

Release Notes for Cisco NCS 6000 Series Routers, Release 5.2.3

Release Notes for Cisco NCS 6000 Series Routers, IOS XR Release 5.2.3

The Cisco Network Convergence System (NCS) 6000 series router delivers outstanding network agility, packet optical convergence, and a system scale measured in petabits per second. It also facilitates the build-out of next-generation core to:

- support elastic capacity at the lowest total ownership cost
- deliver high-bandwidth mobile, video, and cloud services

Running the Cisco IOS XR operating system, Cisco's innovative virtualized operating environment, the Cisco NCS 6000 series router advances the concept of distributed routing and virtualization. With Cisco Virtualized IOS XR, the Cisco NCS 6000 series router brings new levels of programmability and virtualization to:

- enhance application service offerings
- increase provisioning speed
- optimize network economics

The Cisco NCS 6000 series router is engineered for environmental efficiency, with the use of adaptable power consumption. The Cisco NCS 6000 series router is powered by the Cisco nPower Network Processor Units (NPU). These technologies aid the Cisco NCS 6000 series router to achieve the lowest carbon footprint in service provider routing.

The Cisco NCS 6008 router, part of the Cisco NCS 6000 series routers, is the next-generation core routing system that provides industry-leading 8 Tbps of full-duplex network bandwidth through single chassis, and 32Tbps of full-duplex network bandwidth through multi-chassis with eight line cards per chassis.

The Cisco NCS 6008 router runs on Cisco IOS XR software with Linux as the underlying host operating system. A Kernel-based Virtual Machine (KVM) hypervisor provides a virtualized environment to independently run system administration and routing functions on separate virtual machines. This provision makes the new system versatile and robust, and provides immense flexibility for future expansion without the need for a complete system overhaul.

A multi-slice architecture of line cards enables the system to be configured in a mixed operating mode, simultaneously supporting traffic at 10 Gbps and 100 Gbps on slice-level granularity.

This release notes describe the features provided in the Cisco IOS XR Software Release 5.2.3 for the Cisco NCS 6000 series router and are updated as needed.

This electronic documents may contain updates and modifications. For more information on obtaining Cisco documentation, see the [Obtaining Documentation and Submitting a Service Request](#), on page 20 section.

For a list of software caveats that apply to Cisco IOS XR Software Release 5.2.3 see the Caveats section.

Cisco IOS XR Software running on the Cisco NCS 6000 Series Router provides the following features and benefits:

- IP features—This supports a wide range of IPv4 and IPv6 services and routing protocols such as IPv4 unicast services, IPv6 unicast services, IPv4 Multicast services, IPv4 and IPv6 equal-cost multipathing (ECMP), IPv4 and IPv6 load balancing), Cisco Discovery Protocol, IPv4 and IPv6 addressing, Internet Control Message Protocol (ICMP), IPv4 LFA FRR, HSRP, and VRRP.
- IP Multicast Features—Multicast forwarding with support for source-based and shared distribution trees and protocols such as Protocol Independent Multicast Sparse Mode (PIM-SM), PIM Source Specific Multicast (PIM SSM), Automatic Rendezvous Point (AutoRP), Internet Group Management Protocol (IGMP) versions 2 and 3, and Multicast reverse path forwarding (RPF). The Multicast nonstop forwarding (NSF) and Multicast forwarding information base (MFIB) protocols are supported.
- Layer 3 routing protocols—This supports routing protocols such as Border Gateway Protocol Version 4 (BGPv4), Open Shortest Path First Version 2 (OSPFv2) and Version 3 (OSPFv3), Intermediate System-to-Intermediate System (IS-IS) Protocol, NSF using graceful restart for IS-IS, OSPF, and BGP.
- Forwarding features—This supports routing protocols such as Access control lists (ACLs), QoS and class of service (CoS) using modular QoS command-line interface (CLI; MQC), IP packet classification and marking, Queuing (ingress and egress), Policing (ingress and egress), Diagnostic and network management support, Link Bundles, Bi-Direction Forwarding detection (BFD), LACP, and Ethernet OAM Link Monitoring (IEEE 802.3ah).
- Multiprotocol Label Switching (MPLS) Features—Supports MPLS features such as MPLS Label Distribution Protocol (LDP), Resource Reservation Protocol (RSVP), Diffserv Aware Traffic Engineering (TE), MPLS Traffic Engineering control plane (RFCs 2702 and 2430), MPLS forwarding, MPLS load balancing, NSF for RSVP and LDP, and MPLS FRR.
- Security—Features such as Message Digest Algorithm (MD5), Control packet policing, Dynamic control plane protection, and GTSM RFC 3682 (formerly BTSH) are supported.
- Accounting—This supports features such as IP and MPLS Accounting, Interface Counters and Statistics, and Sampled Netflow (IPv4, IPv6, and MPLS).
- Control packet policing
- Dynamic control plane protection
- GTSM RFC 3682 (formerly BTSH)
- Network Management—This supports features like Enhanced CLI, XML interface, Simple Network Management Protocol (SNMP) and MIB support - (SNMPv1,SNMPv2c,SNMPv3), and Cisco Prime Network
- System redundancy—Features such as Power redundancy 1:1 or 1:N, Fan tray redundancy 1:1, Route processor redundancy 1:1, Virtual machine redundancy, Line-card online insertion and removal (OIR) support, Fabric card OIR support, Out of resource management, and IOS XR redundancy.

What is New in Release 5.2.3

Software Features

- Installing packages using ISSU—In-Service Software Upgrade (ISSU) provides the ability to upgrade the router software with no outage on the control plane and forwarding plane. ISSU is a user-initiated and user-controlled process that uses Cisco nonstop forwarding (NSF) and nonstop routing (NSR). ISSU upgrades an image from a lower to a higher version, installs ISSU software maintenance updates (SMUs), multiprotocol label switching (MPLS) and multicast packages with no downtime, degradation of service or loss of packets. ISSU supports zero packet loss (ZPL) and zero topology loss (ZTL) for most of protocols, except L2VPN and EGRP.
- Nonstop Routing enabled by default—In Release 5.2.3 and later, the BGP Nonstop Routing (NSR) functionality is enabled by default. To disable NSR, use the **nsr disable** command.
In releases prior to R5.2.3, NSR is disabled by default, and must be configured manually.
- Tunable SFP+—60x10GE line card supports tunable SFP+ (DWDM-SFP10G-C) that allows DWDM wavelength to be configured within a given range. DWDM tunable SFP+ optical transceiver provides support for 96 channels at 50GHz spacing for high density applications.
- OTN Termination—Cisco NCS 6000 Series Router supports G.709 encapsulation for end to end error monitoring in 10x100 Gigabit Ethernet CXP and 10x100 Gigabit Ethernet CPAK line cards. OTN frames are processed and stripped off OTN overheads and then sent for Ethernet processing. These functionalities are supported in this release
 - ITU G.709 Alarms
 - FEC (Forward Error Correction) Support
 - Configuration and Display of G.709 Alarms and Statistics
- QinQ—QinQ is an extension of 802.1Q for specifying multiple 802.1Q tags (IEEE 802.1QinQ VLAN Tag stacking). Layer 3 VPN service termination and L2VPN service transport are enabled over QinQ sub-interfaces.
- GTP Loadbalancing—GPRS Tunneling Protocol (GTP) Load Balancing enables efficient distribution of traffic in mobile networks, and provides increased reliability and availability for the network.
- Inter-AS— Inter-AS is a peer-to-peer type model that allows extension of VPNs through multiple provider or multi-domain networks. This lets service providers peer up with one another to offer end-to-end VPN connectivity over extended geographical locations.
- 6VPE—6VPE uses the existing MPLS IPv4 core infrastructure for IPv6 transports to enable IPv6 sites to communicate over an MPLS IPv4 core network using MPLS label switch paths (LSPs).
- Command Access in XR and Admin Modes—The XR user group and task is mapped to the System Admin VM group when the System Admin mode is accessed from XR mode using admin command. The corresponding access permission on System Admin VM is available to the user. Currently, only aaa, admin task and root-lr groups are mapped to System Admin VM group or task. The other tasks like protocols are not mapped as these services are not supported in System.
- Green Mode and Dynamic Slice reset support—In Release 5.2.3 the following functionalities are supported:

- Change the mode of operation of a slice (for breakout or OTU4 handling)
- Green Mode (allows a slice to be shutdown when the operator desires it. Restriction: no features should be configured on interfaces belonging to the slice.)
- IPSLA—UDP jitter operation is supported to provide accurate calculations for latency and jitter.
- CCC Controller—Multiple new CCC controller commands have been introduced to provide various card state transition and trace information along with notification history, OIR history, and Ethernet register information.

Limitations and Restrictions

In release 5.2.3 these taskgroups are unavailable:

- provisioning,
- maintenance,
- retrieve.

Hardware Features

Cisco IOS XR Software Release 5.2.3 supports NCS6000 Multichassis System, maximum configuration of 4+2.

Related Documentation

The most current Cisco NCS 6000 Series Router software documentation is located at this URL:

http://www.cisco.com/en/US/products/ps13132/tsd_products_support_series_home.html

Caveats

Caveats describe unexpected behavior in Cisco IOS XR Software releases. Severity-1 caveats are the most critical caveats; severity-2 caveats are less critical.

Release 5.2.3

| Bug ID | Severity | Headline |
|----------------------------|----------|---|
| CSCus68401 | 1 | After active RP reload, standby Mgmt interface configuration lost |
| CSCus31693 | 2 | ISIS Failed to be NSR-ready if te_control process restart on standby RP |
| CSCuq58365 | 3 | NG ISSU: HSRP state changes on V2-A right after run phase |
| CSCus36236 | 2 | Bfd sessions stuck in INIT state after LC OIR following ISSU |
| CSCus40680 | 2 | IPv6 multicast failed to recover due to IPv6 mcast adj in deleted state |

| Bug ID | Severity | Headline |
|----------------------------|----------|---|
| CSCus50478 | 2 | Polling SNMPv3 entity mibs failing to return results on NCS6k |
| CSCul33665 | 2 | NGN: lpts policer configuration for a slot is removed on LC OIR in that slot. |

Cisco Bug Search Tool

Bug Search Tool (BST), the online successor to Bug Toolkit, is designed to improve the effectiveness in network risk management and device troubleshooting. The tool allows partners and customers to search for software bugs based on product, release, and keyword, and aggregates key data such as bug details, product, and version. The tool has provision to filter bugs based on credentials to provide external and internal bug views for the search input.

Use the BST to view the list of outstanding and resolved bugs in a release.

The BST is available at [Bug Search](#). To search for a specific bug, go to <https://tools.cisco.com/bugsearch/bug/bugid>. For more information on BST, see [Bug Search Help](#).

Search Bugs in BST

Follow these instructions to search for bugs that are specific to Cisco IOS XR software release 5.2.3 in BST.

Step 1

Go to <https://tools.cisco.com/bugsearch/>.

Log in to the tool using your Cisco.com user name and password. After successful login, the Bug Search Tool page opens.

Step 2

To search for release 5.2.3 bugs, enter the following parameters in the page:

- Product—Select **Series**, enter **Cisco NCS 6008 - 8-Slot Chassis** in the text box. You can alternately navigate to the product name from the **Select from list** link.
- Releases—Enter 5.2.3.
- Show Bugs—Select **Affecting or Fixed in these Releases**.

Step 3

Press **Enter**.

Note

- By default, the search results include bugs with all severity levels and statuses, and bugs that were modified during the life cycle of the bug. After you perform a search, you can filter your search results to meet your search requirements.
- An initial set of 25 search results is shown in the bottom pane. Drag the scroll bar to display the next set of 25 results. Pagination of search results is not supported.

Release 5.2.3 Packages

This table lists the Cisco IOS XR Software feature set matrix (packages) and associated filenames available for the Cisco IOS XR Software Release 5.2.3 that is supported on the Cisco NCS 6008 router.

Table 1: Cisco IOS XR Software Release 5.2.3 Packages

| Feature Set | Filename | Description |
|--|------------------------|--|
| Composite Package | | |
| Cisco IOS XR IP Unicast Routing Core Bundle | ncs6k-mini-x.iso-5.2.3 | Contains required core packages, including OS, Admin, Base, Forwarding, Modular Services Card, Routing, SNMP Agent, FPD, and Alarm Correlation. |
| Optional Individual Packages (packages that are installed individually) | | |
| Cisco IOS XR Manageability Package | ncs6k-mgbl.pkg-5.2.3 | Extensible Markup Language (XML) Parser and HTTP server packages. |
| Cisco IOS XR MPLS Package | ncs6k-mpls.pkg-5.2.3 | MPLS Traffic Engineering (MPLS-TE), Label Distribution Protocol (LDP), MPLS Forwarding, MPLS Operations, Administration, and Maintenance (OAM), Link Manager Protocol (LMP), Optical User Network Interface (OUNI), Resource Reservation Protocol (RSVP), and Layer-3 VPN. |
| Cisco IOS XR Multicast Package | ncs6k-mcast.pkg-5.2.3 | Multicast Routing Protocols (PIM, Multicast Source Discovery Protocol [MSDP], Internet Group Management Protocol [IGMP], Auto-RP), Tools (SAP, MTrace), and Infrastructure [(Multicast Routing Information Base [MRIB], Multicast-Unicast RIB [MURIB], and Multicast forwarding [MFWD]). |

| | | |
|--|-----------------------|---|
| Cisco IOS XR Security Package | ncs6k-k9sec.pkg-5.2.3 | Support for Encryption, Decryption, IP Security (IPSec), Secure Shell (SSH), Secure Socket Layer (SSL), and Public-key infrastructure (PKI) (Software based IPSec support—maximum of 500 tunnels) |
| Cisco IOS XR Lawful Intercept (LI) Package | ncs6k-li.pkg-5.2.3 | Supports Lawful Intercept (LI) features. |
| Cisco IOS XR Documentation Package | ncs6k-doc.pkg-5.2.3 | .man pages for Cisco IOS XR Software. |

This table lists the TAR files.

Table 2: Cisco IOS XR Software Release 5.2.3 TAR Files

| Feature Set | Filename | Description |
|---|----------------------------|---|
| Cisco IOS XR IP/MPLS Core Software | NCS6000-iosxr-5.2.3.tar | <ul style="list-style-type: none"> • Cisco IOS XR IP Unicast Routing Core Bundle • Cisco IOS XR Manageability Package • Cisco IOS MPLS Package • Cisco IOS XR Multicast Package |
| Cisco IOS XR IP/MPLS Core Software 3DES | NCS6000-iosxr-k9-5.2.3.tar | <ul style="list-style-type: none"> • Cisco IOS XR IP Unicast Routing Core Bundle • Cisco IOS XR Manageability Package • Cisco IOS XR MPLS Package • Cisco IOS XR Multicast Package • Cisco IOS XR Security Package |

The show version Command

To determine the version of Cisco IOS XR Software running on your router, log in to the router and enter the **show version** command. Use this command to validate that the Cisco IOS XR Software version is the latest on your router.

SUMMARY STEPS

1. Establish a Telnet session with the router.
2. Enter **show version** command from XR EXEC mode.

DETAILED STEPS

Step 1 Establish a Telnet session with the router.

Step 2 Enter **show version** command from XR EXEC mode.

```
RP/0/RP0/CPU0:router# show version
```

```
Cisco IOS XR Admin Software, Version 5.2.3
Copyright (c) 2013-2015 by Cisco Systems, Inc.
```

```
Build Information:
```

```
Built By      : junchen
Built On     : Wed Feb  4 11:48:28 PST 2015
Build Host   : iox-lnx-010
Workspace    : /auto/srcarchive12/production/5.2.3/all/workspace
Version     : 5.2.3
Location    : /opt/cisco/calvados/packages/
```

```
BIOS Version : 14.1
```

```
System uptime is 8 hours, 55 minutes
```

System Requirements

Memory Requirements



Caution

If you remove the media in which the software image or configuration is stored, the router may become unstable and fail.

The minimum memory requirements for a Cisco NCS 6008 router running Cisco IOS XR Software Release 5.2.3 consist of the following:

- 48 GB memory on the NCS 6008 Route Processors (NCS6-RP)
- 16 GB memory on line cards

Supported Hardware

The following table lists the supported hardware components on the Cisco NCS 6000 Series Router and the minimum required software release. For more information, see the *Firmware Support* section.

Table 3: Cisco NCS 6008 Router Hardware and Software Compatibility Matrix

| Component | Part Number | Support from Release |
|--|-------------------|----------------------|
| S13 fabric card for LCC with 16 CXP ports for 100GE SR optics | NC6-FC-MC | 5.2.1 |
| S13 fabric card for LCC with 16 CXP ports for 100GE SR optics Spare | NC6-FC-MC= | 5.2.1 |
| S2 fabric card for the FCC with 32 CXP ports for 100GE SR12 CXPs | NCS-F-FC | 5.2.1 |
| S2 fabric card for the FCC with 32 CXP ports for 100GE SR12 CXPs Spare | NCS-F-FC= | 5.2.1 |
| FCC shelf controllers | NCS-F-SC | 5.2.1 |
| FCC shelf controllers Spare | NCS-F-SC= | 5.2.1 |
| FCC shelf controller and switch (SC-SW) card | NCS-F-SCSW | 5.2.1 |
| FCC shelf controller and switch (SC-SW) card Spare | NCS-F-SCSW= | 5.2.1 |
| Short reach SFP 10GE transceiver module | SFP-10G-SR | 5.2.1 |
| Long reach SFP 10GE transceiver module | SFP-10G-LR | 5.2.1 |
| Short reach QSFP 40GE optical module (SC-SW card only) | QSFP-40G-SR4 | 5.2.1 |
| Long reach QSFP 40GE optical module (SC-SW card only) | QSFP-40G-LR4 | 5.2.1 |
| 96 CXP-100G-SR12 optical module | NCS-FAB-OPT | 5.2.1 |
| 2X100GE MS PAYG Card with CPAK | NC6-2-10x100G-M-K | 5.2.1 |

| Component | Part Number | Support from Release |
|--|-------------------|----------------------|
| 2X100GE LSR PAYG Card with CPAK | NC6-2-10x100G-L-K | 5.2.1 |
| 30x10GE MS PAYG Card with SFPP | NC6-30x10G-M-S | 5.2.1 |
| 30x10GE LSR PAYG Card with SFPP | NC6-30x10G-L-S | 5.2.1 |
| Craft Panel | NCS-CRFT | 5.2.1 |
| 60-port 10Gbps SFP+ Lean Core Line card | NC6-60X10GE-L-S | 5.0.1 |
| 60-port 10Gbps SFP+ Multi-Service Core Line card | NC6-60X10GE-M-S | 5.0.1 |
| Cisco 10GBASE-SR SFP+ Module for MMF | SFP-10G-SR | 5.0.1 |
| Cisco 10GBASE-SR SFP+ Module for MMF, extended temperature range | SFP-10G-SR-X | 5.0.1 |
| Cisco 10GBASE-LR SFP+ Module for SMF | SFP-10G-LR | 5.0.1 |
| Cisco multirate 10GBASE-LR, 10GBASE-LW and OTU2e SFP+ Module for SMF, extended temperature range | SFP-10G-LR-X | 5.0.1 |
| Cisco 10GBASE-ER SFP+ Module for SMF | SFP-10G-ER | 5.0.1 |
| Cisco 10GBASE-ZR SFP+ Module for SMF | SFP-10G-ZR | 5.0.1 |
| NCS 6008 - 8-Slot Chassis | NCS-6008 | 5.0.0 |
| NCS 6008 Fabric Card | NC6-FC | 5.0.0 |
| NCS 6008 Route Processor | NC6-RP | 5.0.0 |
| NCS 6008 Chassis Fan Tray | NC6-FANTRAY | 5.0.0 |
| NCS AC Power Tray | NCS-AC-PWRTRAY | 5.0.0 |
| NCS DC Power Tray | NCS-DC-PWRTRAY | 5.0.0 |

| Component | Part Number | Support from Release |
|--|--------------------|-----------------------------|
| NCS PDU Bracket | NCS-PDU-BRKT | 5.0.0 |
| NCS 6008 3-to-1 Phase DELTA PDU | NCS-PDU-DELTA | 5.0.0 |
| NCS 6008 3-to-1 Phase WYE PDU | NCS-PDU-WYE | 5.0.0 |
| NCS 100x10GE Patch Panel Short Reach | NCS-PP-100X10-SR | 5.0.0 |
| NCS 6000 10x100G Multi-Service CPAK | NC6-10X100G-M-K | 5.0.0 |
| NCS 6000 10x100G Multi-Service CXP | NC6-10X100G-M-P | 5.0.0 |
| NCS 6000 10x100G LSR CPAK | NC6-10X100G-L-K | 5.0.0 |
| NCS 6000 10x100G LSR CXP | NC6-10X100G-L-P | 5.0.0 |
| NCS Craft Panel Display Kit | NCS-CRFT | 5.0.0 |
| NCS 6008 Chassis Front Doors | NC6-DOOR-F | 5.0.0 |
| NCS 6008 Chassis Rear Doors | NC6-DOOR-R | 5.0.0 |
| NCS 6008 Chassis Drill Template | NC6-DRILLTEMP | 5.0.0 |
| NCS 6008 Chassis Front-Bottom Grille | NC6-GRILLE-FB | 5.0.0 |
| NCS 6008 Chassis Front-Top Grille | NC6-GRILLE-FT | 5.0.0 |
| NCS 6008 Chassis Rear Grille | NC6-GRILLE-R | 5.0.0 |
| NCS 6008 Power Control Module | NC6-PCM | 5.0.0 |
| NCS 6008 Chassis Trough | NC6-TROUGH | 5.0.0 |
| NCS 6008 Chassis Trough Wide | NC6-TROUGH-W | 5.0.0 |
| NCS 6008 & NCS Fabric Chassis Lift Dolly | NCS-LIFT | 5.0.0 |
| 10X10G-LR Cisco CPAK module for SMF | CPAK-10X10G-LR | 5.0.0 |

| Component | Part Number | Support from Release |
|---|---------------|----------------------|
| CPAK-100G-LR4 Transceiver module, 10 km SMF | CPAK-100G-LR4 | 5.0.0 |
| CXP-100G-SR10 transceiver Module | CXP-100G-SR10 | 5.0.0 |

Firmware Support

To check the firmware code running on the Cisco NCS 6008 router, Release , run the **show hw-module fpd** command in System Admin EXEC mode.

RP/0/RP0/CPU0:router(admin)# **show fpd package**

```

=====
                                Field Programmable Device Package
                                =====
Card Type                        FPD Description                Req   SW   Min Req  Min Req
=====                        =====                        Reload Ver   SW Ver   Board Ver
-----
NC6-4-10X100G-M-K               BAO-MB FPGA                    NO    1.06  1.06     0.0
                                BAO-DB FPGA                    NO    1.06  1.06     0.0
                                S2 GN2411                      YES   5.86  5.86     2.0
                                S3 GN2411                      YES   5.86  5.86     2.0
                                S4 GN2411                      YES   5.86  5.86     2.0
                                S2 GN2411                      YES   7.58  7.58     0.0
                                S3 GN2411                      YES   7.58  7.58     0.0
                                S4 GN2411                      YES   7.58  7.58     0.0
                                CCC-FPGA                       YES   2.09  2.09     0.0
                                CCC-Bootloader                YES   2.09  2.07     0.0
                                CCC-Power-On                  YES   1.38  1.38     0.0
                                Backup-CCC-PwrOn              YES   1.38  1.31     0.0
                                Ethernet-Switch               YES   1.33  1.33     0.0
                                Backup-EthSwitch              YES   1.33  1.32     0.0
                                Primary BIOS                  YES  14.01  14.01    0.0
                                Backup-BIOS                   YES  14.01  14.01    0.0
                                PLX-8748                     YES   0.04  0.04     0.1
-----
NC6-2/10X100G-L-K               BAO-MB FPGA                    NO    1.06  1.06     0.0
                                BAO-DB FPGA                    NO    1.06  1.06     0.0
                                CPAK bay 0 LR4                YES   1.16  1.16     0.0
                                CPAK bay 1 LR4                YES   1.16  1.16     0.0
                                CPAK bay 2 LR4                YES   1.16  1.16     0.0
                                CPAK bay 3 LR4                YES   1.16  1.16     0.0
                                CPAK bay 4 LR4                YES   1.16  1.16     0.0
                                CPAK bay 5 LR4                YES   1.16  1.16     0.0
                                CPAK bay 6 LR4                YES   1.16  1.16     0.0
                                CPAK bay 7 LR4                YES   1.16  1.16     0.0
                                CPAK bay 8 LR4                YES   1.16  1.16     0.0
                                CPAK bay 9 LR4                YES   1.16  1.16     0.0
                                CPAK bay 0 SR10               YES   2.03  2.03     0.0
                                CPAK bay 1 SR10               YES   2.03  2.03     0.0
                                CPAK bay 2 SR10               YES   2.03  2.03     0.0
                                CPAK bay 3 SR10               YES   2.03  2.03     0.0
                                CPAK bay 4 SR10               YES   2.03  2.03     0.0
                                CPAK bay 5 SR10               YES   2.03  2.03     0.0
                                CPAK bay 6 SR10               YES   2.03  2.03     0.0
                                CPAK bay 7 SR10               YES   2.03  2.03     0.0
                                CPAK bay 8 SR10               YES   2.03  2.03     0.0
                                CPAK bay 9 SR10               YES   2.03  2.03     0.0
                                CPAK bay 0 ER4L               YES   0.01  0.01     0.0
                                CPAK bay 1 ER4L               YES   0.01  0.01     0.0
                                CPAK bay 2 ER4L               YES   0.01  0.01     0.0
                                CPAK bay 3 ER4L               YES   0.01  0.01     0.0
                                CPAK bay 4 ER4L               YES   0.01  0.01     0.0

```

| | | | | | |
|-------------------|------------------|-----|-------|-------|-----|
| | CPAK bay 5 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 6 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 7 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 8 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 9 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | S2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 |
| ----- | | | | | |
| NC6-FC | CCC-FPGA | YES | 1.23 | 1.23 | 0.0 |
| | CCC-Power-On | YES | 1.39 | 1.39 | 0.0 |
| | PLX-8713 | YES | 1.03 | 1.03 | 0.1 |
| ----- | | | | | |
| NC6-30/60X10G-L-S | BAO-MB FPGA | NO | 0.23 | 0.23 | 0.0 |
| | BAO-DB FPGA | NO | 0.23 | 0.23 | 0.0 |
| | Slice-0 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-1 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-0 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-1 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 |
| ----- | | | | | |
| NCS-F-SC | PLX-8625 | YES | 0.02 | 0.02 | 0.0 |
| | CCC-FPGA | YES | 2.01 | 2.01 | 0.0 |
| | CCC-Bootloader | YES | 2.01 | 2.01 | 0.0 |
| | CCC-Power-On | YES | 1.39 | 1.39 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.39 | 1.38 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.33 | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | CPU Complex FPGA | YES | 4.06 | 4.06 | 0.1 |
| | CPU Complex BOOT | YES | 4.06 | 4.04 | 0.1 |
| | CPU Complex FPGA | YES | 0.01 | 0.01 | 0.0 |
| | CPU Complex BOOT | YES | 0.01 | 0.01 | 0.0 |
| ----- | | | | | |
| NC6-10X100G-L-K | BAO-MB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | BAO-DB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | CPAK bay 0 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 1 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 2 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 3 LR4 | YES | 1.16 | 1.16 | 0.0 |

System Requirements

| | | | | | |
|-------------------|------------------|-----|-------|-------|-----|
| | CPAK bay 4 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 5 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 6 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 7 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 8 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 9 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 0 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 1 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 2 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 3 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 4 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 5 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 6 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 7 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 8 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 9 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 0 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 1 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 2 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 3 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 4 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 5 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 6 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 7 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 8 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 9 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | S2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 |
| ----- | | | | | |
| NCS-CRFT | Craft-LCC | NO | 1.06 | 1.06 | 0.1 |
| | Craft-FCC | NO | 1.06 | 1.06 | 0.1 |
| ----- | | | | | |
| PROTO-F-SC | PLX-8625 | YES | 0.02 | 0.02 | 0.0 |
| | CCC-FPGA | YES | 2.01 | 2.01 | 0.0 |
| | CCC-Bootloader | YES | 2.01 | 2.01 | 0.0 |
| | CCC-Power-On | YES | 1.39 | 1.39 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.39 | 1.38 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.33 | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | CPU Complex FPGA | YES | 4.06 | 4.06 | 0.1 |
| | CPU Complex BOOT | YES | 4.06 | 4.04 | 0.1 |
| | CPU Complex FPGA | YES | 0.01 | 0.01 | 0.0 |
| | CPU Complex BOOT | YES | 0.01 | 0.01 | 0.0 |
| ----- | | | | | |
| NC6-6-10X100G-L-K | BAO-MB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | BAO-DB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | S2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 |

| | | | | | |
|------------------|------------------|-----|-------|-------|-----|
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 |
| ----- | | | | | |
| PROTO-CXP-2XPITA | BAO-MB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | Slice-0 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-1 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-0 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-1 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 |
| ----- | | | | | |
| NC6-FANTRAY | Fantray FPGA | NO | 2.01 | 2.01 | 0.0 |
| ----- | | | | | |
| P-L-20X40G-QSFP | BAO-MB FPGA | NO | 0.29 | 0.29 | 0.0 |
| | BAO-DB FPGA | NO | 0.29 | 0.29 | 0.0 |
| | Slice-0 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-1 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-0 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-1 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 |
| ----- | | | | | |
| NC6-10X100G-M-P | BAO-MB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | BAO-DB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | Slice-0 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-1 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-0 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-1 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 |

System Requirements

| | | | | | |
|-----------------|------------------|-----|-------|-------|-----|
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 |
| ----- | | | | | |
| NC6-10X100G-M-K | BAO-MB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | BAO-DB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | CPAK bay 0 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 1 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 2 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 3 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 4 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 5 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 6 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 7 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 8 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 9 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 0 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 1 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 2 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 3 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 4 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 5 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 6 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 7 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 8 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 9 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 0 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 1 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 2 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 3 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 4 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 5 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 6 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 7 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 8 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 9 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | S2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S3 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S3 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S4 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 |
| | Backup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 |
| ----- | | | | | |
| NC6-FC-MC | CCC-FPGA | YES | 1.23 | 1.23 | 0.0 |
| | CCC-Power-On | YES | 1.39 | 1.39 | 0.0 |
| | CRE-FPGA-MB | YES | 1.00 | 1.00 | 0.0 |
| | Back-CRE-FPGA-MB | YES | 1.00 | 1.00 | 0.0 |
| | G411 BUS 0 | YES | .86 | 5.86 | 2.0 |
| | GN411 BUS 1 | YES | 5.86 | 5.86 | 2.0 |
| | GN211 BUS 2 | YES | 5.8 | 5.86 | 2.0 |
| | GN241 BUS 0 | YES | 7.58 | 7.58 | 0.0 |
| | GN2411 s 1 | YES | 7.58 | 7.58 | 0.0 |
| | GN2411 B 2 | ES | 7.58 | 7.58 | 0.0 |
| ----- | | | | | |
| NCF-FANTRAY | Fantray FPGA | NO | 2.01 | 2.01 | 0.0 |
| ----- | | | | | |
| NC6-10100G-L-P | BAMB FPGA | NO | 1.0 | 1.06 | 0 |
| | BAO-DB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | Slice-0 G2411 | ES | 5.86 | .86 | 2.0 |
| | Slice-1 GN2411 | YS | 5.86 | .86 | 2.0 |
| | Slice-0 GN24 | YES | 7.58 | 7.5 | 0.0 |
| | Slice-1 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-2 GN2411 | YES | .86 | 5.86 | 2.0 |
| | Slice-3 GN2411 | YES | 5.8 | 5.86 | .0 |

| | | | | | |
|-------------------|------------------|-----|-------|-------|------|
| | Slie-4 GN2411 | YES | 5.8 | 5.86 | .0 |
| | Slice GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice- GN2411 | YES | 7.58 | 7.58 | 0. |
| | Slice-4GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S2 GN241 | YES | 5.86 | 5.86 | 2.0 |
| | S4 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S3 GN2411 | YES | .58 | 7.58 | 0.0 |
| | S4 N2411 | YES | 7.58 | 7.58 | 0 |
| | CCC-FPG | YES | 2.09 | 2.09 | 0.0 |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 |
| | ckup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Etrnet-Switch | YES | 1. | 1.33 | |
| | Backup-hSwitch | YES | 1.33 | 1.32 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | LX-8748 | YES | .04 | 0.04 | 0.1 |
| ----- | | | | | |
| NC6-RP | CCC-PGA | YES | 2.4 | 2.04 | .0 |
| | CCC-otloader | YES | 2.04 | 2.03 | 0.0 |
| | CCC-PoweOn | ES | 1.38 | .38 | 0.0 |
| | Ethernet-Switic | YES | 1.33 | 1.33 | 0.2 |
| | ckup-EthSwitch | YES | 1.33 | 1.32 | 0.2 |
| | Ethernet-Switch | YES | 1. | 1.33 | 1 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0. |
| | PLX-874 | YES | 0.05 | 0.05 | 0.0 |
| | Primary BS | S | 14.01 | 101 | 0.0 |
| | Backup-BIOS | YE | 14.01 | 14.1 | 0.0 |
| | CPU Complex FPGA | YES | 4.06 | 4.06 | 0.1 |
| | CPComplex BOOT | YES | 4.06 | 4.04 | 0.1 |
| | CPU mplex FPGA | YES | 0.01 | 0.01 | 0.0 |
| | CPU Compl BOOT | ES | 0.01 | 0.01 | 0.0 |
| ----- | | | | | |
| NS-F-SCSW (SW) | CCC-FPGA | YES | 1.01 | 1.01 | 0.0 |
| | CCC-Power-On | YES | 1.37 | 1.37 | 0.0 |
| | LX-8614 | YES | .03 | 0.03 | 0.0 |
| ----- | | | | | |
| PWR-2KWC-V2 | DT-PiMCU | NO | 6.03 | 6.03 | 0.12 |
| | DT-Se4vMCU | NO | 6.02 | 6.02 | 0.1 |
| | DT-Sec5MCU | NO | 6.03 | 6.03 | 0.12 |
| | EM-PrimMCU | NO | 3.12 | 3.12 | 0.21 |
| | EM-Sec54vMCU | NO | 3.19 | 3. | 0.21 |
| | EM-Sec5vMCU | NO | 3.19 | 3.19 | 0.21 |
| ----- | | | | | |
| NCS-F-SC | PLX-85 | YES | 0.02 | 0.02 | 0.0 |
| | CCC-FPGA | Y | 2.01 | 2 | 0.0 |
| | CCC-Bootloader | YES | 2.01 | 2.01 | 0.0 |
| | CCC-Power-On | YES | 1.39 | 1.39 | 0.0 |
| | Backup-CCC-PwrOn | YE | 1.39 | 1.38 | 0.0 |
| | Backup-EthSwich | YES | 1.33 | 1. | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.0 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | CPU Complex FPGA | YES | 4.06 | 4.06 | 0.1 |
| | PU Complex BOOT | YES | .06 | 4.04 | 0.1 |
| | CPUComplex FPGA | YES | .01 | 0.01 | 0.0 |
| | CPU mplex BOOT | YES | 0.01 | 0.01 | 0.0 |
| ----- | | | | | |
| NC6-30/60X10G-M-S | BAO-MB FA | NO | 0.23 | 0.23 | 0.0 |
| | S2 GN2411 | YE | 5.86 | 5.86 | 2.0 |
| | S3 GN2411 | YES | 5.86 | 5.8 | 2.0 |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | S GN2411 | YES | 7.58 | 7.58 | 0.0 |
| | CCCPGA | YES | 2.09 | 2.09 | 0 |
| | CCC-Bootader | ES | 2.09 | 2.07 | 0.0 |
| | Backup-CCC-Pwrn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 |
| | Pmary BIOS | YES | 1.01 | 14.01 | 0.0 |
| | Baup-BIOS | YES | 14.0 | 14.01 | 0 |
| | Modena PHY | YES | 0.13 | 0.13 | 0.0 |
| | Modena 1PHY | YES | 0.13 | 0.13 | 0.0 |
| | Modena 2HY | YES | 0.13 | 0.13 | 0.0 |
| | Modena 3 P | YS | 0.13 | 3 | 0.0 |
| | Modena 4 PHY | YES | 0.13 | 0.13 | 0.0 |

System Requirements

| | | | | | |
|------------------|-----------------|-----|-------|-------|------|
| | Modena 5 PHY | YES | 0.13 | 0.13 | 0.0 |
| | Mena 6 PHY | YES | 0. | 0.13 | 0 |
| | Moden7 PHY | YES | 0.13 | 0.13 | 0.0 |
| | Modena PHY | YES | 0.13 | 0.13 | 0.0 |
| | Modena 10 PHY | YES | 0.13 | 0.1 | 0.0 |
| | Modena 11 PHY | YES | .13 | 0.13 | 0.0 |
| | Mdena 12 PHY | YES | 03 | 0.13 | .0 |
| | Modena 13 PHY | YES | 0.1 | 0.13 | .0 |
| | Moden 14 PHY | YES | 0.13 | 0.13 | 0. |
| | Modena 5 PHY | YES | 0.13 | 0.13 | 0.0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 |
| NC6-2/10X100G-M- | BAO-MB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | BAO-DB FPGA | NO | 1.06 | 1.06 | 0.0 |
| | CPAK bay 0 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CAK bay 1 LR4 | YES | .16 | 1.16 | 0.0 |
| | CP bay 2 LR4 | YES | 1.1 | 1.16 | 0.0 |
| | CPAKay 3 LR4 | YES | 1.16 | 1.16 | 0. |
| | CPAK bay 4 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CPAK bay 6 R4 | Y | 1.16 | 16 | 0.0 |
| | CPAK bay 7 LR | YES | 1.16 | 1.1 | 0.0 |
| | CPAK bay 8 LR4 | YES | .16 | 1.16 | 0.0 |
| | CAK bay 9 LR4 | YES | 1.16 | 1.16 | 0.0 |
| | CP bay 0 SR10 | YES | 2.0 | 2.03 | 0 |
| | CPAK ay 1 SR10 | YES | 2.03 | 2.03 | 0. |
| | CPAK ba2 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 3SR10 | ES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 6 SR10 | YE | 2.03 | 23 | 0.0 |
| | CPAK bay 7 SR1 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 8 SR10 | YES | 2.03 | 2.03 | 0.0 |
| | CPAK bay 9 SR10 | YES | 03 | 2.03 | 0.0 |
| | CPAbay 0 ER4L | YES | 0.1 | 0.01 | .0 |
| | CPAK y 1 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK b 2 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 3 4L | YE | 0.01 | 01 | 0.0 |
| | CPAK bay 4 ER4L | YES | 0.01 | 0.0 | 0.0 |
| | PAK bay 5 ER4L | YES | .01 | 0.01 | 0.0 |
| | CPAKbay 6 ER4L | YES | 0.01 | 0.01 | 0. |
| | CPAK bay 7 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | CPAK bay 8R4L | Y | 0.01 | 01 | 0.0 |
| | CPAK bay 9 ER4L | YES | 0.01 | 0.01 | 0.0 |
| | S GN2411 | YES | 86 | 5.86 | 2.0 |
| | S3 2411 | YES | 5.86 | 5.86 | 2 |
| | S4 GN21 | YES | 5.86 | 5.86 | 2. |
| | S2 GN24 | YES | 7.58 | 7.58 | 0.0 |
| | S3 GN241 | YES | 7.58 | 7.58 | 0.0 |
| | S4 GN2411 | YE | 7.58 | 7.8 | 0.0 |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 |
| | CC-Bootloader | YES | .09 | 2.07 | 0.0 |
| | CCCover-On | YES | 1.38 | 1.38 | 0. |
| | Backup-C-PwrOn | YES | 1.38 | 1.31 | 0.0 |
| | Ethernet-witch | ES | 1.33 | .33 | 0.0 |
| | Backup-Ethitch | Y | 1.33 | 12 | 0.0 |
| | Primary BIOS | YES | 14.01 | 14.0 | 0.0 |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| | X-8748 | YES | 04 | 0.04 | .1 |
| ----- | | | | | |
| | DT-Sec54vMCU | NO | 6.02 | 6.02 | 1.0 |
| | DT-Sec5vMCU | NO | 6.04 | 6.04 | 1.0 |
| | EM-Sec54vMCU | NO | 3.12 | 3.12 | 0.21 |
| | E-Sec5vMCU | NO | 3.18 | 3.18 | 0.21 |
| ----- | | | | | |
| NC6-60XGE-L-S | BAO-B FPGA | NO | 0.29 | 0.29 | 0 |
| | BAO-D FPGA | NO | 0.29 | 0.29 | 0. |
| | Slice-0N2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-1 G2411 | ES | 5.86 | 5.86 | 2.0 |
| | Slice-1 GN241 | YE | 7.58 | 7. | 0.0 |
| | Slice-2 GN2411 | YES | 5.86 | 5.86 | 2.0 |
| | Slice-3 GN2411 | YES | .86 | 5.86 | 2.0 |
| | Slice-4 GN2411 | YES | 5. | 5.86 | 0 |
| | Slice-2 GN2411 | YES | 7.58 | 7.58 | 0. |
| | Slice-3 2411 | YES | 7.58 | 7.58 | 0.0 |
| | Slice-4 2411 | ES | 7.58 | .58 | 0.0 |

| | | | | | | |
|-----------------|--------------------------|-----|-------|-------|-----|---|
| | S2 GN2411 | Y | 5.86 | 56 | 2.0 | |
| | S3 GN2411 | YES | 5.86 | 5.8 | 2.0 | |
| | S4 GN2411 | YES | 5.86 | 5.8 | 2.0 | |
| | S2 GN2411 | YES | 7.58 | 7.58 | 0.0 | |
| | S3 GN2411 | YES | 7.58 | 7.58 | 0.0 | |
| | GN2411 | YES | 7.58 | 7.58 | 0.0 | |
| | CC-FPGA | YES | 2. | 2.09 | 0 | |
| | CCC-Btloader | YES | 2.09 | 2.07 | 0.0 | |
| | CCC-Powr-On | YES | 1.38 | 1.38 | 0.0 | |
| | Backup-CCCwrOn | YES | 1.38 | 1.31 | 0.0 | |
| | Backup-EthSwih | YES | 1.33 | 1.3 | 0.0 | |
| | Primary BIOS | YES | 14.01 | 14.01 | 0.0 | |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 | |
| | LX-8748 | YES | 04 | 0.04 | 0.1 | |
| ----- | | | | | | |
| PROTO-CXP-PITA | BAO-MB FPGA | NO | 1.06 | 1.06 | 0.0 | |
| | Slice-1 GN2411 | YES | 7.58 | 7.58 | 0.0 | |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 | |
| | C-Bootloader | YES | 29 | 2.07 | 0.0 | |
| | CCC-ower-On | YES | 1.38 | 1.38 | .0 | |
| | Back-CCC-PwrOn | YES | 1.38 | 1.31 | 0. | |
| | Etheret-Switch | YES | 1.33 | 1.33 | 0.0 | |
| | Backup-ESwitch | ES | 1.33 | .32 | 0.0 | |
| | Backup-BIOS | YES | 14.01 | 14.01 | 0.0 | 0 |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 | |
| ----- | | | | | | |
| NC6-600GE-M-S | BAO-MB FPGA | NO | 0.29 | 0.29 | 0.0 | |
| | BAO-DB FPGA | NO | 0.29 | 0.29 | 0.0 | |
| | S2 GN2411 | YES | 5.86 | 5.86 | 2.0 | |
| | GN2411 | YES | 5.86 | 5.86 | 2.0 | |
| | S2N2411 | YES | 7.5 | 7.58 | 0.0 | |
| | S3 GN11 | YES | 7.58 | 7.58 | 0.0 | |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 | |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 | |
| | Backup-CCC-PwrO | YES | 1.38 | 1.31 | 0.0 | |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 | |
| | Backup-EthSwitch | YES | .33 | 1.32 | 0.0 | |
| | Prary BIOS | YES | 14. | 14.01 | 0 | |
| | Backp-BIOS | YES | 14.0 | 14.01 | 0 | |
| | Modena PHY | YES | 0.13 | 0.13 | 0. | |
| | Modena PHY | YES | 0.13 | 0.13 | 0.0 | |
| | Modena 3 PH | Y | 0.13 | .03 | 0.0 | |
| | Modena 4 PHY | YES | 0.13 | 0.13 | 0.0 | |
| | Mdena 5 PHY | YES | 03 | 0.13 | 0.0 | |
| | Mona 6 PHY | YES | 0. | 0.13 | 0 | |
| | Modena 7 PH | | | | | |
| | PLX-874 | YES | 0.04 | 0.04 | 0.1 | |
| ----- | | | | | | |
| | CCC-FPGA | YE | 2.09 | 29 | 0.0 | |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 | |
| | CCC-Power-On | YES | .38 | 1.38 | 0.0 | |
| | Backup-CCC-PwrOn | YES | 138 | 1.31 | 0.0 | |
| | Etheet-Switch | YES | 1.3 | 1.33 | 0 | |
| | BackupEthSwitch | YES | 1.33 | 1.32 | 0.0 | |
| | PrimaryIOS | YES | 14.01 | 14.01 | 0.0 | |
| | Backup-BIOS | YES | 14.01 | 14. | 0.0 | |
| | PLX-8748 | YES | 0.04 | 0.04 | 0.1 | |
| ----- | | | | | | |
| PROTO-2XP-SFP | BAO-MBPGA | NO | 0.29 | 0.29 | 0.0 | |
| | CCC-FPGA | ES | 2.09 | 2.09 | 0.0 | |
| | CCC-Bootloadr | YE | 2.09 | 2.7 | 0.0 | |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 | |
| | Backup-CCC-PwrO | YES | 1.38 | 1.31 | 0.0 | |
| | thernet-Switch | YES | 1.33 | 1.33 | 0.0 | |
| | Bckup-EthSwitch PLX-8748 | YES | 0.04 | 0.04 | 0.1 | |
| ----- | | | | | | |
| PROTO-1XPAT-SFP | BAO-MB FPGA | NO | 0.29 | 0.29 | 0.0 | |
| | CCC-FPGA | YES | 2.09 | 2.09 | 0.0 | |
| | CCC-Bootloader | YES | 2.09 | 2.07 | 0.0 | |
| | CCC-Power-On | YES | 1.38 | 1.38 | 0.0 | |
| | Backup-CCC-PwrOn | YES | 1.38 | 1.31 | 0.0 | |
| | Ethernet-Switch | YES | 1.33 | 1.33 | 0.0 | |
| | Backup-EthSwitch | YES | 1.33 | 1.32 | 0.0 | |

Important Notes

| | | | | |
|--------------|-----|-------|-------|-----|
| Primary BIOS | YES | 14.01 | 14.01 | 0.0 |
| Backup-BIOS | YES | 14.01 | 14.01 | 0.0 |
| PLX-8748 | YES | 0.04 | 0.04 | 0.1 |

Minimum Firmware Requirement

The following table provides the procedures and resources for minimum firmware requirements:

| | |
|---|---|
| After completing an Return Material Authorization (RMA), upgrade the firmware as per the matrix in this link, which also links to PDF copies of the IOS XR Firmware Upgrade Guides | http://www.cisco.com/web/Cisco_IOS_XR_Software/index.html |
| For the upgrade procedure, see the <i>Performing System Upgrade and Installing Feature Packages</i> chapter of the <i>Cisco NCS 6008 System Setup and Software Installation Guide</i> | http://www.cisco.com/en/US/products/ps13132/tsd_products_support_series_home.html |

Important Notes

- Country-specific laws, regulations, and licenses—In certain countries, use of these products may be prohibited and subject to laws, regulations, or licenses, including requirements applicable to the use of the products under telecommunications and other laws and regulations; customers must comply with all such applicable laws in the countries in which they intend to use the products.
- Field replaceable unit (FRU) removal—For all card removal and replacement (including fabric cards, line cards, fan controller, and RP) follow the instructions provided by Cisco to avoid impact to traffic. See the *Cisco Network Convergence System 6000 Series Routers Hardware Installation Guide* for procedures.
- Exceeding Cisco testing—If you intend to test beyond the combined maximum configuration tested and published by Cisco, contact your Cisco Technical Support representative to discuss how to engineer a large-scale configuration for your purpose.
- **reload**—The reload command in the system admin mode reloads a VM, not a line card.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see [What's New in Cisco Product Documentation](#).

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