



## Provision Fabric Networks

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## Cisco SD-Access Zero-Trust Security Solution

Networks need protection against external and internal threats. Cisco SD-Access provides a zero-trust security solution for your workplace. The Cisco SD-Access zero-trust security solution provides secure access to users and devices from all locations across the network.

The Cisco SD-Access zero-trust security solution includes the following capabilities:

- **Identify and verify all endpoints:** SD-Access establishes an initial level of trust with each connecting endpoint.
- **Establish policy and segmentation:** SD-Access ensures least-privilege access based on the endpoint and user type.

- Continuously monitor endpoints: SD-Access continuously monitors the endpoints to ensure compliance.
- Threat mitigation: SD-Access allows you to quarantine the endpoints that are noncompliant or exhibit malicious behavior.

The Cisco SD-Access zero-trust security solution provides the flexibility to adopt a path to a zero-trust workplace based on your network settings and services. You can configure how users connect to the network using dynamic rules and automated segmentation.

The Cisco SD-Access zero-trust security solution provides the capability to automate network access policies using the following features:

- Endpoint visibility: You can identify and group endpoints. You can map their interactions through traffic flow analysis and define access policies.
- Trust monitoring: You can continuously monitor the endpoint behavior, scan for vulnerabilities, verify trustworthiness for continued access, and isolate rogue or compromised endpoints.
- Network Segmentation: You can enforce group-based access policies and secure network through multilevel segmentation.

The Cisco SD-Access zero-trust security solution enables you to explore various paths to zero-trust workplace based on your network settings and services. You can discover your optimal path based on your current network status, and explore the benefits of each added step on the zero-trust journey.

## Zero-Trust Overview Dashboard

The SD-Access **Zero-Trust Overview** dashboard provides an overview of your zero-trust workplace journey. From the top-left corner, click the menu icon and choose **Provision > Zero-Trust Overview** to view this dashboard.

The zero-trust workplace journey has the following phases:

- Day zero: For starting your zero-trust workplace journey. For more information, see [Day-Zero View of Zero-Trust Overview Dashboard, on page 2](#).
- Day *n*: For ongoing monitoring and configuration changes of your zero-trust workplace journey. For more information, see [Day-n View of Zero-Trust Overview Dashboard, on page 5](#).

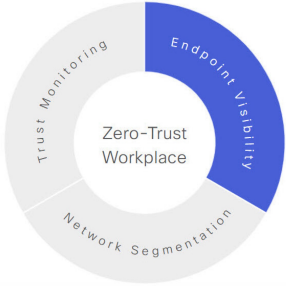
## Day-Zero View of Zero-Trust Overview Dashboard

Before you start your SD-Access zero-trust workplace journey, the day-zero view of the **Zero-Trust Overview** dashboard consists of the following sections:

## Welcome to Cisco SD-Access!


SD-Access offers a turnkey, zero-trust security solution to automate network access policies. Security is deeply embedded within the network, and a software-defined approach allows rapid iteration and innovation.

[Take a Tour](#)



**Endpoint Visibility**

Identify and group endpoints. Map their interactions through traffic flow analysis and define access policies.



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### Explore and start your journey to SD-Access Zero-Trust Workplace

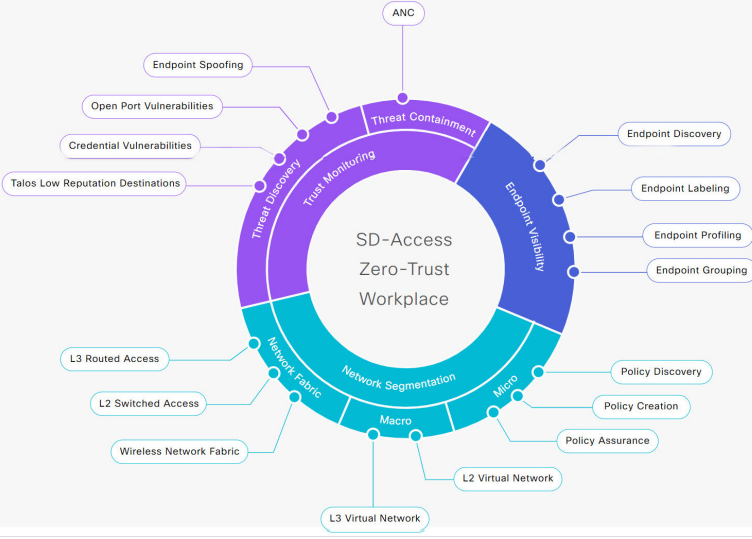
Explore different paths to Zero-Trust Workplace based on your network settings and services. Flexible adoption pathways to reach complete SD-Access mean there is no one-user-fits-all approach. Discover your optimal path based on where your network is currently, and explore the benefits of each added step on on your Zero-Trust journey.

**NETWORK CONNECTIVITY**

With Wireless   With CAT9K   With Traffic Telemetry Appliance

**SERVICES**


With ISE   With Talos   With CBAR Enabled



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### I'm Done Exploring and Ready to Start My Journey

Once you are done exploring your options and have selected your preferred path settings above, click on Start My Journey to start your Cisco SD-Access to Zero-Trust Workplace.



Start my journey with creation of network fabric

I already have connectivity and want to start with Endpoint Visibility

[Start My Journey](#)

- **Welcome to Cisco SD-Access!:** This section consists of an overview video that provides a short overview of the multiple paths towards a full SD-Access zero-trust workplace. It also consists of a circle containing sections for each pillar of the SD-Access zero-trust workplace:

- **Endpoint Visibility**

Provision Fabric Networks

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- **Trust Monitoring**
- **Network Segmentation**

Hover your cursor over each section to view more information.

- **Explore and start your journey to SD-Access Zero-Trust Workplace:** This section allows you to explore the different paths to a zero-trust workplace based on your network settings and services, and discover the optimal path for your network. This section consists of the **Network Connectivity** and **Services** options, and a circular journey map with details about the paths. Based on the options that you choose for network connectivity and services, the journey map displays the available paths to your zero-trust workplace journey.

To view details about each recommended step in the journey map, hover your cursor over the corresponding step around the journey map.

- **I'm Done Exploring and Ready to Start My Journey:** After exploring the paths and selecting your preferred settings, use this section to start your journey to a zero-trust workplace.

## Get Started with SD-Access Zero-Trust Workplace Journey

- 
- Step 1** From the top-left corner, click the menu icon and choose **Provision > Zero-Trust Overview**.
- Step 2** Under **Explore and start your journey to SD-Access Zero-Trust Workplace**, do the following:
- For **Network Connectivity** settings, choose the required options:
    - Enable **With Wireless** to use wireless devices in your zero-trust workplace journey.
    - Enable **With CAT9K** to use Cisco Catalyst 9000 Series devices or enable **With Traffic Telemetry Appliance** to use the Catalyst Center Traffic Telemetry Appliance in your zero-trust workplace journey.
  - For **Services** settings, choose the required options:
    - Enable **With ISE** to use Cisco Identity Services Engine in your zero-trust workplace journey.
    - Enable **With Talos** to use Talos Intelligence in your zero-trust workplace journey.
    - Enable **With CBAR Enabled** to use Controller-Based Application Recognition (CBAR) in your zero-trust workplace journey.
  - (Optional) To view details about each recommended step in the journey map, hover your cursor over the corresponding step around the journey map.
- Step 3** Under **I'm Done Exploring and Ready to Start My Journey**, choose one of the following options:
- To create a fabric network and start your journey towards a zero-trust workplace, click **Start my journey with creation of network fabric**.
  - If you already have fabric network connectivity and want to start your journey towards zero-trust workplace with endpoint visibility, click **I already have connectivity and want to start with Endpoint Visibility**.
- Step 4** Click **Start My Journey**.
- Step 5** In the **Modify Journey Map** dialog box, do the following:

a) Review your journey map settings.

**Note**

- Catalyst Center displays a message if it doesn't discover the selected services for your network.
- Catalyst Center displays a message if it discovers additional services that were not selected in the journey.

b) (Optional) To remove a selected service from your journey map settings, uncheck the corresponding check box.

c) Click **Confirm**.

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## Day-*n* View of Zero-Trust Overview Dashboard

After starting your SD-Access zero-trust workplace journey, the day-*n* view of the **Zero-Trust Overview** dashboard consists of the following sections:

### Your Journey to SD-Access Zero-Trust Workplace

[Take a Tour](#)

Zero Trust Workplace

Your journey to Zero-Trust Workplace

# 50%

Recommended Steps

1 of 3 Current Step

**L2 Switched Access**

SD-Access can be deployed alongside existing Layer 2 switched access networks, without prior conversion to Layer 3 routed access.

[Tip](#)

ROI Report

1 Month

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TIME SAVED	COST SAVED

### Your Journey Map

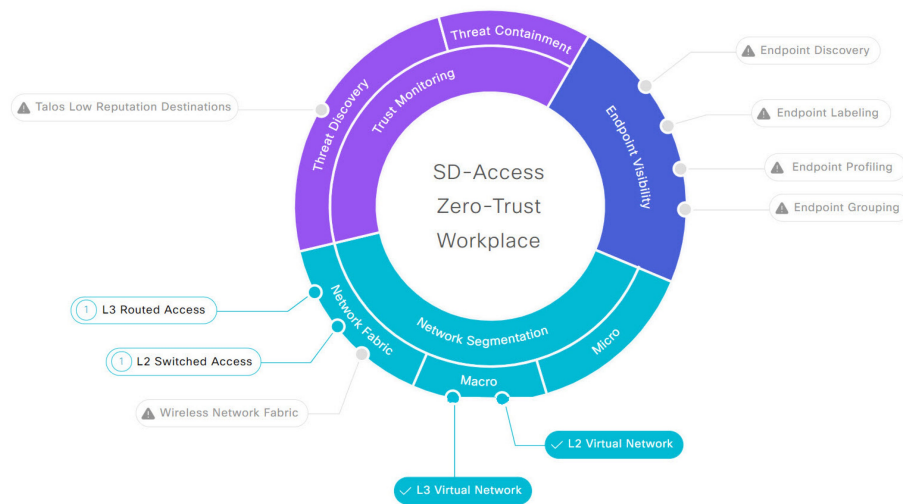
[Modify My Journey](#) [Hide Map](#)

⚠ Three (3) Warning Alerts on this page. [Expand](#) to see detail.

▼ Your Services and Network Settings

- 📶 Wireless
- 🟢 CAT9K
- 📶 Talos
- 📶 CBAR

SUGGESTED STEPS



### Your SD-Access Overview

Virtual Networks

# 16

Virtual Networks

[Go to Page](#)

Fabric Sites

A portion of the fabric with its own control plane nodes, border nodes, and edge nodes.

[Go to Page](#)

Endpoint Analytics



Identify, verify, and build detailed endpoint profiles, and group similar endpoints by applying AI/ML techniques to better identify who/what is in the network.


[Go to Page](#)

- **Your Journey to SD-Access Zero-Trust Workplace:** This section consists of the following dashlets:
  - The **Zero Trust Workplace** dashlet displays the percentage progress of your zero-trust workplace journey.
  - The **Recommended Steps** dashlet displays the next recommended steps for your zero-trust workplace journey. Use the arrow buttons (⏪ and ⏩) to scroll through all the steps. This dashlet also displays the tips for some steps. If available, click **Tip** to view the tips for the corresponding step.

- The **ROI Report** dashlet displays the time and cost savings based on the implemented steps as you progress through your zero-trust workplace journey. Use the drop-down in this dashlet to choose the time period for the report. Click **ROI Report** to view the report.
- **Your Journey Map:** This section displays the details of network connectivity and service settings for your zero-trust workplace journey. Click **Modify My Journey** to modify your zero-trust workplace journey. Click **Hide Map** to hide the journey map.

This section displays the warning alerts for your journey, if available. Click **Expand** to view the details of the alerts. If a selected service is currently unavailable in your network and you want to remove it from your journey, click the corresponding **Remove From Journey** option. If you want to get a selected service that is currently unavailable in your network, click the corresponding hyperlink to get the service.




Expand the **Your Services and Network Settings** drop-down to view the list of selected services for your journey. The  icon next to a service indicates that the service is currently available in your network. The  icon next to a service indicates that the service is currently unavailable in your network.

Hover your cursor over the corresponding  icon to view the **Update Needed** dialog box with details about the unavailable service. In the **Update Needed** dialog box, do the following:

- To remove the service from your journey, click **Remove From Journey**.
- To get the unavailable service in your network, click the corresponding hyperlink.

Enable the **Suggested Steps** toggle button to view the suggested order of steps around your journey map.

To view details about each step in the journey map, hover your cursor over the corresponding step around the journey map.

The  icon next to a step indicates that the corresponding configurations are incomplete. A number next to a step (for example, ) indicates the suggested order of the recommended steps for your journey map. The  icon next to a step indicates that the corresponding configurations are complete.

- **Your SD-Access Overview:** This section consists of dashlets for each functional area of your zero-trust workplace journey. Click the corresponding **Go to Page** option to open the relevant window. Each dashlet indicates its corresponding pillar of the zero-trust workplace journey in its upper-right corner.

## Modify SD-Access Zero-Trust Workplace Journey

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- Step 1** From the top-left corner, click the menu icon and choose **Provision > Zero-Trust Overview**.
- Step 2** Under **Your Journey Map**, click **Modify My Journey**.
- Step 3** Under **Explore and start your journey to SD-Access Zero-Trust Workplace**, do the following:
- a) For **Network Connectivity** settings, choose the required options:
    - Enable **With Wireless** to use wireless devices in your zero-trust workplace journey.
    - Enable **With CAT9K** to use Cisco Catalyst 9000 Series devices or enable **With Traffic Telemetry Appliance** to use the Catalyst Center Traffic Telemetry Appliance in your zero-trust workplace journey.
  - b) For **Services** settings, choose the required options:

- Enable **With ISE** to use Cisco Identity Services Engine in your zero-trust workplace journey.
  - Enable **With Talos** to use Talos Intelligence in your zero-trust workplace journey.
  - Enable **With CBAR Enabled** to use Controller-Based Application Recognition (CBAR) in your zero-trust workplace journey.
- c) (Optional) To view details about each recommended step in the journey map, hover your cursor over the corresponding step around the journey map.

**Step 4** Under **I'm Done Exploring and Ready to Start My Journey**, choose one of the following options:

- To create a fabric network and start your journey towards a zero-trust workplace, click **Start my journey with creation of network fabric**.
- If you already have fabric network connectivity and want to start your journey towards zero-trust workplace with endpoint visibility, click **I already have connectivity and want to start with Endpoint Visibility**.

**Step 5** Click **Modify My Journey**.

**Step 6** In the **Modify Journey Map** dialog box, do the following:

a) Review your journey map settings.

- Note**
- Catalyst Center displays a message if it doesn't discover the selected services for your network.
  - Catalyst Center displays a message if it discovers additional services that were not selected in the journey.

b) (Optional) To remove a selected service from your journey map settings, uncheck the corresponding check box.

c) Click **Confirm**.

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## About Fabric Networks

A fabric network is a logical group of devices that is managed as a single entity in one or multiple locations. Having a fabric network in place enables several capabilities, such as the creation of virtual networks and user and device groups, and advanced reporting. Other capabilities include intelligent services for application recognition, traffic analytics, traffic prioritization, and steering for optimum performance and operational effectiveness.

Catalyst Center allows you to add devices to a fabric network. These devices can be configured to act as control plane, border, or edge devices within the fabric network.

## Fabric Sites

A fabric site is an independent fabric area with a unique set of network devices: control plane, border, edge, wireless controller, ISE PSN. Different levels of redundancy and scale can be designed per site by including local resources: DHCP, AAA, DNS, Internet, and so on.

A fabric site can cover a single physical location, multiple locations, or only a subset of a location:

- Single location: branch, campus, or metro campus



- Multiple locations: metro campus + multiple branches
- Subset of a location: building or area within a campus

A Software-Defined Access fabric network may comprise multiple sites. Each site has the benefits of scale, resiliency, survivability, and mobility. The overall aggregation of fabric sites accommodates a large number of endpoints and scales modularly or horizontally. Multiple fabric sites are interconnected using a transit.

## Transits

A transit is a site that interconnects two or more fabric sites or connects the fabric site with external networks (Internet, data center, and so on). There are two types of transit networks:

- IP transit: Uses a regular IP network to connect to an external network or to connect two or more fabric sites. It leverages a traditional IP-based (VRF-LITE, MPLS) network, which requires remapping of VRFs and SGTs between sites.
- SD-Access transit: Uses LISP/VxLAN encapsulation to connect two fabric sites. The SD-Access transit area may be defined as a portion of the fabric that has its own control plane nodes, but does not have edge or border nodes. However, it can work with a fabric that has an external border. With an SD-Access transit, an end-to-end policy plane is maintained using SGT group tags.

## Fabric Readiness, Image Compatibility, and Compliance Checks

### Fabric Readiness Checks

Fabric readiness checks are a set of preprovisioning checks done on a device to ensure that the device is ready to be added to the fabric. Fabric readiness checks are now done automatically when the device is provisioned. Interface VLAN and Multi VRF configuration checks are not done as part of fabric readiness checks.


Fabric readiness checks include the following:

- Connectivity check: Checks for the necessary connectivity between devices; for example, connectivity from the edge node to map server, from edge node to border, and so on.
- Existing configuration check: Checks for any configuration on the device that conflicts with the configuration that is pushed through SD-Access and can result in a failure later.
- Hardware version: Checks if the hardware version of the device is supported.
- Image type: Checks if the device is running with a supported image type (IOS-XE, IOS, NXOS, Cisco Controller).
- Loopback interface: Checks for the loopback interface configuration on the device. A device must have a loopback interface numbered 0 with an IP address configured on it to work with the SDA application. Lack of a loopback interface numbered 0 may cause fabric provisioning errors because Loopback0 is used as the routing locator (RLOC) by default.
- Software license: Checks if the device is running with an appropriate software license.

If an error is detected during any of the fabric readiness checks, an error notification is displayed on the topology area. You can correct the problem and continue with the provisioning workflow for the device.

### Image Compatibility Check

To ensure the network devices (before and after a fabric deployment) are compatible with the recommended or supported software image versions based on the Catalyst Center package version, Catalyst Center performs Image Compatibility check to evaluate the network devices.

If a network device is running an incompatible software image, the  icon is displayed in the **Provision > Inventory > Image Compatibility** column. You can check the supported software image versions for your device from the [Cisco SD-Access Compatibility Matrix](#) and continue with the provisioning workflow for the device.

### Fabric Compliance Checks

Fabric compliance is a state of a device to operate according to the user intent configured during the fabric provisioning. Fabric compliance checks are triggered based on the following:

- Every 24 hours for wired devices and every six hours for wireless devices.
- When there is a configuration change on the wired device.

A configuration change on the wired device triggers an SNMP trap, which in turn triggers the compliance check. Ensure that you have configured the Catalyst Center server as an SNMP server.

The following compliance checks are done to ensure that the device is fabric compliant:

- Virtual Network: Checks whether the necessary VRFs are configured on the device to comply with the current state of the user intent for the VN on Catalyst Center.
- Fabric Role: Checks whether the configuration on the device is compliant with the user intent for a fabric role on Catalyst Center.
- Segment: Checks the VLAN and SVI configuration for segments.
- Port Assignment: Checks the interface configuration for the VLAN and authentication profile.

## Fabric Health Check

The health of SD-Access application is checked periodically to provide an indication of the application status. SD-Access health check also includes the check for stale database entries in the SD-Access application, which could potentially disrupt fabric provisioning.

You can check the status of SD-Access application on the **System > System 360 > System Health** page. For more information about how to check the health of an application, see “Use System 360” and “Monitor System Health” in the [Cisco Catalyst Center Administrator Guide](#).

You can also use the Validation Tool to run the same checks by subscribing to the SD-Access Application Health status. Validation Tool is available on the **System > System 360 > System Health** page. When you run a new validation, ensure that you check the **Application Health Status** check box under the **Validation Set(s) selection** field. For more information on how to access and run the Validation Tool, see “Use the Validation Tool” in the [Cisco Catalyst Center Administrator Guide](#).

SD-Access application status can have three values:

- **HEALTHY**—Indicates that the SD-Access application is working as expected and all provisioning activities are allowed.

- **UNHEALTHY**—Indicates that the SD-Access application is not working due to dependent services not being healthy. This condition may block all provisioning activities in the SD-Access fabric.
- **DEGRADED**—Indicates that all dependent services are working but there are database inconsistencies in the SD-Access application. This condition may affect the functioning or provisioning of one or more fabric sites.

If your SD-Access application is in the DEGRADED state, contact Cisco TAC to resolve the issue.

## Visibility and Control of Fabric Configurations

The Visibility and Control of Configurations feature provides a solution to further secure your planned network configurations before deploying them on to your devices. With enhanced visibility, you can enforce the previewing of device configurations (CLI and NETCONF commands) before deploying them. With enhanced control, you can ensure only authentic and authorized configurations are provisioned onto your network devices through an IT Service Management (ITSM) check. These two options also offer you the flexibility to preview configurations at your own pace. You can preview the configurations immediately in a visibility- and control-supported workflow or later in the **Activities > Tasks** window.

By default, the Visibility and Control of Configurations settings are configured as follows:

- Visibility of Configurations (**Configuration Preview**) is enabled.
- Control of Configurations (**ITSM Approval**) is disabled.

To enable or disable these settings, see "Enable Visibility and Control of Configurations" in the [Cisco Catalyst Center Administrator Guide](#).



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**Note** If a provisioning workflow supports Visibility and Control of Configurations, the following banner message is displayed when you schedule the deployment of your task:

This workflow supports enforcing network administrators and other users to preview configurations before deploying them on the network devices. To configure this setting, go to **System > Settings > Visibility and Control of Configurations**.

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### Visibility and Control of Configurations Workflow



When it's time to schedule your task during a provisioning workflow, depending on the Visibility and Control of Configurations settings, you can do the following:

- If **Configuration Preview** is enabled, **Generate configuration preview** is selected by default. This means that the **Now** and **Later** scheduling options are dimmed (unavailable) because you must preview the device configurations before deploying them.
- If **Configuration Preview** and **ITSM Approval** are enabled, **Generate configuration preview** is selected by default. This means that the **Now** and **Later** scheduling options are dimmed (unavailable) because you must preview the device configurations and submit them to an IT administrator for approval before deploying them.
- If **Configuration Preview** and **ITSM Approval** are disabled, you can choose any available option (**Now**, **Later**, or **Generate configuration preview**).

If you choose **Generate configuration preview**, Catalyst Center performs the following the high-level steps:

	Step	Description
1	A set of network provisioning prechecks to ensure a seamless provisioning operation.	<p>On the <b>Performing Initial Checks</b> window, Catalyst Center checks for and notifies you of any Pending Operations and Device Compliance issues.</p> <p>You must address all the identified issues and perform a recheck to ensure all the validations are successful. For more information, see <a href="#">Network Provisioning Prechecks</a>.</p>
2	Prepare the chosen devices to generate the configurations.	<p>On the <b>Preparing Devices and Configuration Models</b> window, if the provisioning workflow supports the workflow progression view, the steps the system takes to prepare a listed device are displayed. Otherwise, an in-progress message is displayed.</p> <p>Because this preparation step can take some time, you can exit the workflow and return to it later while the system continues the process in the background.</p>
3	Display the device configurations for the first listed device.	<p>On the <b>Preview Configuration</b> window, Catalyst Center displays a side-by-side comparison of the running configuration and the planned configuration for the first listed device.</p> <p>You can review the device configurations and then, when you're ready, deploy them or submit them for ITSM approval.</p>

While reviewing the configurations on the **Preview Configuration** window, you can do the following:

To...	Do this...
Preview the configuration of a device.	Choose a device in the left pane.
Filter the data in the configuration preview pane.	From the <b>View by Configuration Source</b> drop-down list, choose an available option.
View a side-by-side comparison of the planned configuration and the running configuration, or view only the planned configuration.	<p>Click the view switcher (   ).</p> <p><b>Note</b> Viewing YANG configurations in the side-by-side comparison view isn't supported.</p>

To...	Do this...
Highlight corresponding commands between the running and planned configurations.	<p>Click one command in one configuration to highlight the corresponding command in the other configuration.</p> <p><b>Note</b> Keep the following limitations in mind:</p> <ul style="list-style-type: none"> <li>• The system supports only side-by-side highlighting for first-level commands, not sublevel commands.</li> <li>• All commands must be a complete match for the system to display the side-by-side highlighting between configurations.</li> <li>• If you click any commands starting with <code>NO</code> in one configuration, the system will ignore the <code>NO</code> portion when checking for a match in the other configuration.</li> </ul>
Search for a value in the displayed configuration.	Use the <b>Search configuration</b> field.
Display the workflow progression view.	<p>Choose a device in the left pane, and then click <b>Back to workflow progress</b> in the top-right corner of the right pane. To return to the configuration preview pane, click <b>Go to generated config</b>.</p> <p><b>Note</b> <b>Back to workflow progress</b> and <b>Go to generated config</b> are only available if the workflow supports the workflow progression view.</p>
Exit the workflow and review the device configurations later.	<p>Click <b>Exit and Preview Later</b>.</p> <p>When you're ready to continue reviewing the configurations, go to the <b>Activities &gt; Tasks</b> window and open the relevant work item.</p>

After reviewing the configurations, depending on the Visibility and Control of Configuration settings, you can do the following:

To...	Do this...
Discard the work item permanently.	Click <b>Discard</b> and, in the <b>Warning</b> dialog box, click <b>Yes</b> . If you discard it, you can't recover it later.

To...	Do this...
Retain any generated configurations and discard all other resources.	<p>Click <b>Discard</b> and, in the <b>Discard</b> dialog box, check the <b>Retain generated configs (if any)</b> check box and click <b>Accept</b>.</p> <p><b>Tip</b> If a configuration preview fails, consider retaining any generated configurations and discarding all other resources so that you or your IT administrator can inspect the issue.</p> <p>If you retain any generated configurations and discard all other resources, <b>Exit</b> displays instead of <b>Exit and Preview Later</b> because you've previewed all the configurations and discarded the nongenerated ones.</p>

To...	Do this...
<p>Deploy the configurations or submit them for ITSM approval.</p>	<p>Click <b>Deploy</b> or <b>Submit for ITSM Approval</b>.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• If <b>Save Intent</b> displays instead of <b>Deploy</b>, the parameters that you chose during the workflow are already present on the device. To save those parameters to the database, click <b>Save Intent</b>. No configuration is pushed to the device because the device already has the required configuration.</li> <li>• If there are multiple devices, you must click each device to preview its configuration. However, when you click <b>Deploy</b>, the configurations are pushed to all the devices even if the configurations have not been previewed on all devices.</li> </ul> <p>In the slide-in pane, schedule the time and date of the deployment and, if you're submitting the configurations for ITSM approval, add notes for the IT administrator. Then click <b>Submit</b>.</p> <p>You can check the work item's approval status or the task's deployment status on the <b>Tasks</b> window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it is deployed at the scheduled time.</p> <p><b>Note</b> When you preview the configurations, Catalyst Center creates a snapshot of the configuration previews. If there are any changes in the network settings or network profiles after this operation is scheduled for deployment, the changes are not included during the device provisioning.</p>

## Add a Fabric Site

### Before you begin

You can create a fabric site only if IP Device Tracking (IPDT) is already configured for the site.

- 
- Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- Step 2** Under **SUMMARY**, click the number that indicates the count of the fabric sites.
- The resulting window displays every fabric site that has already been created and its information (such as Health Score, Fabric Zones, Fabric Devices, Fabric Roles, and Connected Transits) in a tabular format.
- You can customize the table view to display only selected columns. Use the gear icon at the top right corner of the window to edit the **Table Settings** and **Apply** the changes.
- Step 3** Click **Create Fabric Sites**.
- Alternatively, instead of the first three steps, click the menu icon and choose **Workflow > Create Fabric Sites and Fabric Zones**.
- Step 4** In the **Create Fabric Sites** window, click **Let's Do it** to go directly to the workflow.
- Step 5** In the **Fabric Site Location** window, choose an area, building, or floor to add as a fabric site.
- Step 6** In the **Wired Endpoint Data Collection** window, ensure that the **Wired Endpoint Data Collection** check box is checked.
- Step 7** In the **Authentication Template** window, do the following:
- a) Choose an authentication template for the fabric site:
    - **Closed Authentication:** Any traffic before authentication is dropped, including DHCP, DNS, and ARP.
    - **Open Authentication:** A host is allowed network access without having to go through 802.1X authentication.
    - **Low Impact:** Security is added by applying an ACL to the switch port, to allow very limited network access before authentication. After a host has been successfully authenticated, additional network access is granted.
    - **None**
  - b) (Optional) If you choose **Closed Authentication**, **Open Authentication**, or **Low Impact**, click **Edit** to edit the authentication settings:
    - **First Authentication Method:** Choose **802.1x** or **MAC Authentication Bypass (MAB)**
    - **802.1x Timeout (in seconds):** Use the slider to specify the 802.1x timeout, in seconds.
    - **Wake on LAN:** Choose **Yes** or **No**.
    - **Number of Hosts:** Choose **Unlimited** or **Single**.
    - **BPDU Guard:** Use this check box to enable or disable the Bridge Protocol Data Unit (BPDU) guard on all the **Closed Authentication** ports.
    - **Pre-Authentication Access Control List:** Enable the toggle button to configure preauthentication control for **Low Impact** authentication. From the **Implicit Action** drop-down list, choose an implicit action and enter a description for the rule. To add an access contract, click **Add Contract Action**, choose the rules, and click **Apply Table**.
- Step 8** (Optional) In the **Fabric Zones** window, choose one of the following options:
- To designate fabric zones later, click **Setup Fabric Zones Later**.
  - To designate fabric zones and create scoped subnets, click **Setup Fabric Zones Now** and choose a fabric site from the network hierarchy displayed.



**Step 9** In the **Summary** window, review the fabric site settings.

You can edit any of the fabric site or zone settings here.

**Step 10** In the **Fabric Site Creation Scheduler** window, depending on the Visibility and Control of Configurations settings, choose an available option.

- To immediately deploy the configuration, click **Now**.
- To schedule the deployment for a later date and time, click **Later**, and define the date, time, and time zone of the deployment.
- To preview the configurations, click **Generate configuration preview**.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations](#).

**Step 11** Click **Deploy**.

**Step 12** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 13** If you chose **Generate configuration preview** in the **Fabric Site Creation Scheduler** window, depending on the Visibility and Control of Configurations settings, do the following:

**a.** On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.

**b.** On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations](#).

**c.** When you're ready, click **Deploy** or **Submit for Approval**. If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

**d.** In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

**e.** Click **Submit**.

When the configurations are successfully submitted, a success message is displayed.

If you previewed and scheduled the task for deployment, you can view the task on the **Tasks** window.

If you submitted the configurations for ITSM approval, you can view the work item's status on the **Tasks** window. If it's not approved, you must resubmit the work item for ITSM approval. When it's approved, it will be deployed at the scheduled time, which you can view on the **Tasks** window. If it's not approved, you must resubmit the work item for ITSM approval. When it's approved, it will deploy at the scheduled time.

**Step 14** It takes a few seconds for the site and zones to be provisioned. Upon successful creation of the site, a Fabric Site Creation Completed message is displayed.

Next, you are provided with options to either create a new fabric site or view the activities on the **Tasks** window.

---

## Configure a Fabric Site

After you create a fabric site, you can configure the devices, virtual networks, and authentication methods for the hosts to connect to a fabric site.

Select a fabric site under the **Provision > SD-Access > Fabric Sites** menu and use the following tabs:

- **Fabric Infrastructure:** Assign devices to fabric roles.
- **Layer 3 Virtual Networks:** Create a Layer 3 virtual network for the fabric site or assign an existing Layer 3 virtual network to the fabric site.
- **Layer 2 Virtual Networks:** Create a Layer 2 virtual network for the fabric site or assign an existing Layer 2 virtual network to the fabric site.
- **Anycast Gateways:** Create an Anycast Gateway for a Layer 3 virtual network in the fabric site.
- **Authentication Template:** Select an authentication template for the fabric.
- **Wireless SSIDs:** Specify wireless SSIDs within the network that hosts can access. You can select the guest or enterprise SSIDs and assign address pools.
- **Port Assignment:** Apply specific configurations to each port, depending on the type of device that connects to the fabric site.

Each of these operations is explained in the later sections.

Note the following constraints:

- Cisco SD-Access deployments support only APs, extended nodes, user devices (such as a single computer or a single computer plus phone), and devices that need trunk ports, such as single servers.
- Servers with internal switches or virtual switches aren't supported.
- Other networking equipment (such as hubs, routers, or switches) isn't supported.

## Add a Device to a Fabric

After you have created a fabric site, you can add devices to the fabric site. You can also specify whether the device should act as a control plane node, an edge node, or a border node.

You can add a new device to the fabric site only if IP Device Tracking (IPDT) is configured for the fabric site.

A device that is assigned the Access role and has been provisioned before enabling IPDT on the site can't be added to the fabric. Reprovision such devices before adding them to the fabric site. Check the Provision workflow to confirm the status of **Deployment of IPDT** on the device.

**Note**

- It's optional to designate the devices in a fabric site as control plane nodes or border nodes. You might have devices that don't occupy these roles. However, every fabric site must have at least one control plane node device and one border node device. In the current release for wired fabric, you can add up to six control plane nodes for redundancy.
- Currently, the Cisco Wireless Controller communicates only with two control plane nodes.

**Before you begin**

Provision the device if you haven't already provisioned it:

- The **Provision > Network Devices > Inventory** window displays the discovered devices.
- The topology view shows a device in gray if it has passed the fabric readiness checks and is ready to be provisioned.
- If an error is detected during any of the fabric readiness checks, an error notification is displayed on the topology area. Click **See more details** to check the problem area listed in the resulting window. Correct the problem and click **Re-check** to ensure that the problem is resolved.
- If you update the device configuration as a part of problem resolution, ensure that you resynchronize the device information by performing an **Inventory > Resync** for the device.

**Note**

You can continue to provision a device that has failed the fabric readiness checks.

**Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.

**Step 2** Under **SUMMARY**, click the number that indicates the count of fabric sites.

**Step 3** Select the fabric site to add a device.

The resulting topology view displays all devices in the network that have been inventoried. In the topology view, any device that is added to the fabric is shown in blue.

**Step 4** From the **List** view under the **Fabric Infrastructure** tab, click a device. A slide-in pane displays the following **Fabric** options:

Option	Description
Edge Node	Toggle the button next to this option to enable the selected device as an edge node.
Border Node	Toggle the button next to this option to enable the selected device as a border node.
Control Plane Node	Toggle the button next to this option to enable the selected device as a control plane node.

To configure a device as a fabric-in-a-box, select the **Control Plane Node**, **Border Node**, and **Edge Node** options.

To configure the device as a control plane and a border node, select both **Control Plane Node** and **Border Node**.

### Step 5

(Optional) To enable the wireless capability for the device, under **Capability**, click the **Embedded Wireless LAN Controller** toggle button and do the following:

Alternatively, if the toggle button is already enabled, you can click **Configure** to configure the wireless settings.

- a) If you have not installed the wireless package on the device yet, Catalyst Center displays a warning message indicating that the embedded wireless controller software image is necessary for enabling the capability. In the warning dialog box, click **OK** to install the image manually.
- b) Under **Download Image**, click **Choose File** to navigate to a software image stored locally, or **Enter image URL** to specify an HTTP or FTP source from which to import the software image.
- c) Click **Import**.

The progress of the image import is displayed. To exit the window, and view the progress of the import and schedule the installation later, click **Close**.

- d) After the image import is complete, under **Schedule Image Installation** on **Download Image**, choose one of the following options:
  - **Now**: Immediately install the image.
  - **Later**: Schedule the image installation for a later date or time.
- e) In the **Task Name** field, update the task name, if required.
- f) If you chose **Later**, do the following:
  - Under **Start Date/Time**, specify a start date and time for the image installation.
  - To use the default site time zone for the image installation, check the **Site Settings** check box. To select a time zone, uncheck the **Site Settings** check box and choose a time zone from the drop-down list.
- g) Click **Apply**.

To view the status of image installation, go to the **Activities > Tasks** window and open the relevant work item. After the software image is distributed and activated on the switch, you must resynchronize the device using the **Provision > Inventory > Resync** option.

- h) Under **Manage Scope**, do the following:
  - Under the **Primary** tab, check the check box next to the required site name.
  - Under the **Secondary** tab, check the check box next to the required site name.

You can select either a parent site or individual sites. If you select a parent site, all the children under the parent site are also selected. You can uncheck the check box to deselect an individual site.

You can also use the **Search Hierarchy** search field or the filter icon to find a site.

- i) Click **Next**.
- j) Under **Advanced**, to enable the Rolling AP Upgrade feature, check the **Enable** check box.
 

(Optional) If you check this check box, from the **AP Reboot Percentage** drop-down list, choose a percentage.
- k) Click **Next**.
- l) Under **Summary**, review the configuration settings.
- m) Click **Save**.

If the wireless capability is enabled for a device and there are changes in the wireless network settings, to push the changes to the device, you must click **Configure** and save the configuration.

**Step 6** Click **Add** to save the configurations.

**Step 7** Click **Deploy** under the **Fabric Infrastructure** tab to configure the device.

Depending on the Visibility and Control of Configurations settings, choose an available option for deployment:

- To immediately deploy the configuration, click **Now**.
- To schedule the deployment for a later date and time, click **Later**, and define the date, time, and time zone of the deployment.
- To preview the configurations, click **Generate configuration preview**.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations](#).

**Note** A device is added to the fabric only if the device runs a software release that is compatible with the Catalyst Center release. For information about fabric device compatibility, see [Cisco SD-Access Compatibility Matrix](#).  
For a given fabric role, if the software image on the device isn't compatible with the Catalyst Center release, the device isn't added to the fabric and an error message is displayed.

**Step 8** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 9** If you chose **Generate configuration preview** in the **Preview Configuration** window, depending on the Visibility and Control of Configurations settings, do the following:

a. Review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

b. When you're ready, click **Deploy** or **Submit for Approval**. If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

c. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

d. Click **Submit**.

When the configurations are successfully submitted, a success message is displayed.

If you previewed and scheduled the task for deployment, you can view the task on the **Tasks** window.

If you submitted the configurations for ITSM approval, you can view the work item's status on the **Tasks** window. If it's not approved, you must resubmit the work item for ITSM approval. When it's approved, it will deploy at the scheduled time, which you can view on the **Tasks** window.

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### What to do next

After a device is added to the fabric, fabric compliance checks are automatically performed to ensure that the device is fabric-compliant. The topology displays a device that has failed the fabric compliance check in blue color with a cross-mark beside it. Click **See more details** on the error notification to identify the problem area and correct it.

## Add a Device as a Border Node

When you add a device to a fabric, you can add it in various combinations to act as a control plane node, border node, or edge node, as described in [Add a Device to a Fabric, on page 18](#).

This section describes how to add a device as a border node and configure the following:

- Border node type: Internal, External, or Internal and External ([Step 9, on page 23](#))
- Border node Priority ([Step 10, on page 23](#))
- Border node Affinity-ID ([Step 10, on page 23](#))
- TCP MSS Adjustment value on the border node switched virtual interfaces (SVIs) ([Step 10, on page 23](#))
- AS Path Prepend ([Step 10, on page 23](#))
- Associated transit: SD-Access transit or IP-based transit ([Step 11, on page 24](#))
- IP address pool allocation for Layer 3 handoff ([Step 11, on page 24](#))

### Before you begin

To use the Border Node Affinity-ID feature, ensure that you create an SD-Access LISP Pub/Sub transit. For more information, see [Create an SD-Access Transit, on page 30](#). When adding the first control plane node in the local fabric site, ensure that you select the LISP Pub/Sub control plane protocol. For more information, see [Configure LISP Pub/Sub, on page 26](#). The border node must be running Cisco IOS XE Release 17.8.1 or later.

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- Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- Step 2** In the **Fabric Sites** tab, under **SUMMARY**, click the number that indicates the count of fabric sites.
- Step 3** In the **Fabric Sites** window, select the fabric site to configure a border node. The resulting topology view displays all the devices in the network inventory. In the topology view, any device that is operating in a fabric role is shown in blue.
- Step 4** Under the **Fabric Infrastructure** tab, click a device.

**Step 5** In the slide-in pane, click the **Border Node** toggle button.

**Step 6** In the resulting slide-in pane, click the **Layer 3 Handoff** tab.

**Step 7** Check the **Enable Layer 3 Handoff** check box.

**Step 8** Enter the **Local Autonomous Number** for the device.

If the local autonomous number is already configured on the device, this field displays the configured number and is disabled. You cannot change the local autonomous number if it's already configured on the device.

**Step 9** Configure the type of border node. By default, a border node is designated as an external border node, wherein it acts as the default gateway to the fabric site, without importing any external routes.

A border node can be configured to be an internal border node, wherein it isn't the default gateway and only imports external routes. A border node can also have a combined role of internal and external borders.

- Check both the **Default to all virtual networks** and **Do not import external routes** check boxes to designate the border as an external border node.
- Uncheck both the **Default to all virtual networks** and **Do not import external routes** check boxes to designate the border as an internal border node.
- Check the **Default to all virtual networks** check box to designate the border node as an external and internal border. It acts as the fabric default gateway and also imports BGP-learned routes into the fabric site. (Don't check the **Do not import external routes** check box.)

For information about border node types, see the [Cisco SD-Access Solution Design Guide](#).

**Step 10** To configure the border node priority, affinity-ID, AS Path Prepend, TCP MSS adjustment and native multicast across SD-Access transit, click **Advanced** and configure the following:

- a) To change the border node priority, check the **Modify Border Priority** check box and enter a new priority value.
  - Priority value ranges from 1 to 10.
  - 1 indicates the highest priority.
  - 10 indicates the lowest priority.
  - The default priority value is 10.

If two or more border nodes are configured in a fabric site, traffic is routed through the border node that has a higher priority. If the priority values are the same, traffic is load balanced across the border nodes.

- b) (Optional) To configure the border node affinity-ID, check the **Modify Border Node Affinity-ID** check box and enter values for the following fields:
  - **Affinity-ID Prime:** A lower relative prime value indicates a higher preference.
  - **Affinity-ID Decider:** When the prime value is the same for two border nodes, the decider value is used as a tie-breaker to determine the border node preference.

Affinity-ID is a relative value, considering the value of this border node among the received values from all the other available border nodes. The lower the relative value of affinity-ID, the higher the preference for a destination border node. By default, the affinity-ID value isn't provisioned.

When the received affinity-ID values are equal, priority is used to determine the border node preference.

**Note** For proper functionality of the Affinity-ID feature, ensure that you configure an affinity-ID on all border nodes connected to the same SD-Access transit.

- c) To define the number of AS Path prepends to the BGP AS\_PATH list, check the **AS Path Prepending** check box and enter a value between 1 to 10.

AS Path prepending helps you to choose the ingress border.

- d) To customize the TCP maximum segment size (MSS) value for the Layer 3 handoff SVIs, check the **TCP MSS Adjustment** check box and input the required value.

The TCP MSS Adjustment value can range from 500 to 1440. **TCP MSS Adjustment** value is applicable for the TCP sessions over both IPv4 and IPv6.

**Note** You can customize the TCP MSS value only if the border device is configured for Layer 3 handoff.

- e) (Optional) To configure native multicast over multiple sites that are connected to an SD-Access transit, check the **Enable Multicast over SD-Access Transit** check box.

**Note** Ensure that you enable a similar check box for the SD-Access transit too.

You can view the border node priority and affinity-ID deployment logs in **Activities > Audit Logs**.

## Step 11

Hover your cursor over **Add Transit Site** and select a transit that will be connected to this border node.

In an **IP:BGP IP TRANSIT**, you can choose to either automate the IP address allocation for a virtual network or manually assign the Local and Peer IP addresses for a virtual network. You cannot do both.

- a) (Optional) To enable Catalyst Center to allocate IP address for the connection between the border node and peer, choose an IP address pool from the **Select IP Address Pool** drop-down list.

**Note** **Select IP Address Pool** is disabled if you have manually assigned the Local and Peer IP addresses.

- b) To configure the handoff interface, click **Add External Interface**.

Do the following steps in the resulting window:

1. Select an interface from the **External Interface** drop-down.
2. The **Remote AS Number** is automatically derived from the selected Transit or Peer network.
3. (Optional) Enter the a description for the interface in the **Interface Description** field.
4. (Optional) From the **Actions** drop-down list, choose **Enable All** or **Disable All**.
5. Click the **Enable Layer 3 Handoff** toggle button for the virtual network. This virtual network is advertised by the border node to the peer through BGP. You can select one, multiple, or all virtual networks.
6. In the **VLAN ID** field, enter an ID for the selected virtual network.
7. (Optional) To manually assign the IPv4 and IPv6 **Local IP Address** and **Peer IP Address** for the selected virtual network, enter the IP addresses and subnet mask in the CIDR notation (IP address/prefix-length).

**Note** The **Local IP Address** and **Peer IP Address** fields are disabled if you have already selected an IP Pool.

8. Click **Save**.

- c) Click **Add**.

## Step 12

(Optional) Perform this step only if you are connecting a traditional network to the fabric site or you are migrating from a traditional network to an SD-Access network. Click the **Layer 2 Handoff** tab.



A list of virtual networks and the count of IP address pools in each virtual network is displayed.

- a) Click a virtual network that is to be handed off.

A list of IP address pools that are present in the virtual network and a list of interfaces through which you can connect to the traditional network are displayed.

- b) From the **External Interface** drop-down, choose an interface.  
c) Under **Interface Description**, enter an optional description for the interface.  
d) In the **External VLAN** field, enter the VLAN number into which the fabric must be extended.

A virtual network can be handed off on a single interface or on multiple interfaces. Layer 2 handoff for a segment can also be done on two different devices. In both cases, ensure that no loops are formed in the network.

Because a border node is connected to the traditional network, it is subject to broadcast storms, Layer 2 loops, and spanning-tree problems that can occur in Layer 2 switched access networks. To prevent disruption of control plane node services or border node services connecting to other external networks, a border node should be dedicated to the Layer 2 handoff feature and not colocated with other fabric roles or services.

- e) Click **Save**.

**Step 13** Click **Add** to save the configurations.

**Step 14** Click **Deploy** under the **Fabric Infrastructure** tab to configure the border node.

Depending on the Visibility and Control of Configurations settings, choose an available option for deployment:

- To immediately deploy the configuration, click **Now**.
- To schedule the deployment for a later date and time, click **Later**, and define the date, time, and time zone of the deployment.
- To preview the configurations, click **Generate configuration preview**.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations](#).

**Note** A device is configured as a border node only if the device runs a software release that is compatible with the Catalyst Center release. If the device runs an incompatible software, an error message is displayed and the device is not configured as a fabric border node. For information about software compatibility, see the [Cisco SD-Access Compatibility Matrix](#).

**Step 15** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

- Step 16** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:
- On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
  - On the **Preview Configuration** window, review the device configurations.  
For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).
  - Do one of the following:
    - When you're ready, click **Deploy** or **Submit for Approval**.
    - If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.
- Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.
- In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.
  - Click **Submit**.  
You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

## Configure LISP Pub/Sub

You can configure LISP Pub/Sub on a fabric site only when you add the first control plane to your fabric.

### Before you begin

Ensure that the fabric devices operate on Cisco IOS XE Release 17.6.1 or later.

- From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- Under **SUMMARY**, click the number that indicates the count of fabric sites.
- Select the fabric site to add a device.  
The resulting topology view displays all devices in the network that have been inventoried. In the topology view, any device that is added to the fabric is shown in blue.
- From the **List** view under the **Fabric Infrastructure** tab, click a device that is to be configured as a control plane.
- In the slide-in pane, enable the **Control Plane Node** toggle button to configure this plane.
- In the **Configure Control Plane** slide-in pane, choose **LISP Pub/Sub** route distribution protocol and click **Add**.
- Click **Deploy** under the **Fabric Infrastructure** tab to configure the LISP Pub/Sub Control Plane.

Depending on the Visibility and Control of Configurations settings, choose an available option for deployment:

- To immediately deploy the configuration, click **Now**.
- To schedule the deployment for a later date and time, click **Later**, and define the date, time, and time zone of the deployment.
- To preview the configurations, click **Generate configuration preview**.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations](#).

**Step 8** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 9** If you chose **Generate configuration preview**, in the **Preview Configuration** window, depending on the Visibility and Control of Configurations settings, do the following:

- a. Review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

- b. When you're ready, click **Deploy** or **Submit for Approval**. If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

- c. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

- d. Click **Submit**.

When the configurations are successfully submitted, a success message is displayed.

If you previewed and scheduled the task for deployment, you can view the task on the **Tasks** window.

If you submitted the configurations for ITSM approval, you can view the work item's status on the **Tasks** window. If it's not approved, you must resubmit the work item for ITSM approval. When it's approved, it will deploy at the scheduled time, which you can view on the **Tasks** window.

**Step 10** To verify the configuration of LISP Pub/Sub in the fabric site, see the LISP Pub/Sub status on the **SITE SUMMARY** window.

# Reconfigure a Fabric

If you modify an IP address pool that is used in a fabric, the fabric becomes outdated. You must update the fabric to configure the IP address pool changes to the devices in the fabric site. The time taken to reconfigure the fabric depends on the number of devices.



**Note** You can't perform other operations on the fabric devices until the fabric is reconfigured to update the devices with the IP address pool changes.

**Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.

**Step 2** In the **Fabric Sites** tab, under **SUMMARY**, click the number that indicates the count of fabric sites.

**Step 3** In the **Fabric Sites** window, select the fabric site that uses the modified IP address pools.

**Step 4** In the **Fabric Infrastructure** tab, under the warning alert, click **Reconfigure Fabric**.

Depending on the Visibility and Control of Configurations settings, choose an available option for reconfiguring the fabric:

- **Now**: Immediately deploy the configurations.
- **Later**: Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

**Step 5** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.

If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.

- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 6** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

- a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
- b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

c. Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

---

## Create an IP Transit

**Step 1** From the top-left corner, click the menu icon and choose **Provision > Transits**.

**Step 2** Click **Create Transit**.

**Step 3** In the **Transit** slide-in pane, enter a name for the transit network.

**Step 4** Choose **IP-Based**.

The routing protocol is set to BGP by default.

**Step 5** Enter the Autonomous System Number (ASN) for the transit network.

**Step 6** Click **Save**.

**Step 7** In the **Transit** slide-in pane, depending on the Visibility and Control of Configurations settings, choose an available option.

- **Now**: Immediately deploy the configurations.
- **Later**: Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

**Step 8** Click **Apply** to create the IP transit.

**Step 9** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.

- **Device Compliance:** Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 10** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.

b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

c. Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

## Create an SD-Access Transit

To add an SD-Access transit:

**Step 1** From the top-left corner, click the menu icon and choose **Provision > Transits**.

**Step 2** Click **Create Transit**.

**Step 3** In the **Transit** slide-in pane, enter a name for the transit.

**Step 4** Choose an SD-Access **Transit Type**.

To configure a transit for the fabric sites that don't have a LISP Pub/Sub control plane, choose **SD-Access (LISP/BGP)**.

To configure a transit for the fabric sites that have a LISP Pub/Sub control plane, choose **SD-Access (LISP Pub/Sub)**.

To share the **SD-Access (LISP Pub/Sub)** Transit with other Catalyst Center clusters, choose **Yes, Share**. Otherwise, choose **No, keep it local**.

**Note** The **Yes, Share** option is visible only if the **Multiple Catalyst Center** package is installed on all the Catalyst Center clusters.

**Step 5** Choose a **Transit Control Plane Node Site** from the drop-down list. Choose at least one transit map server.

**Step 6** Choose a **Transit Control Plane Node** for the transit network from the drop-down list.

**Step 7** (Optional) To configure an additional map server, click the plus icon (+) and repeat [Step 5, on page 31](#) and [Step 6, on page 31](#).

**Step 8** (Optional) To configure native multicast over the LISP Pub/Sub-based SD-Access transit, click **Advanced Attributes**.

In the **Advanced Attributes** slide-in pane, check the **Multicast Over SD-Access Transit** check box.

In the **Advanced Attributes** slide-in pane, click **Save**.

**Note** To complete the native multicast configuration over multiple sites that are connected to the SD-Access transit, ensure that you enable multicast over SD-Access transit on the border nodes.

**Step 9** Click **Save** to save the configurations.

After a transit is created, the **Transits** window displays the newly created transit and its attributes.

**Note** You can't add an **SD-Access (LISP Pub/Sub)** transit to a fabric site that uses LISP/BGP control plane. You can't add **SD-Access (LISP/BGP)** transit to a fabric site that uses LISP Pub/Sub control plane.

**Step 10** In the **Transit** slide-in pane, depending on the Visibility and Control of Configurations settings, choose an available option.

- **Now**: Immediately deploy the configurations.
- **Later**: Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

**Step 11** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 12** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

- a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
- b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

c. Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

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### What to do next

To interconnect the fabric sites with an SD-Access Transit, add the transit to the fabric border node.

## Select an Authentication Template

You can configure an authentication template that applies to all devices in the fabric site.

**Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.

**Step 2** Under **SUMMARY**, click the number that indicates the count of fabric sites.

**Step 3** Click a fabric site.

**Step 4** Click the **Authentication Template** tab.

**Step 5** Under **Select Authentication Template**, choose an authentication template for the site:

- **Open Authentication:** A host is allowed network access without having to go through 802.1X authentication.
- **Closed Authentication:** Any traffic prior to authentication is dropped, including DHCP, DNS, and ARP.



- **Low Impact:** Security is added by applying an ACL to the switch port, to allow limited network access prior to authentication. After a host has been successfully authenticated, additional network access is granted.
- **None**

You can edit the settings of the selected authentication template to address site-specific authentication requirements.

Before you change the site-level authentication, you must resynchronize any fabric device whose Access Points were onboarded through macros or autoconf and haven't yet undergone the periodic resync.

**Step 6** (Optional) To edit the settings of the chosen authentication method, click **Edit**.

a) In the slide-in pane, complete the following:

- **First Authentication Method:** Choose **802.1x** or **MAC Authentication Bypass (MAB)**
- **802.1x Timeout (in seconds):** Use the slider to specify the 802.1x timeout, in seconds.
- **Wake on LAN:** Choose **Yes** or **No**.

Wake on LAN (WoL) is supported only in the following scenarios:

- The source (WoL initiator) and destination (sleeping host) are both in the same subnet and Layer 2 Flooding is enabled.
- The source is outside the SD-Access fabric but located in the network that is connected to the fabric through Layer 3 handoff and the destination is in an SD-Access subnet with IP-Directed Broadcast enabled.

**Note** The following topologies do not support Wake on LAN:

- The WoL initiator and the sleeping host are on different subnets within the same Layer 3 Virtual Network.
- The WoL initiator routes to the sleeping host over an SD-Access Transit.

- **Number of Hosts:** Choose **Unlimited** or **Single**.

**Note** **Number of Hosts** specifies the number of data hosts that can be connected to a port. With **Single**, you can have only one data client on the port. With **Unlimited**, you can have multiple data clients and one voice client on the port.

- **Pre-Authentication Access Control List:** Enable the toggle button to configure preauthentication control for **Low Impact** authentication. From the **Implicit Action** drop-down list, choose an implicit action. Enter a description for the rule. To add an access contract, click **Add Contract Action**, choose the rules, and click **Apply Table**.

b) Click **Save**.

The saved modifications apply only to the site for which the authentication template is edited.

**Step 7** Click **Deploy** under the **Select Authentication Template** tab to configure the authentication template for all the nodes.

Depending on the Visibility and Control of Configurations settings, choose an available option for deployment:

- To immediately deploy the configuration, click **Now**.
- To schedule the deployment for a later date and time, click **Later**, and define the date, time, and time zone of the deployment.
- To preview the configurations, click **Generate configuration preview**.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations](#).

The Hitless Authentication Change feature lets you switch from one authentication method to another without removing the devices from the fabric.

**Step 8** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.

If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.

- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 9** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

**a.** On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.

**b.** On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

**c.** Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

**d.** In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

**e.** Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

## Configure Ports Within the Fabric Site

The **Port Assignment** tab enables you to configure each access device in the fabric site. You can specify network behavior settings for each port on a device.

If you don't configure the authentication template for an individual port, the port inherits these settings from the global authentication template configuration. An inherit icon is displayed next to the authentication template name for the corresponding port in the **Ports** table.

- Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- Step 2** In the **Fabric Sites** tab, under **SUMMARY**, click the number that indicates the count of fabric sites.
- Step 3** In the **Fabric Sites** window, click a fabric site to configure the port assignments.
- Step 4** Click the **Port Assignment** tab.
- Step 5** From the list of fabric devices, select a device and click **Configure**.
- Step 6** In the **Configure Port Assignments** slide-in pane, click a type of connected device:

Option	Description
User Devices and Endpoints	Configures the port to connect to a host device.
Access Point (AP)	Configures the port to connect to an access point.
Trunk	Configure the port as a trunk port.
Supplicant-Based Extended Node	Configures the port to receive a supplicant-based extended node.

- To connect host devices, click **User Devices and Endpoints** and do the following:
  - a. Choose the VLAN name for data from the **VLAN Name (Data)** drop-down list.
  - b. Choose a security group from the **Security Group** drop-down list.  
Security groups are supported only with the **None** authentication template.
  - c. Choose the VLAN name for voice from the **VLAN Name (Voice)** drop-down list.
  - d. Choose the authentication type from the **Authentication Template** drop-down list.
  - e. Enter a **Description** for the connected device.
- To connect an access point, click **Access Point** and do the following:
  - a. Choose the VLAN name from the **VLAN Name (Data)** drop-down list.
  - b. Choose the authentication type from the **Authentication Template** drop-down list.
  - c. Enter a **Description** for the connected device.
- To connect a supplicant-based extended node device, click **Supplicant-Based Extended Node**.
- To connect a trunk port, click **Trunk** and enter a **Description** for the port.

- Step 7** Click **Update** in the **Configure Port Assignment** slide-in pane to save the configurations.

**Step 8** Click **Deploy All** under the **Port Assignment** tab to update the port assignments.

**Step 9** In the **Update Port Assignment** window, depending on the Visibility and Control of Configurations settings, choose an available option:

- **Now**: Immediately deploy the configurations.
- **Later**: Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

**Step 10** Click **Apply** to configure the port assignments.

**Step 11** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 12** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

- a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
- b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

- c. Do one of the following:
  - When you're ready, click **Deploy** or **Submit for Approval**.
  - If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

- d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.
- e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

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## Configure Wireless SSIDs for Fabric Networks

### Before you begin

Ensure to add the wireless device to the fabric site.

- 
- Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- Step 2** Under **SUMMARY**, click the number that indicates the count of fabric sites.
- Step 3** Click a fabric site.
- Step 4** Click the **Wireless SSIDs** tab and specify the wireless SSIDs within the network that the hosts can access.
- Step 5** From the **Choose Pool** drop-down list, choose an IP address pool reserved for the SSID.
- The wireless IP address pools that are configured for Layer 3 and Layer 2 segments are available in this drop-down list.
- Step 6** From the **Assign SGT** drop-down list, choose a security group for the SSID.
- Step 7** Check the **Enable Wireless Multicast** check box to enable wireless multicast on the SSIDs.
- Step 8** Click **Deploy**.
- Step 9** In the **Modify SSID Table** slide-in pane, depending on the Visibility and Control of Configurations settings, choose an available option:
- **Now**: Immediately deploy the configurations.
  - **Later**: Schedule the date and time and define the time zone of the deployment.
  - **Generate configuration preview**: Review the configurations before deploying them.
- If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).
- Step 10** (Optional) In the **Task Name** field, update the task name.
- Step 11** Click **Apply**.
- Step 12** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:
- Pending Operations: Wait for all pending operations to deploy or discard them.
  - Device Compliance: Fix, acknowledge, or ignore all issues.
- If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

### Step 13

If you chose **Generate configuration preview** in the **Modify SSID Table** slide-in pane, depending on the Visibility and Control of Configurations settings, do the following:

- a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
- b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

- c. Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

- d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.
- e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

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## Configure Wireless Mesh Access Point in a Fabric

Starting with Catalyst Center Release 2.3.7, you can onboard a wireless Mesh AP in an SD-Access fabric. You can provision a mesh AP either as a Mesh Access Point (MAP) or a Root Access Point (RAP), depending on the network requirement. For more information, see [About Wireless Mesh Networks](#).

### Before you begin

- Define a list of authorized Access Points (APs). You can choose the AP authorization list while provisioning the Cisco Wireless Controller. Cisco Wireless Controllers respond only to requests from those APs that are present in the AP authorization list. For information on how to create a list of authorized APs, refer to [Create an AP Authorization List](#).
- Define an AP Profile to manage and provision the mesh AP. See [Configure Mesh Settings for an AP Profile for Cisco IOS XE Devices](#).

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- Step 1** If you have existing APs that you want to use in the mesh network mode, you must first change the AP Mode to Bridge using the **Configure Access Point** workflow. For information, see [Configure APs](#).
- Step 2** Provision the fabric-enabled wireless controller with the AP Authorization List to onboard the Mesh APs. See [Provision a Cisco Catalyst 9800 Series Wireless Controller](#).
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#### What to do next

Onboard an AP and provision it in the role of a MAP or a RAP.

## Virtual Networks

Virtual networks are overlays that are used to segment traffic within a common physical network infrastructure; this is also known as macrosegmentation. Layer 2 virtual networks segment switched traffic, and Layer 3 virtual networks segment routed traffic. Each endpoint that is connected to a Cisco SD-Access fabric is assigned to a specific virtual network based on the static edge port configurations or the dynamic policy from the Cisco Identity Service Engine. Within a virtual network, endpoints can communicate with each other unless explicitly blocked by microsegmentation policy. Endpoints across different virtual networks cannot communicate with each other by default. Intervirtual network traffic requires connectivity policy to be implemented outside of the Cisco SD-Access fabric, such as on a fusion device.

A typical use case for virtual networks is an office building containing both corporate endpoints and building-management systems. The corporate endpoints must be segmented from building systems, such as lighting, heating, ventilation, and air conditioning. In such a scenario, a network administrator can use macrosegmentation to segment the corporate endpoints and the building systems using two or more virtual networks to block unauthorized access between the building systems and corporate endpoints.

A Layer 3 virtual network may span multiple fabric sites and across network domains (wireless LAN, campus LAN, and WAN). A Layer 2 virtual network resides within a single fabric site.

## Create a Layer 3 Virtual Network

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- Step 1** From the top-left corner, click the menu icon and choose **Workflows > Create Layer 3 Virtual Networks**. Alternatively, you can navigate to the **Layer 3** tab in **Provision > Virtual Networks** and click **Create Layer 3 Virtual Networks**.
- Step 2** If the task overview window opens, click **Let's Do it** to go directly to the workflow.
- Step 3** In the **Layer 3 Virtual Networks** window, do the following:
- In the **Layer 3 Virtual Network name** field, enter a name for the Layer 3 virtual network.
  - (Optional) To create another Layer 3 virtual network, click the plus icon (+) and enter a name for the Layer 3 virtual network.
- Step 4** In the **Fabric Sites and Fabric Zones (Optional)** window, configure the following:
- Click **Select Fabric Sites** and choose the fabric sites.

You can assign a virtual network to multiple fabric sites. To choose the fabric sites, do one of the following:

- Click the plus icon (+) next to the required fabric sites.
- Click the fabric site name and click **Add Selected**.

**Note** To choose multiple fabric sites, press **Shift**, click the fabric site names, and click **Add Selected**.

- To choose all the fabric sites, click **Add All**.

Repeat this association for all the Layer 3 virtual networks that you created.

- Click **Assign**.
- Click **Select Fabric Zones** and do one of the following:

- Click the plus icon (+) next to the required fabric zones.
- Click the fabric zone name and click **Add Selected**.

**Note** To choose multiple fabric zones, press **Shift**, click the fabric zone names, and click **Add Selected**.

- To choose all the fabric zones, click **Add All**.

- Click **Assign**.

**Step 5** Review the Layer 3 virtual network settings in the **Summary** window.

**Step 6** In the **Deploy Layer 3 Virtual Networks** window, depending on the Visibility and Control of Configurations settings, choose an available option.

- **Now**: Immediately deploy the configurations.
- **Later**: Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Deploy** to create the Layer 3 virtual network.

**Step 7** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.

If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.

- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 8** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:



- a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
- b. On the **Preview Configuration** window, review the device configurations.  
For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).
- c. Do one of the following:
  - When you're ready, click **Deploy** or **Submit for Approval**.
  - If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

- d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.
- e. Click **Submit**.  
You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

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## Create a Layer 2 Virtual Network

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- Step 1** From the top-left corner, click the menu icon and choose **Workflows > Create Layer 2 Virtual Networks**.  
Alternatively, you can navigate to the **Layer 2** tab under **Provision > Virtual Networks** and click **Create Layer 2 Virtual Networks**.
- Step 2** If the task overview window opens, click **Let's Do it** to go directly to the workflow.
- Step 3** In the **Configuration Attributes** window, configure the following:
- a) In the **VLAN Name** field, enter the VLAN name.
  - b) In the **VLAN ID** field, enter the VLAN ID. The valid range for VLAN ID is from 2 through 4093.  
**Note** The VLAN IDs from 1002 through 1005 and 2046 are reserved VLAN IDs.
  - c) From the **Traffic Type** area, choose **Data** or **Voice**.
  - d) Check the **Fabric-Enabled Wireless** check box to enable wireless.  
The **Layer 2 Flooding** check box is enabled by default for a Layer 2 virtual network.
  - e) To add another Layer 2 virtual network, click the plus icon (+) and repeat [3.a, on page 41](#) to [3.d, on page 41](#).
- Step 4** In the **Fabric Sites and Advanced Attributes** window, choose a fabric site for the Layer 2 virtual network from the **Fabric Sites** drop-down. Optionally, to choose the fabric zone to associate with this Layer 2 virtual network, do the following:
- a) Click **Select Fabric Zones** and do one of the following:

- Click the plus icon (+) next to the required fabric zones.
- Click the fabric zone name and click **Add Selected**.

**Note** To choose multiple fabric zones, press **Shift**, click the fabric zone names, and click **Add Selected**.

- To choose all the fabric zones, click **Add All**.

b) Click **Assign**.

Repeat this association for all the Layer 2 virtual networks that you created.

**Step 5** (Optional) In the **Fabric Sites and Advanced Attributes** window, click the **Advanced Attributes** toggle button on to associate a Layer 3 virtual network to this Layer 2 virtual network.

**Step 6** In the **Summary** window, review your Layer 2 virtual network settings.

**Step 7** In the **Create Layer2 Virtual Networks** window, depending on the Visibility and Control of Configurations settings, choose an available option.

- **Now**: Immediately deploy the configurations.
- **Later**: Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Deploy** to create the Layer 2 virtual network.

**Step 8** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 9** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

- On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
- On the **Preview Configuration** window, review the device configurations.  
For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).
- Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

- d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.
- e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

**Step 10** To verify the gateway creation after you see a success message, click **View Anycast Gateway**.

In the **Virtual Networks** window, the **Anycast Gateway** tab displays the details of all the anycast gateways in the fabric.

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## Associate Layer 3 Virtual Networks to Fabric Sites

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**Step 1** From the top-left corner, click the menu icon and choose **Provision > Virtual Networks**.

**Step 2** Under **SUMMARY**, click the number that indicates the count of **Layer 3 Virtual Networks**.

The resulting window displays all the Layer 3 virtual networks that are created at the global level.

**Step 3** In the **Layer 3** tab, check the check box next to the Layer 3 virtual networks for which you want to edit the fabric site association.

**Note** You can edit up to five Layer 3 virtual networks.

**Step 4** Hover your cursor over **More actions**, and choose **Edit Fabric Site and Fabric Zone Associations**.

**Step 5** In the **Fabric Sites and Fabric Zones (Optional)** window, configure the following:

- a) Click **Select Fabric Sites** and choose the fabric sites.

You can assign a virtual network to multiple fabric sites. To choose the fabric sites, do one of the following:

- Click the plus icon (+) next to the required fabric sites.
- Click the fabric site name and click **Add Selected**.

**Note** To choose multiple fabric sites, press **Shift**, click the fabric site names, and click **Add Selected**.

- To choose all the fabric sites, click **Add All**.

Repeat this association for all the Layer 3 virtual networks.

- b) Click **Assign**.
- c) Click **Select Fabric Zones** and do one of the following:
  - Click the plus icon (+) next to the required fabric zones.
  - Click the fabric zone name and click **Add Selected**.
 

**Note** To choose multiple fabric zones, press **Shift**, click the fabric zone names, and click **Add Selected**.
  - To choose all the fabric zones, click **Add All**.
- d) Click **Assign**.

**Step 6** Review the Layer 3 virtual network sites on the **Summary** window.

**Step 7** In the **Update Layer 3 Virtual Networks** window, depending on the Visibility and Control of Configurations settings, choose an available option:

- **Now**: Immediately deploy the configurations.
- **Later**: Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Update** to assign the Layer 3 virtual networks to the selected sites.

**Step 8** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.
 

If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 9** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

- a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
- b. On the **Preview Configuration** window, review the device configurations.
 

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).
- c. Do one of the following:
  - When you're ready, click **Deploy** or **Submit for Approval**.

- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

- In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.
- Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

## Create Anycast Gateways

### Before you begin

Ensure that you have created a Layer 3 virtual network. For more information, see [Create a Layer 3 Virtual Network, on page 39](#).

**Step 1** From the top-left corner, click the menu icon and choose **Provision > Virtual Networks**.

**Step 2** Under **SUMMARY**, click the number that indicates the count of **Anycast Gateways**.

**Step 3** In the **Anycast Gateway** tab, click **Create Anycast Gateways**.

Alternatively, click the menu icon and choose **Workflows > Create Anycast Gateways**.

**Step 4** If the task overview window opens, click **Let's Do it** to go directly to the workflow.

**Step 5** In the **Layer 3 Virtual Networks** window, select one or more virtual networks to add a gateway.

- Click the plus icon (+) next to the required fabric sites.
- Click the fabric site name and click **Add Selected**.

**Note** To choose multiple fabric sites, press **Shift**, click the fabric site names, and click **Add Selected**.

- To choose all the fabric sites, click **Add All**.

**Step 6** In the left pane of the **Configuration Attributes** window, choose the Layer 3 virtual network for which you want to create the anycast gateway and do the following:

- From the **IP Address Pool** drop-down list, choose an IP address pool.
- For **INFRA\_VN**, do the following:
  - Choose **AP** or **Extended Node** from the **Pool Type** drop-down list.
  - Enter a valid **VLAN Name** or check the **Auto generate VLAN name** check box.
  - Enter a custom **VLAN ID** for the virtual network.

- To onboard a supplicant-based extended node, check the **Supplicant-Based Extended Node Onboarding** check box.

**Note** This check box is active only when you choose the **Extended Node** pool type.

- c) To enable the IP-Directed Broadcast feature, check the **IP-Directed Broadcast** check box.

**Note**

- When you enable Directed Broadcast, Catalyst Center automatically enables Layer 2 flooding.
- Routers and Cisco Nexus 7000 Series Switches don't support Directed Broadcast.
- Before enabling Directed Broadcast, ensure that you have enabled underlay multicast.

- d) To enable the intrasubnet routing, check the **Intra-Subnet Routing** check box.

**Note** When you enable intrasubnet routing, Catalyst Center automatically disables the **Fabric-Enabled Wireless** and **Layer 2 Flooding** check boxes.

- e) To customize the TCP maximum segment size (MSS) value for the anycast gateway, check the **TCP MSS Adjustment** check box and input the required value.

TCP MSS Adjustment value can range from 500 to 1440. **TCP MSS Adjustment** value is applicable for the TCP sessions over both IPv4 and IPv6.

TCP MSS Adjustment value is applied to all the anycast gateway switched virtual interfaces (SVIs).

- f) Enter a valid **VLAN Name** or check the **Auto generate VLAN name** check box.

- g) Enter a custom **VLAN ID** for the virtual network.

**Note**

- VLAN IDs 1, 1002-1005, 2046, and 4095 are reserved and can't be used.
- If you don't provide a custom VLAN ID, Catalyst Center generates a VLAN ID in the range of 1021–2020.

- h) Choose **Data** or **Voice** from the **Traffic Type** area.

- i) From the **Security Group** drop-down list, choose a security group.

- j) To include this IP pool in the critical IP address pool, check the **Critical VLAN** check box.

A critical pool is used for closed authentication profile when an authentication server isn't available. A critical VLAN is assigned to the critical pool and all unauthenticated hosts are placed in the critical VLAN in the absence of an authentication server.

**Note** When you enable critical VLAN, Catalyst Center automatically generates the VLAN name.

- k) To enable this IP pool as a wireless IP address pool, check the **Fabric-Enabled Wireless** check box.

- l) To enable Layer 2 flooding, check the **Layer 2 Flooding** check box.

**Note** Layer 2 flooding requires underlay multicast, which is configured during LAN automation. If you don't provision the underlay through LAN automation, configure the underlay multicast manually.

- m) To enable onboarding of bridge-mode virtual machines that are connected to the fabric-enabled wireless network, check both the **Fabric Enabled Wireless** and the **Multiple IP-to-MAC Addresses** check boxes.

- n) To enable a wired host to have multiple IPv4 addresses (IP aliasing), check only the **Multiple IP-to-MAC Addresses** check box.

You can have a maximum of 1000 IPv4 addresses for a single MAC address.

- o) To associate more IP pools, click the plus icon (+) and repeat the steps.

**Step 7**

In the **Fabric Zones (Optional)** window, do the following:

- a) Click **Select Fabric Zones** and do one of the following:

- Click the plus icon (+) next to the required fabric zones.
- Click the fabric zone name and click **Add Selected**.

**Note** To choose multiple fabric zones, press **Shift**, click the fabric zone names, and click **Add Selected**.

- To choose all the fabric zones, click **Add All**.

- b) Click **Assign**.

**Step 8**

Review the anycast gateway settings in the **Summary** window.

**Step 9**

In the **Create Anycast Gateway** window, depending on the Visibility and Control of Configurations settings, choose an available option:

- **Now**: Immediately deploy the configurations.
- **Later**: Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Deploy** to create an anycast gateway.

**Step 10**

On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 11**

If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

- a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
- b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

c. Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

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## Extranet Policy

Configure an extranet policy to allow route leaks between Layer 3 virtual networks (VNs), without using a fusion device. Use an extranet policy to provide the endpoints (hosts or users) with access to shared services like DHCP, DNS, Internet, and so on, through Catalyst Center automation. The shared services connect to a Provider VN. The endpoints that use the shared services reside in a Subscriber VN. An extranet policy establishes communication between the Provider VN and the Subscriber VNs.

You can create an extranet policy, edit an extranet policy, and delete an extranet policy for the following deployments:

- Single site fabric with IP Transit
- Multi-site fabric with SDA Transit

## Guidelines for Configuring an Extranet Policy

Consider the following guidelines before you configure an extranet policy:

- To configure an extranet policy, a device should operate Cisco IOS XE 17.9.1 or a later release.
- Extranet Policy is supported only on the fabric sites that have a LISP Pub/Sub control plane.
- To configure an extranet policy on a multisite fabric with SD-Access transit, ensure that all the sites have the provider VN.
- If you configure multiple VN policies in your network, the same VN cannot be the Provider VN in more than one policy.
- Extranet Policy does not support overlapping IP pools.
- Provider VN in a policy cannot be configured as a Subscriber VN in another VN Policy and conversely.



- Add the Provider VN to all the fabric sites where an extranet policy is applicable.
- Ensure that the Provider VNs do not leak into each other outside the fabric. Else, it might result in route leaks between the Subscriber VNs.
- Extranet policy is not supported on router devices.
- Inter-VN multicast through an extranet policy is not supported. You cannot route multicast between the Layer 3 virtual networks that are interconnected through an extranet policy.

## Create an Extranet Policy

To create an Extranet policy, follow these steps:

- 
- Step 1** From the top-left corner, click the menu icon and choose **Workflows > Create Extranet Policy**.  
Alternatively, navigate to **Extranet Policies** tab under **Provision > Virtual Networks**. In the **Extranet Policies** window, click **Create Extranet Policy**.
- Step 2** Follow the on-screen guidance to provide a name for the policy, to select a Provider VN and the Subscriber VNs.  
You can assign this Extranet policy to one or more fabric sites.  
In a multisite deployment where an SD-Access transit connects the fabric sites, ensure that you select all the fabric sites that are connected by the SD-Access transit.
- Step 3** On the **Summary** page, review the Extranet Policy configuration.  
To make changes, click **Edit** next to the group of settings that you want to change.
- Step 4** In the **Deploy Extranet Policy** window, depending on the Visibility and Control of Configurations settings, choose an available option.
- **Now**: Immediately deploy the configurations.
  - **Later**: Schedule the date and time and define the time zone of the deployment.
  - **Generate configuration preview**: Review the configurations before deploying them.
- If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).
- Step 5** Click **Deploy** to create the Extranet policy.
- Step 6** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:
- Pending Operations: Wait for all pending operations to deploy or discard them.
  - Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
  - After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

- Step 7** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:
- a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
  - b. On the **Preview Configuration** window, review the device configurations.  
For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).
  - c. Do one of the following:
    - When you're ready, click **Deploy** or **Submit for Approval**.
    - If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.
- Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.
- d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.
  - e. Click **Submit**.  
You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

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## Edit an Extranet Policy

You can edit an Extranet Policy to add or delete Subscriber VNs and to assign or remove the policy from a fabric site.

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- Step 1** From the top-left corner, click the menu icon and choose **Provision > Virtual Networks**.
- Step 2** In the **Extranet Policies** tab, select the policy to be edited, and click **More Actions > Edit Extranet Policy**.
- Step 3** Follow the on-screen guidance to edit the policy.

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## Delete an Extranet Policy

To delete an Extranet Policy, follow these steps:

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- Step 1** From the top-left corner, click the menu icon and choose **Provision > Virtual Networks**.
- Step 2** In the **Extranet Policies** tab, select the policy to be deleted, and click **More Actions > Delete Extranet Policy**.

**Step 3** In the **Delete Extranet Policy** slide-in pane, depending on the Visibility and Control of Configurations settings, choose an available option::

- To immediately delete the Extranet Policy, click **Now**.
- To schedule the delete operation for a later date and time, click **Later**, and define the date, time, and time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Apply** to perform the operation.

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## Configure a Fabric Zone

A fabric site (parent site) can be divided into fabric zones with smaller subnets to help you manage the network easily. A fabric zone can have its own edge nodes and extended nodes, but it connects to the parent site for a control plane and border. If you migrated from an earlier Catalyst Center release to the current release, you can create a fabric zone on the existing fabric site. This fabric zone inherits all the properties of its parent site.

### Before you begin

- Ensure that you have created a network hierarchy under the Global site.
- Select a parent site that is not at the lowest level in the hierarchy.

The following is the broad workflow to configure a fabric zone.

1. Create a fabric zone in one of the following ways:
  - Create a fabric site and its zones using the **Create Fabric Site** workflow. For more information, see [Create a Fabric Site and Its Fabric Zones, on page 52](#).
  - Edit an existing fabric site to add fabric zones to it. For more information, see [Create a Fabric Zone Within a Fabric Site, on page 54](#).
2. Add edge nodes and extended nodes to the fabric zone. For more information, see [Add a Device to a Fabric, on page 18](#).
3. Assign Layer 3 virtual networks and segments to the fabric zone. For more information, see [Associate Layer 3 Virtual Networks to Fabric Zones, on page 55](#).



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**Note** Only the virtual networks and segments of the parent site are available to the fabric zone.

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- Note** After a segment is added to a fabric zone, it can't be updated in the parent site.  
 You can't edit edge nodes and extended nodes of a fabric zone in its parent site.  
 You can configure the edge node of a fabric zone as a control plane or a border of the parent site.
- 

## Create a Fabric Site and Its Fabric Zones

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- Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- Step 2** Click **Create Fabric Site**.  
 Alternatively, click the menu icon and choose **Workflows > Create Fabric Site**.
- Step 3** If a task overview window appears, click **Let's Do It** to go directly to the workflow.
- Step 4** In the **Fabric Site Location** window, choose an area, building, or floor to add as a fabric site.
- Step 5** In the **Wired Endpoint Data Collection** window, ensure that the **Wired Endpoint Data Collection** check box is checked.
- Step 6** In the **Authentication Template** window, do the following:
- a) Choose an authentication template for the fabric site:
    - **Closed Authentication:** Any traffic before authentication is dropped, including DHCP, DNS, and ARP.
    - **Open Authentication:** A host is allowed network access without having to go through 802.1X authentication.
    - **Low Impact:** Security is added by applying an ACL to the switch port, to allow limited network access before authentication. After a host has been successfully authenticated, additional network access is granted.
    - **None**
  - b) (Optional) If you choose **Closed Authentication**, **Open Authentication**, or **Low Impact**, click **Edit** to edit the authentication settings:
    - **First Authentication Method:** Choose **802.1x** or **MAC Authentication Bypass (MAB)**
    - **802.1x Timeout (in seconds):** Use the slider to specify the 802.1x timeout, in seconds.
    - **Wake on LAN:** Choose **Yes** or **No**.
    - **Number of Hosts:** Choose **Unlimited** or **Single**.
    - **BPDU Guard:** Use this check box to enable or disable the Bridge Protocol Data Unit (BPDU) guard on all the **Closed Authentication** ports.
    - **Pre-Authentication Access Control List:** Enable the toggle button to configure preauthentication control for **Low Impact** authentication. From the **Implicit Action** drop-down list, choose an implicit action. Enter a description for the rule. To add an access contract, click **Add Contract Action**, choose the rules, and click **Apply Table**.
- Step 7** In the **Fabric Zones** window, to designate fabric zones and create scoped subnets, click **Setup Fabric Zones Now**.  
 To enable a fabric zone, choose a fabric site in the network hierarchy.

**Step 8** In the **Summary** window, review the fabric site settings.  
You can edit any of the fabric site or zone settings here.

**Step 9** In the **Fabric Site Creation Scheduler** window, depending on the Visibility and Control of Configurations settings, choose an available option.

- To immediately deploy the configuration, click **Now**.
- To schedule the deployment for a later date and time, click **Later**, and define the date, time, and time zone of the deployment.
- To preview the configurations, click **Generate configuration preview**.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Deploy**.

**Step 10** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 11** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

**a.** On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.

**b.** On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

**c.** Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

**d.** In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

**Step 12** It takes a few seconds for the site and zones to be provisioned. Upon successful creation of the site, a success message is displayed.

The newly created fabric zone is tagged with an "FZ" in the site hierarchy pane.

## Create a Fabric Zone Within a Fabric Site

**Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.

**Step 2** Under **SUMMARY**, click the number that indicates the count of fabric sites.

**Step 3** For the fabric site where you want to designate fabric zone, under the **Actions** column, hover your cursor over the ellipsis icon ( **⋮** ) and choose **Edit Fabric Zone**.

**Step 4** In the **Edit Fabric Zones** window, choose an area, building, or floor.

**Step 5** Review the fabric site settings in the **Summary** window.

You can edit any of the fabric site or zone settings here.

**Step 6** In the **Fabric Site Update Scheduler** window, depending on the Visibility and Control of Configurations settings, choose an available option.

- To immediately deploy the configuration, click **Now**.
- To schedule the deployment for a later date and time, click **Later**, and define the date, time, and time zone of the deployment.
- To preview the configurations, click **Generate configuration preview**.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Deploy**.

**Step 7** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.

If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.

- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 8** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.

b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

c. Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

**Step 9** It takes several seconds for the fabric site and fabric zones to be provisioned. After the provisioning, a success message is displayed.

The newly created fabric zone is tagged with an "FZ" in the site hierarchy pane.

---

### What to do next

- Add only edge node and extended node devices to the newly created fabric zone.

Devices assigned to a fabric zone can't be assigned to the parent site. However, an edge node device assigned to a fabric zone can still be configured as a control plane or a border node for the parent site.

- Assign IP pools and virtual networks to the fabric zone.

## Associate Layer 3 Virtual Networks to Fabric Zones

### Before you begin

Ensure that you have created the fabric zone.




---

**Note** You can add only the Layer 3 virtual networks of a parent site to a fabric zone.

---

**Step 1** From the top-left corner, click the menu icon and choose **Provision > Virtual Networks**.

**Step 2** Under **SUMMARY**, click the number that indicates the count of **Layer 3 Virtual Networks**.

The resulting window displays all the Layer 3 virtual networks at a global level.

**Step 3** In the **Layer 3** tab, check the check box next to the Layer 3 virtual networks for which you want to edit the fabric zone associations.

**Note** You can edit up to five Layer 3 virtual networks.

**Step 4** Hover your cursor over **More actions**, and choose **Edit Fabric Site and Fabric Zone Associations**.

**Step 5** In the **Fabric Sites and Fabric Zones (Optional)** window, configure the following:

a) Click **Select Fabric Zones** and choose the fabric zones.

You can assign a virtual network to multiple fabric zones in a fabric site. To choose the fabric zones, do one of the following:

- Click the plus icon (+) next to the required fabric zones.
- Click the fabric zone name and click **Add Selected**.

**Note** To choose multiple fabric zones, press **Shift**, click the fabric zone names, and click **Add Selected**.

- To choose all the fabric zones, click **Add All**.

b) Click **Assign**.

c) Repeat this association for all the Layer 3 virtual networks.

**Step 6** Review the Layer 3 virtual network zones on the **Summary** window.

**Step 7** In the **Created and Deploy (Step 1 of 2)** window, click **Update**.

**Step 8** In the **Created and Deploy (Step 2 of 2)** window, click **Deploy** to deploy the Layer 3 virtual networks.

**Step 9** To verify the virtual networks, click **View Layer 3 Virtual Networks**.

In the **Virtual Networks** window, the **Layer 3** tab displays the details of all the Layer 3 virtual networks.

---

## Associate Layer 2 Virtual Networks to Fabric Zones

### Before you begin




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**Note** After you add the gateways to a fabric zone, you can't edit them at the parent site.

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- 
- Step 1** From the top-left corner, click the menu icon and choose **Provision > Virtual Networks**.
- Step 2** Under **SUMMARY**, click the number that indicates the count of **Layer 2 Virtual Networks**.  
The resulting window displays all the Layer 2 virtual networks at a global level.
- Step 3** Click Fabric Site: **Global**.
- Step 4** In the **Select Fabric Site** slide-in pane, choose a fabric site and click **Select**.
- Step 5** In the **Layer 2** tab, check the check box next to the Layer 2 virtual networks for which you want to edit the fabric zone associations.
- Note** You can edit up to five Layer 2 virtual networks.
- Step 6** Hover your cursor over **More actions**, and choose **Edit Layer 2 Fabric Zone Associations**.
- Step 7** In the **Associated Fabric Sites and Fabric Zones** window, configure the following:
- Click **Select Fabric Zones** and choose the fabric zones.  
You can assign a virtual network to multiple fabric zones in a fabric site. To choose the fabric zones, do one of the following:
    - Click the plus icon (+) next to the required fabric zones.
    - Click the fabric zone name and click **Add Selected**.  
**Note** To choose multiple fabric zones, press **Shift**, click the fabric zone names, and click **Add Selected**.
    - To choose all the fabric zones, click **Add All**.
  - Click **Assign**.
  - Repeat this association for all the Layer 2 virtual networks.
- Step 8** In the **Summary** window, review your Layer 2 virtual network settings and click **Create**.
- Step 9** In the **Create** window, click **Deploy** to deploy the Layer 2 virtual network.  
After the Layer 2 virtual network is provisioned, a success message is displayed.
- Step 10** To verify the virtual network creation, click **View Layer 2 Virtual Networks**. In the **Virtual Networks** window, the **Layer 2** tab displays the details of all the Layer 2 virtual networks.
- 

## Associate Anycast Gateways to Fabric Zones

### Before you begin

Ensure that you have created the fabric zone.



---

**Note** You can add only the anycast gateways of a parent site to a fabric zone.

---

After you add an anycast gateway to a fabric zone, you can't update it at the parent site.

- 
- Step 1** From the top-left corner, click the menu icon and choose **Provision > Virtual Networks**.
- Step 2** Under **SUMMARY**, click the number that indicates the count of **Anycast Gateways**.  
The resulting window displays all the anycast gateways at a global level.
- Step 3** Click Fabric Site: **Global**.
- Step 4** In the **Select Fabric Site** slide-in pane, choose a fabric site and click **Select**.
- Step 5** In the **Anycast Gateway** tab, check the check box next to the anycast gateways for which you want to edit the fabric zone associations.
- Note** You can edit up to five anycast gateways.
- Step 6** Hover your cursor over **More actions**, and choose **Edit Fabric Zone Associations**.
- Step 7** In the **Fabric Zones (Optional)** window, do the following:
- Click **Select Fabric Zones** and do one of the following:
    - Click the plus icon (+) next to the required fabric zones.
    - Click the fabric zone name and click **Add Selected**.

**Note** To choose multiple fabric zones, press **Shift**, click the fabric zone names, and click **Add Selected**.

    - To choose all the fabric zones, click **Add All**.
  - Click **Assign**.
- Step 8** Review the anycast gateway settings in the **Summary** window.
- Step 9** In the **Create** window, click **Deploy**.
- Step 10** To verify the gateway creation after you see a success message, click **View Anycast Gateway**.  
In the **Virtual Networks** window, the **Anycast Gateway** tab displays the details of all the anycast gateways.
- 

## Configure an Extended Node Device

An extended node is configured by automated workflow. After configuration, the extended node device is displayed in the fabric topology view. You can assign ports for the extended nodes using the **Port Assignment** tab.




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**Note** You can't onboard the extended nodes through the GUI-based provisioning workflows. An Extended node is onboarded only through the SD-Access automated workflow after resetting the device configuration to the factory default and powering on the device.

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A device is onboarded according to the license of its Extended Node neighbor and its own license:

- If the neighbor is operating with an Essentials license, the device is onboarded as a standard Extended Node, regardless of its license.

- If the neighbor is operating with an Advantage license, the device is onboarded as a standard Extended Node if it has an Essentials license.
- If the neighbor is operating with an Advantage license, the device is onboarded as a Policy Extended Node if it has an Advantage license.
- If the device has more than one neighbor, and those neighbors have different license levels, the device is onboarded as a standard Extended Node, regardless of its license.

Extended node devices support multicast traffic.

Policy Extended Nodes are extended nodes that support security policy within the virtual network. You can select a **Group** during port assignment for a Policy Extended Node.

Policy Extended Node devices include Cisco Catalyst Industrial Ethernet (IE) 3400, IE 3400 Heavy Duty series switches, and Cisco Catalyst 9000 series switches that run Cisco IOS XE Release 17.1.1s or later.

Cisco Digital Building series switches, Cisco Catalyst 3560-CX switches, and Cisco Industrial Ethernet 4000, 4010, and 5000 series switches can't be configured as Policy Extended Nodes.

## Steps to Configure an Extended Node

When configured as a fabric edge, Cisco Catalyst 9300, Cisco Catalyst 9400, and Cisco Catalyst 9500 series switches support extended nodes.



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**Note** Cisco Catalyst 9200 series switches that are configured as fabric edge nodes don't support extended node devices.

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The following are the minimum supported software versions on the extended nodes:

- Cisco Industrial Ethernet 4000, 4010, 5000 series switches: 15.2(7)E0s with LAN base license enabled.  
If you have an IP services license, you must change the Switch Database Management (SDM) template to `dual-ipv4-and-ipv6 default` manually.
- Cisco Catalyst IE 3400, 3400 Heavy Duty (X-coded and D-coded) series switches: Cisco IOS XE Release 17.1.1s.
- Cisco Catalyst IE 3300 series switches: Cisco IOS XE Release 16.12.1s.
- Cisco Digital Building series switches, Cisco Catalyst 3560-CX switches: Release 15.2(7)E0s.

The minimum software version that is required on a policy extended node device and on the edge node device supporting the policy extended node is Cisco IOS XE Release 17.1.1s.

The following configuration steps are applicable to both a standard Extended Node and Policy Extended Node.

### Before you begin

To configure a device as a Policy Extended Node, both the device and the edge node supporting it must have the Network Advantage and Advantage license levels enabled.

- 
- Step 1** Configure a network range for the extended node. See [Configure IP Address Pools](#). This step comprises adding an IP address pool and reserving the IP pool at the site level. Ensure that the CLI and SNMP credentials are configured.
- Step 2** Assign the extended IP address pool to INFRA\_VN. See [Create Anycast Gateways, on page 45](#). Choose **Extended Node** as the **Pool Type**.
- Catalyst Center configures the extended IP address pool and VLAN on the supported fabric edge device. This enables the onboarding of extended nodes.
- Step 3** Configure the DHCP server with the extended IP address pool and Option 43. Ensure that the extended IP address pool is reachable from Catalyst Center.
- Note** For a detailed description of Option 43, see [DHCP Controller Discovery](#).
- Step 4** Connect the extended node device to the fabric edge device. You can have multiple links from the extended node device to the fabric edge.
- Step 5** Create a port channel on the fabric edge node that is connected to the extended node. For a subsequent extended node in a ring or daisy chain, create the port channel on the previous extended node it connects to.
- Note** Complete this step only if the global authentication mode for the fabric is **Open Authentication, Low Impact**, or **Closed Authentication**. If the fabric site is set to **None** authentication mode, the port channel is automatically created during the onboarding of the extended nodes using Plug and Play provisioning.

To create a port channel, complete the following steps:

- a) From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- b) In the **Fabric Sites** tab, click the number that indicates the count of fabric sites.
- c) Click a fabric site.
- d) In the **Fabric Infrastructure** tab, choose a fabric edge node (or an extended node, depending on the connection).
- e) In the **Port Channel** tab of the slide-in pane, click **Create Port Channel**.
- f) Complete the following:
  - Choose an **Extended Node** in the **Connected Device Type** drop-down list.
  - Enter a description.
  - Choose **Port Aggregation Protocol (PAgP Desirable)**.  
Starting with Cisco IOS XE Release 17.1.1s, IE 3300 and IE 3400 devices support PAgP.
  - Select **On** for IE 3300 and IE 3400 devices if they are running versions earlier than Cisco IOS XE Release 17.1.1s.

**Note** Link Aggregation Control Protocol (LACP) doesn't work for extended node onboarding.

  - Choose the ports to be bundled as a port channel.
- g) Click **Done**.

This creates a port channel on the fabric edge node (or the extended node) to onboard an extended device.

- Step 6** Power up the extended node device if it has no previous configuration. If the extended node device has configurations, reset the device configuration to factory default and reload it.

Catalyst Center adds the extended node device to the inventory and assigns the same site as the fabric edge. The extended node device is then added to the fabric, onboarded, and ready to be managed.

**Note** An extended node device is added to the fabric only if the device runs a software release that is compatible with the Catalyst Center release. If the device runs an incompatible software release, it will not be onboarded. For information about fabric device compatibility, see [Cisco SD-Access Compatibility Matrix](#).

After the configuration is complete, the extended node appears in the fabric topology with a tag (X) to indicate that it is an extended node.

---

## Upgrade an Extended Node to a Policy Extended Node

Cisco SD-Access automation onboards a policy extended node-capable device with an Essentials license as an extended node. You can convert this extended node device to a policy-extended node by upgrading its license to Advantage.

In a daisy chain, you cannot upgrade an extended node to a policy extended node if its upstream device is an extended node.

In a ring, you cannot upgrade an extended node to a policy extended node if both its neighbors are extended nodes.

After you upgrade the node to policy extended node, you cannot reconfigure it as an extended node.

To convert an extended node to a policy extended node, do the following.

### Before you begin

- Ensure that the extended node is already onboarded.
- Update the Smart Licensing credentials on Catalyst Center.

---

**Step 1** Change the license level on the device from Essentials to Advantage, using the Catalyst Center License Manager:

- a) From the top-left corner, click the menu icon and choose **Tools > License Manager**.
- b) In the **Devices** tab, select the device.
- c) Choose **Actions > Change License > Change DNA License**.
- d) In the **Change DNA License Level** window, click **Advantage**.
- e) Click **Confirm**.
- f) In the **Success** message window, click **OK**.

The device reloads.

**Step 2** Wait for the node to become **Reachable** and get to the **Managed** state.

The **Provision > Network Devices > Inventory** window displays the reachability status of all the devices.

**Step 3** If you see a **Netconf Connection Refused** error, resynchronize the device. Repeat the resynchronization process until the error is no longer displayed.

- a) In the **Provision > Network Devices > Inventory** window, select the device.
- b) Choose **Actions > Inventory > Resync Device**.

- Step 4** Upgrade to policy extended node.
- In the **Provision > Fabric Sites** window, select the site in which the device is onboarded.
  - In the **Fabric Infrastructure** tab, click a device to edit its attributes.
  - In the **Fabric** tab, click the **Policy** toggle button under **Extended Node Attributes**.
  - In the **Policy Extended Node Upgrade** window that is displayed, click **Upgrade**.

## Delete an Extended Node

This task describes the steps to delete an extended node, policy extended node, and authenticated extended node.

- Step 1** Remove the extended node device from the fabric.
- From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
  - In the **Fabric Sites** tab, click the number that indicates the count of fabric sites.
  - Select the fabric site that contains the extended node device.
  - In the **Fabric Infrastructure** tab, click the extended node device.
  - In the slide-in pane, click **Remove From Fabric**.
  - Click **Add**.

- Step 2** Delete the device from **Inventory**.

For steps to delete the device from inventory, see [Delete a Network Device](#).

- Step 3** For a supplicant-based extended node device, delete the port assignment configuration in the fabric edge node or the FIAB.

## Configure a REP Ring Topology for Extended Nodes and Policy Extended Nodes

To enable redundancy with a recovery time of less than 50 ms for network failures with extended nodes, configure a Resilient Ethernet Protocol (REP) ring for the fabric site.

Unless explicitly stated, the term *extended node* also represents a policy extended node.

The following devices can be configured in a REP ring:

- Extended Node:
  - Cisco Industrial Ethernet (IE) 4000, 4010, 5000 series switches that operate Cisco IOS 15.2(7)E3 and later releases.
  - Cisco Catalyst IE3300 series switches that operate Cisco IOS XE 17.3.3 and later releases.
- Policy Extended Node:
  - Cisco Catalyst IE3400, IE3400H series switches that operate Cisco IOS XE 17.3.3 and later releases.

### Limitations of a REP Ring

- To add an extended node into an existing REP ring, first delete the REP ring. Deleting the REP ring enables the Per VLAN Spanning Tree Protocol (PVSTP), which avoids Layer 2 loops. Then, add the new extended node to the fabric and recreate the REP ring to include the new extended node.
- Multiple rings within a given REP ring and a ring of rings aren't supported.
- A node in a REP ring can have other nodes connected to it in a daisy chain manner. However, a node in a daisy chain can't have a ring of nodes connected to it.
- A REP ring or a daisy chain can't be a mix of extended nodes and policy extended nodes. A REP ring or a daisy chain must consist entirely of either extended nodes or policy extended nodes.
- By default, a maximum of 18 devices can be onboarded in a single REP ring. To onboard more than 18 devices, increase the BPDU timer using **spanning-tree vlan *infra VN VLAN* max-age 40** command. Use the Catalyst Center templates to configure the command.

Note that in some rare instances, when the last two nodes of the ring try to onboard simultaneously, a port channel might not be created between these nodes. A port channel is established between the last two nodes of the ring when a REP ring is created.

Unless otherwise stated, the following steps are applicable to both extended node and policy extended node.

#### Before you begin

Ensure that you have onboarded the fabric edge nodes and extended nodes.

Identify the fabric edge node and its interfaces that terminate the REP ring.




---

**Note** The REP ring configuration procedure may disrupt the network traffic for a brief period.

---

- 
- Step 1** From the top-left corner, click the menu icon and choose **Workflows > Configure REP Ring**.  
Alternatively, you can navigate to the Fabric Site topology view, select the Fabric Edge node or the FIAB node on which you want to create the REP ring and click **Create REP Ring** under the **REP Rings** tab.
- Step 2** If a task overview window appears, click **Let's Do It** to go directly to the workflow.
- Step 3** In the **Select a fabric site** window, select a site that has both edge node and extended nodes.
- Step 4** In the **Select a fabric edge node** window, choose a fabric edge node.
- Step 5** In the **Select Extended Nodes connected to Fabric Edge** window, choose the extended nodes that connect to the fabric edge node.  
You can choose two extended nodes to connect to the fabric edge node.
- Step 6** Review and edit (if necessary) your fabric site, edge node, and extended node selections.
- Step 7** To initiate the REP ring configuration, click **Provision**.  
You can see a detailed status of the configuration progress on the **REP Ring Configuration Status** window.
- Step 8** The **REP Ring Summary** window displays the details of the REP ring that is created along with the discovered devices.
- Step 9** After the creation of the REP ring, a success message is displayed.  
To verify the creation of the REP ring, go to the fabric site window and click the fabric edge node.

In the slide-in window, under the **REP Ring** tab, you can see the list of all REP rings that exist on that edge node.

Click a REP ring name in the list to view its details, such as the devices present in the ring, ports of each device that connect to the ring, and so on.

---

## View REP Ring Status

To view the status of the devices in an REP ring, do the following:

---

- Step 1** In the Catalyst Center GUI, click the menu icon and choose **Provision > Fabric Sites**.
  - Step 2** In the **Fabric Sites** tab, click the number that indicates the count of fabric sites.
  - Step 3** Click a fabric site.
  - Step 4** In the **Fabric Infrastructure** tab, click the fabric edge node or the fabric in a box (FIAB).  
A slide-in pane displays the details of the fabric edge node or the FIAB that is selected.
  - Step 5** In the **REP Rings** tab, click **View** to see the **REP Ring Topology Status**.  
The **REP Topology Status** section displays the current state of all the devices in the REP ring. The state, as displayed in the **Role** column, can be **Open**, **Fail**, or **Alt**.  
**Open** indicates that the device link is up and that it is forwarding traffic.  
**Fail** indicates that the device link is down.  
**Alt** indicates that the device link is up, but the port cannot forward traffic.
- 

## Delete a REP Ring

- Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
  - Step 2** In the **Fabric Infrastructure** tab, click the fabric edge node that terminates the REP Ring.  
A slide-in window displays the details of the fabric edge node selected.
  - Step 3** In the **REP Rings** tab, for the desired REP Ring, click **Actions (...)** > **Delete**.  
This deletes the REP Ring.
- 

## Delete a Node from a REP Ring

This task describes the steps to delete one extended node or multiple extended nodes from a REP ring.





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**Note** After the extended nodes are removed, the downsized REP ring should use the existing interfaces to create a link to the neighboring devices.

---

#### Before you begin

Ensure that the REP ring to which the node belongs is not incomplete.

- 
- Step 1** Manually remove the extended node devices from the network.  
Alternatively, if a device in a REP ring goes down, the **Fabric Infrastructure** window displays a notification.
- Step 2** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- Step 3** In the **Fabric Infrastructure** tab, click the fabric edge node that terminates the REP ring.  
A slide-in pane displays the details of the selected fabric edge node.
- Step 4** In the **REP Rings** tab, for the desired REP ring, choose **Actions (...) > Rediscover**.  
The extended node device is deleted from the REP ring and the REP ring display is updated.
- 

## Configure Supplicant-Based Extended Nodes

Supplicant-based extended nodes, also called Authenticated Extended Nodes (AENs), are extended node devices that receive an IEEE 802.1x (Dot1x) supplicant configuration and are onboarded into the SD-Access network only after a complete authentication and authorization. To onboard a supplicant-based extended node device, the authenticator port on the fabric edge must be configured with a Closed Authentication Template.

The following platforms support supplicant-based extended node onboarding:

#### Fabric Edge or FIAB:

Cisco Catalyst 9000 Series – C9300, C9400, C9500, and C9500H switches that operate Cisco IOS XE 17.7.1 or later.

#### Supplicant-based Extended Node:

Cisco Catalyst 9000 Series – C9200, C9300, C9400, C9500, and C9500H switches that operate Cisco IOS XE 17.7.1 or later.

## Steps to Configure a Supplicant-Based Extended Node

#### Before you begin

- Configure Cisco ISE and ensure that it operates Release 3.1 or later. See [Configure Cisco Identity Services Engine to Onboard Supplicant-Based Extended Node, on page 68](#).
- Add the fabric edge node or FIAB device to the fabric and ensure that it operates Cisco IOS XE 17.7.1 or later.

- Set the Path MTU appropriately for the path between the fabric edge node and Cisco ISE. We recommend a value of 9100. Note that the Path MTU is set for all the devices in the fabric during LAN automation or when the underlay is configured.

- 
- Step 1** Configure AAA server settings in Catalyst Center.
- Define Cisco ISE as the AAA server for device authentication in the **System > Settings > External Services > Authentication and Policy Servers** window.  
For the complete procedure, see "Configure Authentication and Policy Servers" in the *Cisco Catalyst Center Administrator Guide*.
  - Add the Cisco ISE server to the global site. For information, see [Add Cisco ISE or Other AAA Servers](#).
- Step 2** (Optional) Configure Catalyst Center to authorize the device before onboarding.
- From the top-left corner, click the menu icon and choose **System > Settings > Device Settings > PnP Device Authorization**.
  - Check the **Device Authorization** check box to enable authorization on the device.
  - Click **Save**.
- Step 3** Configure the Catalyst Center appliance to manage your PKI certificates.
- From the top-left corner, click the menu icon and choose **System > Settings > Certificates > Certificate Authority**.
  - In the **Certificate Authority** window, click **Use Cisco DNA Center**.
  - In the **CA Management** tab, click **Download** to download the CA Certificate.
  - Add the certificate to the Cisco ISE Trusted Certificate Store. For more information, see the [Cisco Identity Services Engine Administrator Guide](#).  
If you use an external certificate, add that certificate to the Cisco ISE Trusted Certificate Store.
- Step 4** Configure the DHCP server with the extended IP address pool and Option 43. Ensure that the extended IP address pool is reachable from Catalyst Center.  
For a detailed description of Option 43, see [DHCP Controller Discovery](#).
- Step 5** Enable **Closed Authentication** and disable Bridge Protocol Data Unit (BPDU) Guard on the fabric Site.  
By default, selecting Closed Authentication pushes the BPDU Guard configuration on all the downlink access ports. When a remote switch like an extended node is connected, BPDU Guard pushes the port to error disabled mode. To disable BPDU Guard, uncheck the **Enable BPDU Guard** check box during the Closed Authentication configuration.  
For more information, see [Select an Authentication Template](#).
- Step 6** Assign an extended IP address pool to INFRA\_VN, as described in [Create Anycast Gateways, on page 45](#).  
In the **Create Anycast Gateways** workflow, choose **Extended Node** as the **Pool Type** and check the **Supplicant-Based Extended Node Onboarding** check box.  
Catalyst Center configures the extended IP address pool and VLAN on the supported fabric edge device. This enables the onboarding of extended nodes.
- Note** Extended IP address pool is successfully assigned only if the fabric edge devices operate Cisco IOS XE 17.7.1 or later. If you upgraded from an earlier release of Catalyst Center, the supplicant-based extended node migration must be complete before configuring the extended IP address pool.
- Step 7** Connect the extended node device to the fabric edge node or the FIAB.

After powering on, the extended node device is in **Pending Authorization** state if you chose to authorize the device before onboarding (Step 2). You can check the status of the device in the **Provision > Plug and Play** window.

**Step 8** (Optional) Authorize the device.

Perform this step only if the device is in **Pending Authorization** state.

- a) From the top-left corner, click the menu icon and choose **Provision > Plug and Play**.
- b) In the **Plug and Play** window, select the supplicant-based extended node device and choose **Actions > Authorize**.

The authorization process provisions the supplicant-based extended node device for completing a certificate-based EAP-TLS authentication with Cisco ISE. After authentication, Cisco ISE authorizes the supplicant-based extended node device for complete access. The supplicant-based extended node device is then fully onboarded into the SD-Access fabric.

---

After a supplicant-based extended node device is onboarded into the fabric, access to the fabric edge-supplicant port is only based on authentication status. If the device or the port goes down, the authentication session is cleared, and traffic is not allowed on the port. When the port comes up again, it goes through the IEEE 802.1X (Dot1x) authentication process to regain access to the SD-Access network.

## Replace a Faulty Port

If the link between the authenticator (fabric edge or FIAB) port and the supplicant port goes down, you can replace the faulty port and configure a new port through the **Port Assignment** menu.

---

**Step 1** To replace the supplicant port, follow these steps:

- a) Clear the configuration on the new supplicant port.
- b) Copy the existing configuration from the current supplicant port to the new supplicant port to allow 802.1X authentication.

**Step 2** To replace the authenticator port, follow these steps:

- a) Assign the supplicant port to the new interface of the authenticator. For information on port assignment, see [Configure Ports Within the Fabric Site, on page 35](#). Choose **Supplicant-Based Extended Node** as the **Connected Device Type**.
- b) Clear the existing port assignment on the old interface of the authenticator.

**Step 3** Disconnect the physical connection between the old ports of the authenticator and the supplicant. Connect a cable between the new ports of the authenticator and the supplicant. Bring this link up.

**Step 4** After the link between the new ports of the authenticator and supplicant is up, follow these steps:

- a) Resynchronize the device information in Catalyst Center by performing an **Inventory > Resync Device** for both the authenticator and the supplicant. See [Resynchronize Device Information](#).
  - b) Assign the new supplicant port to the authenticator. For information on port assignment, see [Configure Ports Within the Fabric Site, on page 35](#). Choose **Authenticator Switch** as the **Connected Device Type**.
  - c) Clear the port assignment on the old supplicant port.
-

## Configure Cisco Identity Services Engine to Onboard Supplicant-Based Extended Node

This task describes how to profile an Supplicant-Based Extended Node (SBEN) device in Cisco Identity Services Engine (ISE). The steps listed below are part of the Cisco ISE configuration procedure. For more information, refer the [Cisco Identity Services Engine Administrator Guide](#).

### Before you begin

Download the CA certificate from Catalyst Center.

**Step 1** Import the CA certificate into Cisco ISE:

From the Cisco ISE home page, choose **Administration > System > Certificates > System Certificates > Import**. In the **Import** window, ensure that you select the **Trust for client authentication and Syslog** check box. For more information, see the "Import the Root Certificates to the Trusted Certificate Store" section in the [Cisco Identity Services Engine Administrator Guide](#).

**Step 2** Configure the following authorization profiles with their RADIUS attributes:

From the Cisco ISE main menu, choose **Policy > Policy Elements > Results > Authorization > Authorization Profiles**.

Configure the following profiles:

**SBEN-DHCP:**

Access Type = ACCESS\_ACCEPT  
Filter-ID = **SBEN\_DHCP\_ACL.in**

**SBEN\_LIMITED\_ACCESS\_AUTHZ:**

Access Type = ACCESS\_ACCEPT  
Filter-ID = **SBEN\_MAB\_ACL.in**  
cisco-av-pair = interface-template-name=**SWITCH\_SBEN\_MAB\_TEMPLATE**

**SBEN\_FULL\_ACCESS\_AUTHZ :**

Access Type = ACCESS\_ACCEPT  
cisco-av-pair = interface-template-name=**SWITCH\_SBEN\_FULL\_ACCESS\_TEMPLATE**

**Step 3** Define the device profiling policy in the **Profiling Policies** window.

- a) From the Cisco ISE main menu, choose **Policy > Profiling > Profiling Policies**.
- b) In the **Profiling Policies** window, add a new **DHCP-v-i-vendor-class** condition for the **Cisco-Device: Cisco-Switch** policy.

\* Name  Description

Policy Enabled

\* Minimum Certainty Factor  (Valid Range 1 to 65535 )

\* Exception Action

\* Network Scan (NMAP) Action

Create an Identity Group for the policy  Yes, create matching Identity Group  
 No, use existing Identity Group hierarchy

Parent Policy

\* Associated CoA Type

System Type

Rules

If Condition	<input type="text" value="Cisco-IOS-NMAPOSCheck"/>	Then	<input type="text" value="Certainty Factor Increases"/>	<input type="text" value="10"/>	<input type="text"/>
If Condition	<input type="text" value="CDP_cdpCachePlatform_CONTAINS_9200..."/>	Then	<input type="text" value="Certainty Factor Increases"/>	<input type="text" value="20"/>	<input type="text"/>
If Condition	<input type="text" value="DHCP_v-i-vendor-class_CONTAINS_9200..."/>	Then	<input type="text" value="Certainty Factor Increases"/>	<input type="text" value="20"/>	<input type="text"/>

Condition Name	Expression	OR
<input type="text"/>	<input type="text" value="DHCP:v-i-ven..."/> <input type="text" value="CONTAIN"/> <input type="text" value="9200"/>	<input type="text"/>
<input type="text"/>	<input type="text" value="DHCP:v-i-ven..."/> <input type="text" value="CONTAIN"/> <input type="text" value="9300"/>	<input type="text" value="OR"/>
<input type="text"/>	<input type="text" value="DHCP:v-i-ven..."/> <input type="text" value="CONTAIN"/> <input type="text" value="9500"/>	<input type="text" value="OR"/>

- c) Create a new child policy for the supplicant device, under **Cisco-Switch** and apply the **CdpCachePlatform** and **V-I-Vendor-Class** conditions.

Ensure that the **Minimum Certainty Factor** value for the child policy is higher than that of the parent policy.

* Name	CAT9K_EN	Description	<input type="text"/>
Policy Enabled	<input checked="" type="checkbox"/>		
* Minimum Certainty Factor	30	(Valid Range 1 to 65535 )	
* Exception Action	NONE		▼
* Network Scan (NMAP) Action	NONE		▼
Create an Identity Group for the policy	<input checked="" type="radio"/> Yes, create matching Identity Group <input type="radio"/> No, use existing Identity Group hierarchy		
* Parent Policy	Cisco-Switch		▼
* Associated CoA Type	Global Settings		▼
System Type	Administrator Created		
Rules			
If	Condition	CDP_cdpCachePlatform_CONTAINS_C92...	▼
Then		Certainty Factor Increases	▼
		30	▼
If	Condition	DHCP_v-i-vendor-class_CONTAINS_C920...	▼
Then		Certainty Factor Increases	▼
		30	▼

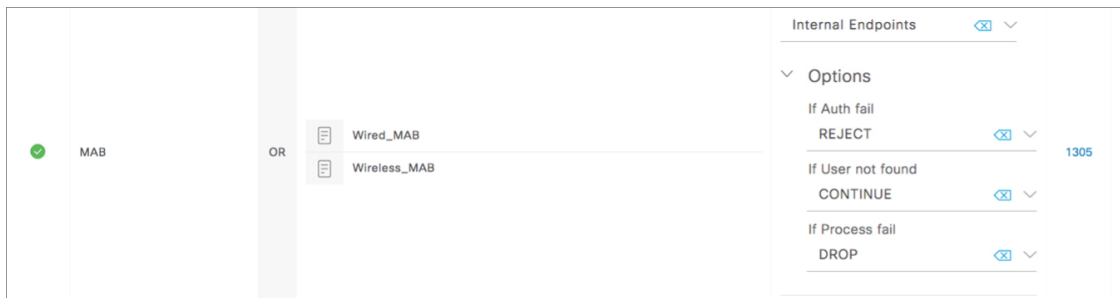
**Step 4** Set the global Change of Authorization (CoA) type to **Reauth**.

To configure the **CoA Type**, from the Cisco ISE home page, navigate to **Work Centers > Profiler > Settings**. Choose **Reauth** from the **CoA Type** drop-down list.

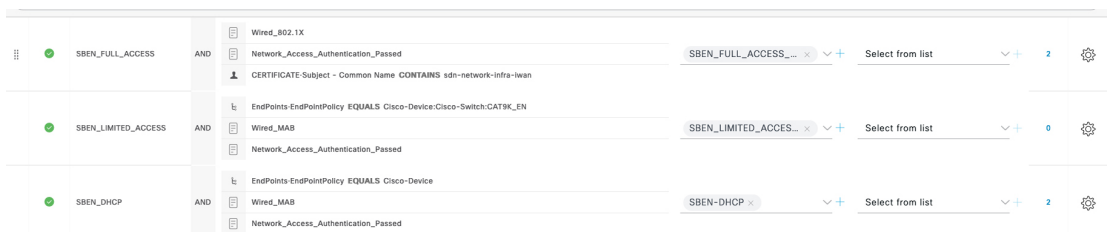
Overview	Ext Id Sources	Network Devices	Endpoint Classification	Node Config	Feeds	Manual Scans	Policy Elements	Profiling Policies	More ▼
<b>Profiler Settings</b> NMAP Scan Subnet Exclusions									
<b>Profiling</b> Profiler Settings									
CoA Type*	Reauth ▼								
Current custom SNMP community strings	***** Show								
Change custom SNMP community strings	<input type="text"/>								
Confirm changed custom SNMP community strings:	<input type="text"/>								
<input type="checkbox"/>	EndPoint Attribute Filter ⓘ								
<input type="checkbox"/>	Anomalous Behaviour Detection ⓘ								
<input type="checkbox"/>	Anomalous Behaviour Enforcement								
<input type="checkbox"/>	Custom Attribute for Profiling Enforcement								
<input type="checkbox"/>	Profiling for MUD								
<input checked="" type="checkbox"/>	Profiler Forwarder Persistence Queue								
<input type="checkbox"/>	XSS Security Scan Enforcement for EndPoint Probe Data ⓘ								

**Step 5** Define the authorization policy in the **Authorization Policy** window.

- From the Cisco ISE home page, choose **Policy > Policy Sets > Default > Authorization Policy**.
- Ensure that the default MAB policy is set to **CONTINUE** option for the **If User not found** field.



- c) In the **Authorization Policy** window, configure the authorization policies for the supplicant device and associate the policies with the authorization profiles that were created earlier (SBEN-DHCP, SBEN\_LIMITED\_ACCESS\_AUTHZ, SBEN\_FULL\_ACCESS\_AUTHZ).



## Configure a Port Channel

A group of ports bundled together to act as a single entity is called a port channel. Port channels between a fabric edge and its remotely connected devices, such as extended nodes or servers, increase the connection resiliency and bandwidth.

### Create a Port Channel

#### Before you begin

The authentication must be **Closed Authentication**.



**Note** The following steps are automated for other authentication modes.

- Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- Step 2** In the **Fabric Sites** tab, under **SUMMARY**, click the number that indicates the count of fabric sites.
- Step 3** In the **Fabric Sites** window, click a fabric site to configure port channels.
- Step 4** In the **Port Assignment** tab, hover your cursor over **More Actions**, and click **Create Port Channel**.
- Step 5** In the **Select your fabric devices** window, select the fabric devices for which a port channel has to be created.

**Step 6** To specify the number of port channels and configure each port channel, perform the following actions in the **Determine number of port channels** window.

- a) From the **Connected Device Type** drop-down list, choose the type of connected device:
  - To create a port channel between a fabric edge node and an extended node or between two extended nodes, choose **Extended Node**.
  - To create a port channel with a fabric edge node or extended node on one side and a third-party device or a server port on the other side, choose **Trunk**.
- b) Enter a **Description** for the new port channel.
- c) Choose a protocol:
  - For the extended nodes that run Cisco IOS XE Release 16.12.1s and earlier releases, choose **On** as the protocol.
  - For the extended nodes that run Cisco IOS XE Release 17.1.1s and later releases, choose **Port Aggregation Protocol (PAgP)** as the protocol.
  - Don't select **Link Aggregation Control Protocol (LACP)** as the protocol for extended nodes. You can only connect the trunk ports or the server ports in the LACP mode.

**Step 7** From the list of available interfaces, choose the interfaces to be bundled as a port channel.

**Note** You cannot have more than 16 members in a port channel that is connected in the LACP mode.  
You cannot have more than eight members in a port channel that is connected in the PAgP mode.

**Step 8** In the **Summary** window, review the port channels that are created.

**Step 9** In the **Deploy Port Channel** window, depending on the Visibility and Control of Configurations settings, choose an available option:

- **Now**: Immediately deploy the configurations.
- **Later**: Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview**: Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Deploy** to configure the port channel.

**Step 10** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- **Pending Operations**: Wait for all pending operations to deploy or discard them.
- **Device Compliance**: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).



If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 11** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.

b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

c. Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

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## Update a Port Channel

### Before you begin

Ensure that at least one member interface exists before you update a port channel.

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**Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.

**Step 2** In the **Fabric Sites** tab, under **SUMMARY**, click the number that indicates the count of fabric sites.

**Step 3** In the **Fabric Sites** window, click a fabric site to update the port channels.

**Step 4** In the **Port Assignment** tab, click the port channel to be updated.

**Step 5** Hover your cursor over **More Actions**, and click **Edit Port Channel**.

**Step 6** Follow the onscreen guidelines to update the port channel configuration.

You can either add interfaces to the port channel or delete existing interfaces on the port channel.

**Step 7** In the **Deploy Port Channel** window, depending on the Visibility and Control of Configurations settings, choose an available option:

- **Now:** Immediately deploy the configurations.
- **Later:** Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview:** Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Deploy** to update the port channel.

**Step 8** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.

If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.

- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 9** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.

b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

c. Do one of the following:

- When you're ready, click **Deploy** or **Submit for Approval**.
- If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.

e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

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## Delete a Port Channel

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- Step 1** From the top-left corner, click the menu icon and choose **Provision > Fabric Sites**.
- Step 2** Under **SUMMARY**, click the number that indicates the count of fabric sites.
- Step 3** Click a fabric site.
- Step 4** In the **Fabric Infrastructure** tab, click a fabric edge node.
- Step 5** In the slide-in pane, click the **Port Channel** tab.  
The **Port Channel** view lists all the existing port channels.
- Step 6** Check the check box for the port channel and click **Delete**.
- Step 7** At the prompt, click **Yes**.
- 

## Multicast

Multicast traffic is forwarded in different ways:

- Through shared trees by using a rendezvous point. PIM SM is used in this case.
- Through shortest path trees (SPT). PIM source-specific multicast (SSM) uses only SPT. PIM SM switches to SPT after the source is known on the edge router that the receiver is connected to.

See [IP Multicast Technology Overview](#).

## Configure Multicast

Catalyst Center provides a workflow to enable group communication or multicast traffic in virtual networks. The workflow also allows you to choose multicast implementation in the network: native multicast or headend replication.



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**Note** You can enable multicast on a virtual network whose border serves as a multisite remote border. Configuring multicast on such a virtual network configures multicast on the devices in the inherited virtual network too, provided the inherited virtual network already contains a segment. If the inherited virtual network doesn't have a segment, multicast is deployed only after the first segment is created. Ensure that a virtual network and its inherited networks deploy the same type of multicast implementation. The edge node devices of an inherited virtual network cannot be configured as a rendezvous point (RP).

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- Step 1** From the top-left corner, click the menu icon and choose **Workflows > Configure Multicast**.
- Step 2** If a task overview window appears, click **Let's Do It** to go directly to the workflow.
- Step 3** In the **Fabric Site** window, select a site in the site hierarchy pane.
- Step 4** In the **Replication Mode** window, choose the method of multicast implementation for the network from the following:
- **Native Multicast**
  - **Head-end replication**
- Step 5** In the **Virtual Networks** window, select the virtual network for which you want to set up multicast.
- Note** You can't select an inherited virtual network to set up multicast.
- Step 6** In the **Multicast pool mapping** window, select an IP address pool from the **IP Pools** drop-down list. The selected IP address pool is associated with the chosen virtual network.
- Step 7** In the **Multicast Mode** window, choose the type of multicast to implement:
- **SSM** (Source Specific Multicast)
  - **ASM** (Any Specific Multicast)
  - Select **SSM** and **ASM** to configure both together.
- Step 8** Do the following:
- a) On selecting **SSM**, configure the SSM list by adding an IP group range for each virtual network. You can add multiple IP group ranges for a virtual network.
    1. By default, 232.0.0.0/8 range of IPv4 address is selected. You can optionally modify the IPv4 address range. Choose an IP group range from 225.0.0.0 to 239.255.255.255.
    2. For IPv6 addresses, FF3x::/32 is reserved for SSM.
  - b) On selecting **ASM**, in the **Multicast Group to Rendezvous Point Mapping** window, configure the rendezvous point for each virtual network:
    1. Choose the type of rendezvous point: **External** or **Fabric**.
    2. Configure the rendezvous points in the respective tabs: **IPv4 RP** and **IPv6 RP**.
    3. You can define any number of external rendezvous points.
    4. Optionally, you can define a group-to-rendezvous point mapping. There could be one or multiple IPv4/IPv6 multicast groups that are associated with a rendezvous point.
    5. You can either have a rendezvous point with no mapping or with mapping. Both can't be configured together.
    6. The permitted multicast group ranges for IPv6 and IPv4 FF00:/8 and 225.0.0.0/8 - 239.0.0.0/8 respectively.
- Step 9** In the **Summary** window, review the multicast settings. To modify any of the settings, click **Edit**.
- Step 10** In the **Deploy Multicast** window, depending on the Visibility and Control of Configurations settings, choose an available option.
- **Now**: Immediately deploy the configurations.

- **Later:** Schedule the date and time and define the time zone of the deployment.
- **Generate configuration preview:** Review the configurations before deploying them.

If only visibility is enabled or both visibility and control are enabled, **Generate configuration preview** is chosen by default, and **Now** and **Later** are dimmed (unavailable). For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

Click **Deploy** to complete the configuration.

**Step 11** On the **Performing Initial Checks** window, address the following issues to continue with your current deployment:

- Pending Operations: Wait for all pending operations to deploy or discard them.
- Device Compliance: Fix, acknowledge, or ignore all issues.  
If you ignore any noncompliant devices, this activity is captured on the **Audit Logs** window.
- After addressing all the issues, click **Recheck** in the bottom-right corner of the window and make sure that all the validations are successful.

For more information, see [Network Provisioning Prechecks](#).

If you chose **Now** or **Later**, click **Submit**, and the device configurations will deploy at the scheduled time. You can view the task on the **Tasks** window.

**Step 12** If you chose **Generate configuration preview**, depending on the Visibility and Control of Configurations settings, do the following:

- a. On the **Preparing Devices and Configuration Models** window, wait for the system to prepare the devices and generate the device configurations. This can take some time, so you can click **Exit and Preview Later**. To view the work item later, go to the **Tasks** window.
- b. On the **Preview Configuration** window, review the device configurations.

For more information, see [Visibility and Control of Fabric Configurations, on page 11](#).

- c. Do one of the following:
  - When you're ready, click **Deploy** or **Submit for Approval**.
  - If you're not ready to deploy the configurations or submit them for ITSM approval, click **Exit and Preview Later**. Later, go to the **Tasks** window, open the work item, and click **Deploy** or **Submit for Approval**.

**Note** You can submit the device configurations for ITSM approval and deploy them without previewing all the configurations.

- d. In the slide-in pane, indicate when you want to deploy the configuration, choose a time zone, and if visibility and control are enabled, add notes for the IT administrator.
- e. Click **Submit**.

You can check the work item's approval status or the task's deployment status on the **Tasks** window. If the work item isn't approved, you need to resubmit the work item for ITSM approval. When it's approved, it's deployed at the scheduled time.

