



## Release Notes for Cisco NCS 6000 Series Routers, IOS XR Release 7.1.2

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# Release Notes for Cisco NCS 6000 Series Routers, IOS XR Release 7.1.2

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 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 electronic documents may contain updates and modifications. For more information on obtaining Cisco documentation, see the [Communications, Services, and Additional Information, on page 22](#) section.

For a list of software caveats that apply to this Release, see the Caveats section. The caveats are updated for every release and are described at <http://www.cisco.com>.

This release notes describe the features provided in the Cisco IOS XR Software Release 7.1.2 section in this document for information on new software features.

# What is New in Release 7.1.2

## Software Features Introduced in this Release

### GRE Tunnel Configuration in oc-interfaces Data Model

Generic Routing Encapsulation (GRE) Tunnel configuration support is added to `oc-interfaces` data model. This data model is used to manage network interfaces and subinterfaces.

In this release, `oc-interfaces` data model supports additional sensor paths for tunnel configuration and state parameters:

- `src`
- `dst`
- `tll` (time-to-live or hop limit)
- `gre-key`

Obtain this data model from [Github](#) repository.

To get started with using data models, see *Programmability Configuration Guide for Cisco NCS 6000 Series Routers*.

### OCNI BGP Advertised Prefix

OCNI BGP data model has global, neighbor and peer-group containers. Under the neighbor container are the Address Family Identifier (AFI) state-related leaves. Three leaves (`sent`, `installed` and `advertised prefix count`) are related to the prefixes received from and advertised to the neighbor specific to that AFI. The `sent` count is defined as how many prefixes are sent to the neighbor for a specific AFI.

In the existing implementation, the cumulative count may not display accurate value owing to various conditions such as route-refresh out, policy changes, route-target changes, configuration changes like `nexthop-self` to name a few.

In this release, BGP walks through the prefix table calculating exactly how many prefixes are advertised for each neighbor. The results are collected in an array, converted and sent to MDT.

Obtain this data model from [Github](#) repository.

For more information, see *Programmability Configuration Guide for Cisco NCS 6000 Series Routers*.

### Table Connection Support in OC NI Data Model

The `openconfig-network-instance` (`oc-ni`) data model is defined by OpenConfig community. This model defines the network instance concept to model Layer 3 and Layer 2 network instances applicable for services such as L3VPN, L2VPN, and EVPN.

The `table-connection` container in the `oc-ni` data model contains policies that dictate how routing information base (RIB) or forwarding information base (FIB) entries are propagated between routing tables.

The leaf list consists of a list of connections between pairs of routing or forwarding tables, the leaking of entries between which is specified by the import policy. A connection connecting a source table to a destination table implies that routes that match the policy specified for the connection are available for the destination protocol to advertise, or match within its policies. It shows the configuration and state parameters that relate to the connection between tables.

The `oc-ni` data model is available in the [Github](#) repository.

For more information about data modes, see *Programmability Configuration Guide for Cisco NCS 6000 Series Routers*

## Segment Routing Performance Measurement for Link Delay Using RFC5357 (TWAMP Light) Encoding

This feature introduces support for Two-Way Active Measurement Protocol (TWAMP) Light (RFC5357) for link delay measurement. TWAMP Light adds two-way or round-trip measurement capabilities.

Network performance data such as packet loss, delay and delay variation, and bandwidth utilization is a critical measure for Traffic Engineering (TE). This data provides service providers the characteristics of their networks for performance evaluation that is required to ensure the Service Level Agreements (SLAs). The performance measurement and delay variation feature allows you to measure those metrics and advertise them through IGP extensions as extended TE metrics.

For more information about configuring the performance measurement and delay variation feature, see the *Configure Performance Measurement* chapter in the *Segment Routing Configuration Guide for Cisco NCS 6000 Series Routers*.

## New Hardware Introduced in Cisco IOS XR Software Release 7.1.2

No new hardware features are introduced in this release.

## Behavior Change Introduced in this Release

Behavior change refers to any modification of an existing software feature, configuration, or a command. This release introduces following behavior change:

### Logging Format BSD

Cisco IOS XR Release 7.1.2 introduces the command *logging format bsd* which enables the router to send system log messages to a remote server in BSD (Berkeley Software Distribution) format. This enables systems that are dependent on the BSD format to correctly interpret the log message.

For more information about this feature, see the *IP Service Level Agreement Commands* chapter in the *System Monitoring Command Reference for Cisco NCS 6000 Series Routers*.

## 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.

### Cisco IOS XR Caveats

These caveats are applicable for Cisco IOS XR Software:

Bug ID	Headline
<a href="#">CSCvv09667</a>	After RP failover SR-policy counters are getting lost
<a href="#">CSCvu27946</a>	"ssh_server drbg_instantiate failed" syslog seen in SSH scale

### Caveats Specific to the NCS 6000 Series Routers

Bug ID	Headline
<a href="#">CSCvr51285</a>	Timestamp is not sent to LC from RP due to which LC does not have synced timestamp.

## Release Packages

This table lists the Cisco IOS XR Software feature set matrix (packages) and associated filenames available for the Cisco IOS XR Software Release 7.1.2 that is supported on the Cisco NCS 6008 router.

**Table 1: Cisco IOS XR Software Release 7.1.2 Packages**

Feature Set	Filename	Description
<b>Composite Package</b>		
Cisco IOS XR IP Unicast Routing Core Bundle	ncs6k-mini-x.iso-7.1.2	Contains required core packages, including OS, Admin, Base, Forwarding, Modular Services Card, Routing, SNMP Agent, FPD, and Alarm Correlation.
<b>Optional Individual Packages</b> (packages that are installed individually)		
Cisco IOS XR Manageability Package	ncs6k-mgbl.pkg-7.1.2	Extensible Markup Language (XML) Parser and HTTP server packages.
Cisco IOS XR MPLS Package	ncs6k-mpls.pkg-7.1.2	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-7.1.2	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], Multicast forwarding [MFWD]).
Cisco IOS XR Security Package	ncs6k-k9sec.pkg-7.1.2	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-7.1.2	Supports Lawful Intercept (LI) features.
Cisco IOS XR Documentation Package	ncs6k-doc.pkg-7.1.2	.man pages for Cisco IOS XR Software.

## Determining Installed Active Packages

To determine active software packages installed on the router, log in to the router and enter the **show install active summary** command in EXEC mode:

```
RP/0/RP0/CPU0:router# show install active
Active Packages: 7
 ncs6k-xr-7.1.2 version=7.1.2 [Boot image]
 ncs6k-li-1.0.0.0-r712
 ncs6k-mcast-1.0.0.0-r712
 ncs6k-k9sec-1.1.0.0-r712
 ncs6k-doc-1.0.0.0-r712
 ncs6k-mgbl-1.0.0.0-r712
 ncs6k-mpls-1.0.0.0-r712
```

## System Requirements

### Memory Requirements

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

- 48 GB memory on the NCS 6008 Route Processors (NCS6-RP)
- 16 GB memory on 1T line cards
- 32 GB memory on 2T line cards

In order to avoid low memory conditions during system operations, it is recommended that you have 2000MB of free memory available on the Route Processors.

### 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 2: Cisco NCS 6008 Router Hardware and Software Compatibility Matrix**

Component	Part Number	Support from Release
Cisco 100GBASE SR4 QSFP Transceiver	QSFP-100G-SR4-S	6.2.2
Cisco 100GBASE LR4 QSFP Transceiver	QSFP-100G-LR4-S	
20-port 100Gbps Lean Core	NC6-20X100GE-L-C	6.2.2
20-port 100Gbps Multi-Service Core	NC6-20X100GE-M-C	6.2.2
Universal Fabric Card	NC6-FC2-U	6.2.1
Cisco NCS 6008 FT, version 2	NC6-FANTRAY-2	6.1.2
CPAK optical transceiver module, 100GBASE-SR4, 100m OM4	CPAK-100G-SR4	6.1.2

<b>Component</b>	<b>Part Number</b>	<b>Support from Release</b>
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
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

<b>Component</b>	<b>Part Number</b>	<b>Support from Release</b>
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
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



Component	Part Number	Support from Release
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
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 6000 Series Router, run the **show fpd package** command in admin mode.

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

```

=====
                                Field Programmable Device Package
                                =====
Card Type          FPD Description          Req   SW   Min Req  Min Req
                    Reboot Ver      SW Ver  Board Ver
=====
-----
NC6-10X100G-L-K   Backup-BIOS (A)          YES   14.09  14.00   0.0
                  Backup-CCC-PwrOn (A)     NO    1.39   1.31   0.0
                  Backup-EthSwitch (A)     YES   1.33   1.32   0.0
                  BAO-DB-FPGA (A)         NO    1.06   1.06   0.0
                  BAO-MB-FPGA (A)         NO    1.06   1.06   0.0
                  CCC-Bootloader (A)      YES   2.12   2.07   0.0
                  CCC-FPGA (A)            YES   2.12   2.12   0.0
                  CCC-Power-On (A)       NO    1.41   1.41   0.0
                  Ethernet-Switch (A)     YES   1.33   1.33   0.0
                  LTC2978_540867_ISP (A)  YES   1.00   1.00   0.0
                  PLX-8748 (A)            YES   0.05   0.05   0.1
                  Primary-BIOS (A)       YES   14.09  14.09   0.0
                  S2-GN2411 (A)          YES   5.86   5.86   2.0
                  S2-GN2411 (A)          YES   7.58   7.58   0.0
                  S3-GN2411 (A)          YES   5.86   5.86   2.0
                  S3-GN2411 (A)          YES   7.58   7.58   0.0
                  S4-GN2411 (A)          YES   5.86   5.86   2.0
                  S4-GN2411 (A)          YES   7.58   7.58   0.0
                  SB Backup Key (A)     NO    1.00   1.00   0.0
                  SB Certificates (A)    NO    1.00   1.00   0.0
                  SB Primary Key (A)    NO    1.00   1.00   0.0
                  SMART-iSATA (A)     NO    7.05   7.05   0.0
                  SMART-SATA (A)      NO    7.05   7.05   0.0
-----
NC6-10X100G-L-P   Backup-BIOS (A)          YES   14.09  14.00   0.0
                  Backup-CCC-PwrOn (A)     NO    1.39   1.31   0.0
                  Backup-EthSwitch (A)     YES   1.33   1.32   0.0
                  BAO-DB-FPGA (A)         NO    1.06   1.06   0.0
                  BAO-MB-FPGA (A)         NO    1.06   1.06   0.0

```

	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	LTC2978_540869_ISP (A)	YES	1.00	1.00	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	S4-GN2411 (A)	YES	5.86	5.86	2.0
	S4-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	Slice-0-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-0-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-1-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-1-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-2-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-2-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-3-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-3-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-4-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-4-GN2411 (A)	YES	7.58	7.58	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
NC6-10X100G-M-K	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	1.06	1.06	0.0
	BAO-MB-FPGA (A)	NO	1.06	1.06	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	S4-GN2411 (A)	YES	5.86	5.86	2.0
	S4-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
NC6-10X100G-M-P	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	1.06	1.06	0.0
	BAO-MB-FPGA (A)	NO	1.06	1.06	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0

S2-GN2411 (A)	YES	7.58	7.58	0.0	
S3-GN2411 (A)	YES	5.86	5.86	2.0	
S3-GN2411 (A)	YES	7.58	7.58	0.0	
S4-GN2411 (A)	YES	5.86	5.86	2.0	
S4-GN2411 (A)	YES	7.58	7.58	0.0	
SB Backup Key (A)	NO	1.00	1.00	0.0	
SB Certificates (A)	NO	1.00	1.00	0.0	
SB Primary Key (A)	NO	1.00	1.00	0.0	
Slice-0-GN2411 (A)	YES	5.86	5.86	2.0	
Slice-0-GN2411 (A)	YES	7.58	7.58	0.0	
Slice-1-GN2411 (A)	YES	5.86	5.86	2.0	
Slice-1-GN2411 (A)	YES	7.58	7.58	0.0	
Slice-2-GN2411 (A)	YES	5.86	5.86	2.0	
Slice-2-GN2411 (A)	YES	7.58	7.58	0.0	
Slice-3-GN2411 (A)	YES	5.86	5.86	2.0	
Slice-3-GN2411 (A)	YES	7.58	7.58	0.0	
Slice-4-GN2411 (A)	YES	5.86	5.86	2.0	
Slice-4-GN2411 (A)	YES	7.58	7.58	0.0	
SMART-iSATA (A)	NO	7.05	7.05	0.0	
SMART-SATA (A)	NO	7.05	7.05	0.0	
-----					
NC6-2/10X100G-L-K	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	1.06	1.06	0.0
	BAO-MB-FPGA (A)	NO	1.06	1.06	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	S4-GN2411 (A)	YES	5.86	5.86	2.0
	S4-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
NC6-2/10X100G-M-K	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	1.06	1.06	0.0
	BAO-MB-FPGA (A)	NO	1.06	1.06	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	S4-GN2411 (A)	YES	5.86	5.86	2.0
	S4-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0

	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
NC6-20X100GE-L-C	Backup-BIOS (A)	YES	1.08	1.08	0.1
	Backup-CCC-PwrOn (A)	NO	1.11	1.10	0.0
	Backup-EthSwitch (A)	YES	1.00	1.00	0.0
	Backup-EthSwitch (A)	YES	1.14	1.14	0.2
	Backup-SolDBfpga (A)	NO	1.04	1.04	0.0
	Backup-SolMBfpga (A)	NO	1.04	1.04	0.0
	CCC-Bootloader (A)	YES	1.08	1.08	0.0
	CCC-FPGA (A)	YES	1.08	1.08	0.0
	CCC-Power-On (A)	NO	1.11	1.11	0.0
	Ethernet-Switch (A)	YES	1.00	1.00	0.0
	Ethernet-Switch (A)	YES	1.14	1.14	0.2
	PLX-8749 (A)	YES	0.06	0.06	0.1
	Primary-BIOS (A)	YES	1.08	1.08	0.1
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SOL-DB-FPGA (A)	NO	1.04	1.04	0.0
	SOL-MB-FPGA (A)	NO	1.04	1.04	0.0
-----					
NC6-20X100GE-M-C	Backup-BIOS (A)	YES	1.08	1.08	0.1
	Backup-CCC-PwrOn (A)	NO	1.11	1.10	0.0
	Backup-EthSwitch (A)	YES	1.00	1.00	0.0
	Backup-EthSwitch (A)	YES	1.14	1.14	0.2
	Backup-SolDBfpga (A)	NO	1.04	1.04	0.0
	Backup-SolMBfpga (A)	NO	1.04	1.04	0.0
	CCC-Bootloader (A)	YES	1.08	1.08	0.0
	CCC-FPGA (A)	YES	1.08	1.08	0.0
	CCC-Power-On (A)	NO	1.11	1.11	0.0
	Ethernet-Switch (A)	YES	1.00	1.00	0.0
	Ethernet-Switch (A)	YES	1.14	1.14	0.2
	PLX-8749 (A)	YES	0.06	0.06	0.1
	Primary-BIOS (A)	YES	1.08	1.08	0.1
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SOL-DB-FPGA (A)	NO	1.04	1.04	0.0
	SOL-MB-FPGA (A)	NO	1.04	1.04	0.0
-----					
NC6-30/60X10G-L-S	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	0.29	0.29	0.0
	BAO-MB-FPGA (A)	NO	0.29	0.29	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	Modena-0-PHY (A)	YES	0.13	0.13	0.0
	Modena-1-PHY (A)	YES	0.13	0.13	0.0
	Modena-10-PHY (A)	YES	0.13	0.13	0.0
	Modena-11-PHY (A)	YES	0.13	0.13	0.0
	Modena-12-PHY (A)	YES	0.13	0.13	0.0
	Modena-13-PHY (A)	YES	0.13	0.13	0.0
	Modena-14-PHY (A)	YES	0.13	0.13	0.0
	Modena-15-PHY (A)	YES	0.13	0.13	0.0
	Modena-2-PHY (A)	YES	0.13	0.13	0.0
	Modena-3-PHY (A)	YES	0.13	0.13	0.0
	Modena-4-PHY (A)	YES	0.13	0.13	0.0
	Modena-5-PHY (A)	YES	0.13	0.13	0.0
	Modena-6-PHY (A)	YES	0.13	0.13	0.0
	Modena-7-PHY (A)	YES	0.13	0.13	0.0

	Modena-8-PHY (A)	YES	0.13	0.13	0.0
	Modena-9-PHY (A)	YES	0.13	0.13	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	S4-GN2411 (A)	YES	5.86	5.86	2.0
	S4-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	Slice-0-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-0-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-1-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-1-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-2-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-2-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-3-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-3-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-4-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-4-GN2411 (A)	YES	7.58	7.58	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
NC6-30/60X10G-M-S	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	0.29	0.29	0.0
	BAO-MB-FPGA (A)	NO	0.29	0.29	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	Modena-0-PHY (A)	YES	0.13	0.13	0.0
	Modena-1-PHY (A)	YES	0.13	0.13	0.0
	Modena-10-PHY (A)	YES	0.13	0.13	0.0
	Modena-11-PHY (A)	YES	0.13	0.13	0.0
	Modena-12-PHY (A)	YES	0.13	0.13	0.0
	Modena-13-PHY (A)	YES	0.13	0.13	0.0
	Modena-14-PHY (A)	YES	0.13	0.13	0.0
	Modena-15-PHY (A)	YES	0.13	0.13	0.0
	Modena-2-PHY (A)	YES	0.13	0.13	0.0
	Modena-3-PHY (A)	YES	0.13	0.13	0.0
	Modena-4-PHY (A)	YES	0.13	0.13	0.0
	Modena-5-PHY (A)	YES	0.13	0.13	0.0
	Modena-6-PHY (A)	YES	0.13	0.13	0.0
	Modena-7-PHY (A)	YES	0.13	0.13	0.0
	Modena-8-PHY (A)	YES	0.13	0.13	0.0
	Modena-9-PHY (A)	YES	0.13	0.13	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
NC6-4-10X100G-M-K	Backup-BIOS (A)	YES	14.09	14.00	0.0

	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	1.06	1.06	0.0
	BAO-MB-FPGA (A)	NO	1.06	1.06	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	S4-GN2411 (A)	YES	5.86	5.86	2.0
	S4-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
NC6-6-10X100G-L-K	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	1.06	1.06	0.0
	BAO-MB-FPGA (A)	NO	1.06	1.06	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	S4-GN2411 (A)	YES	5.86	5.86	2.0
	S4-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
NC6-60X10GE-L-S	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	0.29	0.29	0.0
	BAO-MB-FPGA (A)	NO	0.29	0.29	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	Modena-0-PHY (A)	YES	0.13	0.13	0.0
	Modena-1-PHY (A)	YES	0.13	0.13	0.0
	Modena-10-PHY (A)	YES	0.13	0.13	0.0
	Modena-11-PHY (A)	YES	0.13	0.13	0.0
	Modena-12-PHY (A)	YES	0.13	0.13	0.0
	Modena-13-PHY (A)	YES	0.13	0.13	0.0
	Modena-14-PHY (A)	YES	0.13	0.13	0.0
	Modena-15-PHY (A)	YES	0.13	0.13	0.0
	Modena-2-PHY (A)	YES	0.13	0.13	0.0
	Modena-3-PHY (A)	YES	0.13	0.13	0.0

Modena-4-PHY (A)	YES	0.13	0.13	0.0
Modena-5-PHY (A)	YES	0.13	0.13	0.0
Modena-6-PHY (A)	YES	0.13	0.13	0.0
Modena-7-PHY (A)	YES	0.13	0.13	0.0
Modena-8-PHY (A)	YES	0.13	0.13	0.0
Modena-9-PHY (A)	YES	0.13	0.13	0.0
PLX-8748 (A)	YES	0.05	0.05	0.1
Primary-BIOS (A)	YES	14.09	14.09	0.0
S2-GN2411 (A)	YES	5.86	5.86	2.0
S2-GN2411 (A)	YES	7.58	7.58	0.0
S3-GN2411 (A)	YES	5.86	5.86	2.0
S3-GN2411 (A)	YES	7.58	7.58	0.0
S4-GN2411 (A)	YES	5.86	5.86	2.0
S4-GN2411 (A)	YES	7.58	7.58	0.0
SB Backup Key (A)	NO	1.00	1.00	0.0
SB Certificates (A)	NO	1.00	1.00	0.0
SB Primary Key (A)	NO	1.00	1.00	0.0
Slice-0-GN2411 (A)	YES	5.86	5.86	2.0
Slice-0-GN2411 (A)	YES	7.58	7.58	0.0
Slice-1-GN2411 (A)	YES	5.86	5.86	2.0
Slice-1-GN2411 (A)	YES	7.58	7.58	0.0
Slice-2-GN2411 (A)	YES	5.86	5.86	2.0
Slice-2-GN2411 (A)	YES	7.58	7.58	0.0
Slice-3-GN2411 (A)	YES	5.86	5.86	2.0
Slice-3-GN2411 (A)	YES	7.58	7.58	0.0
Slice-4-GN2411 (A)	YES	5.86	5.86	2.0
Slice-4-GN2411 (A)	YES	7.58	7.58	0.0
SMART-iSATA (A)	NO	7.05	7.05	0.0
SMART-SATA (A)	NO	7.05	7.05	0.0

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NC6-60X10GE-M-S	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	0.29	0.29	0.0
	BAO-MB-FPGA (A)	NO	0.29	0.29	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	LTC2978_540870_DB_ISP (A)	YES	1.00	1.00	0.0
	LTC2978_540870_MB_ISP (A)	YES	1.00	1.00	0.0
	Modena-0-PHY (A)	YES	0.13	0.13	0.0
	Modena-1-PHY (A)	YES	0.13	0.13	0.0
	Modena-10-PHY (A)	YES	0.13	0.13	0.0
	Modena-11-PHY (A)	YES	0.13	0.13	0.0
	Modena-12-PHY (A)	YES	0.13	0.13	0.0
	Modena-13-PHY (A)	YES	0.13	0.13	0.0
	Modena-14-PHY (A)	YES	0.13	0.13	0.0
	Modena-15-PHY (A)	YES	0.13	0.13	0.0
	Modena-2-PHY (A)	YES	0.13	0.13	0.0
	Modena-3-PHY (A)	YES	0.13	0.13	0.0
	Modena-4-PHY (A)	YES	0.13	0.13	0.0
	Modena-5-PHY (A)	YES	0.13	0.13	0.0
	Modena-6-PHY (A)	YES	0.13	0.13	0.0
	Modena-7-PHY (A)	YES	0.13	0.13	0.0
	Modena-8-PHY (A)	YES	0.13	0.13	0.0
	Modena-9-PHY (A)	YES	0.13	0.13	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0

	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
NC6-FANTRAY	Fantray-FPGA (A)	NO	2.01	2.01	0.0
NC6-FANTRAY-2	Fantray-FPGA (A)	NO	3.05	3.05	0.0
NC6-FC	CCC-FPGA (A)	YES	1.29	1.29	0.0
	CCC-Power-On (A)	NO	1.39	1.39	0.0
	LTC2978_420830_ISP (A)	YES	1.00	1.00	0.0
	PLX-8713 (A)	YES	1.03	1.03	0.1
	SB Certificates (A)	NO	1.00	1.00	0.0
NC6-FC-MC	Back-CRE-FPGA-MB (A)	YES	1.00	1.00	0.0
	CCC-FPGA (A)	YES	1.29	1.29	0.0
	CCC-Power-On (A)	NO	1.39	1.39	0.0
	CRE-FPGA-MB (A)	YES	1.00	1.00	0.0
	GN2411-BUS-0 (A)	YES	5.86	5.86	2.0
	GN2411-BUS-0 (A)	YES	7.58	7.58	0.0
	GN2411-BUS-1 (A)	YES	5.86	5.86	2.0
	GN2411-BUS-1 (A)	YES	7.58	7.58	0.0
	GN2411-BUS-2 (A)	YES	5.86	5.86	2.0
	GN2411-BUS-2 (A)	YES	7.58	7.58	0.0
	LTC2978_420833_ISP (A)	YES	1.00	1.00	0.0
	PLX-8713 (A)	YES	1.03	1.03	0.1
	SB Certificates (A)	NO	1.00	1.00	0.0
NC6-FC2-U	CCC-FPGA (A)	YES	2.11	2.11	0.0
	CCC-Power-On (A)	NO	1.39	1.39	0.0
	LTC2980_LTC3882_420845_ISP (A)	YES	1.00	1.00	0.0
	PLX-8713 (A)	YES	1.05	1.05	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
NC6-RP	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.42	1.32	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.2
	Backup-EthSwitch (A)	YES	1.33	1.32	0.1
	CCC-Bootloader (A)	YES	2.07	2.03	0.0
	CCC-FPGA (A)	YES	2.07	2.07	0.0
	CCC-Power-On (A)	NO	1.42	1.42	0.0
	CPU Backup_Key (A)	NO	1.00	1.00	0.0
	CPU Primary_Key (A)	NO	1.00	1.00	0.0
	CPU-Complex-BOOT (A)	YES	4.08	4.04	0.1
	CPU-Complex-BOOT (A)	YES	0.01	0.01	0.0
	CPU-Complex-FPGA (A)	YES	4.08	4.08	0.1
	CPU-Complex-FPGA (A)	YES	0.01	0.01	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.2
	Ethernet-Switch (A)	YES	1.33	1.33	0.1
	LTC2978_1E0800_DB_ISP (A)	YES	1.00	1.00	0.0
	LTC2978_1E0800_MB_ISP (A)	YES	1.00	1.00	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.0
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
NCS-CRFT	Craft-FCC (A)	NO	1.06	1.06	0.1
	Craft-LCC (A)	NO	1.06	1.06	0.1
NCS-F-FANTRAY	Fantray-FPGA (A)	NO	2.01	2.01	0.0



NCS-F-FC	Back-CRE-FPGA-DC (A)	YES	1.00	1.00	0.0
	Back-CRE-FPGA-MB (A)	YES	1.00	1.00	0.0
	CCC-FPGA (A)	YES	1.29	1.29	0.0
	CCC-Power-On (A)	NO	1.39	1.39	0.0
	CRE-FPGA-DC (A)	YES	1.00	1.00	0.0
	CRE-FPGA-MB (A)	YES	1.00	1.00	0.0
	GN2411-BUS-0 (A)	YES	5.86	5.86	2.0
	GN2411-BUS-0 (A)	YES	7.58	7.58	0.0
	GN2411-BUS-1 (A)	YES	5.86	5.86	2.0
	GN2411-BUS-1 (A)	YES	7.58	7.58	0.0
	GN2411-BUS-2 (A)	YES	5.86	5.86	2.0
	GN2411-BUS-2 (A)	YES	7.58	7.58	0.0
	GN2411-BUS-3 (A)	YES	5.86	5.86	2.0
	GN2411-BUS-3 (A)	YES	7.58	7.58	0.0
	GN2411-BUS-4 (A)	YES	5.86	5.86	2.0
	GN2411-BUS-4 (A)	YES	7.58	7.58	0.0
	LTC2978_420834_ISP (A)	YES	1.00	1.00	0.0
PLX-8713 (A)	YES	1.04	1.04	0.1	
SB Certificates (A)	NO	1.00	1.00	0.0	

NCS-F-FC2	Back-CRE2-FPGA-DC (A)	YES	1.00	1.00	0.0
	CCC-FPGA (A)	YES	1.10	1.10	0.0
	CCC-Power-On (A)	NO	1.05	1.05	0.0
	CRE2-FPGA-DC (A)	YES	1.03	1.03	0.0
	LTC2980_LTC3882_42094B_IS (A)	YES	1.00	1.00	0.0
	PLX-8713 (A)	YES	1.05	1.05	0.1
	SB Certificates (A)	NO	1.00	1.00	0.0

NCS-F-SC	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.41	1.38	0.0
	Backup-EthSwitch (A)	YES	1.33	1.33	0.0
	CCC-Bootloader (A)	YES	2.03	2.01	0.0
	CCC-FPGA (A)	YES	2.03	2.03	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	CPU Backup_Key (A)	NO	1.00	1.00	0.0
	CPU Primary_Key (A)	NO	1.00	1.00	0.0
	CPU-Complex-BOOT (A)	YES	4.08	4.04	0.1
	CPU-Complex-BOOT (A)	YES	0.01	0.01	0.0
	CPU-Complex-FPGA (A)	YES	4.08	4.08	0.1
	CPU-Complex-FPGA (A)	YES	0.01	0.01	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	LTC2978_1F0804_MB_ISP (A)	YES	1.00	1.00	0.0
	PLX-8625 (A)	YES	0.02	0.02	0.0
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
SMART-SATA (A)	NO	7.05	7.05	0.0	

NCS-F-SCSW	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.41	1.38	0.0
	Backup-EthSwitch (A)	YES	1.33	1.33	0.0
	CCC-Bootloader (A)	YES	2.03	2.01	0.0
	CCC-FPGA (A)	YES	2.03	2.03	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	CPU Backup_Key (A)	NO	1.00	1.00	0.0
	CPU Primary_Key (A)	NO	1.00	1.00	0.0
	CPU-Complex-BOOT (A)	YES	4.08	4.04	0.1
	CPU-Complex-BOOT (A)	YES	0.01	0.01	0.0
	CPU-Complex-FPGA (A)	YES	4.08	4.08	0.1
	CPU-Complex-FPGA (A)	YES	0.01	0.01	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0

	PLX-8625 (A)	YES	0.02	0.02	0.0
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
NCS-F-SCSW (SW)	CCC-FPGA (A)	YES	1.03	1.03	0.0
	CCC-Power-On (A)	NO	1.39	1.39	0.0
	LTC2978_1F0806_ISP (A)	YES	1.00	1.00	0.0
	PLX-8614 (A)	YES	0.03	0.03	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
-----					
P-L-20X40G-QSFP	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-DB-FPGA (A)	NO	0.29	0.29	0.0
	BAO-MB-FPGA (A)	NO	0.29	0.29	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	S2-GN2411 (A)	YES	5.86	5.86	2.0
	S2-GN2411 (A)	YES	7.58	7.58	0.0
	S3-GN2411 (A)	YES	5.86	5.86	2.0
	S3-GN2411 (A)	YES	7.58	7.58	0.0
	S4-GN2411 (A)	YES	5.86	5.86	2.0
	S4-GN2411 (A)	YES	7.58	7.58	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	Slice-0-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-0-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-1-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-1-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-2-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-2-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-3-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-3-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-4-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-4-GN2411 (A)	YES	7.58	7.58	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
PROTO-1XPAT-QSFP	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-MB-FPGA (A)	NO	0.29	0.29	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
PROTO-1XPAT-SFP	Backup-BIOS (A)	YES	14.09	14.00	0.0

	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-MB-FPGA (A)	NO	0.29	0.29	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
PROTO-2XPAT-SFP	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-MB-FPGA (A)	NO	0.29	0.29	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	Modena-0-PHY (A)	YES	0.13	0.13	0.0
	Modena-1-PHY (A)	YES	0.13	0.13	0.0
	Modena-2-PHY (A)	YES	0.13	0.13	0.0
	Modena-3-PHY (A)	YES	0.13	0.13	0.0
	Modena-4-PHY (A)	YES	0.13	0.13	0.0
	Modena-5-PHY (A)	YES	0.13	0.13	0.0
	Modena-6-PHY (A)	YES	0.13	0.13	0.0
	Modena-7-PHY (A)	YES	0.13	0.13	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
PROTO-2XPAT-SFP-L	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-MB-FPGA (A)	NO	0.29	0.29	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
PROTO-CXP-1XPITA	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-MB-FPGA (A)	NO	1.06	1.06	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1

	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	Slice-1-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-1-GN2411 (A)	YES	7.58	7.58	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
PROTO-CXP-2XPITA	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-MB-FPGA (A)	NO	1.06	1.06	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8748 (A)	YES	0.05	0.05	0.1
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	Slice-0-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-0-GN2411 (A)	YES	7.58	7.58	0.0
	Slice-1-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-1-GN2411 (A)	YES	7.58	7.58	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
PROTO-F-SC	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.41	1.38	0.0
	Backup-EthSwitch (A)	YES	1.33	1.33	0.0
	CCC-Bootloader (A)	YES	2.03	2.01	0.0
	CCC-FPGA (A)	YES	2.03	2.03	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	CPU Backup_Key (A)	NO	1.00	1.00	0.0
	CPU Primary_Key (A)	NO	1.00	1.00	0.0
	CPU-Complex-BOOT (A)	YES	4.08	4.04	0.1
	CPU-Complex-BOOT (A)	YES	0.01	0.01	0.0
	CPU-Complex-FPGA (A)	YES	4.08	4.08	0.1
	CPU-Complex-FPGA (A)	YES	0.01	0.01	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	PLX-8625 (A)	YES	0.02	0.02	0.0
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	SMART-iSATA (A)	NO	7.05	7.05	0.0
	SMART-SATA (A)	NO	7.05	7.05	0.0
-----					
PROTO-NC6K-ATV	Backup-BIOS (A)	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn (A)	NO	1.39	1.31	0.0
	Backup-EthSwitch (A)	YES	1.33	1.32	0.0
	BAO-MB-FPGA (A)	NO	1.00	1.00	0.0
	CCC-Bootloader (A)	YES	2.12	2.07	0.0
	CCC-FPGA (A)	YES	2.12	2.12	0.0
	CCC-Power-On (A)	NO	1.41	1.41	0.0
	Ethernet-Switch (A)	YES	1.33	1.33	0.0
	Primary-BIOS (A)	YES	14.09	14.09	0.0
	SB Backup Key (A)	NO	1.00	1.00	0.0
	SB Certificates (A)	NO	1.00	1.00	0.0
	SB Primary Key (A)	NO	1.00	1.00	0.0
	Slice-1-GN2411 (A)	YES	5.86	5.86	2.0
	Slice-1-GN2411 (A)	YES	7.58	7.58	0.0

PWR-2KW-DC-V2	DT-PrimCU (A)	NO	6.03	6.03	0.12
	DT-Sec54vMCU (A)	NO	6.02	6.02	0.12
	DT-Sec5vMCU (A)	NO	6.03	6.03	0.12
	EM-PrimCU (A)	NO	3.12	3.12	0.21
	EM-Sec54vMCU (A)	NO	3.19	3.19	0.21
	EM-Sec5vMCU (A)	NO	3.19	3.19	0.21
PWR-3KW-AC-V2	DT-PrimCU (A)	NO	6.02	6.02	1.0
	DT-Sec54vMCU (A)	NO	6.02	6.02	1.0
	DT-Sec5vMCU (A)	NO	6.04	6.04	1.0
	EM-Sec54vMCU (A)	NO	3.12	3.12	0.21
	EM-Sec5vMCU (A)	NO	3.18	3.18	0.21

## 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	<a href="http://www.cisco.com/web/Cisco_IOS_XR_Software/index.html">http://www.cisco.com/web/Cisco_IOS_XR_Software/index.html</a>
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>	<a href="http://www.cisco.com/en/US/products/ps13132/tsd_products_support_series_home.html">http://www.cisco.com/en/US/products/ps13132/tsd_products_support_series_home.html</a>

## Important Notes

- From Release 6.0, the onePK toolkit is not supported.
- 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.
- BFD limitation—If the current PPS (packets per second) is more than 7000 packets per line card (LC) then on upgrading the Cisco IOS XR software to release 5.2.5 or later the BFD sessions may shut down. You can avoid this scenario by adjusting the PPS per LC so that the load on a LC does not exceed more than 7000 PPS.  
To know the current load (PPS value), use **show bfd summary** command. Use the **bfd address-family ipv4 minimum-interval** command to configure BFD timer.
- 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.

## Related Documentation

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

<http://www.cisco.com/c/en/us/support/routers/network-convergence-system-6000-series-router/tsd-products-support-series-home.html>

The document containing Cisco IOS XR System Error Messages (SEM) is located at this URL:

[https://www.cisco.com/c/en/us/td/docs/ios\\_xr\\_sw/error/message/ios-xr-sem-guide.html](https://www.cisco.com/c/en/us/td/docs/ios_xr_sw/error/message/ios-xr-sem-guide.html)

### Production Software Maintenance Updates (SMUs)

A production SMU is a SMU that is formally requested, developed, tested, and released. Production SMUs are intended for use in a live network environment and are formally supported by the Cisco TAC and the relevant development teams. Software bugs identified through software recommendations or Bug Search Tools are not a basis for production SMU requests.

For information on production SMU types, refer the [Production SMU Types](#) section of the [IOS XR Software Maintenance Updates \(SMUs\)](#) guide.

## Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at [Cisco Profile Manager](#).
- To get the business impact you're looking for with the technologies that matter, visit [Cisco Services](#).
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- To find warranty information for a specific product or product family, access [Cisco Warranty Finder](#).

### Cisco Bug Search Tool

[Cisco Bug Search Tool](#) (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.





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