Optical Access Architecture Reference Document: Huawei vs ZTE OLT Capability Comparison Report

OPTICAL ACCESS ARCHITECTURE REFERENCE DOCUMENT: HUAWEI VS ZTE OLT CAPABILITY COMPARISON REPORT

EXECUTIVE SUMMARY

This document provides a comprehensive architectural and performance comparison of the Huawei SmartAX MA5800 series and the ZTE ZXA10 TITAN series Optical Line Terminal (OLT) platforms. As the cornerstone of modern Fiber-to-the-x (FTTx) networks, the OLT serves as the central aggregation point for thousands of subscriber connections, directly impacting network performance, scalability, and total cost of ownership . This report analyzes the fundamental architectural differences between the distributed forwarding paradigm of the Huawei MA5800 and the high-density centralized approach of the ZTE C600/C650 series, delivering a data-driven evaluation for network architects and procurement specialists. The analysis encompasses system switching capacity, per-slot bandwidth, PON port density, redundancy mechanisms, and environmental tolerances to establish a clear framework for strategic infrastructure investment.

PLATFORM ARCHITECTURE AND CHASSIS DESIGN

The architectural philosophy underpinning an OLT platform determines its scalability, fault tolerance, and traffic forwarding efficiency.

HUAWEI SMARTAX MA5800 SERIES: DISTRIBUTED FORWARDING PARADIGM

The Huawei SmartAX MA5800 series is recognized as the industry's first smart OLT designed with a native distributed architecture . Unlike centralized designs where all traffic must traverse the main control board, the MA5800 performs packet forwarding and processing directly on the service boards. This architecture reduces latency, eliminates a single point of congestion, and ensures deterministic performance as subscriber density increases. The platform supports a non-blocking architecture, with each service slot capable of

handling up to 200 Gbps of throughput on higher-end models, allowing it to seamlessly support GPON, 10G PON (XG(S)-PON), and future 50G PON technologies within a single chassis . The MA5800-X17 and MA5800-X15 models offer massive port density and backplane/system throughput capacity, supporting concurrent access for GPON, 10G PON, and 50G PON ONTs on the same platform, providing superior investment protection and a clear migration path to next-generation speeds . This design aligns with IEEE 802.3 and ITU-T G.987/G.9807 standards, ensuring robust interoperability.

The MA5800 series includes various chassis options to address different deployment scales: the MA5800-X17 (10U, 21-inch), MA5800-X15 (10U, 19-inch), MA5800-X7 (6U, 19-inch), and MA5800-X2 (2U, 19-inch) . The MA5800-X17 supports control board slots 9 and 10, service board or upstream interface board slots 1–8 and 11–19, and universal interface board slot 0, with power board slots 20 and 21 . The maximum payload switching capacity of the control board in load sharing mode can reach up to 8.0 Tbit/s with the MPLH control board, while the MPLA, MPLB, and MPLG boards offer 3.6 Tbit/s, 7.0 Tbit/s, and 7.3 Tbit/s respectively . The maximum payload bandwidth per service slot varies from 100 Gbit/s (MPLA) to 200 Gbit/s (MPLB/MPLG/MPLH) .

ZTE ZXA10 TITAN SERIES: CENTRALIZED HIGH-DENSITY INTEGRATION

The ZTE ZXA10 C600/C650 series, part of the TITAN platform, focuses on high-density integration and cost-efficiency for space-constrained deployments . The control, switching, and power interfaces are integrated into the main control board, which streamlines the chassis design but places the forwarding burden on the central processing unit. The ZXA10 C650 is a medium-capacity optical access OLT device that provides users with full-service access, widely used in public households, commercial buildings, enterprise private lines, video, mobile backhaul, and hotspot coverage scenarios . It features a compact 6U (263.9 mm x 482.6 mm x 288.5 mm) chassis that weighs less than 30 kg and offers 7 service board slots, with each slot providing a bandwidth of 200 G . The ZXA10 C69E-15 is a large-capacity OLT device with distributed, ultra-broadband, converged, and virtualized features, supporting the smooth evolution of access networks from 10G to 50G PON . It occupies an 11U (19-inch) chassis (486.1 mm x 482.6 mm x 288.5 mm) and weighs less than 58 kg, with 15 service board slots . The device supports various uplink boards, including 8/16*10GE/GE and 2*100GE, and PON boards such as 16*GPON, 16*10G-EPON, 16*XG-PON&GPON Combo, and 16*XGS-PON&GPON Combo .

HIGH-AVAILABILITY AND REDUNDANCY FEATURES

Carrier-grade reliability is non-negotiable in telecom infrastructure. Both Huawei and ZTE have engineered robust redundancy mechanisms to ensure

service continuity.

Huawei MA5800 series supports dual control boards with 1+1 redundancy, dual AC/DC power supplies, and Type B/C quick switchover for PON protection . The MA5801 series, a compact box-shaped OLT, also supports dual AC/DC power supplies and Type B/C quick switchover, ensuring high reliability in space-constrained deployments . The system reliability specifications for the MA5800 series indicate system availability greater than 99.999% for typical configurations, with a mean time between failures (MTBF) of approximately 45 years . The MA5801 models also demonstrate high reliability, with system availability exceeding 99.999% and MTBF figures ranging from 45 to 62 years depending on the specific model .

ZTE ZXA10 C650 and C69E-15 OLT platforms similarly support redundant power supplies, main control and switching boards, uplink ports, and fans, with support for multiple uplink protection schemes and Type B/C networking protection . The ZTE C69E-15 supports 1+1 power board and main control switch board redundancy, ensuring high availability for large-scale carrier deployments . Both manufacturers support In-Service Software Upgrade (ISSU) capabilities to minimize service disruption during maintenance windows.

Parameter	**Huawei SmartAX**	**ZTE ZXA10 C650**	**ZTE ZXA10**

	MA5800-X7		**C69E-15**
Architecture Philosophy	Distributed Forwarding	Centralized (Integrated Control/Switch)	Distributed / Centralized Hybrid
Chassis Height (RU)	6U (263.9 mm)	6U (263.9 mm)	11U (486.1 mm)
Service Slots	7	7	15
Per-Slot Bandwidth	200 Gbit/s	200 Gbit/s	N/A
System Switching Capacity	Up to 8.0 Tbit/s (MPLH)	Not explicitly specified	Up to 240 PON ports
Max PON Ports (GPON)	112	112	240
PON Technology Support	GPON, XG-PON, XGS-PON, 50G PON	GPON, 10G-EPON, XG Combo, XGS Combo	GPON, 10G-EPON, XG Combo, XGS Combo
Operating Temperature	-40°C to +65°C	-40°C to +65°C	-40°C to +65°C
Power Supply	DC: -38.4V to -72V, AC: 100-240V	DC: -48V ± 20%; -60V ± 20%	DC: -48V ± 20%; -60V ± 20%

TECHNICAL SPECIFICATIONS COMPARISON MATRIX

The following table provides a side-by-side comparison of key technical specifications that directly impact network throughput, subscriber capacity, and reliability.

PARAMETER | HUAWEI SMARTAX MA5800-X7 | ZTE ZXA10 C650 | ZTE ZXA10 C69E-15

--- | --- | --- | ---

ARCHITECTURE PHILOSOPHY | Distributed Forwarding (Non-blocking per slot) | Centralized (Integrated Control/Switch) | Distributed / Centralized Hybrid

CHASSIS HEIGHT (RU) | 6U (263.9 mm) | 6U (263.9 mm) | 11U (486.1 mm)

SERVICE SLOTS | 7 | 7 | 15

BACKPLANE / PER-SLOT CAPACITY | 200 Gbit/s | 200 Gbit/s | 240 GPON/10G-EPON/XG Combo/XGS Combo ports max

SYSTEM SWITCHING CAPACITY | Up to 8.0 Tbit/s (MPLH) | Not explicitly specified | Up to 240 PON ports

MAXIMUM PON PORTS (GPON) | 112 GPON ports | 112 GPON/10G-EPON/XG Combo/XGS Combo ports | 240 GPON/10G-EPON/XG Combo/XGS Combo ports

CONTROL/REDUNDANCY | Dual Control Boards (1+1 Redundancy) | Power, main control, uplink ports, fans, Type B/C | Power, main control, uplink ports, fans, Type B/C

POWER SUPPLY OPTIONS | DC: -38.4V to -72V, AC: 100-240V, 1+1 Redundancy | DC: -48V ± 20%; -60V ± 20% | DC: -48V ± 20%; -60V ± 20%

PON TECHNOLOGY SUPPORT | GPON, XG-PON, XGS-PON, 50G PON (Combo) | GPON, 10G-EPON, XG Combo, XGS Combo | GPON, 10G-EPON, XG Combo, XGS Combo

OPERATING TEMPERATURE | -40°C to +65°C (min start -25°C) | -40°C to +65°C (min start -25°C) | -40°C to +65°C (min start -25°C)

SYSTEM RELIABILITY (MTBF) | ~45 years (reference) | Not explicitly specified | Not explicitly specified

FLEX-PON AND MULTI-GENERATION TECHNOLOGY SUPPORT

A critical differentiator in modern OLT platforms is the ability to support multiple PON generations on a single chassis, enabling operators to migrate services without forklift upgrades.

The Huawei MA5800 series features the Any Port Any Service Flex-PON solution, allowing smooth upgrade and evolution from GPON to XG(S)-PON . The platform supports GPON, XG-PON, XGS-PON, and 50G PON technologies, with

Combo ports that enable mixed deployment of different PON standards on the same physical interface . The MA5800 series supports symmetric 50G-PON & XGS-PON Combo ports and symmetric 50G-PON & XGS-PON & GPON Combo ports, offering a clear path to next-generation speeds . This capability is particularly valuable for operators with diverse subscriber bases and phased upgrade strategies. The MA5801-FL16 model, for instance, provides 16 Flex-PON ports that can work with different optical modules to implement hybrid access of GPON, XGS-PON, and GPON Combo .

The ZTE ZXA10 C620 is a small-capacity OLT of the TITAN series that supports distributed, ultra-broadband, and fixed-mobile convergence characteristics, meeting the development needs of big video, fixed-mobile convergence, and network reconstruction . The platform supports various PON technologies, including GPON, XG-PON, XGS-PON, XG-PON & GPON Combo, XGS-PON & GPON Combo, and Any-PON, alongside P2P interfaces such as GE/FE and 10GE . The C69E-15 supports 16*XG-PON&GPON Combo and 16*XGS-PON&GPON Combo boards, enabling multi-generation PON coexistence . This support for Combo PON technology allows ZTE platforms to bridge legacy GPON deployments with next-generation XGS-PON without requiring immediate ONT replacements.

ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS

Telecom equipment must operate reliably across a wide range of environmental conditions, particularly for outdoor and remote deployments.

Huawei MA5800 series OLTs operate in ambient temperatures ranging from -40°C to +65°C, with a minimum startup temperature of -25°C . The devices support ambient humidity from 5% to 95% RH and atmospheric pressures from 70 to 106 kPa, with altitude support below 4000 m (note that air density variations at altitude affect heat dissipation, so the working environment temperature varies accordingly) .

The compact MA5801 series OLT weighs less than 5 kg and occupies 1U of installation space, making it ideal for space-constrained deployments . The outdoor-rated EA5801S-FL16 features an IP65 protection rating, ensuring resilience against dust and water ingress for pole, tower, or wall mounting .

ZTE OLTs similarly operate across extreme temperature ranges. The ZXA10 C620 operates from -40°C to +65°C with a minimum startup temperature of -25°C and humidity tolerance from 5% to 95% . The ZXA10 C650 and C69E-15 share these environmental specifications, supporting operation in both indoor and outdoor cabinets . The C620 features dimensions of 88.1 mm x 482.6 mm x 283.5 mm (H x W x D), with an empty chassis weight of 3.93 kg and a full

configuration weight of less than 13 kg .

SCALING STRATEGY AND DEPLOYMENT SCENARIOS

The choice between Huawei and ZTE platforms often depends on the specific scale, growth trajectory, and budgetary constraints of the network operator.

Huawei MA5800 series is the preferred choice for large-scale ISPs and high-density urban deployments requiring future-proofing . Its distributed architecture and modular line cards allow operators to scale capacity linearly by adding service boards without replacing the chassis. The ability to support concurrent access for GPON, 10G PON, and 50G PON ONTs on the same platform provides superior investment protection and a clear migration path to next-generation speeds . The MA5800 series supports up to 34,816 access ONTs (MA5800-X17) and 262,143 MAC addresses, with IPv4 routing tables supporting up to 65,536 entries and IPv6 routing tables up to 16,384 entries .

The ZTE ZXA10 C620 and C650 series OLTs are well-suited for greenfield deployments, small to medium enterprises, and MDU applications where space is at a premium and initial capital expenditure is a primary constraint . Their compact chassis maximizes rack unit density, making them ideal for street cabinets and remote central offices . The platform supports flexible networking

modes, including P2P, cascading, and ring networking, and provides robust H-QoS control for refined traffic management . For budget-conscious operators rolling out services in rural or low-density areas, the ZTE platform offers a compelling ROI with a significantly lower entry cost .

COMPLIANCE AND STANDARDS

Both Huawei and ZTE OLT platforms are designed to meet rigorous international standards for telecommunications equipment.

Huawei MA5800 series complies with IEEE 802.3 and ITU-T G.987/G.9807 standards, ensuring robust interoperability . The platform holds CoC V8 Certification for energy efficiency, featuring six-level dynamic energy saving capabilities including smart meters, energy consumption visualization,

manageability, and optimization . The equipment also meets the requirements for NEBS (Network Equipment Building System) and ETSI standards, with carrier-grade reliability specifications.

ZTE ZXA10 C650 and C69E-15 OLTs are designed for carrier-grade deployments, supporting multiple uplink protection schemes, Type B/C networking protection, and comprehensive QoS and security features . The platforms provide BITS clock output/1PPS+ToD time interfaces for precise synchronization, critical for mobile backhaul and latency-sensitive applications .

Both manufacturers support comprehensive network management systems: Huawei U2000 and CLI for MA5800 series, and ZTE ZTE NMS for TITAN platform devices . This enables efficient FCAPS (Fault, Configuration, Accounting, Performance, Security) management across the access network infrastructure.

CONCLUSION: A STRATEGIC ARCHITECTURAL DECISION

In the context of the Huawei MA5800 versus the ZTE TITAN series OLT, there is no universal "best" platform; the optimal choice is dictated by your network's specific lifecycle stage and performance requirements. The Huawei MA5800 is a premium, carrier-grade platform engineered for the future. Its distributed architecture, superior per-slot bandwidth (scalable to 200 Gbps per slot), and

seamless support for multi-generational PON technologies (GPON, XGS-PON, and 50G PON) make it the gold standard for Tier-1 operators and networks demanding ultra-high scalability and deterministic low-latency performance . Conversely, the ZTE ZXA10 C650 and C620 are highly optimized, cost-effective solutions for immediate needs, offering exceptional value in compact, space-constrained environments with robust support for GPON and 10G PON technologies . By mapping your network's scale, budget, and long-term vision to the technical merits outlined in this document, you can make a data-driven decision that ensures sustained performance and investment protection in the competitive telecom landscape .