



Manage Software Images

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About Image Repository

Cisco DNA Center stores all of the software images, software maintenance updates (SMUs), subpackages, ROMMON images, and so on for the devices in your network. Image Repository provides the following functions:

- **Image Repository:** Cisco DNA Center stores all the unique software images according to image type and version. You can view, import, and delete software images.
- **Provision:** You can push software images to the devices in your network.

Before using Image Repository features, you must enable Transport Layer Security protocol (TLS) on older devices such as Cisco Catalyst 3000, 4000, and 6000. After any system upgrades, you must re-enable TLS. For more information, see “Configure Security for Cisco DNA Center” in the [Cisco DNA Center Administrator Guide](#).

Integrity Verification of Software Images

The Integrity Verification application monitors software images that are stored in Cisco DNA Center for unexpected changes or invalid values that could indicate your devices are compromised. During the import process, the system determines image integrity by comparing the software and hardware platform checksum

value of the image that you are importing to the checksum value identified for the platform in the Known Good Values (KGV) file to ensure that the two values match.

On the **Image Repository** window, a message displays if the Integrity Verification application cannot verify the selected software image using the current KGV file. For more information about the Integrity Verification application and importing KGV files, see the [Cisco DNA Center Administrator Guide](#).

View Software Images

After you run Discovery or manually add devices, Cisco DNA Center automatically stores information about the software images, SMUs, and subpackages for the devices.

Step 1 In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Design > Image Repository**.

The software images are organized and displayed based on the device type. By default, software images for physical devices are displayed. Click the **Virtual** tab to view software images for virtual devices.

Note When cisco.com credentials are not set, a warning alert is displayed.

Step 2 In the **Family** column, click the downward arrow to view all the software images for the specified device type family. The **Device(s)** column indicates how many devices are using the specific image shown in the **Image Name** field. Click the number of devices to view the devices that are using the image.

Step 3 In the **Version** column, click the **Add On** link to view the applicable **SMUs**, **Subpackages**, **ROMMON**, **APSP**, and **APDP** upgrades for the base image.

Subpackages are the additional features that can be added to the existing base image. The subpackage version that matches the image family and the base image version is displayed here.

AP Service Pack (APSP) and AP Device Pack (APDP) are images for upgrading APs associated with wireless controllers.

- When a new AP hardware model is introduced, APDP is used to connect to the existing wireless network.
- For associated APs, critical AP bug fixes are applied through APSP.

Note If you tag any SMU as golden, it is automatically activated when the base image is installed.
You cannot tag a subpackage as golden.

For ROMMON upgrades, the cisco.com configuration is mandatory. When a device is added, the latest ROMMON details are retrieved from cisco.com for applicable devices. Also, when the base image is imported or tagged, the ROMMON image is automatically downloaded from cisco.com.

Step 4 In the **Advisory** column, click the number of critical or high advisories to view the advisories for a specific software image.

The **Image Advisory** slide-in pane shows **Family Name**, **Version**, and **Advisories** of the software image. The advisories are classified as **Critical**, **High**, **Medium**, **Low**, and **Informational**.

Click **CRITICAL**, **HIGH**, or **MEDIUM** to view the advisories specific to each category.

To fix the advisories, do the following:

- Click **Fix Advisories**.
The **Image Update** window appears.

- b) Select a recommended software image to update the device.

If the recommended software image is not available in the image repository, you can download it from cisco.com.

- c) Click **Download and Mark Golden**.

- d) From the **Download Image** dialog box, do one of the following:

- Keep the **Mark the image as golden after download** check box checked (the default). Then, click **Download**. The software image is downloaded and marked as golden.
- Uncheck the **Mark the image as golden after download** check box and click **Download**. The software image is downloaded to the repository but is not marked as golden.

- e) Click **OK**.

The software image is downloaded. You can view the progress in **Show Tasks**.

Step 5

In the **Device Role** column, select a device role for which you want to indicate that this is a *golden* software image. For more information, see [About Golden Software Images, on page 5](#) and [Specify a Golden Software Image, on page 6](#).

Use a Recommended Software Image

Cisco DNA Center displays and allows you to select Cisco-recommended software images for the devices that it manages.



Note Only the latest Cisco-recommended software images are available for download.

Step 1 In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **System > Settings > Cisco.com Credentials**.

Step 2 Verify that you have entered the correct credentials to connect to cisco.com.

Step 3 In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Design > Image Repository**.

Cisco DNA Center displays the Cisco-recommended software images according to device type.

Step 4 Designate the recommended image as golden. See [Specify a Golden Software Image, on page 6](#) for more information.

Step 5 Push the recommended software image to the devices in your network. See [Provision a Software Image, on page 8](#) for more information.

Import a Software Image

You can import software images and software image updates from your local computer or from a URL.

Imported images are categorized based on different supervisors that are present in a specific device family. Categorization under different supervisors supports only the Cisco Catalyst 9400 series family.

If you use FTP to import an image from an FTP server, use the FTP standard:

```
ftp://username:password@ip_or_hostname/path
```

- Step 1** In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Design > Image Repository**.
- Step 2** Click **Import**.
- Step 3** Click **Choose File** to navigate to a software image or software image update stored locally. Alternately, enter the image URL to specify an HTTP or FTP source from which to import the software image or software image update.
- Step 4** If the image you are importing is for a third-party (non-Cisco) vendor, select **Third Party** under **Source**. Choose an **Application Type**, describe the device **Family**, and identify the **Vendor**.
- Step 5** Click **Import**.
- A window displays the progress of the import.
- Step 6** Click **Show Tasks** to verify that the image was imported successfully.
- If you imported a SMU, Cisco DNA Center automatically applies the SMU to the correct software image, and an **Add-On** link appears below the corresponding software image.
- Step 7** Click the **Add-On** link to view the SMU.
- Step 8** In the **Device Role** field, select the role for which you want to mark this SMU as golden. See [Specify a Golden Software Image, on page 6](#).

You can only mark a SMU as golden if you previously marked the corresponding software image as golden.

Note Cisco DNA Center does not allow you to import software images for the FTD devices that are managed by FMC. When you add FMC to inventory and it goes to the 'Managed' state, the software images present in FMC are shown in Image Repository and are categorized based on device family.

Assign a Software Image to a Device Family

After importing a software image, you can assign or unassign it to available device families. The imported image can be assigned to multiple devices at any time.

To assign an imported software image to a device family:

- Step 1** In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Design > Image Repository**.
- Step 2** Click **Imported Images**.
- Step 3** Click **Assign** in the corresponding image name row.
- Step 4** In the **Assign Device Family** window, choose the **Device Series from Cisco.com** or **All Device Series** and click **Assign** link to which you want to map the image.
- Note:** If cisco.com credentials are not set, specify the credentials in **System > Settings > Cisco.com Credentials**.
- Step 5** Select appropriate site from the Global hierarchy and click **Assign** and then click **Save**.
- Step 6** To unassign an image, choose a site from the Global hierarchy and click **Unassign** link in the **Action** column.
- The software image is assigned to the device family and the number of devices using that image are shown in the **Device(s)** column. After assigning the image, you can mark it as a golden image. See [Specify a Golden Software Image](#).

If the device family is marked as a golden image, you cannot delete that image from the device family.

Note For PnP devices, you can import a software image and assign it to a device family even before the device is available. You can also mark the image as a golden image. When the device is made available in the inventory, the image that is assigned to the device family is automatically assigned to the newly added devices of that device family.

When the image is imported and Cisco DNA Center has cisco.com credentials added, Cisco DNA Center provides the list of device families that are applicable for the image. You can select the required device family from the list.

When the image is not available in cisco.com or when credentials are not added in Cisco DNA Center, you must design the right device family for the image.

Upload Software Images for Devices in Install Mode

The Image Repository page might show a software image as being in Install Mode. When a device is in Install Mode, Cisco DNA Center is unable to upload its software image directly from the device. When a device is in Install Mode, you must first manually upload the software image to the Cisco DNA Center repository before marking the image as golden, as shown in the following steps.

-
- Step 1** In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Design > Image Repository**.
 - Step 2** In the **Image Name** column, find the software image of the device that is running in **Install Mode**.
 - Step 3** Click **Import** to upload the binary software image file for the image that is in Install Mode.
 - Step 4** 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.
 - Step 5** Click **Import**.
A window displays the progress of the import.
 - Step 6** Click **Show Tasks** and verify that the software image you imported is green, indicating it has been successfully imported and added to the Cisco DNA Center repository.
 - Step 7** Click **Refresh**.
The Image Repository window refreshes. Cisco DNA Center displays the software image, and the Golden Image and Device Role columns are no longer dimmed.
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About Golden Software Images

Cisco DNA Center allows you to designate software images and SMUs as *golden*. A golden software image or SMU is a validated image that meets the compliance requirements for the particular device type. Designating a software image or SMU as golden saves you time by eliminating the need to make repetitive configuration changes and ensures consistency across your devices. You can designate an image and a corresponding SMU as golden to create a standardized image. You can also specify a golden image for a specific device role. For

example, if you have an image for the Cisco 4431 Integrated Service Routers device family, you can further specify a golden image for those Cisco 4431 devices that have the Access role only.

You cannot mark a SMU as golden unless the image to which it corresponds is also marked golden.

Specify a Golden Software Image

You can specify a golden software image for a device family or for a particular device role. The device role is used for identifying and grouping devices according to their responsibilities and placement within the network.

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- Step 1** In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Design > Image Repository**.
The software images are displayed according to device type.
- Step 2** From the **Family** column, select a device family for which you want to specify a golden image.
- Step 3** From the **Image Name** column, select the software image that you want to specify as golden.
- Step 4** If the software image that you specify as golden is already uploaded into the Cisco DNA Center repository, click the star icon in the **Golden Image** column.
The software image is marked as golden.
- Step 5** If the software image that you specify as golden is not already uploaded into the Cisco DNA Center repository, click the download icon in the **Golden Image** column.
This process might take some time.
- Note** Importing software images from devices is not allowed.
- Step 6** From the **Download Image** dialog box, do one of the following:
- Keep the **Mark the image as golden after download** check box checked by default and click **Download**. The software image is downloaded and marked as golden.

Note If Cisco.com credentials are not set, you are prompted to specify them.

The in-progress software image download is shown in the **Device Role** column.

If the software image is downloaded and successfully marked as golden, the color of the star icon turns gold. If the software image download fails, the color of the star icon turns red and a **Please Retry** status is displayed.
 - Uncheck the **Mark the image as golden after download** check box and click **Download**. The software image is downloaded to the repository but is not marked as golden.
- Step 7** In the **Device Role** column, select a device role for which you want to specify a golden software image. Even if you have devices from the same device family, you can specify a different golden software image for each device role. Note that you can select a device role for physical images only, not virtual images.
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Configure an Image Distribution Server

Image distribution server helps in storage and software distribution. You can configure an external image distribution server to distribute software images and set up one or more protocols for newly added image distribution server.

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- Step 1** In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **System > Settings > Device Settings**.
- Step 2** From the **Device Settings** drop-down list, choose **Image Distribution Servers**.
- Step 3** In the **Image Distribution Servers** window, click **Servers**.
- The **Image Distribution Servers** table displays the details of host, username, SFTP, SCP, and connectivity of image distribution servers.
- Step 4** Click **Add** to add a new image distribution server.
- The **Add a New Image Distribution Server** slide-in pane appears.
- Step 5** Configure the following image distribution server settings:
- **Host:** Hostname or IP address of the image distribution server.
 - **Root Location:** Check the **Use root directory for file transfers** check box to use the root directory for file transfers or uncheck the **Use root directory for file transfers** check box and enter the root location.
- Note** For Cisco AireOS Controllers, the image distribution fails if the configured path is more than 16 characters.
- Expand **SFTP and SCP**.
 - **Username:** Name that is used to log in to the image distribution server. The username must have read/write privileges on the working root directory on the server.
 - **Password:** Password that is used to log in to the image distribution server.
 - **Port Number:** Port number on which the image distribution server is running.
- Step 6** Click **Save**.
- Step 7** To edit the settings, click the Edit icon for the corresponding image distribution server in the **Action** column, make the required changes in the **Edit** window, and click **Save**.
- Step 8** To delete an image distribution server, click the Delete icon for the corresponding image distribution server in the **Action** column and click **Delete**.
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Change the Protocol Order of an Image Distribution Server

You can change the protocol order of an image distribution server. Protocol order helps in performing verification checks on the image distribution servers. By default, the software images are distributed using the first protocol in the protocol order.

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- Step 1** In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **System > Settings > Device Settings > Image Distribution Servers**.
- Step 2** In the **Image Distribution Servers** window, click **Preferences**.
- The default protocol order is shown.
- Step 3** Click the on or off toggle button to enable or disable a protocol.
- Note** The HTTPS or SCP protocol must be enabled for image distribution. The SFTP protocol must be enabled for all protocol orders.
- If the HTTPS protocol is disabled or image distribution has failed while using the HTTPS protocol, the software image will be distributed using the SCP protocol.
- Step 4** Drag and drop the protocols to change the protocol order.
- Step 5** Click **Save**.
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Add Image Distribution Servers to Sites

You can associate SFTP servers located in different geographical regions to sites, buildings, and floors. All the devices under the network hierarchy use the associated image distribution server during a network upgrade.

Before you begin

You must configure an image distribution server. See [Configure an Image Distribution Server, on page 7](#).

- Step 1** In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Design > Network Settings**.
- Step 2** In the left pane, choose the desired site to which you want to associate the image distribution server.
- Step 3** Click **Add Servers**.
- Step 4** In the **Add Servers** window, check the **Image Distribution** check box.
- Step 5** Click **OK**.
- Step 6** Click the **Primary** drop-down list and choose the image distribution server that you want to configure as primary.
- Step 7** Click the **Secondary** drop-down list and choose the image distribution server that you want to configure as secondary.
- Step 8** Click **Save**.
-

Provision a Software Image


You can push software images to the devices in your network. Before pushing a software image to a device, Cisco DNA Center performs upgrade readiness prechecks on the device, such as checking the device management status, disk space, and so on. If any prechecks fail, you cannot perform the software image update. After the software image of the device is upgraded, Cisco DNA Center checks for the CPU usage, route summary, and so on, to ensure that the state of the network remains unchanged after the image upgrade.



Note You can perform prechecks on multiple devices.

Cisco DNA Center compares each device software image with the image that you have designated as golden for that specific device type. If there is a difference between the software image of the device and the golden image, Cisco DNA Center specifies that the software image of the device is outdated. The upgrade readiness prechecks are triggered for those devices. If all the prechecks are cleared, you can distribute (copy) the new image to the device and activate it (that is, make the new image the running image). The activation of the new image requires a reboot of the device. Because a reboot might interrupt the current network activity, you can schedule the process for a later time.

If you have not designated a golden image for the device type, the device's image cannot be updated. See [Specify a Golden Software Image, on page 6](#).

Step 1 In the Cisco DNA Center GUI, click the **Menu** icon () and choose **Provision > Network Devices > Inventory**.

Step 2 From the **Focus** drop-down list, choose **Software Images**. Select the device whose image you want to upgrade.

Note If the prechecks succeed for a device, the **Outdated** link in the Software Image column has a green tick mark. If any of the upgrade readiness prechecks fail for a device, the **Outdated** link has a red mark, and you cannot update the software image for that device. Click the **Outdated** link and correct the errors before proceeding. See [List of Device Upgrade Readiness Prechecks](#).

Step 3 From the **Actions** drop-down list, choose **Software Images > Update Image**.

The **Image Upgrade** window appears.

Step 4 **Analyze Selection:** Choose the devices that you want to upgrade and click **Next**.

Step 5 **Distribute:** Click **Now** to start the distribution immediately or click **Later** to schedule the distribution at a specific time.

To choose the validators you want to run for the current workflow and add new custom checks, do the following:

- a) Hover your mouse over the Info icon to view the validation criteria and the CLI commands that are used for validation.
- b) Click the on or off toggle button to uncheck the validators that you do not want to run for the current workflow.
- c) (Optional) To add new custom prechecks and postchecks, do the following:
 - Click **add a new check** link to launch the **Add a New Custom Check** window.
 - Enter the **Name** for the custom check.
 - Click the **When** drop-down arrow and choose pre, post, or both.
 - Click **Select a Test Device** drop-down arrow and choose a device for which you want to run these custom checks.
 - Click **Open Command Runner** and enter the CLI commands.
 - Expand the **Additional Criteria** area.
 - Click the **Operation** drop-down arrow and choose **Distribution**.
 - Click the **Device Series** drop-down arrow and choose the device series for which you want to run these custom checks.

- Click **Save**.
- If you want to edit a custom check, click the corresponding More icon, choose **Edit**, make the required changes, and click **Save**.
- If you want to delete a custom check, click the corresponding More icon, choose **Delete**, and click **Delete** in the **Confirm Delete** message.

- Note**
- If you associated the external image distribution server with a network hierarchy, the image distribution server distributes the image to all devices under the network hierarchy. See [Add Image Distribution Servers to Sites, on page 8](#).
 - If the image has been distributed to the selected device, click **Next**.
 - If the **SWIM Events for ITSM (ServiceNow)** bundle is enabled, you need to update the image (distribute and activate) at a later time. Do not click **Now** to update the image. If you must update the image now, then the bundle and its integration workflow (image update schedule approval in ServiceNow) must first be disabled. To access the bundle, choose **Platform > Manage > Bundles > SWIM Events for ITSM (ServiceNow)**. Click the **Disable** button in the **SWIM Events for ITSM (ServiceNow)** window. Wait a few seconds before proceeding to update the image, because the process to disable the bundle and workflow takes a few seconds.

Step 6 Click **Next**.

Step 7 **Activate:** Click **Now** to start the activation immediately or click **Later** to schedule the activation at a specific time.

FLASH CLEANUP: Stores only the running software image and removes all the previous software images saved on the device.

Check the **Initiate Flash Cleanup after Activation** check box to remove all the previous software images saved on the device.

To choose the validators you want to run for the current workflow and add new custom checks, do the following:

- Hover your mouse over the Info icon to view the validation criteria and the CLI commands that are used for validation.
- Click the on or off toggle button to uncheck the validators that you do not want to run for the current workflow.
- (Optional) To add new custom prechecks and postchecks, do the following:
 - Click **add a new check** link to launch the **Add a New Custom Check** window.
 - Enter the **Name** for the custom check.
 - Click the **When** drop-down arrow and choose pre, post, or both.
 - Click **Select a Test Device** drop-down arrow and choose a device for which you want to run these custom checks.
 - Click **Open Command Runner** and enter the CLI commands.
 - Expand the **Additional Criteria** area.
 - Click the **Operation** drop-down arrow and choose **Activation**.
 - Click the **Device Series** drop-down arrow and choose the device series for which you want to run these custom checks.
 - Click **Save**.

- If you want to edit a custom check, click the corresponding More icon, choose **Edit**, make the required changes, and click **Save**.
- If you want to delete a custom check, click the corresponding More icon, choose **Delete**, and click **Delete** in the **Confirm Delete** message.

Step 8 Click **Next**.

Step 9 In the **Summary** window, review the image upgrade settings. To make any changes, click **Back**; otherwise, click **Submit**.

Step 10 From the **Actions** drop-down list, choose **Software Images > Image Update Status** and check the status of the update.

Import ISSU Compatibility Matrix

In-Service Software Upgrade (ISSU) is a process that upgrades the image on a device without rebooting or with minimal interruption of service. For an example of the Cisco IOS XE ISSU compatibility matrix for Catalyst Switches, see <https://software.cisco.com/download/home/286315874/type/286326638/release/17.4.1>. You can download and import the ISSU compatibility matrix in Cisco DNA Center when you want to upgrade devices with ISSU.

Step 1 In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Design > Image Repository**.

Step 2 Click **Import**.

The **Import Image/Add-On** window appears.

Step 3 To import the ISSU compatibility matrix with a software image, do the following:

- a) Click **Choose File** and browse to a software image or enter the URL of an HTTP or FTP source from which to import a software image.
- b) If the image you are importing is for a third-party (non-Cisco) vendor, select **Third Party** under **Source**. Choose an **Application Type**, describe the device **Family**, and identify the **Vendor**.
- c) Under **Select ISSU compatibility matrix**, click **Choose File** and browse to the ISSU compatibility matrix file.
- d) Click **Import**.

Step 4 (Optional) To import the ISSU compatibility matrix for software images that are already imported, do the following:

- a) Under **Select ISSU compatibility matrix**, click **Choose File** and browse to the ISSU compatibility matrix file.
- b) Click **Import**.

Step 5 Click **Show Tasks** to view the ISSU compatibility matrix file **Import** status.

Upgrade a Software Image with ISSU

Upgrading devices using the In-Service Software Upgrade (ISSU) eliminates the need to reboot and reduces service interruption.

Before you begin

Before you upgrade a device using the ISSU, you must import the ISSU compatibility matrix file. See [Import ISSU Compatibility Matrix, on page 11](#).

-
- Step 1** In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Provision > Network Devices > Inventory**.
- Step 2** From the **Focus** drop-down list, choose **Software Images**. Select the device whose image you want to upgrade.
- Step 3** From the **Actions** drop-down list, choose **Software Images > Update Image**.
The **Image Upgrade** window appears.
- Step 4** In the **Analyze Selection** window, enable the ISSU upgrade:
- a) Choose the device that you want to upgrade with ISSU.

Note The **To Image** column shows the ISSU validation status.

 - **ISSU shown in amber:** ISSU validation failed because the selected image is not ISSU compatible.
 - **ISSU shown in gray:** ISSU validation succeeded and the device supports ISSU.
 - b) From the **ISSU** drop-down list, choose **Enable ISSU Upgrade**.
 - c) Click **Next**.
- Step 5** From the **Distribute** window, click **Now** to start the image distribution immediately or **Later** to schedule the distribution at a specific time.
- To choose the validators you want to run for the current workflow and add new custom checks, do the following:
- a) Hover your cursor over the Info icon to view the validation criteria and the CLI commands that are used for validation.
 - b) Click the toggle button to uncheck the validators that you do not want to run for the current workflow.
 - c) (Optional) To add new custom prechecks and postchecks, do the following:
 - Click **add a new check** to launch the **Add a New Custom Check** window.
 - Enter the **Name** for the custom check.
 - Click the **When** drop-down list and choose **pre**, **post**, or **both**.
 - From the **Select a Test Device** drop-down list, choose a device for which you want to run the custom checks.
 - Click **Open Command Runner** and enter the CLI commands.
 - Expand the **Additional Criteria** area.
 - Click the **Operation** drop-down arrow and choose **Distribution**.
 - Click the **Device Series** drop-down arrow and choose the device series for which you want to run the custom checks.
 - Click **Save**.
 - If you want to edit a custom check, click the corresponding More icon, choose **Edit**, make the required changes, and click **Save**.
 - If you want to delete a custom check, click the corresponding More icon, choose **Delete**, and in the **Confirm Delete** message, click **Delete**.

- Note**
- If associated with a network hierarchy, the external image distribution server distributes the image to all devices in the network hierarchy. See [Add Image Distribution Servers to Sites, on page 8](#).
 - If the image has been distributed to the selected device, click **Next**.
 - If the **SWIM Events for ITSM (ServiceNow)** bundle is enabled, you need to update the image (distribute and activate) at a later time. Do not click **Now** to update the image.
- If you must update the image now, the bundle and its integration workflow (image update schedule approval in ServiceNow) must first be disabled. To access the bundle, choose **Platform > Manage > Bundles > SWIM Events for ITSM (ServiceNow)**. Click the **Disable** button in the **SWIM Events for ITSM (ServiceNow)** window. Wait several seconds before updating the image, because the process to disable the bundle and workflow takes several seconds.

Step 6 Click **Next**.

Step 7 From the **Activate** window, click **Now** to start the activation immediately or click **Later** to schedule the activation at a specific time.

FLASH CLEANUP: Stores only the running software image and removes all the previous software images saved on the device.

Check the **Initiate Flash Cleanup after Activation** check box to remove all the previous software images saved on the device.

To choose the validators you want to run for the current workflow and add new custom checks, do the following:

- a) Hover your cursor over the Info icon to view the validation criteria and the CLI commands that are used for validation.
- b) Click the toggle button to uncheck the validators that you do not want to run for the current workflow.
- c) (Optional) To add new custom prechecks and postchecks, do the following:
 - Click **add a new check** link to launch the **Add a New Custom Check** window.
 - Enter the **Name** for the custom check.
 - Click the **When** drop-down list and choose **pre**, **post**, or **both** as required.
 - Click **Select a Test Device** drop-down list and choose a device for which you want to run these custom checks.
 - Click **Open Command Runner** and enter the CLI commands.
 - Expand the **Additional Criteria** area.
 - Click the **Operation** drop-down list and choose **Activation**.
 - Click the **Device Series** drop-down list and choose the device series for which you want to run these custom checks.
 - Click **Save**.
 - If you want to edit a custom check, click the corresponding More icon, choose **Edit**, make the required changes, and click **Save**.
 - If you want to delete a custom check, click the corresponding More icon, choose **Delete**, and click **Delete** in the **Confirm Delete** message.

Step 8 Click **Next**.

- Step 9** From the **Summary** page, review the image upgrade settings. To make any changes, click **Back**; otherwise click **Submit**.
- Step 10** From the **Actions** drop-down list, choose **Software Images > Image Update Status** and check the status of the update.

List of Device Upgrade Readiness Prechecks

Precheck	Description
File transfer check	Checks if the device is reachable through HTTPS and SCP. The default order of protocols is HTTPS first and then SCP.
NTP clock check	Compares device time and Cisco DNA Center time to ensure successful Cisco DNA Center certificate installation.
Flash check	Verifies if there is enough disk space for the update. If there is not enough disk space, a warning or error message is returned. For information about the supported devices for Auto Flash cleanup and how files are deleted, see Auto Flash Cleanup .
Config register check	Verifies the config registry value.
Crypto RSA check	Checks whether an RSA certificate is installed.
Crypto TLS check	Checks whether the device supports TLS 1.2.
IP Domain name check	Checks whether the domain name is configured.
Startup config check	Checks whether the startup configuration exists for the device.
NFVIS Flash check	Checks if the golden image is ready to be upgraded in the NFVIS device.
Service Entitlement check	Checks if the device has valid license.

View Image Update Status

- Step 1** In the Cisco DNA Center GUI, click the **Menu** icon (☰) and choose **Provision > Network Devices > Inventory**.
- Step 2** From the **Focus** drop-down list, choose **Software Images**.
- Step 3** From the **Actions** drop-down list, choose **Software Images > Image Update Status**.
By default, the **Image Upgrade Status** window shows all the image update tasks.
- Step 4** To filter the tasks based on the update status, click **In Progress**, **Success**, or **Failure**.
- Step 5** In the left pane, click **Task Names** or **Image Versions** to filter the tasks based on operations or image versions.
The **Status** column shows the current status of the tasks. For in-progress tasks, a progress bar shows the progress of the image update.
- Step 6** Click the device name to view the detailed information of a task.

- **Operations:** Shows the status of each operation that is associated with the task and the time taken to complete each operation.
- **Tasks:** Shows the status and details of prechecks and postchecks that are associated with the task.

Click the number of differences in the **Differences** column, corresponding to each script, to view the differences between precheck and postcheck.

Step 7 Click **Upcoming Tasks** to view the tasks that are scheduled for a later time.
The **Upcoming Tasks** slide-in pane appears.

Step 8 Click the number of devices in the **Devices Scheduled** column to view the devices for which the image update task is scheduled.

Step 9 Select the devices for failed tasks and click **Retry** to retry the image update.

The **Image Upgrade** window appears. From this window, you can schedule an image update task for now or for later. For more information, see [Provision a Software Image](#).

Auto Flash Cleanup

During the device upgrade readiness precheck, the flash check verifies whether there is enough space on the device to copy the new image. If there is insufficient space:

- **For devices that support auto flash cleanup**, the flash check fails with a warning message. For these devices, the auto cleanup process is attempted during the image distribution process to create the sufficient space. As a part of the auto flash cleanup, Cisco DNA Center identifies unused .bin, .pkg, and .conf files and delete them iteratively until enough free space is created on the device. Image distribution is attempted after the flash cleanup. You can view these deleted files in **Sytem > Audit Logs**.



Note Auto flash cleanup is supported on all devices except Nexus switches and Wireless controllers.

- **For devices that do not support auto flash cleanup**, the flash check fails with an error message. You can delete files from device flash to create required space before starting the image upgrade.

