



Provision a LAN Underlay

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LAN Automation

Catalyst Center provides LAN automation as an alternative for manual deployment of new networks. This automation allows you to simplify network operations and create a standard error-free network. LAN automation uses the IS-IS routing protocol to deploy a Layer 3 routed access design.

LAN Automation provides the following capabilities:

- Provision your network through LAN automation
- View the history of LAN automation sessions
- View the summary of LAN automated devices

From the top-left corner, click the menu icon and choose **Provision > LAN Automation** to view this window.

- **Start LAN Automation:** Use this option to initiate LAN automation sessions on your network.
- **Overview:** Expand this section to view the prerequisites and more information about provisioning your network through LAN automation.
- **Sessions:** This section consists of the **History** of LAN automation sessions, and the list of **LAN Automated Devices**.

Day-Zero Operation

On day zero, click **Start LAN Automation** to start provisioning your network through LAN automation. For more information, see [Provision a Network Through LAN Automation, on page 3](#).

For day zero, Catalyst Center doesn't display any data in the **Sessions** section.

Day-*n* Operation

On day *n*, you can click **Start LAN Automation** to initiate more LAN automation sessions. You can run up to five LAN automation sessions simultaneously across sites. For more information, see [Provision a Network Through LAN Automation, on page 3](#).

When a LAN automation session is in progress, Catalyst Center displays a tile for the session on the **LAN Automation** window. To view the details of the session, click **See Session Details** in the tile. To stop LAN automation for the session, click **Stop LAN Automation** in the tile.

The **History** tab displays the history of LAN automation sessions in your network. You can use the **Search** field to search for specific text. To view the session details, click the hyperlinked date. To view the logs for a session, in the session details window, click **View Session Logs**.

The **LAN Automated Devices** tab displays the details of the LAN automated devices. You can use the search field to filter the data based on specific text. Click one of the following toggle buttons to filter the data:

- **Seed Devices:** Displays the data for seed devices
- **Discovered:** Displays the data for discovered devices
- **Provisioned:** Displays the data for provisioned devices
- **Error:** Displays the data for devices with errors

In the **LAN Automated Devices** tab, you can also do the following:

- Click the device name hyperlink to view the device details.
- Provision interfaces between two devices by clicking **Add Link**. For more information, see [Create a Link Between Interfaces, on page 9](#).
- Delete the interface between two devices by clicking **Delete Link**. For more information, see [Delete a Link Between Interfaces, on page 9](#).
- Customize the hostname and loopback IP address of a device by clicking **Edit Device**.



Note

- To edit the hostname and loopback IP address of a device on Day-*n*, the device must be in the **Managed** state in the Inventory.
- You can edit the loopback IP addresses of a maximum of 25 devices in a single Day-*n* workflow.

For more information, see [Edit Hostname and Loopback IP Address of LAN Automated Devices](#).

Prerequisites for Provisioning a Network Through LAN Automation

Before provisioning a network through LAN automation, ensure the following:

- Configure your network hierarchy. (See [Add a Device to a Site](#).)

- Define the following global network settings:
 - Network servers, such as the AAA, DHCP, and DNS servers. (See [Configure Global Network Servers](#).)
 - Device credentials, such as the CLI, SNMP, HTTP, and HTTPS credentials. (See [Add Global CLI Credentials](#), [Add Global SNMPv2c Credentials](#), [Add Global SNMPv3 Credentials](#), and [Add Global HTTPS Credentials](#).)



Note SNMPv2 write credentials are not required and if configured, it won't be pushed to the device during LAN automation.

- IP address pools. (See [Configure IP Address Pools](#).)
- Ensure you have at least one device in your inventory. If not, discover devices using the Discovery feature.



Note LAN automation is blocked if the discovered site is configured with "cisco" in the username of your CLI credentials.

- If you have a Cisco Catalyst 9400 Switch configured in the network, the following operations must be completed on the switch for LAN automation to automatically enable the 40G port:
 - The day-zero configuration is performed on the switch.
For more information, see “Initial Configuration for the Switch” in the [Cisco Catalyst 9400 Series Switches Hardware Installation Guide](#).
 - A 40G Quad Small Form-Factor Pluggable (QSFP) transceiver is inserted in either port 9 or port 10 of the Supervisor, and the ports numbered 1 to 8 on the Supervisor do not have a 10G or 1G Small Form-Factor Pluggable (SFP) transceiver that is inserted in them. If there are dual supervisor engines, ensure that the 40G QSFP is inserted in port 9.
For more information on the Catalyst 9400 Series Supervisor, see the “Uplink Ports” topic in the [Cisco Catalyst 9400 Series Supervisor Module Installation Note](#).

Provision a Network Through LAN Automation

Before you begin

Make sure that the prerequisites have been met. For more information, see [Prerequisites for Provisioning a Network Through LAN Automation, on page 2](#).

Step 1 Reserve an IP address pool for the site that you are provisioning.

Note The size of the LAN automation IP address pool must be at least 25 bits of netmask or larger.

- a) From the top-left corner, click the menu icon and choose **Design > Network Settings > IP Address Pools**.
- b) From the left hierarchy tree, choose a site.
- c) Click **Reserve**. In the **Reserve IP Pool** slide-in pane, enter the following information to reserve all or a part of an available global IP address pool for your chosen site:
 - **IP Address Pool Name:** Unique name for the reserved IP address pool.
 - **Type:** Type of IP address pool. For LAN automation, choose **LAN**.
 - **IP Address Space:** Check either the **IPv4** or the **IPv6** check box to create an address pool. To create a dual-stack pool, check both the **IPv4** and **IPv6** check boxes.
 - **Global IP Pool:** IPv4 address pool from which you want to reserve all or some of the IP addresses.

Note LAN automation uses only the IPv4 subnet.

 - **Prefix length / Number of IP Addresses:** IP subnet and mask address that is used to reserve all or a part of the global IP address pool or the number of IP addresses that you want to reserve.
 - **Gateway:** Gateway IP address.
 - **DHCP Server(s):** DHCP server IP address.
 - **DNS Server(s):** DNS server IP address.
- d) Click **Reserve**.

Step 2

To initiate the discovery and provisioning of the devices, do the following:

- a) From the top-left corner, click the menu icon and choose **Provision > LAN Automation**.
- b) In the **LAN Automation** window, click **Start LAN Automation**.

The workflow guides you through the configuration process.

- c) In the **Seed Devices** window, do the following:
 1. Select the Primary Seed Device and its interface.
 2. (Optional) Select the Secondary Seed Device and its interface.
- d) In the **Sessions Attributes** window, do the following:
 1. Choose the site to which all the newly discovered devices are assigned. This site can be different from the primary and peer sites.
 2. From the **Principal IP Address Pool** drop-down, choose the IP address pool.
 3. (Optional) Click the **Advance Attributes** toggle button to set the IS-IS password and also to enable multicast.
 4. In the **HOSTNAME MAPPING** section, in the **Discovered Devices Hostname Prefix** field, define a prefix name for the devices.

You can either select a hostname map file from the **Choose a File** drop-down, or upload the CSV file from a storage device.

The CSV file contains a serial number and hostname for each device. Optionally, it can also have a customized loopback IP address for each device. The LAN automation process assigns the specified loopback IP address for the corresponding device. If the CSV file does not contain the loopback IP address information, a random IP address from the IP pool is assigned to the device.

Note The loopback IP address for a device can be an address from any IP address pool in the same site as the device.

5. Click **Review**.

- e) In the **Review** window, look through all the LAN automation session settings. To make any changes, click **Edit**. Click **Start**.

Step 3 The following table describes each field that you see in the workflow window:

Primary Seed Device	Select the primary device that Catalyst Center uses as the starting point to discover and provision new devices.
Secondary Seed Device	Select the secondary seed device.
Discovered Device Site	All the newly discovered devices are assigned to this site. This site can be different from the primary and peer sites.
Principal IP Pool	The IP address pool that is reserved for LAN automation.
Link Overlapping IP Pool	<p>The IP address pool that is shared with other sites and is used to configure the /31 IP addresses on point-to-point links in the underlay.</p> <ul style="list-style-type: none"> • A link that overlaps IP pool can be a subpool that is inherited from a parent site or a subpool that is defined in any other site. • A link that overlaps IP pool allows you to overlap /31 IP addresses in a multisite deployment. Hosts in different sites will be able to reuse the IP addresses on the /31 links. • If you choose to define a link that overlaps IP pool, the addresses that are defined in the Principal IP Pool field are used for management IPs, such as loopback address, VLAN address, and so on.
IS-IS Domain Password	A user-provided IS-IS password when LAN automation starts. If the password exists on the seed device, it is reused and is not overwritten. If no user-provided password is entered and there is no existing IS-IS password on the device, the default domain password is used. If both the primary and the secondary seeds have domain passwords, ensure that they match.
Advertise LAN Automation Summary Route into BGP	<p>Check this check box if you want LAN automation to advertise the principal IP pool into BGP on the primary and peer seed device. LAN automation advertises the summary route on the seed devices only if BGP is configured on them.</p> <p>This check box is disabled by default. It is enabled only if the primary or the peer seed device has an autonomous system (AS) number configured.</p>
Enable Multicast	Check this check box to enable underlay native multicast. LAN automation creates a multicast tree with seed devices as RPs and discovered devices as subscribers.

Choose a File	<p>Click Browse to choose a hostname map file. User-provided names are configured for discovered devices using the chosen CSV file that contains a mapping between serial numbers and hostnames. If the discovered device is a stack, all the serial numbers of the stack are provided in the CSV file.</p> <p>Optionally, in the third field, you can specify a loopback IP address for the device.</p> <p>A sample CSV file is as follows:</p> <pre>standalone-switch,FCW2212LONF,10.1.1.4 stack-switch,"FCW2212E00Y,FCW2212LOGV"</pre>
Device Name Prefix	<p>Name prefix for the devices being provisioned. When Catalyst Center provisions each device, it prefixes the device with the text that you provide and adds a unique number at the end. For example, if you input "Access" as the name prefix, each consecutive device that is provisioned is named Access-1, Access-2, Access-3, and so on.</p>

Step 4 In the **Review** window, click **Start**.

Catalyst Center begins to discover and provision the new devices.

LAN automation configures an IP address on the seed device of VLAN 1. If this VLAN 1 IP address of the seed device is not reachable from Catalyst Center, an error message is displayed on the **LAN Automation Status** window. Hover your cursor over the **See Details** link on this window to see the error details and possible remedial actions.

Step 5 Monitor and review the progress of the devices being provisioned.

In the **LAN Automation** window, click **See Session Details** on the status pane.

You can filter the status display and see the details of the discovered devices, or the provisioned devices, or error messages.

Note The provisioning of new devices may take several minutes.

Step 6 Stop the LAN automation session after all the devices have been discovered and added to the inventory.

a) In the **LAN Automation Status** window, click **Stop LAN Automation**.

When you stop LAN automation, a **Review LAN Automation Session** workflow is triggered. This workflow allows you to review the devices that are discovered during the LAN automation session and make changes before deployment.

b) In the **Review Discovered Devices** window, you can edit the loopback IP address (Management IP address) of a device.

c) Click **Validate** to verify the edited IP address.

d) If the validation is a success, click **Apply** to deploy the LAN automation configurations.

Step 7 (Optional) You can have multiple LAN automation sessions (up to five sessions) running in parallel. The details of each session are displayed on the respective tiles in the **LAN Automation** window.

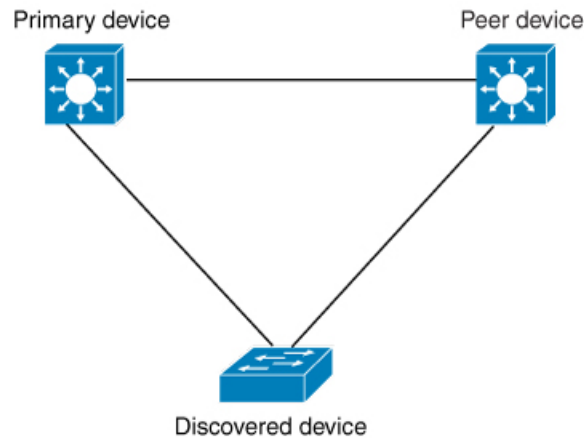
Consider the following aspects before you start simultaneous LAN automation sessions:

- You can't use the same seed device for more than one session.
- You can't use the same site for parallel sessions.
- You can't use the same IP pool for parallel sessions.

Peer Device in LAN Automation Use Case

Provision a Dual-Homed Switch

You must always select a peer device to provision the dual-homed switch.

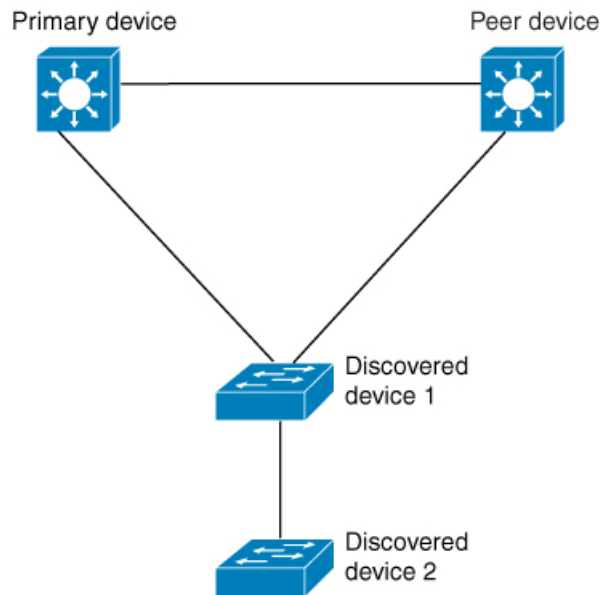


Catalyst Center configures the DHCP server on the primary device. Because Catalyst Center understands that the discovered device is connected to both the primary and peer devices, it configures two Layer 3 point-to-point connections when the LAN automation task is stopped. One connection is established between the discovered device and the primary device; the other connection is established between the discovered device and the peer device.



Note If the link between the primary and the peer device is not configured before the LAN automation job is executed, you must select the interface of the primary device that connects to the peer device as part of the LAN automation configuration in Catalyst Center.

LAN Automation's Two-Hop Limitation



For the preceding topology, Catalyst Center configures the following links:

- A point-to-point Layer 3 routed connection from *Discovered device 1* to *Primary device*
- A point-to-point Layer 3 routed connection from *Discovered device 1* to *Peer device*
- A point-to-point Layer 3 routed connection from *Discovered device 1* to *Discovered device 2*

Consider the scenario where a device—named *Discovered device 3*—is directly connected below *Discovered device 2*. The connection between *Discovered device 2* and *Discovered device 3* is not configured as part of the LAN automation job because it is more than two hops away from *Primary device*.

Check the LAN Automation Status

You can view the status of in-progress LAN automation jobs.

Before you begin

You must have created and started a LAN automation job.

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

A status pane displays the current status of LAN automation.

Step 2 In the status pane, click **See Session Details**.

You can view the overall status of LAN Automation (In Progress or Completed), and also filter the view based on the discovered or provisioned devices.

Step 3 In the **LAN Automation** window, click **LAN Automated Devices** tab to view the configuration logs and session logs.

Create a Link Between Interfaces

To add a link between interfaces through LAN Automation, follow these steps:

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

Step 2 On the **LAN Automation** window, in the **LAN Automation Devices** tab, click **Add Link**.

Alternatively, you can create a link from **Workflows > Add Link**.

Step 3 Follow these steps in the **Add Link** workflow:

- a) Select the two devices to establish the link.
- b) Select an IP address pool within the LAN.

Ensure that the IP address pool is reachable from Catalyst Center.

- c) Select the interfaces on both the devices between which you want to establish a connection.
- d) Click **Now** or **Later** to indicate when you want to provision the link.
- e) Enter a name for the task in the field provided.
- f) In the **Summary** window, review the configuration settings. To make any changes, click **Edit**.
- g) Click **Start Add Link**.

The **Link Configuration Started Successfully** window is displayed.

Step 4 (Optional) To view the status of the configuration, click **View Status in Activities**.

Delete a Link Between Interfaces

Use this procedure to delete the interface links that were created during LAN Automation or by performing an Add Link operation.

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

Step 2 On the **LAN Automation** window, in the **LAN Automation Devices** tab, click **Delete Link**.

Alternatively, you can delete a link from **Workflows > Delete Link**.

Step 3 Follow the steps in the **Delete Link** workflow:

- a) Select the two devices to delete the interface link.
- b) Select the interfaces on both these devices between which you want to delete the link.
- c) Click **Now** or **Later** to indicate when you want to start the delete process.
- d) Enter a name for the task in the field provided.
- e) In the **Summary** window, review the configuration settings. To make any changes, click **Edit**.
- f) Click **Start Delete Link**.

The **LAN Automation configuration has been removed from the selected interfaces** window is displayed.

Step 4 (Optional) To view the status of the delete link task, click **View Status in Activities**.

Edit Hostname and Loopback IP Address of LAN Automated Devices

You can customize the hostname and loopback IP address of devices that are discovered through LAN automation using the reserved IP address pools of the type **LAN**.



- Note**
- To edit the hostname and loopback IP address of a device on Day-*n*, the device must be in the **Managed** state in the Inventory.
 - You can edit the loopback IP addresses of a maximum of 25 devices in a single Day-*n* workflow.

Before you begin

- Discover the devices through LAN automation. For more information, see [Provision a Network Through LAN Automation, on page 3](#).
- Reserve the required IP address pools of the type **LAN**. For more information, see [Reserve an IP Address Pool](#).

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

Step 2 In the **LAN Automated Devices** tab of the **LAN Automation** window, check the check box next to the devices that you want to edit.

Step 3 Click **Edit Device**.

Step 4 In the **Edit Devices** window, do the following:

- In the **Device Name** field, enter the hostname for the device.
- From the **IP Address Pool** drop-down list, choose an IP address pool.
- In the **IP Address** field, enter an IPv4 address without a subnet mask.

Note The IP address must be within the range of the selected IP address pool.

- Repeat Step [4.a, on page 10](#), Step [4.b, on page 10](#), and Step [4.c, on page 10](#) for each device.
- Click **Validate**.

If the specified IP address isn't available for allocation, Catalyst Center displays an error message. Enter a valid IPv4 address in the corresponding **IP Address** field.

- Click **Next**.

Step 5 In the **Schedule Edit Device Deployment** window, do one of the following:

- Click the **Now** radio button, name the task, and click **Apply**.

- Click the **Later** radio button; name the task; specify the start date, start time, and time zone; and click **Apply**.
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