



Devices

This chapter has details about the devices of the Cisco Nexus Data Broker.

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Devices

The **Devices** tab has the following sub tabs:

- **NDB Devices**—aggregation devices managed by the NDB controller. See [NDB Devices](#) for more details.
- **Span Devices**—NX-OS devices and ACI devices connected to the NDB controller. See [Span Devices, on page 12](#) for more details.
- **Device Groups**—the groups to which the NDB devices are segregated into. See [Device Groups](#) for more details.


NDB Devices

The **NDB Devices** tab displays details of all the devices connected to the NDB controller.

A table is displayed with the following details:

Table 1: NDB Devices

Column Name	Description
Status (the first column of the table)	<p>The current status of the device connected to the NDB; indicated by color. The options are:</p> <ul style="list-style-type: none">• Green—indicates that the device is operational and connected to the NDB controller.• Red—indicates failure and the device is not connected to the NDB controller.• Yellow—indicates that the device is connected but not ready yet. Reboot the device and wait for a few minutes for the status to turn green. Refresh and check.• Gray—indicates that the device is in maintenance mode.

Column Name	Description
IP Address	<p>The IP address of the device.</p> <p>This field is a hyperlink. Click the IP address to view more details of the device.</p> <p>Click the IP Address. A new pane is displayed on the right which has more information about the device. Additional actions that can be performed from here are:</p> <ul style="list-style-type: none"> • Editing a Device • Take Device Offline • Edit Global Configuration <p>Note The <i>Take Device Offline</i> action is generally grayed out and is available only for devices in maintenance mode.</p> <p>You can also view the Ports, Port Channels and Port Groups of the device by clicking the corresponding tab. For more information about Port Channels and Groups, see Port Channels and Port Groups.</p> <p>Click the Details icon () to get additional details of the device. A new window displays the following details for the selected device:</p> <ul style="list-style-type: none"> • General • Ports • Port Channel • Port Groups • Global Configuration • Monitor Sessions • Flow Statistics • Port Statistics • TCAM Resource Utilization <p>Additional actions that can be performed from Details tab:</p> <ul style="list-style-type: none"> • Trigger Global ACLs—this action identifies the non-configured interfaces of a device and attaches global ACLs to all these interfaces. It is mandatory for all interfaces of a device to be configured with global ACLs. • Adding a Port Channel

Column Name	Description
Device Name	The device name (switch name) as indicated by the administrator while configuring the device. Device name is displayed only if the device status is green. If the status of the device is red or yellow, the device name is not displayed.
Platform	The device platform.
Node ID	The node ID of the device.
Profile Name	The profile of the device as configured during device addition.
NX-OS	The software version currently running on the device.
Mode	<p>The mode the switch is currently using. The options are:</p> <ul style="list-style-type: none"> • NDB mode—indicates that the whole switch (all interfaces) is managed by the NDB controller. • Hybrid—indicates that only some interfaces in the device are managed by the NDB controller. <p>Note By default, this column is hidden. When Hybrid mode is enabled on the device during device addition, this column is displayed.</p>
Port	The port used by the NDB controller to communicate to the NDB device.
Status Description	<p>The status of the connection between the NDB device and the NDB controller. The options are:</p> <ul style="list-style-type: none"> • Connection succeeded—indicates that the connection between the device and NDB controller is successful. • Connection failed—indicates that the connection between the device and NDB controller has failed. A reason for failure is also displayed, such as authentication failed, connection refused (incorrect port). • Connection not ready—indicates that the device reload was not successful.

The following actions can be performed from the **NDB Devices** tab:

- **Add Device**—Use this to add a new device. See [Adding a Device](#) for details.
- **Rediscover Device**—Select the required device by checking the check box at the beginning of the row. Click **Actions > Rediscover Device(s)**. A pop-up appears. Click **Rediscover** to rediscover the selected devices. When you rediscover devices, the global ACLs are reattached.



Note Rediscovering a device leads to UDF, ports, global and connections reconfigurations and this results in traffic loss.

When there is a configuration error, use rediscover to reconfigure the device.

If you choose the rediscover action without selecting a check box, an error is displayed. You will be prompted to select a device.

- **Reconnect Device**— Select the required device by checking the check box at the beginning of the row. Click **Actions** > **Reconnect Device(s)**. A pop-up appears. Click **Reconnect** to reconnect the selected devices. The reconnect action is used to re-establish a failed connection between a device and NDB controller.

If you choose the reconnect action without selecting a check box, an error is displayed. You will be prompted to select a device.

- **Update Profile**—Use this action to add or update the profile for a device. See [Updating Device Profile](#) for details about this task.
- **Delete Device**—Select the required device by checking the check box which is available at the beginning of the row. Click **Actions** > **Delete Device(s)**. A pop-up window displays two options:
 - **Delete**—Use this option to delete the device from the NDB controller while retaining the device configuration.
 - **Purge and Delete**—Use this option to delete the device and also remove device configuration from the NDB controller.

If you choose the delete action without selecting a check box, an error is displayed. You will be prompted to select a device.



Note If a device is not reachable and disconnects from the NDB controller, the NDB controller tries to locate and connect to the device after every 30 seconds.

Global deny ACLs are automatically added to all non-configured interfaces (Edge SPAN/TAP, Packet Truncation, Remote Source, and Local and Remote Monitor) on a device. By default, Global Deny ACL feature is enabled on all the devices. You can disable the Global Deny ACL feature by setting the `configure.global.acls` parameter to false in the **config.ini** file. Ensure that you restart NDB after making changes in the configuration file.

Adding a Device

Use this procedure to add a device to NDB controller.

Before you begin

Before adding a device to the NDB controller, do the following:

- Enable NXAPI on the device using the **feature nxapi** command.
- Use the Device Prerequisites option, if you are adding a device for the first time to the NDB controller.



Note Check the *Cisco Nexus Data Broker Release Notes, Release 3.10*, to see the supported Cisco Nexus Series switches and the supported NX-OS versions.

- Step 1** Navigate to **Devices > NDB Devices**.
- Step 2** From the **Actions** drop down menu, select **Add Device**.
- Step 3** In the **Add Device** dialog box, enter the following details:

Table 2: Add Device

Field	Description
General	
IP Address/ Hostname	Enter the name or IP address of the device. To add multiple devices, add the hostnames or IP Addresses separated with a comma.
Username/ Profile	<p>Select either Username or Profile.</p> <p>If you click Username, the following fields are displayed:</p> <ul style="list-style-type: none"> • Username—Enter the switch username to login to the device. • Password—Enter the switch password. <p>If you click Profile, the following fields are displayed:</p> <ul style="list-style-type: none"> • Profile—From the Select Profile drop-down list, select a profile. <p>Note You can associate multiple switches to a profile. The profile configuration is applied to all the member switches.</p>
Connection Type	Select the Connection Type from the drop- down list. Currently, only NX-API is supported.
Port	Enter the device communication port. Use port 80 for NX-API over HTTP and 443 for HTTPS.

Field	Description
Device Prerequisites	<p>Click the gray button to enable Device Prerequisites. The bar turns blue and the button moves to the right. The following check boxes appear:</p> <ul style="list-style-type: none"> • Interface Commands—By default, this check box is checked. Device Prerequisites automatically executes a set of default interface commands. • Reboot—Check the check box to reboot the device before it gets added to NDB. • TCAM—Check the check box to set a TCAM value. Select Default or Scale. A memory of 1024 or 2048 is allocated, respectively. <p>For more information about Device Prerequisites, see Device Prerequisites, on page 10.</p>
Hybrid Mode	<p>Slide the bar to the right to enable hybrid mode. In hybrid mode, only some interfaces of the device are managed by NDB.</p> <p>For this option to be displayed, the config.ini file should be enabled using nx.hybrid.support=true. Restart NDB to use this feature on all the the devices connected to NDB.</p>

Step 4 Click **Add Device**.

Global ACLs are automatically added to all the interfaces on a device. By default, Global ACLs are enabled for a device. To manage Global ACLs, you need to add the `configure.global.acls` parameter in the `config.ini` file. Set the `configure.global.acls` parameter to *false* and restart the device to disable Global ACLs on the device.

Editing a Device

Use this procedure to edit a device.

Before you begin

Create one or more devices.

Step 1 Navigate to **Devices > NDB Devices**.

Step 2 In the displayed table, click an **IP Address**.

A new pane is displayed on the right.

Step 3 Click **Actions** and select **Edit Device**.

Step 4 In the **Edit Device** dialog box, the current device information is displayed. Modify these fields, as required:

Table 3: Edit Device

Field	Description
General	
IP Address/ Hostname	The current IP address of the device. This field cannot be edited.
Username/ Profile	<p>Select either Username or Profile.</p> <p>If you click Username, the following fields are displayed:</p> <ul style="list-style-type: none"> • Username—Username used to login to the device is displayed; you can edit this field. • Password—Enter the password for the username. <p>If you click Profile, the following fields are displayed:</p> <ul style="list-style-type: none"> • Profile—From the Select Profile drop-down list, select a profile. <p>Note You can associate multiple switches to a profile. The profile configuration is applied to all the member switches.</p>
Connection Type	Select the Connection Type from the drop down menu. Currently, only NXAPI is supported.
Port	Enter the device communication port. Use port 80 for NX-API over HTTP and 443 for HTTPS.
Device Prerequisites	<p>Click the gray button to enable Device Prerequisites. The bar turns blue and the button moves to the right. The following check boxes appear:</p> <ul style="list-style-type: none"> • Interface Commands—By default, this check box is checked. Device Prerequisites automatically executes a set of default interface commands. • Reboot—Check the check box to reboot the device before it gets added to NDB. • TCAM—Check the check box to set a TCAM value. Select Default or Scale. A memory of 1024 or 2048 is allocated, respectively. <p>For more information about Device Prerequisites, see Device Prerequisites, on page 10.</p>

Step 5 Click **Edit Device**.

Updating Device Profile

Use this procedure to assign (associate) a profile to a device or update the profile for a device.

Before you begin

Create one or more profiles.

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- Step 1** Navigate to **Devices > NDB Devices**.
- Step 2** From the **Actions** drop-down menu, select **Assign/ Update Profile**.
- Step 3** In the **Assign/ Update Profile** dialog box, enter the following details:

Table 4: Assign/ Update Profile

Field	Description
General	
Profile	Select a Profile from the drop down menu.
Connection Type	The default NXAPI connection type is displayed.

- Step 4** Click **Assign/ Update Profile**.
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Adding a Port Channel

Use this procedure to add a port channel.

See [Port Channels and Port Groups](#) for more information about port channels.

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- Step 1** Navigate to **Devices > NDB Devices**.
- Step 2** Click an **IP Address** and select the Details icon.
- Step 3** In the **Add Port Channel** dialog box, enter the following details:

Table 5: Add Port Channel

Field	Description
General	
ID	Enter a name for the port channel.
Description	Enter a description for the port channel.
Port	Click Select Port . Select the required check boxes and click Select .

- Step 4** Click **Add Port Channel**.
-

Device Prerequisites

NDB pushes basic configuration to a newly added device. Ensure NX-API is enabled on the new device for NDB to push prerequisite configuration successfully. Manual configuration of the NX-API devices to make it ready for NDB is not required.

Device Prerequisites can be configured when you add or edit a device, or when you add or change profile to a device. See [Adding a Device, on page 5](#) and/or [Editing a Device, on page 7](#).

Following configurations are pushed into the new switch by NDB:

- While onboarding an NDB device, without STP pre-requisites (when independent links or port channels are connected to NDB devices), you need to manually configure the **switchport mode trunk** and **spanning-tree bpduguard enable** commands.
- TCAM configurations based on the device platform
- MST mode is enabled on the Spanning Tree
- Basic VLAN configuration
- LLDP feature is enabled (only for the centralized mode of NDB)

Device is rebooted after all the configurations are successfully pushed by NDB. The device reboot is required because of the TCAM configurations. The reboot is supported from NX-OS 9.2(3) and above.

Port Channels and Port Groups

Port Channels

A port channel is an aggregation of multiple physical interfaces that creates a logical interface. You can bundle up to 8 individual active links into a port channel to provide increased bandwidth and redundancy. If a member port within a port channel fails, the traffic previously carried over the failed link switches to the remaining member ports within the port channel. Port channeling also load balances traffic across these physical interfaces. The port channel stays operational as long as at least one physical interface within the port channel is operational.

You create a port channel by bundling compatible interfaces. You can configure and run either static port channels or ports channels running the Link Aggregation Control Protocol (LACP). Any configuration changes that you apply to the port channel are applied to each member interface of that port channel. For example, if you configure Spanning Tree Protocol (STP) parameters on the port channel, the Cisco NX-OS applies those parameters to each interface in the port channel.

You can use static port channels, with no associated protocol, for a simplified configuration. For more efficient use of the port channel, you can use the Link Aggregation Control Protocol (LACP), which is defined in IEEE 802.3ad. When you use LACP, the link passes protocol packets.

Port Groups

Ports of a device (or different devices) can be grouped together to form a port group. The port groups can be a combination of the edge-span and the edge-tap ports across different switches. Selecting individual ports of a port group is disabled when using a port group.

Precision Time Protocol

Precision Time Protocol (PTP) devices include ordinary clocks, boundary clocks, and transparent clocks. Non-PTP devices include ordinary network switches, routers, and other infrastructure devices. A PTP system can consist of a combination of PTP and non-PTP devices.

PTP is a distributed protocol that specifies how real-time PTP clocks in the system synchronize with each other. These clocks are organized into a master-member synchronization hierarchy with the grandmaster clock, the clock at the top of the hierarchy, determining the reference time for the entire system. Synchronization is achieved by exchanging PTP timing messages, with the members using the timing information to adjust their clocks to the time of their master in the hierarchy. PTP operates within a logical scope called a PTP domain.

PTP is a time synchronization protocol for nodes distributed across a network. Its hardware timestamp feature provides excellent accuracy.

PTP is supported on the following platforms:

- Cisco Nexus 9200 switches
- Cisco Nexus 9300 switches—9300-FX, FX2, EX
- Cisco Nexus 9500 switches—9500-FX, EX
- Cisco Nexus 3548 switches



Note After PTP is configured, the default PTP configuration is synchronized with all the ISL ports of the corresponding device.

See [Editing Global Configuration for a Device](#) for configuring PTP.

Netflow

NetFlow identifies packet flows for ingress IP packets and provides statistics based on these packet flows. NetFlow does not require any change to either the packets themselves or to any networking device.

In order to provide enough free space to monitor flows, the ing-netflow TCAM region is carved to 512 by default on Cisco Nexus 9300-FX platform switches. If more space is required, use the **hardware access-list tcam region ing-netflow size** command to modify the size of this TCAM region, using a multiple of 512.

Netflow is supported on the following platforms:

- Cisco Nexus 9300 switches—9300-FX, FX2, EX
- Cisco Nexus 9500 switches—9500-FX, EX

See [Editing Global Configuration for a Device](#) for configuring Netflow.

For more information about Netflow, see *Cisco Nexus 9000 Series NX-OS System Management Configuration Guide*.

Sampled Flow

You can manage Sampled Flow (sFlow) on NDB that are based on NX-API. sFlow allows you to monitor real-time traffic in data networks that contain switches and routers. It uses the sampling mechanism in the

sFlow agent software on switches and routers to monitor traffic and to forward the sample data to the central data collector.

See [Editing Global Configuration for a Device](#) for configuring sFlow.

Symmetric and Non-Symmetric Load Balancing

You can configure symmetric load balancing and enable MPLS tag stripping on the Cisco Nexus 3000 Series and Cisco Nexus 9000 Series switches using NX-API configuration mode, from the Cisco Nexus Data Broker GUI and the REST API interfaces.

The following table lists the symmetric and non-symmetric load balancing options:

Configuration Type	Hashing Configuration	Platforms	Options
Symmetric	SOURCE_DESTINATION	Nexus 9000 Series (all), N3K-C3164xx, N3K-C32xx	IP, IP-GRE, IP-L4PORT, IP-L4PORT-VLAN, IP-VLAN, L4PORT, MAC
		REST API	IP, IP-GRE, PORT, MAC, IP-ONLY,PORT-ONLY
Non-symmetric	SOURCE, DESTINATION	Nexus 9000 Series (all), N3K-C3164xx, N3K-C32xx	IP, IP-GRE, IP-L4PORT, IP-L4PORT-VLAN, IP-VLAN, L4PORT, MAC
		REST API	IP, IP-GRE, PORT, MAC

Span Devices

Switch port Analyzer (SPAN) is an efficient and high performance traffic monitoring system. It duplicates the network traffic and routes the packets to an the analyzer for monitoring. SPAN is used for troubleshooting connectivity issues and calculating network utilization, and performance monitoring. You can add, edit, remove, and rediscover a device to SPAN using NDB.

The **Span Devices** tab displays details of the devices connected to the SPAN.

Select **APIC/ ACI Devices** or **NX-OS Devices** to see the details.

- **NX-OS Devices**—devices that are running on NX-OS (standalone devices) and connected to the NDB controller.
- **ACI Devices/ APIC**—APIC and ACI devices connected to the NDB controller.



Note The NX-OS device can be a Cisco Nexus 9000 Series switch or Cisco Nexus 3000 Series switch in NX-OS mode. NX-API has to be enabled on the production (NX-OS) switches.

Table 6: ACI Devices/ APIC

Column	Description
Active IP	Active IP address of the APIC device.
Username	Username currently logged into the APIC device.
Primary IP Address	Primary IP address of the device.
Secondary IP Address	Secondary IP address of the device.
Tertiary IP Address	Tertiary IP address of the device.

Table 7: NX-OS Devices

Column	Description
Active IP	Active IP address of the NX-OS device.
Username	Username currently logged in to the NX-OS device.

The following actions can be performed from the **Span Devices** tab:

- **Add Span Device**—Use this to add a new span device. See [Adding a Span Device](#) for details.
- **Rediscover Span Device**—Select the required device by checking the check box at the beginning of the row. Click **Actions > Rediscover Span Device**. A pop-up window is displayed. Click **Rediscover** to rediscover the selected devices.

Use the **Rediscover Span Device** option to re-establish the connection between the NDB controller and the Span device(s).

If you choose the rediscover action without selecting a check box, an error is displayed. You will be prompted to select a device.

- **Delete Span Device**—Select the required device by checking the check box which is available at the beginning of the row. Click **Actions > Delete Span Device**.

If you choose the delete action without selecting a check box, an error is displayed. You will be prompted to select a device.

Adding a Span Device

Use this procedure to add a device to SPAN.

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- Step 1** Navigate to **Devices > Span Devices**.
- Step 2** From the **Actions** drop down list, select **Add Span Device**.
- Step 3** In the **Add Span Device** dialog box, enter the following details:

Table 8: Add Span Device

Field	Description
General	Select ACI or NX-OS . The options available for each are discussed in the rows, below.
Fields displayed for ACI :	
APIC IP Address/ Hostname	Enter the IP address for the APIC device.
APIC IP Address (Secondary)	Enter a secondary IP address for the APIC device.
APIC IP Address (Tertiary)	Enter a tertiary IP address for the APIC device.
Username	Enter a username to login to the device.
Password	Enter the password for the username.
Fields displayed for NX-OS :	
Address	IP address of the NX-OS device.
Port	The device communication port.
Username	Enter a username for the device.
Password	Enter the required password to authenticate the username.

Step 4 Click **Add Span Device**.

Editing a Span Device

Use this procedure to edit a Span device. Some of the parameters which were selected earlier (in the *Adding a Span Device* procedure) can not be changed.

Before you begin

Create one or more Span devices.

Step 1 Navigate to **Devices > Span Devices**.

Step 2 In the displayed table, click an **IP Address**.

A new pane is displayed on the right.

Step 3 Click **Actions** and select **Edit Span Device**.

Step 4 In the **Edit Span Device** dialog box, the current span device information is displayed. Modify these fields, as required:

Table 9: Edit Span Device

Field	Description
General	This field cannot be edited. If you have added an ACI or NX-OS span device, that selection can not be changed. However, you can edit the parameters for ACI and NX-OS; they have been discussed in the subsequent rows.
Fields displayed for ACI :	
APIC IP Address/ Hostname	The primary IP address for the APIC/ ACI device. This field can not be edited.
APIC IP Address (Secondary)	Enter a secondary IP address for the APIC device.
APIC IP Address (Tertiary)	Enter a tertiary IP address for the APIC device.
Username	Enter a username to login to the device.
Password	Enter the password for the username.
Fields displayed for NX-OS :	
NX-OS	Select NX-OS to add an NX-OS device. The following options are displayed: <ul style="list-style-type: none"> • Address • Port • Username • Password
Address	IP address of the NX-OS device. This field cannot be edited.
Port	The device communication port.
Username	Username of the device.
Password	Enter password to authenticate the username.

Step 5 Click **Edit Span Device**.

Device Groups

The **Device Groups** tab displays details of the device groups. A table is displayed with the following details:

Table 10: Device Groups

Column Name	Description
Group	<p>The device group name.</p> <p>This field is a hyperlink. Click the group name and a new pane is displayed on the right that has the list of devices included in the group. Additional actions that can be performed from here are:</p> <ul style="list-style-type: none"> • Editing a Device Group
Devices	The number of devices in the device group.

The following actions can be performed from the **Device Groups** tab:

- **Add Device Group**—Use this to add a new device group. See [Adding a Device Group](#).
- **Delete Device Group**—Select the required device group by checking the check box which is available at the beginning of the row. Click **Actions > Delete Device Group(s)**. The selected device group(s) are deleted. If you choose the delete action without selecting a check box, an error is displayed. You will be prompted to select a device group.

Adding a Device Group

Use this procedure to add a new device group.

- Step 1** Navigate to **Devices > Device Groups**.
- Step 2** From the **Actions** drop down menu, select **Add Device Group**.
- Step 3** In the **Add Device Group** dialog box, enter the following details:

Table 11: Add Device Group

Field	Description
General	
Device Group Name	Enter a name for the device group.
Devices	<p>Click Select Device(s).</p> <p>The Select Device dialog box opens. Check the check box corresponding to the device(s) you want to add to the group. Click Select.</p> <p>Note Check if the device is already part of another group; if yes, the device is removed from the previous group and added to the new group.</p>

- Step 4** Click **Add Device Group**.

Editing a Device Group

Use this procedure to edit a device group.

Before you begin

Add one or more device groups.

Step 1 Navigate to **Devices > Device Groups**.

Step 2 Click a **Device Group** name.

A new pane is displayed on the right.

Step 3 Click **Action > Edit Device Group**.

Enter the following details, in the displayed window.

Table 12: Edit Device Group

Field	Description
General	
Device Group Name	Device group name. This field cannot be edited.
Devices	<p>The devices which are currently part of the device group are displayed. You can delete devices from a group. To add more devices to the group, click Select Device(s).</p> <p>The Select Device dialog box opens. Check the check box corresponding to the device(s) you want to add to the group. Click Select.</p> <p>Note Check if the device is already part of another group; if yes, the device is removed from the previous group and added to the new group.</p>

Step 4 Click **Edit Device Group**.

