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ZebOS®
Network Platform

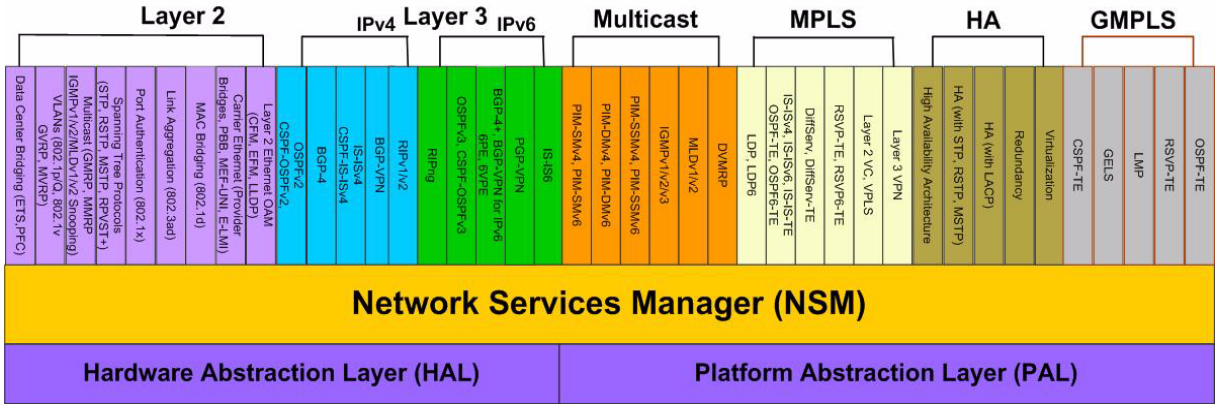
Network Services Module

Overview

The ZebOS® Network Platform Network Services Module (NSM) is the base module that simultaneously and independently communicates with every ZebOS routing and switching process. The NSM acts as the backbone of the ZebOS routing and switching software modules and supports IPv4, IPv6, MPLS, Mobile IP, DiffServ extensions, DiffServ-TE, Multicast, and Layer 2/Layer 3 based protocols. In addition, NSM supports Routing Redundancy, Virtual Routing, IGMPv1 (interoperable with host only), IGMPv2 and IGMPv3, as well as management and configuration services for all protocol modules.

The NSM communicates directly with each ZebOS routing and switching module to manage route tables and to perform route conversion and redistribution. The NSM also interfaces with the Platform Abstraction Layer (PAL) to communicate with the underlying operating system, or with the Hardware Abstraction Layer (HAL), to communicate with network processors for forwarding table updates. This powerful architecture gives equipment developers and designers the flexibility and freedom to integrate any of the ZebOS modules with many popular operating systems.

Additionally, the NSM and associated ZebOS protocol modules can support carrier-class routing and switching solutions for markets such as Access, Edge, Core, Enterprise, Wireless, or Storage Area Network (SAN). These offerings include the ability to provide MPLS-VPN solutions based on BGP-VPN and LDP, as well as support of Mobile IPv6 Neighbor Discovery/Home Agent Discovery.



Network Services Module Communications Model

Benefits

- Scalable, modular, and platform-independent
- Built-in redundancy management APIs for redundant applications; ideal for high-availability carrier-class systems
- Support of simultaneous IPv4, IPv6, MPLS, Layer 2 switching and Layer 3 routing without performance degradation
- Ideal footprint for edge, access, core, wireless, and SAN systems

Supported Software Modules

Layer 2

- VLAN Modules: 802.1p/Q, 802.1v, Generic VLAN Registration Protocol (GVRP), and Multiple VLAN Registration Protocol (MVRP)
- Multicast Modules: Multiple Registration Protocol (MRP), GARP Multicast Registration Protocol (GMRP), Multiple Multicast Registration Protocol (MMRP), IGMP and MLD Snooping/Proxy
- Carrier Ethernet: 802.1ab, Provider Bridging, and MEF-UNI
- Spanning Tree: STP, RSTP, MSTP and RPVST+ modules
- Port Authentication: VLAN Stacking, 802.1x Port Authentication
- Link Aggregation: Link Aggregation (802.3ad) and Link Aggregation Control Protocol (LACP)
- Data Center Bridging: Enhanced Transmission Selection (ETS) and Priority-based Flow Control (PFC)
- MAC Bridging: 802.1d
- Layer 2 OAM Modules: Link Layer Discovery Protocol (LLDP), Ethernet to the First Mile (EFM) and Connectivity Fault Management (CFM)
- Carrier Ethernet Modules: 802.1ad Provider Bridging, MEF User-to-Network Interface (UNI), Provider Backbone Bridges (PBB), Ethernet Link Management (E-LMI)

IPv4 and IPv6

- Routing Information Protocol (RIP) v1/v2
- RIPng
- RIP-Virtual Routing
- Open Shortest Path First (OSPF) v2/v3
- OSPF-Virtual Routing
- OSPF-TE
- Constrained Shortest Path First-Open Shortest Path First (CSPF-OSPF) v2
- Border Gateway Protocol 4+ (BGP-4+)
- BGP/BGP-4+ Virtual Routing
- BGP-VPN (Virtual Private Networks)
- Intermediate System-to-Intermediate System (IS-IS)
- IS-IS TE
- 6PE/6VPE

Multicast

- Protocol Independent Multicast - Dense Mode (PIM-DM)
- Protocol Independent Multicast - Sparse Mode (PIM-SM)
- Protocol Independent Multicast - Source-Specific Multicast (PIM-SSM)

- Internet Group Management Protocol (IGMP) v1/v2/v3
- Distance Vector Multicast Routing Protocol (DVMRP)
- Multicast Listener Discovery (MLD) v1/v2

Multi-Protocol Label Switching

- Label Distribution Protocol (LDP)
- Resource reSerVation Protocol - Traffic Engineering (RSVP-TE)
- DiffServ and DiffServ-TE
- MPLS
- MPLS Forwarder
- MPLS L2 Virtual Circuit (Martini Draft)
- Virtual Private LAN Services (VPLS)
- Layer 3 Virtual Private Network (VPN)

Generalized Multi-Protocol Label Switching

- Constrained Shortest Path First (CSPF) TE extensions for GMPLS
- GMPLS Ethernet Label Switched (GELS)
- Link Management Protocol (LMP))
- Resource reSerVation Protocol (RSVP) TE extensions for GMPLS
- Open Shortest Path First (OSPF) TE Extensions for GMPLS

Management Tools

- IMI/IMIsh
- CLI
- SNMP
- SMUX
- AgentX

Standard Deliverables

- Source Code (written in ANSI-compliant C)
- Installation Guide
- Configuration Guides
- Command Reference Guides
- Developer Guides