Enterprise Core Systems Engineering Reference Manual: QoS Configuration Ethernet Switch

PRODUCT IDENTIFICATION

This document serves as the definitive engineering reference manual for the EliteCore XGS-9200 Series of QoS-configurable Ethernet switching platforms. Designed as the foundational element for next-generation enterprise core, campus aggregation, and high-performance data center networks, the XGS-9200 series integrates advanced hardware-accelerated Quality of Service (QoS) capabilities with a non-blocking switching architecture to deliver deterministic performance, sub-millisecond latency, and carrier-grade reliability for mission-critical applications.



CORE INTERNAL TOPOLOGY

The internal architecture of the EliteCore XGS-9200 is engineered around a fully distributed, shared-memory switching fabric. At the heart of the system is the proprietary HyperFlow 5.0 ASIC, which integrates a high-performance packet processor, a deep shared packet buffer, and a sophisticated hierarchical QoS scheduler. The switching fabric operates as a crossbar matrix, providing line-rate, non-blocking connectivity between all physical ports.

Key architectural components include:

- **HyperFlow 5.0 ASIC:** A 1.6 Tbps packet processing engine capable of supporting up to 256K forwarding entries and 64K queue instances per system.
- **Deep Buffer Architecture:** A 32 MB dynamically allocated shared buffer that provides 2-second burst absorption at 40 Gbps, ensuring lossless behavior for critical traffic classes.
- **PowerPC Management Module:** A dedicated control plane processor that handles Layer 2/3 protocol states, management interfaces, and QoS policy orchestration independent of the data plane.
- **Internal Control & Monitoring Bus:** Provides real-time telemetry on power consumption, thermal status, and port health without compromising forwarding performance.

SWITCHING SUBSYSTEM CAPABILITIES

The EliteCore XGS-9200 provides a rich suite of switching and routing capabilities, all of which are tightly integrated with its QoS engine to enforce policies at wire speed. Layer 2 features include extensive VLAN support (Port-based, IEEE 802.1Q, and Q-in-Q), Spanning Tree Protocol (STP, RSTP, MSTP), and Link Aggregation (IEEE 802.3ad). For Layer 3, the platform supports static routing, RIP, OSPFv2/v3, and BGP-4, enabling it to function effectively as a high-performance core or aggregation switch.

All forwarding decisions are made in hardware, and the QoS engine is invoked in parallel with the forwarding lookup. This ensures that classification, policing, marking, and queueing actions are applied on a per-packet basis without introducing performance degradation.

OPERATIONAL ADVANTAGES

- **Deterministic Application Performance:** The advanced QoS capabilities allow granular control over network traffic, ensuring that voice, video, and critical business applications receive the necessary bandwidth and low latency, even under heavy load.
- **Simplified Management:** A comprehensive suite of management interfaces, including CLI, SNMPv3, and an intuitive Web UI, simplifies

configuration, monitoring, and troubleshooting.

- **Investment Protection:** The modular design and scalable feature set, including support for IPv6 and MPLS, ensure that the platform can evolve with future network requirements.

- **Rack Efficiency:** The 1RU form factor offers an exceptional port density (48x SFP+ and 6x QSFP28) per rack unit, optimizing data center real estate and reducing power and cooling costs.

- **Zero-Touch Provisioning:** Support for ZTP automates the initial configuration and firmware upgrade process, significantly accelerating large-scale deployments.

SPECIFICATION MATRIX

PORT CONFIGURATION

- Interface Options: 48x 1/10G SFP+ ports (front-panel), 6x 40/100G QSFP28 uplink ports (front-panel).
- Console Port: 1x RJ45 serial console port.
- Management Port: 1x 10/100/1000BASE-T Ethernet management port.
- USB Port: 1x USB 2.0 port for configuration file transfer and firmware upgrades.

SWITCHING & PERFORMANCE

- Switching Capacity: Up to 2.56 Tbps.

- Forwarding Rate: Up to 1,900 Mpps.

- Buffer Memory: 32 MB shared packet buffer.

- MAC Address Table: 128K entries.

- IPv4/IPv6 Routes: 256K / 128K entries.

- Jumbo Frame Support: Up to 12KB.

SOFTWARE FEATURES

- Layer 2: IEEE 802.1D, 802.1w, 802.1s, 802.1Q, 802.1ad (Q-in-Q), 802.3ad (LACP), 802.1AB (LLDP), IGMP Snooping.

- Layer 3: Static Routes, RIP v1/v2, RIPv2, OSPFv2/v3, BGP-4, PIM-SM/DM, VRRP, ECMP.

- QoS & CoS: 8 hardware queues per port, Strict Priority (SP), Weighted Round Robin (WRR), SP+WRR, Traffic Shaping, Policing (single and dual-rate), Congestion Avoidance (RED/WRED), Remarking (DSCP, 802.1p, CoS), ACL-based Classification.

- Security: AAA, TACACS+, RADIUS, MAC Authentication Bypass, 802.1X, Port Security, Access Control Lists (ACLs) on L2-L4, DHCP Snooping, IP Source Guard, Dynamic ARP Inspection.

- Manageability: CLI (Telnet/SSH), SNMP v1/v2c/v3, RMON, Web UI, Syslog, sFlow, NTP.

Parameter	Specification
Form Factor	1RU Standard Rackmount (19-inch)
Switching Capacity	Up to 2.56 Tbps
Forwarding Rate	Up to 1,900 Mpps
Packet Buffer	32 MB Shared Buffer
Power Supply	Dual Hot-Swappable Redundant AC (100-240V, 50/60Hz) or -48V DC
Max Power Consumption	350W (Full Load)
MTBF	> 280,000 Hours at 25°C
Weight	7.5 kg (16.5 lbs)
Dimensions (WxDxH)	440 mm x 510 mm x 44 mm



REGULATORY COMPLIANCE

The EliteCore XGS-9200 series is manufactured in accordance with international safety and environmental standards. The platform is designed to operate within a temperature range of 0°C to 45°C and a relative humidity of 5% to 95% (non-condensing). It is compliant with the following standards:

- **EMC:** FCC Part 15 Class A, VCCI Class A, EN 55032 Class A, EN 55024.
- **Safety:** UL/CSA 60950-1, EN 60950-1, IEC 60950-1.
- **Environmental:** RoHS Directive 2011/65/EU, WEEE Directive 2012/19/EU.
- **Telco/NEBS:** Designed to meet GR-63-CORE and GR-1089-CORE standards.
- **ETSI:** ETSI EN 300 386 V1.6.1.