



NCS 5500

System Upgrade Procedure

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



Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Europe Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: +31 0 800 020 0791
Fax: +31 0 20 357 1100

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

Cisco Systems, Inc. All rights reserved. CCVP, the Cisco logo, and the Cisco Square Bridge logo are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn is a service mark of Cisco Systems, Inc.; and Access Registrar, Aironet, BPX, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, Follow Me Browsing, FormShare, GigaDrive, GigaStack, HomeLink, Internet Quotient, IOS, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, LightStream, Linksys, MeetingPlace, MGX, Networking Academy, Network Registrar, Packet, PIX, ProConnect, RateMUX, ScriptShare, SlideCast, SMARTnet, StackWise, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0609R)

Contents

Contents	2
Background	3
Scope of this document.....	3
Obtain Required Package Files	4
Flow Diagram of System Upgrade.....	5
1. Configuration Backup	6
2. Install Bridge SMUs	7
3. Perform Pre-Upgrade Tasks	11
4. Upgrade	15
5. Post-Upgrade Procedure.....	23
6. Caveats	24
7. Field Programmable Versions	26

Background

Scope of this document

This document provides information on the two methods available for system upgrade for NCS5500 Series platforms from software version 6.1.3/ 6.1.31/6.1.4/6.2.2/6.2.3/6.2.25/6.3.1/6.3.15/6.3.2/6.3.3/6.5.2 to 6.5.3

Platform	From	To
NCS 5500 Modular Chassis (NCS 5504,5508, 5516)	6.1.3/6.1.31/6.1.4/6.2.2/6.2.3/6.2.25/6.3.1/6.3.15/6.3.2/6.3.3/6.5.2	6.5.3
NCS 5500 Fixed Platforms (5501, 5501-SE,55A1, 5502, 5502-SE)	6.1.3/6.1.31/6.1.4/6.2.2/6.2.3/6.2.25/6.3.1/6.3.15/6.3.2/6.3.3/6.5.2	6.5.3

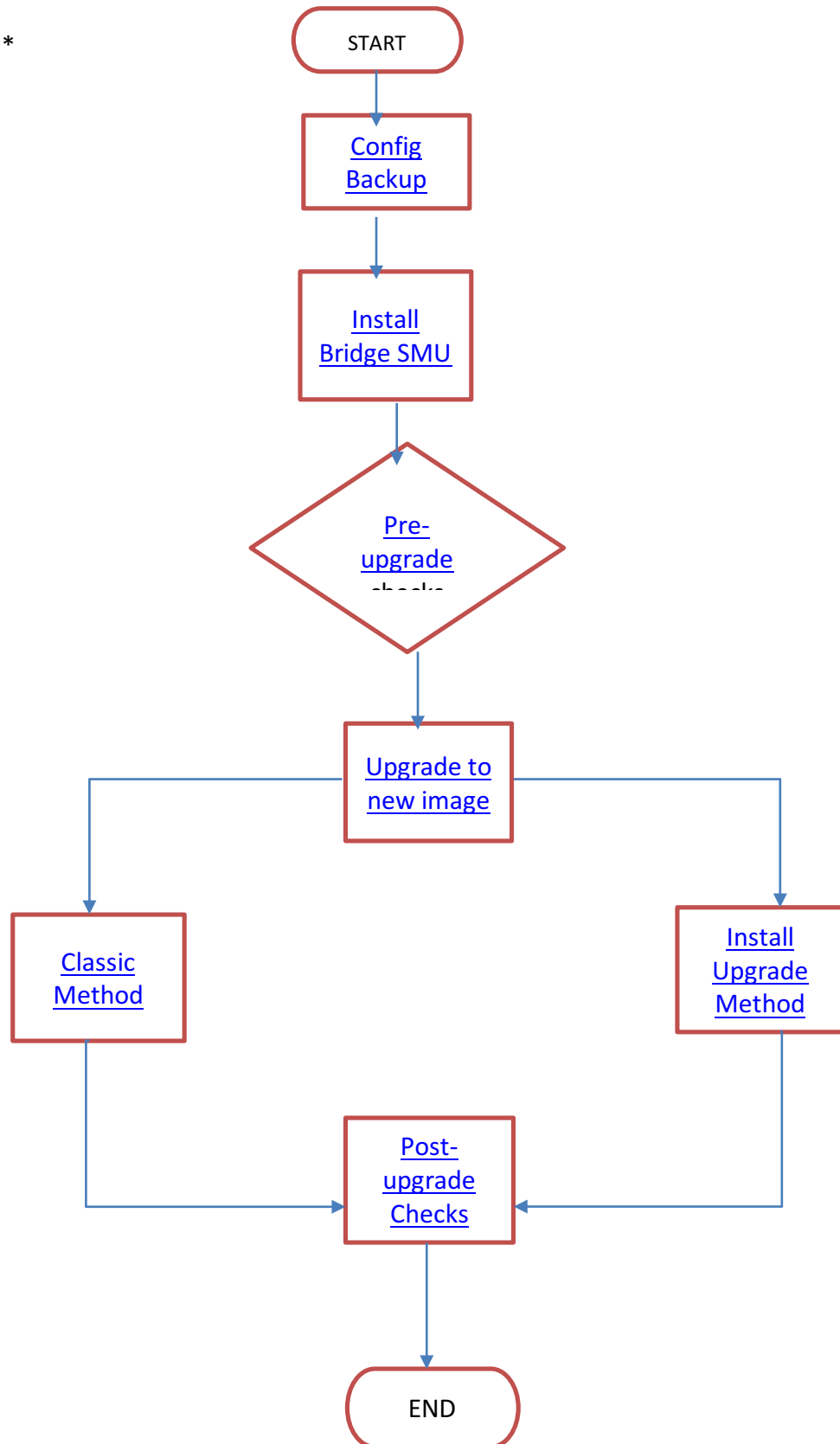
Obtain Required Package Files

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.	ncs5500-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.	ncs5500-mgbl-3.0.0.0-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.	ncs5500-mpls-2.1.0.0-r653.x86_64.rpm
Cisco IOS XR MPLS-TE and RSVP Package MPLS Traffic Engineering (MPLS-TE) and Resource Reservation Protocol (RSVP).	ncs5500-mpls-te-rsvp-3.1.0.0-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.	ncs5500-mcast-2.1.0.0-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)	ncs5500-k9sec-3.1.0.0-r653.x86_64.rpm
Cisco IOS XR OSPF Package Open Shortest Path First (OSPF) version 2 for IPv4 and OSPF version 3 for IPv6.	ncs5500-ospf-2.0.0.0-r653.x86_64.rpm
Cisco IOS XR IS-IS Package Intermediate System to Intermediate System (IS-IS).	ncs5500-isis-2.1.0.0-r653.x86_64.rpm
Cisco IOS XR LI Package Lawful Intercept	ncs5500-li-1.0.0.0-r653.x86_64.rpm
Cisco IOS XR USB Boot Package	ncs5500-usb_boot-6.5.3.zip

Flow Diagram of System Upgrade

** REFORMAT**



1. Configuration Backup

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

```
RP/0/RP0/CPU0:router#copy running-config harddisk:<filename>
```

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

```
RP/0/RP0/CPU0:router#copy running-config  
ftp://<username>@<ftp_server_ip>//<file_path>
```

For Example:

```
RP/0/RP0/CPU0:router#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 6.1.3/6.1.31/6.1.4/6.2.2/6.2.25/6.2.3/6.3.1/6.3.15/6.3.2/6.3.3/6.5.2 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

**** ADD INSTALL IMPACT*** RESTART /RELOAD**

Base (From) Release	Target (To) Release	Bridge SMU	INSTALL IMPACT
6.1.3	6.5.3	CSCvf01652, CSCvf46971 (XR and SYSADMIN)	Needs Reload
6.1.31	6.5.3	CSCve17920, CSCvf70917, CSCvf01652 (XR and SYSADMIN)	Needs Reload
6.1.4	6.5.3	CSCvf01652 (XR and SYSADMIN)	Needs Reload
6.2.2	6.5.3	CSCvf01652 (XR and SYSADMIN)	Needs Reload
6.2.3	6.5.3	No Bridge SMU Required	NA
6.2.25	6.5.3	CSCvf82318, CSCvf01652 (XR and SYSADMIN)	Needs Reload
6.3.1	6.5.3	CSCvf01652 (XR and SYSADMIN)	Needs Reload
6.3.15	6.5.3	No Bridge SMU Required	NA
6.3.2	6.5.3	No Bridge SMU Required	NA
6.3.3	6.5.3	No Bridge SMU Required	NA



Note: Below is an example to download and install bridge SMU

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

```
RP/0/RP0/CPU0:router#clear configuration inconsistency
```

****CHK AND ADD CSM FOR FRETТА****

- 1) Download bridge SMU tar “NCS5500-iosxr-6.2.25-bridge_smus.tar” from CCO and copy tar file to tftp / scp / ftp server. Please note several releases need pre-requisite SMU(s) to install the corresponding bridge SMU. Download both bridge SMU and verify the contents of the tar file. Here we are taking 6.2.25 as base release.

```
root@sit-emr-vnc> tar -tvf NCS5500-iosxr-6.2.25-bridge_smus.tar
-rw-r--r-- root/eng 4069937 2018-08-20 15:42 ncs5500-sysadmin-system-
6.2.25.1-r6225.CSCvf01652.arm.rpm
-rw-r--r-- root/eng 4139978 2018-08-20 15:28 ncs5500-sysadmin-system-
6.2.25.1-r6225.CSCvf01652.x86_64.rpm
-rw-r--r-- root/eng 2099622 2018-08-20 15:24 ncs5500-infra-6.0.0.2-
r6225.CSCvf01652.x86_64.rpm
```

- 2) Copy the tar file “NCS5500-iosxr-6.2.25-bridge_smus.tar” to the router harddisk:

```
RP/0/RP0/CPU0:router# copy <scp, ftpsource> harddisk:
```

Example (ftp):

```
RP/0/RP0/CPU0:router# copy ftp://user1@223.255.254.254/auto/tftp-sjc-
users1/user1/NCS5500-iosxr-6.2.25-bridge_smus.tar harddisk:
Destination filename [/harddisk:/NCS5500-iosxr-6.2.25-bridge_smus.tar ]?
Accessing ftp://223.255.254.254/auto/tftp-sjc-users1/user1/NCS5500-iosxr-
6.2.25-bridge_smus.tar
```

Example (scp):

```
RP/0/RP0/CPU0:router#scp root@1.56.24.1:/auto/tftp-
gyre/user/user1/6225sit/images/cco/NCS5500-iosxr-6.2.25-bridge_smus.tar
harddisk:
Tue Aug 07 11:01:40.691 PDT
Connecting to 1.56.24.1...
Password:
Transferred 49776640 Bytes
49776640 bytes copied in 2 sec (20014732)bytes/sec
```

- 3) Verify that “NCS5500-iosxr-6.2.25-bridge_smus.tar” is copied to the harddisk correctly.

```
RP/0/RP0/CPU0:NCS5501SE-F2504#dir harddisk: | inc .tar
Mon Aug 20 16:04:08.351 EDT
  419 -rwxr--r-- 1 10321920 Aug 20 16:02 NCS5500-iosxr-6.2.25-
bridge_smus.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_RP0_CPU0:/misc/disk1]$md5sum NCS5500-iosxr-6.2.25-bridge_smus.tar
ed302fd72c40c986f99456ccf45cbe12  NCS5500-iosxr-6.2.25-bridge_smus.tar
```

- 5) Add SMU from XR VM Plane:

```
RP/0/RP0/CPU0:router# install add source harddisk: NCS5500-iosxr-6.2.25-bridge_smus.tar
Mon Aug 20 16:39:30.020 EDT
Aug 20 16:39:31 Install operation 217 started by root:
install add source harddisk: NCS5500-iosxr-6.2.25-bridge_smus.tar
Aug 20 16:39:32 Install operation will continue in the background
RP/0/RP0/CPU0:router# Aug 20 16:39:38 Install operation 217 finished successfully
```

Note down the install id of successful install operation in step 2:

```
RP/0/RP0/CPU0:router#install prepare id <install id of install add operation>
```

```
RP/0/RP0/CPU0:router#install prepare id 217
Tue Aug 20 16:49:21.713 EDT
Aug 07 11:03:22 Install operation 114 started by root:
install prepare id 217
Aug 20 16:49:47 Package list:
Aug 20 16:49:48      ncs5500-sysadmin-system-6.2.25.1-r625.CSCvf01652.x86_64
Aug 20 16:49:48      ncs5500-sysadmin-system-6.2.25.1-r6225.CSCvf01652.arm
Aug 20 16:49:48      ncs5500-infra-5.0.0.5-r6225.CSCvf01652.x86_64
Aug 20 16:49:49 Install operation will continue in the background
RP/0/RP0/CPU0:router# Aug 20 16:49:52 Install operation 218 finished successfully
```

- 6) Perform install activation operation. When prompted for confirmation say "yes"

```
RP/0/RP0/CPU0:router#install activate
Tue Aug 20 16:51:16.695 PDT
Aug 20 16:51:17 Install operation 219 started by root:
install activate
This install operation will reload the sdr, continue?
[yes/no]:[yes] yes
Aug 20 16:51:22 Install operation will continue in the background
```

7) Once router is up after reload, verify SMUs are installed successfully

```
RP/0/RP0/CPU0:router# sh install active summary
Mon Aug 20 17:31:29.283 EDT
Active Packages: 11
ncs5500-xr-6.2.25 version=6.2.25 [Boot image]
ncs5500-mcast-2.2.0.0-r6225
ncs5500-mpls-2.1.0.0-r6225
ncs5500-mgbl-3.0.0.0-r6225
ncs5500-mpls-te-rsvp-2.3.0.0-r6225
ncs5500-ospf-2.0.0.0-r6225
ncs5500-isis-2.2.0.0-r6225
ncs5500-k9sec-3.2.0.0-r6225
ncs5500-infra-6.0.0.1-r6225.CSCvf82318
ncs5500-dpa-fwding-6.0.0.1-r6225.CSCvf82318
ncs5500-infra-6.0.0.2-r6225.CSCvf01652

sysadmin-vm:0_RP0# show install active summary
Mon Aug 20 21:32:30.293 UTC
Active Packages: 2
ncs5500-sysadmin-6.2.25 version=6.2.25 [Boot image]
ncs5500-sysadmin-system-6.2.25.1-r6225.CSCvf01652
```

8) Commit the active SMUs

```
RP/0/RP0/CPU0:router# install commit
Mon Aug 20 17:33:46.594 EDT
Aug 20 17:33:47 Install operation 228 started by root:
install commit
Aug 20 17:33:48 Install operation will continue in the background
RP/0/RP0/CPU0:NCS5501SE-F2504#Aug 20 17:33:54 Install operation 228
finished successfully
```

3. Perform 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:

```
#show platform          (verify that all nodes are in "OPERATIONAL" state)

#show platform vm       (verify that all nodes are in "FINAL Band" state)

#show redundancy        (verify that a Standby RP is available and in "ready" state)

#show ipv4 interface brief <or> show ipv6 interface brief <or> show
interface summary      (verify that all necessary interfaces are "UP")
#install verify packages (no anomalies should be displayed)

#show install active summary (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')

# show health gsp       (verify transport infrastructure is OK)
# admin show controller fabric health (quick fabric health check)

#show hw-module fpd     (Ensure all the FPD versions status are CURRENT)

# show alarms           (Ensure no outstanding alarms)
```

Please refer to section “**8. Field Programmable Versions**” for FPD version information.
Power down all unused cards.

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

- a. 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)
- b. Set IGP metric to the highest possible value so the IGP will try to route the traffic through the alternate path.

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
```

- c. 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/RP0/CPU0:router(config)#fpd auto-upgrade enable
RP/0/RP0/CPU0:router(config)#commit
RP/0/RP0/CPU0:router#show run fpd auto-upgrade
fpd auto-upgrade enable

RP/0/RP0/CPU0:router#admin

admin connected from 127.0.0.1 using console on xr-vm_node0_RP0_CPU0
sysadmin-vm:0_RP0# conf t
Thu Mar 28 22:02:06.750 UTC
Entering configuration mode terminal
sysadmin-vm:0_RP0(config)# fpd auto-upgrade enable
sysadmin-vm:0_RP0(config)# commit
sysadmin-vm:0_RP0# show running-config fpd
Thu Mar 28 22:02:06.768 UTC
fpd auto-upgrade enable
```

3) Check available space in install repository. At least 50% of free space is required to perform System upgrade.

Note: In case of not enough space, some steps that can performed include removing inactive packages “install remove inactive”. Other steps include deleting unwanted files under `harddisk:dumper`, `harddisk:showtech` and `harddisk:cisco_support`

```
sysadmin-vm:0_RP0# show media
Thu Mar 28 22:02:06.768 UTC
```

Partition	Size	Used	Percent	Avail
rootfs:	3.9G	1.3G	36%	2.4G
apphost:	3.7G	106M	3%	3.4G
/dev/sde	969M	377M	42%	527M
harddisk:	35G	769M	3%	32G
log:	459M	73M	18%	352M
config:	459M	2.3M	1%	423M
disk0:	2.0G	75M	5%	1.8G

```
rootfs: = root file system (read-only)
log:    = system log files (read-only)
config: = configuration storage (read-only)
```

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

```
sysadmin-vm:0_RP0# show install health
Fri Mar 29 06:14:42.774 UTC
Platform is: ncs5500
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:host_version
Verifying Result for:cal_smus
Verifying Result for:xr_version
Verifying Result for:host_smus
Verifying Result for:cal_local_active_swp
Verifying Result for:xr_smus
Verifying Result for:cal_local_committed_swp
Verifying Result for:xr_disk_space
Verifying Result for:cal_disk_space
Verifying Result for:xr_marker_files
Verifying Result for:cal_marker_files
Verifying Result for:xr_mount_points
Verifying Result for:cal_mount_points
Verifying Result for:xr_stale_symlinks
Verifying Result for:cal_stale_symlinks
Verifying Result for:xr_prepared_packages
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
*****
System is in Consistent State. You can go ahead with next operation.
*****
Total time taken: 6.18529486656 seconds.
sysadmin-vm:0_RP0#
```

5) Check inactive packages and remove them before upgrading.

XR:

```
RP/0/RP0/CPU0:router#sh install inactive
Fri Mar 29 06:17:18.415 UTC
3 inactive package(s) found:
ncs5500-mpls-te-rsvp-2.2.0.0-r631
ncs5500-mcast-2.1.0.0-r631
ncs5500-ospf-2.0.0.0-r63136I

RP/0/RP0/CPU0:router# install remove inactive

RP/0/RP0/CPU0:router#sh install inactive
Fri Mar 29 06:17:19.312 UTC
No inactive package(s) in software repository
RP/0/RP0/CPU0:router#
```

Sysadmin:

```
sysadmin-vm:0_RP0# show install inactive
Fri Mar 29 06:17:20.215 UTC
Node 0/RP0 [RP]
Inactive Packages:
ncs5500-sysadmin-system-6.3.1.2-r631.CSCvf01652
ncs5500-sysadmin-6.3.1.36I
ncs5500-sysadmin-6.3.1

sysadmin-vm:0_RP0# install remove inactive

sysadmin-vm:0_RP0# show install inactive
Fri Mar 29 06:17:21.223 UTC
Node 0/RP0 [RP]
Inactive Packages:
sysadmin-vm:0_RP0#
```

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 upgrade' CLI IS THE PREFERRED METHOD TO PERFORM A SYSTEM UPGRADE AND CONTINUE TO NEXT SECTION (5. Upgrade – 'install upgrade' 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

```
[root@fretta-pxe CCO]# tar -tvf NCS5500-iosxr-k9-6.5.3.tar
-rw-r--r-- vram/eng      3111117 2019-03-26 06:51:13 ncs5500-isis-2.1.0.0-r653.x86_64.rpm
-rwxr-x--- vram/crypto  7119933 2019-03-26 06:50:37 ncs5500-k9sec-3.1.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng      341753 2019-03-26 06:45:06 ncs5500-li-1.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng     12876953 2019-03-26 06:51:09 ncs5500-mcast-2.1.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng     29137591 2019-03-26 06:50:56 ncs5500-mgbl-3.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng    1417299968 2019-03-26 06:50:28 ncs5500-mini-x-6.5.3.iso
-rw-r--r-- vram/eng     2579114 2019-03-26 06:45:09 ncs5500-mls-2.1.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng     10138186 2019-03-26 06:51:22 ncs5500-mls-te-rsvp-3.1.0.0-
r653.x86_64.rpm
-rw-r--r-- vram/eng      4091333 2019-03-26 06:51:17 ncs5500-ospf-2.0.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng       742 2019-03-26 17:43:19 README-NCS5500-iosxr-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/RP0/CPU0:router#scp root@1.75.55.1:/auto/tftp-gud/sit/653/CCO/NCS5500-
iosxr-k9-6.5.3.tar /harddisk:/.
Thu Mar 28 22:19:16.915 UTC
Connecting to 1.75.55.1...
Password:
  Transferred 1486714880 Bytes
  1486714880 bytes copied in 220 sec (6755860)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 NCS5500-iosxr-k9-6.5.3.tar
b97ff760b7d5ece373b700df45543398 NCS5500-iosxr-k9-6.5.3.tar
```

- 4) Perform 'install add' of 6.5.3 tar file (6.5.3 SMUs can be included in the tarball) : **
ALSO INSTALL ADD ANY SMUs in same command***

```
RP/0/RP0/CPU0:router#install add source harddisk:/ NCS5500-iosxr-k9-
6.5.3.tar
Thu Mar 28 22:28:02.701 UTC
Mar 28 22:28:03 Install operation 265 started by root:
```

```
install add source harddisk:/ NCS5500-iosxr-k9-6.5.3.tar
Mar 28 22:28:05 Install operation will continue in the background
Mar 28 22:29:35 Install operation 265 finished successfully
```

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

```
Mar 28 22:29:35 Install operation 265 finished successfully
```

- 6) Prepare the packages added in step 4)

```
RP/0/RP0/CPU0:NCS5501SE-F2504# install prepare id 265
Thu Mar 28 22:33:12.893 UTC
Mar 28 22:33:14 Install operation 266 started by root:
install prepare id 265
Mar 28 22:33:14 Package list:
Mar 28 22:33:14      ncs5500-mpls-te-rsvp-3.1.0.0-r653.x86_64
Mar 28 22:33:14      ncs5500-k9sec-3.1.0.0-r653.x86_64
Mar 28 22:33:14      ncs5500-isis-2.1.0.0-r653.x86_64
Mar 28 22:33:14      ncs5500-mcast-2.1.0.0-r653.x86_64
Mar 28 22:33:14      ncs5500-mini-x-6.5.3
Mar 28 22:33:14      ncs5500-li-1.0.0.0-r653.x86_64
Mar 28 22:33:14      ncs5500-mgbl-3.0.0.0-r653.x86_64
Mar 28 22:33:14      ncs5500-mpls-2.1.0.0-r653.x86_64
Mar 28 22:33:14      ncs5500-ospf-2.0.0.0-r653.x86_64
Mar 28 22:33:19 Install operation will continue in the background
```

- 7) Check if install prepare is successful

```
RP/0/RP0/CPU0:router# show install prepare
Thu Mar 28 22:48:12.231 UTC
Prepared Boot Image: ncs5500-mini-x-6.5.3
Prepared Boot Partition: /dev/panini_vol_grp/xr_lv266
Restart Type: Reboot
Prepared Packages:
ncs5500-mini-x-6.5.3
ncs5500-mpls-te-rsvp-3.1.0.0-r653
ncs5500-k9sec-3.1.0.0-r653
ncs5500-isis-2.1.0.0-r653
ncs5500-mcast-2.1.0.0-r653
ncs5500-li-1.0.0.0-r653
ncs5500-mgbl-3.0.0.0-r653
ncs5500-mpls-2.1.0.0-r653
ncs5500-ospf-2.0.0.0-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/RP0/CPU0:ROUTER# show install log 266
Thu Mar 28 22:47:13.763 UTC
```



```

Mar 28 22:33:14 Install operation 266 started by root:
install prepare id 265
Mar 28 22:33:14 Package list:
Mar 28 22:33:14     ncs5500-mpls-te-rsvp-3.1.0.0-r653.x86_64
Mar 28 22:33:14     ncs5500-k9sec-3.1.0.0-r653.x86_64
Mar 28 22:33:14     ncs5500-isis-2.1.0.0-r653.x86_64
Mar 28 22:33:14     ncs5500-mcast-2.1.0.0-r653.x86_64
Mar 28 22:33:14     ncs5500-mini-x-6.5.3
Mar 28 22:33:14     ncs5500-li-1.0.0.0-r653.x86_64
Mar 28 22:33:14     ncs5500-mgbl-3.0.0.0-r653.x86_64
Mar 28 22:33:14     ncs5500-mpls-2.1.0.0-r653.x86_64
Mar 28 22:33:14     ncs5500-ospf-2.0.0.0-r653.x86_64
Mar 28 22:33:19 Action 1: install prepare action started
Mar 28 22:33:19 Install operation will continue in the background
Mar 28 22:33:49 The prepared software is set to be activated with
reload upgrade
Mar 28 22:33:50 Start preparing new VM for reload upgrade
Mar 28 22:41:07 All the above nodes completed System Upgrade
prepare.
Mar 28 22:41:07 Action 1: install prepare action finished
successfully
Mar 28 22:41:13 Install operation 266 finished successfully
Mar 28 22:41:13 Ending operation 266

```

9) Activate all the packages prepared in step 5)

```
RP/0/RP0/CPU0:router#install activate
```

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

```

RP/0/RP0/CPU0:router#install activate
Thu Mar 28 22:54:48.586 UTC
Mar 28 22:54:50 Install operation 268 started by root:
install activate
This install operation will reload the system, continue?
[yes/no]:[yes] yes
Mar 28 22:54:54 Install operation will continue in the background
Mar 28 22:56:23 Install operation 268 finished successfully

```

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



Note: Under ideal conditions, 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/RP0/CPU0:router#show install active summary
Thu Mar 28 23:06:59.798 UTC
Active Packages: 9
  ncs5500-xr-6.5.3 version=6.5.3 [Boot image]
  ncs5500-li-1.0.0.0-r653
  ncs5500-mpls-2.1.0.0-r653
  ncs5500-k9sec-3.1.0.0-r653

```

```
ncs5500-mgbl-3.0.0.0-r653
ncs5500-mcast-2.1.0.0-r653
ncs5500-isis-2.1.0.0-r653
ncs5500-mpls-te-rsvp-3.1.0.0-r653
ncs5500-ospf-2.0.0.0-r653
```

- 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:router#install commit
Thu Mar 28 23:08:07.089 UTC
Mar 28 23:08:08 Install operation 269 started by root:
  install commit
Mar 28 23:08:10 Install operation will continue in the background
Mar 28 23:08:27 Install operation 269 finished successfully
```

- 14) Verify system stability through commands described under Check System Stability section (3.1) after router comes up with new software

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

```
RP/0/RP0/CPU0:SP_LEAF_1#show version
Thu Mar 28 23:09:16.844 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 06:46:13 PDT 2019
  Built Host    : iox-ucs-027
  Workspace    : /auto/srcarchive13/prod/6.5.3/ncs5500/ws
  Version      : 6.5.3
  Location     : /opt/cisco/XR/packages/

cisco NCS-5500 () processor
System uptime is 8 minutes
```

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

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

- 17) Optional: If not installed together with the main tar ball SMUs can be added as following:

```
RP/0/RP0/CPU0:router#install add source harddisk: <SMU tar file for 6.5.3>
```

18) Activate the SMUs

```
RP/0/RP0/CPU0:router#install activate id <add id of step 17>
```

19) Enter 'yes' to reload prompt. This is only required if reload SMUs are contained.

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

NOTE: ISO of previously committed image will be removed is 5501, 5501-SE or 5502**. If the NCS5501 is a NCS5501 / NCS5501-SE or NCS-5502 , please note that the iso of the previously committed image will be removed.

4.2 Install Upgrade Method

All System Upgrade related install operations should be done in the XR VM plane.
Skip this section if section '4. Upgrade – Classic Method' has been performed

- 1) Download 6.5.3 mini ISO and packages tar (NCS5500-iosxr-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 any 6.5.3 mandatory SMUs and copy to the same directory.

```
fretta-sit-auto:185> tar -tvf NCS5500-iosxr-k9-6.5.3.tar
-rw-r--r-- vram/eng      3111117 2019-03-26 06:51:13 ncs5500-isis-2.1.0.0-
r653.x86_64.rpm
-rwxr-x--- vram/crypto 7119933 2019-03-26 06:50:37 ncs5500-k9sec-3.1.0.0-
r653.x86_64.rpm
-rw-r--r-- vram/eng      341753 2019-03-26 06:45:06 ncs5500-li-1.0.0.0-
r653.x86_64.rpm
-rw-r--r-- vram/eng     12876953 2019-03-26 06:51:09 ncs5500-mcast-2.1.0.0-
r653.x86_64.rpm
-rw-r--r-- vram/eng     29137591 2019-03-26 06:50:56 ncs5500-mgbl-3.0.0.0-
r653.x86_64.rpm
-rw-r--r-- vram/eng    1417299968 2019-03-26 06:50:28 ncs5500-mini-x-6.5.3.iso
-rw-r--r-- vram/eng      2579114 2019-03-26 06:45:09 ncs5500-mpls-2.1.0.0-
r653.x86_64.rpm
-rw-r--r-- vram/eng     10138186 2019-03-26 06:51:22 ncs5500-mpls-te-rsvp-
3.1.0.0-r653.x86_64.rpm
-rw-r--r-- vram/eng      4091333 2019-03-26 06:51:17 ncs5500-ospf-2.0.0.0-
r653.x86_64.rpm
-rw-r--r-- vram/eng        742 2019-03-26 17:43:19 README-NCS5500-iosxr-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 NCS5500-iosxr-k9-6.5.3.tar
b97ff760b7d5ece373b700df45543398 NCS5500-iosxr-k9-6.5.3.tar
```

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



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

```
RP/0/RP0/CPU0:router# install upgrade source
scp://root@1.75.55.1//auto/tftp-gud/sit/653/CCO version 6.5.3 noprompt
Fri Mar 29 00:13:32.518 PDT
+++++
+++++
Install operation 315 started by root:
exec-timeout is suspended.
No install operation in progress at this moment
Enter password for root@1.75.55.1:
Scheme : scp
Hostname : 1.75.55.1
Username : root
SourceDir : auto/tftp-gud/sit/653/CCO
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 .... ncs5500-mgbl-3.0.0.0-r653.x86_64.rpm
Fetching .... ncs5500-li-1.0.0.0-r653.x86_64.rpm
Fetching .... ncs5500-isis-2.1.0.0-r653.x86_64.rpm
Fetching .... ncs5500-k9sec-3.1.0.0-r653.x86_64.rpm
Fetching .... ncs5500-mpls-2.1.0.0-r653.x86_64.rpm
Fetching .... ncs5500-mcast-2.1.0.0-r653.x86_64.rpm
Fetching .... ncs5500-mini-x-6.5.3.iso
Fetching .... ncs5500-ospf-2.0.0.0-r653.x86_64.rpm
Fetching .... ncs5500-mpls-te-rsvp-3.1.0.0-r653.x86_64.rpm
Adding packages
    ncs5500-ospf-2.0.0.0-r653.x86_64.rpm
    ncs5500-mcast-2.1.0.0-r653.x86_64.rpm
    ncs5500-mini-x-6.5.3.iso
    ncs5500-mpls-te-rsvp-3.1.0.0-r653.x86_64.rpm
    ncs5500-isis-2.1.0.0-r653.x86_64.rpm
    ncs5500-mpls-2.1.0.0-r653.x86_64.rpm
    ncs5500-li-1.0.0.0-r653.x86_64.rpm
    ncs5500-k9sec-3.1.0.0-r653.x86_64.rpm
    ncs5500-mgbl-3.0.0.0-r653.x86_64.rpm
Install add operation successful
Activating ncs5500-k9sec-3.1.0.0-r653 ncs5500-mgbl-3.0.0.0-r653 ncs5500-li-
1.0.0.0-r653 ncs5500-isis-2.1.0.0-r653 ncs5500-mini-x-6.5.3 ncs5500-mpls-
```

```

te-rsvp-3.1.0.0-r653 ncs5500-ospf-2.0.0.0-r653 ncs5500-mcast-2.1.0.0-r653
ncs5500-mpls-2.1.0.0-r653
Mar 29 00:17:18 Install operation 317 started by root:
  install activate pkg ncs5500-k9sec-3.1.0.0-r653 ncs5500-mgbl-3.0.0.0-r653
ncs5500-li-1.0.0.0-r653 ncs5500-isis-2.1.0.0-r653 ncs5500-mini-x-6.5.3
ncs5500-mpls-te-rsvp-3.1.0.0-r653 ncs5500-ospf-2.0.0.0-r653 ncs5500-mcast-
2.1.0.0-r653 ncs5500-mpls-2.1.0.0-r653 noprompt
Mar 29 00:17:18 Package list:
Mar 29 00:17:18      ncs5500-k9sec-3.1.0.0-r653
Mar 29 00:17:18      ncs5500-mgbl-3.0.0.0-r653
Mar 29 00:17:18      ncs5500-li-1.0.0.0-r653
Mar 29 00:17:18      ncs5500-isis-2.1.0.0-r653
Mar 29 00:17:18      ncs5500-mini-x-6.5.3
Mar 29 00:17:18      ncs5500-mpls-te-rsvp-3.1.0.0-r653
Mar 29 00:17:18      ncs5500-ospf-2.0.0.0-r653
Mar 29 00:17:18      ncs5500-mcast-2.1.0.0-r653
Mar 29 00:17:18      ncs5500-mpls-2.1.0.0-r653
Mar 29 00:17:46 Install operation will continue in the background
Mar 29 00:24:38 Install operation 317 finished successfully

```

- 5) Respond 'yes' to the reload prompt (sample output above). This step can be skipped if no prompt option was used in step 3.



Note: This operation may take up to 30 minutes to get the reload prompt.

- 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: Under ideal conditions, 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:router#show install active summary
sysadmin-vm:0_RP0# show install active summary

```

- 8) Verify show version to check router is upgraded to 651.

```

RP/0/RP0/CPU0:TOR-4#sh version
Fri Mar 29 00:35:51.985 PDT
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 06:46:13 PDT 2019
  Built Host    : iox-ucs-027
  Workspace     : /auto/srcarchive13/prod/6.5.3/ncs5500/ws
  Version       : 6.5.3
  Location      : /opt/cisco/XR/packages/

cisco NCS-5500 () processor
System uptime is 7 minute

```

- 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)

```
RP/0/RP0/CPU0:router#install commit
```

- 10) Verify system stability through commands described under Check System Stability section (3.1) after router comes up with new software

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

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

5. Post-Upgrade Procedure

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

OSPF

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

ISIS

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

2) 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:router##install remove inactive all
```

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

```
RP/0/RP0/CPU0:router# clear configuration inconsistency
Creating any missing directories in Configuration File system...OK
Initializing Configuration Version Manager...OK
Syncing commit database with running configuration...OK
```

4) Verify fpd versions running are current:

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

Please refer to “Determine Firmware Support” section in Release Notes for Cisco NCS 5500 Series Routers for FPD version information.

6. Caveats

There are no caveats for System Upgrade. We need to install bridge SMU on base release to upgrade to 653.

7. Field Programmable Versions

NCS55xx Field Programmable Versions.

** FPD versions on the boards shipped by manufacturing may have higher versions than the fpd package integrated in XR

PID	FPD Device	FPD Versions Release 6.1.3	FPD Versions Release 6.1.4	FPD Versions Release 6.2.25	FPD Versions Release 6.3.1	FPD Versions Release 6.3.15	FPD Versions Release 6.3.2	FPD Versions Release 6.3.3	FPD Versions Release 6.5.3
NC55-RP	Bootloader	9.23	9.23	9.23	9.23	9.25	9.25	9.25	9.28
	IOFPGA	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
NC55-SC	Bootloader	1.7	1.7	1.7	1.74	1.74	1.74	1.74	1.74
	IOFPGA	0.08	0.08	0.08	0.08	0.1	0.1	0.10	0.10
NC55-5508-FC	Bootloader	1.7	1.7	1.7	1.74	1.74	1.74	1.74	1.74
	IOFPGA	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
NC55-36X100G	Bootloader	1.17	1.17	1.17	1.17	1.17	1.17	1.18	1.18
	IOFPGA	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	MIFPGA	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
	SATA	NA	NA	NA	NA	NA	NA	5.00	5.00
NC55-24X100G-SE	Bootloader	1.11	1.11	1.11	1.11	1.11	1.11	1.13	1.13
	IOFPGA	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13
	MIFPGA	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	SATA	NA	NA	NA	NA	NA	NA	5.00	5.00
NC55-18H18F	Bootloader	1.11	1.11	1.11	1.11	1.11	1.11	1.13	1.13
	IOFPGA	0.2	0.2	0.22	0.22	0.22	0.22	0.22	0.22
	MIFPGA	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
NC55-36X100G-S	Bootloader	1.11	1.11	1.11	1.11	1.11	1.11	1.13	1.13
	IOFPGA	0.09	0.09	0.09	0.1	0.1	0.1	0.11	0.11
	MIFPGA	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07
	SATA	NA	NA	NA	NA	NA	NA	5.00	5.00
NC55-24H12F-SE	Bootloader	1.11	1.11	1.11	1.11	1.11	1.11	1.13	1.13
	IOFPGA	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09
	MIFPGA	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03
	SATA	NA	NA	NA	NA	NA	NA	5.00	5.00
NCS-5501	Bootloader	1.05	1.11	1.13	1.11	1.16	1.16	1.16	1.18
	CPU-IOFPGA	1.12	1.14	1.14	1.14	1.14	1.14	1.14	1.14
	MB-IOFPGA	1.04	1.04	1.04	1.04	1.05	1.05	1.05	1.05
	MB-MIFPGA	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
NCS-5501-SE	Bootloader	1.11	1.13	1.15	1.15	1.16	1.16	1.16	1.18
	CPU-IOFPGA	1.12	1.14	1.14	1.14	1.14	1.14	1.14	1.14
	MB-IOFPGA	1.07	1.07	1.07	1.08	1.1	1.11	1.11	1.11
	MB-MIFPGA	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
	SATA	NA	NA	NA	NA	NA	NA	5.00	5.00
NCS-5502	Bootloader	1.11	1.13	1.15	1.13	1.16	1.16	1.16	1.18

	CPU-IOFPGA	1.12	1.14	1.14	1.14	1.14	1.14	1.14	1.14
	DC-IOFPGA	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	DC-MIFPGA	1.02	1.02	1.02	1.02	1.02	1.02	NA	1.02
	MB-IOFPGA	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	MB-MIFPGA	1.02	1.05	1.02	1.02	1.02	1.02	NA	1.02
	SATA	NA	NA	NA	NA	NA	NA	5.00	5.00
NCS-5502-SE	Bootloader	1.11	1.13	1.15	1.15	1.16	1.16	1.16	1.18
	CPU-IOFPGA	1.12	1.14	1.14	1.14	1.14	1.14	1.14	1.14
	DC-IOFPGA	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	DC-MIFPGA	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
	MB-IOFPGA	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	MB-MIFPGA	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
	SATA	NA	NA	NA	NA	NA	NA	5.00	5.00
NC55-5516-FC	Bootloader	1.73	1.73	1.73	1.75	1.75	1.75	1.75	1.75
	IOFPGA	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
NCS-55A1-36H-S	Bootloader	N/A	N/A	1.05	1.05	1.07	1.07	1.07	1.10
	CPU-IOFPGA	N/A	N/A	1.14	1.14	1.14	1.14	1.14	1.14
	MB-IOFPGA	N/A	N/A	1	1	1	1.01	1.01	1.01
	MB-MIFPGA	N/A	N/A	1	1	1	1.02	1.02	1.03
NC55-6X200-DWDM-S	Bootloader	N/A	N/A	1.11	1.11	1.11	1.12	1.13	1.13
	IOFPGA	N/A	N/A	0.1	0.11	0.11	0.11	0.11	0.11
	DENALI	N/A	N/A	13.48	13.48	13.48	13.48	NA	13.48
	MORGOTH	N/A	N/A	5.13	5.2	5.17	5.17	NA	5.25
	MSFPGA	N/A	N/A	2.21	2.22	2.22	2.22	NA	2.22
	CFP2_PORT	N/A	N/A	5.23	5.23	5.23	5.23	NA	5.23
	SATA	NA	NA	NA	NA	NA	NA	5.00	5.00
NC55-36X100G-A-SE	MIFPGA	N/A	N/A	N/A	0.03	0.03	0.03	0.03	0.03
	Bootloader				0.13	0.13	0.13	0.13	0.13
	DBFPGA				0.14	0.14	0.14	0.14	0.14
	IOFPGA				0.21	0.21	0.21	0.21	0.21
	SATA	NA	NA	NA	NA	NA	NA	5.00	5.00
NC55-5504-FC	Bootloader	N/A	N/A	N/A	1.75	1.75	1.75	1.75	1.75
	IOFPGA	N/A	N/A	N/A	0.07	0.07	0.07	0.07	0.07
NC55-RP-E	Bootloader	N/A	N/A	N/A	1.1	1.13	1.14	1.14	1.18
	IOFPGA				0.18	0.19	0.21	0.21	0.23
	OMGFPGA				0.4	0.4	0.48	0.48	0.48

NCS-55A1-24H	Bootloader	N/A	N/A	N/A	1.05	1.07	1.07	1.07	1.10
	CPU-IOFPGA				1.14	1.14	1.14	1.14	1.14
	MB-IOFPGA				1.00	1.00	1.00	1.00	1.00
	MB-MIFPGA				1.00	1.00	1.00	NA	1.02
NCS-55A1-36H-SE-S	Bootloader	N/A	N/A	N/A	1.05	1.07	1.07	1.07	1.11
	CPU-IOFPGA				1.14	1.14	1.14	1.14	1.14
	MB-IOFPGA				1	1	1	1.01	1.01
	MB-MIFPGA				1	1	1	NA	1.03
NCS-55A2-MOD-S	Bootloader	N/A	N/A	N/A	1.05	1.07	1.07		1.10
	CPU-IOFPGA								1.18
	MB-IOFPGA				1.14	1.14	1.14		0.15
	MB-MIFPGA				1	1	1		0.16
NC55-MOD-A-S	Bootloader	NA	NA	NA	NA	NA	NA		
	DBFPGA								
	IOFPGA								
	SATA								
NCS-55A2-MOD-HD-S	Bootloader	NA	NA	NA	NA	NA	NA		
	CPU-IOFPGA								
	MB-IOFPGA								
	SATA								
NC55-MPA-1TH2H-S	MPAFPGA	NA	NA	NA	NA	NA	NA		
	NA								
	NA								
	NA								
NC55-MPA-4H-S	MPAFPGA	NA	NA	NA	NA	NA	NA		
	NA								
	NA								
	NA								