

Cisco ASR9K

IOS-XR Release 6.8.1 (32-bit)

IOS-XR System Upgrade Procedure

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1 Introduction

1.1 Purpose, Scope and Audience

The purpose of this document is to describe the upgrade and downgrade procedure for the Cisco ASR 9000 Series Aggregation Services Router 6.8.1 (32 Bit).

Audience: This guide is for Cisco Systems Field Engineers and Network Operators. It is split into four sections.

- 1) Simple one command install upgrade procedures & detailed IOS XR install upgrade procedures
- 2) Other boot options
- 3) FPD upgrade
- 4) Caveats and CLI changes

1.2 Upgrade/downgrade Matrix

Single Step Upgrade/Downgrade is supported for following releases:

Platform	Supported From	To
ASR9K Fixed + Modular Chassis	6.1.x, 6.2.x, 6.3.x, 6.4.x, 6.5.x, 6.6.x, 6.7.x	6.8.1

For older releases, it is recommended to first upgrade to one of the supported releases and then move to the target release. The following link can be used to download the upgrade document for 6.3.3 release (File name: ASR9K-px-docs-6.3.3.tar):

<https://software.cisco.com/download/home/283876390/type/280805694/release/6.3.3>

1.3 Summary of Upgrade Steps

1. Backup existing configuration
 2. Perform system and network maintenance tasks
 3. Copy the image to the router using tftp, http, sftp, scp
 4. Add the software to the router using install add source
 5. Activate the image via install activate
 6. Commit the software via install commit
- Following cards will not be supported from release:
 - No hardware is deprecated in 6.8.1.

1.4 Cisco Software Manager

CSM Server is a web-based, server-side automation and orchestration framework. It gives service providers the ability to simultaneously schedule and deploy SMUs & software upgrades across hundreds of routers in a scheduled manner through a simple point and click Web interface. It can be used to manage SMUs, to create your own SMU tar ball, or find out which SMUs are applicable to your network.

More information on CSM: [Download CSM/ CSM Documentation](#)

1.5 Mandatory SMUs

The following table outlines the SMUs that must be installed for upgrade and downgrade procedure.

Table 1: Needed Mandatory SMUs

Release Mandatory/Optional SMUs		
	Upgrade SMUs	Downgrade SMUs
R6.1.x	N/A	NA
R6.2.x	N/A	CSCvj18407, CSCvp25986
R6.3.x	N/A	N/A
R6.4.x	N/A	N/A
R6.5.x	N/A	N/A
R6.7.x	N/A	N/A

*Above table applicable only for 32-bit IOS-XR.

1.6 Packages for Upgrade

As software features grow, so do file sizes. In order to ease the downloading experience and TFTP size issues, Cisco is changing its package delivery system by providing multiple files of smaller sizes as shown below.

Table 3: 32 Bit - IOS-XR Packaging Format

File	Contents	Comment
ASR9K-iosxr-px-6.8.1-turboboot.tar	Boot .vm image	Contains mini.vm only.
ASR9K-iosxr-px-k9-6.8.1.tar	All 32-bit pies and mini.pie	Contains all pie including k9sec and mini.pie
ASR9K-iosxr-px-6.8.1.tar	All 32-bit pies and mini.pie	Contains all pies except k9sec
asr9k-ncs500x-nV-px-6.8.1.tar	Include ncs500X pie	Include ncs500X pie

1.7 Required & Optional Package files

The mini package is mandatory to perform the System Upgrade and upgrade needs to be done from admin mode. The additional XR packages listed below are needed depending on the router configuration and required features.

Description	Package Name
Boot Image	asr9k-mini-px.pie-6.8.1 [Boot image]
mpls	asr9k-mpls-px.pie-6.8.1
bng	asr9k-bng-px.pie-6.8.1
bng-suppl	asr9k-bng-suppl-px.pie-6.8.1
multicast	asr9k-mcast-px.pie-6.8.1
fpd	asr9k-fpd-px.pie-6.8.1
ncs500X	asr9k-ncs500x-nV-px.pie-6.8.1
li	asr9k-li-px.pie-6.8.1
services	asr9k-services-px.pie-6.8.1
k9sec	asr9k-k9sec-px.pie-6.8.1
mgbl	asr9k-mgbl-px.pie-6.8.1
asr9000v	asr9k-asr9000v-nV-px.pie-6.8.1
video	asr9k-video-px.pie-6.8.1
optic	asr9k-optic-px.pie-6.8.1
doc	asr9k-doc-px.pie-6.8.1

2 Pre-Upgrade Tasks

Note: Config backup, precheck, image download, tar file copy to router and install add are hitless operations and can be done outside of the upgrade maintenance window.

2.1 Configuration Backup

- 1) Copy the running-configuration to a harddisk: on the router:

```
RP/0/RP0/CPU0:ASR9K#copy running-config harddisk:/running_config
```

- 2) Copy the running-configuration to a remote server:

```
RP/0/RP0/CPU0:ASR9K#scp /harddisk:/<file name> <user>@<server-IP>:/<file path>/config
```

2.2 System Stability check

The following commands should be executed at the XR prompt to verify basic system stability before the upgrade.

show platform	verify that all nodes are in "IOS XR RUN" state
Admin show platform	verify that all nodes are in " IOS XR RUN " state
show redundancy	verify that a Standby RP is available and the system is in "NSR-ready" state
show ipv4 interface brief <or> show ipv6 interface brief <or> show interface summary	verify that all necessary interfaces are "UP"
show install active	verify that the proper set of packages are active
show install committed	verify that the proper set of committed packages are same as active. If not, execute 'install commit'
cfs check/ clear configuration inconsistency	verify/fix configuration file system
admin show hw-module fpd location all	Ensure all the FPD versions status are CURRENT Please refer to "Field Programmable Versions Document" for FPD version information.
show pfm location all	Shows any outstanding alarms in system
admin show environment all	Shows temperature, Fan, Voltage, Power status
admin show led	Shows LED status
show media	Shows the disk usage
show inventory	Shows chassis inventory information
show logging	Capture show logging to check for any errors

2.3 Enable auto-fpd upgrade

Enable auto FPD auto upgrade from admin

```
RP/0/RP0/CPU0:ASR9K(admin-config)#fpd auto-upgrade
RP/0/RP0/CPU0:ASR9K(admin-config)#commit
```

2.4 Disk Cleanup

Check available space in install repository. At least 2G of free space is required to perform system upgrade.

If copying the packages and SMUs to the harddisk, ensure 50% free space on the harddisk.

```
RP/0/RP0/CPU0:ASR9K#show filesystem location 0/RP0/CPU0
RP/0/RP0/CPU0:ASR9K#show filesystem location 0/RP1/CPU0
```

Check inactive packages and remove them before upgrading in XR.

```
RP/0/RP0/CPU0:ASR9K(admin)#install remove inactive
```

Check and delete core files and any other files which are not required in harddisk in XR.

```
RP/0/RP0/CPU0:ASR9K#run
#cd /harddisk:/dumper
```

Remove all unneeded core files using “rm <filename>”

3 Software Upgrade

All System Upgrade related install operations should be done in the admin plane. The optional packages (mpls, mcast, mgbl etc.) that are being installed/upgraded must match the active packages, else the install will fail.

- Download the 6.8.1 image (ASR9K-iosxr-px-k9-6.8.1.tar or ASR9K-iosxr-px-6.8.1.tar) from CCO. Copy tar file to a server and verify the contents of the tar file:

```
tar -tvf ASR9K-iosxr-px-k9-6.8.1.tar
```

- Copy the 6.8.1 tar file to the router harddisk and verify that file is copied successfully:

```
RP/0/RP0/CPU0:ASR9K#scp <user-name>@<server-IP>:<file path>/<image file>
harddisk:/
```

- Verify the md5 checksum of the tar/individual rpms with the original MD5 values on CCO:

```
#md5sum <tar file>
```

- Perform ‘install add’ of the 6.8.1 tar file:

```
RP/0/RP0/CPU0:ASR9K(admin)#install add source harddisk:/ ASR9K-iosxr-px-k9-
6.8.1.tar
```

- Take a note of the install operation id generated by the add operation in previous step:

```
Install operation id# finished successfully
```

- Copy & add recommended SMUs for 6.8.1 if not already in initial tarball (optional):

```
RP/0/RP0/CPU0:ASR9K(admin)#install add source harddisk:/ <SMU tar file>
```

- Activate the mini and pies using the install IDs provided upon completion of the previous operations:

```
RP/0/RP0/CPU0:ASR9K(admin)#install activate id <id1> <id2> prompt none
```

- Router will reload at the end of activation to start using the new packages.



This operation may take up to 30 minutes to complete.

- Verify that all the packages are installed correctly in admin:

```
RP/0/RP0/CPU0:ASR9K(admin)#show install active
```

- Verify system stability through commands described under Check System Stability section (2.2) after router comes up with new software.

- Verify show version to check router is upgraded:

```
Cisco IOS XR Software, Version 6.8.1[Default]
Copyright (c) 2021 by Cisco Systems, Inc.
```

```
ROM: System Bootstrap, Version 17.37(c) 1994-2019 by Cisco Systems, Inc.
```

```
ASR9K uptime is 18 minutes
System image file is "disk0:asr9k-os-mbi-6.8.1/0x100305/mbiasr9k-rsp3.vm"
```

```
cisco ASR9K Series (Pentium Celeron Stepping 3) processor with 16777216K bytes of
memory.
Pentium Celeron Stepping 3 processor at 2405MHz, Revision 2.174
ASR 9906 4 Line Card Slot Chassis
```

```
1 FastEthernet
4 Management Ethernet
24 TenGigE
24 DWDM controller(s)
375k bytes of non-volatile configuration memory.
5985M bytes of hard disk.
93775856k bytes of disk0: (Sector size 512 bytes).
93775856k bytes of disk1: (Sector size 512 bytes).
```

- Check to see if there were startup configurations failed:

```
RP/0/RP0/CPU0:ASR9K#show configuration failed startup
```

- Execute 'install commit' to commit the newly active software (install commit is required after any install activate operation else after router reload, nodes will go back to previously committed software):

```
RP/0/RP0/CPU0:ASR9K(admin)#install commit
```

4 Post-Upgrade Tasks

- Disk cleanup: Once software upgrade has been completed, disk space can be recovered by removing any inactive packages that are no longer needed (if the packages are required at a later time, they can be re-added):

```
RP/0/RP0/CPU0:ASR9K(admin) #install remove inactive all
```

- Verify/fix configuration file system (mandatory):

```
RP/0/RP0/CPU0:ASR9K#cfs check
```

- Verify fpd versions running are current:

```
RP/0/RP0/CPU0:ASR9K(admin) #show hw-module fpd location all
```

5 Other Boot Options (Turboboot/USB)

For Turboboot and USB, Please refer to the chapter ROM Monitor Configuration Guide for Cisco ASR 9000 Series Routers, IOS XR Release 6.6.x:

https://www.cisco.com/c/en/us/td/docs/routers/asr9000/software/asr9k-r6-6/rom-monitor/configuration/guide/b-rommon-cg-asr9000-66x/b-rommon-cg-asr9000-66x_chapter_011.html

6 FPD Upgrade

The fpd auto-upgrade feature, if configured on the router, should take care of fpd upgrade. Manual fpd upgrade can be performed after 6.8.1 upgrade is install committed. Run the “show hw-module fpd location all” command and check which firmware files need to be upgraded by inspecting the Upg/Dng column. If there are any marked ‘Yes’, manual upgrade is required. After manual upgrade, a reload is required for the fpd to take effect. Issue the following command to upgrade FPD:

```
RP/0/RP1/CPU0:ASR9K(admin)#upgrade hw-module fpd all location all
```

Note: Except CBC update, router reload is required after running the “upgrade hw-module fpd all location all” command to make the changes take effect. No reload is required after running the upgrade hw-module fpd cbc location all command as the new CBC firmware will be active. The software automatically resets the local CAN Bus. FPD pie is mandatory for the above steps.

7 Downgrade from 6.8.1 IOS XR Release

7.1 Downgrading IOS XR

There are multiple options to choose from to downgrade IOS XR.

If FPD upgrade was done as part of 6.8.1 installation, FPDs do not need to be updated again once the previously published image is activated.

Option 1: If install commit was not done after upgrade to 6.8.1, a router reload will bring it back to previous install committed image.

Option 2: Use install add, prepare and activate to install a CCO image with a lower version.

Example:

```
install add source hddisk: asr9k-mini-px.pie-6.6.3 ASR9K-iosxr-px-k9-6.6.3.tar
```

```
install prepare id <id>
```

```
install activate id <id> noprompt
```

```
install commit
```

7.2 Post-Downgrade Tasks

- Disk cleanup: Once software upgrade has been completed, disk space can be recovered by removing any inactive packages that are no longer needed. If the packages are required at a later time, they can be re-added:

```
RP/0/RP0/CPU0:ASR9K(admin)#install remove inactive all
```

- Verify/fix configuration file system (mandatory):

```
RP/0/RP0/CPU0:ASR9K#cfs check
```

- Verify fpd versions running are current:

```
RP/0/RP0/CPU0:ASR9K(admin)#show hw-module fpd location all
```

8 Caveats

There are no caveats for System Upgrade to 6.8.1.