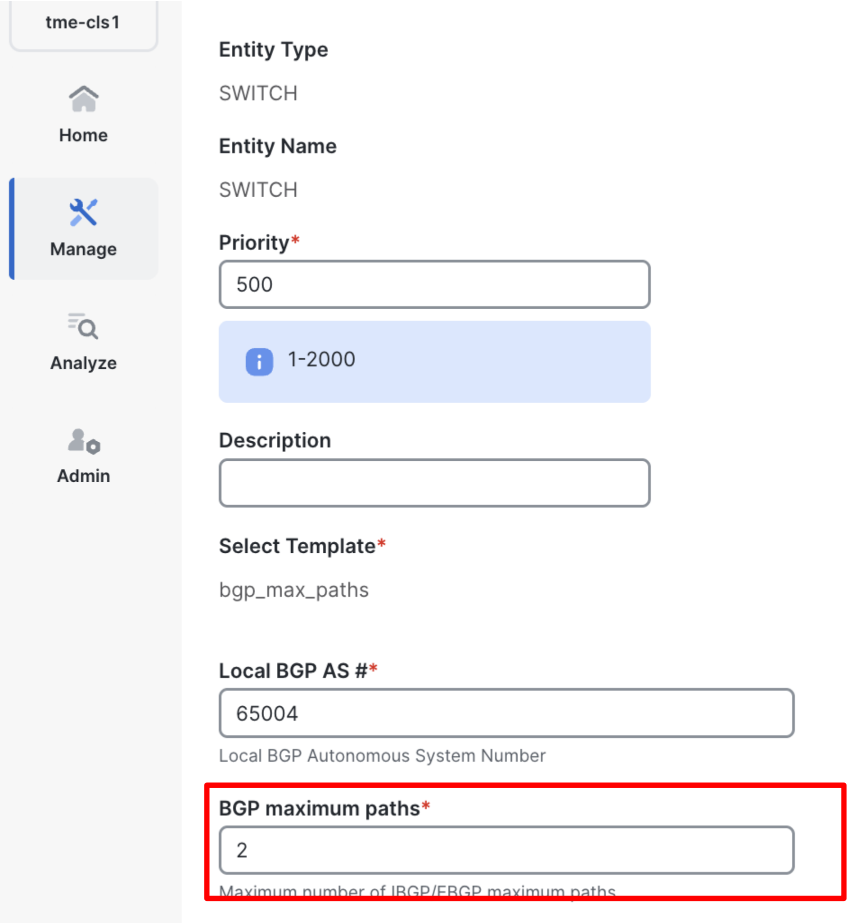
17. Add or modify BGP max paths policy template. Navigate to **Manage > Fabrics > <fabric Name> > Configuration policies > Policy**, search for **Template == bgp_max_paths**. If this policy does not exist, create a new one. In our example, you have already created one, so you will modify the template.



☑ Template	Description	Content type	Switch	Entity name	Entity type	Source	Pri
☑ bgp_max_paths	-	TEMPLATE_CLI	tme-dc3-spine1	SWITCH	SWITCH	-	500

Figure 60.
Editing bgp_max_paths policy

18. Edit this policy to add the **BGP maximum paths** as 2. This is essential in our case since you use 2 edge routers in our external fabric for redundancy. This means that there are 2 paths to reach our Cisco Nexus Dashboard data interface from the 2 respective external devices. This is useful for enabling ECMP such that both switches and respective paths can be used.



Entity Type

SWITCH

Entity Name

SWITCH

Priority*

500

1-2000

Description

Select Template*

bgp_max_paths

Local BGP AS #*

65004

Local BGP Autonomous System Number

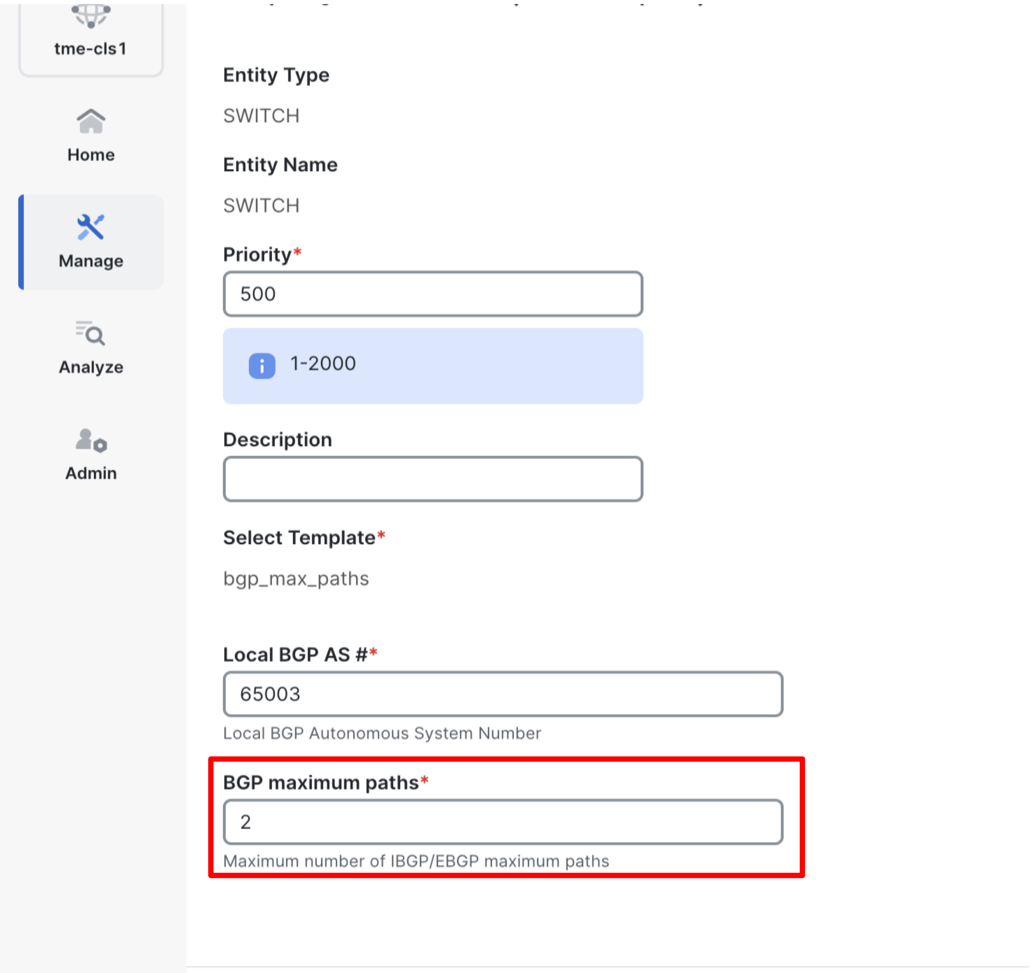
BGP maximum paths*

2

Maximum number of IBGP/EBGP maximum paths

Figure 61.

Editing BGP maximum paths configuration for local BGP AS 65004



Entity Type
SWITCH

Entity Name
SWITCH

Priority*
500

1-2000

Description

Select Template*
bgp_max_paths

Local BGP AS #*
65003
Local BGP Autonomous System Number

BGP maximum paths*
2
Maximum number of IBGP/EBGP maximum paths

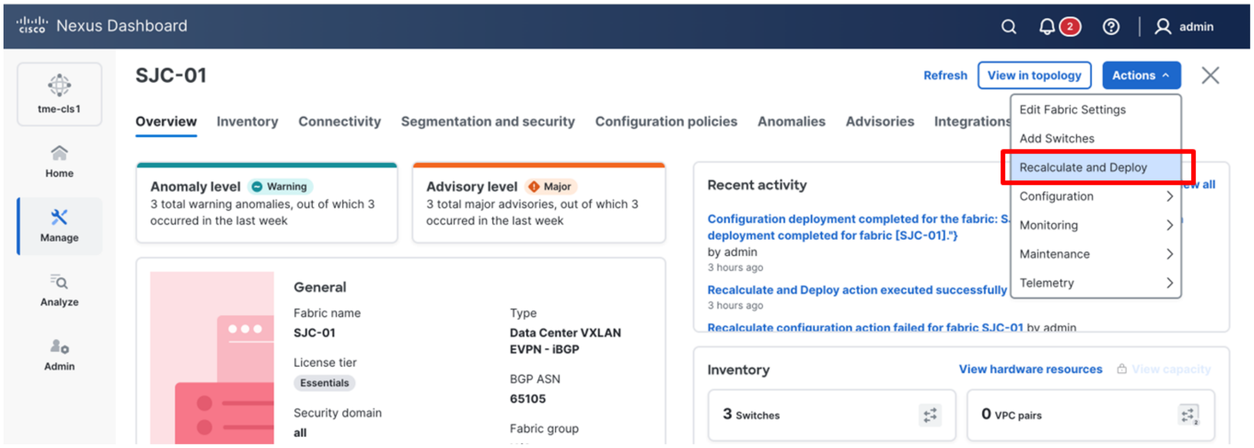
Figure 62.
Editing BGP maximum paths configuration for local BGP AS 65003

19. Click **Save**.
20. Click **Actions** and select **Recalculate and Deploy** to deploy all the telemetry configuration on the fabric.
21. Verify that the data network subnet (192.0.2.0/24) is advertised to the fabric through external Border Gateway Protocol (eBGP) sessions.
    If the external switches are Cisco NX-OS and the default gateway for the Cisco Nexus Dashboard data subnet is a Switch Virtual Interface (SVI) running Hot Standby Router Protocol (HSRP), add a redistribution statement under the BGP configuration to advertise that subnet.

```
tme-nxos-1# show running-config interface vlan 10

interface Vlan10

  no shutdown

  vrf member nd

  ip address 192.168.10.252/24

  hsrp 10
```

```
    ip 192.168.10.254

router bgp 65004
vrf nd
    address-family ipv4 unicast
      redistribute direct route-map direct-connect-svi □
      maximum-paths 64
      maximum-paths ibgp 2

tme-nxos-2# show running-config interface vlan 10
interface Vlan10
  no shutdown
  vrf member nd
  ip address 192.168.10.253/24
  hsrp 10
    ip 192.168.10.254

router bgp 65004
vrf nd
    address-family ipv4 unicast
      redistribute direct route-map direct-connect-svi □
      maximum-paths 64
      maximum-paths ibgp 2
```

Note: If Cisco Nexus Dashboard manages the external fabric, perform a **Recalculate and Deploy** on that fabric.



Anomaly level Warning
3 total warning anomalies, out of which 3 occurred in the last week

Advisory level Major
3 total major advisories, out of which 3 occurred in the last week

Configuration deployment completed for the fabric: S... deployment completed for fabric [SJC-01].")
by admin
3 hours ago

Recalculate and Deploy action executed successfully
3 hours ago

Recalculate configuration failed for fabric SJC-01 by admin

General
Fabric name: SJC-01
Type: Data Center VXLAN EVPN - iBGP
License tier: Essentials
BGP ASN: 65105
Security domain: all
Fabric group

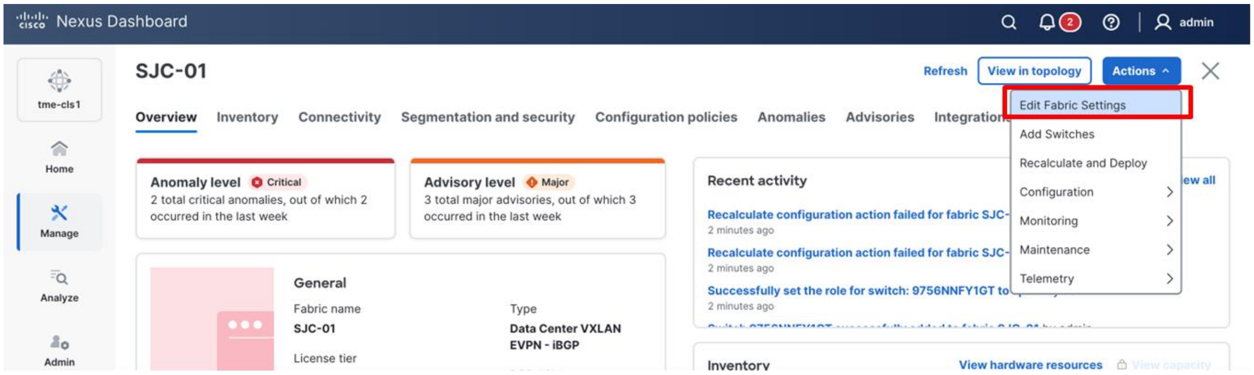
Inventory
3 Switches
0 VPC pairs

Figure 63.
Performing Recalculate and Deploy on the fabric

Network Time Protocol (NTP) Configuration

For a network site managed by Cisco Nexus Dashboard, enable and configure NTP on Cisco Nexus Dashboard. This will push the NTP configs to all the switches.

1. Navigate to **Manage > Fabrics**, select the **fabric <*fabric name*>**.
2. From **Actions** drop-down list, select **Edit fabric settings**.



Anomaly level Critical
2 total critical anomalies, out of which 2 occurred in the last week

Advisory level Major
3 total major advisories, out of which 3 occurred in the last week

Recalculate configuration action failed for fabric SJC-
2 minutes ago

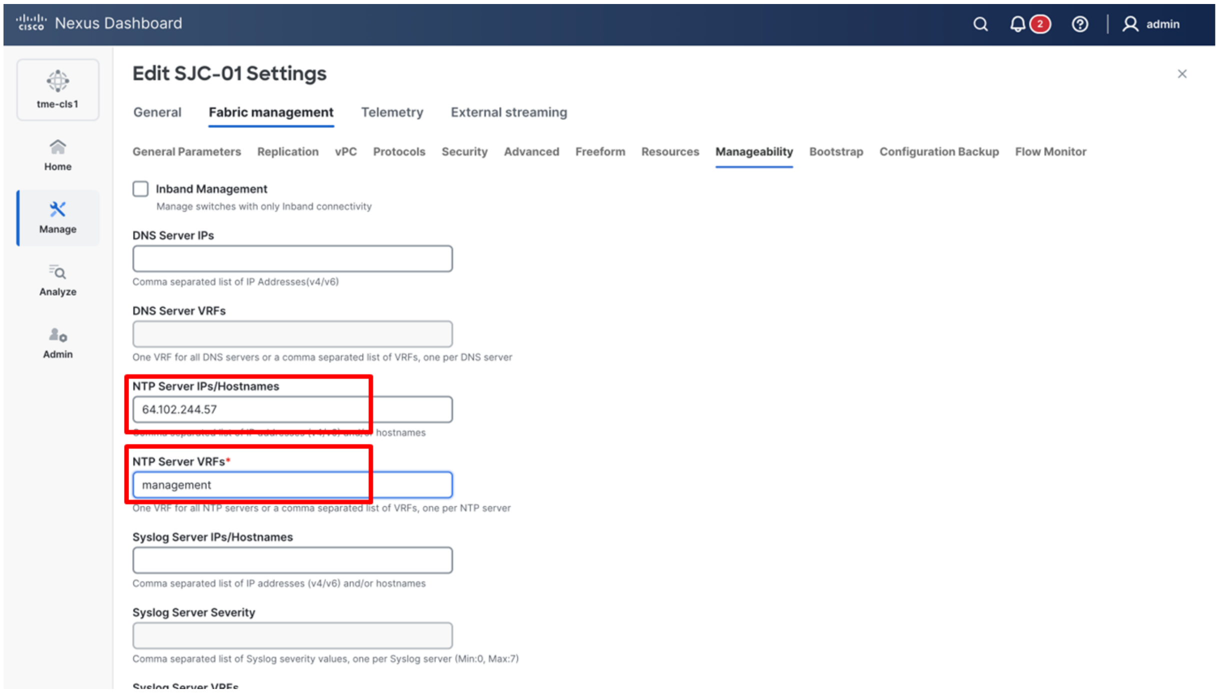
Recalculate configuration action failed for fabric SJC-
2 minutes ago

Successfully set the role for switch: 9756NNFY1GT to
2 minutes ago

General
Fabric name: SJC-01
Type: Data Center VXLAN EVPN - iBGP
License tier

Figure 64.
Editing fabric details for the fabric

3. Go to **Fabric Management > Manageability** tab to fill in the NTP server IP and VRF details and click **Save**.



Edit SJC-01 Settings

□ Inband Management
Manage switches with only Inband connectivity

DNS Server IPs
Comma separated list of IP Addresses(v4/v6)

DNS Server VRFs
One VRF for all DNS servers or a comma separated list of VRFs, one per DNS server

NTP Server IPs/Hostnames: 64.102.244.57
Comma separated list of IP addresses (v4/v6) and/or hostnames

NTP Server VRFs*: management
One VRF for all NTP servers or a comma separated list of VRFs, one per NTP server

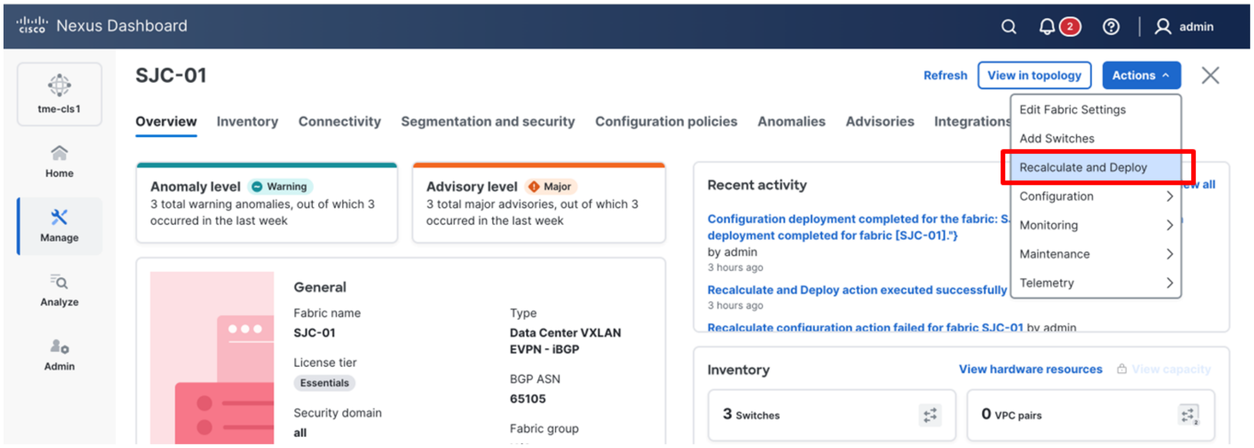
Syslog Server IPs/Hostnames
Comma separated list of IP addresses (v4/v6) and/or hostnames

Syslog Server Severity
Comma separated list of Syslog severity values, one per Syslog server (Min:0, Max:7)

Syslog Server VRFs

Figure 65.
Configuring NTP server on the fabric

4. From **Actions** drop-down list, select **Recalculate and Deploy**.



Anomaly level Warning
3 total warning anomalies, out of which 3 occurred in the last week

Advisory level Major
3 total major advisories, out of which 3 occurred in the last week

Recent activity
Configuration deployment completed for the fabric: S... deployment completed for fabric [SJC-01]."}
by admin
3 hours ago
Recalculate and Deploy action executed successfully
3 hours ago
Recalculate configuration action failed for fabric SJC-01 by admin

General
Fabric name: SJC-01
Type: Data Center VXLAN EVPN - iBGP
License tier: Essentials
BGP ASN: 65105
Security domain: all
Fabric group

Inventory
3 Switches
0 vPC pairs

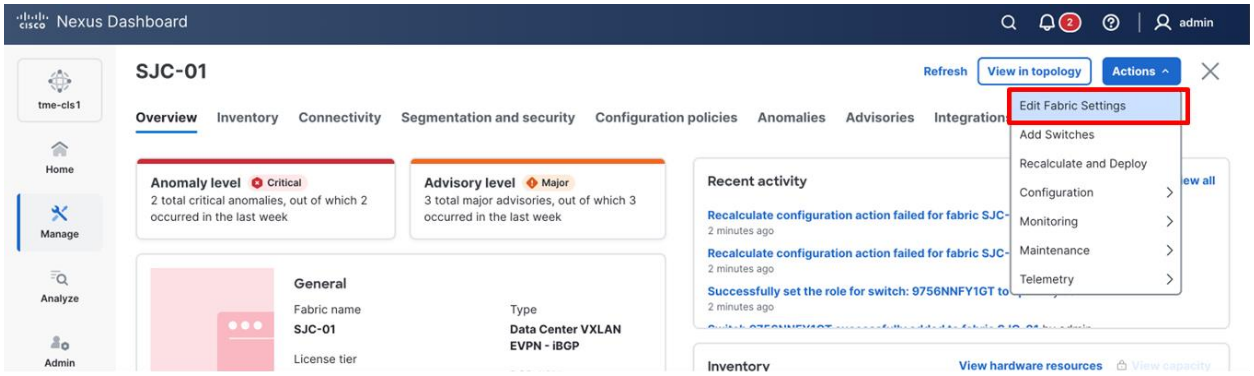
Figure 66.
Performing Recalculate and Deploy on the fabric

Precision Time Protocol (PTP) Configuration

Note: PTP is only required for Traffic Analytics and Flow Telemetry features.

When PTP is enabled, it becomes the default clock even if NTP is enabled on the switches. PTP requires a source loopback used for exchanging PTP packets and a PTP domain ID that defines boundaries of the PTP messages. Cisco Nexus Dashboard offers easy site setup for enabling PTP.

1. Navigate to **Manage > Fabrics**, select the **fabric <fabric name>**, from the drop-down list, select **Edit fabric settings.**



Anomaly level Critical
2 total critical anomalies, out of which 2 occurred in the last week

Advisory level Major
3 total major advisories, out of which 3 occurred in the last week

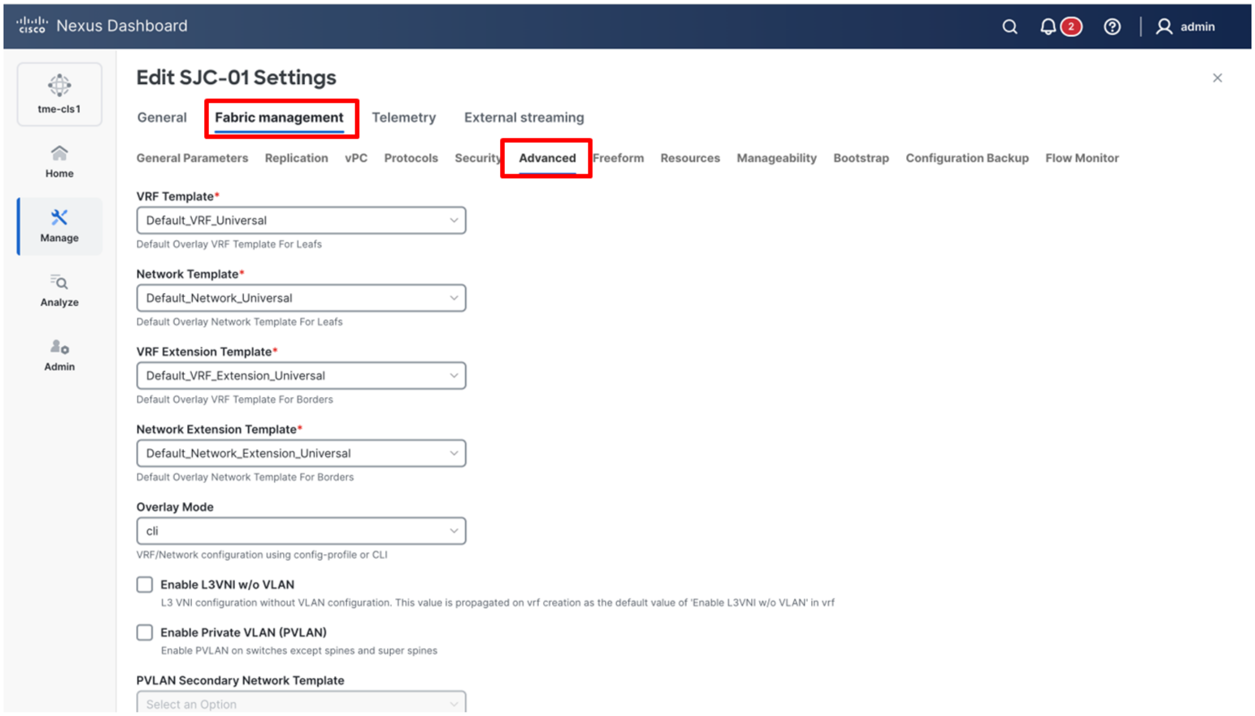
Recent activity
Recalculate configuration action failed for fabric SJC-
2 minutes ago
Recalculate configuration action failed for fabric SJC-
2 minutes ago
Successfully set the role for switch: 9756NNFY1GT to
2 minutes ago

General
Fabric name
SJC-01
Type
Data Center VXLAN EVPN - iBGP
License tier

Inventory

Figure 67.
Editing fabric settings

2. Click **Fabric management > Advanced** tab and select **Enable Precision Time Protocol (PTP)**. Enter your values in **PTP Source Loopback Id**, and **PTP Domain Id**. Click **Save.** This enables PTP globally and on core-facing interfaces.



Edit SJC-01 Settings

VRF Template*
Default_VRF_Universal
Default Overlay VRF Template For Leafs

Network Template*
Default_Network_Universal
Default Overlay Network Template For Leafs

VRF Extension Template*
Default_VRF_Extension_Universal
Default Overlay VRF Template For Borders

Network Extension Template*
Default_Network_Extension_Universal
Default Overlay Network Template For Borders

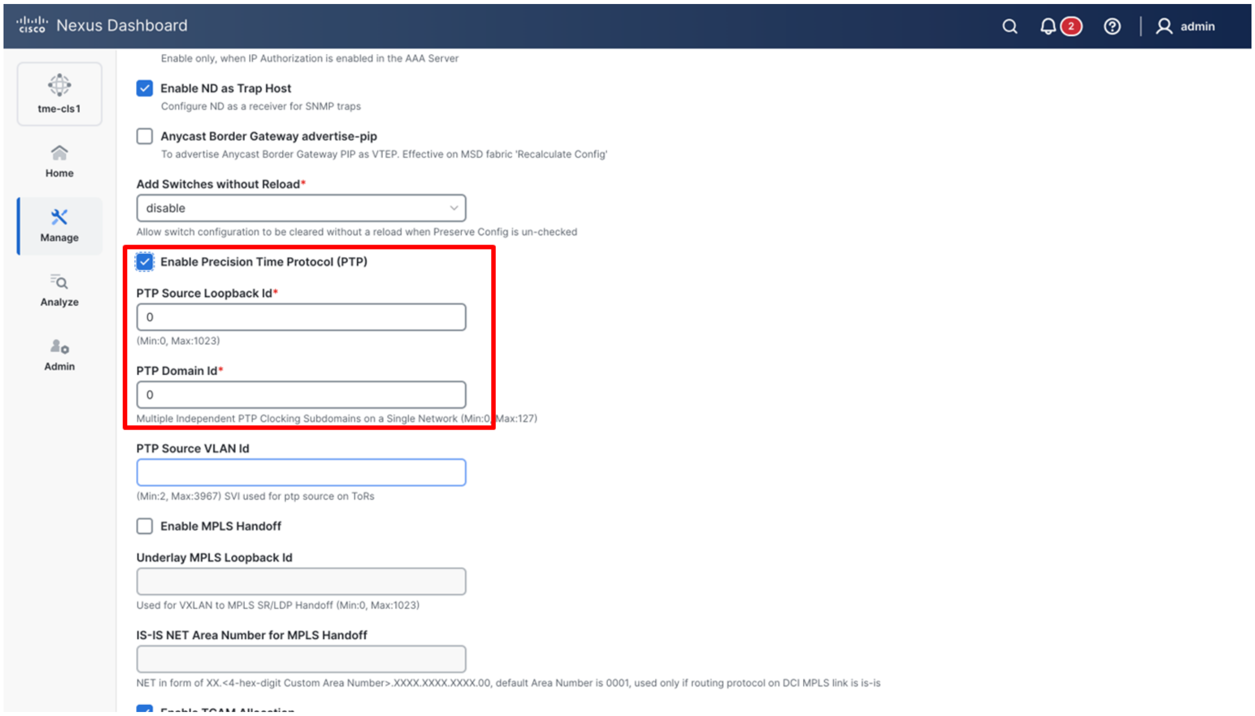
Overlay Mode
cli
VRF/Network configuration using config-profile or CLI

☐ Enable L3VNI w/o VLAN
L3 VNI configuration without VLAN configuration. This value is propagated on vrf creation as the default value of 'Enable L3VNI w/o VLAN' in vrf

☐ Enable Private VLAN (PVLAN)
Enable PVLAN on switches except spines and super spines

PVLAN Secondary Network Template
Select an Option

Figure 68.
Editing Advanced tab



Enable only, when IP Authorization is enabled in the AAA Server

☑ Enable ND as Trap Host
Configure ND as a receiver for SNMP traps

□ Anycast Border Gateway advertise-pip
To advertise Anycast Border Gateway PIP as VTEP. Effective on MSD fabric 'Recalculate Config'

Add Switches without Reload*
disable
Allow switch configuration to be cleared without a reload when Preserve Config is un-checked

☑ Enable Precision Time Protocol (PTP)

PTP Source Loopback Id*
0
(Min:0, Max:1023)

PTP Domain Id*
0
Multiple Independent PTP Clocking Subdomains on a Single Network (Min:0, Max:127)

PTP Source VLAN Id
(Min:2, Max:3967) SVI used for ptp source on ToRs

□ Enable MPLS Handoff

Underlay MPLS Loopback Id
Used for VXLAN to MPLS SR/LDP Handoff (Min:0, Max:1023)

IS-IS NET Area Number for MPLS Handoff
NET in form of XX.<4-hex-digit Custom Area Number>.XXXX.XXXX.XXXX.00, default Area Number is 0001, used only if routing protocol on DCI MPLS link is is-is

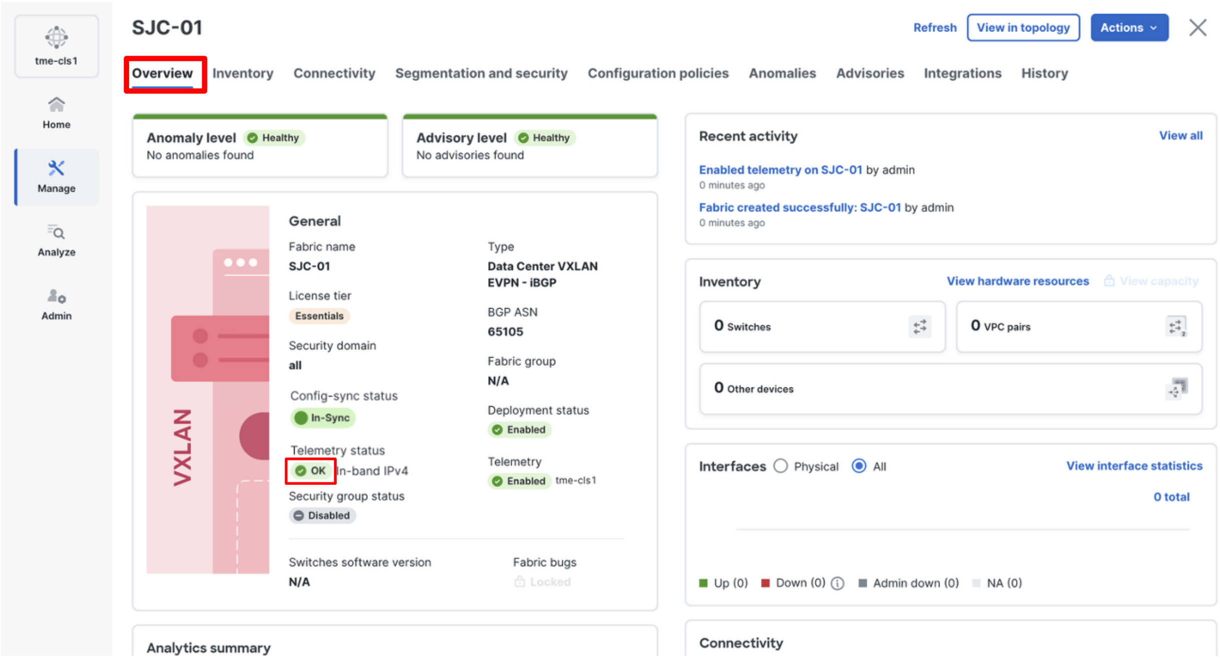
Figure 69.
Configuring PTP

3. From the **Actions** drop-down list, select **Recalculate and Deploy** to ensure switches are configured with the required PTP settings as configured in Cisco Nexus Dashboard.

NTP and PTP verifications

To verify PTP status on Cisco Nexus Dashboard

1. To verify PTP on Cisco Nexus Dashboard, go to **Manage > Fabrics > <*fabric Name*>** (SJC-01 in this example) **> Overview > Telemetry status** as **OK/Not OK**.



SJC-01

Anomaly level Healthy
No anomalies found

Advisory level Healthy
No advisories found

General

Fabric name
SJC-01

Type
Data Center VXLAN EVPN - iBGP

License tier
Essentials

BGP ASN
65105

Security domain
all

Fabric group
N/A

Config-sync status
In-Sync

Deployment status
Enabled

Telemetry status
OK In-band IPv4

Telemetry
Enabled tme-cls1

Security group status
Disabled

Switches software version
N/A

Fabric bugs
Locked

Recent activity

Enabled telemetry on SJC-01 by admin
0 minutes ago

Fabric created successfully: SJC-01 by admin
0 minutes ago

Inventory

0 Switches

0 VPC pairs

0 Other devices

Interfaces ○ Physical ● All

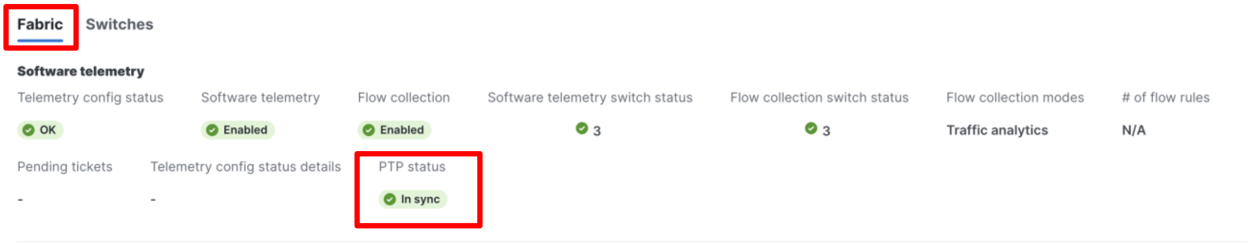
0 total

🟩 Up (0) 🟥 Down (0) ■ Admin down (0) ■ NA (0)

Figure 70.

Reviewing telemetry status of the fabric

2. On the **Fabric** tab, verify the **PTP status** if it displays **In sync**.



Software telemetry

Telemetry config status	Software telemetry	Flow collection	Software telemetry switch status	Flow collection switch status	Flow collection modes	# of flow rules
OK	Enabled	Enabled	3	3	Traffic analytics	N/A

Pending tickets	Telemetry config status details	PTP status
-	-	In sync

Figure 71.

Verifying PTP status on the fabric via Cisco Nexus Dashboard

To verify the PTP status on the switches

With either managed or monitored mode fabrics, verifications on the switch remain the same.

3. NTP verifications: Login to the switches to confirm the configuration and clock settings. Verify below commands for NTP setup on the switch as the clock time source.

```
leaf-101(config)# show run ntp

!Command: show running-config ntp

!No configuration change since last restart

!Time: Sun Feb 9 21:54:40 2025

version 10.5(3) Bios:version 05.40

ntp server 64.102.244.57
```

```
 use-vrf management -> Verify the configuration


leaf-101(config)# show clock

21:53:34.997 UTC Sun Feb 9 2025

Time source is NTP -> Verify NTP is the time source


leaf-101(config)# show ntp peers

-----------------------------------------------------

     Peer IP Address          Serv/Peer

-----------------------------------------------------

     64.102.244.57

         Server (configured)  -> Verify the server is configured
```

- PTP Verifications: After enabling PTP either through Nexus Dashboard or CLI configurations, verify below commands for PTP on the switch as the clock time source.

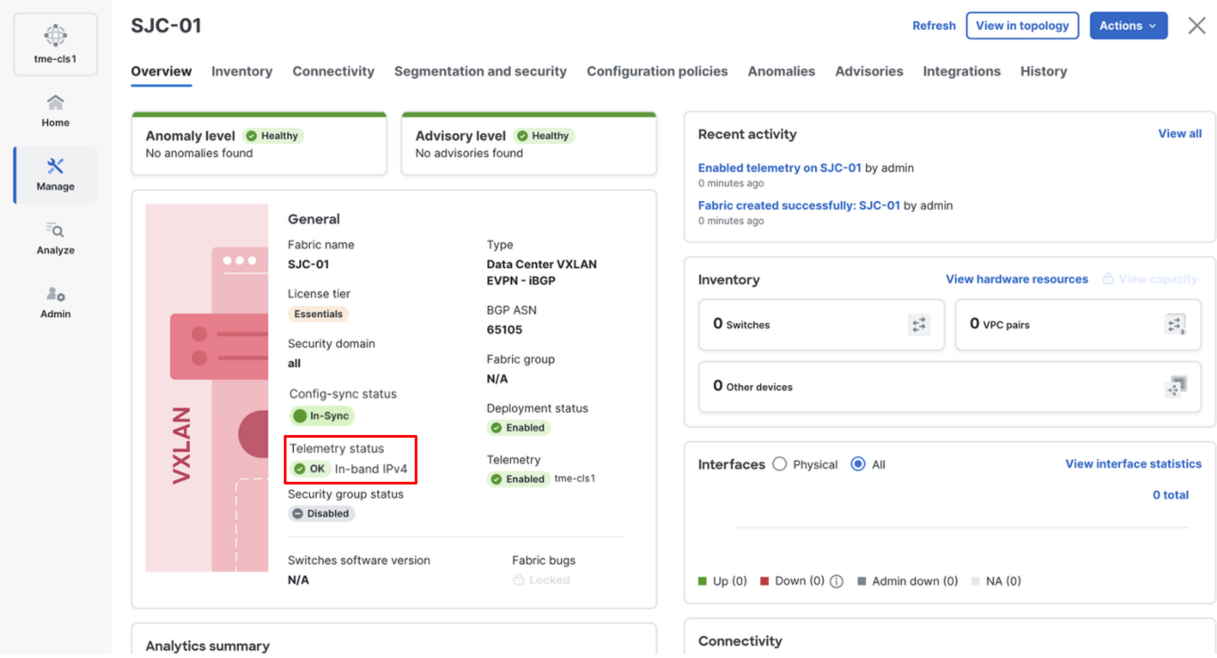
```
leaf-101# show run ptp

feature ptp. -> Verify that PTP is enabled and configured on the interfaces

ptp source 10.0.0.1

ptp domand 0

interface Ethernet1/1

    ptp

interface Ethernet1/33

    ttag

      ttag-strip


leaf-101# show clock

01:56:04.353 UTC sun Feb 9 2025

Time source is PTP -> Verify PTP is the time source


leaf-101# show ptp clock foreign-masters record

P1=Priority1, P2=Priority2, C=Class, A=Accuracy,

OSLV=Offset-Sclaed-Log-Variance, SR=Steps-Removed

GM=Is grandmaster
```

```
----------   -------------------   ---   ----   ----   ---   -----   ----------
Interface         Clock-ID         P1    P2     C      A     OSLV    SR
----------   -------------------   ---   ----   ----   ---   -----   ----------
Eth1/1    2c:4f:52:ff:fe:56:61:1f  255   255    248    254   65535   1

-> Verify if it can reach the grand master on its ptp configured interfaces


leaf-101# show ptp clock
PTP Device Type : boundary-clock
PTP Device Encapsulation : NA
PTP Source IP Address : 10.2.0.1  -> Verify if source loopback IP is as configured
Clock Identity : d4:78:9b:ff:fe:19:87:c3
Clock Domain: 0
Slave Clock Operation : Two-step
Master Clock Operation : Two-step
Clave-Only Clock Mode : Disabled
Number of PTP ports: 3
Priority1 : 255
Priority2 : 255
Clock Quality:
        Class : 248
                  Accuracy : 254
                  Offset (log variance) :
Offset From Master : 12
Mean Path Delay : 168
Steps removed : 2
Correction range : 100000
MPD range : 1000000000
Local clock time: Fri Aug 22 01:56:08 2025
PTP clock state             : Locked
```

```
leaf-101# show ptp parent
PTP PARENT PROPERTIES
Parent Clock:
Parent Clock Identity: 2c:4f:52:ff:fe:56:61:1f
Parent Port Number: 4
Observed Parent Offset (log variance): NA
Observed Parent Clock Phase Change Rate: N/A

Parent IP: 10.2.0.4
Grandmaster Clock:
Grandmaster Clock Identity: 00:ee:ab:ff:fe:3a:16:e7  -> Get the Grandmaster clock ID
Grandmaster Clock Quality
        Class : 248
                  Accuracy : 254
                  Offset (log variance) : 65535
                  Priority1: 255
                  Priority2: 255

spine-201# show ptp clock foreign-masters record
P1=Priority1, P2=Priority2, C=Class, A=Accuracy,
OSLV=Offset-Scaled-Log-Variance, SR=Steps-Removed
GM=Is grandmaster
----------   ---------------------   ---   ----   ----   ---   -----   ----------
Interface         Clock-ID           P1    P2     C      A     OSLV    SR
----------   ---------------------   ---   ----   ----   ---   -----   ----------
Eth1/4     00:ee:ab:ff:fe:3a:16:e7   255   255    248    254   65535   1      GM
-> Check the Grandmaster clock ID and confirm the right Grandmaster registration on the clients
```

Verification of Successful Telemetry Deployment

1. If BGP sessions establish correctly between the border device and the edge routers after deployment, the **Telemetry** tab displays **Enabled** and the **Telemetry Status** displays **OK** on the fabric overview page.



SJC-01

Anomaly level: Healthy — No anomalies found

Advisory level: Healthy — No advisories found

General

Fabric name: SJC-01

Type: Data Center VXLAN EVPN - iBGP

License tier: Essentials

BGP ASN: 65105

Security domain: all

Fabric group: N/A

Config-sync status: In-Sync

Deployment status: Enabled

Telemetry status: OK In-band IPv4

Telemetry: Enabled tme-cls1

Security group status: Disabled

Switches software version: N/A

Fabric bugs: Locked

Recent activity

Enabled telemetry on SJC-01 by admin — 0 minutes ago

Fabric created successfully: SJC-01 by admin — 0 minutes ago

Inventory

0 Switches

0 VPC pairs

0 Other devices

Interfaces ○ Physical ● All

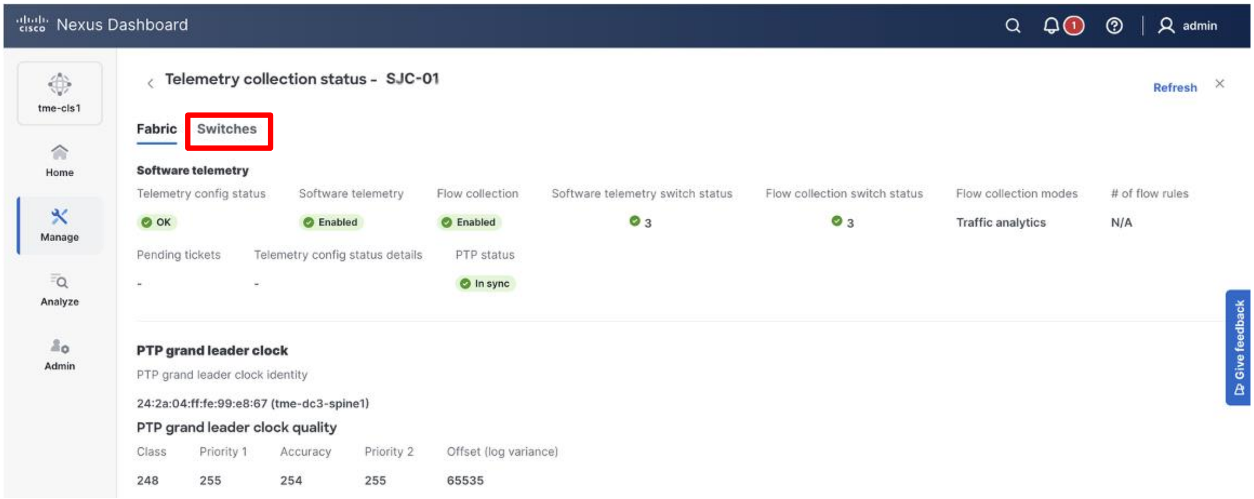
0 total

🟩 Up (0) 🟥 Down (0) ■ Admin down (0) ■ NA (0)

Figure 72.

Verifying telemetry status of the fabric

2. To view the deployed configuration, select **Telemetry Status OK**, then select the **Switches** tab.



Telemetry collection status - SJC-01

Fabric | Switches

Software telemetry

Telemetry config status	Software telemetry	Flow collection	Software telemetry switch status	Flow collection switch status	Flow collection modes	# of flow rules
OK	Enabled	Enabled	3	3	Traffic analytics	N/A

Pending tickets	Telemetry config status details	PTP status
-	-	In sync

PTP grand leader clock

PTP grand leader clock identity

24:2a:04:ff:fe:99:e8:67 (tme-dc3-spine1)

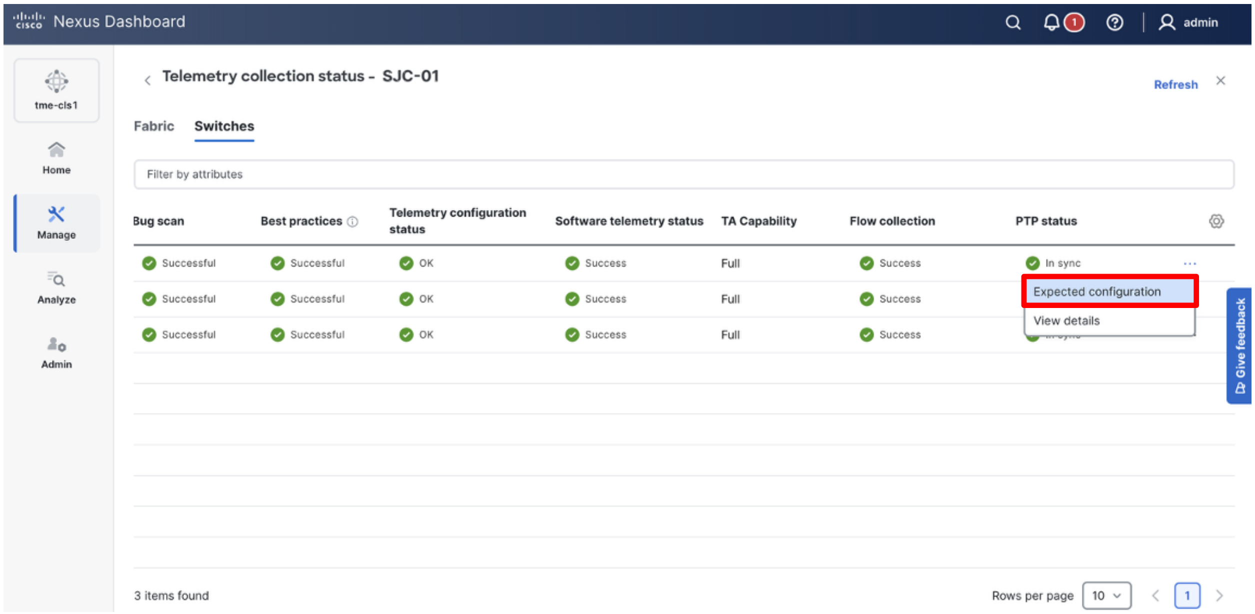
PTP grand leader clock quality

Class	Priority 1	Accuracy	Priority 2	Offset (log variance)
248	255	254	255	65535

Figure 73.

Reviewing the telemetry configuration that is being pushed to the fabric switches

3. Select the configuration for a switch in the **PTP status** and select **Expected configuration** to view the details deployed in it.



Telemetry collection status - SJC-01

Fabric | Switches

Filter by attributes

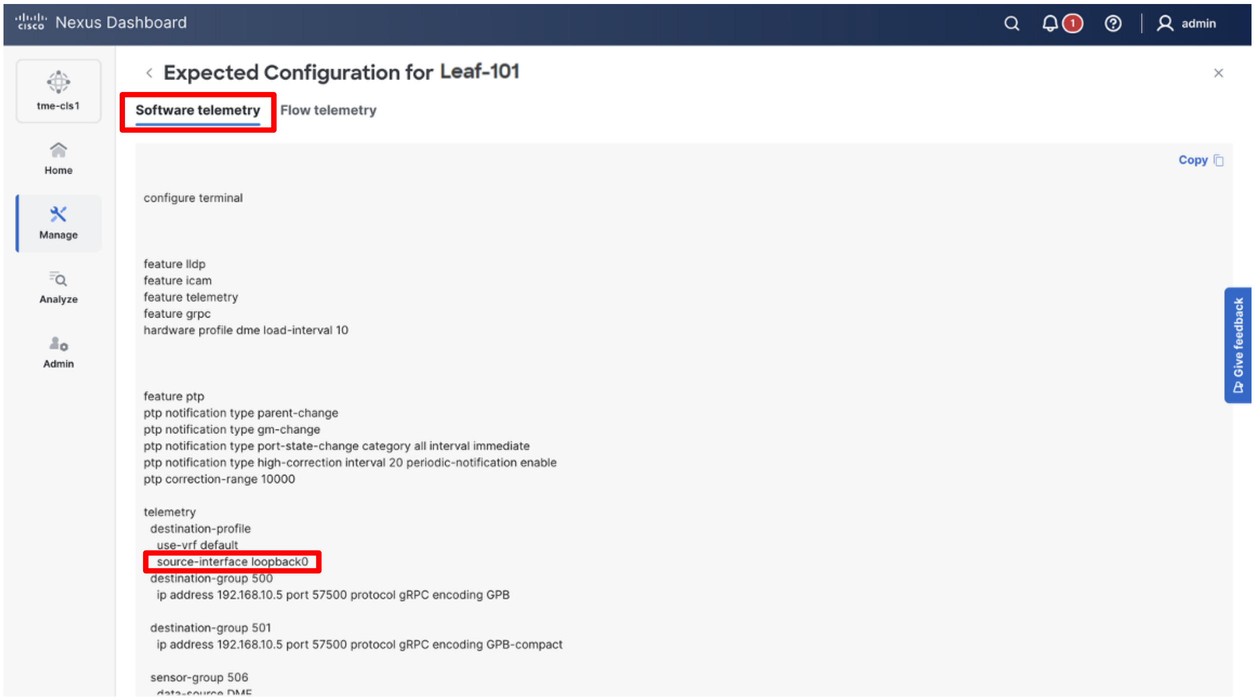
Bug scan	Best practices	Telemetry configuration status	Software telemetry status	TA Capability	Flow collection	PTP status
Successful	Successful	OK	Success	Full	Success	In sync
Successful	Successful	OK	Success	Full	Success	
Successful	Successful	OK	Success	Full	Success	In sync

3 items found

Rows per page 10 1

Figure 74.
Reviewing the telemetry configuration that is being pushed to the fabric switches

4. Verify the configurations deployed on the switches in the **Software telemetry** tab.



Expected Configuration for Leaf-101

Software telemetry | Flow telemetry

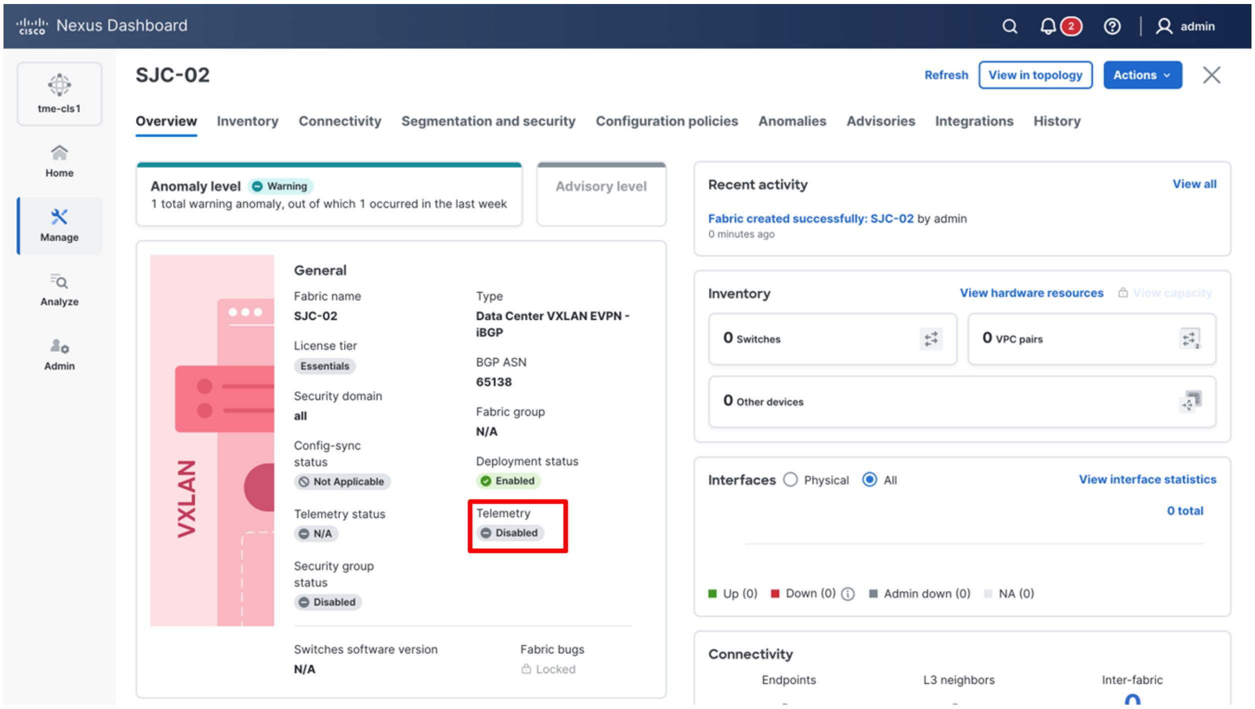
```
configure terminal



feature lldp
feature icam
feature telemetry
feature grpc
hardware profile dme load-interval 10



feature ptp
ptp notification type parent-change
ptp notification type gm-change
ptp notification type port-state-change category all interval immediate
ptp notification type high-correction interval 20 periodic-notification enable
ptp correction-range 10000

telemetry
 destination-profile
  use-vrf default
  source-interface loopback0
 destination-group 500
  ip address 192.168.10.5 port 57500 protocol gRPC encoding GPB

 destination-group 501
  ip address 192.168.10.5 port 57500 protocol gRPC encoding GPB-compact

 sensor-group 506
  data-source DME
```

Figure 75.
Reviewing the telemetry configuration that is being pushed to the fabric switches

Enable Telemetry on a pre-onboarded site

If a fabric exists with switches onboarded for NX-OS controller and management, you can enable telemetry to gain operational insights.

1. Verify the status of **Telemetry** on the fabric.



SJC-02

Anomaly level: Warning
1 total warning anomaly, out of which 1 occurred in the last week

General

Fabric name: SJC-02

Type: Data Center VXLAN EVPN - iBGP

License tier: Essentials

BGP ASN: 65138

Security domain: all

Fabric group: N/A

Config-sync status: Not Applicable

Deployment status: Enabled

Telemetry status: N/A

Telemetry: Disabled

Security group status: Disabled

Switches software version: N/A

Fabric bugs: Locked

Recent activity

Fabric created successfully: SJC-02 by admin
0 minutes ago

Inventory

0 Switches

0 VPC pairs

0 Other devices

Interfaces ○ Physical ● All

0 total

🟩 Up (0) 🟥 Down (0) ■ Admin down (0) NA (0)

Connectivity

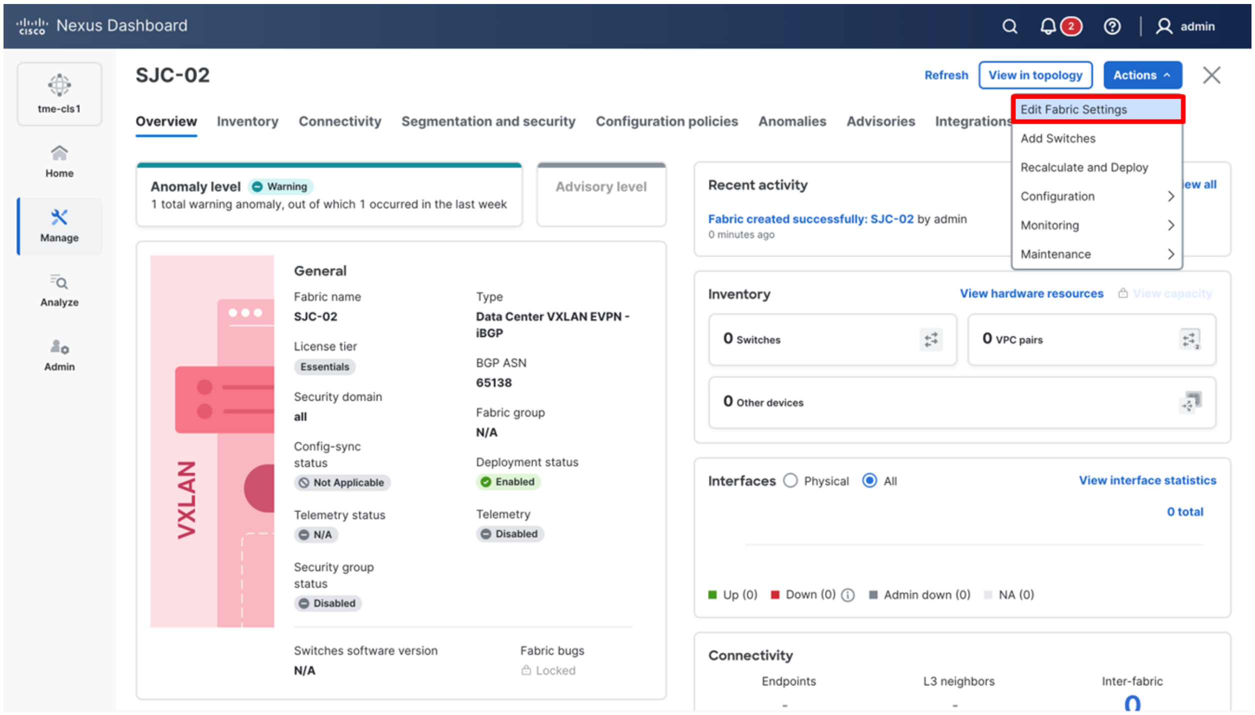
Endpoints: -

L3 neighbors: -

Inter-fabric: 0

Figure 76.
Telemetry currently disabled on the fabric

2. To enable telemetry on this fabric, navigate to **Manage > Fabrics > <*fabric name*> > Actions > Edit fabric settings.**



SJC-02

Anomaly level: Warning
1 total warning anomaly, out of which 1 occurred in the last week

General

Fabric name: SJC-02

Type: Data Center VXLAN EVPN - iBGP

License tier: Essentials

BGP ASN: 65138

Security domain: all

Fabric group: N/A

Config-sync status: Not Applicable

Deployment status: Enabled

Telemetry status: N/A

Telemetry: Disabled

Security group status: Disabled

Switches software version: N/A

Fabric bugs: Locked

Recent activity

Fabric created successfully: SJC-02 by admin
0 minutes ago

Inventory

0 Switches

0 VPC pairs

0 Other devices

Interfaces ○ Physical ● All

0 total

🟩 Up (0) 🟥 Down (0) ■ Admin down (0) NA (0)

Connectivity

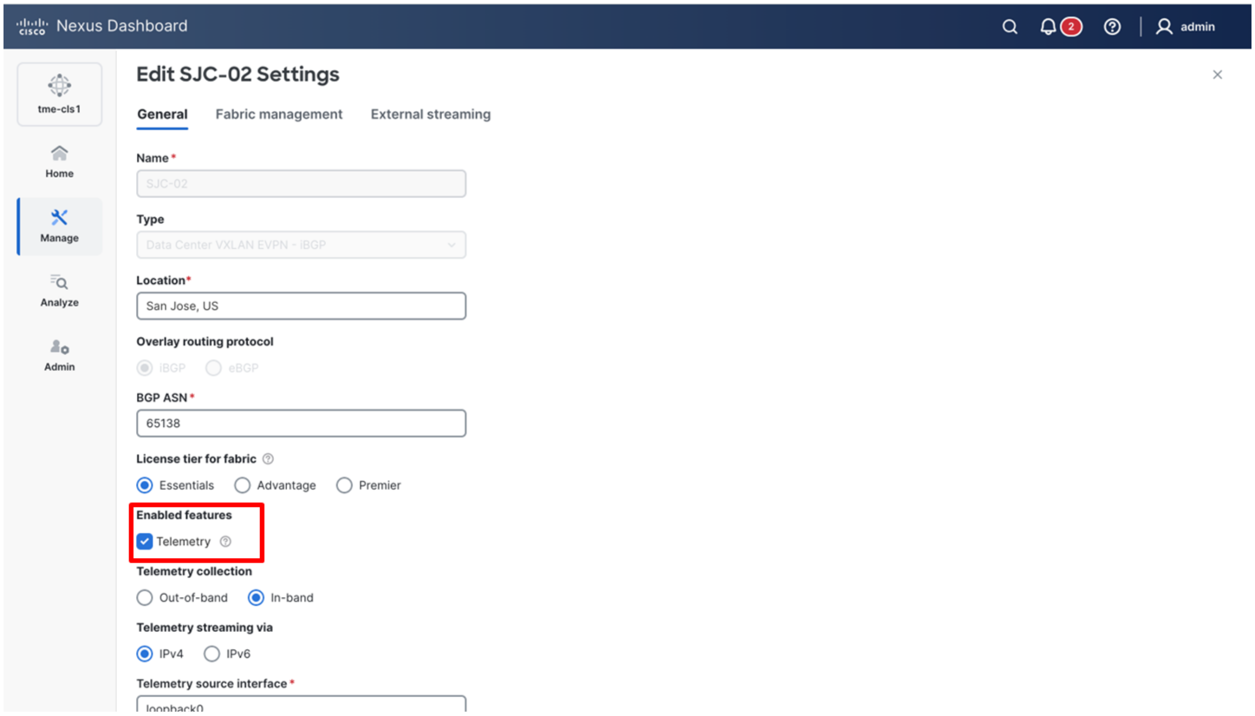
Endpoints: -

L3 neighbors: -

Inter-fabric: 0

Figure 77.
Editing fabric settings

3. Under **General** – from **Enabled features**, select **Telemetry** checkbox.



Edit SJC-02 Settings

Name*
SJC-02

Type
Data Center VXLAN EVPN - iBGP

Location*
San Jose, US

Overlay routing protocol
● iBGP ○ eBGP

BGP ASN*
65138

License tier for fabric
● Essentials ○ Advantage ○ Premier

Enabled features
☑ Telemetry

Telemetry collection
○ Out-of-band ● In-band

Telemetry streaming via
● IPv4 ○ IPv6

Telemetry source interface*
loopback0

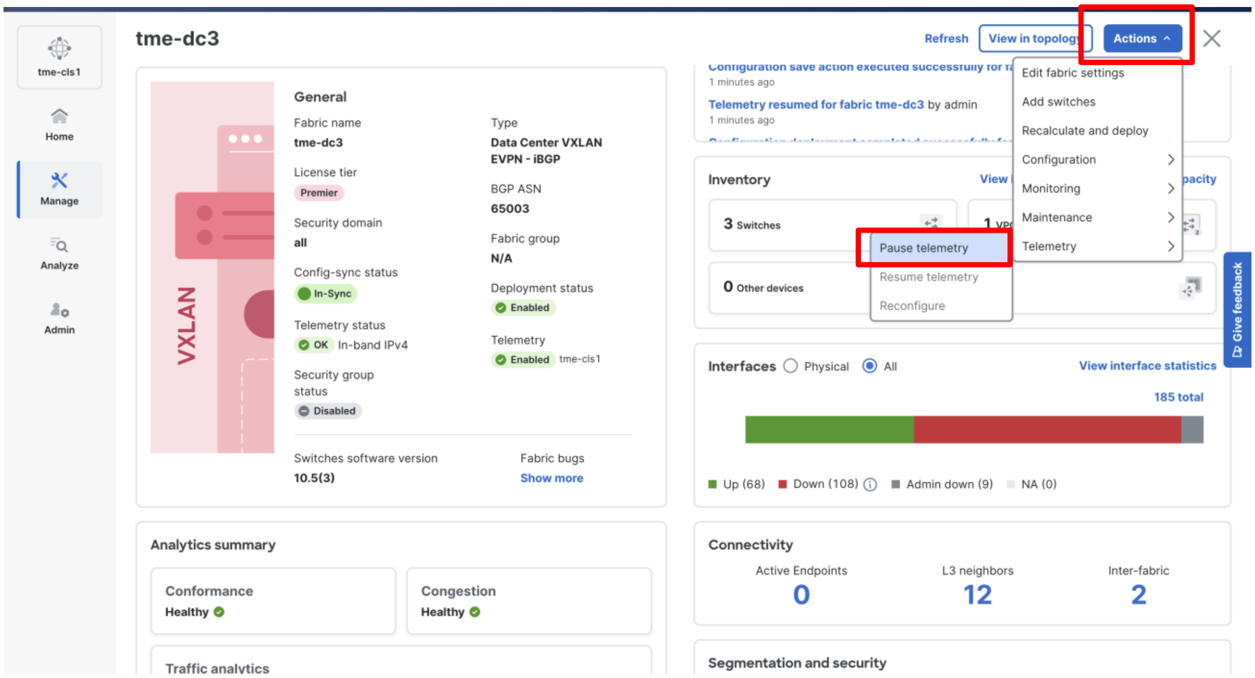
Figure 78.
Enabling telemetry for a fabric

Check the **Telemetry** check box to enable telemetry streaming for the fabric. Refer to the steps above for any additional configuration requirements.

Pausing/Resuming/Reconfiguring Telemetry on a Pre-Onboarded Site

You can pause, resume, or reconfigure telemetry in Cisco Nexus Dashboard. When you pause telemetry, data is available only up to the time of the pause. Real-time data becomes available again after you resume telemetry.

1. To pause telemetry: Click **Actions > Telemetry > Pause telemetry**. The **Telemetry status** displays as **Paused**.



tme-dc3

General

Fabric name: tme-dc3
Type: Data Center VXLAN EVPN - iBGP
License tier: Premier
BGP ASN: 65003
Security domain: all
Fabric group: N/A
Config-sync status: In-Sync
Deployment status: Enabled
Telemetry status: OK In-band IPv4
Telemetry: Enabled tme-cls1
Security group status: Disabled
Switches software version: 10.5(3)
Fabric bugs: Show more

Configuration save action executed successfully for fa
1 minutes ago
Telemetry resumed for fabric tme-dc3 by admin
1 minutes ago

Inventory
3 Switches
1 VPC
0 Other devices

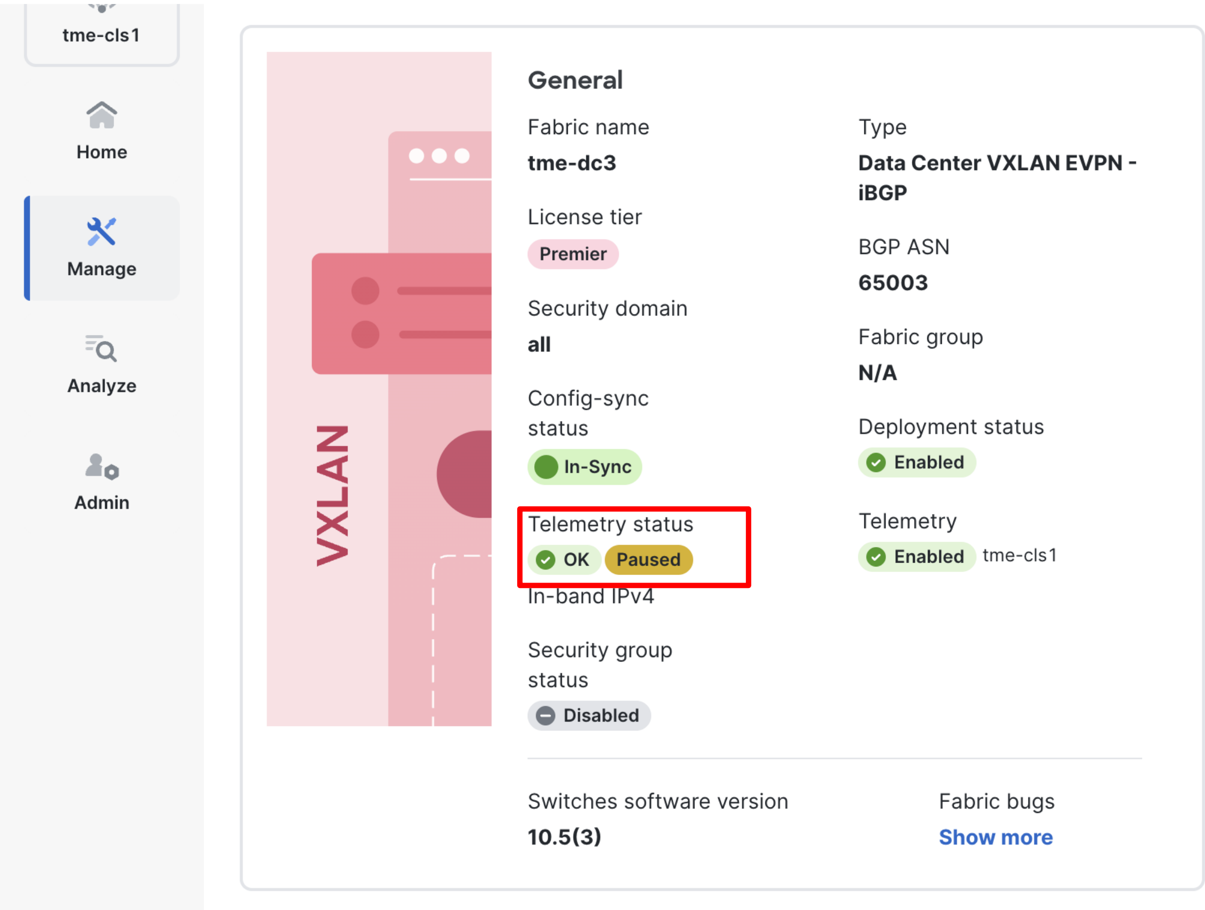
Interfaces ○ Physical ● All
View interface statistics
185 total
🟩 Up (68) 🟥 Down (108) ▨ Admin down (9) NA (0)

Analytics summary
Conformance: Healthy
Congestion: Healthy
Traffic analytics

Connectivity
Active Endpoints: 0
L3 neighbors: 12
Inter-fabric: 2

Segmentation and security

Figure 79.
Pausing telemetry on a fabric



General

Fabric name: tme-dc3
Type: Data Center VXLAN EVPN - iBGP
License tier: Premier
BGP ASN: 65003
Security domain: all
Fabric group: N/A
Config-sync status: In-Sync
Deployment status: Enabled
Telemetry status: OK Paused In-band IPv4
Telemetry: Enabled tme-cls1
Security group status: Disabled
Switches software version: 10.5(3)
Fabric bugs: Show more

Figure 80.
Telemetry status showing paused for a fabric

2. To resume telemetry: Click **Actions > Telemetry > Resume telemetry**.

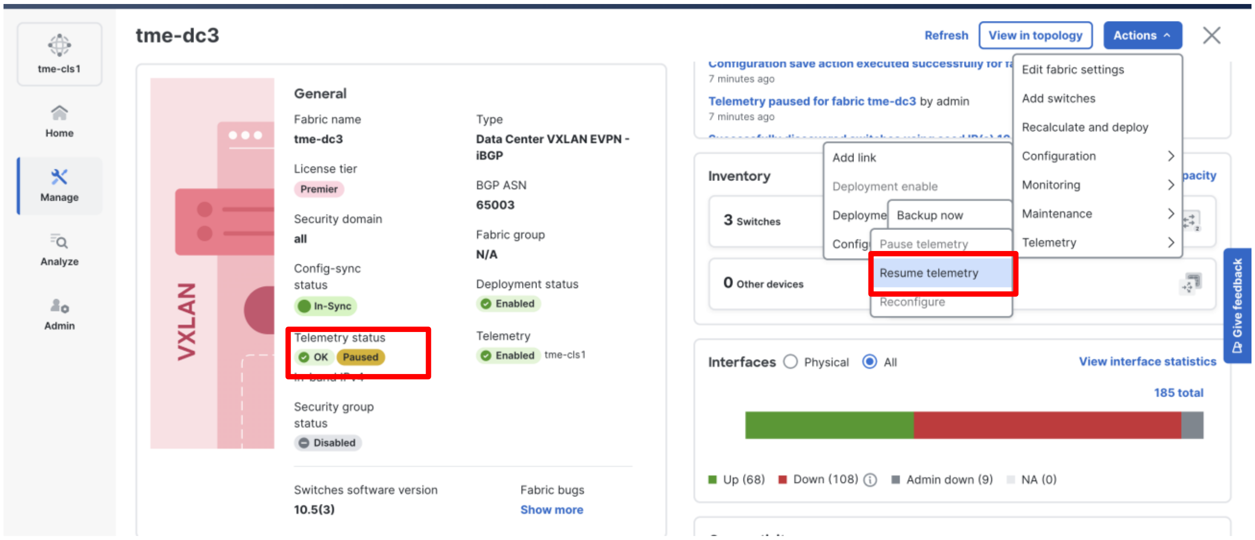


Figure 81.
Resuming telemetry on a fabric

Prepare Cisco Nexus Dashboard Monitored Sites for Streaming Telemetry

Cisco Nexus Dashboard supports monitored mode which requires discovering switches and adding them to a fabric. In monitored mode, Cisco Nexus Dashboard does not manage the switch configuration and typically only helps monitor the fabric. This mode can work complementary to any configuration tools and methods used as it is agnostic of the switch configurations. For a Cisco Nexus Dashboard monitored network site, users need to deploy and verify the needed switch configuration for Cisco Nexus Dashboard by themselves.

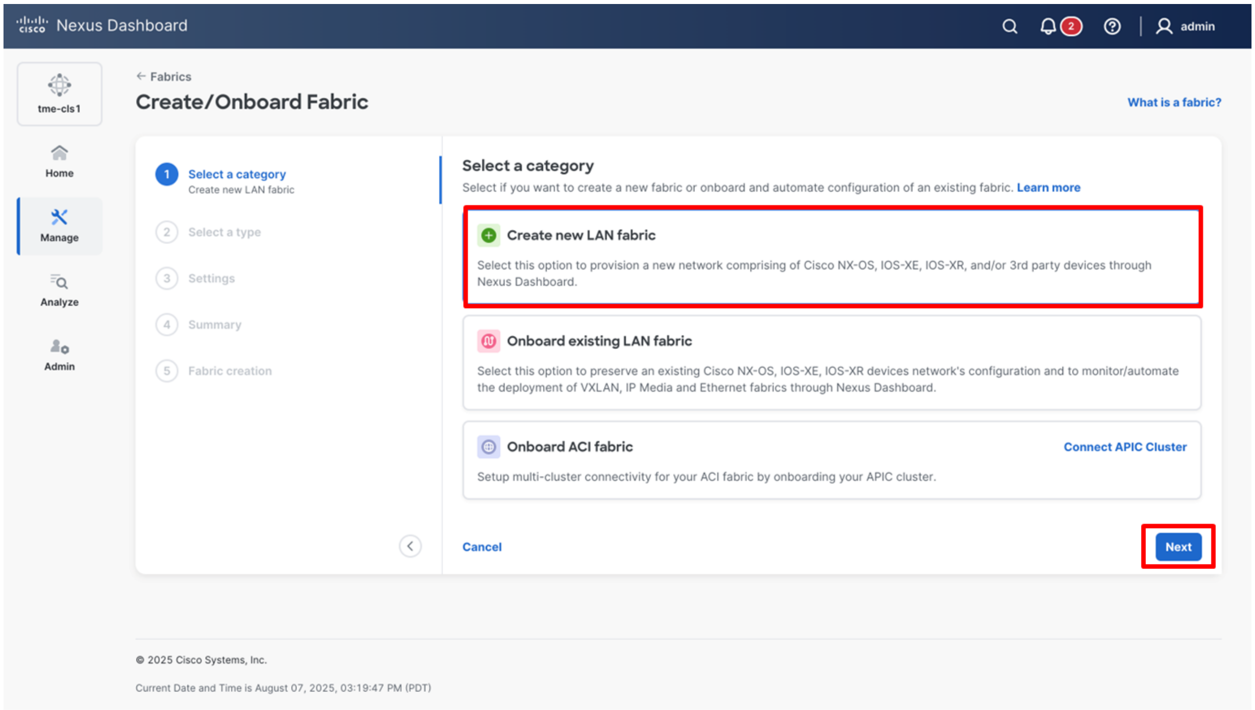
This section helps to prepare a Cisco Nexus Dashboard monitored fabric for streaming telemetry to Cisco Nexus Dashboard. It details each of the steps below in order:

- Create fabric
- Discover switches
- Configure Routable Loopback Interfaces on the switches
- Configure NTP
- Configure PTP

Create Fabric

This section shows you how to create a Cisco Nexus Dashboard monitored fabric.

1. Navigate to **Manage > Fabrics > Actions > Create fabric > Create new LAN fabric** and click **Next**.



Create/Onboard Fabric

Select a category

Select if you want to create a new fabric or onboard and automate configuration of an existing fabric. Learn more

Create new LAN fabric

Select this option to provision a new network comprising of Cisco NX-OS, IOS-XE, IOS-XR, and/or 3rd party devices through Nexus Dashboard.

Onboard existing LAN fabric

Select this option to preserve an existing Cisco NX-OS, IOS-XE, IOS-XR devices network's configuration and to monitor/automate the deployment of VXLAN, IP Media and Ethernet fabrics through Nexus Dashboard.

Onboard ACI fabric Connect APIC Cluster

Setup multi-cluster connectivity for your ACI fabric by onboarding your APIC cluster.

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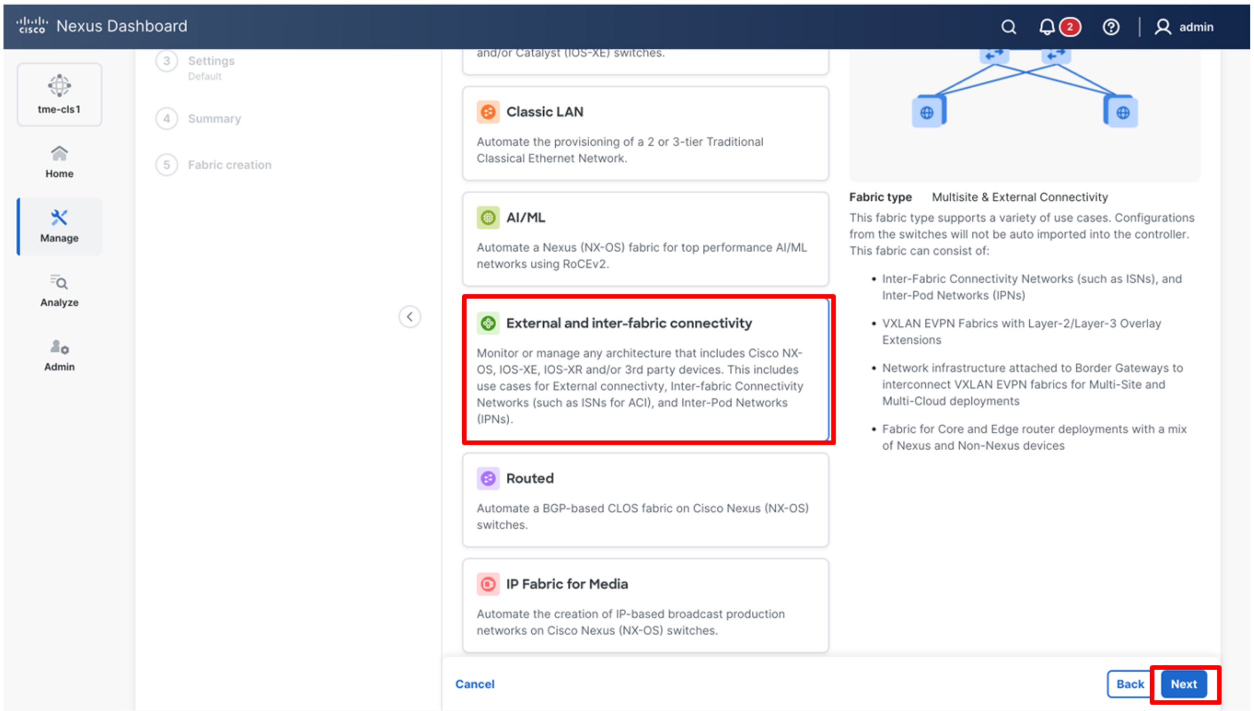
Current Date and Time is August 07, 2025, 03:19:47 PM (PDT)

Figure 82.

Creating a new LAN fabric

2. Cisco Nexus Dashboard supports multiple fabric types (for example: **Classic LAN** , **VXLAN** fabrics and so on). Select **External and inter-fabric connectivity** and click **Next.**



and/or Catalyst (IOS-XE) switches.

Classic LAN

Automate the provisioning of a 2 or 3-tier Traditional Classical Ethernet Network.

AI/ML

Automate a Nexus (NX-OS) fabric for top performance AI/ML networks using RoCEv2.

External and inter-fabric connectivity

Monitor or manage any architecture that includes Cisco NX-OS, IOS-XE, IOS-XR and/or 3rd party devices. This includes use cases for External connectivty, Inter-fabric Connectivity Networks (such as ISNs for ACI), and Inter-Pod Networks (IPNs).

Routed

Automate a BGP-based CLOS fabric on Cisco Nexus (NX-OS) switches.

IP Fabric for Media

Automate the creation of IP-based broadcast production networks on Cisco Nexus (NX-OS) switches.

Fabric type Multisite & External Connectivity

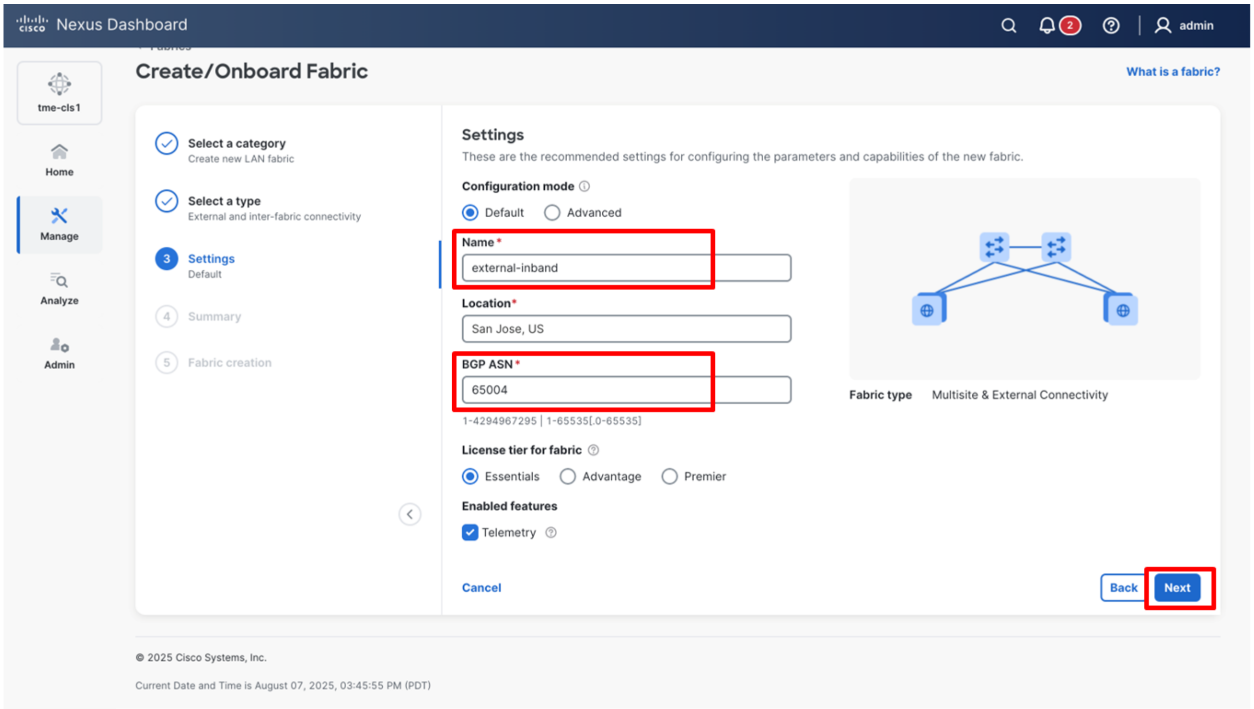
This fabric type supports a variety of use cases. Configurations from the switches will not be auto imported into the controller. This fabric can consist of:

- Inter-Fabric Connectivity Networks (such as ISNs), and Inter-Pod Networks (IPNs)
- VXLAN EVPN Fabrics with Layer-2/Layer-3 Overlay Extensions
- Network infrastructure attached to Border Gateways to interconnect VXLAN EVPN fabrics for Multi-Site and Multi-Cloud deployments
- Fabric for Core and Edge router deployments with a mix of Nexus and Non-Nexus devices

Figure 83.

Selecting fabric type as external and Inter-fabric connectivity

3. In **Settings** enter the **Name**, **Location**, and **BGP ASN**, and select the **License tier for fabric** used in the site, then click **Next.**



Settings

These are the recommended settings for configuring the parameters and capabilities of the new fabric.

Configuration mode
● Default ○ Advanced

Name *
external-inband

Location*
San Jose, US

BGP ASN *
65004
1-4294967295 | 1-65535[.0-65535]

License tier for fabric
● Essentials ○ Advantage ○ Premier

Enabled features
☑ Telemetry

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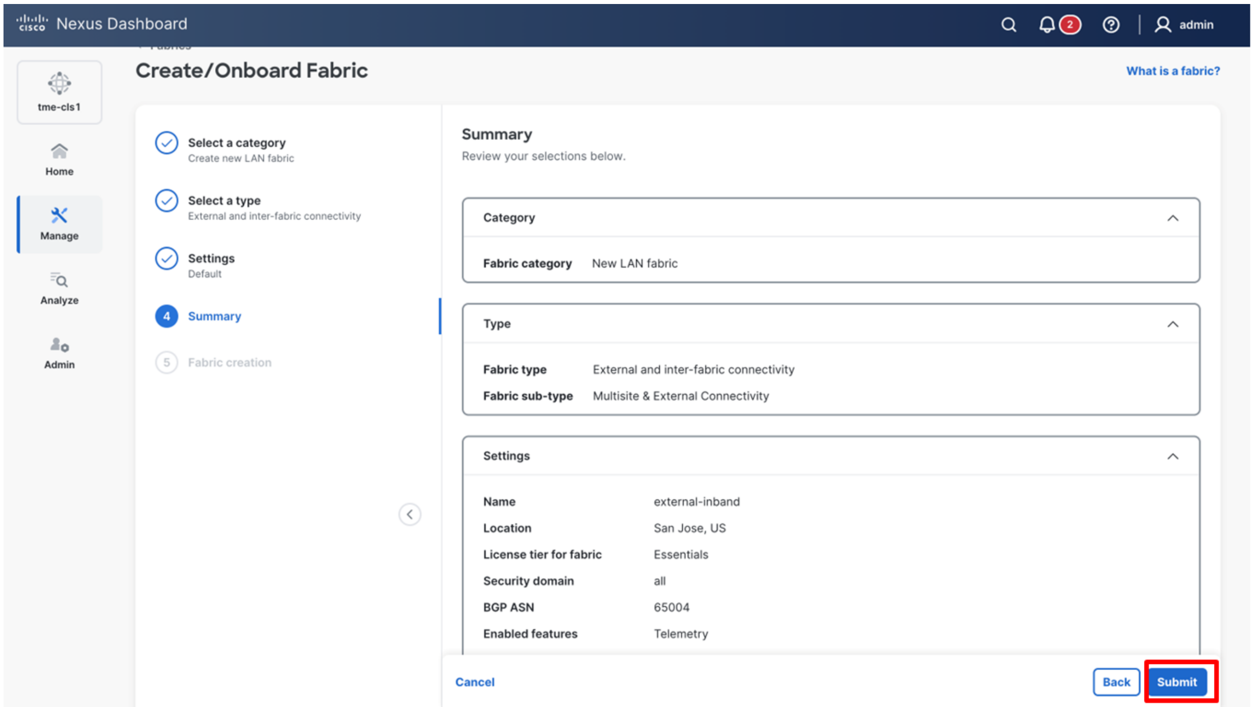
Figure 84.

Providing fabric details such as Name, BGP ASN, and so on

4. Review the fabric details and click **Submit**.



Summary

Review your selections below.

Category

Fabric category New LAN fabric

Type

Fabric type External and inter-fabric connectivity
Fabric sub-type Multisite & External Connectivity

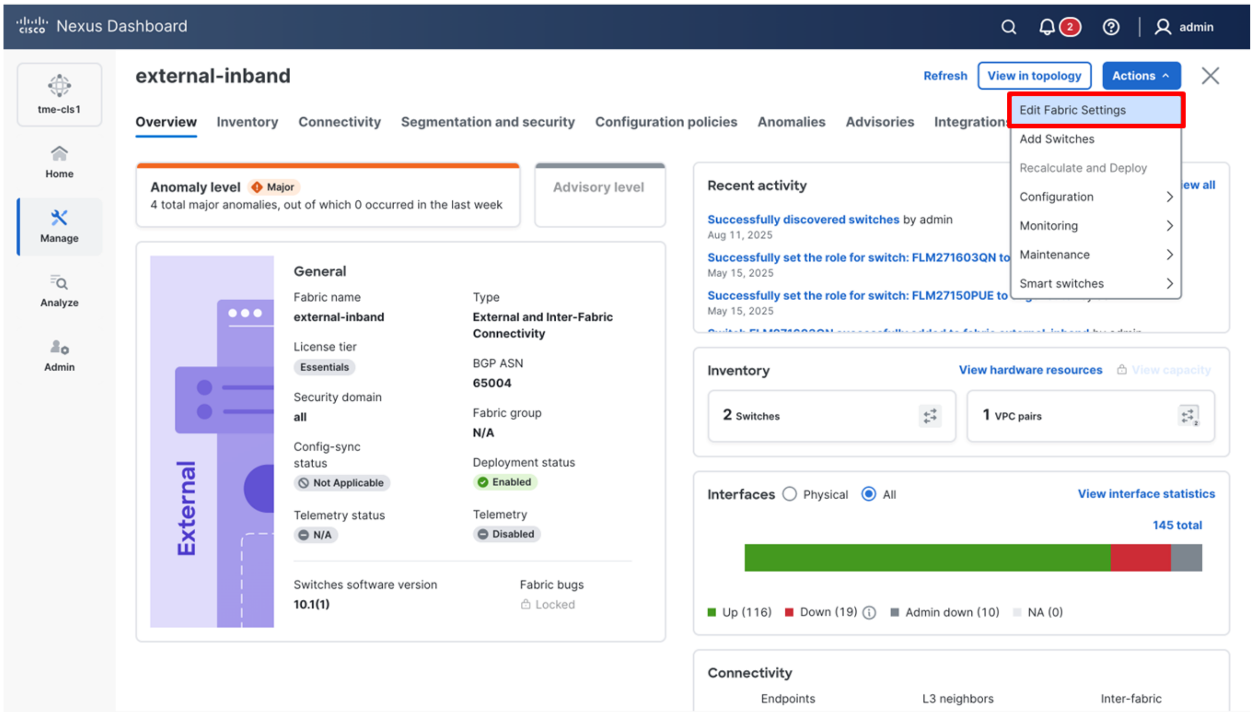
Settings

Name	external-inband
Location	San Jose, US
License tier for fabric	Essentials
Security domain	all
BGP ASN	65004
Enabled features	Telemetry

Figure 85.

Confirming fabric details and submitting the new fabric

5. Navigate to **Manage > Fabrics > <fabric name> > Edit fabric settings > Fabric management**, check the **Fabric Monitor Mode** check box. Onboard the fabric to Cisco Nexus Dashboard in “Monitor” mode. In this mode, Cisco Nexus Dashboard does not deploy configuration to the switches.



external-inband

Anomaly level ◆ Major
4 total major anomalies, out of which 0 occurred in the last week

Advisory level

General

Fabric name external-inband	Type External and Inter-Fabric Connectivity
License tier Essentials	BGP ASN 65004
Security domain all	Fabric group N/A
Config-sync status Not Applicable	Deployment status Enabled
Telemetry status N/A	Telemetry Disabled
Switches software version 10.1(1)	Fabric bugs Locked

Recent activity

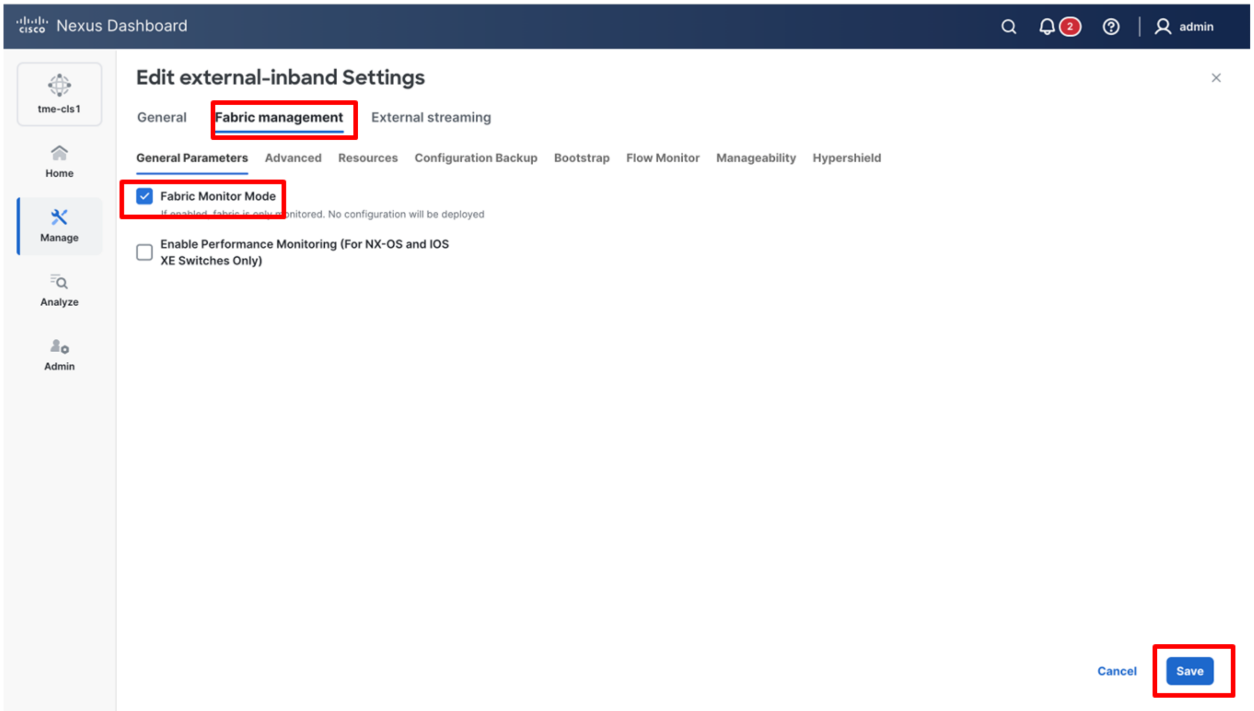
Successfully discovered switches by admin
Aug 11, 2025
Successfully set the role for switch: FLM271603QN to
May 15, 2025
Successfully set the role for switch: FLM27150PUE to
May 15, 2025

Inventory
2 Switches
1 VPC pairs

Interfaces ○ Physical ● All
145 total
🟩 Up (116) 🟥 Down (19) ■ Admin down (10) NA (0)

Connectivity
Endpoints L3 neighbors Inter-fabric

Figure 86.
Editing fabric settings



Edit external-inband Settings

☑ Fabric Monitor Mode
If enabled, fabric is only monitored. No configuration will be deployed

□ Enable Performance Monitoring (For NX-OS and IOS XE Switches Only)

Figure 87.

Onboard the fabric in monitor mode on Cisco Nexus dashboard

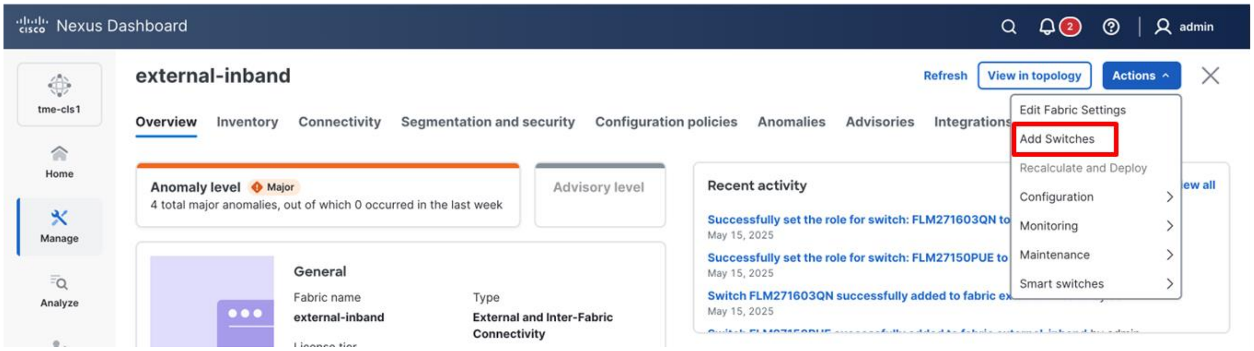
6. Click **Save**.

Note: Because Cisco Nexus Dashboard only monitors the fabric, you must configure the switches. In this mode, Cisco Nexus Dashboard does not deploy configurations to the switches.

Discover Switches in the Fabric

Cisco Nexus Dashboard can use a single seed or multiple IPs in the fabric and dynamically discover the switches for a set number of hops defined in Max Hops or also a list of all switch IPs in the fabric with a hop count ‘0’ can also serve the purpose. It allows selection of switches to be added to the fabric.

1. Navigate to **Manage > Fabrics > *Fabric name* (external-in-band)**. From the **Actions** drop-down list, select **Add Switches**.
   A pop-up page appears, to allow the user to choose a fabric that the discovered switches will belong to.



external-inband

Anomaly level Major
4 total major anomalies, out of which 0 occurred in the last week

Advisory level

General

Fabric name: external-inband

Type: External and Inter-Fabric Connectivity

Recent activity

Successfully set the role for switch: FLM271603QN to
May 15, 2025

Successfully set the role for switch: FLM27150PUE to
May 15, 2025

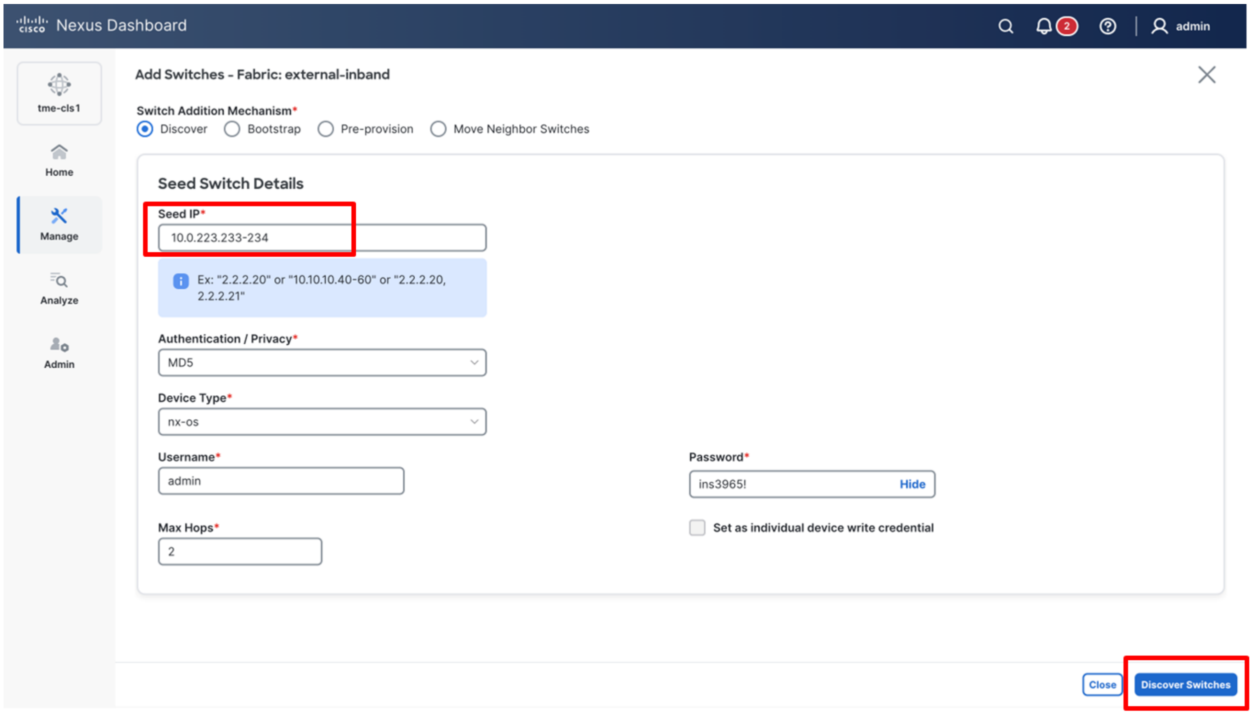
Switch FLM271603QN successfully added to fabric ex
May 15, 2025

Figure 88.

Adding switches to the monitored fabric

2. Click **Choose Fabric**.

3. Enter a **Seed IP** (mgmt0 interface IP of the switch) of any switch in the fabric to be discovered. Choose the **Authentication Protocol** used to login to switches and provide **Username** and **Password**. Enter the number of hops in **Max Hops** from the seed to determine the detection boundary.



Add Switches - Fabric: external-inband

Switch Addition Mechanism*
● Discover ○ Bootstrap ○ Pre-provision ○ Move Neighbor Switches

Seed Switch Details

Seed IP*: 10.0.223.233-234

Ex: "2.2.2.20" or "10.10.10.40-60" or "2.2.2.20, 2.2.2.21"

Authentication / Privacy*: MD5

Device Type*: nx-os

Username*: admin

Password*: ins3965! Hide

Max Hops*: 2

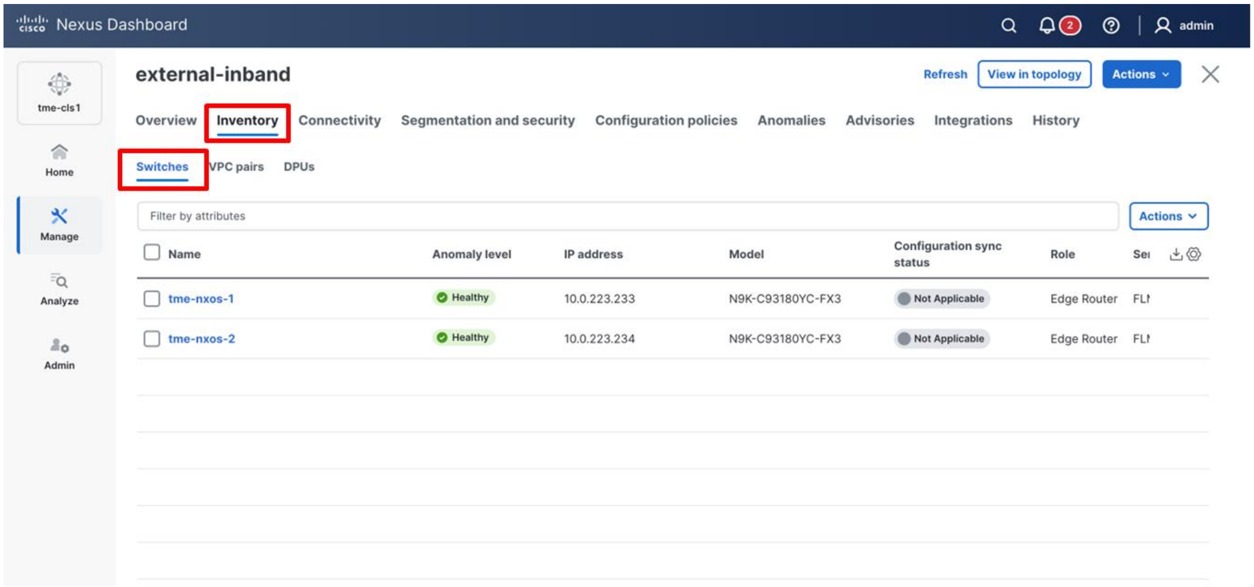
□ Set as individual device write credential

Figure 89.
Discovering switches in the fabric

4. Click **Discover Switches.**

5. Select all the switches intended to be part of the fabric and click **Add Switches.**

6. Click **Manage > Fabrics > <*fabric name*> > Inventory > Switches**. The Switches that are discovered and part of the fabric intended are displayed. You can view the switches associated with the fabric from **Manage > Fabrics > Fabrics Overview > Inventory > Switches** tab also.



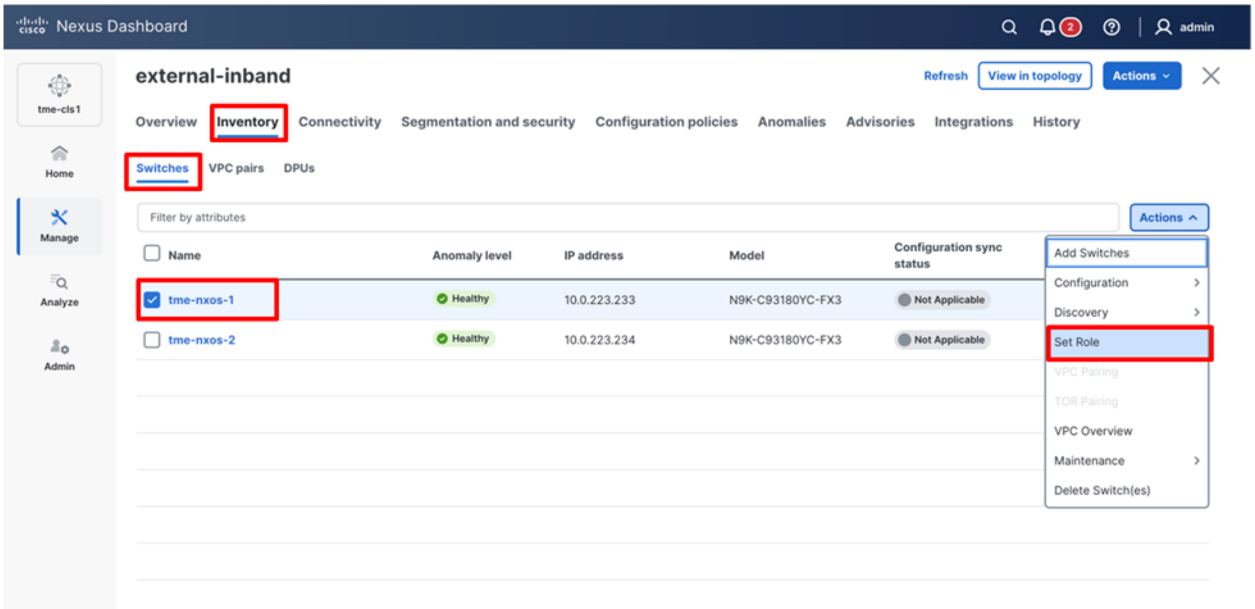
Name	Anomaly level	IP address	Model	Configuration sync status	Role	Sei
tme-nxos-1	Healthy	10.0.223.233	N9K-C93180YC-FX3	Not Applicable	Edge Router	FL
tme-nxos-2	Healthy	10.0.223.234	N9K-C93180YC-FX3	Not Applicable	Edge Router	FL

Figure 90.
Reviewing the switches in the fabric through the inventory tab

7. After the switches are added to the fabric, assign roles to the switches by selecting the switch/switches and choosing the intended role, such as Spine, Leaf, Border Gateway, Edge Router, and so on.

8. To set the switch role, navigate to **Manage > Fabrics-> <*Fabric name*> (external-in-band) > Inventory > Switches**. Check the switch check box next to the switch name.

9. From **Actions** drop-down list, select **Set Role**.

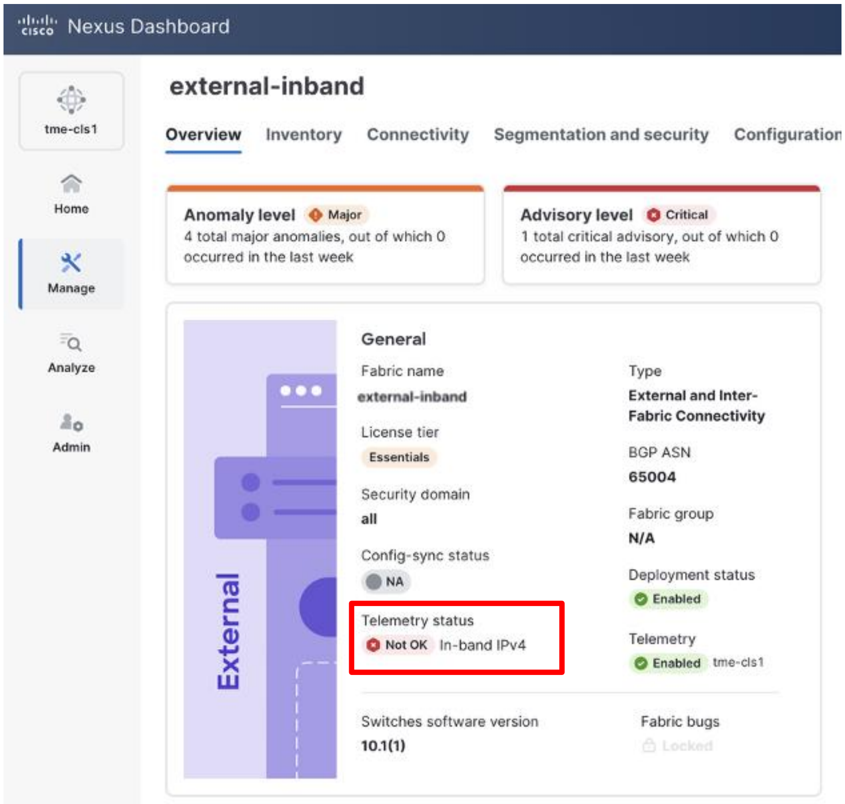


	Name	Anomaly level	IP address	Model	Configuration sync status
☑	tme-nxos-1	Healthy	10.0.223.233	N9K-C93180YC-FX3	Not Applicable
□	tme-nxos-2	Healthy	10.0.223.234	N9K-C93180YC-FX3	Not Applicable

Figure 91.
Setting the role for the fabric switches

10. After setting the role, you can find the expected configuration for configuring telemetry for the fabrics on Cisco Nexus Dashboard. However, in fabric monitor mode, you will not be able to push the configuration to the switches through ND and will be responsible for configuring the fabric switches manually. Cisco Nexus Dashboard makes it easy to configure telemetry for monitored fabrics by providing the expected configuration on the switches for enabling telemetry on the fabrics.

11. To find this configuration, from the fabric **Overview** page, check the **Telemetry status**, for **Not OK**.



external-inband

Anomaly level Major
4 total major anomalies, out of which 0 occurred in the last week

Advisory level Critical
1 total critical advisory, out of which 0 occurred in the last week

General

Fabric name: external-inband

Type: External and Inter-Fabric Connectivity

License tier: Essentials

BGP ASN: 65004

Security domain: all

Fabric group: N/A

Config-sync status: NA

Deployment status: Enabled

Telemetry status: Not OK In-band IPv4

Telemetry: Enabled tme-cls1

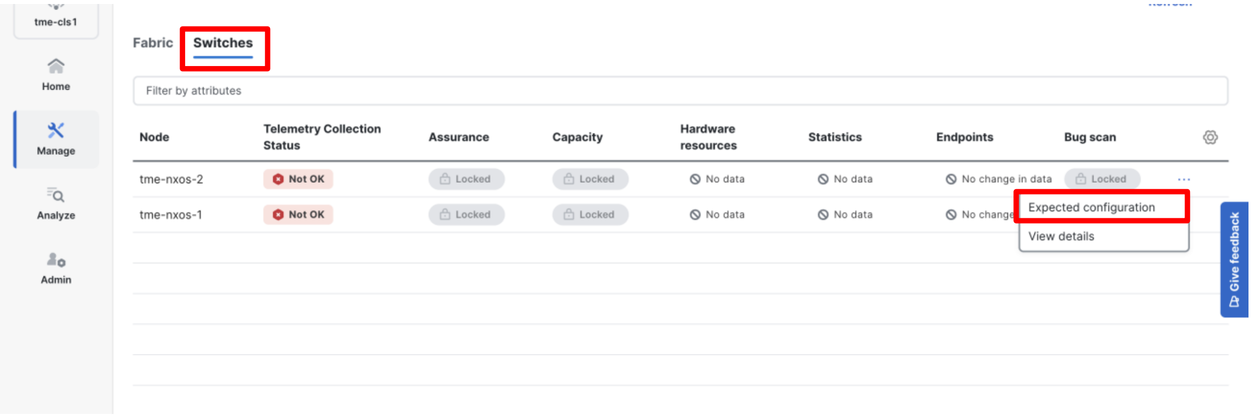
Switches software version: 10.1(1)

Fabric bugs: Locked

Figure 92.
Telemetry status of fabric showing Not OK

12. Navigate to **Switches**.

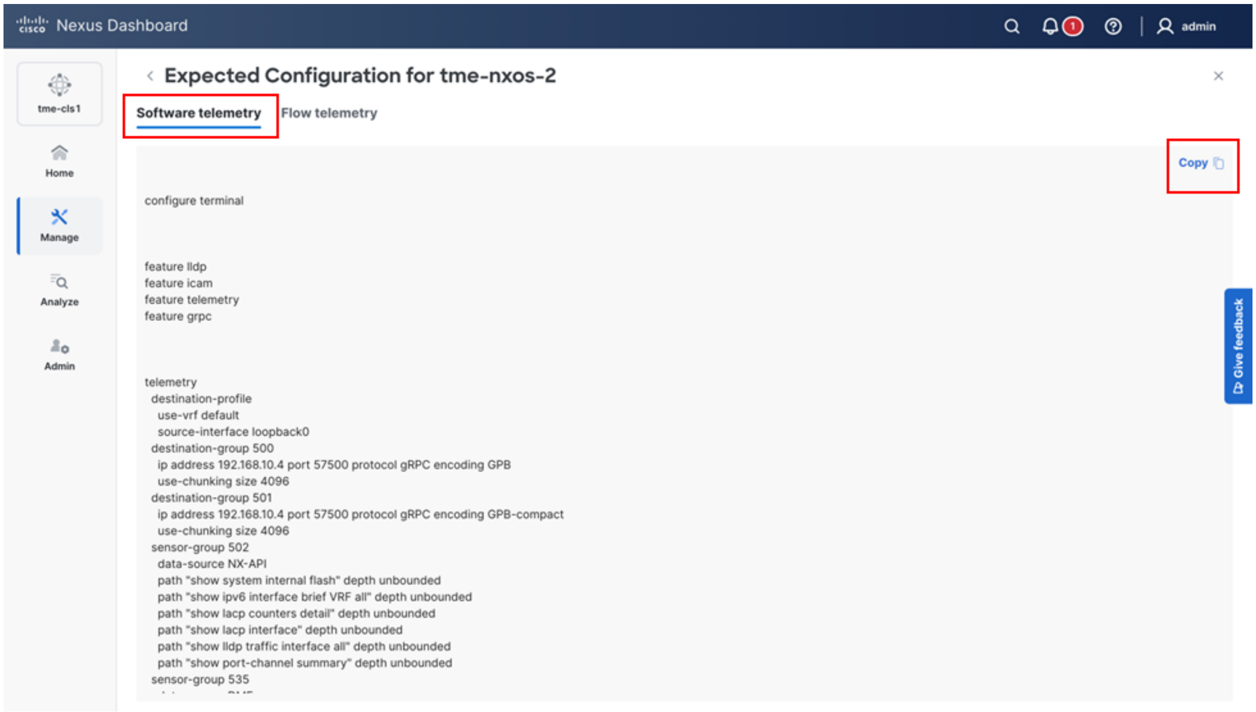
13. Click on ellipsis **(...) > Expected configuration**.



Node	Telemetry Collection Status	Assurance	Capacity	Hardware resources	Statistics	Endpoints	Bug scan
tme-nxos-2	Not OK	Locked	Locked	No data	No data	No change in data	Locked
tme-nxos-1	Not OK	Locked	Locked	No data	No data	No change	

Figure 93.
Reviewing the expected telemetry configuration for the fabric switches

14. Verify the configuration for software telemetry. This is the configuration that needs to be applied to the switches to enable and stream telemetry to Cisco Nexus Dashboard from the fabric switches. To copy the configuration and then paste it to the switches directly, simply click **Copy**.



Expected Configuration for tme-nxos-2

Software telemetry | Flow telemetry

```
configure terminal



feature lldp
feature icam
feature telemetry
feature grpc



telemetry
 destination-profile
  use-vrf default
  source-interface loopback0
 destination-group 500
  ip address 192.168.10.4 port 57500 protocol gRPC encoding GPB
  use-chunking size 4096
 destination-group 501
  ip address 192.168.10.4 port 57500 protocol gRPC encoding GPB-compact
  use-chunking size 4096
 sensor-group 502
  data-source NX-API
  path "show system internal flash" depth unbounded
  path "show ipv6 interface brief VRF all" depth unbounded
  path "show lacp counters detail" depth unbounded
  path "show lacp interface" depth unbounded
  path "show lldp traffic interface all" depth unbounded
  path "show port-channel summary" depth unbounded
 sensor-group 535
```

Figure 94.

Reviewing and copying the expected telemetry configuration from Cisco Nexus Dashboard for the fabric switches

Configure a Routable Loopback Interface on Switches

Each switch in the network site needs a routable loopback interface to source the telemetry data to Cisco Nexus Dashboard. Any existing loopback on the switches with the required IP connectivity to Cisco Nexus Dashboard Data Network could be used or users can create a new loopback for the purpose.

For a Cisco Nexus Dashboard monitored fabric, users need to configure and manage such a loopback interface on the switches by themselves. Below shows the procedure.

1. Configure a loopback interface on the switches.

```
leaf-201(config)# interface loopback 0

leaf-201(config-if)# description Routing loopback interface

leaf-201(config-if)# ip address 20.2.0.1/32

leaf-201(config-if)# ip router ospf underlay area 0.0.0.0


leaf-201# show run interface loopback 0 >> check for

interface loopback0

  description Routing loopback interface

  ip address 20.2.0.1/32

  ip router ospf underlay area 0.0.0.0
```

```
leaf-201# show interface loopback 0
loopback0 is up
admin state is up,
  Hardware: Loopback
  Description: Routing loopback interface
  Internet Address is 20.2.0.1/32
  MTU 1500 bytes, BW 8000000 Kbit , DLY 5000 usec
  reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation LOOPBACK, medium is broadcast
  Auto-mdix is turned off
    1031148 packets input 96462171 bytes
    0 multicast frames 0 compressed
    0 input errors 0 frame 0 overrun 0 fifo
    0 packets output 0 bytes 0 underruns
    0 output errors 0 collisions 0 fifo
0     out_carrier_errors
```

2. Check if the loopback created can reach the Cisco Nexus Dashboard Data Network by pinging the Cisco Nexus Dashboard Data Network IP address from the loopback interface. In the example below, the IP address 192.168.10.10 is one of the Cisco Nexus Dashboard Data Network IP addresses. If there are no firewalls or other network devices blocking the ICMP traffic, the ping should succeed.

```
leaf-201# ping 192.168.10.10 source-interface loopback 0
PING 192.168.1.201 (192.168.1.201): 56 data bytes
64 bytes from 192.168.10.10: icmp_seq=0 ttl=62 time=0.56 ms
64 bytes from 192.168.10.10: icmp_seq=1 ttl=62 time=0.431 ms
64 bytes from 192.168.10.10: icmp_seq=2 ttl=62 time=0.38 ms
64 bytes from 192.168.10.10: icmp_seq=3 ttl=62 time=0.449 ms
64 bytes from 192.168.10.10: icmp_seq=4 ttl=62 time=0.379 ms

--- 192.168.10.10 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.379/0.439/0.56 ms
```

3. For an effective verification, make sure the ping is sourced from the Loopback interface.

Network Time Protocol (NTP) Configuration

You must enable NTP and configure the NTP server on each switch in the network site that is monitored by Cisco Nexus Dashboard. Additionally, it is also important to ensure that all the switches have consistent NTP configuration and are synchronized to the same NTP server.

The following commands can be used to configure NTP on the individual switches (use the IP address of the NTP server in your deployment).

```
spine-201# config terminal

Enter configuration commands, one per line. End with CNTL/Z.

spine-201(config)# ntp server 64.102.244.57 use-vrf management
```

Precision Time Protocol (PTP) Configuration

Note: PTP is required only for Traffic Analytics and Flow Telemetry features.

For Cisco Nexus Dashboard managed or monitored network site, an external PTP grandmaster that provides a clock source with at least microsecond accuracy is required. When PTP is enabled, it is the default clock even if NTP is enabled on the switches. PTP requires a source loopback used for exchanging PTP packets and a PTP domain ID that defines the boundaries of the PTP messages.

For Cisco Nexus Dashboard monitored network site, you must configure PTP on each network switch as Cisco Nexus Dashboard does not manage the switch configuration. This section describes how to configure PTP on an NX-OS switch.

1. Enable feature PTP.

```
leaf-101# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

leaf-101(config)#  feature ptp  -> Enabling feature ptp
```

2. Configure PTP domain ID and PTP source interface (a routable loopback).

```
leaf-101(config)# ptp domain 1  -> PTP domain ID

leaf-101(config)# ptp source 10.2.0.1-> PTP source IP
```

3. Configure PTP under core facing interfaces and ttag under Host facing interfaces.

```
interface Ethernet1/1  -> Core facing interface

  ptp

interface Ethernet1/33 -> host facing interface

  ttag

  ttag-strip
```

NTP and PTP verifications

With either managed or monitored mode fabrics, verifications on the switch remain the same.

- NTP verifications: Login to the switches to confirm the configuration and clock settings. Verify below commands for NTP setup on the switch as the clock time source.

```
leaf-101(config)# show run ntp

!Command: show running-config ntp

!No configuration change since last restart

!Time: Sun Feb 9 21:54:40 2025

version 10.5(3) Bios:version 05.40

ntp server 64.102.244.57 use-vrf management -> Verify the configuration


leaf-101(config)# show clock

21:53:34.997 UTC Sun Feb 9 2025

Time source is NTP -> Verify NTP is the time source


leaf-101(config)# show ntp peers

---------------------------------------------------

     Peer IP Address          Serv/Peer

---------------------------------------------------

     64.102.244.57       Server (configured) -> Verify the server is configured
```

- PTP Verifications: After enabling PTP either through Cisco Nexus Dashboard or CLI configurations, verify below commands for PTP on the switch as the clock time source.

```
leaf-101# show run ptp

feature ptp. -> Verify that PTP is enabled and configured on the interfaces

ptp source 10.0.0.1

ptp domand 0

interface Ethernet1/1

    ptp

interface Ethernet1/33

    ttag

      ttag-strip
```

```
leaf-101# show clock
01:56:04.353 UTC sun Feb 9 2025
Time source is PTP -> Verify PTP is the time source

leaf-101# show ptp clock foreign-masters record
P1=Priority1, P2=Priority2, C=Class, A=Accuracy,
OSLV=Offset-Sclaed-Log-Variance, SR=Steps-Removed
GM=Is grandmaster

----------   -------------------   ---   ----   ----   ---   -----   ----------
Interface         Clock-ID         P1    P2     C      A     OSLV    SR
----------   -------------------   ---   ----   ----   ---   -----   ----------
Eth1/1    2c:4f:52:ff:fe:56:61:1f  255   255    248    254   65535   1

-> Verify if it can reach the grand master on its ptp configured interfaces

leaf-101# show ptp clock
PTP Device Type : boundary-clock
PTP Device Encapsulation : NA
PTP Source IP Address : 10.2.0.1  -> Verify if source loopback IP is as configured
Clock Identity : d4:78:9b:ff:fe:19:87:c3
Clock Domain: 0
Slave Clock Operation : Two-step
Master Clock Operation : Two-step
Clave-Only Clock Mode : Disabled
Number of PTP ports: 3
Priority1 : 255
Priority2 : 255
Clock Quality:
        Class : 248
                  Accuracy : 254
                  Offset (log variance) :
```

```
Offset From Master : 12
Mean Path Delay : 168
Steps removed : 2
Correction range : 100000
MPD range : 1000000000
Local clock time: Fri Aug 22 01:56:08 2025
PTP clock state             : Locked

leaf-101# show ptp parent
PTP PARENT PROPERTIES
Parent Clock:
Parent Clock Identity: 2c:4f:52:ff:fe:56:61:1f
Parent Port Number: 4
Observed Parent Offset (log variance): NA
Observed Parent Clock Phase Change Rate: N/A

Parent IP: 10.2.0.4
Grandmaster Clock:
Grandmaster Clock Identity: 00:ee:ab:ff:fe:3a:16:e7  -> Get the Grandmaster clock
ID
Grandmaster Clock Quality
        Class : 248
                  Accuracy : 254
                  Offset (log variance) : 65535
                  Priority1: 255
                  Priority2: 255

spine-201# show ptp clock foreign-masters record
P1=Priority1, P2=Priority2, C=Class, A=Accuracy,
OSLV=Offset-Scaled-Log-Variance, SR=Steps-Removed
GM=Is grandmaster
----------   ---------------------   ---   ----   ----   ---   -----   ----------
```

```
Interface         Clock-ID             P1    P2     C      A      OSLV    SR
----------   ---------------------   ---   ----   ----   ---    -----   ----------
Eth1/4     00:ee:ab:ff:fe:3a:16:e7   255   255    248    254    65535   1       GM
-> Check the Grandmaster clock ID and confirm the right Grandmaster registration on
clients
```

Conclusion

Cisco Nexus Dashboard provides key insights into your fabrics, providing real-time detailed information about all the flows that go in and out of your fabrics – making a network engineer's life easier. To visualize the telemetry information on Cisco Nexus Dashboard, it is imperative to configure telemetry streaming from the fabric devices to Cisco Nexus Dashboard. With Cisco Nexus Dashboard, there are various telemetry streaming design options available as highlighted and discussed in this whitepaper.

References

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- https://www.cisco.com/c/en/us/td/docs/dcn/nd/4x/release-notes/cisco-nexus-dashboard-release-notes-411.html.
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