



Release Notes for Cisco NCS 6000 Series Routers, IOS XR Release 7.1.1

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Release Notes for Cisco NCS 6000 Series Routers, IOS XR Release 7.1.1



Note This software release has reached end-of-life status. For more information see the [End-of-Life and End-of-Sale Notices](#).

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.

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>.

What's New in Release

Cisco is continuously enhancing the product with every release and this section covers a brief description of key features and enhancements. It also includes links to detailed documentation, where available.

Software

Seamless Bidirectional Forwarding Detection

Bidirectional forwarding detection (BFD) provides low-overhead, short-duration detection of failures in the path between adjacent forwarding engines. BFD allows a single mechanism to be used for failure detection over any media and at any protocol layer, with a wide range of detection times and overhead.

In BFD, each end of the connection maintains a BFD state and transmits packets periodically over a forwarding path. Seamless BFD (SBFD) is unidirectional, resulting in faster session activation. The BFD state and client context is maintained on the head-end (initiator) only. The tail-end (reflector) validates the BFD packet and responds, so there's no need to maintain the BFD state on the tail-end.

For more information, see the *Segment Routing Configuration Guide for Cisco NCS 6000 Series Routers*.

Segment Routing Traffic Matrix Collection for Telemetry

This feature introduces support for enabling the Segment Routing Traffic Matrix (SR-TM) and the corresponding model-driven streaming Telemetry paths to export SR-TM statistics.

For more information about streaming model-driven telemetry data, see *Telemetry Configuration Guide for Cisco NCS 6000 Series Routers*.

For more information about SR-TM, see the *Segment Routing Configuration Guide for Cisco NCS 6000 Series Aggregation Services Routers*.

Segment Routing for Flexible Algorithm

Segment Routing (SR) allows a flexible definition of end-to-end paths within IGP topologies by encoding paths as sequences of topological sub-paths, called segments. It also defines an algorithm that defines how the path is computed and provides a way to associate prefix-SID with an algorithm. This allows IGPs to compute the path based on various algorithms and forward the traffic on such a path using the algorithm-specific segments. No additional segments are required for traffic to stay on the computed paths as in the case of the SR-TE.

For more information, see the *Segment Routing Configuration Guide for Cisco NCS 6000 Series Aggregation Services Routers*.

ACL support on CSI interface

Secure domain routers (SDRs) are a means of carving multi-tenants of a single physical system into multiple logically separated routers. The software, the configurations, the protocols, and the routing tables, which are assigned, are unique to a particular SDR. Other functions, such as chassis-control and switch fabric, are shared with the rest of the system. This virtual interface that connects two SDRs to each other is known as cross SDR interconnect (CSI) interface. This feature enables the configuration of ACLs on CSI interfaces. Therefore, ingress traffic for SDRs can be filtered allowing better control and segregation of SDR traffic.

For more information about the feature, see the chapter *Implementing Access Lists and Prefix Lists* in the *IP Addresses and Services Configuration Guide for Cisco NCS 6000 Series Routers* and the chapter *Configuring Collapsed Forwarding* in the *System Management Configuration Guide for Cisco NCS 6000 Series Routers*.

MTU Configuration On a Layer-2 CSI-Ether Interface

MTU value can be configured for a CSI-Ether interface. If sub interfaces are created within the parent interface, they inherit the MTU configured on the parent interface.

For information on how to configure MTU value on a CSI-Ether interface, see the *Configuring Collapsed Forwarding* chapter in the *System Management Configuration Guide for Cisco NCS 6000 Series Routers*.

Add IPv6 Loop-Free Alternate Support

The Add IPv6 Loop-Free Alternate Support feature adds LFA support for IPv6 addresses.

For more information about the feature, see the chapter *Implementing IP Fast Reroute Loop-Free Alternate* in the *Routing Configuration Guide for Cisco NCS 6000 Series Routers*.

Layer 2 Support for LI and QoS on Pseudowire Headend Interface

The Layer 2 Support for LI and QoS on Pseudowire Headend Interface feature allows you to enable Lawful Intercept (LI) and Quality of Service (QoS) on PWHE L2 subinterface.

The Lawful Intercept (LI) feature supports service providers in meeting the requirements of law enforcement agencies to provide the ability to intercept Voice-over-Internet protocol (VoIP) or data traffic going through the edge routers. This feature allows you to replicate and forward intercepted packets to the mediation device (MD).

Quality of Service (QoS) is the technique of prioritizing traffic flows and providing preferential forwarding for higher-priority packets. You can apply only two-level hierarchical policy over the PWHE interface. The top-level parent policy with a default class and configured with shape or police rate in absolute bandwidth. Use this absolute rate as reference for the child policy where you specify actual match or action.

For more information about this feature, see the *Configuring Collapsed Forwarding* chapter in the *System Management Configuration Guide for Cisco NCS 6000 Series Routers*.

Multiple MPLS-TE Tunnel End Points

From the 7.0.1 release, with IS-IS as the IGP, multiple MPLS-TE tunnel end points can be enabled on an LER. You can configure a maximum of 63 IPv4 addresses, or 15 IPv6 addresses on an LER.

IS-IS autoroute announce function is enhanced to redirect traffic from an MPLS-TE tunnel source IP address prefix to a matching IP address of an MPLS-TE tunnel destination interface.

For information on how to use the enhanced IS-IS autoroute announce function, see the *Implementing MPLS TE* chapter in the *MPLS Configuration Guide for Cisco NCS 6000 Series Routers*.

MVPN GRE over PWHE with CSI – IPv6 support.

MVPN GRE over PWHE is supported on CSI interface. From this release both IPv4 and IPv6 are supported on PE-CE multicast over PWHE interfaces.

For more information on MVPN GRE over PWHE, see the *Implementing Multicast Routing* chapter in the *Multicast Configuration Guide for the Cisco NCS 6000 Series Routers, Release 7.1.x*

Pay As You Grow (PAYG) on 20-Port 100-Gbps Line Cards

The pricing benefits and operational flexibility provided by the Pay As You Grow (PAYG) licensing model has been extended to NCS 6000 20-Port 100-Gbps (2T) line cards.

Following are the new PAYG license hardware PIDs introduced in this release:

- NC6-10/20X100G-L-C: NCS 6000 Series 20-port 100-Gbps Label Switch Router Line Card with 10 ports enabled
- NC6-10/20X100G-M: NCS 6000 Series 20-port 100-Gbps Multiservice Line Card with 10 ports enabled

For enabling additional ports, use the following PAYG license software PIDs:

- S-NC6-2T-PG-200-L=: Software license for 2x100GE ports on the NC6-10/20X100G-L-C Line Card
- S-NC6-2T-PG-200-M=: Software license for 2x100GE ports on the NC6-10/20X100G-M Line Card

For more information about the NCS 6000 line cards, see [Cisco Network Convergence System 6000 Series Routers Hardware Installation Guide](#).

Policy-Based Tunnel Selection for SR-TE Policy

Policy-Based Tunnel Selection (PBTS) is a mechanism that lets you direct traffic into specific SR-TE policies based on different classification criteria. PBTS benefits Internet service providers (ISPs) that carry voice and data traffic through their networks, who want to route this traffic to provide optimized voice service. PBTS works by selecting SR-TE policies based on the classification criteria of the incoming packets, which are based on the IP precedence, experimental (EXP), differentiated services code point (DSCP), or type of service (ToS) field in the packet.

For more information, see the "Configure SR-TE Policies" chapter in the *Segment Routing Configuration Guide for Cisco NCS 6000 Series Aggregation Services Routers*.

Hardware

No new hardware features are introduced in this release.

Hardware Enhancement Introduced in this Release

- Cisco IOS-XR Release 7.1.1 introduces a GDDR5 component change in the Cisco NCS6K 2T line cards. This component change requires a SMU upgrade on previous releases of IOS-XR that use these line cards.

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

There are no caveats specific to Cisco IOS XR Software Release.

Caveats Specific to the NCS 6000 Series Routers

There are no caveats in this release.

Release 7.1.1 Packages

This table lists the Cisco IOS XR Software feature set matrix (packages) and associated filenames available for the Cisco IOS XR Software Release 7.1.1 that is supported on the Cisco NCS 6008 router.

Table 1: Cisco IOS XR Software Release 7.1.1 Packages

Feature Set	Filename	Description
Composite Package		

Cisco IOS XR IP Unicast Routing Core Bundle	ncs6k-mini-x.iso-7.1.1	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-7.1.1	Extensible Markup Language (XML) Parser and HTTP server packages.
Cisco IOS XR MPLS Package	ncs6k-mpls.pkg-7.1.1	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-7.1.1	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-7.1.1	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-7.1.1	Supports Lawful Intercept (LI) features.
Cisco IOS XR Documentation Package	ncs6k-doc.pkg-7.1.1	.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: 8
ncs6k-xr-7.1.1 version=7.1.1 [Boot image]
ncs6k-infra-test-1.0.0.0-r711
ncs6k-k9sec-1.0.0.0-r711
ncs6k-li-1.0.0.0-r711
ncs6k-mpls-1.0.0.0-r711
ncs6k-mgbl-1.0.0.0-r711
```

Supported Packages and System Requirements

This section describes the system requirements for Cisco NCS 6000 Series Routers for Software Release .

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
20-port 100Gbps Lean Core PAYG Line Card	NC6-10/20X100G-L-C	7.1.1
20-port 100Gbps Multi-Service PAYG Line Card	NC6-10/20X100G-M	7.1.1
Cisco 100GBASE SR4 QSFP Transceiver Cisco 100GBASE LR4 QSFP Transceiver	QSFP-100G-SR4-S QSFP-100G-LR4-S	6.2.2
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
S13 fabric card for LCC with 16 CXP ports for 100GE SR optics	NC6-FC-MC	5.2.1

Component	Part Number	Support from Release
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
Cisco 10GBASE-LR SFP+ Module for SMF	SFP-10G-LR	5.0.1

Component	Part Number	Support from Release
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
NCS 6008 Power Control Module	NC6-PCM	5.0.0

Component	Part Number	Support from Release
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
=====          =====          Req  Ver   SW Ver   Board Ver
=====          =====          =====
NC6-10X100G-L-K   Backup-BIOS              YES   14.09  14.00    0.0
                  Backup-CCC-PwrOn        NO    1.39   1.31    0.0
                  Backup-EthSwitch       YES    1.33   1.32    0.0
                  BAO-DB-FPGA            NO    1.06   1.06    0.0
                  BAO-MB-FPGA            NO    1.06   1.06    0.0
                  CCC-Bootloader         YES    2.12   2.07    0.0
                  CCC-FPGA                YES    2.12   2.12    0.0
                  CCC-Power-On           NO    1.41   1.41    0.0
                  Ethernet-Switch        YES    1.33   1.33    0.0
                  PLX-8748                YES    0.05   0.05    0.1
                  Primary-BIOS           YES   14.09  14.09    0.0
                  S2-GN2411              YES    5.86   5.86    2.0
                  S2-GN2411              YES    7.58   7.58    0.0
                  S3-GN2411              YES    5.86   5.86    2.0
                  S3-GN2411              YES    7.58   7.58    0.0
                  S4-GN2411              YES    5.86   5.86    2.0
                  S4-GN2411              YES    7.58   7.58    0.0
                  SMART-iSATA            NO    7.05   7.05    0.0
                  SMART-SATA             NO    7.05   7.05    0.0
-----
NC6-10X100G-L-P   Backup-BIOS              YES   14.09  14.00    0.0
                  Backup-CCC-PwrOn        NO    1.39   1.31    0.0
                  Backup-EthSwitch       YES    1.33   1.32    0.0
                  BAO-DB-FPGA            NO    1.06   1.06    0.0
                  BAO-MB-FPGA            NO    1.06   1.06    0.0
                  CCC-Bootloader         YES    2.12   2.07    0.0
                  CCC-FPGA                YES    2.12   2.12    0.0
                  CCC-Power-On           NO    1.41   1.41    0.0
                  Ethernet-Switch        YES    1.33   1.33    0.0
                  PLX-8748                YES    0.05   0.05    0.1
                  Primary-BIOS           YES   14.09  14.09    0.0
                  S2-GN2411              YES    5.86   5.86    2.0

```

	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	S4-GN2411	YES	5.86	5.86	2.0
	S4-GN2411	YES	7.58	7.58	0.0
	Slice-0-GN2411	YES	5.86	5.86	2.0
	Slice-0-GN2411	YES	7.58	7.58	0.0
	Slice-1-GN2411	YES	5.86	5.86	2.0
	Slice-1-GN2411	YES	7.58	7.58	0.0
	Slice-2-GN2411	YES	5.86	5.86	2.0
	Slice-2-GN2411	YES	7.58	7.58	0.0
	Slice-3-GN2411	YES	5.86	5.86	2.0
	Slice-3-GN2411	YES	7.58	7.58	0.0
	Slice-4-GN2411	YES	5.86	5.86	2.0
	Slice-4-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-10X100G-M-K	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	1.06	1.06	0.0
	BAO-MB-FPGA	NO	1.06	1.06	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	S4-GN2411	YES	5.86	5.86	2.0
	S4-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-10X100G-M-P	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	1.06	1.06	0.0
	BAO-MB-FPGA	NO	1.06	1.06	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	S4-GN2411	YES	5.86	5.86	2.0
	S4-GN2411	YES	7.58	7.58	0.0
	Slice-0-GN2411	YES	5.86	5.86	2.0
	Slice-0-GN2411	YES	7.58	7.58	0.0
	Slice-1-GN2411	YES	5.86	5.86	2.0
	Slice-1-GN2411	YES	7.58	7.58	0.0
	Slice-2-GN2411	YES	5.86	5.86	2.0
	Slice-2-GN2411	YES	7.58	7.58	0.0
	Slice-3-GN2411	YES	5.86	5.86	2.0
	Slice-3-GN2411	YES	7.58	7.58	0.0
	Slice-4-GN2411	YES	5.86	5.86	2.0

	Slice-4-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-2/10X100G-L-K	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	1.06	1.06	0.0
	BAO-MB-FPGA	NO	1.06	1.06	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	S4-GN2411	YES	5.86	5.86	2.0
	S4-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-2/10X100G-M-K	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	1.06	1.06	0.0
	BAO-MB-FPGA	NO	1.06	1.06	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	S4-GN2411	YES	5.86	5.86	2.0
	S4-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-20X100GE-L-C	Backup-BIOS	YES	1.08	1.08	0.1
	Backup-CCC-PwrOn	NO	1.11	1.10	0.0
	Backup-EthSwitch	YES	1.00	1.00	0.0
	Backup-EthSwitch	YES	1.14	1.14	0.2
	Backup-SolDBfpga	NO	1.04	1.04	0.0
	Backup-SolMBfpga	NO	1.04	1.04	0.0
	CCC-Bootloader	YES	1.08	1.08	0.0
	CCC-FPGA	YES	1.08	1.08	0.0
	CCC-Power-On	NO	1.11	1.11	0.0
	Ethernet-Switch	YES	1.00	1.00	0.0
	Ethernet-Switch	YES	1.14	1.14	0.2
	PLX-8749	YES	0.06	0.06	0.1
	Primary-BIOS	YES	1.08	1.08	0.1
	SOL-DB-FPGA	NO	1.04	1.04	0.0
	SOL-MB-FPGA	NO	1.04	1.04	0.0

NC6-20X100GE-M-C	Backup-BIOS	YES	1.08	1.08	0.1
	Backup-CCC-PwrOn	NO	1.11	1.10	0.0
	Backup-EthSwitch	YES	1.00	1.00	0.0
	Backup-EthSwitch	YES	1.14	1.14	0.2

	Backup-SolDBfpga	NO	1.04	1.04	0.0
	Backup-SolMBfpga	NO	1.04	1.04	0.0
	CCC-Bootloader	YES	1.08	1.08	0.0
	CCC-FPGA	YES	1.08	1.08	0.0
	CCC-Power-On	NO	1.11	1.11	0.0
	Ethernet-Switch	YES	1.00	1.00	0.0
	Ethernet-Switch	YES	1.14	1.14	0.2
	PLX-8749	YES	0.06	0.06	0.1
	Primary-BIOS	YES	1.08	1.08	0.1
	SOL-DB-FPGA	NO	1.04	1.04	0.0
	SOL-MB-FPGA	NO	1.04	1.04	0.0

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

NC6-30/60X10G-M-S	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	0.29	0.29	0.0
	BAO-MB-FPGA	NO	0.29	0.29	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0

	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	Modena-0-PHY	YES	0.13	0.13	0.0
	Modena-1-PHY	YES	0.13	0.13	0.0
	Modena-10-PHY	YES	0.13	0.13	0.0
	Modena-11-PHY	YES	0.13	0.13	0.0
	Modena-12-PHY	YES	0.13	0.13	0.0
	Modena-13-PHY	YES	0.13	0.13	0.0
	Modena-14-PHY	YES	0.13	0.13	0.0
	Modena-15-PHY	YES	0.13	0.13	0.0
	Modena-2-PHY	YES	0.13	0.13	0.0
	Modena-3-PHY	YES	0.13	0.13	0.0
	Modena-4-PHY	YES	0.13	0.13	0.0
	Modena-5-PHY	YES	0.13	0.13	0.0
	Modena-6-PHY	YES	0.13	0.13	0.0
	Modena-7-PHY	YES	0.13	0.13	0.0
	Modena-8-PHY	YES	0.13	0.13	0.0
	Modena-9-PHY	YES	0.13	0.13	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-4-10X100G-M-K	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	1.06	1.06	0.0
	BAO-MB-FPGA	NO	1.06	1.06	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	S4-GN2411	YES	5.86	5.86	2.0
	S4-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-6-10X100G-L-K	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	1.06	1.06	0.0
	BAO-MB-FPGA	NO	1.06	1.06	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	S4-GN2411	YES	5.86	5.86	2.0

	S4-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-60X10GE-L-S	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	0.29	0.29	0.0
	BAO-MB-FPGA	NO	0.29	0.29	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	Modena-0-PHY	YES	0.13	0.13	0.0
	Modena-1-PHY	YES	0.13	0.13	0.0
	Modena-10-PHY	YES	0.13	0.13	0.0
	Modena-11-PHY	YES	0.13	0.13	0.0
	Modena-12-PHY	YES	0.13	0.13	0.0
	Modena-13-PHY	YES	0.13	0.13	0.0
	Modena-14-PHY	YES	0.13	0.13	0.0
	Modena-15-PHY	YES	0.13	0.13	0.0
	Modena-2-PHY	YES	0.13	0.13	0.0
	Modena-3-PHY	YES	0.13	0.13	0.0
	Modena-4-PHY	YES	0.13	0.13	0.0
	Modena-5-PHY	YES	0.13	0.13	0.0
	Modena-6-PHY	YES	0.13	0.13	0.0
	Modena-7-PHY	YES	0.13	0.13	0.0
	Modena-8-PHY	YES	0.13	0.13	0.0
	Modena-9-PHY	YES	0.13	0.13	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	S4-GN2411	YES	5.86	5.86	2.0
	S4-GN2411	YES	7.58	7.58	0.0
	Slice-0-GN2411	YES	5.86	5.86	2.0
	Slice-0-GN2411	YES	7.58	7.58	0.0
	Slice-1-GN2411	YES	5.86	5.86	2.0
	Slice-1-GN2411	YES	7.58	7.58	0.0
	Slice-2-GN2411	YES	5.86	5.86	2.0
	Slice-2-GN2411	YES	7.58	7.58	0.0
	Slice-3-GN2411	YES	5.86	5.86	2.0
	Slice-3-GN2411	YES	7.58	7.58	0.0
	Slice-4-GN2411	YES	5.86	5.86	2.0
	Slice-4-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-60X10GE-M-S	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	0.29	0.29	0.0
	BAO-MB-FPGA	NO	0.29	0.29	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	Modena-0-PHY	YES	0.13	0.13	0.0
	Modena-1-PHY	YES	0.13	0.13	0.0
	Modena-10-PHY	YES	0.13	0.13	0.0
	Modena-11-PHY	YES	0.13	0.13	0.0
	Modena-12-PHY	YES	0.13	0.13	0.0

	Modena-13-PHY	YES	0.13	0.13	0.0
	Modena-14-PHY	YES	0.13	0.13	0.0
	Modena-15-PHY	YES	0.13	0.13	0.0
	Modena-2-PHY	YES	0.13	0.13	0.0
	Modena-3-PHY	YES	0.13	0.13	0.0
	Modena-4-PHY	YES	0.13	0.13	0.0
	Modena-5-PHY	YES	0.13	0.13	0.0
	Modena-6-PHY	YES	0.13	0.13	0.0
	Modena-7-PHY	YES	0.13	0.13	0.0
	Modena-8-PHY	YES	0.13	0.13	0.0
	Modena-9-PHY	YES	0.13	0.13	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

NC6-FANTRAY	Fantray-FPGA	NO	2.01	2.01	0.0

NC6-FANTRAY-2	Fantray-FPGA	NO	3.05	3.05	0.0

NC6-FC	CCC-FPGA	YES	1.29	1.29	0.0
	CCC-Power-On	NO	1.39	1.39	0.0
	PLX-8713	YES	1.03	1.03	0.1

NC6-FC-MC	Back-CRE-FPGA-MB	YES	1.00	1.00	0.0
	CCC-FPGA	YES	1.29	1.29	0.0
	CCC-Power-On	NO	1.39	1.39	0.0
	CRE-FPGA-MB	YES	1.00	1.00	0.0
	GN2411-BUS-0	YES	5.86	5.86	2.0
	GN2411-BUS-0	YES	7.58	7.58	0.0
	GN2411-BUS-1	YES	5.86	5.86	2.0
	GN2411-BUS-1	YES	7.58	7.58	0.0
	GN2411-BUS-2	YES	5.86	5.86	2.0
	GN2411-BUS-2	YES	7.58	7.58	0.0
	PLX-8713	YES	1.03	1.03	0.1

NC6-FC2-U	CCC-FPGA	YES	2.11	2.11	0.0
	CCC-Power-On	NO	1.39	1.39	0.0
	PLX-8713	YES	1.05	1.05	0.0

NC6-RP	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.42	1.32	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.2
	Backup-EthSwitch	YES	1.33	1.32	0.1
	CCC-Bootloader	YES	2.07	2.03	0.0
	CCC-FPGA	YES	2.07	2.07	0.0
	CCC-Power-On	NO	1.42	1.42	0.0
	CPU-Complex-BOOT	YES	4.08	4.04	0.1
	CPU-Complex-BOOT	YES	0.01	0.01	0.0
	CPU-Complex-FPGA	YES	4.08	4.08	0.1
	CPU-Complex-FPGA	YES	0.01	0.01	0.0
	Ethernet-Switch	YES	1.33	1.33	0.2
	Ethernet-Switch	YES	1.33	1.33	0.1
	PLX-8748	YES	0.05	0.05	0.0
	Primary-BIOS	YES	14.09	14.09	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
SMART-SATA	NO	7.05	7.05	0.0	

NCS-CRFT	Craft-FCC	NO	1.06	1.06	0.1
	Craft-LCC	NO	1.06	1.06	0.1

NCS-F-FANTRAY	Fantray-FPGA	NO	2.01	2.01	0.0
NCS-F-FC	Back-CRE-FPGA-DC	YES	1.00	1.00	0.0
	Back-CRE-FPGA-MB	YES	1.00	1.00	0.0
	CCC-FPGA	YES	1.29	1.29	0.0
	CCC-Power-On	NO	1.39	1.39	0.0
	CRE-FPGA-DC	YES	1.00	1.00	0.0
	CRE-FPGA-MB	YES	1.00	1.00	0.0
	GN2411-BUS-0	YES	5.86	5.86	2.0
	GN2411-BUS-0	YES	7.58	7.58	0.0
	GN2411-BUS-1	YES	5.86	5.86	2.0
	GN2411-BUS-1	YES	7.58	7.58	0.0
	GN2411-BUS-2	YES	5.86	5.86	2.0
	GN2411-BUS-2	YES	7.58	7.58	0.0
	GN2411-BUS-3	YES	5.86	5.86	2.0
	GN2411-BUS-3	YES	7.58	7.58	0.0
	GN2411-BUS-4	YES	5.86	5.86	2.0
	GN2411-BUS-4	YES	7.58	7.58	0.0
	PLX-8713	YES	1.04	1.04	0.1
NCS-F-FC2	Back-CRE2-FPGA-DC	YES	1.00	1.00	0.0
	CCC-FPGA	YES	1.10	1.10	0.0
	CCC-Power-On	NO	1.05	1.05	0.0
	CRE2-FPGA-DC	YES	1.03	1.03	0.0
	PLX-8713	YES	1.05	1.05	0.1
NCS-F-SC	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.41	1.38	0.0
	Backup-EthSwitch	YES	1.33	1.33	0.0
	CCC-Bootloader	YES	2.03	2.01	0.0
	CCC-FPGA	YES	2.03	2.03	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	CPU-Complex-BOOT	YES	4.08	4.04	0.1
	CPU-Complex-BOOT	YES	0.01	0.01	0.0
	CPU-Complex-FPGA	YES	4.08	4.08	0.1
	CPU-Complex-FPGA	YES	0.01	0.01	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8625	YES	0.02	0.02	0.0
	Primary-BIOS	YES	14.09	14.09	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0
NCS-F-SCSW	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.41	1.38	0.0
	Backup-EthSwitch	YES	1.33	1.33	0.0
	CCC-Bootloader	YES	2.03	2.01	0.0
	CCC-FPGA	YES	2.03	2.03	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	CPU-Complex-BOOT	YES	4.08	4.04	0.1
	CPU-Complex-BOOT	YES	0.01	0.01	0.0
	CPU-Complex-FPGA	YES	4.08	4.08	0.1
	CPU-Complex-FPGA	YES	0.01	0.01	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8625	YES	0.02	0.02	0.0
	Primary-BIOS	YES	14.09	14.09	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0
NCS-F-SCSW (SW)	CCC-FPGA	YES	1.03	1.03	0.0
	CCC-Power-On	NO	1.39	1.39	0.0
	PLX-8614	YES	0.03	0.03	0.0
P-L-20X40G-QSFP	Backup-BIOS	YES	14.09	14.00	0.0

	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-DB-FPGA	NO	0.29	0.29	0.0
	BAO-MB-FPGA	NO	0.29	0.29	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	S2-GN2411	YES	5.86	5.86	2.0
	S2-GN2411	YES	7.58	7.58	0.0
	S3-GN2411	YES	5.86	5.86	2.0
	S3-GN2411	YES	7.58	7.58	0.0
	S4-GN2411	YES	5.86	5.86	2.0
	S4-GN2411	YES	7.58	7.58	0.0
	Slice-0-GN2411	YES	5.86	5.86	2.0
	Slice-0-GN2411	YES	7.58	7.58	0.0
	Slice-1-GN2411	YES	5.86	5.86	2.0
	Slice-1-GN2411	YES	7.58	7.58	0.0
	Slice-2-GN2411	YES	5.86	5.86	2.0
	Slice-2-GN2411	YES	7.58	7.58	0.0
	Slice-3-GN2411	YES	5.86	5.86	2.0
	Slice-3-GN2411	YES	7.58	7.58	0.0
	Slice-4-GN2411	YES	5.86	5.86	2.0
	Slice-4-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

PROTO-1XPAT-QSFP	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-MB-FPGA	NO	0.29	0.29	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

PROTO-1XPAT-SFP	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-MB-FPGA	NO	0.29	0.29	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

PROTO-2XPAT-SFP	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-MB-FPGA	NO	0.29	0.29	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	Modena-0-PHY	YES	0.13	0.13	0.0

	Modena-1-PHY	YES	0.13	0.13	0.0
	Modena-2-PHY	YES	0.13	0.13	0.0
	Modena-3-PHY	YES	0.13	0.13	0.0
	Modena-4-PHY	YES	0.13	0.13	0.0
	Modena-5-PHY	YES	0.13	0.13	0.0
	Modena-6-PHY	YES	0.13	0.13	0.0
	Modena-7-PHY	YES	0.13	0.13	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

PROTO-2XPAT-SFP-L	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-MB-FPGA	NO	0.29	0.29	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

PROTO-CXP-1XPITA	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-MB-FPGA	NO	1.06	1.06	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	Slice-1-GN2411	YES	5.86	5.86	2.0
	Slice-1-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

PROTO-CXP-2XPITA	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-MB-FPGA	NO	1.06	1.06	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8748	YES	0.05	0.05	0.1
	Primary-BIOS	YES	14.09	14.09	0.0
	Slice-0-GN2411	YES	5.86	5.86	2.0
	Slice-0-GN2411	YES	7.58	7.58	0.0
	Slice-1-GN2411	YES	5.86	5.86	2.0
	Slice-1-GN2411	YES	7.58	7.58	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

PROTO-F-SC	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.41	1.38	0.0
	Backup-EthSwitch	YES	1.33	1.33	0.0
	CCC-Bootloader	YES	2.03	2.01	0.0
	CCC-FPGA	YES	2.03	2.03	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	CPU-Complex-BOOT	YES	4.08	4.04	0.1

	CPU-Complex-BOOT	YES	0.01	0.01	0.0
	CPU-Complex-FPGA	YES	4.08	4.08	0.1
	CPU-Complex-FPGA	YES	0.01	0.01	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	PLX-8625	YES	0.02	0.02	0.0
	Primary-BIOS	YES	14.09	14.09	0.0
	SMART-iSATA	NO	7.05	7.05	0.0
	SMART-SATA	NO	7.05	7.05	0.0

PROTO-NC6K-ATV	Backup-BIOS	YES	14.09	14.00	0.0
	Backup-CCC-PwrOn	NO	1.39	1.31	0.0
	Backup-EthSwitch	YES	1.33	1.32	0.0
	BAO-MB-FPGA	NO	1.00	1.00	0.0
	CCC-Bootloader	YES	2.12	2.07	0.0
	CCC-FPGA	YES	2.12	2.12	0.0
	CCC-Power-On	NO	1.41	1.41	0.0
	Ethernet-Switch	YES	1.33	1.33	0.0
	Primary-BIOS	YES	14.09	14.09	0.0
	Slice-1-GN2411	YES	5.86	5.86	2.0
	Slice-1-GN2411	YES	7.58	7.58	0.0

PWR-2KW-DC-V2	DT-PrimMCU	NO	6.03	6.03	0.12
	DT-Sec54vMCU	NO	6.02	6.02	0.12
	DT-Sec5vMCU	NO	6.03	6.03	0.12
	EM-PrimMCU	NO	3.12	3.12	0.21
	EM-Sec54vMCU	NO	3.19	3.19	0.21
	EM-Sec5vMCU	NO	3.19	3.19	0.21

PWR-3KW-AC-V2	DT-PrimMCU	NO	6.02	6.02	1.0
	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
	EM-Sec5vMCU	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	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

Other Important Information

- To uniquely identify a line card as a Cisco device, all Cisco IOS XR supported platforms are shipped with a non-tamper-able Trust Anchor Module (TAM) in the hardware. The Cisco Trust Anchor module (TAm) helps verify that Cisco hardware is authentic and provides additional security services. This feature is supported from Cisco IOS XR Release 7.1.x on Cisco NCS 6000 platform.

- 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

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](#).
- To submit a service request, visit [Cisco Support](#).
- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit [Cisco Marketplace](#).
- To obtain general networking, training, and certification titles, visit [Cisco Press](#).
- 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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