

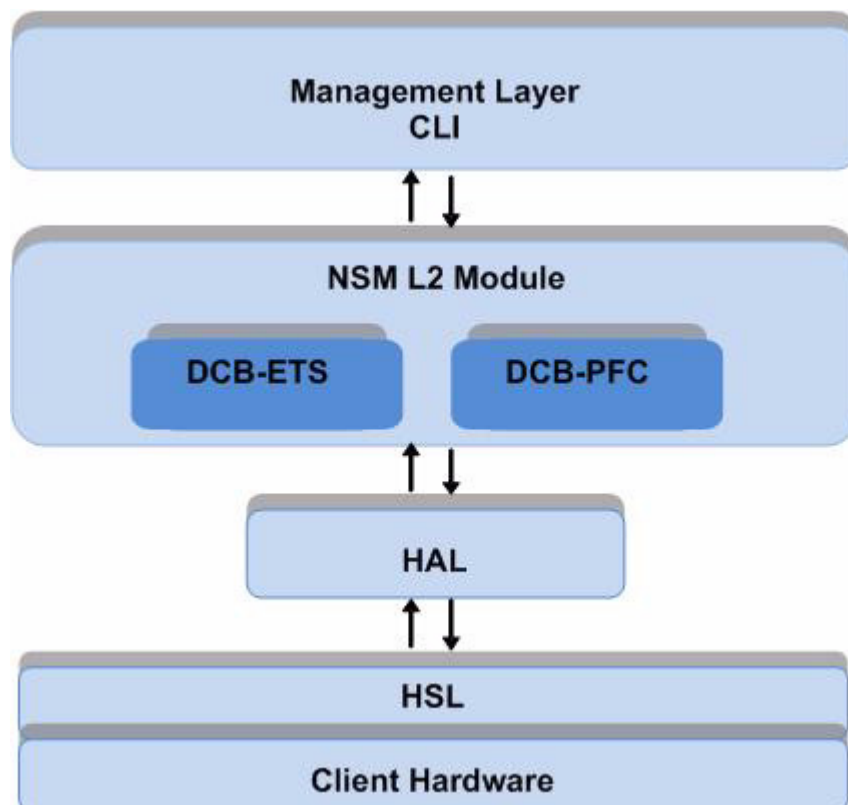
**ZebOS®
Network Platform**

Data Center Bridging Modules

Overview

The ZebOS Network Platform's Data Center Bridging (DCB) software is a collection of standards-based extensions for Ethernet protocols. It provides a lossless transport layer to allow the convergence of LANs and SANs into a single unified fabric. DCB is a flexible framework that defines the capabilities required for switches and end-points to be part of a data center environment. Data Center Bridging protocols enable transport of Fibre Channel, TCP/IP, and IPC traffic over a single, converged Ethernet network.

Data center networks and backplane fabrics employ applications that depend on the delivery of data packets with a lower latency and lower probability of packet loss than is typical of IEEE 802 VLAN bridged networks. DCB supports the use of a single bridged local area network for these applications, as well as traditional LAN applications.



Data Center Bridging in the ZebOS Architecture

System Architecture

The sections that follow describe the system architecture for DCB:

Priority-based Flow Control

The Priority-based Flow Control (PFC) standard specifies protocols, procedures and managed objects that enable flow control per traffic class on IEEE 802 full-duplex links. Priority-based flow control helps eliminate frame loss due to congestion by operating on individual priorities. Along with other Data Center Bridging technologies, PFC helps the flow of higher-layer protocols, which are highly loss sensitive, while not affecting traditional LAN protocols that utilize other priorities.

Data Center Bridging networks (bridges and end-nodes) include limited bandwidth-delay product and limited hop-count. VLAN tag priority values identify traffic classes. Priority-based flow control helps eliminate frame loss due to congestion by a mechanism similar to the IEEE 802.3x PAUSE, but operates on individual priorities.

Enhanced Transmission Selection

The Enhanced Transmission Selection (ETS) standard supports the allocation of bandwidth among traffic classes. When the available load in a traffic class does not use its allocated bandwidth, ETS allows other traffic classes to use the available bandwidth.

A network can prioritize traffic to offer different service characteristics to different traffic classes. However, a user may want to share bandwidth among the priorities that are carrying bursty, high-offered loads, instead of servicing them with a strict priority. Therefore, traffic set at a specific priority level that does not use its set allocation allows traffic set at other priorities to utilize the unused bandwidth.

Data Center Bridging eXchange

The Data Center Bridging eXchange (DCBx) protocol is used by DCB-enabled devices to exchange information with directly-connected peers. The DCBx may also be used to detect misconfigurations and to configuring the peers. DCBx uses the Link Layer Discovery Protocol (LLDP) as a signaling mechanism.

For each feature that is supported by DCBx, specified attributes are exchanged:

- Specific attributes to exchange
- How attributes are used to detect misconfigurations
- What action is required when a misconfiguration is detected

The DCBx implementation is heavily dependent on the LLDP stack which resides in that module. More information about LLDP can be found in the Layer 2 Protocol Modules product brief.

Features

- Enhanced performance for Ethernet networks and lossless fabric for traffic on converged networks
- Virtual links by traffic class that includes pause-per-class technology, congestion management and event notification
- Improved performance, including stability, enhanced throughput and robustness

Standards Supported

- IEEE 802.1Qbb — Priority-based Flow Control
- IEEE 802.1Qaz — Enhanced Transmission Selection

Requirements

- ZebOS Network Services Manager
- ZebOS xSTP - Spanning Tree Protocols
- ZebOS Layer 2 VLAN
- ZebOS Layer 2 VLAN Classification
- ZebOS Layer 2 Link Layer Discovery Protocol

Standard Deliverables

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