ZTE ZXR10 8900E Core Switch Backplane Switching Fabric Performance Reference - Official Technical Overview & Hardware Datasheet

PRODUCT IDENTIFICATION

The ZTE ZXR10 8900E Series represents the zenith of carrier-grade core switching, engineered specifically for the rigorous demands of next-generation metropolitan area networks (MANs), large-scale campus backbones, and high-density enterprise datacenter cores. This document serves as the definitive performance reference for the system's backplane and switching fabric, detailing the architectural innovations that enable its industry-leading throughput, ultra-low latency, and carrier-class reliability.

As the foundational platform for ZTE's Elite Data-Carrier Switching portfolio, the 8900E is designed to support the exponential growth of IP traffic driven by 5G backhaul, cloud computing, and high-definition video services. Its advanced Clos-based switching architecture, combined with a sophisticated backplane design, ensures a future-proof investment that scales seamlessly from 40G to 400G and beyond.



CORE INTERNAL TOPOLOGY

The ZXR10 8900E's internal architecture is a masterclass in high-speed digital design. At its heart lies a passive, high-performance optical backplane that interconnects all line cards, fabric cards, and management modules. The backplane utilizes a multi-stage Clos switching fabric, employing a distributed, shared-memory architecture that eliminates any single point of congestion. Data is forwarded via a system of high-bandwidth serial links operating at 25 Gbps and 50 Gbps per lane, aggregated to support a total system switching capacity of up to 25.6 Tbps and beyond, depending on the specific fabric card configuration.

The fabric is composed of multiple, independent switching fabric cards (SFCs) that operate in an N+1 or N+N redundancy model. Each SFC houses a custom,

fifth-generation forwarding ASIC that performs packet parsing, classification, and forwarding decisions entirely in hardware. This distributed approach ensures that line-rate, non-blocking performance is sustained across all ports under any traffic pattern. Furthermore, the backplane incorporates advanced signal integrity and clock synchronization mechanisms, including IEEE 1588v2 (Precision Time Protocol) for telecom-grade timing distribution, making it ideal for mobile backhaul and synchronization-sensitive applications.

SWITCHING SUBSYSTEM CAPABILITIES

- Non-Blocking Performance: The 8900E guarantees 100% non-blocking switching performance, ensuring that every port can transmit and receive data simultaneously at wire speed. This is crucial for ensuring deterministic performance in congested core environments.

- Intelligent Load Balancing: The fabric's centralized scheduler utilizes proprietary flow-based load-balancing algorithms. These algorithms analyze packet headers in real-time and distribute traffic evenly across all active fabric links, maximizing throughput and minimizing latency for delay-sensitive traffic like VoIP and video conferencing.

- High-Density Port Buffering: The system is equipped with a massive,

distributed packet buffer pool of up to 128 MB per line card, designed to absorb traffic bursts and prevent packet loss during micro-bursts. The buffering architecture employs a dynamic queue management system that supports Weighted Random Early Detection (WRED) and tail drop policies, providing fine-grained Quality of Service (QoS) control.

- Robust Redundancy: The architecture supports 1+1 and N+1 redundancy for all active components, including fabric cards, management modules, and power supplies. The system's stateful failover mechanisms ensure sub-50ms convergence in case of a component failure, delivering the five-nines (99.999%) reliability demanded by carrier networks.

OPERATIONAL ADVANTAGES

The switching fabric of the ZXR10 8900E provides tangible operational benefits to network operators:

- Seamless Scalability: Network architects can start with a minimum configuration and scale capacity linearly by adding additional fabric cards and line cards, aligning capital expenditure with traffic growth.

- Energy Efficiency: The architecture is optimized for power efficiency, utilizing low-power silicon and advanced thermal management to deliver industry-leading performance per watt, reducing operational expenditures

(OPEX).

- Simplified Network Design: The non-blocking nature of the fabric simplifies the planning and provisioning of bandwidth, allowing for a flatter, more efficient network topologies.

SPECIFICATION MATRIX

The following table provides a detailed breakdown of the key performance parameters for the ZTE ZXR10 8900E core switch backplane and switching fabric.

Parameter	**Specification**
System Architecture	Modular, Clos-based multi-stage switching fabric
Backplane Type	High-speed passive optical backplane
Total Switching Capacity	Up to 25.6 Tbps (full configuration)
Forwarding Rate	Up to 5,760 Mpps
Fabric Redundancy	1+1 (Active/Standby) and N+1 (Load-sharing) support
Line-Rate Ports Support	100GE/40GE/25GE/10GE/1GE
Packet Buffer	Distributed, up to 128 MB per line card
Latency	< 2 microseconds (64-byte frames,

	cut-through mode)
High Availability	Sub-50ms link/device failover convergence
Power Supply	Dual Hot-Swappable Redundant AC/DC (200-240V AC or -48V DC)
Cooling	Smart fan tray, variable-speed, hot-swappable
Environmental Standards	Temperature: 0°C to 45°C, Humidity: 5% to 95% RH
Mean Time Between Failures	> 300,000 hours
Software	ZTE ZXROS (Carrier-grade network OS)
Standards Compliance	IEEE 802.3, 802.1Q, 802.1ad, 802.3ae, 802.3ba, MEF 9/14, ITU-T G.8032

REGULATORY COMPLIANCE

The ZTE ZXR10 8900E meets or exceeds all major international standards for telecommunications equipment, ensuring global interoperability and deployment. Key certifications include:

- Safety: UL 60950-1, CAN/CSA C22.2 No. 60950-1, IEC 60950-1, EN 60950-1.

- EMC: FCC Part 15 (Class A), EN 55032 (Class A), EN 55024, VCCI-CISPR 32

(Class A), CNS 13438.

- Environmental: RoHS, WEEE, REACH. The platform is also designed for operation in a wide range of environmental conditions, supporting temperatures from 0 ° C to 45 ° C and humidity from 5% to 90% (non-condensing).

