1188 East Arques Avenue
Sunnyvale, CA 94086
tel: 408.400.1900
fax: 408.400.1863
sales@ipinfusion.com
www.ipinfusion.com

ZebOS®
Network Platform

# Spanning Tree Modules

## Overview

The ZebOS Network Platform Spanning Tree Modules offer customers a combination of three vital switching management modules: Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP) and Multiple Spanning Tree Protocol (MSTP).

ZebOS STP creates spanning trees within mesh networks of Layer 2 connected bridges, disabling any links that are not a part of the tree and leaving a single active connection between any two unique network nodes. STP elects a root bridge, finds paths and determines the least cost path to the root bridge, then disables all other paths. Network managers may design a topology that uses redundant links as automatic backup paths in the case of active link failure. Automatic backup takes place without the pitfalls of bridge loops, or the need to manually enable or disable backup links. ZebOS STP supports all STP switch port states, including Listening, Learning, Blocking, Forwarding and Disabled. The network administrator must manually set the Disabled state.

ZebOS RSTP provides for faster spanning tree convergence upon identification of a spanning-tree topology change. ZebOS RSTP utilizes Bridge Port Roles as defined below:

- A Root Bridge Port is selected to forward the spanning-tree topology.
- A Designated Bridge Port is the forwarding port for each Local Area Network (LAN) segment.
- An Alternate Bridge Port supplies an alternate path to the root bridge. (This path is not the same as using the Root port.)
- A Backup Bridge Port is a redundant path to a segment where another bridge port already connects.

ZebOS MSTP expands the versatility of VLANs by allowing configuration of a separate spanning tree for each VLAN group and blocking redundant links within each spanning tree.

## Features

### Spanning Tree Protocol

- Enables devices to avoid bridge loops by exchanging BPDU (bridge protocol data units)
- Standard MIB support per RFC 1493 and RFC 2674
- Spanning Tree Algorithm Calculates Best Path
- Prevents Multiple Between-Network Segments

### Rapid Spanning Tree Protocol

- Fast detection of root switch failure
- Accelerated reconfiguration and restoration of Spanning Trees after link failures
- Sub-50 millisecond convergence time for ring topologies
- LAN-attached ports can be configured as Edge Ports

### Multiple Spanning Tree Protocol

- Allows VLAN bridges to utilize Multiple Spanning Trees
- Traffic from different VLANs may flow over divergent paths within a virtual bridged LAN
- Faster convergence times for RSTP and MSTP
- Supports up to 64 instances
- Ability to disable Spanning Tree for specific instances

In addition to the Features listed above, all ZebOS Spanning Tree Protocol modules support 802.3x Flow Control, Broadcast Storm Recovery, and Port Mirroring requirements.

## Benefits

- Stable and robust implementations of STP, RSTP and MSTP
- Industry-standard Command Line Interface (CLI)
- Platform-independent

## Standards Supported

- Spanning Tree — Spanning Tree Algorithm and Bridging Protocol
- IEEE.802.3x — Flow Control
- IEEE 802.1D (2004) — Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP)
- IEEE.802.1Q (2005) — Multiple Spanning Tree Protocol (MSTP)
- IEEE 802.1ah/D3-5 — Modification to MSTP Port Timers State Machine and Addition of Port Receive Pseudo-Information State Machine
- RFC 4188 — Definitions of Managed Objects for Bridges
- RFC 4318 — Definitions of Managed Objects for Bridges with Rapid Spanning Tree Protocol
- draft-ietf-malhotra-mstpmib-01 — MIB for Multiple Spanning Tree Protocol

## Requirements

- ZebOS Network Services Manager
- ZebOS Layer 2 VLAN

## Standard Deliverables

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