

# **Cisco NCS5500**

## **IOS-XR Release 7.8.2**

### **IOS-XR System Upgrade Procedure**

## Table of Contents

|  |           |
|--|-----------|
| <b>1 Introduction.....</b>                         | <b>3</b>  |
| 1.1 Purpose, Scope and Audience .....              | 3         |
| 1.2 Upgrade/downgrade Matrix.....                  | 3         |
| 1.3 Summary of Upgrade Steps .....                 | 4         |
| 1.4 Mandatory SMUs .....                           | 4         |
| 1.5 Packages for Upgrade.....                      | 5         |
| 1.6 Required Package files .....                   | 5         |
| <b>2 Pre-Upgrade Task .....</b>                    | <b>6</b>  |
| 2.1 Configuration Backup .....                     | 6         |
| 2.2 System Stability check.....                    | 7         |
| 2.3 Cost out IGP: .....                            | 8         |
| 2.4 Enable auto-fpd upgrade:.....                  | 8         |
| 2.5 Disk Cleanup: .....                            | 8         |
| <b>3 Software Upgrade .....</b>                    | <b>10</b> |
| <b>4 Post Upgrade Tasks .....</b>                  | <b>13</b> |
| <b>5 Other Boot Options (GISO/IPXE/USB).....</b>   | <b>14</b> |
| <b>6 FPD Upgrade .....</b>                         | <b>15</b> |
| <b>7 Downgrade from 7.8.2 IOS XR Release .....</b> | <b>16</b> |
| 7.1 Post Downgrade Tasks .....                     | 17        |
| <b>8 Caveats.....</b>                              | <b>18</b> |

# 1 Introduction

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## 1.1 Purpose, Scope and Audience

The purpose of this document is to describe the upgrade and downgrade procedure for the Cisco NCS 5500 Series Network Convergence System Router, Release IOS-XR 7.8.2

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

- 1) Simple one command install upgrade process & detailed IOS XR install upgrade process
- 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           |
|---------------------------------|---|--------------|
| NCS5500 Fixed + Modular Chassis | IOS-XR<br>7.3.2/7.4.x/7.5.x/7.6.x/7.7.x/7.8.1 | IOS-XR 7.8.2 |

For older releases, it is recommended to first upgrade to one of the supported releases and then move to the target release. Please refer the corresponding release MoP for known limitation's/caveat's.

**Note:**

Because of kernel changes in 7.6.1, NCS5500 platform needs to be upgraded to 7.3.2 or upto 7.5.2 release first if the running release on the router is < 7.3.1. Once router is upgraded to 7.3.2 or upto 7.5.2 CCO image, please proceed with upgrade to 7.6.1 and higher version release upgrade.

Similarly, for downgrade if the version to be downgraded is <7.3.1, NCS5500 platform needs to be downgraded to 7.5.2 or upto 7.3.2. Once this has been completed, router can be proceeded for lower versions downgrade.

## 1.3 Summary of Upgrade Steps

1. Add the image to the router using tftp, http, sftp, scp. Via install add source
2. Activate the image via install activate
3. Release IOS-XR 7.8.2 introduces the below mentioned PIDs:
  - NA
4. Following cards will not be supported from release IOS-XR 7.8.2:
  - NA

## 1.4 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 |
| R7.3.2  | Including 7.8.2 thirdparty SMUs as part of the upgrade operation is not supported. Please refer to CSCvz86625's RNE for more details | NA             |
| R7.4.1  | Including 7.8.2 thirdparty SMUs as part of the upgrade operation is not supported. Please refer to CSCvz86625's RNE for more details | NA             |
| R7.4.2  | NA   | NA             |
| R7.5.x  | NA   | NA             |
| R7.6.x  | NA   | NA             |
| R7.7.x  | NA   | NA             |
| R7.8.1  | NA   | NA             |

\*Applicable to eXR only.

## 1.5 Packages for Upgrade

Following files are available to download for various boot options:

**Table 2: IOS-XR Software files available for download**

| # | File                       | Contents                         | Comment                           |
|---|----------------------------|----------------------------------|-----------------------------------|
| 1 | NCS5500-iosxr-7.8.2.tar    | NCS 5500 IOS XR Software         | Contains all rpms except k9sec    |
| 2 | NCS5500-iosxr-k9-7.8.2.tar | NCS 5500 IOS XR Software<br>3DES | Contains all rpms including k9sec |
| 3 | ncs5500-usb_boot-7.8.2.zip | NCS 5500 IOS XR Software         | Contains USB Boot Package         |

## 1.6 Required Package files

Mini ISO Package is mandatory to perform the System Upgrade and upgrade needs to be done from XR VM. Additional XR packages listed below are needed depending on the router configuration and required features:

| Description  | Package Name                                 |
|--------------|--|
| Boot Image   | ncs5500-mini-x-7.8.2.iso                     |
| mpls         | ncs5500-mpls-1.0.0.0-r782.x86_64.rpm         |
| mpls-rsvp-te | ncs5500-mpls-te-rsvp-1.0.0.0-r782.x86_64.rpm |
| multicast    | ncs5500-mcast-1.0.0.0-r782.x86_64.rpm        |
| ospf         | ncs5500-ospf-1.0.0.0-r782.x86_64.rpm         |
| isis         | ncs5500-isis-1.0.0.0-r782.x86_64.rpm         |
| li           | ncs5500-li-1.0.0.0-r782.x86_64.rpm           |
| eigrp        | ncs5500-eigrp-1.0.0.0-r782.x86_64.rpm        |
| k9sec        | ncs5500-k9sec-1.0.0.0-r782.x86_64.rpm        |
| mgbl         | ncs5500-mgbl-1.0.0.0-r782.x86_64.rpm         |
| lictrl       | ncs5500-lictrl-1.0.0.0-r782.x86_64.rpm       |
| healthcheck  | ncs5500-healthcheck-1.0.0.0-r782.x86_64.rpm  |

## 2 Pre-Upgrade Task

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Note: Config backup, precheck, Image download, tar file copy to router and install add are hitless operation and can be done outside of MW.

### 2.1 Configuration Backup

- Copy the running-configuration to a harddisk: on the router.

```
RP/0/RP0/CPU0:55XX# copy running-config harddisk:/running_config
```

- Copy the running-configuration to a remote scp server

```
RP/0/RP0/CPU0:55XX#scp harddisk:/<file name> <user_name>@<server ip>:/<path>
```

## 2.2 System Stability check

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

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

## 2.3 Cost out IGP:

Cost-out IGP: To minimize traffic loss during the upgrade please follow below steps:

For OSPF use “max-metric” command.

```
RP/0/RP0/CPU0:55XX(config-ospf)# max-metric router-lsa
```

For ISIS use “set-overload-bit” command.

```
RP/0/RP0/CPU0:55XX(config-isis)# set-overload-bit
```

## 2.4 Enable auto-fpd upgrade:

Enable auto FPD auto upgrade from XR and Sysadmin.

```
RP/0/RP0/CPU0:55XX(config)#fpd auto-upgrade enable
RP/0/RP0/CPU0:55XX(config)#commit
```

## 2.5 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 SMU's to the harddisk ensure 50% free space on the harddisk. Check in Both XR and admin plane

XR:

```
RP/0/RP0/CPU0:55XX# show media location 0/RP0/CPU0
RP/0/RP0/CPU0:55XX# show media location 0/RP1/CPU0
```

Admin:

```
sysadmin-vm:0_RP0# show media location 0/RP0
sysadmin-vm:0_RP0# show media location 0/RP1
```

Check inactive packages and remove them before upgrading in XR and Admin plane.

XR:

```
RP/0/RP0/CPU0:55XX#install remove inactive all
```

Admin:

```
sysadmin-vm:0_RP0# install remove inactive
```



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

XR:

```
RP/0/RP0/CPU0:55XX#run
[xr-vm_node0_RP0_CPU0:~]$cd /misc/disk1
[xr-vm_node0_RP0_CPU0:/misc/disk1]$rm *core*
```


Admin:

```
RP/0/RP0/CPU0:55XX#admin
sysadmin-vm:0_RP0# run
[sysadmin-vm:0_RSP0:~]$ cd /misc/disk1
[sysadmin-vm:0_RSP0:~]$ rm *core*
```

## 3 Software Upgrade

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

- Download IOS-XR 7.8.2 image from CCO.  
Copy tar file to scp server. Verify the contents of the tar file
  - Copy the IOS-XR 7.8.2 tar file to the router harddisk and verify that file is copied successfully  
`RP/0/RP0/CPU0:55XX#scp <user_name>@<server ip>:/<path>/<image> /misc/disk1/.`
  - Verify the md5 checksum of the tar/individual rpms with the original MD5 values on CCO  
`[xr-vm_node0_RP0_CPU0:/misc/disk1]$md5sum NCS5500-iosxr-k9-7.8.2.tar`
  - Perform 'install add' of NCS5500-iosxr-k9-7.8.2.tar file:  
`RP/0/RP0/CPU0:55XX#install add source harddisk:/ NCS5500-iosxr-k9-7.8.2.tar`
  - Take a note of the install operation id generated by the add operation in previous step  
Install operation **id#** finished successfully
  - Add recommended SMUs for IOS-XR 7.8.2 if not already in initial tarball (optional)  
`RP/0/RP0/CPU0:55XX#install add source harddisk: <mandatory SMU tar file>`
  - Take a note of the install operation id generated by the add operation in previous step  
Install operation **id#** finished successfully
  - Prepare the packages added before  
`RP/0/RP0/CPU0:55XX#install prepare id <>`  
Or (if SMU was added)  
`RP/0/RP0/CPU0:55XX#install prepare id <> <>`
  - Activate all the packages  
`RP/0/RP0/CPU0:55XX#install activate`
  - Router will reload at the end of activation to start using the new packages.
-  **Note** This operation may take up to 30 minutes to complete.
- Verify that all the packages are installed correctly in XR and SysAdmin  
`RP/0/RP0/CPU0:55XX#show install active`  
`sysadmin-vm:0_RP0# 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.

```
RP/0/RP0/CPU0:NCS55xx#show version
Cisco IOS XR Software, Version 7.8.2
Copyright (c) 2013-2023 by Cisco Systems, Inc.
```

```
Build Information:
  Built By      : ingunawa
  Built On      : Wed Mar 15 11:17:07 PDT 2023
  Built Host    : iox-ucs-053
  Workspace     : /auto/srcarchive13/prod/7.8.2/ncs5500/ws
  Version       : 7.8.2
  Location      : /opt/cisco/XR/packages/
  Label        : 7.8.2
```

```
cisco NCS-5500 () processor
System uptime is 10 hours 17 minutes
```

- Check to see if there were any failed startup configurations.

```
RP/0/RP0/CPU0:55XX#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/CPU0:55XX#install commit
```

### Single Command Upgrade Example:

- Copy tar file to harddisk and untar it

```
RP/0/RP0/CPU0:55XX#scp <user_name>@<server ip>:/<path>/<image>  
/misc/disk1/install/.
```

```
RP/0/RP0/CPU0:55XX#run  
[xr-vm_node0_RP0_CPU0:~]$cd /misc/disk1/install  
[xr-vm_node0_RP0_CPU0:/misc/disk1/install]$ tar -xvf <tar_filename>
```

- Execute the below mentioned CLI from XR

```
RP/0/RP0/CPU0:55XX#install source harddisk:/install/ ncs5500-mini-x-  
7.8.2.iso noprompt
```

- Perform install commit after router reload

```
RP/0/RP0/CPU0:55XX#install commit
```

## 4 Post Upgrade Tasks

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- 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 later, they can be re-added):

```
RP/0/RP0/CPU0:55XX#install remove inactive all
```

- Verify/fix configuration file system (mandatory):

```
RP/0/RP0/CPU0:55XX#cfs check
```

- Verify fpd versions running are current:

```
RP/0/RP0/CPU0:55XX#show hw-module fpd
```

- Restore IGP metric if changed before the upgrade (this is done from xr vm)

### OSPF

```
RP/0/RP0/CPU0:55XX# (config-ospf)# no max-metric router-lsa
```

### ISIS

```
RP/0/RP0/CPU0:55XX# (config-isis)# no set-overload-bit
```

## 5 Other Boot Options (GISO/IPXE/USB)

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Please refer below for various boot options:

Router Bring up:

<https://www.cisco.com/c/en/us/td/docs/iosxr/ncs5500/system-setup/77x/b-system-setup-cg-ncs5500-77x/m-bring-up-the-router.html>

GISO:

<https://www.cisco.com/c/en/us/td/docs/iosxr/ncs5500/system-setup/77x/b-system-setup-cg-ncs5500-77x/m-golden-iso.html>

IPXE and USB Boot option:

<https://www.cisco.com/c/en/us/td/docs/iosxr/ncs5500/system-setup/77x/b-system-setup-cg-ncs5500-77x/m-perform-disaster-recovery.html>

Please find below the link for more information about installation of optional rpms.

<https://www.cisco.com/c/en/us/td/docs/iosxr/ncs5500/system-setup/77x/b-system-setup-cg-ncs5500-77x/m-performing-system-upgrade-and-installing-packages.html>

## 6 FPD Upgrade

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Fpd auto-upgrade feature if configured on router should take care of fpd upgrade. Manual fpd upgrade can be performed after IOS-XR 7.8.2 upgrade is install committed. Run the “show hw-module fpd” command to check which firmware files need to be upgraded, by inspecting the ‘Status’ column. If there is any ‘NEED UPGD’ marked, 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:router#upgrade hw-module location all fpd all**

### Auto-FPD requirements:

- NA

## 7 Downgrade from 7.8.2 IOS XR Release

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Note

If the target release is 77x, deactivate healthcheck rpm (install deactivate ncs5500-healthcheck-1.0.0.0-r782.x86\_64) on 782 before downgrading the image to 77x. More details captured in CSCwe27780

Downgrade can be performed by following options.

1) Disable fpd auto-upgrade

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

**Option 2:** If downgrade image is part of inactive packages (the mini ISO is broken down into individual ISOs (XR, sysadmin and host) ex – ncs5500-mini-x-7.5.1, ncs5500-xr-7.5.1

install remove ncs5500-mini-x-7.5.1.iso (This will remove the mini as well as individual ISOs) and then install add mini.iso

Install prepare, activate the packages along with iso.

**Option 3:** install add downgrade image iso +rpm, prepare and activate

**Example:**

```
install add source harddisk: <tar file>
```

```
install prepare id 338
```

```
install activate id 338 noprompt
```

**Note:** Please do refer the caveats for known anomalies.

If FPD upgrade was done as part of IOS-XR 7.8.2 installation, FPDs do not need to be updated again once the previously published image is activated.



## 7.1 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 later, they can be re-added):

```
RP/0/RP0/CPU0:55XX#install remove inactive all
```

- Verify/fix configuration file system (mandatory):

```
RP/0/RP0/CPU0:55XX#cfs check
```

- Verify fpd versions running are current:

```
RP/0/RP0/CPU0:55XX#show hw-module fpd
```

- Restore IGP metric if changed before the upgrade (this is done from xr vm)

### OSPF

```
RP/0/RP0/CPU0:55XX(config-ospf)# no max-metric router-lsa
```

### ISIS

```
RP/0/RP0/CPU0:55XX(config-isis)# no set-overload-bit
```

## 8 Caveats

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NA