



Software Maintenance Upgrade

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Introduction to Software Maintenance Upgrade

Software Maintenance Upgrade (SMU) is a package that can be installed on a system to provide a patch fix or a security resolution to a released image. A SMU package is provided for each release and per component basis, and is specific to the corresponding platform.

A SMU provides a significant benefit over classic Cisco IOS software because it allows you to address the network issue quickly while reducing the time and scope of the testing required. The Cisco IOS XE platform internally validates the SMU compatibility and does not allow you to install noncompatible SMUs.

All the SMUs are integrated into the subsequent Cisco IOS XE software maintenance releases. A SMU is an independent and self-sufficient package and does not have any prerequisites or dependencies. You can choose which SMUs to install or uninstall in any order.



Note SMUs are supported only on Extended Maintenance releases and for the full lifecycle of the underlying software release.



Note You can activate the file used in the **install add file** command only from the filesystems of the active device. You cannot use the file from the standby or member filesystems; the **install add file** command will fail in such instances.



Note When the SMU file is deleted and a reboot is performed, the device may display the following error message:

```
--- Starting SMU Add operation ---
Performing SMU_ADD on all members
  FAILED: Improper State./bootflash/<previously-installed-smu-filename>.smu.bin not
present. Please restore file for stability.
Checking status of SMU_ADD on [1/R0]
SMU_ADD: Passed on []. Failed on [1/R0]
Finished SMU Add operation
FAILED: add_activate_commit /bootflash/<tobeinstalled-wlc-smu-filename>.smu.bin Wed Aug 02
08:30:18 UTC 2023.
```

This error occurs because the previous SMU file was not properly removed from the controller. It may lead to functional errors, such as the inability to install new SMU or APSP files.

We recommend that you use the `install remove file` command to remove previous instances of APSP or SMU files from the bootflash.

SMU infrastructure can be used to meet the following requirements in the wireless context:

- Controller SMU: Controller bug fixes or Cisco Product Security Incident Response information (PSIRT).
- APSP: AP bug fixes, PSIRTs, or minor features that do not require any controller changes.
- APDP: Support for new AP models without introduction of new hardware or software capabilities.



Note The `show ap image` command displays cumulative statistics regarding the AP images in the controller. We recommend that you clear the statistics using the `clear ap predownload statistics` command, before using the `show ap image` command, to ensure that correct data is displayed.

SMU Workflow

The SMU process should be initiated with a request to the SMU committee. Contact your customer support to raise an SMU request. During the release, the SMU package is posted on the Cisco Software Download page and can be downloaded and installed.

SMU Package

An SMU package contains the metadata and fix for the reported issue the SMU is requested for.

SMU Reload

The SMU type describes the effect on a system after installing the corresponding SMU. SMUs can be nontraffic-affecting or can result in device restart, reload, or switchover.

A controller cold patch require a cold reload of the system during activation. A cold reload is the complete reload of the operating system. This action affects the traffic flow for the duration of the reload (~5 min). This reload ensures that all the processes are started with the correct libraries and files that are installed as part of the corresponding SMU.

Controller hot patching support allows the SMU to be effective immediately after activation, without reloading the system. After the SMU is committed, the activation changes are persistent across reloads. Hot patching

SMU packages contain metadata that lists all processes that need to be restarted in order to activate the SMU. During SMU activation, each process in this list will be restarted one at a time until the SMU is fully applied.

Installing a SMU (GUI)

Procedure

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- Step 1** Choose **Administration > Software Management** and click the **Software Maintenance Upgrade** tab.
- Step 2** Click **Add** to add a SMU image.
- Step 3** From the **Transport Type** drop-down list, choose the transfer type to transfer the software image to your device as TFTP, SFTP, FTP, Device, or Desktop (HTTP).
- If you choose **TFTP** as the **Transport Type**, you need to enter the **Server IP Address (IPv4/IPv6)**, **File path** and choose a **File System** from the drop-down list. For example, if the SMU file is at the root of the TFTP server you can enter `/C9800-universalk9_wlc.17.03.02a.CSCvw55275.SPA.smu.bin` in the **File path** field.
 - If you choose **SFTP** as the **Transport Type**, you need to enter the **Server IP Address (IPv4/IPv6)**, **SFTP Username**, **SFTP Password**, **File path** and choose a **File System** from the drop-down list.
 - If you choose **FTP** as the **Transport Type**, you need to enter the **Server IP Address (IPv4/IPv6)**, **FTP Username**, **FTP Password**, **File path**, and choose a **File System** from the drop-down list.
 - If you choose **Device** as the **Transport Type**, you need to enter the **File path** and choose a **File System** from the drop-down list. This is possible when the software is already present on the device due to an earlier download and activation, followed by a subsequent deactivation.
Note The File System depends upon the kind of device you are using. On physical controllers, you have the option to store the file to the bootflash or hard disk, whereas in case of virtual controllers, you can only store it in the bootflash.
 - If you choose **Desktop (HTTPS)** as the **Transport Type**, you need to choose a **File System** from the drop-down list and click **Select File** to navigate to the **Source File Path**.
- Step 4** Enter the **File Name** and click **Add File**.
- This operation copies the maintenance update package from the location you selected above to the device and performs a compatibility check for the platform and image versions and adds the SMU package for all the members. After a SMU is successfully added to the system, a message is displayed about the successful operation and that the SMU can be activated on the device. The message displays the name of the package (SMU) that is now available to be activated. It lists the SMU Details - Name, Version, State (active or inactive), Type (reload, restart, or non-reload) and other compatibility details. If SMU is of the Type - reload, then any operation (activate, deactivate or rollback) will cause the device to reload; restart involves only a process restart and if it is non reload- no change in process takes place.
- Step 5** Select the SMU and click on **Activate** to activate the SMU on the system and install the package, and update the package status details.
- Step 6** Select the SMU and click **Commit** to make the activation changes persistent across reloads.
- The Commit operation creates commit points. These commit points are similar to snapshots using which you can determine which specific change you want to be activated or rolled back to, in case there is any issue with

the SMU. The commit can be done after activation when the system is up, or after the first reload. If a package is activated, but not committed, it remains active after the first reload, but not after the second reload.

Installing SMU

Procedure

	Command or Action	Purpose
Step 1	install add file bootflash: <i>filename</i> Example: Device# install add file bootflash:<Filename>	Copies the maintenance update package from a remote location to the device, and performs a compatibility check for the platform and image versions. This command runs base compatibility checks on a file to ensure that the SMU package is supported on the platform. It also adds an entry in the package/SMU.sta file, so that its status can be monitored and maintained.
Step 2	install activate file bootflash: <i>filename</i> Example: Device# install activate file bootflash:<Filename>	Runs compatibility checks, installs the package, and updates the package status details. For a restartable package, the command triggers the appropriate post-install scripts to restart the necessary processes, and for non-restartable packages it triggers a reload.
Step 3	install commit Example: Device# install commit	Commits the activation changes to be persistent across reloads. The commit can be done after activation while the system is up, or after the first reload. If a package is activated but not committed, it remains active after the first reload, but not after the second reload.
Step 4	show version Example: Device# show version	Displays the image version on the device.
Step 5	show install summary Example: Device# show install summary	Displays information about the active package. The output of this command varies according to the install commands that are configured.

Roll Back an Image (GUI)

Procedure

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- Step 1** Choose **Administration > Software Management**.
 - Step 2** Go to **SMU, APSP** or **APDP**.
 - Step 3** Click **Rollback**.
 - Step 4** In the **Rollback to** drop-down list, choose **Base, Committed** or **Rollback Point**.
 - Step 5** Click **Add File**.
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Rollback SMU

Procedure

	Command or Action	Purpose
Step 1	install rollback to { base committed id committed } <i>committed ID</i> Example: Device(config)# install rollback to id 1234	Returns the device to the previous installation state. After the rollback, a reload is required.
Step 2	install commit Example: Device# install commit	Commits the activation changes to be persistent across reloads.

Deactivate SMU

Procedure

	Command or Action	Purpose
Step 1	install deactivate file bootflash: <i>filename</i> Example: Device# install deactivate file bootflash:<Filename>	Deactivates an active package, updates the package status, and triggers a process to restart or reload.
Step 2	install commit Example: Device# install commit	Commits the activation changes to be persistent across reloads.

Configuration Examples for SMU

The following is sample of the SMU configuration, after the install add for the SMU is done:

```
Device#show install summary
```

```
[ Chassis 1 2 ] Installed Package(s) Information:  
State (St): I - Inactive, U - Activated & Uncommitted,  
             C - Activated & Committed, D - Deactivated & Uncommitted
```

```
-----  
Type  St  Filename/Version  
-----
```

```
IMG   C   16.8.1.0.39751  
  
-----
```

```
Auto abort timer: inactive  
-----
```