Cellular Modem Firmware Upgrade

Cellular Modem Firmware Upgrade

Table 1: Feature History

Feature Name	Release Information	Feature Description
Cellular Modem Firmware Upgrade	Cisco IOS CG Release 17.12.1 Cisco Catalyst SD-WAN Control Components Release 20.12.1	Cisco SD-WAN Manager supports upgrading the cellular modem firmware of the following devices running Cisco IOS CG software: • Cisco Catalyst Wireless Gateways (CG113-4GW6) • Cisco Catalyst Cellular Gateways (CG522-E, CG418-E)

Feature Name	Release Information	Feature Description
Cellular Modem Firmware Upgrade for Cisco IOS XE Platforms	Cisco IOS XE Catalyst SD-WAN Release 17.14.1a Cisco Catalyst SD-WAN Control Components Release 20.14.1	Extended support to the following platforms, when equipped with a cellular modem: • Cisco ISR1100 and ISR1100X Series Platforms • Cisco Catalyst 8200 Series Edge Platforms • Cisco Catalyst 8300 Series Edge Platforms
P-LTE-450 MHz Module Firmware Upgrade using Cisco SD-WAN Manager	Cisco IOS XE Catalyst SD-WAN Release 17.18.1a Cisco Catalyst SD-WAN Manager Release 20.18.1	Cisco SD-WAN Manager supports upgrading the P-LTE-450 MHz module firmware on the following platforms: • Cisco IR1101 platform • Cisco IR1800 Series platforms See the Firmware upgrade for P-LTE-450 MHz modules section.
Wi-Fi Module Firmware Upgrade using Cisco SD-WAN Manager	Cisco IOS XE Catalyst SD-WAN Release 17.18.1a Cisco Catalyst SD-WAN Manager Release 20.18.1	Cisco SD-WAN Manager supports upgrading the Wi-Fi module firmware on Cisco IR1800 platforms.

Information About Cellular Modem Firmware Upgrade

Using Cisco SD-WAN Manager, you can upgrade the cellular modem firmware of devices that include a cellular modem.

Notification of Available Firmware Upgrades

On the Cisco Software Download site, you can log in with your user account and set notifications to inform you of when a firmware upgrade is available for your devices.

Upgrade Process

After you download firmware upgrade files from the Cisco Software Download site, the overall process is as follows:

- Save the downloaded firmware upgrade files to a file server accessible by the devices in the network. For details, see **Before You Begin** in Upgrade the Cellular Modem Firmware of a Device, on page 6.

- Using the workflow described in Upgrade the Cellular Modem Firmware of a Device, on page 6, select the devices for which to upgrade the modem firmware using the downloaded files. In that workflow, you indicate the location of the file server and directory. If a firmware update file is available for a selected device, Cisco SD-WAN Manager automatically determines the correct file to use and upgrades the modem firmware on the device.

The workflow enables you to schedule the firmware upgrade for a specific time, such as to align with a maintenance window.

Example Illustrating Cellular Modem Firmware Upgrade

The following example scenario illustrates how the firmware upgrade affects only the active firmware on the device.

1. You begin with the following firmware versions on a cellular-enabled device:

```
Router#show cellular 0/2/0 firmware
 Idx Carrier              FwVersion        PriVersion   Status
 1   DOCOMO               02.24.05.06      001.007_000  Inactive
 2   GENERIC              02.24.05.06      002.026_000  Active
 3   KDDI                 02.24.05.06      001.005_000  Inactive

Firmware Activation mode  =  AUTO
```

   The command output indicates, for example, that the GENERIC firmware type has firmware version 02.24.05.06, and that the GENERIC firmware type is the active one.

2. You learn that there are two firmware upgrades available:
   - For GENERIC, you can download 02.24.05.07.
   - For DOCOMO, you can download 02.24.05.07.
3. You download both of the files and put them on the file server.
4. You run the firmware upgrade workflow, described in Upgrade the Cellular Modem Firmware of a Device, on page 6.
   - The device finds the GENERIC 02.24.05.07 firmware upgrade file and uses it to upgrade the GENERIC firmware type, which is the active firmware type.
   - The device does not upgrade the DOCOMO firmware type, even though there is a firmware upgrade file that could accomplish that. This is because DOCOMO is not an active firmware type on the device.
5. After the upgrade, check the firmware versions and note that the firmware upgrade occurred only for the GENERIC firmware type, which is the active one.

```
Router#show cellular 0/2/0 firmware
 Idx Carrier              FwVersion        PriVersion   Status
 1   DOCOMO               02.24.05.06      001.007_000  Inactive
 2   GENERIC              02.24.05.07      002.026_000  Active
 3   KDDI                 02.24.05.06      001.005_000  Inactive

Firmware Activation mode  =  AUTO
```

Benefits of Cellular Modem Firmware Upgrade

Cisco SD-WAN Manager provides an easy-to-use workflow for upgrading modem firmware on one or more devices, making it unnecessary to execute modem firmware upgrade using CLI commands on each device individually.

Supported Platforms for Cellular Modem Firmware Upgrade

- From Cisco Catalyst SD-WAN Control Components Release 20.12.1:
  - Cisco Catalyst Wireless Gateways (CG113-4GW6)
  - Cisco Catalyst Cellular Gateways (CG522-E, CG418-E)
- From Cisco Catalyst SD-WAN Control Components Release 20.14.1:
  - Cisco ISR1100 and ISR1100X Series Platforms
  - Cisco Catalyst 8200 Series Edge Platforms
  - Cisco Catalyst 8300 Series Edge Platforms
- From Cisco Catalyst SD-WAN Manager Release 20.18.1, for P-LTE-450 modules:
  - Cisco IR1101 Platform
  - Cisco IR1800 Series Platforms

Supported Platforms for Wi-Fi module firmware upgrade

Wi-Fi module firmware upgrade

Starting from Cisco Catalyst SD-WAN Manager Release 20.18.1, the Cisco IR1800 series supports Wi-Fi module firmware upgrade using Cisco SD-WAN Manager.

Prerequisites for Cellular Modem Firmware Upgrade

File Server Accessibility

Ensure that the file server storing the firmware upgrade files is accessible by the devices in the network.

Firmware Download

Download the required firmware updates from Cisco.com, for the cellular-modem-equipped devices you wish to upgrade.

Prerequisites for Wi-Fi module firmware upgrades

Minimum Firmware Version – Wi-Fi Module

The Wi-Fi module must be running a firmware version 17.17.1 or higher. If the module's firmware version is earlier than 17.17.1, you cannot upgrade to 17.18.x or later using Cisco SD-WAN Manager.

To verify the current firmware version of a Wi-Fi module, use the `show wireless-bridge status` CLI command.

Restrictions for Cellular Modem Firmware Upgrade

- After downloading a firmware upgrade file from Cisco.com, do not change the filename. A device uses the filename to determine which firmware upgrade files are relevant to it.
- Cisco SD-WAN Manager only supports upgrading the currently active firmware type. For example a device may have five different firmware types, such as generic and firmware for four specific carriers. Only one firmware type can be active at a given time and Cisco SD-WAN Manager upgrades only the the active one.
- Firmware downgrade is not supported by Cisco SD-WAN Manager.
- The P-LTE-450 firmware upgrade will not start if the device is turned off or unreachable.

Order of firmware upgrade

Upgrade Sequence

The firmware upgrade process follows a specific order of precedence based on the firmware files present on the remote server. Modules are upgraded in this order:

- Wi-Fi Module
- P-LTE-450 module
- LTE module

To ensure the correct module is upgraded, save only the relevant firmware files on the remote server.

For example, if you want to upgrade the firmware for LTE modules, make sure that no Wi-Fi firmware files are stored on the server. If firmware files for other modules, such as Wi-Fi or P-LTE-450 module are present, those modules will be upgraded first, following the precedence order, even if you do not intend to upgrade them.

Note For WI-FI modules, the upgrade process works only when the device is in Workgroup Bridge (WGB) mode.

If the Wi-Fi module is turned off or unreachable, Wi-Fi module firmware upgrade will be skipped and cellular modem firmware upgrade will continue.

Upgrade the Cellular Modem Firmware of a Device

Before You Begin

- See the prerequisites and restrictions sections of this documentation.
- Download firmware upgrade files from the Cisco Software Download site.
- Save the downloaded firmware upgrade files to a file server accessible by devices in the network. The file types of the downloaded files may differ, according to the different modem hardware used in your Cisco products. Example file types include .bin, .cwe, .nvu, and .spk.

  You can download firmware upgrade files for different types of cellular-enabled devices and in most cases, save them to the same directory on the file server. If the firmware upgrade for your device requires two files for two upgrade steps (a modem firmware upgrade file, and a separate OEM PRI file) save the two files to separate directories.

Upgrade the Cellular Modem Firmware of a Device

1. From the Cisco SD-WAN Manager menu, choose **Workflows** > **Firmware Upgrade**.
2. In the workflow, follow the prompts to select the devices to upgrade, the server, and the firmware image path.

   When configuring a server for storing firmware upgrade images, enter the following fields:

Field	Description
Server Name	Enter a name for the file server with the firmware upgrade files.
Server IP or DNS Name	IP address or DNS name of the file server.
Protocol	Choose the SCP protocol.
Port	Enter the port that you have configured for the remote server. Default (for SCP): 22
User ID, Password	Enter the login credentials for the file server.
Image Location Prefix	Enter the path to the directory storing the firmware upgrade files.
VPN	Enter the VPN that you have configured for reaching the remote server interface.

Note For information about configuring a remote server for storing device software upgrade images, see Register Remote Server in the Manage Software Upgrade and Repository section of the *Cisco Catalyst SD-WAN Monitor and Maintain Configuration Guide*.

If a relevant firmware upgrade file exists at the image path location, the device uses the file for the upgrade. If more than one relevant firmware upgrade file is available, the device uses the latest version. If no

relevant file exists at the image path location, the **Summary** page of the workflow indicates that no file is available, and no firmware upgrade occurs.

Cisco SD-WAN Manager upgrades only the currently active firmware type.

Note The workflow prompts you to configure a remote server. Alternatively, you can configure a file server as described in Configure a Remote File Server for Firmware Upgrade Images, on page 7.

3. Optionally, schedule the upgrade for a specific time, for example to coincide with a maintenance window.

Note To cancel a scheduled upgrade before it occurs, do the following:

   a. From the Cisco SD-WAN Manager menu, choose **Maintenance** > **Software Upgrade**.

   b. Click **Firmware**.

   c. Click **Cancel Firmware Upgrade** to cancel a scheduled upgrade.

4. On the **Summary** page, review the details and click **Next** to begin the upgrade task.

   The upgrade takes several minutes.

5. (Optional) Click **Check my upgrade task** to show the status of the upgrade or upgrades for each device.

View the Status of a Cellular Modem Firmware Upgrade

1. From the Cisco SD-WAN Manager menu, choose **Maintenance** > **Software Upgrade**.
2. Click **Firmware**.

   The table shows devices in the process of firmware upgrade or awaiting a scheduled upgrade. See the **CurrentVersion** column to view the firmware version of a device.
3. (Optional) Click **Cancel Firmware Upgrade** to cancel a scheduled upgrade.

Configure a Remote File Server for Firmware Upgrade Images

Before You Begin

This procedure addresses configuring a remote server for firmware upgrade images, for the firmware upgrade use case. For information about configuring a remote server for storing device software upgrade images, see Register Remote Server in the Manage Software Upgrade and Repository section of the *Cisco Catalyst SD-WAN Monitor and Maintain Configuration Guide*.

Configure a Remote File Server for Firmware Upgrade Images

1. From the Cisco SD-WAN Manager menu, choose **Maintenance** > **Software Repository** and click **Remote Server**.
2. Click **Add Remote Server** and enter the following fields:

Field	Description
Server Name	Enter a name for the file server with the firmware upgrade files.
Server IP or DNS Name	IP address or DNS name of the file server.
Protocol	Choose the SCP protocol.
Port	Enter the port that you have configured for the remote server. Default (for SCP): 22
User ID, Password	Enter the login credentials for the file server.
Image Location Prefix	Enter the path to the directory storing the firmware upgrade files, or enter **/** by itself, which enables you to specify the path while executing the Firmware Upgrade workflow.
VPN	Enter the VPN that you have configured for reaching the remote server interface.

3. Click **Add**.

Firmware upgrade for P-LTE-450 MHz modules

Starting from Cisco Catalyst SD-WAN Manager Release 20.18.1, you can upgrade the firmware for P-LTE-450 MHz modules on Cisco IOS XE Catalyst SD-WAN devices from the Cisco SD-WAN Manager.

A P-LTE-450 module firmware upgrade is a process that:

- provides you a simplified workflow in Cisco SD-WAN Manager for upgrade,
- enables you to upgrade multiple devices at the same time, and
- allows you to track upgrade status and schedule tasks from a central interface.

Firmware upgrade for Wi-Fi modules

Starting from Cisco Catalyst SD-WAN Manager Release 20.18.1, you can upgrade the Wi-Fi modules (PID is WP-WIFI6) on Cisco IOS XE Catalyst SD-WAN devices directly from the Cisco SD-WAN Manager.

A Wi-Fi module firmware upgrade is a process that:

- provides you a simplified workflow in Cisco SD-WAN Manager for upgrade,
- enables you to upgrade multiple devices at the same time, and

- allows you to track upgrade status and schedule tasks from a central interface.

Upgrading module firmware using Cisco SD-WAN Manager

Minimum supported release: Cisco Catalyst SD-WAN Manager Release 20.18.1and Cisco IOS XE Catalyst SD-WAN Release 17.18.1a

Starting from Cisco Catalyst SD-WAN Manager Release 20.18.1, the following module firmware upgrades are supported:

- P-LTE-450 MHz module
- Wi-Fi module

Summary

The module firmware upgrade process involves a sequence of actions between the SD-WAN Manager, remote server, and devices. Cisco SD-WAN Manager sends the necessary instructions to each device, which then performs pre-checks, downloads, validates, and installs the firmware. Throughout the process, Cisco SD-WAN Manager provides real-time status updates, allowing you to monitor and confirm the completion of the upgrade across all selected devices.

Workflow

These are the stages of upgrading firmware for P-LTE-450 MHz and Wi-Fi modules:

1. Identify device or module: Identify the device or module that requires a firmware upgrade. Cisco SD-WAN Manager displays the list of devices that are eligible for firmware upgrade. Each of these devices have either a Wi-Fi module, P-LTE-450 MHz module, or a cellular modem or a combination of these.

   Before you proceed with upgrading the firmware for the module, make a note of which devices to upgrade. This is an important step because firmware upgrade is done in a specific order. For more information, see Order of firmware upgrade, on page 5.

2. Download firmware files: Download the firmware files for the Wi-Fi module from Cisco Software Central. All the firmware files are hosted on Cisco Software Central. After identifying the device to be upgraded, search and download the specific firmware software.

   Download the firmware files for the P-LTE-450 MHz module from the Intelliport product website. For any assistance, contact the Intelliport representatives. You can download the Pluggable Interface Module (PIM) firmware or modem firmware or both.

   Save the downloaded firmware upgrade files to a file server accessible by devices in the network.

3. Configure a remote server to host the firmware image:

   The P-LTE-450 PIM has an integrated modem, which is a core component for establishing and managing the connection to the LTE 450 MHz mobile networks. The firmware upgrade of P-LTE-450 module includes upgrading the PIM firmware and the modem firmware.

   There are two phases in the P-LTE-450 firmware upgrade process, each using a separate firmware file. The sequence of upgrade is as follows:

   a. Modem firmware is upgraded first

b. PIM firmware is upgraded next

You can also upgrade the modem firmware and PIM firmware seperately. If the firmware upgrade fails either for PIM or modem, an error message with error details appears on Cisco SD-WAN Manager.

To configure remote file server for firmware upgrade, see Configure a Remote File Server for Firmware Upgrade Images, on page 7.

4. Understand the order of upgrading firmware:The firmware upgrade process follows a specific order of precedence based on the firmware files present on the remote server. For more information, see Order of firmware upgrade, on page 5

.

5. Start or Schedule the firmware upgrade: Use the firmware upgrade workflow in Cisco SD-WAN Manager. You can start the upgrade right away or schedule it for a specific time, for example to coincide with a maintenance window. For more information, see Upgrade the firmware for P-LTE-450 MHz or Wi-Fi modules, on page 10.
6. Processing upgrade: Cisco SD-WAN Manager sends an upgrade request, including server details and the firmware path, to each device for the modules requiring an upgrade. Each device verifies the files, then downloads and installs the firmware either at the scheduled time or immediately.
7. Track progress: Use Cisco SD-WAN Manager to monitor the status of your firmware upgrades.
8. Upgrade execution: After verification, the P-LTE-450 MHz or the Wi-Fi module firmware is upgraded.
9. Verify the firmware upgrade: After the upgrade, verify that the devices have successfully updated to the new firmware version. For more information, see View the Status of a Cellular Modem Firmware Upgrade, on page 7.

Upgrade the firmware for P-LTE-450 MHz or Wi-Fi modules

Minimum supported release: Cisco Catalyst SD-WAN Manager Release 20.18.1 and Cisco IOS XE Catalyst SD-WAN Release 17.18.1a

This section provides the steps to upgrade the firmware on your Cisco IOS XE Catalyst SD-WAN device.

Before you begin

- See the prerequisite and restrictions sections.
- See the Supported Platforms for Cellular Modem Firmware Upgrade, on page 4 section.

Procedure

Step 1 From the Cisco SD-WAN Manager menu, choose **Workflows** > **Firmware Upgrade**.

Step 2 In the workflow, follow the prompts to choose the devices to upgrade. Proceed with one of the methods in the following table based on your scenario.

If..	Then..
If you have configured the remote server for storing firmware image files.	Follow the prompts to choose the server, and the firmware image path.
If you want to configure a remote server in the firmware upgrade workflow.	After choosing the device or devices to upgrade, configure a remote file server for the firmware upgrade images. To configure a remote file server, click the **Select remote server** dropdown, then click **Create New**, and enter the following fields in the **Add Remote Server**. See the following table "Add Remote Server" to enter the fields.
If you want to configure a remote server from **Maintenance** > **Software Repository**.	Configure a file server as described in Configure a Remote File Server for Firmware Upgrade Images, on page 7.

Table 2: Add Remote Server

Field	Description
Server Name	Enter a name for the file server with the firmware upgrade files.
Server IP or DNS Name	IP address or DNS name of the file server.
Protocol	Choose the SCP protocol. **Note** For P-LTE-450 MHz and Wi-Fi modules, choose only SCP protocol.
Port	Enter the port that you have configured for the remote server. Default (for SCP): 22
User ID and Password	Enter the login credentials for the file server.
Image Location Prefix	Enter the path to the directory storing the firmware upgrade files.
VPN	Enter the VPN that you have configured for reaching the remote server interface.

The following table describes different scenarios when one, multiple, or no relevant firmware upgrade files are found at the specified location.

Table 3: Image Path Location

If..	Then..
If a relevant firmware upgrade file exists at the image path location.	The device uses the file for the upgrade.
If more than one relevant firmware upgrade file is available.	The device uses the latest version.
If no relevant file exists at the image path location.	The device checks the availability of files on the specified remote server. The firmware upgrade fails if no valid files are found on the remote server. This status is indicated in the **Summary** page of the workflow.

Cisco SD-WAN Manager upgrades only the currently active firmware type.

Step 3 If you have not configured a remote server, you can configure it after selecting a device. To configure a remote file server for firmware upgrade images, click the **Select remote server** dropdown, then click **Create New**, and enter the required fields.

Step 4 Optionally, schedule the upgrade for a specific time, for example to coincide with a maintenance window.

Step 5 On the **Summary** page, review the details and click **Next** to begin the upgrade task.

Step 6 (Optional) Click **Check my upgrade task** to see the status of the upgrade or upgrades for each device.

What to do next

View status of the firmware upgrade, View the Status of a Cellular Modem Firmware Upgrade

Upgrade the firmware for Cellular or Wi-Fi modules

This section provides the steps to upgrade the firmware on your Cisco IOS XE Catalyst SD-WAN device.

Before you begin

- See the prerequisite and restrictions sections.
- See the Supported Platforms for Cellular Modem Firmware Upgrade, on page 4 section.

Procedure

Step 1 From the SD-WAN Manager menu, choose **Workflows** > **Workflow Library** > **Firmware Upgrade**.

Step 2 In the workflow, follow the prompts to choose the devices to upgrade. To begin with, choose the type of module for firmware upgrade.

- Cellular module
- Wi-Fi
- Cellular LTE 450 MHz

Note
You can choose module type for firmware upgrade only on devices running SD-WAN Manager 26.1.1 or higher.

For devices running versions earlier than SD-WAN Manager 26.1.1, SD-WAN Manager performs the firmware upgrade based on the firmware image stored in the remote server.

For all device versions, modules are upgraded in this order:

a. Wi-Fi Module

b. P-LTE-450 module

c. Cellular module

Step 3 Choose the reachable device or devices for firmware upgrade.

Based on the module type you choose in Step 2, SD-WAN Manager will filter and display only devices that support that specific module type. For example, if you choose **Wi-Fi**, SD-WAN Manager will list only devices with Wi-Fi module support.

Note
SD-WAN Manager filters devies based on the supported module type but not based on the presence of the module on the device.

Step 4 Proceed with one of the methods in the following table based on your scenario.

If..	Then..
If you have configured the remote server for storing firmware image files.	Choose the remote server from the **Host server** dropdown, and the firmware **Image path**.
If you want to configure a remote server in the firmware upgrade workflow.	To configure a remote file server, click **+ Add new remote server**, and enter the required fields. See the following table "Add Remote Server" to enter the fields.
If you want to configure a remote server from **Maintenance** > **Software Repository**.	Configure a file server as described in Configure a Remote File Server for Firmware Upgrade Images, on page 7.

Table 4: Add Remote Server

Field	Description
Server Name	Enter a name for the file server with the firmware upgrade files.
Server IP or DNS Name	IP address or DNS name of the file server.
Protocol	Choose the SCP protocol. **Note** For P-LTE-450 MHz and Wi-Fi modules, choose only SCP protocol.
Port	Enter the port that you have configured for the remote server. Default (for SCP): 22
User ID and Password	Enter the login credentials for the file server.
Image Location Prefix	Enter the path to the directory storing the firmware upgrade files.
VPN	Enter the VPN that you have configured for reaching the remote server interface.

The following table describes different scenarios when one, multiple, or no relevant firmware upgrade files are found at the specified location.

Table 5: Image Path Location

If..	Then..
If a relevant firmware upgrade file exists at the image path location.	The device uses the file for the upgrade.

If..	Then..
If more than one relevant firmware upgrade file is available.	The device uses the latest version.
If no relevant file exists at the image path location.	The device checks the availability of files on the specified remote server. The firmware upgrade fails if no valid files are found on the remote server. This status is indicated in the **Summary** page of the workflow.

SD-WAN Manager upgrades only the currently active firmware type.

Step 5 (Optional) Schedule the upgrade for a specific time, for example to coincide with a maintenance window.

Step 6 On the **Summary** page, review the details and click **Schedule upgrade** to begin the upgrade task.

What to do next

View status of the firmware upgrade, View the Status of a Cellular Modem Firmware Upgrade