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# Contents

[Introduction](#)  
[Prerequisites](#)  
[Requirements](#)  
[Components Used](#)  
[Related Products](#)  
[IOS XR SP Overview](#)  
[Production SPs](#)  
[SP Behavior with Optional PIEs](#)  
[SP Restart Types](#)  
[SP Naming Conventions](#)  
[Download SMUs from CDC](#)  
[SMU Delivery Timelines](#)  
[SMU Supercedes and Prerequisites](#)  
[Supercedes](#)  
[Prerequisites](#)  
[SP Installation](#)  
[Example Install Add Activate Operation](#)  
[SMU Management](#)  
[Related Cisco Support Community Discussions](#)

## Introduction

This document describes Service Packs (SPs) for routers that run Cisco IOS<sup>®</sup> XR software.

## Prerequisites

## Requirements

Cisco recommends that you have knowledge of these topics:

- Cisco IOS XR Software Versions 4.3.2 and Later
- Cisco IOS XR Software Installation and Upgrade Procedures

## Components Used

The information in this document is based on Cisco IOS XR software that is run on Cisco Aggregation Services Router (ASR) 9000 Series hardware.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

## Related Products

This document can also be used with these hardware versions:

- Cisco ASR 9001
- Cisco ASR 9001-S
- Cisco ASR 9006
- Cisco ASR 9010
- Cisco ASR 9904
- Cisco ASR 9912
- Cisco ASR 9922

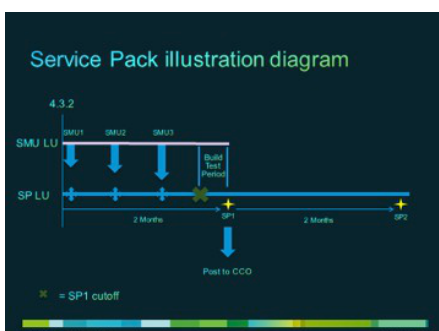
## IOS XR SP Overview

An SP combines multiple Platform Dependent (PD) and Platform Independent (PI) Software Maintenance Updates (SMUs) into one package.

The goal of SPs is to reduce the independent SMU management overhead. An SP provides the same number of fixes through a single or small number of SP Package Installation Envelopes (PIEs).

Umbrella and Composite SMUs also provide multiple fixes in a single PIE and are common. They provide fixes that fall under a predefined boundary, which is typically PD fixes or PI fixes in a specific component. The 4.2.3 Composite SMU, C-SMU1, and C-SMU2 contain only PD fixes. A BGP Umbrella SMU contains only PI BGP component changes. SPs remove these boundaries and allow all of the PD and PI fixes to be delivered in a single package.

This diagram illustrates an overview of SPs when compared to regular SMUs:



## Production SPs

SPs are formally developed, tested, and released on an average two-month interval on supported maintenance releases for Cisco IOS XR Software Versions 4.3.2 and later.

## SP Behavior with Optional PIEs

SPs do not require all of the optional packages (MPLS or MGBL, for example) in order to be installed on the system. The only prerequisite is that Cisco IOS XR is installed.

Fixes for optional packages that are not installed do not become activated. In order to activate a fix for an optional package, the package must be installed prior to the SP or the optional PIE can be installed after SP installation. Use the **admin show install active detail** command in order to understand the optional PIEs for which the SP contains fixes.

In this example, the SP does not contain fixes for the Multicast (MCAST) PIE, so the PIE can be installed without trouble:

```
RP/0/RSP0/CPU0:ASR9K-PE3#admin show install active detail
disk0:asr9k-px-4.3.2.sp-1.0.0
disk0:asr9k-9000v-nv-supp-4.3.2.sp-1.0.0
disk0:asr9k-os-mpi-4.3.2.sp-1.0.0
disk0:iosxr-service-4.3.2.sp-1.0.0
disk0:asr9k-fpd-4.3.2.sp-1.0.0
disk0:iosxr-mgbl-4.3.2.sp-1.0.0
disk0:iosxr-mpls-4.3.2.sp-1.0.0
disk0:asr9k-fwding-4.3.2.sp-1.0.0
disk0:iosxr-routing-4.3.2.sp-1.0.0
disk0:iosxr-infra-4.3.2.sp-1.0.0
disk0:asr9k-base-4.3.2.sp-1.0.0
```

## SP Restart Types

SPs have restart types, which are always set to Reload Required.

Each SP has a **readme.txt** file that documents the content, the impact of the SMU, the Distributed Defect Tracking Systems (DDTSs) that are included, and the other SPs that are superseded.

Use the **admin show install package <sp-package>** command after the SP is installed, or the **admin show install pie-info <sp-pie>** command on the SP PIE prior to an **Install Add** of the SP PIE, in order to identify the SP content.

**Note:** You can use the **admin show install package sp-desc** command in order to verify this information at any point after SP installation, but only with Versions 5.1.1 and later.

## SP Naming Conventions

An SP consists of the binary file and its associated **readme.txt** file, which contains any associated caveats. Examples include:

- **asr9k-px-4.3.2.sp-1.0.0.pie**
- **asr9k-px-4.3.2.sp-1.0.0.txt**
- **asr9k-px-4.3.2.sp-1.0.0.tar**

The naming convention follows the **platform-type-release-SP-version-file** format:

- **Platform:** asr9k (ASR 9000)
- **Image Type:** px
- **Release:** 4.3.2 (for example)
- **File formats:**
  - .pie
  - .txt
  - .tar

## Download SMUs from CDC

SPs are located in the Download Software Center on Cisco.com (CDC).

Complete these steps in order to download SPs:

1. Navigate to the Download Software Center and then to the router platform type.
2. Navigate to **Downloads Home > Products > Routers > Service Provider Edge Routers > Cisco ASR 9000 Series Aggregation Services Routers > Cisco ASR 9006 Router**.

**Note:** This example uses the Cisco ASR9006 Router. The navigation path varies in relation to your router platform type.

3. Select **IOS XR Service Packs**.



## SMU Delivery Timelines

SPs are delivered approximately every eight to ten weeks for the life of a release.

## SMU Supersedes and Prerequisites

This section describes the SMU supersedes and prerequisites.

## Supercedes

It is important to understand that SPs are committed to an SP software lineup (LU) that is particular to the release, which is different from the SMU LU for the same release. Hence, it is a challenge for an SMU to be deployed on top of an SP without careful consideration of the SMU build process; the SMU metadata must be programmed with knowledge of the SP.

**Note:** Currently, SMUs on top of SPs are not supported. If an urgent fix is needed on top of SP, the next SP will be expedited.

SPs are cumulatively built, and every new SP release fully supercedes the prior SPs for a given release. A newer SP for a release can be installed without installation of the previous SPs for that release. Also, SPs can be installed on top of each other without any problems, even if there are some gaps in the SP versions.

Here are two techniques that are used in order to identify SP supercedes:

- Check the **readme.txt** file that comes with the SP.
- Use the Cisco Software Manager (CSM).

## Prerequisites

SPs for all releases prior to 5.1.1 Require a pre-requisite SMU (CSCu158246) to be installed, as well as of its pre-requisites so that the system understands the Service Pack PIE. In 5.1.1 this information is already in the base code, hence a pre-requisite smu is not required.

## SP Installation

Complete these three operational steps in order to apply an SP:

1. Enter the **install add** admin command in order to add the SP to the file system.
2. Enter the **install activate** admin command in order to activate the SP on the system.
3. Enter the **install commit** admin command in order to commit the SP change so that it is persistent across reloads.

**Tip:** You can perform steps 1 and 2 in a single install operation, which is described in the next section.

## Example Install Add Activate Operation

This example provides an alternative SP installation method.

```
RP/0/RSP0/CPU0:ASR9K-PE3(admin)#install add  
disk0:/asr9k-px-4.3.2.sp-1.0.0.pie activate
```

```
Fri Feb 7 14:01:31.675 UTC
Install operation 37 '(admin) install add /disk0:/asr9k-px-4.3.2.sp-1.0.0.pie
activate' started by user 'cisco' via CLI at 14:01:31
UTC Fri Feb 07 2014.
Part 1 of 2 (add software): Started
The install operation will continue asynchronously.
RP/0/RSP0/CPU0:ASR9K-PE3(admin)#
Install operation 37 '(admin) install add /disk0:/asr9k-px-4.3.2.sp-1.0.0.pie
activate' started by user 'cisco' via CLI at 14:01:31
UTC Fri Feb 07 2014.
Part 1 of 2 (add software): Started
Info:      The following package is now available to be activated:
Info:
Info:      disk0:asr9k-px-4.3.2.sp-1.0.0
Info:
Info:      The package can be activated across the entire router.
Info:
Part 1 of 2 (add software): Completed successfully
Part 2 of 2 (activate software): Started
Info:      This operation will reload the following nodes in parallel:
Info:      0/RSP0/CPU0 (RP) (SDR: Owner)
Info:      0/0/CPU0 (LC) (SDR: Owner)
Info:      0/1/CPU0 (LC) (SDR: Owner)
Info:      0/2/CPU0 (LC) (SDR: Owner)
Info:      0/3/CPU0 (LC) (SDR: Owner)
Info:      Install operation 37 is paused as the user must answer a question.
Info:      Please continue the operation using one the following steps:
Info:      - run the command '(admin) install operation 37 attach
synchronous'and then answer the query.
Info:      - run the command '(admin) install attach 37'
and then answer the query.
Proceed with this install operation (y/n)? [y]
Info:      Install Method: Parallel Reload
Info:      The changes made to software configurations will not be persistent
across system reloads. Use the command '(admin)
install commit' to make changes persistent.
Info:      Please verify that the system is consistent following the software
change using the following commands:
Info:      show system verify
Info:      install verify packages
Part 2 of 2 (activate software): Completed successfully
Part 1 of 2 (add software): Completed successfully
Part 2 of 2 (activate software): Completed successfully
Install operation 37 completed successfully at 14:04:15 UTC Fri Feb 07 2014.
```

```
RP/0/RSP0/CPU0:ASR9K-PE3(admin)#
```

```
RP/0/RSP0/CPU0:ASR9K-PE3#show install active summary
```

```
Sat Feb 8 05:15:55.981 UTC
```

```
Default Profile:
```

```
SDRs:
```

```
Owner
```

```
Active Packages:
```

```
disk0:asr9k-mini-px-4.3.2
```

```
disk0:asr9k-px-4.3.2.sp-1.0.0
```

If needed, you can install SP3 on top of the previous system, which has SP1. The output from the **show install active summary** command only shows SP3 as the active SP. Here is an example:

```
RP/0/RSP0/CPU0:ASR9K-PE3#show install active summary
```

```
Sat Feb 8 05:15:55.981 UTC
```

```
Default Profile:
```

```
SDRs:
```

```
Owner
```

Active Packages:

disk0:asr9k-mini-px-4.3.2

disk0:asr9k-px-4.3.2.sp-3.0.0

## SMU Management

The CSM provides Cisco IOS XR SMU and SP recommendations to users and reduces the effort that it takes in order to manually search, identify, and analyze SMUs that are needed for a device. The CSM can connect to multiple devices and provide SMU and SP management for multiple Cisco IOS XR platforms and releases.

The CSM is a standalone application that can be installed on Microsoft Windows, Macintosh (MAC), and UNIX systems. The CSM supports the Cisco Carrier Routing System (CRS) and Cisco ASR 9000 Series devices.

Refer to the Cisco Software Manager User Guide for more information.

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