



Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 24.1.1

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Network Convergence System 5500 Series Routers

What's New in Cisco IOS XR Release 24.1.1

For more details on the Cisco IOS XR release model and associated support, see [Software Lifecycle Support Statement - IOS XR](#).

New in Documentation

Feature	Description
Cisco IOS XR Feature Finder	We have launched this interactive tool that assists you in locating features introduced across Cisco IOS XR releases and platforms. This tool empowers you to explore, discover, and utilize the full potential of our platforms. As we continue to enhance the tool, we would love to hear your feedback. You are welcome to drop us a note here .

Software Features Enhanced and Introduced

To learn about features introduced in other Cisco IOS XR releases, select the release from the [Documentation Landing Page](#).

Feature	Description
Licensing	
Smart Licensing Using Policy	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>Cisco Smart Licensing Using Policy (SLP) is an enhancement to the existing Cisco Smart Licensing model. It streamlines the licensing process for Cisco IOS XR products by introducing a more flexible and automated approach. With SLP, you no longer need to register your device during installation, and there is no evaluation license state or period. This simplifies the licensing process and reduces complexity. To use SLP, your devices must establish trust and send the initial license usage report within 90 days.</p> <p>Starting with this release, cslu is the default communication transport mode.</p> <p>The feature introduces these changes:</p> <p>YANG Data Models:</p> <ul style="list-style-type: none">• <code>Cisco-IOS-XR-smart-license-cfg.yang</code> (see GitHub, YANG Data Models Navigator)
Application Hosting	
Support for Docker Application Management via AppMgr Commands	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>This feature enhances the integration of Docker containerized applications with the AppMgr infrastructure on IOS-XR software, enabling you to configure Docker runtime options during the launch of the container. This allows you to overwrite default configurations for parameters such as CPU usage, security settings, health checks, and more. Multiple Docker runtime options are supported, providing users with the flexibility to customize container behavior based on specific requirements.</p>

Feature	Description
Programmability	
Certificate Common-Name For Dial-in Using gRPC Protocol	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>You can now specify a common-name for the certificate generated by the router while using gRPC dial-in and avoid failure during certificate verification. Earlier, the common-name in the certificate was fixed.</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> • gRPC certificate common-name <p>YANG Data Model:</p> <ul style="list-style-type: none"> • <code>Cisco-IOS-XR-um-grpc-cfg.yang</code> • <code>Cisco-IOS-XR-man-ems-cfg</code> <p>(see GitHub, YANG Data Models Navigator)</p>
IANA Port Numbers For gRPC Services	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native]).</p> <p>You can now efficiently manage and customize port assignments for gNMI, gRIBI, and P4RT services without port conflicts. This is possible because Cisco IOS XR now supports the Internet Assigned Numbers Authority (IANA)-assigned specific ports for P4RT (Port 9559), gRIBI (Port 9340), and gNMI (Port 9339). You can now use both IANA-assigned and user-specified ports for these gRPC services across any specified IPv4 or IPv6 addresses. As part of this support, a new submode for gNMI in gRPC is introduced.</p> <p>This feature introduces the following changes:</p> <ul style="list-style-type: none"> • CLI: <p>port</p>

Feature	Description
Set Limit on Concurrent Streams for gRPC Server	<p>To limit the load on XR gRPC server and to minimize the risk of a vulnerability attack, you can set the limit on the concurrent streams per gRPC connection.</p> <p>This feature enables you to specify a limit on the number of concurrent streams per gRPC connection to be applied on the server.</p> <p>The feature introduces the following commands:</p> <p>CLI</p> <ul style="list-style-type: none"> • grpc max-concurrent-streams <p>YANG Data Models:</p> <ul style="list-style-type: none"> • <code>Cisco-IOS-XR-man-ems-oper.yang</code> • <code>Cisco-IOS-XR-man-ems-cfg.yang</code> <p>(see GitHub, YANG Data Models Navigator)</p>
View Inconsistent OpenConfig Configuration	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>OpenConfig infrastructure now provides an operational data YANG model, <code>Cisco-IOS-XR-yiny-oper</code>, which can be queried to view the inconsistent OpenConfig configuration caused due to activities such as interface breakout operations, installation activities or insertion of a new line card.</p> <p>See GitHub, YANG Data Models Navigator</p>
gRPC Authentication Modes	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>This feature lists the four types of authentication mechanisms for Extensible Manageability Services (EMS) to ensure the security and integrity of data exchange are: Metadata with TLS, Metadata without TLS, Metadata with Mutual TLS, and Certificate based.</p>
<p>Routing</p>	
Monitor the Per-Session BFD Hardware Offload Statistics	<p>Introduced in this release on: NCS 5700 fixed port routers (NCS 5700 line cards [Mode: Native])</p> <p>We've improved the ability to diagnose scenarios related to Bidirectional Forwarding Detection (BFD) sessions, enabling more effective troubleshooting and optimization by allowing detailed insights into the packets sent and received by hardware for transmission (Tx) and reception (Rx) per BFD. session.</p> <p>This feature is supported on both IPv4 and IPv6 networks.</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> • hw-module profile bfd statistics singlepath <p>YANG Data Models:</p> <ul style="list-style-type: none"> • New XPath for <code>Cisco-IOS-XR-ip-bfd-oper.yang</code> <p>(See GitHub, YANG Data Models Navigator)</p>

Feature	Description
MPLS	
Set Global RSVP Message Retransmission Interval	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>During Fast Reroute (FRR), an RSVP router sends multiple messages to neighbors. If a neighbor fails to acknowledge the messages due to an overload of RSVP message processing or a high frequency of failures, RSVP retransmits the messages, which can result in network congestion. You can now set a longer RSVP message retransmission interval to provide sufficient processing time for neighbors, reduce signaling overhead, and prevent network congestion.</p> <p>You can set this interval for all directly connected neighbors at once or remote neighbors connected through backup tunnels. Previously, you could only enable this option per interface.</p> <p>The feature introduces these changes:</p> <p>CLI: signalling refresh reduction reliable retransmit-time</p> <p>YANG Data Model: Cisco-IOS-XR-ip-rsvp-cfg.yang (see GitHub, YANG Data Models Navigator)</p>
Segment Routing	
Delay Measurement on NCS-57C3-MOD Fixed Port Routers	<p>Introduced in the release on: NCS 5700 fixed port routers.</p> <p>The NCS-57C3-MOD fixed port routers now support the Two-Way Active Measurement Protocol (TWAMP) Light, which allows them to measure network delay metrics for links, IP Endpoints, and SR policy. These routers optimize forwarding capacity of up to 2.4 Terabits and are energy-efficient, enhancing network performance and reliability. By utilizing TWAMP Light, you can obtain detailed data for more precise and timely diagnosis of potential network issues, improving network performance and reliability.</p>
ISIS Flex-Algo UCMP Support	<p>Unequal-Cost Multiple Path (UCMP) support, present in ISIS for algorithm 0, permits the use of non-optimal paths to carry a part of the traffic. This is particularly beneficial in networks with redundancy where redundant links are not part of the Equal-Cost Multi-Path (ECMP) set and are not fully utilized. UCMP allows complete usage of these redundant network resources. When applied to Flex-Algo, UCMP provides similar functionality for algorithm-specific paths, ensuring compliance with the specific constraints of each algorithm.</p> <p>When UCMP is enabled at ISIS-AF level using the existing UCMP configuration, it is enabled for all the Flex-algos. You can use ucmp disable command under ISIS Flex-Algo sub-mode to disable UCMP for a specific Flex-Algo.</p> <p>This feature introduces the ucmp disable command.</p>
Identical Route Distinguisher (RD) for Interworking Gateways between MPLS and SRv6 Domains	<p>Introduced in the release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native]).</p> <p>You can now configure the same Route Distinguisher (RD) for interworking gateways catering to both MPLS and SRv6 domains that help conserve hardware resources, reduce the BGP table scale and minimize the processing load on routers. At the same time, it ensures seamless connectivity across SRv6 and MPLS L3 EVPN domains, thus promoting interoperability and efficiency in modern network environments.</p> <p>Previously, a unique RD was required to extend L3 services between MPLS and SRv6 domains resulting in higher router load and resource consumption, which could have affected performance.</p>

Feature	Description
Reporting of SR-TE Policies Using BGP-Link State for SRv6	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>You can gather the Traffic Engineering Policy information that is locally available in a node and advertise it in BGP-LS for SRv6. Previous versions only supported SR-MPLS.</p> <p>There are no changes to the configuration procedures from previous releases and works on the same configuration as the SR-MPLS feature.</p>
SR-MPLSv6 Traffic Engineering	<p>We have introduced the capability for SR Policy to support segment lists with IPv6 addresses, which can be either dynamically computed or explicitly set at the SRTE headend.</p>
Synthetic Loss Measurement	<p>Introduced in this release on: NCS 5500 fixed port routersNCS 5500 modular routersNCS 5700 fixed port routersNCS 5500 line cardsNCS 5700 line cards [Mode: Native]</p> <p>You can now proactively monitor and address potential network issues before they impact users by measuring key parameters everywhere, packet loss, and jitter. Using this information, you can plan network capacity optimally and ensure quality of service. Such proactive action is possible because this feature reports synthetic Two-Way Active Measurement Protocol (TWAMP) test packets deployed in delay-profile or delay measurement sessions.</p> <p>It also enables you to set the upper and lower limits and notifies when the synthetic packet loss metric is out of the set limit.</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> • The optional anomaly-loss keyword is introduced in the performance-measurement delay-profile command. • show performance-measurement history <p>YANG Data Model</p> <ul style="list-style-type: none"> • New XPath for <code>Cisco-IOS-XR-um-performance-measurement-cfg</code> • New operations for <code>Cisco-IOS-XR-perf-meas-oper.yang</code> <p>(see GitHub, YANG Data Models Navigator)</p>

Feature	Description
Compute candidate paths and SR-TE policies with IP exclusion	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards)</p> <p>You can now exclude network resources using their IP addresses and enforce affinity for a group of candidate paths that belong to the same disjoint group. Also, for new services that use Pseudo-wire (PW) over SR-TE policies, you can calculate, customize, and preview candidate paths.</p> <p>Previously, affinity constraints and candidate path disjointness were mutually exclusive.</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> • The feature introduces shortest-path and exclude-resources keywords in the segment-routing traffic-eng policy and segment-routing traffic-eng on-demand color commands. <p>YANG Data Models:</p> <ul style="list-style-type: none"> • Cisco-IOS-XR-infra-xtc-oper.yang • Cisco-IOS-XR-infra-xtc-agent-oper.yang • Cisco-IOS-XR-infra-xtc-agent-cfg.yang
Interface and Hardware Component	
CFM over Static L2VPN and LSP with Single-Pass GRE Tunnel	<p>Introduced in this release on: NCS 5500 fixed port routers (select variants only*); NCS 5500 modular routers (select variants only*)</p> <p>By activating Connectivity Fault Management (CFM) when using GRE tunnel as the underlying transport mechanism, you can now monitor and isolate faults within a maintenance domain. CFM is now available over static L2VPN and LSP with single-pass GRE tunnels on your PE routers. It helps check if L2VPN services are working and possibly take corrective actions if they aren't. This capability enhances tunnel health monitoring and fault identification across the pseudowire (PW) tunnel between edge routers.</p>
XR Interface Operational State in Linux Kernel	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>You can now use the ifconfig command to determine the operational status of the XR interface in the Linux kernel when its line protocol is UP. The IFF-RUNNING (RUNNING) flag in ifconfig command indicates that the interface is ready for data transmission and reception.</p> <p>Earlier, you could see the XR interface status as UP or Down using the show interfaces command.</p>
L2VPN and Ethernet Services	

Feature	Description
EVPN Non-Revertive Designated Forwarder Election	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>In a preference-based Designated Forwarder (DF) election, non-revertive mode prevents the traffic disruption that occurs during the recovery of a node in a port-active multihoming network.</p> <p>While recovering from a link failure, an EVPN ethernet-segment (ES) performs DF re-election and re-carves the services among the multihomed nodes, which causes traffic interruption and interface flapping, leading to traffic loss. In the non-revertive mode, the EVPN ES does not re-carve the services after the recovery, thus avoiding the traffic disruption.</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> • non-revertive • revert • The ethernet-segment interface <i>interface-name</i> revert keyword is introduced in the l2vpn evpn command. <p>YANG Data Model:</p> <ul style="list-style-type: none"> • <code>Cisco-IOS-XR-evpn-oper.yang</code> • <code>Cisco-IOS-XR-l2vpn-cfg.yang</code> <p>(see GitHub, YANG Data Models Navigator)</p>

Feature	Description
Host Tracking using BFD	<p>Introduced in this release on: NCS 5500 modular routers (NCS 5500 line cards)</p> <p>You can now enhance the resilience of virtualized environments by hosting Virtual Network Functions (VNFs) for rapid failure detection via Bidirectional Forwarding Detection (BFD). You can set up BFD sessions between routers and VNFs. When BFD identifies a failure, you have the ability to quickly scale or migrate VNFs as required. The system facilitates the assignment of a Virtual IP address (VIP) to a service that spans multiple VNF instances, which permits the rerouting of traffic if a failure occurs. In the event of a VNF instance failure, traffic typically halts until the network's Address Resolution Protocol (ARP) processes the removal of the failed VNF's ARP entry. Activating BFD for VNFs accelerates the removal of ARP entries, leading to more rapid traffic rerouting to functioning VNFs and minimizing service downtime..</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> • The bfd fastdetect command is made available in ARP host-tracking configuration mode. • bgp-gateway • host-tracking • show bgp l2vpn evpn <p>YANG Data Model</p> <ul style="list-style-type: none"> • New XPath for <code>Cisco-IOS-XR-l2vpn-cfg</code> <p>(see GitHub, YANG Data Models Navigator)</p>
Combined Frame Delay and Frame Loss Measurement for Y.1564 Service Activation Test	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers</p> <p>We have enhanced the ITU-T Y.1564 Service Activation Testing (SAT) capabilities by enabling a comprehensive service quality measurement that includes network responsiveness, congestion, and other issues degrading network performance. This feature also allows a holistic testing of the QoS SLAs, which helps identify potential issues faster and troubleshoot effectively.</p> <p>This feature introduces the following change:</p> <p>CLI:</p> <p>The measurement combined keyword is added to the ethernet service-activation-test profile command.</p> <p>YANG DATA Model:</p> <ul style="list-style-type: none"> • New XPath for <code>Cisco-IOS-XR-ethernet-sat-cfg.yang</code> (see Github, YANG Data Models Navigator)

Feature	Description
Loopback Frames for Y.1564 Service Activation Test	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers</p> <p>This feature enables the redirection of test traffic from the destination router to the source router in loopback message (LBM) format. Loopback message enables the measurement of various parameters and performance metrics, such as frame delay, frame loss rates, and QoS settings, after the traffic has completed its round trip.</p> <p>Such comprehensive measurement helps identify issues within the network setup. You can also use it to ensure the service is running and meets the SLA.</p> <p>This feature introduces the following change:</p> <p>CLI:</p> <p>The packet-format lbm keyword is added to the ethernet service-activation-test profile command.</p> <p>YANG DATA Model: New XPath for Cisco-IOS-XR-ethernet-sat-cfg.yang (see Github, YANG Data Models Navigator)</p>
Optional Source MAC Address for Y.1564 Service Activation Test	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers</p> <p>By specifying the source MAC address to the ITU-T Y.1564 SAT, you can ensure that the test results are relevant and applicable to the specific service configuration for use in production and before deployment for your customers.</p> <p>This feature introduces the following change:</p> <p>Modified CLI:</p> <p>The source keyword is added to the ethernet service-activation-test command.</p> <p>YANG DATA Model:</p> <ul style="list-style-type: none"> • New XPath for Cisco-IOS-XR-ethernet-sat-act.yang (see Github, YANG Data Models Navigator)
Modular QoS	
Egress Traffic Management on NCS-57C3 Fixed Port Routers	<p>Introduced in this release on: NCS 5700 fixed port routers (select variants only*)</p> <p>This model enhances the egress queueing policy by making the feature-rich ingress pipeline available to the outgoing traffic. It also enables the scaling of egress QoS policies by limiting the usage of VOQ connectors on all ingress devices to only physical ports or main interfaces.</p> <p>*This feature is supported on NCS-57C3-MOD-SYS routers.</p>
Selective Egress Policy-Based Queue Mapping on NCS-57C3-MOD-SYS Routers and NC57-18DD-SE Line Cards	<p>Introduced in this release on: NCS 5700 fixed port routers (select variants only*), NCS 5700 line cards [Mode: Compatibility; Native] (select variants only*)</p> <p>Based on specific customer service level agreements (SLAs), you can prioritize network traffic types by grouping egress traffic classes into priority queues.</p> <p>*This feature is supported on:</p> <ul style="list-style-type: none"> • NCS-57C3-MOD-SYS routers • NC57-18DD-SE line cards
Netflow	

Feature	Description
Support for BGP Monitoring using IPFIX in MPLS Records	This feature enhances BGP Information Elements in IPFIX records, specifically supporting the gathering of eight additional BGP fields in IPFIX MPLS IPv4/IPv6 records. This improves monitoring and congestion mitigation capabilities, particularly in core-edge link scenarios.
System Management	
PTP-NTP Interworking	<p>NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>We have improved NTP synchronization and reliability to achieve nanosecond-level accuracy for applications that require high-precision timing. This is achieved by enabling NTP-PTP interworking which allows the use of PTP as the reference clock.</p> <p>As in previous releases, the NTP client continues to support polling NTP protocol-based external time servers to synchronize the local system clock and achieve accuracy within the millisecond range.</p>
System Security	
DSCP Marking from TCP Connection Phase for SSH Packets	<p>Introduced in this release on: NCS 5700 fixed port routers</p> <p>We now prevent SSH client packet drops in the TCP connection (initial handshake) phase as they travel across transit routers in the network. This is because you can mark the DSCP values for SSH client packets in the TCP connection phase, which overrides the transit routers' policies to filter and drop packets with no DSCP value marked. Using a new command, you can also set the DSCP value from the TCP connection phase for SSH server packets.</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> • ssh server set-dscp-connection-phase <p>YANG Data Model:</p> <ul style="list-style-type: none"> • New XPath, <code>set-dscp-connection-phase</code>, for <code>Cisco-IOS-XR-crypto-ssh-cfg.yang</code> (see GitHub, YANG Data Models Navigator)
Interaction with MASA through gRPC	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>From this release, you can use the gRPC protocol to interact with MASA APIs in addition to the current HTTP protocols. Through structured serialization of data with gRPC's Protocol Buffers, the communication between services is made more efficient, type-safe, and consistent.</p>
Multi-Factor Authentication for SSH	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>You can now deploy robust authentication mechanisms for SSH connections to your routers and reduce security risks due to compromised or weak passwords. We now support multi-factor authentication (MFA)—a secure access management solution that verifies the identity of a user using multiple verification factors—for SSH login on Cisco IOS XR routers. These verification factors include a combination of login credentials such as username and password and a token, a cryptographic device, or a mobile phone with MFA application installed.</p> <p>No new commands or data models were introduced or modified as part of this feature.</p>

Feature	Description
Pre-upload Pinned-Domain Certificate	<p>Introduced in this release on: NCS 5500 fixed port routers; NCS 5700 fixed port routers; NCS 5500 modular routers (NCS 5500 line cards; NCS 5700 line cards [Mode: Compatibility; Native])</p> <p>You can now pre-upload your Pinned-Domain Certificate (PDC) credentials before requesting OVs Ownership Vouchers (OVs) from the MASA server, thus making the voucher request process easier.</p>
MACsec capability for 1 GbE Optical SFPs on NCS 5700 fixed port routers	<p>Introduced in this release on: NCS 5700 fixed port routers (select variants only*)</p> <p>We now support MACsec encryption on select 1 GbE optical SFP transceivers by encrypting Ethernet frames at the link layer to secure communication for all traffic in Ethernet-based networks.</p> <p>* This feature is supported on the following hardware:</p> <ul style="list-style-type: none"> • NCS-57C3-MODS-SYS • SFP-1G-SX (optical SFP) • SFP-1G-LH (optical SFP)

YANG Data Models Introduced and Enhanced

This release introduces or enhances the following data models. For detailed information about the supported and unsupported sensor paths of all the data models, see the [Github](#) repository. To get a comprehensive list of the data models supported in a release, navigate to the Available-Content.md file for the release in the Github repository. The unsupported sensor paths are documented as deviations. For example, openconfig-acl.yang provides details about the supported sensor paths, whereas cisco-xr-openconfig-acl-deviations.yang provides the unsupported sensor paths for openconfig-acl.yang on Cisco IOS XR routers.

You can also view the data model definitions using the [YANG Data Models Navigator](#) tool. This GUI-based and easy-to-use tool helps you explore the nuances of the data model and view the dependencies between various containers in the model. You can view the list of models supported across Cisco IOS XR releases and platforms, locate a specific model, view the containers and their respective lists, leaves, and leaf lists presented visually in a tree structure.

Feature	Description
Programmability	

Feature	Description
openconfig-mpls-ldp.yang Version 3.1.0	<p>This OpenConfig data model introduces the following changes:</p> <ul style="list-style-type: none"> • Enable and authenticate LDP signalling messages using enable and authentication-key leaves globally for all interfaces or for LDP neighbors. • Configure the global and neighbor label switch identifier for the router using lsr-id leaf • Define the time for which a neighbor adjacency will be kept by the router while it waits for a new "hello" message using hello-holdtime leaf • Define the interval for sending these "hello" messages on each link LDP adjacency using hello-interval leaf • Enable and configure the address family name for IPv4 and IPv6 interfaces using enabled and afi-name leaves • Configure the list of LDP configurations for each interface using interface-id leaf where the interface referenced is based on the interface and subinterface leaves within the interface-ref container • Define the list of LDP neighbors and their attributes using label-space-id leaf • Configure the list for attributes related to address families for targeted LDP using afi-name leaf • Specify the neighbor address of the targeted LDP session using remote-address leaf • Enable or disable the acceptance of targeted LDP "hello" messages using hello-accept leaf • Enable and configure the interval for which the remote LDP peers wait for the local node to reconnect gracefully after a failure using enable and reconnect-time leaves • Configure the time interval to gracefully restart a Label Switch Router's (LSR) forwarding when in recovery mode using forwarding-holdtime leaf
Cisco-IOS-XR-evpn-oper.yang	This YANG model is modified to enable non-revertive mode on preference based EVPN DF election.
Cisco-IOS-XR-l2vpn-cfg.yang	This YANG model is modified to enable non-revertive mode on preference based EVPN DF election.
Cisco-IOS-XR-infra-xtc-agent-oper.yang	This native data model is enhanced with a new container, <i>excluded-resources</i> to display associated resource lists for policies.

Feature	Description
Cisco-IOS-XR-infra-xtc-oper.yang	This native data model is enhanced with a new container, <i>constraints-information</i> , to exclude IP constraints for candidate paths and includes the shortest-path flag in the disjoint constraints.
Cisco-IOS-XR-infra-xtc-agent-cfg.yang	This native data model is enhanced with a new container, <i>resources</i> , and a new leaf, <i>exclude-resource-rule</i> in the <i>resources-rule-table</i> container to configure and associate resource lists as constraints to policies. Additionally, new leaves such as <i>shortest-path</i> and <i>fallback-disable</i> are added in the <i>disjoint-path</i> container to extend the disjoint constraint configuration.
openconfig-ospfv2.yang Version 0.4.0	<p>The OpenConfig data model is part of the openconfig-network-instance.yang data model and configures OSPF functionalities, such as multiple processes, areas, and interfaces.</p> <p>In this release, the OpenConfig data model supports streaming Model-driven telemetry (MDT)—both Cadence driven and Event-driven telemetry (EDT).</p> <p>EDT and MDT for all state leafs under the Link state database (LSDB) container are not supported.</p>
openconfig-network-instance.yang	<p>This OpenConfig data model augments the Cisco-IOS-XR-openconfig-bgp-ext.yang and supports streaming Model-driven telemetry (MDT) for all the leaves. However, only the following leaves support both Event-driven telemetry (EDT) and Model-driven telemetry (MDT):</p> <ul style="list-style-type: none"> • max-prefix-discard-extra-paths • max-prefix-exceed-paths-discard • route-policy-prefix-orf • dmz-link-bandwidth • previous-connection-state
Cisco-IOS-XR-ip-rsvp-cfg.yang	<p>The Cisco-IOS-XR-ip-rsvp-cfg.yang data model's global-refresh-reduction container is updated with the following:</p> <p>The global-retransmit-timer container and its two leaves are added to hold the global RSVP message retransmission interval parameters.</p> <p>The retransmit-time leaf holds the RSVP message retransmission interval.</p> <p>The global-retransmit-timer-option leaf either holds the all-option (if the interval is enabled for all RSVP interfaces) or the backup-option (if the interval is enabled only for backup tunnels).</p>

Feature	Description
Cisco-IOS-XR-ethernet-sat-act.yang	This Cisco native data model is enhanced with a new leaf, <i>service-activation-test-start-source</i> , to specify source MAC address for a service activation test.
Cisco-IOS-XR-ethernet-sat-cfg.yang	This native data model has introduced the following leaves: <ul style="list-style-type: none"> • <i>Measurement</i>: This leaf facilitates the computation of combined frame loss and frame delay for each traffic frame transmitted and received during ITU-T Y.1564 Service Activation Testing (SAT). • <i>packet-format</i>: This leaf enables sending loop back messages (LBM) by default during ITU-T Y.1564 Service Activation Testing (SAT), for frame-loss measurement
Cisco-IOS-XR-um-grpc-cfg.yang	This YANG model is modified to specify a common-name for the certificate generated by the router while using gRPC dial-in.
Cisco-IOS-XR-man-ems-cfg.yang	This YANG model is modified to specify a common-name for the certificate generated by the router while using gRPC dial-in and to specify a limit on the number of concurrent streams per gRPC connection.
Cisco-IOS-XR-crypto-ssh-cfg.yang	This Cisco native data model is enhanced with a new leaf, <i>set-dscp-connection-phase</i> , to set the DSCP marking for the SSH packets starting from the TCP connection phase.
Cisco-IOS-XR-man-ems-oper.yang	This YANG model is modified to specify a limit on the number of concurrent streams per gRPC connection.

Hardware Introduced

Hardware	Description
Cisco PON OLT SFP	<p>This release supports configuration and management of the Cisco PON 10G OLT SFP+ transceiver on the following Cisco NCS 5500 Series Routers:</p> <ul style="list-style-type: none"> • NCS-55A1-24Q6H-SS • NCS-55A2-MOD-S • NCS-57C1-48Q6D <p>The transceiver module plugs into the 10G port on the router. The combination of the transceiver, PON Manager, PON Controller, and the MongoDB creates a network management solution for monitoring and managing OLTs and ONU devices in the network. With the help of the transceiver, the router functions as an OLT, this removes the requirement of a separate OLT Chassis.</p> <p>For more information, refer to Release Notes for Cisco Routed PON, Cisco IOS XR Release 24.1.1.</p>

Features Supported on Cisco NC5700 Line Cards and NCS 5700 Fixed Port Routers

The following table lists the features supported on Cisco NC5700 line cards in compatibility mode (NC5700 line cards with previous generation NCS 5500 line cards in the same NCS 5500 modular routers) and native mode (NCS 5500 modular routers with only NCS 5700 line cards and NCS 5700 fixed port routers).

To enable the native mode on Cisco NCS 5500 series modular routers having Cisco NCS 5700 line cards, use the **hw-module profile npu native-mode-enable** command in the configuration mode. Ensure that you reload the router after configuring the native mode.

Features supported in the native mode are also available on Cisco NCS 5700 fixed port routers.

Table 1: Features Supported on Cisco NC5700 Line Cards

Feature	Compatible Mode	Native Mode
Smart Licensing Using Policy	✓	✓
Support for Docker Application Management via AppMgr Commands	✓	✓
Certificate Common-Name For Dial-in Using gRPC Protocol	✓	✓
IANA Port Numbers For gRPC Services	✓	✓
Set Limit on Concurrent Streams for gRPC Server	✓	✓
View Inconsistent OpenConfig Configuration	✓	✓
gRPC Authentication Modes	✓	✓
Monitor the Per-Session BFD HW Offload Statistics	×	✓
Set Global RSVP Message Retransmission Interval	✓	✓
Identical Route Distinguisher (RD) for Interworking Gateways between MPLS and SRv6 Domains	✓	✓
Reporting of SR-TE Policies Using BGP-Link State for SRv6	×	✓
Synthetic Loss Measurement	×	✓
XR Interface Operational State in Linux Kernel	✓	✓
EVPN Non-Revertive Designated Forwarder (DF) Election	✓	✓
Selective Egress Policy-Based Queue Mapping on NCS-57C3-MOD-SYS Routers and NC57-18DD-SE Line Cards	✓	✓
PTP-NTP Interworking	✓	✓
MASA API integration with gRPC	✓	✓
Multi-Factor Authentication for SSH	✓	✓
Pre-upload Pinned-Domain Certificate	✓	✓

For the complete list of features supported on Cisco NC57 line cards until Cisco IOS XR Release 24.1.1. see:

- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.11.1](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.10.1](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.9.2](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.9.1](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.8.2](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.8.1](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.7.2](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.7.1](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.6.2](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.6.1](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.5.3](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.5.2](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.5.1](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.4.2](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.4.1](#)
- [Release Notes for Cisco NCS 5500 Series Routers, IOS XR Release 7.3.1](#)

Caveats

Table 2: Cisco NCS 5500 Series Router Specific Bugs

Bug ID	Headline
CSCwj07339	The call-home configurations displayed in the show run call-home command are missing in the show running-config command output.

Behavior Changes

- From this release, the default order of authentication methods for SSH clients on Cisco IOS XR routers running Cisco IOS XR SSH is changed to: **public-key**, **keyboard-interactive**, and **password**.

Prior to this release, the default order was: **public-key**, **password**, and **keyboard-interactive**.

Release Package

This table lists the Cisco IOS XR Software feature set matrix (packages) with associated filenames.

Visit the [Cisco Software Download page](#) to download the Cisco IOS XR software images.

Table 3: Release 24.1.1 Packages for Cisco NCS 5500 Series Router

Composite Package		
Feature Set	Filename	Description
Cisco IOS XR IP Unicast Routing Core Bundle	ncs5500-mini-x.iso	Contains base image contents that includes: <ul style="list-style-type: none"> • Host operating system • System Admin boot image • IOS XR boot image • BGP packages
Individually-Installable Optional Packages		
Feature Set	Filename	Description
Cisco IOS XR Manageability Package	ncs5500-mgbl-3.0.0.0-r2411.x86_64.rpm	Extensible Markup Language (XML) Parser, Telemetry, Netconf, gRPC and HTTP server packages.
Cisco IOS XR MPLS Package	ncs5500-mpls-2.1.0.0-r2411.x86_64.rpm ncs5500-mpls-te-rsvp-2.2.0.0-r2411.x86_64.rpm	MPLS and MPLS Traffic Engineering (MPLS-TE) RPM.
Cisco IOS XR Security Package	ncs5500-k9sec-3.1.0.0-r2411.x86_64.rpm	Support for Encryption, Decryption, Secure Shell (SSH), Secure Socket Layer (SSL), and Public-key infrastructure (PKI)
Cisco IOS XR ISIS package	ncs5500-isis-1.2.0.0-r2411.x86_64.rpm	Support ISIS
Cisco IOS XR OSPF package	ncs5500-ospf-2.0.0.0-r2411.x86_64.rpm	Support OSPF
Lawful Intercept (LI) Package	ncs5500-li-1.0.0.0-r2411.x86_64.rpm	Includes LI software images
Multicast Package	ncs5500-mcast-1.0.0.0-r2411.x86_64rpm	Support Multicast
EIGRP	ncs5500-eigrp-1.0.0.0-r2411.x86_64.rpm	Supports Enhanced Interior Gateway Routing Protocol
Lawful Intercept Control	ncs5500-lictrl-1.0.0.0-r2411x86_64.rpm	Supports Lawful Intercept Control
Healthcheck	ncs5500-healthcheck-1.0.0.0-r2411.x86_64.rpm	Supports System Health Check

Table 4: Release 24.1.1 TAR files for Cisco NCS 5500 Series Router

Feature Set	Filename
NCS 5500 IOS XR Software 3DES	NCS5500-iosxr-k9-24.1.1.tar
NCS 5500 IOS XR Software	NCS5500-iosxr-24.1.1.tar

NCS 5500 IOS XR Software	NCS5500-docs-24.1.1.tar
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Table 5: Release 24.1.1 Packages for Cisco NCS 5700 Series Router

Feature Set	Filename
NCS 5700 IOS XR Software	ncs5700-x64-24.1.1.iso
NCS 5700 IOS XR Software (only k9 RPMs)	ncs5700-k9sec-rpms.24.1.1.tar
NCS 5700 IOS XR Software Optional Package	NCS5700-optional-rpms.24.1.1.tar This TAR file contains the following RPMS: <ul style="list-style-type: none"> • optional-rpms/cdp/* • optional-rpms/eigrp/* • optional-rpms/telnet/*

Determine Software Version

To verify the software version running on the router, use **show version** command in the EXEC mode.

```
Router# show version
Cisco IOS XR Software, Version 24.1.1
Copyright (c) 2013-2024 by Cisco Systems, Inc.

Build Information:
  Built By      : swtools
  Built On     : Sun Mar 10 13:14:54 PDT 2024
  Built Host   : iox-ucs-046
  Workspace    : /auto/srcarchive15/prod/24.1.1/ncs5500/ws
  Version      : 24.1.1
  Location     : /opt/cisco/XR/packages/
  Label       : 24.1.1
```

```
cisco NCS-5500 () processor
System uptime is 3 hours 40 minutes
```

Determine Firmware Support

Use the **show hw-module fpd** command in EXEC and Admin mode to view the hardware components with their current FPD version and status. The status of the hardware must be CURRENT; Running and Programed version must be the same.

You can also use the **show fpd package** command in Admin mode to check the fpd versions.

NCS 5500 Fixed Port Routers

```
Router# show fpd package
=====
                          Field Programmable Device Package
                          =====
Card Type          FPD Description          Req   SW   Min Req  Min Req
                  Reload  Ver   SW Ver  Board Ver
=====
=====
```

NC55-12X100G-SE-PR	Bootloader (A)	YES	1.20	1.20	0.0
	IOFPGA (A)	YES	0.12	0.12	0.0
	MIFPGA	YES	0.03	0.03	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-12X100GE-PROT	Bootloader (A)	YES	1.22	1.22	0.0
	IOFPGA (A)	YES	0.15	0.15	0.0
	MIFPGA	YES	0.09	0.09	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-18H18F	Bootloader (A)	YES	1.20	1.20	0.0
	IOFPGA (A)	YES	0.22	0.22	0.0
	MIFPGA	YES	0.03	0.03	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-24H12F-SE	Bootloader (A)	YES	1.20	1.20	0.0
	IOFPGA (A)	YES	0.09	0.09	0.0
	MIFPGA	YES	0.03	0.03	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-24X100G-SE	Bootloader (A)	YES	1.20	1.20	0.0
	IOFPGA (A)	YES	0.13	0.13	0.0
	MIFPGA	YES	0.03	0.03	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0

	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-32T16Q4H-A	Bootloader (A)	YES	0.05	0.05	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.93	0.93	0.0
	MIFPGA	YES	0.60	0.60	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
	TimingIC-A	YES	7.216	7.216	0.0
	TimingIC-B	YES	7.216	7.216	0.0

NC55-32T16Q4H-AT	Bootloader (A)	YES	0.05	0.05	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.93	0.93	0.0
	MIFPGA	YES	0.60	0.60	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
	TimingIC-A	YES	7.216	7.216	0.0
	TimingIC-B	YES	7.216	7.216	0.0

NC55-36X100G	Bootloader (A)	YES	1.22	1.22	0.0
	IOFPGA (A)	YES	0.15	0.15	0.0
	MIFPGA	YES	0.09	0.09	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-36X100G-A-SE	Bootloader (A)	YES	0.15	0.15	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.26	0.26	0.0
	MIFPGA	YES	0.03	0.03	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0

	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-36X100G-S	Bootloader (A)	YES	1.20	1.20	0.0
	IOFPGA (A)	YES	0.12	0.12	0.0
	MIFPGA	YES	0.07	0.07	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-5504-FC	Bootloader (A)	YES	1.75	1.75	0.0
	IOFPGA (A)	YES	0.10	0.10	0.0

NC55-5504-FC2	Bootloader (A)	YES	1.13	1.13	0.0
	IOFPGA (A)	YES	0.47	0.47	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-5508-FC	Bootloader (A)	YES	1.74	1.74	0.0
	IOFPGA (A)	YES	0.16	0.16	0.0

NC55-5508-FC2	Bootloader (A)	YES	1.80	1.80	0.0
	IOFPGA (A)	YES	0.19	0.19	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-5516-FC	Bootloader (A)	YES	1.75	1.75	0.0
	IOFPGA (A)	YES	0.26	0.26	0.0

NC55-5516-FC2	Bootloader (A)	YES	1.80	1.80	0.0
	IOFPGA (A)	YES	0.24	0.24	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0

	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-6X100GE-PROT	Bootloader (A)	YES	1.22	1.22	0.0
	IOFPGA (A)	YES	0.15	0.15	0.0
	MIFPGA	YES	0.09	0.09	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-6X200-DWDM-S	Bootloader (A)	YES	1.20	1.20	0.0
	CFP2_PORT_0	NO	5.56	5.56	2.1
	CFP2_PORT_1	NO	5.56	5.56	2.1
	CFP2_PORT_2	NO	5.56	5.56	2.1
	CFP2_PORT_3	NO	5.56	5.56	2.1
	CFP2_PORT_4	NO	5.56	5.56	2.1
	CFP2_PORT_5	NO	5.56	5.56	2.1
	DENALI0	NO	13.48	13.48	0.0
	DENALI1	NO	13.48	13.48	0.0
	DENALI2	NO	13.48	13.48	0.0
	IOFPGA (A)	YES	0.14	0.14	0.0
	MORGOH	YES	5.26	5.26	0.0
	MSFPGA0	YES	2.22	2.22	0.0
	MSFPGA1	YES	2.22	2.22	0.0
	MSFPGA2	YES	2.22	2.22	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-MOD-A-S	Bootloader (A)	YES	1.03	1.03	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.14	0.14	0.0
	MIFPGA	YES	0.16	0.16	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-MOD-A-SE-S	Bootloader (A)	YES	1.03	1.03	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.14	0.14	0.0
	MIFPGA	YES	0.16	0.16	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0

	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
NC55-MPA-12T-S	MPAFPGA	YES	0.28	0.28	0.0
NC55-MPA-1TH2H-S	CFP2-D-DCO_2	NO	38.27397	38.27397	0.1
	CFP2-D10-DCO_2	NO	67.30726	67.30726	0.1
	CFP2-D15-DCO_2	NO	67.30726	67.30726	0.1
	CFP2-DE-DCO_2	NO	38.27397	38.27397	0.1
	CFP2-DETS-DCO_2	NO	38.27397	38.27397	0.1
	CFP2-DS-DCO_2	NO	38.27397	38.27397	0.1
	CFP2-DS100-DCO_2	NO	38.27397	38.27397	0.1
	MPAFPGA	YES	0.54	0.54	0.0
NC55-MPA-2TH-HX-S	CFP2-D-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-D-DCO_1	NO	38.27397	38.27397	0.1
	CFP2-D10-DCO_0	NO	67.30726	67.30726	0.1
	CFP2-D10-DCO_1	NO	67.30726	67.30726	0.1
	CFP2-D15-DCO_0	NO	67.30726	67.30726	0.1
	CFP2-D15-DCO_1	NO	67.30726	67.30726	0.1
	CFP2-DE-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-DE-DCO_1	NO	38.27397	38.27397	0.1
	CFP2-DETS-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-DETS-DCO_1	NO	38.27397	38.27397	0.1
	CFP2-DS-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-DS-DCO_1	NO	38.27397	38.27397	0.1
	CFP2-DS100-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-DS100-DCO_1	NO	38.27397	38.27397	0.1
	MPAFPGA	YES	0.54	0.54	0.0
NC55-MPA-2TH-S	CFP2-D-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-D-DCO_1	NO	38.27397	38.27397	0.1
	CFP2-D10-DCO_0	NO	67.30726	67.30726	0.1
	CFP2-D10-DCO_1	NO	67.30726	67.30726	0.1
	CFP2-D15-DCO_0	NO	67.30726	67.30726	0.1
	CFP2-D15-DCO_1	NO	67.30726	67.30726	0.1
	CFP2-DE-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-DE-DCO_1	NO	38.27397	38.27397	0.1
	CFP2-DETS-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-DETS-DCO_1	NO	38.27397	38.27397	0.1
	CFP2-DS-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-DS-DCO_1	NO	38.27397	38.27397	0.1
	CFP2-DS100-DCO_0	NO	38.27397	38.27397	0.1
	CFP2-DS100-DCO_1	NO	38.27397	38.27397	0.1
	MPAFPGA	YES	0.54	0.54	0.0
NC55-MPA-4H-HD-S	MPAFPGA	YES	0.55	0.55	0.0
NC55-MPA-4H-HX-S	MPAFPGA	YES	0.54	0.54	0.0
NC55-MPA-4H-S	MPAFPGA	YES	0.54	0.54	0.0
NC55-OIP-2	CPLD-MPAFPGA	YES	2.00	2.00	0.0
	MPAFPGA	YES	4.09	4.09	0.0
NC55-OIP-4	MPAFPGA	YES	0.10	0.10	0.0

NC55-PWR-3KW-2HV	DT-LogicMCU (A)	NO	3.01	3.01	0.2
	DT-PrimMCU (A)	NO	3.00	3.00	0.2
	DT-SecMCU (A)	NO	3.01	3.01	0.2

NC55-PWR-3KW-DC	DT-SecMCU (A)	NO	4.12	4.12	0.1

NC55-PWR-4.4KW-DC	QCS-LogicMCU (A)	NO	3.00	3.00	0.1
	QCS-PrimMCU (A)	NO	3.00	3.00	0.1
	QCS-SecMCU (A)	NO	3.00	3.00	0.1

NC55-RP	Bootloader (A)	YES	9.31	9.31	0.0
	IOFPGA (A)	YES	0.09	0.09	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-RP-E	Bootloader (A)	YES	1.24	1.24	0.0
	IOFPGA (A)	YES	0.23	0.23	0.0
	OMGFPGA (A)	YES	0.61	0.61	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-RP-PROTO	Bootloader (A)	YES	9.31	9.31	0.0
	IOFPGA (A)	YES	0.06	0.06	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC55-RP2-E	Bootloader (A)	YES	0.09	0.09	0.0
	IOFPGA (A)	YES	0.50	0.50	0.0
	OMGFPGA (A)	YES	0.52	0.52	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
TimingIC-A	YES	7.216	7.216	0.0	

	TimingIC-B-0	YES	7.216	7.216	0.0
	TimingIC-B-1	YES	7.216	7.216	0.0
NC55-SC	Bootloader (A)	YES	1.74	1.74	0.0
	IOFPGA (A)	YES	0.10	0.10	0.0
NC57-1600W-ACFW	PrimMCU-ACFW (A)	NO	1.02	1.02	0.0
	SecMCU-ACFW (A)	NO	1.07	1.07	0.0
NC57-1600W-DCFW	PrimMCU-DCFW (A)	NO	1.07	1.00	0.0
NC57-18DD-SE	Bootloader (A)	YES	1.03	1.03	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.22	0.22	0.0
	MIFPGA	YES	0.11	0.11	0.0
	QDD_BRT_FW_CO_P00	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P01	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P02	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P03	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P04	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P05	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P06	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P07	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P08	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P09	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P10	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P11	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P12	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P13	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P14	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P15	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P16	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P17	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P18	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P19	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P20	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P21	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P22	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P23	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P24	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P25	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P26	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P27	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P28	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P29	YES	70.130	70.130	0.0
	QDD_FW_CO_P00	YES	61.23	61.23	0.0
	QDD_FW_CO_P01	YES	61.23	61.23	0.0
	QDD_FW_CO_P02	YES	61.23	61.23	0.0
	QDD_FW_CO_P03	YES	61.23	61.23	0.0
	QDD_FW_CO_P04	YES	61.23	61.23	0.0
	QDD_FW_CO_P05	YES	61.23	61.23	0.0
	QDD_FW_CO_P06	YES	61.23	61.23	0.0
	QDD_FW_CO_P07	YES	61.23	61.23	0.0
	QDD_FW_CO_P08	YES	61.23	61.23	0.0
	QDD_FW_CO_P09	YES	61.23	61.23	0.0
	QDD_FW_CO_P10	YES	61.23	61.23	0.0
	QDD_FW_CO_P11	YES	61.23	61.23	0.0
	QDD_FW_CO_P12	YES	61.23	61.23	0.0
	QDD_FW_CO_P13	YES	61.23	61.23	0.0
	QDD_FW_CO_P14	YES	61.23	61.23	0.0
	QDD_FW_CO_P15	YES	61.23	61.23	0.0
	QDD_FW_CO_P16	YES	61.23	61.23	0.0
	QDD_FW_CO_P17	YES	61.23	61.23	0.0
	QDD_FW_CO_P18	YES	61.23	61.23	0.0

QDD_FW_CO_P19	YES	61.23	61.23	0.0	
QDD_FW_CO_P20	YES	61.23	61.23	0.0	
QDD_FW_CO_P21	YES	61.23	61.23	0.0	
QDD_FW_CO_P22	YES	61.23	61.23	0.0	
QDD_FW_CO_P23	YES	61.23	61.23	0.0	
QDD_FW_CO_P24	YES	61.23	61.23	0.0	
QDD_FW_CO_P25	YES	61.23	61.23	0.0	
QDD_FW_CO_P26	YES	61.23	61.23	0.0	
QDD_FW_CO_P27	YES	61.23	61.23	0.0	
QDD_FW_CO_P28	YES	61.23	61.23	0.0	
QDD_FW_CO_P29	YES	61.23	61.23	0.0	
SATA-INTEL_240G(A)	NO	1132.00	1132.00	0.0	
SATA-INTEL_480G(A)	NO	1132.00	1132.00	0.0	
SATA-M500IT-MC(A)	NO	3.00	3.00	0.0	
SATA-M500IT-MU-A(A)	NO	5.00	5.00	0.0	
SATA-M500IT-MU-B(A)	NO	4.00	4.00	0.0	
SATA-M5100(A)	NO	75.00	75.00	0.0	
SATA-M600-MCT(A)	NO	5.00	5.00	0.0	
SATA-M600-MU(A)	NO	6.00	6.00	0.0	
SATA-Micron(A)	NO	1.00	1.00	0.0	
SATA-SMART-128G(A)	NO	1241.00	1241.00	0.0	

NC57-24DD	Bootloader(A)	YES	1.03	1.03	0.0
	DBFPGA(A)	YES	0.14	0.14	0.0
	IOFPGA(A)	YES	0.23	0.23	0.0
	MIFPGA	YES	0.11	0.11	0.0
	QDD_BRT_FW_CO_P00	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P01	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P02	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P03	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P04	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P05	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P06	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P07	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P08	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P09	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P10	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P11	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P12	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P13	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P14	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P15	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P16	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P17	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P18	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P19	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P20	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P21	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P22	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P23	YES	70.130	70.130	0.0
	QDD_FW_CO_P00	YES	61.23	61.23	0.0
	QDD_FW_CO_P01	YES	61.23	61.23	0.0
	QDD_FW_CO_P02	YES	61.23	61.23	0.0
	QDD_FW_CO_P03	YES	61.23	61.23	0.0
	QDD_FW_CO_P04	YES	61.23	61.23	0.0
	QDD_FW_CO_P05	YES	61.23	61.23	0.0
	QDD_FW_CO_P06	YES	61.23	61.23	0.0
	QDD_FW_CO_P07	YES	61.23	61.23	0.0
	QDD_FW_CO_P08	YES	61.23	61.23	0.0
	QDD_FW_CO_P09	YES	61.23	61.23	0.0
	QDD_FW_CO_P10	YES	61.23	61.23	0.0
	QDD_FW_CO_P11	YES	61.23	61.23	0.0
	QDD_FW_CO_P12	YES	61.23	61.23	0.0
	QDD_FW_CO_P13	YES	61.23	61.23	0.0

	QDD_FW_CO_P14	YES	61.23	61.23	0.0
	QDD_FW_CO_P15	YES	61.23	61.23	0.0
	QDD_FW_CO_P16	YES	61.23	61.23	0.0
	QDD_FW_CO_P17	YES	61.23	61.23	0.0
	QDD_FW_CO_P18	YES	61.23	61.23	0.0
	QDD_FW_CO_P19	YES	61.23	61.23	0.0
	QDD_FW_CO_P20	YES	61.23	61.23	0.0
	QDD_FW_CO_P21	YES	61.23	61.23	0.0
	QDD_FW_CO_P22	YES	61.23	61.23	0.0
	QDD_FW_CO_P23	YES	61.23	61.23	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC57-36H-SE	Bootloader (A)	YES	1.03	1.03	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.05	0.05	0.0
	MIFPGA	YES	0.03	0.03	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC57-36H6D-S	Bootloader (A)	YES	0.02	0.02	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.47	0.47	0.0
	MIFPGA	YES	0.40	0.40	0.0
	QDD_BRT_FW_CO_P24	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P25	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P26	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P27	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P28	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P29	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P30	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P31	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P32	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P33	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P34	YES	70.130	70.130	0.0
	QDD_BRT_FW_CO_P35	YES	70.130	70.130	0.0
	QDD_FW_CO_P24	YES	61.23	61.23	0.0
	QDD_FW_CO_P25	YES	61.23	61.23	0.0
	QDD_FW_CO_P26	YES	61.23	61.23	0.0
	QDD_FW_CO_P27	YES	61.23	61.23	0.0
	QDD_FW_CO_P28	YES	61.23	61.23	0.0
	QDD_FW_CO_P29	YES	61.23	61.23	0.0
	QDD_FW_CO_P30	YES	61.23	61.23	0.0
	QDD_FW_CO_P31	YES	61.23	61.23	0.0
	QDD_FW_CO_P32	YES	61.23	61.23	0.0
	QDD_FW_CO_P33	YES	61.23	61.23	0.0
	QDD_FW_CO_P34	YES	61.23	61.23	0.0
	QDD_FW_CO_P35	YES	61.23	61.23	0.0

	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
	TimingIC-A	YES	7.216	7.216	0.0
	TimingIC-B	YES	7.216	7.216	0.0

NC57-48Q2D-S	ALDRINFPGA (A)	YES	1.06	1.06	0.0
	Bootloader (A)	YES	1.00	1.00	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.105	0.105	0.0
	MIFPGA	YES	0.21	0.21	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
	TimingIC-A	YES	7.216	7.216	0.0
	TimingIC-B	YES	7.216	7.216	0.0

NC57-48Q2D-SE-S	ALDRINFPGA (A)	YES	1.06	1.06	0.0
	Bootloader (A)	YES	1.00	1.00	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0
	IOFPGA (A)	YES	0.105	0.105	0.0
	MIFPGA	YES	0.21	0.21	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
	TimingIC-A	YES	7.216	7.216	0.0
	TimingIC-B	YES	7.216	7.216	0.0

NC57-MOD-RP2-E	Bootloader (A)	YES	0.14	0.14	0.0
	IOFPGA	YES	0.51	0.51	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0

NC57-MOD-S	Bootloader (A)	YES	2.03	2.03	0.0
	DBFPGA (A)	YES	0.14	0.14	0.0

	IOFPGA (A)	YES	0.42	0.42	0.0
	MIFPGA	YES	0.18	0.18	0.0
	QDD_BRT_FW_C0_P08	YES	70.130	70.130	0.0
	QDD_BRT_FW_C0_P09	YES	70.130	70.130	0.0
	QDD_FW_C0_P08	YES	61.23	61.23	0.0
	QDD_FW_C0_P09	YES	61.23	61.23	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
	TimingIC-A	YES	7.216	7.216	0.0
	TimingIC-B	YES	7.216	7.216	0.0

NC57-MPA-12L-S	MPAFPGA	YES	0.28	0.28	0.0

NC57-MPA-1FH1D-S	CFP2-M25-DCO_1	NO	67.30726	67.30726	0.1
	MPAFPGA	YES	0.80	0.80	0.0
	QDD_BRT_FW_C1_P00	YES	70.130	70.130	0.0
	QDD_BRT_FW_C2_P00	YES	70.130	70.130	0.0
	QDD_BRT_FW_C3_P00	YES	70.130	70.130	0.0
	QDD_FW_C1_P00	YES	61.23	61.23	0.0
	QDD_FW_C2_P00	YES	61.23	61.23	0.0
	QDD_FW_C3_P00	YES	61.23	61.23	0.0

NC57-MPA-2D4H-S	MPAFPGA	YES	0.07	0.07	0.0
	QDD_FW_C1_P00	YES	61.23	61.23	0.0
	QDD_FW_C1_P01	YES	61.23	61.23	0.0
	QDD_FW_C1_P02	YES	61.23	61.23	0.0
	QDD_FW_C1_P03	YES	61.23	61.23	0.0
	QDD_FW_C2_P00	YES	61.23	61.23	0.0
	QDD_FW_C2_P01	YES	61.23	61.23	0.0
	QDD_FW_C2_P02	YES	61.23	61.23	0.0
	QDD_FW_C2_P03	YES	61.23	61.23	0.0
	QDD_FW_C3_P00	YES	61.23	61.23	0.0
	QDD_FW_C3_P01	YES	61.23	61.23	0.0
	QDD_FW_C3_P02	YES	61.23	61.23	0.0
	QDD_FW_C3_P03	YES	61.23	61.23	0.0

NCS-57C3-MOD-SYS	ALDRINFPGA (A)	YES	1.04	1.04	0.0
	Bootloader (A)	YES	0.16	0.16	0.0
	DBFPGA (A)	YES	0.56	0.56	0.0
	IOFPGA	YES	0.101	0.101	0.0
	MIFPGA	YES	0.19	0.19	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
	SSFP_E1F_0	NO	13.01	13.01	0.0
	SSFP_E1F_1	NO	13.01	13.01	0.0
	SSFP_E1F_10	NO	13.01	13.01	0.0
	SSFP_E1F_11	NO	13.01	13.01	0.0
	SSFP_E1F_12	NO	13.01	13.01	0.0

SSFP_E1F_13	NO	13.01	13.01	0.0
SSFP_E1F_14	NO	13.01	13.01	0.0
SSFP_E1F_15	NO	13.01	13.01	0.0
SSFP_E1F_16	NO	13.01	13.01	0.0
SSFP_E1F_17	NO	13.01	13.01	0.0
SSFP_E1F_18	NO	13.01	13.01	0.0
SSFP_E1F_19	NO	13.01	13.01	0.0
SSFP_E1F_2	NO	13.01	13.01	0.0
SSFP_E1F_20	NO	13.01	13.01	0.0
SSFP_E1F_21	NO	13.01	13.01	0.0
SSFP_E1F_22	NO	13.01	13.01	0.0
SSFP_E1F_23	NO	13.01	13.01	0.0
SSFP_E1F_24	NO	13.01	13.01	0.0
SSFP_E1F_25	NO	13.01	13.01	0.0
SSFP_E1F_26	NO	13.01	13.01	0.0
SSFP_E1F_27	NO	13.01	13.01	0.0
SSFP_E1F_28	NO	13.01	13.01	0.0
SSFP_E1F_29	NO	13.01	13.01	0.0
SSFP_E1F_3	NO	13.01	13.01	0.0
SSFP_E1F_30	NO	13.01	13.01	0.0
SSFP_E1F_31	NO	13.01	13.01	0.0
SSFP_E1F_32	NO	13.01	13.01	0.0
SSFP_E1F_33	NO	13.01	13.01	0.0
SSFP_E1F_34	NO	13.01	13.01	0.0
SSFP_E1F_35	NO	13.01	13.01	0.0
SSFP_E1F_36	NO	13.01	13.01	0.0
SSFP_E1F_37	NO	13.01	13.01	0.0
SSFP_E1F_38	NO	13.01	13.01	0.0
SSFP_E1F_39	NO	13.01	13.01	0.0
SSFP_E1F_4	NO	13.01	13.01	0.0
SSFP_E1F_40	NO	13.01	13.01	0.0
SSFP_E1F_41	NO	13.01	13.01	0.0
SSFP_E1F_42	NO	13.01	13.01	0.0
SSFP_E1F_43	NO	13.01	13.01	0.0
SSFP_E1F_44	NO	13.01	13.01	0.0
SSFP_E1F_45	NO	13.01	13.01	0.0
SSFP_E1F_46	NO	13.01	13.01	0.0
SSFP_E1F_47	NO	13.01	13.01	0.0
SSFP_E1F_5	NO	13.01	13.01	0.0
SSFP_E1F_6	NO	13.01	13.01	0.0
SSFP_E1F_7	NO	13.01	13.01	0.0
SSFP_E1F_8	NO	13.01	13.01	0.0
SSFP_E1F_9	NO	13.01	13.01	0.0
SSFP_OC3_STM1_0	NO	12.01	12.01	0.0
SSFP_OC3_STM1_1	NO	12.01	12.01	0.0
SSFP_OC3_STM1_10	NO	12.01	12.01	0.0
SSFP_OC3_STM1_11	NO	12.01	12.01	0.0
SSFP_OC3_STM1_12	NO	12.01	12.01	0.0
SSFP_OC3_STM1_13	NO	12.01	12.01	0.0
SSFP_OC3_STM1_14	NO	12.01	12.01	0.0
SSFP_OC3_STM1_15	NO	12.01	12.01	0.0
SSFP_OC3_STM1_16	NO	12.01	12.01	0.0
SSFP_OC3_STM1_17	NO	12.01	12.01	0.0
SSFP_OC3_STM1_18	NO	12.01	12.01	0.0
SSFP_OC3_STM1_19	NO	12.01	12.01	0.0
SSFP_OC3_STM1_2	NO	12.01	12.01	0.0
SSFP_OC3_STM1_20	NO	12.01	12.01	0.0
SSFP_OC3_STM1_21	NO	12.01	12.01	0.0
SSFP_OC3_STM1_22	NO	12.01	12.01	0.0
SSFP_OC3_STM1_23	NO	12.01	12.01	0.0
SSFP_OC3_STM1_24	NO	12.01	12.01	0.0
SSFP_OC3_STM1_25	NO	12.01	12.01	0.0
SSFP_OC3_STM1_26	NO	12.01	12.01	0.0
SSFP_OC3_STM1_27	NO	12.01	12.01	0.0

SSFP_OC3_STM1_28	NO	12.01	12.01	0.0
SSFP_OC3_STM1_29	NO	12.01	12.01	0.0
SSFP_OC3_STM1_3	NO	12.01	12.01	0.0
SSFP_OC3_STM1_30	NO	12.01	12.01	0.0
SSFP_OC3_STM1_31	NO	12.01	12.01	0.0
SSFP_OC3_STM1_32	NO	12.01	12.01	0.0
SSFP_OC3_STM1_33	NO	12.01	12.01	0.0
SSFP_OC3_STM1_34	NO	12.01	12.01	0.0
SSFP_OC3_STM1_35	NO	12.01	12.01	0.0
SSFP_OC3_STM1_36	NO	12.01	12.01	0.0
SSFP_OC3_STM1_37	NO	12.01	12.01	0.0
SSFP_OC3_STM1_38	NO	12.01	12.01	0.0
SSFP_OC3_STM1_39	NO	12.01	12.01	0.0
SSFP_OC3_STM1_4	NO	12.01	12.01	0.0
SSFP_OC3_STM1_40	NO	12.01	12.01	0.0
SSFP_OC3_STM1_41	NO	12.01	12.01	0.0
SSFP_OC3_STM1_42	NO	12.01	12.01	0.0
SSFP_OC3_STM1_43	NO	12.01	12.01	0.0
SSFP_OC3_STM1_44	NO	12.01	12.01	0.0
SSFP_OC3_STM1_45	NO	12.01	12.01	0.0
SSFP_OC3_STM1_46	NO	12.01	12.01	0.0
SSFP_OC3_STM1_47	NO	12.01	12.01	0.0
SSFP_OC3_STM1_5	NO	12.01	12.01	0.0
SSFP_OC3_STM1_6	NO	12.01	12.01	0.0
SSFP_OC3_STM1_7	NO	12.01	12.01	0.0
SSFP_OC3_STM1_8	NO	12.01	12.01	0.0
SSFP_OC3_STM1_9	NO	12.01	12.01	0.0
TimingIC-A	YES	23.112	23.112	0.0
TimingIC-B	YES	7.216	7.216	0.0

NCS-57C3-MODS-SYS	ALDRINFPGA (A)	YES	1.04	1.04	0.0
	Bootloader (A)	YES	0.16	0.16	0.0
	DBFPGA (A)	YES	0.56	0.56	0.0
	IOFPGA	YES	0.101	0.101	0.0
	MIFPGA	YES	0.19	0.19	0.0
	SATA-INTEL_240G (A)	NO	1132.00	1132.00	0.0
	SATA-INTEL_480G (A)	NO	1132.00	1132.00	0.0
	SATA-M500IT-MC (A)	NO	3.00	3.00	0.0
	SATA-M500IT-MU-A (A)	NO	5.00	5.00	0.0
	SATA-M500IT-MU-B (A)	NO	4.00	4.00	0.0
	SATA-M5100 (A)	NO	75.00	75.00	0.0
	SATA-M600-MCT (A)	NO	5.00	5.00	0.0
	SATA-M600-MU (A)	NO	6.00	6.00	0.0
	SATA-Micron (A)	NO	1.00	1.00	0.0
	SATA-SMART-128G (A)	NO	1241.00	1241.00	0.0
	SSFP_E1F_0	NO	13.01	13.01	0.0
	SSFP_E1F_1	NO	13.01	13.01	0.0
	SSFP_E1F_10	NO	13.01	13.01	0.0
	SSFP_E1F_11	NO	13.01	13.01	0.0
	SSFP_E1F_12	NO	13.01	13.01	0.0
	SSFP_E1F_13	NO	13.01	13.01	0.0
	SSFP_E1F_14	NO	13.01	13.01	0.0
	SSFP_E1F_15	NO	13.01	13.01	0.0
	SSFP_E1F_16	NO	13.01	13.01	0.0
	SSFP_E1F_17	NO	13.01	13.01	0.0
	SSFP_E1F_18	NO	13.01	13.01	0.0
	SSFP_E1F_19	NO	13.01	13.01	0.0
	SSFP_E1F_2	NO	13.01	13.01	0.0
	SSFP_E1F_20	NO	13.01	13.01	0.0
	SSFP_E1F_21	NO	13.01	13.01	0.0
	SSFP_E1F_22	NO	13.01	13.01	0.0
	SSFP_E1F_23	NO	13.01	13.01	0.0
	SSFP_E1F_24	NO	13.01	13.01	0.0
	SSFP_E1F_25	NO	13.01	13.01	0.0

SSFP_E1F_26	NO	13.01	13.01	0.0
SSFP_E1F_27	NO	13.01	13.01	0.0
SSFP_E1F_28	NO	13.01	13.01	0.0
SSFP_E1F_29	NO	13.01	13.01	0.0
SSFP_E1F_3	NO	13.01	13.01	0.0
SSFP_E1F_30	NO	13.01	13.01	0.0
SSFP_E1F_31	NO	13.01	13.01	0.0
SSFP_E1F_32	NO	13.01	13.01	0.0
SSFP_E1F_33	NO	13.01	13.01	0.0
SSFP_E1F_34	NO	13.01	13.01	0.0
SSFP_E1F_35	NO	13.01	13.01	0.0
SSFP_E1F_36	NO	13.01	13.01	0.0
SSFP_E1F_37	NO	13.01	13.01	0.0
SSFP_E1F_38	NO	13.01	13.01	0.0
SSFP_E1F_39	NO	13.01	13.01	0.0
SSFP_E1F_4	NO	13.01	13.01	0.0
SSFP_E1F_40	NO	13.01	13.01	0.0
SSFP_E1F_41	NO	13.01	13.01	0.0
SSFP_E1F_42	NO	13.01	13.01	0.0
SSFP_E1F_43	NO	13.01	13.01	0.0
SSFP_E1F_44	NO	13.01	13.01	0.0
SSFP_E1F_45	NO	13.01	13.01	0.0
SSFP_E1F_46	NO	13.01	13.01	0.0
SSFP_E1F_47	NO	13.01	13.01	0.0
SSFP_E1F_5	NO	13.01	13.01	0.0
SSFP_E1F_6	NO	13.01	13.01	0.0
SSFP_E1F_7	NO	13.01	13.01	0.0
SSFP_E1F_8	NO	13.01	13.01	0.0
SSFP_E1F_9	NO	13.01	13.01	0.0
SSFP_OC3_STM1_0	NO	12.01	12.01	0.0
SSFP_OC3_STM1_1	NO	12.01	12.01	0.0
SSFP_OC3_STM1_10	NO	12.01	12.01	0.0
SSFP_OC3_STM1_11	NO	12.01	12.01	0.0
SSFP_OC3_STM1_12	NO	12.01	12.01	0.0
SSFP_OC3_STM1_13	NO	12.01	12.01	0.0
SSFP_OC3_STM1_14	NO	12.01	12.01	0.0
SSFP_OC3_STM1_15	NO	12.01	12.01	0.0
SSFP_OC3_STM1_16	NO	12.01	12.01	0.0
SSFP_OC3_STM1_17	NO	12.01	12.01	0.0
SSFP_OC3_STM1_18	NO	12.01	12.01	0.0
SSFP_OC3_STM1_19	NO	12.01	12.01	0.0
SSFP_OC3_STM1_2	NO	12.01	12.01	0.0
SSFP_OC3_STM1_20	NO	12.01	12.01	0.0
SSFP_OC3_STM1_21	NO	12.01	12.01	0.0
SSFP_OC3_STM1_22	NO	12.01	12.01	0.0
SSFP_OC3_STM1_23	NO	12.01	12.01	0.0
SSFP_OC3_STM1_24	NO	12.01	12.01	0.0
SSFP_OC3_STM1_25	NO	12.01	12.01	0.0
SSFP_OC3_STM1_26	NO	12.01	12.01	0.0
SSFP_OC3_STM1_27	NO	12.01	12.01	0.0
SSFP_OC3_STM1_28	NO	12.01	12.01	0.0
SSFP_OC3_STM1_29	NO	12.01	12.01	0.0
SSFP_OC3_STM1_3	NO	12.01	12.01	0.0
SSFP_OC3_STM1_30	NO	12.01	12.01	0.0
SSFP_OC3_STM1_31	NO	12.01	12.01	0.0
SSFP_OC3_STM1_32	NO	12.01	12.01	0.0
SSFP_OC3_STM1_33	NO	12.01	12.01	0.0
SSFP_OC3_STM1_34	NO	12.01	12.01	0.0
SSFP_OC3_STM1_35	NO	12.01	12.01	0.0
SSFP_OC3_STM1_36	NO	12.01	12.01	0.0
SSFP_OC3_STM1_37	NO	12.01	12.01	0.0
SSFP_OC3_STM1_38	NO	12.01	12.01	0.0
SSFP_OC3_STM1_39	NO	12.01	12.01	0.0
SSFP_OC3_STM1_4	NO	12.01	12.01	0.0

SSFP_OC3_STM1_40	NO	12.01	12.01	0.0
SSFP_OC3_STM1_41	NO	12.01	12.01	0.0
SSFP_OC3_STM1_42	NO	12.01	12.01	0.0
SSFP_OC3_STM1_43	NO	12.01	12.01	0.0
SSFP_OC3_STM1_44	NO	12.01	12.01	0.0
SSFP_OC3_STM1_45	NO	12.01	12.01	0.0
SSFP_OC3_STM1_46	NO	12.01	12.01	0.0
SSFP_OC3_STM1_47	NO	12.01	12.01	0.0
SSFP_OC3_STM1_5	NO	12.01	12.01	0.0
SSFP_OC3_STM1_6	NO	12.01	12.01	0.0
SSFP_OC3_STM1_7	NO	12.01	12.01	0.0
SSFP_OC3_STM1_8	NO	12.01	12.01	0.0
SSFP_OC3_STM1_9	NO	12.01	12.01	0.0
TimingIC-A	YES	23.112	23.112	0.0
TimingIC-B	YES	7.216	7.216	0.0

NCS 5700 Fixed Port Routers

Router# show fpd package

```

=====
                          Field Programmable Device Package
=====

```

Card Type	FPD Description	Req Reload	SW Ver	Min Req SW Ver	Min Req Board Ver

NCS-57B1-5DSE-SYS	ADM1_Config	NO	0.50	0.50	0.0
	ADM2_Config	NO	0.50	0.50	0.0
	ADM3_Config	NO	0.50	0.50	0.0
	IoFpga	YES	0.09	0.09	0.0
	IoFpgaGolden	YES	0.09	0.08	0.0
	Primary-BIOS	YES	1.11	1.11	0.0
	StdbyFpga	YES	0.24	0.24	0.0
	StdbyFpgaGolden	YES	0.24	0.24	0.0
	TamFw	YES	6.05	6.05	0.0
	TamFwGolden	YES	6.05	6.05	0.0

NCS-57B1-6D24-SYS	ADM1_Config	NO	0.94	0.94	0.0
	ADM2_Config	NO	0.94	0.94	0.0
	ADM3_Config	NO	0.94	0.94	0.0
	IoFpga	YES	0.09	0.09	0.0
	IoFpgaGolden	YES	0.09	0.08	0.0
	Primary-BIOS	YES	1.11	1.11	0.0
	SsdIntelS4510	YES	11.20	11.20	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	StdbyFpga	YES	0.24	0.24	0.0
	StdbyFpgaGolden	YES	0.24	0.24	0.0
	TamFw	YES	6.05	6.05	0.0
	TamFwGolden	YES	6.05	6.05	0.0

NCS-57C1-48Q6-SYS	ADM1_Config	YES	0.07	0.07	0.0
	ADM2_Config	YES	0.07	0.07	0.0
	IoFpga	YES	0.47	0.47	0.0
	IoFpgaGolden	YES	0.47	0.47	0.0
	Primary-BIOS	YES	3.07	3.07	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	StdbyFpga	YES	0.31	0.31	0.0
	StdbyFpgaGolden	YES	0.31	0.31	0.0
	TamFw	YES	7.10	7.10	0.0
	TamFwGolden	YES	7.10	7.10	0.0

NCS-57D2-18DD-SYS	ADM1-DBConfig	YES	1.92	1.92	0.0
	ADM2-DBConfig	YES	1.92	1.92	0.0
	ADM3-DBConfig	YES	1.92	1.92	0.0

	ADM4-MBConfig	YES	1.92	1.92	0.0
	ADM5-MBConfig	YES	1.92	1.92	0.0
	ADM6-MBConfig	YES	1.92	1.92	0.0
	FtFpga	NO	0.20	0.20	0.0
	FtFpgaGolden	NO	0.20	0.00	0.0
	IoFpga	YES	0.06	0.06	0.0
	IoFpgaDB	YES	0.07	0.07	0.0
	IoFpgaGolden	YES	0.05	0.05	0.0
	IoFpgaGoldenDB	YES	0.05	0.05	0.0
	Primary-BIOS	YES	4.10	4.10	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	StdbyFpga	YES	0.96	0.96	0.0
	StdbyFpgaGolden	YES	0.83	0.83	0.0
	TamFw	YES	7.09	7.09	0.0
	TamFwGolden	YES	7.09	7.09	0.0

PSU1100W-ACPI	EM-PrimMCU	NO	1.01	1.01	0.0
	EM-SecMCU	NO	1.05	1.05	0.0

PSU2KW-ACPE	PO-PrimMCU	NO	17.56	17.56	0.0

PSU2KW-ACPI	PO-PrimMCU	NO	1.03	1.03	0.0
	PO-SecMCU	NO	1.13	1.13	0.0

PSU2KW-DCPE	PO-PrimMCU	NO	17.56	17.56	0.0

PSU2KW-DCPI	PO-PrimMCU	NO	1.07	1.07	0.0

PSU950W-DCPI	EM-PrimMCU	NO	1.00	1.00	0.0

This sample output is for **show hw-module fpd** command from the Admin mode:

```

sysadmin-vm:0_RP0# show hw-module fpd
                    FPD Versions
                    =====
Location  Card type      HWver FPD device      ATR Status   Run      Programd
-----
0/0      NC57-48Q2D-SE-S    0.4   ALDRINFPGA      CURRENT      1.06     1.06
0/0      NC57-48Q2D-SE-S    0.4   Bootloader      CURRENT      1.00     1.00
0/0      NC57-48Q2D-SE-S    0.4   DBFPGA         CURRENT      0.14     0.14
0/0      NC57-48Q2D-SE-S    0.4   IOFPGA         CURRENT      0.105    0.105
0/0      NC57-48Q2D-SE-S    0.4   SATA-INTEL_240G  CURRENT      1132.00  1132.00
0/1      NC57-18DD-SE       1.1   Bootloader      CURRENT      1.03     1.03
0/1      NC57-18DD-SE       1.1   DBFPGA         CURRENT      0.14     0.14
0/1      NC57-18DD-SE       1.1   IOFPGA         CURRENT      0.22     0.22
0/1      NC57-18DD-SE       1.1   SATA-M5100     CURRENT      75.00    75.00
0/2      NC57-18DD-SE       1.1   Bootloader      CURRENT      1.03     1.03
0/2      NC57-18DD-SE       1.1   DBFPGA         CURRENT      0.14     0.14
0/2      NC57-18DD-SE       1.1   IOFPGA         CURRENT      0.22     0.22
0/2      NC57-18DD-SE       1.1   SATA-M5100     CURRENT      75.00    75.00
0/3      NC57-18DD-SE       1.1   Bootloader      CURRENT      1.03     1.03
0/3      NC57-18DD-SE       1.1   DBFPGA         CURRENT      0.14     0.14
0/3      NC57-18DD-SE       1.1   IOFPGA         CURRENT      0.22     0.22
0/3      NC57-18DD-SE       1.1   SATA-M5100     CURRENT      75.00    75.00
0/4      NC57-36H-SE        0.201 Bootloader      CURRENT      1.03     1.03
0/4      NC57-36H-SE        0.201 DBFPGA         CURRENT      0.14     0.14
0/4      NC57-36H-SE        0.201 IOFPGA         CURRENT      0.05     0.05
0/4      NC57-36H-SE        0.201 SATA-M5100     CURRENT      75.00    75.00
0/5      NC57-18DD-SE       1.1   Bootloader      CURRENT      1.03     1.03
0/5      NC57-18DD-SE       1.1   DBFPGA         CURRENT      0.14     0.14
0/5      NC57-18DD-SE       1.1   IOFPGA         CURRENT      0.22     0.22
0/5      NC57-18DD-SE       1.1   SATA-M5100     CURRENT      75.00    75.00
0/6      NC57-18DD-SE       1.1   Bootloader      CURRENT      1.03     1.03
0/6      NC57-18DD-SE       1.1   DBFPGA         CURRENT      0.14     0.14

```

0/6	NC57-18DD-SE	1.1	IOFPGA	CURRENT	0.22	0.22
0/6	NC57-18DD-SE	1.1	SATA-M5100	CURRENT	75.00	75.00
0/7	NC57-36H-SE	1.0	Bootloader	CURRENT	1.03	1.03
0/7	NC57-36H-SE	1.0	DBFPGA	CURRENT	0.14	0.14
0/7	NC57-36H-SE	1.0	IOFPGA	CURRENT	0.05	0.05
0/7	NC57-36H-SE	1.0	SATA-Micron	CURRENT	1.00	1.00
0/RP0	NC55-RP2-E	1.0	Bootloader	CURRENT	0.09	0.09
0/RP0	NC55-RP2-E	1.0	IOFPGA	CURRENT	0.50	0.50
0/RP0	NC55-RP2-E	1.0	OMGFPGA	CURRENT	0.52	0.52
0/RP0	NC55-RP2-E	1.0	SATA-M5100	CURRENT	75.00	75.00
0/RP1	NC55-RP2-E	1.0	Bootloader	CURRENT	0.09	0.09
0/RP1	NC55-RP2-E	1.0	IOFPGA	CURRENT	0.50	0.50
0/RP1	NC55-RP2-E	1.0	OMGFPGA	CURRENT	0.52	0.52
0/RP1	NC55-RP2-E	1.0	SATA-M5100	CURRENT	75.00	75.00
0/FC0	NC55-5508-FC2	1.0	Bootloader	CURRENT	1.80	1.80
0/FC0	NC55-5508-FC2	1.0	IOFPGA	CURRENT	0.19	0.19
0/FC0	NC55-5508-FC2	1.0	SATA-M5100	CURRENT	75.00	75.00
0/FC1	NC55-5508-FC2	1.0	Bootloader	CURRENT	1.80	1.80
0/FC1	NC55-5508-FC2	1.0	IOFPGA	CURRENT	0.19	0.19
0/FC1	NC55-5508-FC2	1.0	SATA-M5100	CURRENT	75.00	75.00
0/FC2	NC55-5508-FC2	1.0	Bootloader	CURRENT	1.80	1.80
0/FC2	NC55-5508-FC2	1.0	IOFPGA	CURRENT	0.19	0.19
0/FC2	NC55-5508-FC2	1.0	SATA-M5100	CURRENT	75.00	75.00
0/FC3	NC55-5508-FC2	1.0	Bootloader	CURRENT	1.80	1.80
0/FC3	NC55-5508-FC2	1.0	IOFPGA	CURRENT	0.19	0.19
0/FC3	NC55-5508-FC2	1.0	SATA-M5100	CURRENT	75.00	75.00
0/FC4	NC55-5508-FC2	1.0	Bootloader	CURRENT	1.80	1.80
0/FC4	NC55-5508-FC2	1.0	IOFPGA	CURRENT	0.19	0.19
0/FC4	NC55-5508-FC2	1.0	SATA-M5100	CURRENT	75.00	75.00
0/FC5	NC55-5508-FC2	1.0	Bootloader	CURRENT	1.80	1.80
0/FC5	NC55-5508-FC2	1.0	IOFPGA	CURRENT	0.19	0.19
0/FC5	NC55-5508-FC2	1.0	SATA-M5100	CURRENT	75.00	75.00
0/SC0	NC55-SC	1.4	Bootloader	CURRENT	1.74	1.74
0/SC0	NC55-SC	1.4	IOFPGA	CURRENT	0.10	0.10
0/SC1	NC55-SC	1.4	Bootloader	CURRENT	1.74	1.74
0/SC1	NC55-SC	1.4	IOFPGA	CURRENT	0.10	0.10

Compatibility Matrix for EPNM and Crosswork with Cisco IOS XR Software

The compatibility matrix lists the version of EPNM and Crosswork that are supported with Cisco IOS XR Release in this release.

Table 6: Compatibility Matrix

Cisco IOS XR	Crosswork	EPNM
Release 24.1.1	Crosswork Optimization Engine 6.0	Evolved Programmable Network Manager 7.1.1

Important Notes

- The total number of bridge-domains (2*BDs) and GRE tunnels put together should not exceed 1518. Here the number 1518 represents the multi-dimensional scale value.
- The offline diagnostics functionality is not supported in NCS 5500 platform. Therefore, the **hw-module service offline location** command will not work. However, you can use the **(sysadmin)# hw-module shutdown location** command to bring down the LC.

Licensing

Starting with Cisco IOS XR Release 24.1.1, Smart Licensing Using Policy (SLP) is the default Licensing model. When you upgrade to the Cisco IOS XR Release 24.1.1 release or later, the Smart Licensing Using Policy is enabled by default.

You can migrate your devices to Smart Licensing with Policy model, see *Migrating from Smart Licensing to Smart Licensing Using Policy*, [Smart Licensing Using Policy on Cisco IOS XR Routers](#).

We recommend that you update to the latest version of [SSM On-Prem](#) or [Cisco Smart Licensing Utility](#).



Note SSM On-Prem and CSSM both support SLP devices and SL devices. SLP devices and SL devices can coexist in a network. The Smart Licensing (SL) model is available in releases Cisco IOS XR Release 7.11.1 and earlier.

Supported Transceiver Modules

To determine the transceivers that Cisco hardware device supports, refer to the [Transceiver Module Group \(TMG\) Compatibility Matrix](#) tool.

Upgrading Cisco IOS XR Software

Cisco IOS XR Software is installed and activated from modular packages, allowing specific features or software patches to be installed, upgraded, or downgraded without affecting unrelated processes. Software packages can be upgraded or downgraded on all supported card types, or on a single card (node).

Before starting the software upgrade, use the **show install health** command in the admin mode. This command validates if the statuses of all relevant parameters of the system are ready for the software upgrade without interrupting the system.



Note • If you use a TAR package to upgrade from a Cisco IOS XR release prior to 7.x, the output of the **show install health** command in admin mode displays the following error messages:

```
sysadmin-vm:0_RSP0# show install health
. . .
ERROR /install_repo/gl/xr -rw-r--r--. 1 8413 floppy 3230320 Mar 14 05:45 <platform>-isis-2.2.0.0-r702.x86_64
ERROR /install_repo/gl/xr -rwxr-x---. 1 8413 165 1485781 Mar 14 06:02 <platform>-k9sec-3.1.0.0-r702.x86_64
ERROR /install_repo/gl/xr -rw-r--r--. 1 8413 floppy 345144 Mar 14 05:45 <platform>-li-1.0.0.0-r702.x86_64
```

You can ignore these messages and proceed with the installation operation.

- Quad configurations will be lost when you perform a software downgrade on a NCS-55A1-48Q6H device from IOS XR Release 7.5.1 onwards to a release prior to IOS XR Release 7.5.1 due to non-backward compatibility change. The lost configuration can be applied manually after the downgrade.



Note A quad is a group of four ports with common speeds, 1G/10G or 25G. You can configure the ports speed for by using the **hw-module quad** command.

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.

Cisco IOS XR Error messages

To view, search, compare, and download Cisco IOS XR Error Messages, refer to the [Cisco IOS XR Error messages](#) tool.

Cisco IOS XR MIBs

To determine the MIBs supported by platform and release, refer to the [Cisco IOS XR MIBs](#) tool.

Related Documentation

The most current Cisco NCS 5500 router documentation is located at the following URL:

<https://www.cisco.com/c/en/us/td/docs/iosxr/ios-xr.html>



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