



ASR9K IOS-XR 64-bit System Upgrade Procedure

**IOS-XR 6.1.x /6.2.x/6.3.x/6.4.x/6.5.x
to
IOS-XR-6.5.3**



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Background

Scope of this document

This document provides information on the two methods available for system upgrade for ASR9K Series platforms from software version 6.1.3/6.1.4/6.2.25/6.3.x/6.4.x to 6.5.3



Note: This document covers eXR to eXR upgrade procedure only.

Platform	From	To
ASR9K Modular Chassis	6.1.3/6.1.4/6.2.25/6.2.3/6.3.x/6.4.x/6.5.x	6.5.3

Cisco Software Manager (CSM) can be used to manage Image, SMUs and SPs. It can help create your own SMU tar ball or find out which SMUs/SPs are applicable to your network. More information on CSM:

- [CSM Download page](#)
- [User Documentation](#)

It's highly recommended that CSM be used to come up with a list of optimized set of SMUs or Service Packs that should be installed on the release that is going to be deployed. SMUs/SP + Major release can be installed together in one install operation to save time and avoid multiple reloads. For more information on Service packs, see the following link, when possible it's always preferred to deploy Service Packs <http://www.cisco.com/c/en/us/support/docs/ios-nx-os-software/ios-xr-software/117550-technote-product-00.pdf>

However, in the absence of CSM, the MOP (Method of Procedure) described in this document can be followed for software upgrade of Cisco ASR 9000 series routers.

Obtain 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:

Package Description	Package Filename
Cisco IOS XR IP Unicast Routing Core Bundle Contains the required core packages, including OS, Admin, Base, Forwarding, Modular Services Card, Routing, SNMP Agent, and Alarm Correlation.	asr9k-mini-x-6.5.3.iso
Cisco IOS XR Manageability Package Telemetry, Extensible Markup Language (XML), Parser, and HTTP server packages, NETCONF, YANG Models, gRPC.	asr9k-mgbl-x64-2.0.0.0-r653.x86_64.rpm
Cisco IOS XR MPLS Package Label Distribution Protocol (LDP), MPLS Forwarding, MPLS Operations, Administration, and Maintenance (OAM), Link Manager Protocol (LMP), Optical User Network Interface (OUNI) and Layer-3 VPN.	asr9k-mpls-x64-2.0.0.0-r653.x86_64.rpm
Cisco IOS XR MPLS-TE and RSVP Package MPLS Traffic Engineering (MPLS-TE) and Resource Reservation Protocol (RSVP).	asr9k-mpls-te-rsvp-x64-2.1.0.0-r653.x86_64.rpm
Cisco IOS XR MCAST Package Contains Automatic Multicast Tunneling (AMT), IGMP Multicast Listener Discovery (MLD), Multicast Source Discovery Protocol (MSDP) and PIM.	asr9k-mcast-x64-2.0.0.0-r653.x86_64.rpm
Cisco IOS XR Security Package Support for Encryption, Decryption, IP Security (IPSec), Secure Shell (SSH), Secure Socket Layer (SSL), and Public-key Infrastructure (PKI)	asr9k-k9sec-x64-2.1.0.0-r653.x86_64.rpm
Cisco IOS XR OSPF Package Open Shortest Path First (OSPF) version 2 for IPv4 and OSPF version 3 for IPv6.	asr9k-ospf-x64-1.0.0.0-r653.x86_64.rpm
Cisco IOS XR IS-IS Package Intermediate System to Intermediate System (IS-IS).	asr9k-isis-x64-1.1.0.0-r653.x86_64.rpm
Cisco IOS XR LI Package Lawful Intercept	asr9k-li-x64-1.1.0.0-r653.x86_64.rpm
Cisco IOS XR BNG Package Broadband Network Gateway	asr9k-bng-x64-1.0.0.0-r653.x86_64.rpm
Cisco IOS XR EIGRP Package Enhanced Interior Gateway Routing Protocol	asr9k-eigrp-x64-1.0.0.0-r653.x86_64.rpm
Cisco IOS XR 9000v nV satellite package nV satellite package for 9000v system	asr9k-9000v-nV-x64-1.0.0.0-r653.x86_64.rpm
Cisco IOS XR Optics Package	asr9k-optic-x64-1.0.0.0-r653.x86_64.rpm

1. Configuration Backup

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

```
router# copy running-config harddisk:<filename>
```

2. Copy the running-configuration to a remote ftp server

```
router# copy running-config tftp://<ftp server IP Address>
```

For Example:


```
copy running-config ftp://user1@223.255.254.254/auto/tftp-gyre/user1/running_cfg
```


2. Install Bridge SMUs

This section lists the Bridge SMUs needed to perform a System Upgrade from 6.1.3/6.1.31/6.1.4/6.2.25/6.2.3/6.3.1/ to 6.5.3 image. Bridge SMUs will be available for download from CCO. Please refer the below table for bridge SMUs. Please install the bridge SMUs before upgrading to 6.5.3

Bridge SMU: Here bridge SMU means all the mandatory SMUs required to upgrade to Target release from Base Release

Base (From) Release	Target (To) Release	Bridge SMU	Install Impact
6.1.3	6.5.3	CSCvf01652 (XR and SYSADMIN)	Hitless
6.1.31	6.5.3	CSCvf01652 (XR and SYSADMIN)	Hitless
6.1.4	6.5.3	CSCvf01652 (XR and SYSADMIN)	Hitless
6.2.25	6.5.3	CSCvf01652 (XR and SYSADMIN)	Hitless
6.3.1	6.5.3	CSCvf01652 (XR and SYSADMIN)	Hitless

 **Note:** No Bridge SMU required for upgrade from 632/64x/65x to 653

 **Note:** Bridge SMU's activation is hitless and reload is not required

Before installing the SMU, run “clear configuration inconsistency from XR

```
router# clear configuration inconsistency
```

- 1) Download bridge SMU tar “ASR9K-iosxr-6.2.25-bridge_smus.tar” from CCO and copy tar file to tftp / scp / ftp server. Few release (for ex 6131) needs pre-req SMUs to upgrade. Download both bridge SMU and verify the contents of the tar file.

```
[root@exr-pxe 6225-FCS]# tar -tvf ASR9K-iosxr-6.2.25-bridge_smus.tar
-rwxrwxrwx root/eng 35950952 2017-12-20 14:31:07 asr9k-infra-5.0.0.5-
r6225.CSCvf01652.x86_64.rpm
-rwxrwxrwx root/eng 3244405 2017-12-20 14:32:29 asr9k-sysadmin-system-6.2.25-
r6225.CSCvf01652.arm.rpm
-rwxrwxrwx root/eng 3269942 2017-12-20 14:32:29 asr9k-sysadmin-system-6.2.25-
r6225.CSCvf01652.x86_64.rpm
[root@exr-pxe root]#
```

- 2) Copy the tar file to the router harddisk:

```
router# copy <scp, ftp or tftp source> harddisk:
```

Example (ftp):

```
RP/0/RSP0/CPU0:AGN_PE_13_9k#copy ftp://user1@223.255.254.245/auto/tftp-
gud/sit/6.2.25/exr/CCO-
SMU/asr9k-x64-6.2.25.CSCvf01652.tar harddisk:
Destination filename [/harddisk:/asr9k-x64-6.2.25.CSCvf01652.tar]?
Accessing ftp://223.255.254.245/auto/tftp-gud/sit/6.2.25/exr/CCO-SMU/asr9k-x64-
6.2.25.CSCvf01652.tar
CCCCC
1536000 bytes copied in      1 sec ( 955818)bytes/sec
RP/0/RSP0/CPU0:AGN_PE_13_9k#copy ftp://user1@223.255.254.245/auto/tftp-
gud/sit/6.2.25/exr/CCO-
SMU/asr9k-sysadmin-6.2.25.CSCvf01652.tar harddisk:
Destination filename [/harddisk:/asr9k-sysadmin-6.2.25.CSCvf01652.tar]?
Accessing ftp://223.255.254.245/auto/tftp-gud/sit/6.2.25/exr/CCO-SMU/asr9k-
sysadmin-
6.2.25.CSCvf01652.tar
CCCCCCCCCCCCCCCC
4136960 bytes copied in      4 sec ( 946239)bytes/sec
```

- 3) Verify that is copied to the harddisk correctly.

```
RP/0/RSP0/CPU0:AGN_PE_13_9k#dir harddisk:/ | i CSCvf01652
Wed Aug 22 14:05:01.898 EDT
    44 -rwxr--r-- 1    4136960 Aug 22 14:03 asr9k-sysadmin-6.2.25.CSCvf01652.tar
   379 -rwxr--r-- 1    1536000 Aug 22 14:03 asr9k-x64-6.2.25.CSCvf01652.tar
```

Now that you've copied the bridge SMUs to the correct location on the router, we can proceed with installing bridge SMUs as detailed below.

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

```
[xr-vm_node0_RSP0_CPU0:/harddisk:]$ md5sum asr9k-x64-6.2.25.CSCvf01652.tar
2c9a36c27f1aa2c67bab7fee3f04541d asr9k-x64-6.2.25.CSCvf01652.tar [xr-
vm_node0_RSP0_CPU0:/harddisk:]$ md5sum asr9k-sysadmin-6.2.25.CSCvf01652.tar
e4f91bcbdb443b63db37fdc31c854df30 asr9k-sysadmin-6.2.25.CSCvf01652.tar
```

- 5) Add SMU from XR VM Plane:

```
RP/0/RSP0/CPU0:AGN_PE_13_9k#install add source harddisk:/ asr9k-x64-
6.2.25.CSCvf01652.tar
Wed Aug 22 15:30:18.050 EDT
Aug 22 15:30:19 Install operation 348 started by lab:
  install add source harddisk:/ asr9k-x64-6.2.25.CSCvf01652.tar
Aug 22 15:30:20 Install operation will continue in the background
RP/0/RSP1/CPU0:A9910-F2501#Aug 22 15:30:26 Install operation 348 finished
successfully
RP/0/RSP0/CPU0:AGN_PE_13_9k#install add source harddisk:/ asr9k-sysadmin-
6.2.25.CSCvf01652.tar
Wed Aug 22 15:31:03.883 EDT
Aug 22 15:31:05 Install operation 349 started by lab:
  install add source harddisk:/ asr9k-sysadmin-6.2.25.CSCvf01652.tar
Aug 22 15:31:06 Install operation will continue in the background
RP/0/RSP1/CPU0:A9910-F2501#Aug 22 15:31:12 Install operation 349 finished
successfully
```

- 6) Note down the install id of successful install operation in step 5:

```
router#install prepare id <install id of install add operation>
```

```
RP/0/RSP0/CPU0:AGN_PE_13_9k#install prepare id 348
Wed Aug 22 15:32:50.472 EDT
Aug 22 15:32:51 Install operation 351 started by lab:
  install prepare id 348
Aug 22 15:32:51 Package list:
Aug 22 15:32:51      asr9k-iosxr-infra-64-3.0.0.1-r6225.CSCvf01652.x86_64
Aug 22 15:32:55 Install operation will continue in the background
RP/0/RSP0/CPU0:AGN_PE_13_9k#Aug 22 15:33:37 Install operation 351 finished
successfully
```

7) Perform install activation operation (on xr prompt and admin prompt)

```
RP/0/RSP0/CPU0:AGN_PE_13_9k# install activate
Wed Aug 22 15:51:37.670 EDT
Aug 22 15:51:39 Install operation 359 started by lab:
  install activate
Aug 22 15:51:40 Install operation will continue in the background
RP/0/RSP0/CPU0:AGN_PE_13_9k#
```

8) Verify SMUs are installed successfully (on xr and admin)

```
RP/0/RSP0/CPU0:AGN_PE_13_9k# sh install active summary
Wed Aug 22 16:05:31.050 EDT
  Active Packages: 14
    asr9k-xr-6.2.25 version=6.2.25 [Boot image]
    asr9k-eigrp-x64-1.0.0.0-r6225
    asr9k-isis-x64-1.2.0.0-r6225
    asr9k-mpls-x64-2.0.0.0-r6225
    asr9k-mpls-te-rsvp-x64-1.3.0.0-r6225
    asr9k-ospf-x64-1.0.0.0-r6225
    asr9k-mgbl-x64-2.0.0.0-r6225
    asr9k-mcast-x64-2.1.0.0-r6225
    asr9k-m2m-x64-2.0.0.0-r6225
    asr9k-li-x64-1.1.0.0-r6225
    asr9k-optic-x64-1.0.0.0-r6225
    asr9k-k9sec-x64-2.2.0.0-r6225
    asr9k-9000v-nV-x64-1.0.0.0-r6225
    asr9k-iosxr-infra-64-3.0.0.1-r6225.CSCvf01652

RP/0/RSP0/CPU0:AGN_PE_13_9k# show install active summary
Wed Aug 22 20:06:33.374 UTC
  Active Packages: 2
    asr9k-sysadmin-6.2.25 version=6.2.25 [Boot image]
    asr9k-sysadmin-system-6.2.25.1-r6225.CSCvf01652
```

9) Commit the active SMUs

```
RP/0/RSP0/CPU0:AGN_PE_13_9k# install commit
Wed Aug 22 16:10:25.801 EDT
Aug 22 16:10:27 Install operation 360 started by lab:
  install commit
Aug 22 16:10:28 Install operation will continue in the background
RP/0/RSP0/CPU0:AGN_PE_13_9k# Aug 22 16:10:36 Install operation 360 finished
successfully
```


3. Pre-Upgrade Tasks

3.1 System Stability Check

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

Command	Description
<code>show platform</code>	verify that all nodes are in "OPERATIONAL" state
<code>show platform vm</code>	verify that all nodes are in "FINAL Band" state
<code>show redundancy</code>	verify that a Standby RP is available and in "ready" state
<code>show ipv4 interface brief <or> show ipv6 interface brief <or> show interface summary</code>	verify that all necessary interfaces are "UP"
<code>show install active</code>	verify that the proper set of packages are active
<code>admin show install active</code>	verify that the proper set of packages are active on sysadmin plane
<code>show install commit</code>	verify that the proper set of committed packages are same as active. If not, execute 'install commit'
<code>cfs check/clear configuration inconsistency</code>	verify/fix configuration file system
<code>show hw-module fpd</code>	Ensure all the FPD versions status are CURRENT
<code>show pfm location all</code>	Ensure no errors are present

Please refer to “**Field Programmable Versions Document**” for FPD version information.

1) To minimize traffic loss during the upgrade please follow below steps:

- Make sure that all the traffic flowing through the router which needs to be upgraded has an alternate path. In this scenario, one can take one of the redundant routers out of service, upgrade it and then bring it back into service without any significant traffic loss (this should work for the core routers, for the edge devices usually the redundant path may not be available)
- Set IGP metric to the highest possible value so the IGP will try to route the traffic through the alternate path.



Note: Config changes of IGP metric may cause traffic loss.

For OSPF use “max-metric” command.

```
router(config-ospf)# max-metric router-lsa
```

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

```
router(config-isis)# set-overload-bit
```

- After all the software is upgraded restore the IGP metric by removing the commands:

OSPF

```
router(config-ospf)# no max-metric router-lsa
```

ISIS

```
router(config-isis)# no set-overload-bit
```

2) **Enable auto FPD auto upgrade from XR and Sysadmin.**

```
RP/0/RSP0/CPU0:AGN_PE_13_9k(config)#fpd auto-upgrade enable
RP/0/RSP0/CPU0:AGN_PE_13_9k (config)#commit
RP/0/RSP0/CPU0:AGN_PE_13_9k# sh run fpd auto-upgrade
Wed Aug 22 16:18:58.244 EDT
fpd auto-upgrade enable

#admin
Thu Aug 22 16:22:29.745 EDT
admin connected from 127.0.0.1 using console on xr-vm_node0_RP0_CPU0
sysadmin-vm:0_RP0# config t
Thu Aug 22 16:23:16.796 EDT
Entering configuration mode terminal
sysadmin-vm:0_RP0(config)# fpd auto-upgrade enable
sysadmin-vm:0_RP0(config)# commit
sysadmin Thu Aug 09 -vm:0_RP0# show run fpd
Thu Aug 22 16:23:54.867 EDT
fpd auto-upgrade enable
```

3) **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.**

```
sysadmin-vm:0_RP1# show media
Thu Aug 22 16:26:31.460 EDT
```

Partition	Size	Used	Percent	Avail
rootfs:	2.4G	902M	40%	1.4G
install:	7.4G	1.6G	23%	5.4G
harddisk:/tftpboot	31G	2.6G	9%	27G
harddisk:	38G	607M	2%	35G
log:	459M	167M	40%	258M
config:	459M	24M	6%	401M
disk0:	2.0G	47M	3%	1.8G
rootfs:/mnt/plog	15M	512K	4%	14M
install:/tmp	7.4G	1.6G	23%	5.4G
install:/cache	7.4G	1.6G	23%	5.4G
rootfs:/install/tmp	7.4G	1.6G	23%	5.4G

```
rootfs: = root file system (read-only)
log:    = system log files (read-only)
config: = configuration storage (read-only)
install: = install repository (read-only)
sysadmin-vm:0_RP1#
```

4) Check inactive packages and remove them before upgrading.

XR:

```
RP/0/RSP0/CPU0:AGN_PE_13_9k#install remove inactive
Thu Aug 22 23:23:48 Install operation 179 started by root:
install remove inactive
Thu Aug 22 23:23:49 Install operation will continue in the background
RP/0/RSP0/CPU0:AGN_PE_13_9k#Install operation 179 finished successfully
```

Sysadmin:

```
sysadmin-vm:0_RP0# show install inactive
Thu Aug 22 23:23:54.796 EDT
Node 0/RP0 [RP]
Inactive Packages:
asr9k-sysadmin-system-6.3.1.2-r631.CSCvf01652
asr9k-sysadmin-6.3.1.36I
asr9k-sysadmin-6.3.1

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

5) Check health of the system before proceeding to install upgrade operation

```
sysadmin-vm:0_RSP0# show install health
Thu Aug 16 15:50:59.649 UTC
Platform is: asr9k
Collecting Cards Information
Collecting Sysadmin VMs Information
Collecting XR VMs Information
Verifying all the required VMs are running.
Pass: All required VMs are Running
Collecting sysadmin VMs data
Collecting Host data
Collecting XR VMs data
Collecting Lead VMs data
Verifying Test Plugins
Verifying Plugins results
Verifying Result for:cal_version
Verifying Result for:cal_smus
Verifying Result for:cal_local_active_swp
Verifying Result for:cal_local_committed_swp
Verifying Result for:cal_disk_space
Verifying Result for:cal_marker_files
Verifying Result for:cal_mount_points
Verifying Result for:cal_stale_symlinks
Verifying Result for:cal_prepared_packages
Verifying Result for:cal_master_active_swp
Verifying Result for:cal_master_committed_swp
Verifying Result for:xr_master_active_swp
Verifying Result for:xr_master_committed_swp
Verifying Result for:xr_local_active_swp
Verifying Result for:xr_local_committed_swp
Verifying Result for:cal_tftp_boot_image_version
Verifying Result for:cal_image
Verifying Result for:system_image_version
Verifying Result for:system_image_stale_symlink
Verifying Result for:host_version
Verifying Result for:host_smus
Verifying Result for:xr_version
Verifying Result for:xr_smus
```

```
Verifying Result for:xr_disk_space
Verifying Result for:xr_marker_files
Verifying Result for:xr_mount_points
Verifying Result for:xr_stale_symlinks
Verifying Result for:xr_prepared_packages
*****
System is in Consistent State. You can go ahead with next operation.
*****
Total time taken: 9.98123979568 seconds.
```

4. Upgrade

4.1 CLASSIC METHOD

All System Upgrade related install operations should be done in the XR VM plane.

SKIP THIS SECTION IF 'install update' CLI IS THE PREFERRED METHOD TO PERFORM A SYSTEM UPGRADE AND CONTINUE TO NEXT SECTION (4.2. Upgrade – 'install update' CLI Method)

- 1) Download 6.5.3 mini ISO and packages tar and SMUs from CCO.

Copy tar file to tftp / scp / ftp server. Verify the contents of the tar file"

```
echien-cel# tar -tvf ASR9K-x64-iosxr-px-k9-6.5.3.tar
-rw-r--r-- vram/eng 27600097 2019-03-26 10:07 asr9k-9000v-nV-x64-1.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 6646680 2019-03-26 10:22 asr9k-bng-x64-1.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 596928 2019-03-26 10:07 asr9k-eigrp-x64-1.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 3114750 2019-03-26 10:08 asr9k-isis-x64-1.1.0.0-r653.x86_64.rpm
-rwxr-x--- vram/crypto 7558220 2019-03-26 10:07 asr9k-k9sec-x64-2.1.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 493126 2019-03-26 10:08 asr9k-li-x64-1.1.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 5259 2019-03-26 10:22 asr9k-m2m-x64-2.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 14338264 2019-03-26 10:10 asr9k-mcast-x64-2.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 29154478 2019-03-26 10:08 asr9k-mgbl-x64-2.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 10144215 2019-03-26 10:07 asr9k-mpls-te-rsvp-x64-2.1.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 2581932 2019-03-26 10:07 asr9k-mpls-x64-2.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 96061 2019-03-26 10:06 asr9k-optic-x64-1.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 4097070 2019-03-26 10:07 asr9k-ospf-x64-1.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng 1078 2019-03-26 19:40 README-ASR9K-x64-iosxr-px-k9-6.5.3.txt
```

- 2) Copy the 6.5.3 tar file to the router harddisk and verify that file is copied successfully

```
RP/0/RSP0/CPU0:AGN_PE_13_9k# scp root@1.56.24.1:/auto/tftp-
gyre/user/user1/633sit/images/cco/ASR9K- iosxr-k9-6.5.3.tar harddisk:
Thu Aug 09 09:37:32.591 UTC
Connecting to 1.56.24.1...
Password:
Transferred 1150730240 Bytes
1150730240 bytes copied in 62 sec (18382565)bytes/sec
```

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

```
[xr-vm_node0_RP0_CPU0:/misc/disk1]$md5sum ASR9K-x64-iosxr-px-k9-6.5.3.tar
69c39e9154c714ff3d618ca55ff8d573 ASR9K-x64-iosxr-px-k9-6.5.3.tar
[xr-vm_node0_RP0_CPU0:/misc/disk1]$
```

- 4) Perform 'install add' of 6.5.3 tar file:

```
Thu Aug 12 23:42:53 Install operation 180 started by root:
install add source ftp://user1@223.255.254.245/auto/tftp-
gud/sit/6.3.3/exr/current asr9k_x64_25I.tar
Thu Aug 09 23:42:54 Action 1: install add action started
Thu Aug 09 23:42:55 Install operation will continue in the background
Aug 22 00:17:12 Packages added:
```

```

Aug 22 00:17:12      asr9k-mini-x64-6.3.3
Aug 22 00:17:12      asr9k-mpls-te-rsvp-x64-2.1.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-isis-x64-1.2.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-mpls-x64-2.0.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-k9sec-x64-3.2.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-li-x64-1.1.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-eigrp-x64-1.0.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-bng-x64-1.0.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-mgbl-x64-3.0.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-mcast-x64-2.0.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-optic-x64-1.0.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-ospf-x64-1.0.0.0-r653.x86_64
Aug 22 00:17:12      asr9k-9000v-nV-x64-1.0.0.0-r653.x86_64
Aug 22 00:17:12 Action 1: install add action finished successfully
Aug 22 00:17:14 Install operation 180 finished successfully
Aug 22 00:17:14 Ending operation 180

```

5) Take a note of the install operation id generated by the add operation in step 4)

```

Install operation 180 finished successfully

```

6) Prepare the packages added in step 4)

```

RP/0/RSP0/CPU0:AGN_PE_13_9k#install prepare id 180
Thu Aug 22 13:15:13:58:39.293 UTC
Aug 22 13:15:40 Install operation 181 started by root:
install prepare id 180
Aug 09 18:23:22 Package list:
Aug 09 18:23:22      asr9k-mpls-te-rsvp-x64-2.1.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-mpls-x64-2.0.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-9000v-nV-x64-1.0.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-isis-x64-1.1.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-mgbl-x64-3.0.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-li-x64-1.1.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-optic-x64-1.0.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-k9sec-x64-3.2.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-ospf-x64-1.0.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-eigrp-x64-1.0.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-bng-x64-1.0.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-mcast-x64-2.0.0.0-r653.x86_64
Aug 09 18:23:22      asr9k-mini-x64-6.3.3
Aug 09 18:23:57 Install operation will continue in the background
Aug 09 18:46:11 Install operation 187 finished successfully

```

7) Check if install prepare is successful

```

RP/0/RSP0/CPU0:AGN_PE_13_9k##show install prepare
Thu Aug 09 10:14:09.192 UTC
Prepared Boot Image:  asr9k-mini-x-6.5.3
Restart Type: Reboot
Prepared Packages:
asr9k-xr-6.5.3 version=6.5.3 [Boot image]
asr9k-mcast-2.0.0.0-r653
asr9k-mpls-2.0.0.0-r653
asr9k-mgbl-2.0.0.0-r653
asr9k-mpls-te-rsvp-2.1.0.0-r653
asr9k-ospf-1.0.0.0-r653
asr9k-isis-1.1.0.0-r653
asr9k-li-1.1.0.0-r653
asr9k-k9sec-3.2.0.0-r653
Use the "install activate" command to activate the prepared packages.

```

Use the "install prepare clean" command to undo the install prepare operation.

8) Check 'show install log' is successful and for any errors

```
RP/0/RSP0/CPU0:AGN_PE_13_9k##show install log 181
Thu Aug 09 10:16:42.439 UTC
Aug 09 09:58:40 Install operation 181 started by root:
  install prepare id 118
Aug 09 13:15:14 Package list:
Aug 09 13:15:15   asr9k-isis-1.1.0.0-r653.x86_64
Aug 09 13:15:15   asr9k-mpls-te-rsvp-2.1.0.0-r653.x86_64
Aug 09 13:15:15   asr9k-mcast-2.0.0.0-r653.x86_64
Aug 09 13:15:15   asr9k-mpls-2.0.0.0-r653.x86_64
Aug 09 13:15:15   asr9k-mgbl-34.0.0.0-r653.x86_64
Aug 09 13:15:15   asr9k-mini-x-6.3.3
Aug 09 13:15:15   asr9k-li-1.1.0.0-r653.x86_64
Aug 09 13:15:15   asr9k-ospf-1.0.0.0-r653.x86_64
Aug 09 13:15:15   asr9k-k9sec-3.2.0.0-r653.x86_64
Aug 09 09:58:46 Action 1: install prepare action started
Aug 09 13:15:46 Install operation will continue in the background
Aug 09 13:15:07 The prepared software is set to be activated with reload upgrade
Aug 09 13:15:07 Start preparing new VM for reload upgrade
Aug 09 13:15:48 All the above nodes completed System Upgrade prepare.
Aug 09 13:15:48 Action 1: install prepare action finished successfully
Aug 09 13:15:52 Install operation 119 finished successfully
Aug 09 13:15:52 Ending operation 119
```

9) Activate all the packages prepared in step 5

```
RP/0/RSP0/CPU0:AGN_PE_13_9k##install activate
```

10) Respond 'yes' to the reload prompt (sample output below):

```
RP/0/RSP0/CPU0:AGN_PE_13_9k#install activate
Thu Aug 09 10:17:23.552 UTC
Aug 09 10:17:24 Install operation 120 started by root:
  install activate
This install operation will reload the sdr, continue?
[yes/no]:[yes] yes
Aug 09 10:18:32 Install operation will continue in the background
```

11) 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.

12) Verify that all the packages are installed correctly in XR and SysAdmin

```
RP/0/RSP0/CPU0:AGN_PE_13_9k##show install active
sysadmin-vm:0_RP0# show install active
```

- 13) 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:AGN_PE_13_9k#install commit
```

- 14) Verify system stability through commands described under Check System Stability section (2.1) after router comes up with new software

- 15) Verify show version to check router is upgraded to 6.5

```
RP/0/RP0/CPU0:AUTO-ASR9912-I2201#sh version
Fri Mar 29 00:30:18.907 UTC
Cisco IOS XR Software, Version 6.5.3
Copyright (c) 2013-2019 by Cisco Systems, Inc.

Build Information:
  Built By       : ahoang
  Built On       : Tue Mar 26 07:18:24 PDT 2019
  Built Host     : iox-ucs-018
  Workspace      : /auto/srcarchive13/prod/6.5.3/asr9k-x64/ws
  Version        : 6.5.3
  Location       : /opt/cisco/XR/packages/
  Label          : 6.5.3-stsgiso

cisco ASR9K () processor
System uptime is 3 hours 5 minutes

RP/0/RP0/CPU0:AUTO-ASR9912-I2201#
```

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

```
router#show configuration failed startup
```

- 17) Add recommended SMUs for 6.5.3 if not already in initial tarball (optional)

```
router#install add source harddisk: <mandatory SMU tar file for 6.3.3>
```

- 18) Activate the recommended SMUs (if recommended smu's in step 16 were added)

```
router#install activate id <add id of step 17>
```

- 19) Enter 'yes' to reload prompt

- 20) After system comes up from reload, execute 'install commit'

4.2 Upgrade – 'install update' CLI Method

All System Upgrade related install operations should be done in the XR VM plane.

Skip this section if section '4.1. Upgrade – Classic Method' has been performed

- 1) Download 6.5.3 mini ISO and packages tar (ASR9K-x64-iosxr-px-k9-6.5.3.tar) and SMUs from CCO. Copy tar file to tftp / scp / ftp server directory.
- 2) Extract tar file to the directory. Also, extract all 6.5.3 mandatory SMUs and copy to the same directory.

```
• echien-cel# tar -xvf ASR9K-x64-iosxr-px-k9-6.5.3.tar
• asr9k-9000v-nV-x64-1.0.0.0-r653.x86_64.rpm
• asr9k-bng-x64-1.0.0.0-r653.x86_64.rpm
• asr9k-eigrp-x64-1.0.0.0-r653.x86_64.rpm
• asr9k-isis-x64-1.1.0.0-r653.x86_64.rpm
• asr9k-k9sec-x64-2.1.0.0-r653.x86_64.rpm
• asr9k-li-x64-1.1.0.0-r653.x86_64.rpm
• asr9k-m2m-x64-2.0.0.0-r653.x86_64.rpm
• asr9k-mcast-x64-2.0.0.0-r653.x86_64.rpm
• asr9k-mgbl-x64-2.0.0.0-r653.x86_64.rpm
• asr9k-mpls-te-rsvp-x64-2.1.0.0-r653.x86_64.rpm
• asr9k-mpls-x64-2.0.0.0-r653.x86_64.rpm
• asr9k-optic-x64-1.0.0.0-r653.x86_64.rpm
• asr9k-ospf-x64-1.0.0.0-r653.x86_64.rpm
• README-ASR9K-x64-iosxr-px-k9-6.5.3.txt
```

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

```
[xr-vm_node0_RP0_CPU0:/misc/disk1]$md5sum ASR9K-x64-iosxr-px-k9-6.5.3.tar
69c39e9154c714ff3d618ca55ff8d573 ASR9K-x64-iosxr-px-k9-6.5.3.tar
[xr-vm_node0_RP0_CPU0:/misc/disk1]$
```

- 4) Perform System Upgrade using 'install update' CLI.



Note 1: In 6.1.2 and beyond, no prompt option is introduced and can be use.

```
RP/0/RP0/CPU0:ios#install upgrade source
scp://root@10.8.26.240/nobackup/images/653_CCO/asr9k-x64 version 6.5.3
Fri Mar 29 04:13:59.160 UTC
+++++
Install operation 6 started by root:
exec-timeout is suspended.
No install operation in progress at this moment
Enter password for root@10.8.26.240:
Scheme : scp
Hostname : 10.8.26.240
Username : root
SourceDir : nobackup/images/653_CCO/asr9k-x64
Collecting software state..
Getting platform
Getting supported architecture
Getting active packages from XR
```

```

Getting inactive packages from XR
Getting list of RPMs in local repo
Getting list of provides of all active packages
Getting provides of each rpm in repo
Getting requires of each rpm in repo
Fetching .... asr9k-mini-x64-6.5.3.iso
Fetching .... asr9k-k9sec-x64-2.1.0.0-r653.x86_64.rpm
Fetching .... asr9k-isis-x64-1.1.0.0-r653.x86_64.rpm
Fetching .... asr9k-9000v-nV-x64-1.0.0.0-r653.x86_64.rpm
Fetching .... asr9k-li-x64-1.1.0.0-r653.x86_64.rpm
Fetching .... asr9k-mpls-x64-2.0.0.0-r653.x86_64.rpm
Fetching .... asr9k-bng-x64-1.0.0.0-r653.x86_64.rpm
Fetching .... asr9k-optic-x64-1.0.0.0-r653.x86_64.rpm
Fetching .... asr9k-mcast-x64-2.0.0.0-r653.x86_64.rpm
Fetching .... asr9k-mgbl-x64-3.0.0.0-r653.x86_64.rpm
Fetching .... asr9k-eigrp-x64-1.0.0.0-r653.x86_64.rpm
Fetching .... asr9k-mpls-te-rsvp-x64-1.3.0.0-r653.x86_64.rpm
Fetching .... asr9k-m2m-x64-2.0.0.0-r653.x86_64.rpm
Fetching .... asr9k-ospf-x64-1.0.0.0-r653.x86_64.rpm
Adding packages
    asr9k-eigrp-x64-1.0.0.0-r653.x86_64.rpm
    asr9k-m2m-x64-2.0.0.0-r653.x86_64.rpm
    asr9k-optic-x64-1.0.0.0-r653.x86_64.rpm
    asr9k-ospf-x64-1.0.0.0-r653.x86_64.rpm
    asr9k-mgbl-x64-3.0.0.0-r653.x86_64.rpm
    asr9k-isis-x64-1.1.0.0-r653.x86_64.rpm
    asr9k-mini-x64-6.5.3.iso
    asr9k-k9sec-x64-2.1.0.0-r653.x86_64.rpm
    asr9k-mpls-x64-2.0.0.0-r653.x86_64.rpm
    asr9k-9000v-nV-x64-1.0.0.0-r653.x86_64.rpm
    asr9k-li-x64-1.1.0.0-r653.x86_64.rpm
    asr9k-mpls-te-rsvp-x64-2.1.0.0-r653.x86_64.rpm
    asr9k-bng-x64-1.0.0.0-r653.x86_64.rpm
    asr9k-mcast-x64-2.0.0.0-r653.x86_64.rpm
Install add operation successful
Activating asr9k-mpls-te-rsvp-x64-2.1.0.0-r653 asr9k-eigrp-x64-1.0.0.0-r653 asr9k-
m2m-x64-2.0.0.0-r653 asr9k-mcast-x64-2.0.0.0-r653 asr9k-li-x64-1.1.0.0-r653 asr9k-
mini-x64-6.5.3 asr9k-bng-x64-1.0.0.0-r653 asr9k-mgbl-x64-3.0.0.0-r653 asr9k-optic-
x64-1.0.0.0-r653 asr9k-ospf-x64-1.0.0.0-r653 asr9k-k9sec-x64-2.1.0.0-r653 asr9k-
isis-x64-1.1.0.0-r653 asr9k-9000v-nV-x64-1.0.0.0-r653 asr9k-mpls-x64-2.0.0.0-r653
Aug 09 12:44:02 Install operation 320 started by root:
    install activate pkg asr9k-mpls-te-rsvp-x64-2.1.0.0-r653 asr9k-eigrp-x64-
1.0.0.0-r653 asr9k-m2m-x64-2.0.0.0-r653 asr9k-mcast-x64-2.0.0.0-r653 asr9k-li-x64-
1.1.0.0-r653 asr9k-mini-x64-6.5.3 asr9k-bng-x64-1.0.0.0-r653 asr9k-mgbl-x64-
3.0.0.0-r653 asr9k-optic-x64-1.0.0.0-r653 asr9k-ospf-x64-1.0.0.0-r653 asr9k-k9sec-
x64-2.1.0.0-r653 asr9k-isis-x64-1.1.0.0-r653 asr9k-9000v-nV-x64-1.0.0.0-r653
asr9k-mpls-x64-2.0.0.0-r653 noprompt
Aug 09 12:44:02 Package list:
Aug 09 12:44:02     asr9k-mpls-te-rsvp-x64-2.1.0.0-r653
Aug 09 12:44:02     asr9k-eigrp-x64-1.0.0.0-r653
Aug 09 12:44:02     asr9k-m2m-x64-2.0.0.0-r653
Aug 09 12:44:02     asr9k-mcast-x64-2.0.0.0-r653
Aug 09 12:44:02     asr9k-li-x64-1.1.0.0-r653
Aug 09 12:44:02     asr9k-mini-x64-6.5.3
Aug 09 12:44:02     asr9k-bng-x64-1.0.0.0-r653
Aug 09 12:44:02     asr9k-mgbl-x64-3.0.0.0-r653
Aug 09 12:44:02     asr9k-optic-x64-1.0.0.0-r653
Aug 09 12:44:02     asr9k-ospf-x64-1.0.0.0-r653
Aug 09 12:44:02     asr9k-k9sec-x64-2.1.0.0-r653
Aug 09 12:44:02     asr9k-isis-x64-1.1.0.0-r653
Aug 09 12:44:02     asr9k-9000v-nV-x64-1.0.0.0-r653
Aug 09 12:44:02     asr9k-mpls-x64-2.0.0.0-r653
Aug 09 12:45:04 Install operation will continue in the background

```

```
This install operation will reload the system, continue?  
[yes/no]:[yes]
```

```
exec-timeout is resumed.
```

```
RP/0/RP0/CPU0:LS1#Aug 09 13:12:30 Install operation 320 finished successfully  
Connection closed by foreign host.
```

- 5) Respond 'yes' to the reload prompt (sample output above). This step can be skipped if no prompt option was used in step 3.
- 6) After user enter 'yes' to the reload prompt router will reload at the end of activation to start using the new packages. [This step can be skipped if no prompt option was used in step 4.]



Note: This operation may take up to 30 minutes to complete.

- 7) Verify that all the packages are installed correctly in XR and sysadmin

- RP/0/RP0/CPU0:AUTO-ASR9912-I2201#sh install active
- Fri Mar 29 00:02:09.757 UTC
- Node 0/RP0/CPU0 [RP]
- Boot Partition: xr_lv6
- Active Packages: 14
 - asr9k-xr-6.5.3 version=6.5.3 [Boot image]
 - asr9k-optic-x64-1.0.0.0-r653
 - asr9k-mpls-x64-2.0.0.0-r653
 - asr9k-9000v-nV-x64-1.0.0.0-r653
 - asr9k-eigrp-x64-1.0.0.0-r653
 - asr9k-k9sec-x64-2.1.0.0-r653
 - asr9k-mpls-te-rsvp-x64-2.1.0.0-r653
 - asr9k-ospf-x64-1.0.0.0-r653
 - asr9k-li-x64-1.1.0.0-r653
 - asr9k-isis-x64-1.1.0.0-r653
 - asr9k-mgbl-x64-2.0.0.0-r653
 - asr9k-mcast-x64-2.0.0.0-r653
 - asr9k-m2m-x64-2.0.0.0-r653
 - asr9k-bng-x64-1.0.0.0-r653

- 8) Verify show version to check router is upgraded to 653.

```
RP/0/RP0/CPU0:AUTO-ASR9912-I2201#sh version  
Fri Mar 29 00:00:47.053 UTC  
Cisco IOS XR Software, Version 6.5.3  
Copyright (c) 2013-2019 by Cisco Systems, Inc.
```

```
Build Information:
```

```
Built By   : ahoang  
Built On   : Tue Mar 26 07:18:24 PDT 2019  
Built Host : iox-ucs-018
```

```
Workspace : /auto/srcarchive13/prod/6.5.3/asr9k-x64/ws
Version   : 6.5.3
Location  : /opt/cisco/XR/packages/
Label     : 6.5.3-stsgiso
```

```
cisco ASR9K () processor
System uptime is 2 hours 35 minutes
```

- 9) 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)

```
router#install commit
```

- 10) Verify system stability through commands described under Check System Stability section (2.1) after router comes up with new software

- 11) Check to see if there were any failed startup config.

```
router#show configuration failed startup
```


4.3 Upgrade – GISO method

Golden ISO (GISO) is a customized ISO that a user can build to suit the installation requirement. The user can customize the installable image to include the standard base image with the basic functional components, and add additional RPMs, SMUs and configuration files based on requirement.

The customized ISO is built using Golden ISO (GISO) build script gisobuild.py available on the CCO tar file. It is also available on ASR9K-eXR box under /pkg/bin in XR domain.

Please refer to the CCO documentation as below on how to customize installation using GISO.

https://www.cisco.com/c/en/us/td/docs/iosxr/asr9000/flex-packaging/b-flexible-packaging-configuration-guide-asr9000/b-flexible-packaging-configuration-guide-asr9000_chapter_011.html

 **Note:** If you have an NCS500x configured as a satellite on ASR9k-eXR host, additional steps are required to upgrade the image for Cisco NCS 500x Satellite. Please refer to the section “*Image upgrade for Cisco NCS500x Satellite from Cisco IOS XR Software Release 6.0.0*” from below:

https://www.cisco.com/c/en/us/td/docs/routers/asr9000/software/asr9k-r6-3/nv/configuration/guide/b-nv-system-cg-asr9000-63x/b-nv-system-cg-asr9000-63x_chapter_010.html

5. Post-Upgrade Tasks

1) 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):

```
router##install remove inactive all
```

2) Verify/fix configuration file system (mandatory):

```
router# #cfs check
Creating any missing directories in Configuration File system...OK
Initializing Configuration Version Manager...OK
Syncing commit database with running configuration...OK
```

3) Verify fpd versions running are current:

```
router#show hw-module fpd
```

Please refer to “Determine Firmware Support” section in Release Notes for Cisco ASR9000 Series Routers for FPD version information.

4) Verify system for crashes, tracebacks, redundancy and alarms.

Crashes – “**show context**” should not show any process crashes.

Tracebacks – “**show logging | include Traceback**” should not indicate any tracebacks

Redundancy – “**show redundancy**” should indicate Standby node is ready and NSR-ready

Alarms – “**show alarms**” should not indicate any outstanding alarms.

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

OSPF

```
router# (config-ospf)# no max-metric router-lsa
```

ISIS

```
router# (config-isis)# no set-overload-bit
```

6. Caveats

There are no caveats for System Upgrade to 6.5.3. Please refer to the Bridge SMU table for the appropriate bridge SMU's required for upgrade