

# Upgrade Software on ASR1000 Series Platforms: A Quick Start Guide

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## Introduction

This document describes key considerations, known issues and best practices when upgrading Cisco ASR 1000 Series router software in autonomus mode.

## Prerequisites

### Requirements

Cisco recommends that you have knowledge of these topics:

- Cisco IOS® XE software
- Basic router configuration and management

### Components Used

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, ensure that you understand the potential impact of any command.

## Background Information

Upgrading your Cisco ASR 1000 Series Router to Cisco IOS XE 17.x and newer versions ensures you benefit from the latest features, security enhancements, and performance improvements. This guide outlines the necessary steps, including interim upgrades for older versions, and considerations for ROMmon (ROM Monitor), FPGA (Field-Programmable Gate Array), and Smart Licensing.

## Cisco IOS XE Upgrade Paths

This table summarizes the upgrade paths suggestions for ASR1000 Series platforms based on your current software version:

| Current Version | Interim Step #1                           | Interim Step #2                                                      | Final Step     |
|-----------------|-------------------------------------------|----------------------------------------------------------------------|----------------|
| 3.x/16.(1–8).x  | 16.9.x (RP2)<br>or 16.12.x (other models) | 17.9.x ( <i>only if PAK/RTU licenses in use, no snapshot taken</i> ) | 17.12 or newer |
| 16.(9–12).x     | N/A                                       | 17.9.x ( <i>only if PAK/RTU licenses in use, no snapshot taken</i> ) | 17.12 or newer |

**Why this matters:** Some older versions require intermediate upgrades for compatibility or feature support. This ensures the platform boots correctly and functions post-upgrade.

### Important notes

#### PAK license snapshot

- If you have a PAK license **without a snapshot** and want to upgrade to Cisco IOS XE 17.12.1a or later, you must first upgrade to an interim version (17.9.x) to allow the system to automatically snapshot the PAK license and complete Device-Led Conversion (DLC) proces — *then* upgrade to your target release.
- See [FN-74148](#) and [Snapshots for PAK Licenses](#) for details.

#### Weak ciphers deprecation

Starting with Cisco IOS XE 17.11.1a:

- DES, 3DES, MD5, and DH Groups 1, 2, and 5 are deprecated and no longer supported
- Use **AES, SHA, and DH Groups 14+** instead
- esp-gmac transforms are also deprecated
- See [FN-72510](#) for details.

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 **Caution:** If deprecated ciphers are configured and the software upgrade is performed to Cisco IOS XE 17.11.1a or newer the **IPsec tunnel negotiation fails** and it results in **service disruption**. To **temporarily** continue using weak ciphers during migration, disable CSDL compliance with ***crypto engine compliance shield disable*** command and reboot.

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## Pre-Upgrade Checklist

- Backup current configuration and local licenses (if applicable)
- Ensure you have at least 2 GB of free space on bootflash

- Allocate **15–20 minutes** for downtime
- Review relevant **release notes** for all versions involved in your upgrade path.

## General Upgrade Steps

### Path A: from Cisco IOS XE 3.x/16.(1–8).x to 17.12 or newer:

1. Upgrade **ROMmon** if needed (see [ROMmon Upgrade](#)).
2. Upgrade to Cisco IOS XE **16.9.x** (for ASR 1000-RP2) or **16.12.x** for other models.
3. Upgrade **FPGA** if needed (see [FPGA/CPLD Upgrade](#)).
4. If PAK licenses were used with no snapshot: upgrade to Cisco IOS XE **17.9.x**, upon the upgrade the system automatically [takes a PAK snapshot](#) and completes Device-Led Conversion (DLC) process.
5. Upgrade to the target version (Cisco IOS XE 17.12 or newer).

### Path B: from Cisco IOS XE 16.(9–12).x to 17.12 or newer:

1. Upgrade **ROMmon** if needed (see [ROMmon Upgrade](#)).
2. Upgrade **FPGA** if needed (see [FPGA/CPLD Upgrade](#)).
3. If PAK licenses were used with no snapshot: upgrade to Cisco IOS XE **17.9.x**, upon the upgrade the system automatically [takes a PAK snapshot](#) and completes Device-Led Conversion (DLC) process.
4. Upgrade to the target version (Cisco IOS XE 17.12 or newer).

## ROMmon Upgrade (Required)

ROMmon is the bootloader firmware installed on specific hardware modules in the Cisco IOS XE router. Upgrading it ensures the hardware can boot and run newer Cisco IOS XE 17.x images.

**Recommended version at the time of this writing:** 17.15(4r)



**Warning:** After upgrading to ROMmon 17.3(1r) or newer, you **cannot revert** on: ASR 1001-X, ASR 1001-HX, ASR 1002-HX, ASR 1000-RP3



**Warning:** After upgrading ROMmon to 17.15(4r), you **cannot downgrade** to any earlier version on any card/platform.

- 
- Check current ROMmon version installed on the RP module (refer to "Firmware Version" at the bottom of the output)

<#root>

Router#

**show platform**

<...>

Slot          CPLD Version

## Firmware Version

```
-----  
0      19060309      16.9(4r)  
R0     19060309
```

**16.9(4r)**

```
      <<<<<<  
F0     19060309      16.9(4r)
```

- If your version is older than 17.3(1r), proceed with the upgrade.

## ROMmon Upgrade Steps:

### Step 1. Copy the ROMmon image to bootflash.

```
copy tftp: bootflash:
```

### Step 2. Verify the MD5 checksum of the ROMmon image matches the value published for this file on Software Download page

```
verify /md5 bootflash:asr1000-rommon.1715-4r.SPA.pkg
```

### Step 3. Upgrade the ROMmon monitor.

```
upgrade rom-monitor filename bootflash:asr1000-rommon.1715-4r.SPA.pkg all
```



**Note:** When upgrading ROMmon to 17.15(4r) via *upgrade rom-monitor filename all*, first manually reload the ESP cards using *hw-module slot <F0/F1> reload*. Once cards reach the **ok** state, reload the entire chassis with *reload*. The ESP module remains disabled for up to 15 minutes during recovery.



**Note:** For ASR1000-MIP100, ROMmon is not updated — 16.3(2r) is packaged inside 17.15(4r) intentionally (to support the *upgrade rom-monitor filename all* command). This is expected behavior.

## Resources:

- [ROMmon Upgrade Guide](#)
- [ROMmon 17.15\(4r\) Download](#)

## FPGA/CPLD Upgrade

FPGA or CPLD (Complex Programmable Logic Device) versions manage low-level hardware features. Incorrect or outdated versions can cause boot errors or hardware malfunction with newer Cisco IOS XE images.

### How to confirm the CPLD/FPGA version

- Run ***show hw-programmable all*** command to check your current CPLD/FPGA versions of each module.
- The CPLD version is also displayed in the bottom section of the output of ***show platform*** command.

### When to Upgrade CPLD/FPGA

1. **ASR 1000-RP2:** If FPGA version is older than **17071402**, upgrade is required.

**Note:** ROMmon versions older than 16.9(5r) or FPGA versions older than 17071402 cannot boot IOS XE images larger than 1GB. See Cisco bug ID [CSCvm90995](#)

2. **Other platforms:** Upgrade if CPLD/FPGA is older than the recommended version below.

### Recommended Versions

This table lists recommended versions and respective download links for both CPLD and FPGA for each ASR 1000 platform.

| Platform     | CPLD     | FPGA     | Download                 |
|--------------|----------|----------|--------------------------|
| ASR 1000-RP2 | 14111801 | 18102401 | <a href="#">Download</a> |
| ASR 1000-RP3 | 19091111 | —        | <a href="#">Download</a> |
| ASR1001-X    | 19060309 | —        | <a href="#">Download</a> |
| ASR1002-X    | 14012203 | 20034    | <a href="#">Download</a> |
| ASR1001-HX   | 19030215 | 16051716 | <a href="#">Download</a> |
| ASR1002-HX   | 19030211 | 15102108 | <a href="#">Download</a> |

#### Platform-specific notes:

- **ASR1001-X, ASR1001-HX, ASR1002-HX:** Download links point to a **.bin file** - a special FPGA Upgrade Tool addressing [CVE-2019-1649](#) (Cisco Secure Boot Hardware Tampering Vulnerability). Must be run from the ROMmon prompt. See [detailed instructions](#).
- **ASR1000-RP2, ASR1000-RP3, ASR1002-X:** Download links point to a standard .pkg firmware file.

Upgrade steps:

### Step 1. Copy the image to bootflash.

```
copy tftp: bootflash:
```

### Step 2. Upgrade the hardware programmable component.

```
upgrade hw-programmable fpga filename bootflash:<hw-programmables-image.pkg> r0
```

## Cisco IOS XE Software Upgrade Process

Depending on your current software version the process of upgrading Cisco IOS XE to the target 17.x version requires an interim upgrade step or it could be a direct upgrade.

Both options are described in this section.

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### Path A: Upgrade with Interim Step



**Note:** Use this path if your current version is Cisco IOS XE 3.x or 16.(1–8).x.

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### Upgrade Steps

#### Step 1. Copy the interim image to bootflash and verify

```
copy tftp://<interim-image.bin> bootflash:
verify /md5 bootflash:<interim-image.bin>
```

#### Step 2. Set boot parameters for the interim image

```
configure terminal
no boot system
boot system bootflash:<interim-image.bin>
boot system bootflash:<current-image.bin>
end
write memory
```

### Step 3. Set the configuration register and reload

```
configure terminal
config-register 0x2102
end
write memory
reload
```

Once the router boots into the **interim version**, verify functionality and licensing state.

### Step 4. Copy the final image to bootflash and verify

```
copy tftp://<final-image.bin> bootflash:
verify /md5 bootflash:<final-image.bin>
```

### Step 5. Update the boot statement to the final image, save the config and reload

```
configure terminal
no boot system
boot system bootflash:<final-image.bin>
boot system bootflash:<interim-image.bin>
end
write memory
reload
```

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## Path B: Upgrade to Cisco IOS XE 17.x

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**Note:** Use this path if your current version is Cisco IOS XE 16.(9-12).x. These versions are compatible with a direct upgrade to Cisco IOS XE 17.x.

No interim step required **unless** target is Cisco IOS XE 17.12 or newer and **PAK licenses were used with no snapshot taken** - in that case, an interim upgrade to 17.9.x is recommended first, so the [PAK snapshot can be collected](#).

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## Upgrade Steps

### Step 1. Copy the final image to bootflash and verify

```
copy tftp://<final-image.bin> bootflash:
verify /md5 bootflash:<final-image.bin>
```

## Step 2. Configure the boot image

```
configure terminal
no boot system
boot system bootflash:<final-image.bin>
boot system bootflash:<current-image.bin>
end
write memory
```

## Step 3. Set the configuration register and reload

```
configure terminal
config-register 0x2102
end
write memory
reload
```

## Install Mode

From Cisco IOS XE 17.15.1a, all platforms ship in install mode by default. You can boot, upgrade, and downgrade using install commands.

Instructions on converting from bundle mode to install mode, upgrading and downgrading in install mode: [Installing the Software Using Install Commands](#)

## Smart Licensing Using Policy (SLP)

**Requirement:** Smart Licensing Using Policy becomes **mandatory** in releases Cisco IOS XE 17.3.2 and later.

Reference: [Cisco SLP Overview and Onboarding Guide](#)

## Last supported Cisco IOS XE release for ASR1000 modules

| Part ID                                       | Last supported Cisco IOS XE version |
|-----------------------------------------------|-------------------------------------|
| ASR1000-MIP100                                | 17.18.x                             |
| EPA-1X100GE<br>EPA-QSFP-1X100GE<br>EPA-2X40GE | 17.18.x                             |

|                                      |         |
|--------------------------------------|---------|
| EPA-18X1GE<br>EPA-10X10GE            |         |
| ASR1000-ESP100-X<br>ASR1000-ESP200-X | 17.18.x |
| ASR1000-RP3                          | 17.18.x |
| ASR1000-ESP100<br>ASR1000-ESP200     | 17.15.x |
| ASR1000-RP2                          | 17.9.x  |
| ASR1000-SIP40                        | 17.9.x  |
| ASR1000-6TGE<br>ASR1000-2T+20X1GE    | 17.9.x  |

