



Neptune

What's New Guide

V9.1

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Ribbon's qualification lab is accredited by A2LA for competence in electrical testing according to the International Standard ISO IEC 17025-2017 General Requirements for the Competence of Testing and Calibration Laboratories.\



Ribbon's management applications run on VMWare virtualization hypervisors.

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Neptune What's New Guide

This document provides a brief introduction to the new hardware features and functionality included in Neptune V9.1. For more detailed information about each feature, refer to the release notes for this version and see the specific related topics in the Neptune documentation suite.

New Hardware Features in Neptune V9.1

This section provides a brief introduction to the new hardware features and functionality included in this Neptune release. For more detailed information about each feature, see the specific related topics in the Neptune documentation suite.

- [eEXT-2UH Card Set Expanded](#)
- [LED Indicator Behavior](#)
- [Manual Upgrade Procedures](#)
- [MS16_4MR Cards](#)
- [New Smart SFP Transceivers](#)
- [New Transceivers](#)
- [NPT-1012D Platform](#)
- [NPT-2400 Platform](#)

eEXT-2UH Card Set Expanded

The eEXT-2UH platforms are high density modular expansion units for Neptune's multiservice metro access platform series. These expansion units provide a base NPT-XXXX platform with additional traffic and protection capabilities, enhancing scalability and providing the flexibility of additional I/O slots, available to be used as needed.

With version 9.1, additional cards can be configured in the eEXT-2UH expansion platform. The following table lists the modules supported in the eEXT-2UH units. The specific card options available may depend on the base platform.

eEXT-2UH Cards and Slots

Card	eEXT-2UH Slots
INF_1200	PSA and PSB
AC_PS-1200	PSA and PSB
ACP2U	ACP
FCU_eE2UH	FS
TP32_2	ES#1, ES#2, ES#3
OBC_B/C	ES#1, ES#2, ES#3
DHGE_10_POE	ES#1, ES#2, ES#3
EM_10EB	ES#1, ES#2, ES#3

Related Topics in the *Neptune Reference Manual*:

- [eEXT-2UH Expansion Unit](#)

LED Indicator Behavior

The meaning of LED lights for optical Ethernet ports has been changed from "Laser-on" to indicate "Link status" Rx/Tx activity, with the following LED behavior:

- Green steadily On: link up
- Green Off: link down
- Green On with random blinking: link up and packets flowing

Manual Upgrade Procedures

Neptune upgrades are a "one-click" process. After the user sends the new version activation command, the MCP starts upgrading the software (and FPGA) of the whole NE. This is an automatic procedure and continues until the upgrade is complete; user intervention is not required.

To support the option of configuring a flexible maintenance window for different customers, the user must be able to control the reset time for each I/O card during the system upgrade. This is applicable to redundant platforms only (NPT-1800, NPT-1300, NPT-1200, NPT-1250, NPT-1050).

Manual upgrade is applicable for I/O slots and cards (T-slots, E-slots); controller card (MCP/CIPS/MCIPS) upgrade is still automatic.

MS16_4MR Cards

Neptune's TDM to IP portfolio has been enhanced with the new MS16_4 MR I/O card. The MS16_4MR is a single T-slot CES multiservice module with 4 x multi-rate interfaces and configurable line rates (OC-3/12/48 or STM-1/4/16), with dual 10G connectivity to the matrix cards. Both intra-card and cross-card linear MS (Line) protection is supported, both unidirectional and bidirectional. The MS16_4MR supports the following features:

- CEP services, through multi-rate SFP interfaces, in any combination of:
 - STS-1 (of OC-3/12/48)
 - STS-3c (of OC-3/12/48)
 - STS-12c (of OC-12/48)
 - STS-48c (of OC-48)
- Unchannelized CEP support
- Channelized SAToP and CESoPSN support (future)
- Encapsulation
 - Ethernet (CESoETH)
 - MPLS (CESoMPLS)
- Linear MSP 1+1 protection - intra-card and cross-card
 - Unidirectional
 - Bidirectional
- Timing
 - 2 reference clocks
 - EPAR for CEP clock recovery mechanism
- Supported in the following platforms:
 - NPT-1022/B
 - NPT-1050
 - NPT-1100
 - NPT-1250
 - NPT-1300
 - NPT-1800
 - NPT-2300

Related topics in Neptune Reference Manual:

- [MS16_4MR Overview](#)

New Smart SFP Transceivers

Neptune's TSoP capabilities are complemented with a Gigabit Ethernet system interface. The OC-3/STM-1 and OC-12/STM-4 smart SFPs introduce duplex fiber at an industrial temperature range.

With TSoP, the SONET/SDH signal is forwarded completely transparently, maintaining its embedded payload structure, protection protocols, and synchronization end-to-end. This simplifies the configuration and service turn-up of SONET/SDH connections across a packet network.

TSOP (Transparent SDH over Packet) smart SFPs provide a standard SFP interface and can be assigned with any 1G/10G port. They support encapsulation of CESoETH and CESoMPLS.

Related Topics in the *Neptune Reference Manual*:

- [Smart SFPs: CES Transceivers](#)

New Transceivers

Support for the following transceivers was added in this release:

- OTR400Q56DD_CTM module coherent QSFP-DD module (Open ZR+, C-band tunable laser, high Tx power)
 - Operates in 100G/400G line rates
 - DWDM tunable (ch17 – ch60, 50ghz spacing, default channel #37) coherent OPEN ZR+ module
 - Support O-FEC and configurable Tx power, from +1dbm till -10dbm
 - 100G Supported in all cards with QSFP28DD support (DHCE_1QB/C, DHCE_2Q, NPT-1100 base ports (P25,P26), NPT-2100A (P0/P1)/2400 base ports (P16-P29), and 400G cards – MCIPS3T (P13,P14), DH400_1Q
 - 400G rate supported in NPT-2100A (P0-P1), MCIPS3T (P13-P14), DH400_1Q, NPT-2400 (P24-P29)
- OTR100Q28I_ZR4
 - QSFP_28 transceiver , Up to 80km on single mode fiber with industrial grade operating temperature (case temperature -40 till 85deg)
 - Can be installed in all 100G capable ports (excluding DHCE_2F, DHCE_2MRF)
- OTR100Q28_LR27BD
 - Single Lambda 100G QSFP28 BIDI transceiver module for links up to 10km over single mode fiber, with industrial grade operating temperature (case temperature -40 till 85deg)
 - Tx laser is 1271nm , should work opposite to OTR100Q28_LR33BD
- OTR100Q28_LR33BD
 - Single Lambda 100G QSFP28 BIDI transceiver module for links up to 10km over single mode fiber, with industrial grade operating temperature (case temperature -40 till 85deg)
 - Tx laser is 1331nm , should work opposite to OTR100Q28_LR27BD
- New Alien transceivers
 - QSFP+ transceivers, for 10g-4x breakout
 - 400G transceivers with 4 wavelengths OTR400Q56DD_xx4
 - 400G transceivers with 8 wavelengths OTR400Q56DD_xx8

For more information, see the [Neptune System Specifications](#).

NPT-1012D Platform

The NPT-1012D is an extremely compact edge device supporting Ethernet, Circuit Emulation Services (CES), MPLS-TP, and IP/MPLS. The NPT-1012D supports two form factors. One is a hardened DIN-rail form factor optimized for remote locations with strict environmental and size requirements. The second is a rack-mountable form factor, which uses a special 19" rack adapter allowing 2 NPT-1012Ds to be mounted side-by-side. In both cases (hardened DIN-rail or 19" rack mountable form factor) it supports 32 Gbps switching capacity, making this a perfect fit for operators looking for a flexible fully-managed packet transport edge device. The NPT-1012D is optimized for critical infrastructure applications, where the advanced IP/MPLS

traffic engineering tools and features must extend to remote locations (interior and exterior), with strict environmental and size requirements.

Highlights of the NPT-1012D include:

- CE2.0-compliant, carrier Ethernet, IP/MPLS, L3 access and pre-aggregation device
 - Port fan-out of 44Gbps
 - 32Gbps packet processing, implemented through a system-on-a-chip (SoC) architecture
 - Dual-stack MPLS (MPLS-TP and IP/MPLS)
- Fan-out capabilities
 - Base unit fan-out capabilities
 - 4 x 10G/1G (SFP+/SFP)
 - 4 x 1000/100 Base-T
- Timing capabilities
 - G.8262.1 Sync-E
 - IEEE1588v2: 1PPS, ToD, Built-in GNSS
 - G.8275.1: Precision time protocol telecom profile for phase/time synchronization with full timing support from the network
 - T-BC performance can reach G.8273.2 class C
 - G.8275.2: Precision time protocol telecom profile for phase/time synchronization with partial timing support from the network
 - Comply with G.8273.4 in -T-BC-P/A performance
- Automatic installation using ZTP
- Air Flow: Side-2-Side
- SDN interfaces: NETCONF/YANG support
- Temperature hardened, ranging from -25°C to +65°C
- Optional fan-filter, redundant DC input with standard terminal lug connectors

Related topics in the *Neptune Reference Manual*

- [NPT-1012D System Architecture](#)

NPT-2400 Platform

The NPT-2400 platform has a 4.8T non-blocking switch capacity, high 100G fan-out, 6 x 400G client/line interfaces, and 2RU form factor. These features enable the NPT-2400 to provide the performance and interfaces required at the metro edge aggregation sites in xHaul, broadband backhaul, and Converged Interconnect Networks (CINs).

The full set of IP/MPLS/MPLS-TP/Segment Routing transport capabilities provided by Ribbon's IP Wave rNOS allows the NPT-2400 to meet the service performance needs (SLAs) at these aggregation sites, on a service-by-service basis. 5G-specific functionality, such as 5G-specific interfaces and Class C timing, mean the NPT-2400 is ideally suited for aggregation sites in xHaul-specific networks, or in multiservice networks where both mobile xHaul and fixed broadband backhaul are supported.

The NPT-2400 provides an extensive number of coherent, OpenZR+ compliant interfaces for 100G/200G and 400G, providing the IPoDWDM and/or IPoOLS capabilities essential in today's metro aggregation network.

Related topics in the *Neptune Reference Manual*

- [NPT-2400 System Architecture](#)

New Software Features in Neptune V9.1

This section provides a brief introduction to the new software features and functionality included in this Neptune version. For more detailed information about each feature, see the specific related topics in the Neptune documentation suite.

- [DiffServ Support in NPT-1015](#)
- [IP Packet Load Balancing](#)
- [MAC Authentication Bypass](#)
- [Secure Syslog Protocol](#)

DiffServ Support in NPT-1015

The differentiated service (DiffServ) concept is a well-known priority-marking scheme used in IP packet networks, based on a set of forwarding behaviors called Per-Hop Behavior (PHB). These behaviors are in turn organized into a PHB Scheduling Classes (PSC) framework and are associated with relative priority markings, called DiffServ Code Points (DSCP), carried in the IP header. These PHBs in essence represent the underlying QoS mechanism or packet forwarding treatment within a node. Neptune platforms apply the IETF DiffServ Architecture (RFC 2475) across all network layers, utilizing classification mechanisms like MPLS Traffic Class (TC) bits, IP DSCP, and IEEE 802.1p for implementing the DiffServ PHBs in use.

Related Topics in *Neptune Layer 2 CPE Reference Manual*:

- [DiffServ Architecture](#)

IP Packet Load Balancing

Neptune platforms support IP packet payload-based load-balancing for MPLS encapsulated traffic. The platform hardware identifies the packet header type (either IPv4/IPv6 or MPLS) and hashes the relevant header fields accordingly. A hash algorithm for next-hop address selection creates an optimal traffic distribution, thus balancing the traffic load across LAG links.

Neptune platforms in the NPT-2xxx series also support load balancing of IPv4 or IPv6 packets using GPRS Tunneling Protocol (GTP) tunnel endpoint identifier (TE-ID) field hash calculations. GTP is a tunnel control and management protocol. Wireless networks use GTP tunnels to deliver mobile data. GTP includes a complete set of procedures and protocols for signaling, data transfer, and tunnel control and management. GTP offers a comprehensive approach to creating, deleting, and modifying tunnels, as well as a tunneling mechanism to provide a service for carrying user data packets over the network.

GTP load balancing enables using the tunnel endpoint identifier (TE-ID), unique for each traffic flow, to compute load balancing (or hashing) of traffic in tunnels between ports. Using the TE-ID ensures that load balancing occurs even if the other parameters (such as source or destination address or port, or router ID) don't have unique values, thus achieving a greater distribution of traffic over equal-cost links, allowing efficient distribution of traffic in mobile networks, and providing increased reliability and availability for the network.

Using GTP TE-ID based load balancing rather than LAG round-robin offers the following advantages:

- It does not cause packet disordering
- It is applicable to both ECMP and LAG
- It is supported for all traffic paths, L2 or L3 or MPLS (local handoff or transit)

NPT-2xxx series platforms automatically choose the GTP TE-ID load balancing option. If there is no GTP TE-ID field present, then the hardware automatically falls back to the IP packet-payload based load-balancing scheme.

Related Topics in the *Neptune Reference Manual*:

- [Link Aggregation LAG](#)

MAC Authentication Bypass

MAC Authentication Bypass (MAB) uses the MAC address of a device to determine the level of network access to be provided. MAB offers visibility and identity-based access control at the network edge for endpoints, mainly for those that do not support IEEE 802.1X. With the appropriate design and well-chosen components, you can meet the needs of your security policy while reducing the impact on your infrastructure and end users.

Related Topics in the *Neptune Reference Manual*:

- [MAC Authentication Bypass MAB](#)

Secure Syslog Protocol

Syslog traffic between the NE and the syslog server will be configured over TCP with TLS V1.3, as per RFC5425. Default configuration will use syslog over UDP, to allow backward compatibility during software upgrades to V9.1.

Related Topics in the *Neptune System Specification*:

- [Neptune SYSLOG Over TLS](#)