Software Maintenance Upgrade

Software Maintenance Upgrade (a SMU), is a package that can be installed on a system to provide a fix or a security resolution to a released image.

Restrictions for Software Maintenance Upgrade

- Hot patching is not supported.
- SMU supports cold patching using install mode only.
- SMU installation will be supported in install mode only.

Information About Software Maintenance Upgrade

SMU Overview

An SMU is a package that can be installed on a system, to provide a fix or a security resolution to a released image. An SMU package is provided on a per release and per component basis.

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

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

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

Perform these basic steps to install an SMU:

1. Add the SMU to the filesystem.

2. Activate the SMU on the system.
3. Commit the SMU changes so that it is persistent across reloads.

SMU Workflow

The SMU process is initiated with a request to the Cisco Customer Support. Contact your customer support to raise an SMU request.

At release time, the SMU package is posted to the Cisco Software Download page and can be downloaded and installed.

SMU Package

The SMU package contains a small set of files for patching the release along with metadata that describes the contents of the package, and fix for the reported issue that the SMU is requested for. The SMU package also supports patching of the public key infrastructure (PKI) component.

SMU Reload

All SMUs 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. This reload ensures that all processes are started with the correct libraries and files that are installed as part of the SMU.

Note If the user deletes the SMU file from the directory and performs a bootup, the device displays the error message **`%BOOT-3-BOOTTIME_SMU_MISSING_DETECTED: R0/0: install_engine: SMU file /bootflash/ie35xx-lni.17.17.1.SSA.bin missing and system impact will be unknown`**. However, this will not lead to any functional error.

How to Manage Software Maintenance Updates

The following sections provide information about managing SMUs.

You can install, activate, and commit an SMU package using a single command (1-step process) or using separate commands (3-step process).

Tip Use the 1-step process when you have to install just one SMU package file and use the 3-step process when you have to install multiple SMUs. The 3-step process minimises the number of reloads required when you have more than one SMU package file to install.

Installing an SMU Package: 1-Step Process

This task shows how to use the single **install add file activate commit** command for installing an SMU package.

Before you begin

Check that the SMU you are about to install corresponds to the software image installed on your device. For example, SMU `/auto/tftp-blr-users2/much/SMU_BUILDS/ie35xx-universalk9.2024-12 03_06.55_much.0.CSCwm26661.SSA.smu.bin` is compatible with software image `ie35xx-17.17.1.SPA.bin`.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password, if prompted.
Step 2	**install add file flash:** *filename* [**activate commit**] **Example:** `Device# install add file flash:ie35xx-universalk9.2024-12 03_06.55_much.0.CSCwm26661.SSA.smu.bin activate commit`	Copies the maintenance update package from flash to the device, performs a compatibility check for the platform and image versions, activates the SMU package, and makes the package persistent across reloads. This command extracts the individual components of the .bin file into the subpackages and packages.conf files. You can also copy the SMU package from from a remote location (through FTP, HTTP, HTTPS, or TFTP). **Note** If the SMU file is copied using TFTP, use bootflash to activate the SMU.
Step 3	**exit** **Example:** `Device# exit`	Exits privileged EXEC mode and returns to user EXEC mode.

Installing an SMU Package: 3-Step Process

This task shows you the 3-step process for installing an SMU package. Use this method to install multiple SMUs and avoid multiple reloads.

Before you begin

Check that the SMU you are about to install corresponds to the software image installed on your device. For example, SMU `/auto/tftp-blr-users2/much/SMU_BUILDS/ie35xx-universalk9.2024-12 03_06.55_much.0.CSCwm26661.SSA.smu.bin` is compatible with software image `ie35xx-17.17.1.SPA.bin`.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**install add file** *location filename* **Example:** `Device# install add file flash:ie35xx-universalk9.2024-12 03_06.55_much.0.CSCwm26661.SSA.smu.bin` `Device# install add file flash:ie35xx-universalk9.2024-12 03_06.55_much.0.CSCwm26661.SSA.smu.bin`	Copies the maintenance update package from flash to the device, and then performs a compatibility check for the platform and image versions, and adds the SMU package on all member nodes or FRUs, as applicable. This command also 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. You can also copy the SMU package from a remote location (through FTP, HTTP, HTTPS, or TFTP).
Step 3	**install activate file** *location filename* **Example:** `Device# install activate file flash:ie35xx-universalk9.2024-12 03_06.55_much.0.CSCwm26661.SSA.smu.bin, ie35xx-universalk9.2024-12 03_06.55_much.0.CSCwm26661.SSA.smu.bin`	Activates the SMU package file that was added and updates the package status details. You will be promped to reload the system in order to complete the activation process. When entering multiple SMUs, use a comma (without a space before or after), to separate file names. Also ensure that total number of characters does not exceed 128. This step involves a reload.
Step 4	**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.

Managing an SMU

This task shows how to rollback the installation state, deactivate, and remove a previously installed SMU package from the device. This can be used for a SMU that has been installed with the 1-step and 3-step process.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**install rollback to** {**base** | **committed** | **id** *commit-ID*} **Example:** `Device# install rollback to committed`	Returns the device to the previous installation state. After the rollback, a reload is required.
Step 3	**install deactivate file** *location filename* **Example:** `Device# install deactivate file flash:ie35xx-17.17.1.SPA.smu.bin`	Deactivates an active package, updates the package status, and triggers a process to restart or reload.
Step 4	**install remove** {**file** *location filename* | **inactive**} **Example:** `Device# install remove file flash:ie35xx-17.17.1.SPA.smu.bin`	Checks if the specified SMU is inactive and if it is, deletes it from the file system. The **inactive** option deletes all the inactive packages from the file system.
Step 5	**show version** **Example:** `Device# show version`	Displays the image version on the device.
Step 6	**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.

Configuration Examples for Software Maintenance Upgrade

The following is a list of SMU configuration examples.

- Installing an SMU (3-Step Process, Using flash:), on page 5
- Example: Installing an SMU (3-Step Process, Using TFTP), on page 8

Installing an SMU (3-Step Process, Using flash:)

The following example shows how to install a SMU package by using the 3-step process. Here the SMU package file is saved in the device's flash.

1. Copying the SMU package file from flash and installing it.

```
Device# install add file flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
install_add: START Wed Mar 10 14:17:45 IST 2025
install_add: Adding SMU

--- Starting initial file syncing ---
Info: Finished copying flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin to the
selected switch(es)
Finished initial file syncing


*Mar 10 14:17:48.128 IST: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0: install_engine:
 Started install add flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.binExecuting
pre scripts....
Executing pre sripts done.
--- Starting SMU Add operation ---
Performing SMU_ADD on all members
  [1] SMU_ADD package(s) on switch 1
  [1] Finished SMU_ADD on switch 1
Checking status of SMU_ADD on [1]
SMU_ADD: Passed on [1]
Finished SMU Add operation

SUCCESS: install_add /flash/ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin Wed Mar
10 14:18:00 IST 2025
```

Verifying the addition and installation of the SMU package file by using the **show install summary** command. The status of the SMU package file is `I`, because it has not been activated and committed yet.

```
Device# show install summary

[ Switch 1 ] Installed Package(s) Information:
State (St): I - Inactive, U - Activated & Uncommitted,
            C - Activated & Committed, D - Deactivated & Uncommitted
--------------------------------------------------------------------------------
Type  St   Filename/Version
--------------------------------------------------------------------------------
SMU   I    flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
IMG   C    17.17.1.0.3431

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

2. Activating the SMU package file.

```
Device# install activate file flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin

install_activate: START Wed Mar 10 14:19:59 IST 2025
install_activate: Activating SMU

*Mar 10 14:20:01.513 IST: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0: install_engine:
 Started install activate flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin

This operation requires a reload of the system. Do you want to proceed? [y/n]y
Executing pre scripts....
Executing pre sripts done.

--- Starting SMU Activate operation ---
Performing SMU_ACTIVATE on all members
  [1] SMU_ACTIVATE package(s) on switch 1
  [1] Finished SMU_ACTIVATE on switch 1
```

```
Checking status of SMU_ACTIVATE on [1]
SMU_ACTIVATE: Passed on [1]
Finished SMU Activate operation

install_activate: Reloading the box to complete activation of the SMU...
install_activate will reload the system now!

*Mar 10 14:20:22.258 IST: %INSTALL-5-INSTALL_AUTO_ABORT_TIMER_PROGRESS: Switch 1 R0/0:
rollback_timer: Install auto abort timer will expire in 7200 seconds
     Chassis 1 reloading, reason - Reload command
Mar 10 14:20:28.291: %PMAN-5-EXITACTION: F0/0: pvp: Process manager is exiting: reload
fp action requested
Mar 10 14:20:30.718: %PMAN-5-EXITACTION: R0/0: pvp: Proce
Mar 10 14:20:34.834: %PMAN-5-EXITACTION: C0/0: pvp: Process manager is exiting:
Mar 10 14:20:36.053: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
 install activate SMU flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
watchdog watchdog0: watchdog did not stop!
reboot: Restarting system

Initializing Hardware...
<output truncated>

############
Mar 10 08:52:01.806: %BOOT-5-BOOTTIME_SMU_TEMP_ACTIVE_DETECTED: R0/0: install_engine:
SMU file /flash/ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin active temporary...
SMU committ is pending

Cisco IOS Software, L3 Switch Software (ie35xx_LITE_IOSXE), Version xx.x.x, RELEASE
SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2025 by Cisco Systems, Inc.
Compiled Thu 22-Mar-25 17:30 by mcpre

<output truncated>
```

Verifying activation of the SMU package file by using the **show install summary** command. The status of the SMU package file is U, because it has not been committed yet.

```
[ Switch 1 ] Installed Package(s) Information:
State (St): I - Inactive, U - Activated & Uncommitted,
            C - Activated & Committed, D - Deactivated & Uncommitted
--------------------------------------------------------------------------------
Type  St   Filename/Version
--------------------------------------------------------------------------------
SMU   U   flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
IMG   C    17.16.4.0.3431

--------------------------------------------------------------------------------
Auto abort timer: active on install_activate, time before rollback - 01:41:52
--------------------------------------------------------------------------------
```

3. Committing the SMU package file

```
Device# install commit
install_commit: START Wed Mar 10 14:38:42 IST 2025
install_commit: Committing SMU

*Mar 10 14:38:44.906 IST: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0: install_engine:
 Started install commitExecuting pre scripts....
Executing pre sripts done.
--- Starting SMU Commit operation ---
Performing SMU_COMMIT on all members
  [1] SMU_COMMIT package(s) on switch 1
  [1] Finished SMU_COMMIT on switch 1
Checking status of SMU_COMMIT on [1]
```

```
SMU_COMMIT: Passed on [1]
Finished SMU Commit operation

SUCCESS: install_commit /flash/ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin Wed Mar
 10 14:38:58 IST 2025
*Mar 10 14:38:59.385 IST: %INSTALL-5-INSTALL_COMPLETED_INFO: Switch 1 R0/0:
install_engine: Completed install commit SMU
```

Verifying the commit by using the **show install summary** command. The SMU package file has been installed, activated and committed and the status is C.

```
Device# show install summary
[ Switch 1 ] Installed Package(s) Information:
State (St): I - Inactive, U - Activated & Uncommitted,
            C - Activated & Committed, D - Deactivated & Uncommitted
--------------------------------------------------------------------------------
Type  St   Filename/Version
--------------------------------------------------------------------------------
SMU   C   flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
IMG   C    17.17.1.0.3431

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

Verifying active packages by using the **show install active** command

```
Device# show install active
[ Switch 1 ] Active Package(s) Information:
State (St): I - Inactive, U - Activated & Uncommitted,
            C - Activated & Committed, D - Deactivated & Uncommitted
--------------------------------------------------------------------------------
Type  St   Filename/Version
--------------------------------------------------------------------------------
SMU   C    flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
IMG   C    17.17.1.0.3431
```

Checking the version, by using the **show version** command:

```
Device# show version
Cisco IOS XE Software, Version 17.17.1
Cisco IOS Software, L3 Switch Software (ie35xx_LITE_IOSXE), Version 17.17.1, RELEASE
SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2025 by Cisco Systems, Inc.
Compiled Thu 22-Mar-25 17:30 by mcpre
...
```

Example: Installing an SMU (3-Step Process, Using TFTP)

The following example shows how to install a SMU package by using the 3-step process. Here the SMU package file is saved in a remote (TFTP) location.

1. Adding the SMU package file.

```
Device# install add file
tftp://172.16.0.1//tftpboot/folder1/ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin

Mar 22 11:32:27.035: %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started install
 add tftp://172.16.0.1//tftpboot/folder1/ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
```

```
Mar 22 11:32:27.035 %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started install
 add tftp://172.16.0.1//tftpboot/folder1/ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
Downloading file
tftp://172.16.0.1//tftpboot/folder1/ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
Finished downloading file
tftp://172.16.0.1//tftpboot/folder1/ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
to flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
install_add: Adding SMU
install_add: Checking whether new add is allowed ....

--- Starting initial file syncing ---

025335: *Mar 22 2025 11:32:26 UTC: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0:
install_engine: Started install add
tftp://172.16.0.1//tftpboot/folder1/ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin[1]:
 Copying flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin from switch 1 to switch
 2
[2]: Finished copying to switch 2
Info: Finished copying flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin to the
selected switch(es)
Finished initial file syncing

--- Starting SMU Add operation ---
Performing SMU_ADD on all members
[1] SMU_ADD package(s) on switch 1
[1] Finished SMU_ADD on switch 1
[2] SMU_ADD package(s) on switch 2
[2] Finished SMU_ADD on switch 2
Checking status of SMU_ADD on [1 2]
SMU_ADD: Passed on [1 2]
Finished SMU Add operation

SUCCESS: install_add Mon Mar 22 11:32:56 UTC 2025
Mar 22 11:32:57.598: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
 install add SMU flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
Mar 22 11:32:57.598 %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
install add SMU flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin

ECSG-SEC-35xx-24P#
025336: *Mar 22 2025 11:32:57 UTC: %INSTALL-5-INSTALL_COMPLETED_INFO: Switch 1 R0/0:
install_engine: Completed install add SMU
flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
```

Verifying addition by using the **show install summary** command.

```
Device# show install summary
[ Switch 1 2 ] Installed Package(s) Information:
State (St): I - Inactive, U - Activated & Uncommitted,
C - Activated & Committed, D - Deactivated & Uncommitted
--------------------------------------------------------------------------------
Type St Filename/Version
--------------------------------------------------------------------------------
SMU I flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
IMG C 17.17.02.0.6

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

2. Activating the SMU package file.

Note You use TFTP to add the SMU package file (in the previous step) and *flash*, to activate - not TFTP.

```
Device# install activate file flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin

install_activate: START Mon Mar 22 11:37:17 UTC 2025

Mar 22 11:37:37.582: %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started install
 activate flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
Mar 22 11:37:37.582 %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started install
 activate flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
install_activate: Activating SMU

025337: *Mar 22 2025 11:37:37 UTC: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0:
install_engine: Started install activate
flash:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
This operation may require a reload of the system. Do you want to proceed? [y/n]n
```

Checking the version, by using the **show version** command:

```
Device# show version
Cisco IOS XE Software, Version 17.17.1
Cisco IOS Software, L3 Switch Software (ie35xx_LITE_IOSXE), Version 17.17.1, RELEASE
SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2025 by Cisco Systems, Inc.
Compiled Thu 22-Mar-25 17:30 by mcpre
<output truncated>
```

3. Committing the SMU package file.

```
Device# install commit

install_commit: START Mon Mar 22 11:38:48 UTC 2025
SUCCESS: install_commit Mon Mar 22 11:38:52 UTC 2025
Device#
```

Verifying that the update package is now committed, and that it will be persistent across reloads:

```
Device# show install summary

Active Packages:
tftp:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
Inactive Packages:
No packages
Committed Packages:
tftp:ie35xx_lite_iosxe.xx.xx.xx.CSCvk70181.SPA.smu.bin
Uncommitted Packages:
No packages
Device#
```