ZXR10 Switch Spanning Tree Protocol (STP) Interworking with Cisco Catalyst - Official Technical Overview & Hardware Datasheet

PRODUCT IDENTIFICATION

This document serves as the definitive technical reference for the ZTE ZXR10 Series Switch Spanning Tree Protocol (STP) implementation and its interworking capabilities with Cisco Catalyst switches. The ZXR10 family represents a class of high-performance, carrier-grade Ethernet switches engineered for seamless integration into multi-vendor environments, ensuring robust loop-free Layer 2 network topologies.

The ZXR10 platform embeds an advanced STP state machine that is fully compliant with IEEE 802.1D, 802.1w (Rapid Spanning Tree Protocol), and 802.1s (Multiple Spanning Tree Protocol). Its interoperability with Cisco Catalyst switches is validated through rigorous interoperability testing, guaranteeing deterministic failover times and consistent spanning-tree domain behavior across heterogeneous networks. This document outlines the hardware platform specifications, protocol operation modes, and key parameters essential for network architects and operations teams.



CORE INTERNAL TOPOLOGY

The internal architecture of the ZXR10 is built around a high-speed, non-blocking switching fabric that interconnects all physical interfaces with a centralized CPU complex. The core topology is designed to separate management plane functions from data plane forwarding, ensuring that STP processing overhead does not impact line-rate forwarding performance.

The system incorporates a dedicated hardware timer unit for precise topology change detection and BPDU (Bridge Protocol Data Unit) handling. This hardware-assisted approach ensures that convergence times for RSTP and MSTP are consistently met, even under heavy network loads. The platform's backplane architecture supports a flexible number of line cards or fixed port configurations, all of which participate uniformly in the STP domain.

SWITCHING SUBSYSTEM CAPABILITIES

The ZXR10's switching subsystem is designed to provide wire-speed Layer 2 switching with full STP support. Key capabilities include:

- **Protocol Compliance**: Full support for IEEE 802.1D STP, 802.1w RSTP, and 802.1s MSTP with up to 64 MST instances.
- **Interworking Modes**: Configurable features to emulate Cisco's PortFast, UplinkFast, and BackboneFast, allowing for optimized interworking with Cisco Catalyst switches.
- **BPDU Filtering and Guard**: Advanced features to prevent misconfigurations, including BPDU Guard, Root Guard, and Loop Guard, which mirror Cisco's proprietary extensions to ensure operational consistency.
- **Scalability**: Supports up to 4,096 VLANs per MST instance, enabling fine-grained traffic segmentation in large campus or data center environments.

The platform also features rapid convergence technologies, with sub-second failover times typical for RSTP and MSTP. The hardware timer precision ensures that timer-based mechanisms (e.g., Max Age, Forward Delay) are strictly adhered to, maintaining stability in complex topologies.

OPERATIONAL ADVANTAGES

Deploying ZTE ZXR10 switches alongside Cisco Catalyst equipment presents several distinct operational advantages for enterprise network operators:

- **Seamless Interoperability**: ZTE's STP implementation has been validated against multiple generations of Cisco Catalyst hardware, ensuring consistent BPDU handling, bridge priority calculation, and port roles assignment.
- **Unified Management**: The ZXR10 can be managed via a unified CLI or SNMP interface, allowing for integration with existing network management systems (NMS) used in Cisco-centric environments.
- **Vendor-Agnostic Best Practices**: The platform supports both per-VLAN and per-instance spanning-tree configurations, providing flexibility to adopt the same design principles used in Cisco environments.
- **Reduced TCO**: By enabling a mix of cost-effective ZXR10 switches in non-critical aggregation layers, enterprises can reduce capital expenditure while maintaining operational excellence.

SPECIFICATION MATRIX

The following specification matrix details the key hardware and software parameters of the ZXR10 series that are directly relevant to STP operations and

general switch performance.

Parameter	Specification
Form Factor	1RU / 2RU Fixed or Modular Chassis (based on model)
Switching Capacity	Up to 1.28 Tbps (non-blocking, full-duplex)
Forwarding Rate	Up to 960 Mpps (line-rate, 64-byte packets)
Power Supply	Dual Hot-Swappable Redundant AC/DC (100-240V AC / -48V DC)
STP Instances	Up to 64 MST instances (IEEE 802.1s)
Maximum VLANs	4,096 (IEEE 802.1Q)
BPDU Processing	Hardware-assisted with sub-second convergence (RSTP/MSTP)
Port Density	Up to 48 x 1G/10G SFP+/SFP or 32 x 40G/100G QSFP (per unit)
Operating Temperature	0 ° C to 45 ° C (standard operating range)
MTBF	> 300,000 hours (calculated per Telcordia SR-332)

REGULATORY COMPLIANCE

The ZTE ZXR10 series switches are certified to meet a comprehensive range of global telecommunications and safety standards. These certifications underline the platform's suitability for mission-critical enterprise and carrier-grade deployments. The platform complies with:

- **Safety**: IEC/EN 60950-1, UL 60950-1, CSA C22.2 No. 60950-1, and EN 60825-1 (Laser Safety).
- **EMC**: FCC Part 15 (Class A), VCCI (Class A), EN 55022 (Class A), and EN 55024.
- **Environmental**: RoHS 2011/65/EU and WEEE 2012/19/EU, demonstrating a commitment to sustainable manufacturing.
- **Network Protocols**: Rigorous conformance to IEEE 802.3 standards for Ethernet, IEEE 802.1Q for VLAN tagging, and the complete IEEE 802.1D/w/s suite for spanning tree operations.

The interoperability with Cisco Catalyst switches has been internally tested and verified to ensure stable operation in mixed-vendor topologies. ZTE provides detailed integration guides that document tested scenarios and configuration best practices.

