



Reimagine Your **EDGE**

WHITEPAPER

Gain Your Competitive **EDGE**

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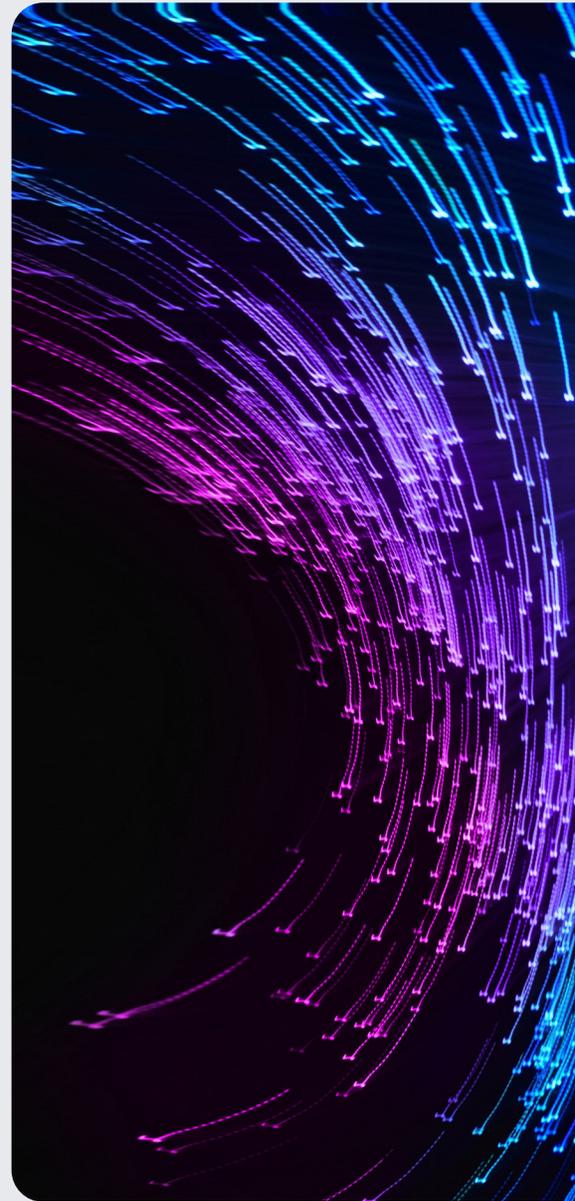
Gain Your Competitive **EDGE**

The future competitiveness of communications service providers (CSPs) will be determined at the network EDGE. By embracing a software-defined, fiber-first strategy that pushes bandwidth and intelligence to the EDGE, CSPs will gain the services agility and network scalability necessary to meet the demands of the future and deliver the ultimate subscriber experience.

Where do you stand in developing and executing your **EDGE** strategy?

- **Multi-Gigabit broadband services are the new standard** – Is your Access EDGE 10G ready today and easily upgradable in-place to low-latency 50G / 100G connectivity in the near future?
- **Customers no longer value broadband as just a “Service” ... they demand an “Experience”** – Do you have a Subscriber and Cloud EDGE in place to provide end-to-end visibility, management, analytics to orchestrate across your multi-vendor ecosystem and rapidly launch new services?
- **Transport demands have skyrocketed at the network EDGE as multi-gig and 5G experience requirements proliferate** – Does your Optical EDGE provide the intelligence and flexibility to strategically and cost-effectively scale?
- **How will you establish your Competitive EDGE in this rapidly emerging world?**

By strategically pushing compute and intelligence to the network EDGE, closer to where data is created and consumed and where the subscriber experience is defined, cutting-edge analytics and AI technologies transform your network performance and the actionable insights necessary for launching new services and revenue opportunities.



We at DZS are 100% dedicated to this vision. Our EDGE innovations are empowering our customers to experience dramatically faster response times and vital operational savings. By leveraging DZS, they are building a competitive EDGE in the market.

In fact, DZS customers, leveraging our world-class software, artificial intelligence expertise and EDGE innovations have seen:

Customer churn
decrease by

20%+

Subscriber quality of
experience improve by

35%+

EDGE DWDM transport
costs reduce by up to

\$200,000+
per location

New features and services
onboarding speed increase
from 8 weeks

to 3 days

Average Revenue
Per User (ARPU)

**more than
double**

The DZS EDGE Portfolio – Empowering the EDGE

EDGE transformation is a strategic and business imperative for CSPs, and DZS systems and software are leading the way. Our portfolio simplifies EDGE transformation, addressing the unique requirements, challenges and opportunities of the Access, Subscriber, Optical and Cloud EDGE, and provides the end-to-end, standard-based solutions that give CSPs a Competitive EDGE.

- **DZS Velocity is the industry's only Access EDGE-ready portfolio** – hardened solutions in a range of flexible form factors that deliver world-leading performance and density with in-place upgrades from 10G to 50G/100G technologies.
- **DZS Helix provides solutions fine-tuned to the needs of the Subscriber EDGE** – Residential & business ONTs, access points, and gateways with world-class WiFi and proven interoperability.
- **DZS Saber redefines the Optical EDGE with the first hardened, compact, and modular DWDM transport platform** – Featuring 100G-400G per lambda and multi-degree CDC FlexGrid ROADMs.
- **DZS Chronos accelerates 4G/5G deployment at the mobile Optical EDGE** – hardened xHaul systems that have become the standard in the industry's most advanced O-RAN deployments.

- **DZS Cloud gives you command of the Cloud EDGE** – provides the analytics, actionable insights, and control at the network EDGE that enable the ultimate subscriber experience and operational efficiency:
 - **DZS Xtreme** allows vendor-agnostic network orchestration and automation, simplifying and accelerating the introduction of new services from on-boarding new equipment and software, to testing, turn-up, administration and management.
 - **DZS Express** and **CloudCheck** offer cloud-native and AI-driven network and service assurance and WiFi experience management solutions, enhanced by the expertise gleaned from 70M+ subscribers globally.
- **DZS Professional Services & Customer Care help you transform faster with more confidence** – transformation acceleration services that give you a competitive EDGE via an array of services, from education/training, SLAs, remote/on-site professional services and managed services to custom services and 7x24x365 technical support.



DZS has already empowered many of the world's leading carriers to find their EDGE and deliver the ultimate subscriber experience, and we are ready to help you find yours. [Let's partner](#) to accelerate your EDGE transformation strategy.

DZS EDGE innovations will help you to gain your competitive EDGE.

Rethinking Communications Network Architecture – The Power of the EDGE

EDGE transformation is a strategic and business imperative that reflects fundamental changes taking place across the communications network:



The Access EDGE is being redefined as unprecedented bandwidth is pushed closer to the subscriber, creating the need for new hardened equipment with extraordinary performance (high capacity, ultra-low latency, user intelligence) and a path from 10G to 50G/100G PON technologies.

Read Heavy Reading’s white paper

[“100G PON is Closer Than You Think: Why You Should Begin Your Upgrade Strategy Now.”](#)



The Subscriber EDGE has become the focal point of the customer experience (WiFi integrity, agility, security), a critical tool in managing subscriber satisfaction and a platform for new subscriber insights and revenues.

Read Heavy Reading’s white paper

[“Broadband Subscriber Demand: A More Immersive Experience”](#)



The Optical EDGE is embracing new ways of thinking about traditional and mobile transport, where skyrocketing capacity requirements and long-distance challenges, driven by XGS-PON and 5G deployments, are being met by breakthroughs in the hardening of coherent optics, integration of advanced timing, modular flexibility and intelligence deployed much closer to the subscriber than ever before.

Read Heavy Reading's white paper

["The New Optical Edge" featuring a case study of Windstream's Optical EDGE strategy](#)



The Cloud EDGE is proving to be essential in providing the insights and analytics to both optimize and assure the subscriber experience and drive operational efficiency and agility across increasingly multi-vendor networks.

Read the DZS white papers

["Improve Quality of Experience and Generate Incremental Revenues" and "Create Transformational Services Quickly"](#)

It is time to rethink how we architect the communications network with the EDGE in mind. DZS has been leading this charge with real and proven solutions deployed in tens of millions of homes around the world.

The DZS EDGE portfolio helps CSPs turn the promise of EDGE transformation into reality. Our solutions are optimized to capitalize on the changes taking place at the Access, Subscriber, Optical and Cloud EDGE, and work as open, best-in-class solutions or in concert as an end-to-end portfolio to give CSPs a Competitive EDGE.



Access EDGE

- Architected for the EDGE – Hardened, High Capacity, Flexible
- Future-Ready – In-Place upgrades to 50G/100G PON
- Highest Performance – Multi-Terabit Capacity, Non-Blocking
- Lowest TCO per Port – Leading Density, Unmatched Longevity
- Simple Integration – Netconf/Yang Support, Standards-Based
- Extensible Software Platform – Virtualization, SDN-Control
- Transformation Optimized – Deploy Centralized/Disaggregated
- World-Class Orchestration/Automation with DZS Xtreme

The DZS Velocity portfolio, environmentally hardened across the entire range of solutions, has form factors ranging from fixed 1RU units through 2-slot, 6-slot, 14-slot and 16-slot chassis systems. It is the industry's broadest access portfolio made to span the needs from the central office or data center all the way to the access EDGE. Complemented by DZS XCELERATE system-on-a-card technology that is common for all systems, DZS Access EDGE empowers service providers to leap to multi-gigabit services at scale by enabling rapid transition from GPON to XGS-PON and gigabit Ethernet to 10 gigabit Ethernet and on to 50G/100G services via any service port across the range of DZS systems, including stackable options. XCELERATE also allows service providers to transition to disaggregated

architectures at their own pace by leveraging the same equipment used to pivot to multi-gigabit services, dramatically enhancing the economics of network evolution. These systems offer non-blocking architectures ready for future technologies and have been optimized for low latency and symmetric hyperfast bandwidth through unparalleled 800 Gbps per slot capacity.

DZS Access EDGE solutions allow service providers to take a no-compromise approach to their network investments by accelerating and simplifying the network-wide deployment of future-proof, next-generation, multi-gigabit services over fiber, so they can deliver the advanced services expected by their customers with maximum flexibility.

With architectural headroom and customization to address low latency, symmetric, and non-blocking services, DZS Access EDGE systems support multiple operational paradigms to optimize simplicity (such as open solutions and multi-vendor access edge network integration and service creation).

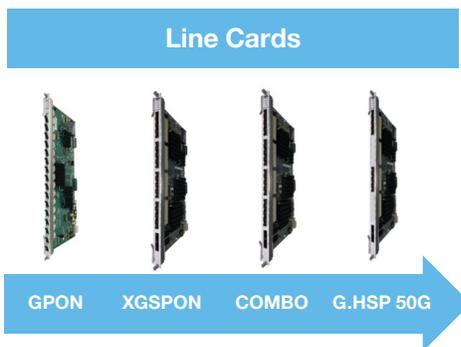
Access EDGE solutions from DZS come with unprecedented flexibility including the ability to support and deliver: Any fiber network topology (PON, GPON, XGS-PON, Point-to-Point); any service (multi-play residential, business, mobile transport); any network location (central office,

buildings, remote terminal cabinets); to any subscriber location (Optical Line Terminals delivering fiber to the home, business, or multi-dwelling units).

The DZS Velocity systems also utilize the same disaggregated Spine / Leaf switching architecture that is widely deployed in high-capacity data centers, while retaining the operational benefits of a chassis-based solution. These benefits include higher port density per rack unit, lower power consumption, faster installation and turn-up, and easier maintenance and serviceability.

DZS Velocity Portfolio

- Designed for current/future service delivery needs
- System-on-a-Card architecture
 - Non-blocking designs up to 50 GPON



	V1-16XC	V2 Chassis	V6 Chassis	V14 / V16 Chassis
Max # OLT ports (or combo ports)	16	32	96	256
Rack Units	1	2	6	14
Max Uplink (NNI) Capacity	200Gbps	400Gbps	900Gbps + 1.2Tbps	500Gbps + 3.2Tbps

The DZS Velocity portfolio of broadband access systems, switches, and routers are unified by our powerful Software Defined Network (SDN) enabled operating system sdNOS, providing carriers with extraordinary flexibility to the latest fiber access technologies and software-centric operational models that are open and aligned with Broadband Forum standards.

Featuring dual 100GE NNI interfaces on its faceplate and dual 100Gbps connections across the backplane to its central fabric cards, the DZS Velocity combo line card supports true non-blocking delivery of concurrent XGS-PON and GPON services to all connected subscribers.

Velocity combo XGS-PON / GPON 1U fixed form factor V1 OLT and 16 port combo blades for deployment in the V2, V6, V14, or V16 chassis are the ideal products to build fiber access networks today that are ready for the applications of tomorrow.

DZS combo cards are built on a system-on-a-card architecture and include the enhanced flexibility to support GPON, XGS-PON or 10 Gig point-to-point Ethernet on the same port.

The newly introduced V6 platform is designed to disrupt the global OLT market delivering the highest capacity (800 Gbps bi-directional per slot / 24K combo subscribers in one system), the highest switching fabric (ready for 25 and 50+ Gbps), the most flexible deployment architecture (CO edge/switch on a card/disaggregated), and feature-rich software defined operating system (sdNOS). The V6 is ideally suited for Tier I, Tier II, Fiber Overbuilders, Utility Coop and WISPs that are focused on serving markets from 20K to 20M+ subscribers.

DZS Velocity V6 Platform



4xQSFP28-DD (200Gpbs each)



Subscriber EDGE

- Architected to Optimize EDGE Performance – Superior WiFi, Intelligence
- AI-Driven Excellence – Self-Optimized WiFi Performance
- Predictive Analytics – Real-Time, Automated, Actionable
- Latest Technologies – WiFi 6e, EasyMesh, Businesses Features
- Lowest OPEX/Churn – Ultimate Experience with CloudCheck
- World-Class Subscriber App – Cybersecurity, parental controls
- Broadest Interop – Wide 3rd Party Compatibility, Smart OMCI

The Subscriber EDGE is the portion of the access network that connects broadband delivered to the home or business directly to the consumer across their broadband-enabled devices. In doing so, it is the interface to the customer and often plays a disproportionately prominent role defining the subscriber experience. DZS Subscriber EDGE solutions extend multi-gigabit broadband connectivity throughout the home and office and to the specific devices connected to the WiFi network.

The DZS Helix portfolio offers an industry-leading range of residential and business optimized access points, ONTs and gateways featuring the latest WiFi technologies, business features, and Smart OMCI technology for rapid 3rd party interoperability

and manageability. Many of these standards based, solutions have the processing power to provide extraordinary insight into the premises and connected devices, especially when managed by DZS Cloud EDGE software.

Our carrier-grade ONTs, WiFi access points and service gateways are designed to meet emerging service provider and end-user requirements for ubiquitous broadband access throughout the home driven by the growth of cloud-connected media content, mobile devices, and IoT. Using innovative hardware designs and industry-leading software services, DZS offers the subscriber the ultimate immersive WiFi experience and the ability to manage their personal networks.

Residential and Business Class ONTs and CPE



The combination of intelligence, simplicity and carrier-grade performance allows DZS customers to deliver a demonstrably superior service to their customers. DZS provides a comprehensive portfolio of ONTs and fiber termination access solutions delivering service providers requirements for highspeed data, voice, and IPTV. The unique DZS software management features allow subscribers to enjoy hyper-connected multi-media services and applications faster, easier, and more reliably.

Some key attributes of the DZS XGS-PON ONT access solutions are:

- Silicon diversity by working with MaxLinear, Airoha and Broadcom (Market leading chip suppliers)
- Fully compliant with OpenOMCI standards
- Common software and extensible feature available on DZS ONTs
- Adoption of AT&T OpenOMCI standard and provisioning models
- Class N1 and N2 up to 1:128 splits on XGS-PON
- Business services with 802.1x RADIUS support, authenticated services
- Advanced bridge storm and bridge loop detection/protection
- Reduced cost for service deployment, easy to use trouble-shooting tools
- Interoperable with Nokia and other 3rd party OLTs in various xPON global deployments



Optical EDGE

- Built for the Transport EDGE – Hardened, Flexible, Scalable
- Extraordinary Capacity – 400G per Wavelength, 1.6T per 1RU
- Proven xHaul – Serving World’s Most Advanced 5G Networks
- Advanced Mobile Transport – TSN, GrandMaster Clock
- Smart Middle Mile – World’s Only 1RU CDC FlexGrid ROADM
- Lowest Installed Cost – Save \$200K per Site, Pay-as-you-Grow
- Standards Aligned – O-RAN and OpenROADM Leadership
- Long Distance – Up to 120km without Amplification

The Optical EDGE consists of the portion of the access network that transports aggregated traffic back to the network core. DZS has invested heavily in transport technologies (including 100/400 Gbps coherent optics and ROADM) and is recognized as the first company in the industry to environmentally harden coherent optics. The DZS Saber and Chronos portfolios were architected to bring unprecedented transport capacity and flexibility to the network edge.

The DZS Saber platforms were the first to bring hardened coherent optical solutions to the optical EDGE, delivering up to 400Gbps with each wavelength in modular 1RU solutions that can be deployed in unimproved remote cabinets

and huts, resulting in savings of up to \$200k per location versus traditional solutions, and stacked for extraordinary capacity. Reaching unamplified distances of up to 120km, Saber also features support for multi-degree Flex Grid ROADM in the industry’s smallest form factor. The hardened DZS Chronos systems feature advanced timing (TNS and Grandmaster Clock) and extraordinary capacity for mobile xHaul, including proven O-RAN support. Read more about “The New Optical Edge” in a paper from Heavy Reading featuring a case study of Windstream’s “Project ICON”. DZS Saber significantly improves deployment flexibility, application optionality and the economics of edge transport.

The highly scalable DZS Saber 4400 delivers multi-terabit bandwidth to the edge of the network in a hardened, compact, modular system.

The purpose-built DZS Saber 9103 is a cost-effective 100 Gbps transport access aggregator. All Saber products are hardened coherent optics solutions that can support multi-wavelength transport and span distances well over 100 kilometers without amplification.

Saber Platforms: Reimagine the Optical Edge

Platform Features

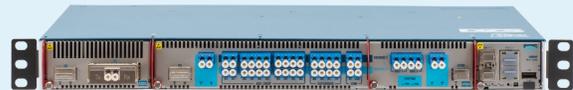
- Hardened & compact
- 100G-400G coherent optics
- Layer 0 – Layer 3
- Interoperable
- Integrated with DZS Expresso
 - Optical Health Analysis, Network Visibility, Process Automation

Advantages

- Upgrades standard cabinets with nx100G transport
- Saves \$50k-\$100k+ per system deployed
 - No leasing in-building space for transport deployment
 - No building unnecessary HUT-style solution
 - No deploying 'air-conditioned' deluxe cabinets
- Add additional entry-points anywhere along the route
- Massively-scalable after the first wavelength
- Easy to add optical path protection



Saber 4400 Modular, Extensible Platform



Saber 9103 Purpose-built Solutions



Chronos Systems: Reimagine the Mobile EDGE

The Mobile EDGE is a portfolio within our Optical EDGE that specializes in innovative 5G and Open RAN (O-RAN) mobile transport solutions. This portfolio is characterized by extremely low latency, the integrated timing necessary to manage service assurance in today's advanced mobile networks, and high performance and capacity.

DZS C1216 systems portfolio are the industry's most widely deployed O-RAN fronthaul gateways, showcased in Rakuten's deployments across Japan as well as with other Rakuten Symphony

clients around the world. These environmentally hardened solutions feature eCPRI and CPRI gateway interfaced and integrated TNS and Grandmaster Clock timing. The DZS M4000 system also features integrated timing and functions as a highly flexible front/mid/backhaul cell site router. E-series E3200 solutions specialize in in-building 5G O-RAN small cell fronthaul. Together, this portfolio provides a wide range of proven systems that are pioneering the mass deployment of 5G and O-RAN deployments globally.

DZS Chronos Systems for O-RAN

Platform Features



Cseries
C1216RO

- IP65 outdoor fronthaul gateway solution for 4G and 5G commercial service
- Main functions:
 - 25GE/100GE based eCPRI switching
 - High precision GM with integrated GNSS RCVR
 - ZTP with Rakuten OSS
 - NETCONF/YANG
- Tens of thousands of units deployed to date
- Key ecosystem component in multiple O-RAN Alliance Plugfests

C1216LO

Outdoor 5G O-RAN Fronthaul & MacSec Support



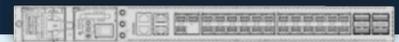
M4000

Hardened 5G O-RAN Anyhaul



C1228RI

Hardened 5G O-RAN Fronthaul & Legacy 5G CPRI Transport



E321XP

In-Building 5G O-RAN Small Cell Fronthaul





Cloud EDGE

- Empowers EDGE Excellence – Orchestration, Automation, Experience
- E2E Services Management – Access, Transport, NFV Domains, Slicing
- Single Pane of Glass – Across All Multi-Vendor Equipment and Apps
- Launch New Services Fast – Reduce On-Boarding from Months to Days
- Unparalleled Experience Management – Connected Device to Core
- Command WiFi Experience – Intercept Issues, Reduce Calls/ Truck Rolls
- Unrivaled Home Control & Visibility – Self-Service, Personalize, Control
- Proven Scale & Extensive Expertise – 70M+ Connected Subs, AI Insights

DZS Cloud is the platform that sits above the Access, Optical, and Subscriber EDGE solutions and enables extraordinary service provider agility, efficiency, intelligence, and experience creation. DZS Cloud offers the industry's most advanced and comprehensive cloud-native and AI-driven solutions for multi-vendor orchestration and automation, network and service assurance, and WiFi experience management. With over 70M subscribers under management, these award-winning solutions bring unprecedented intelligence and learned expertise to the network, allowing service providers to transform into experience providers.

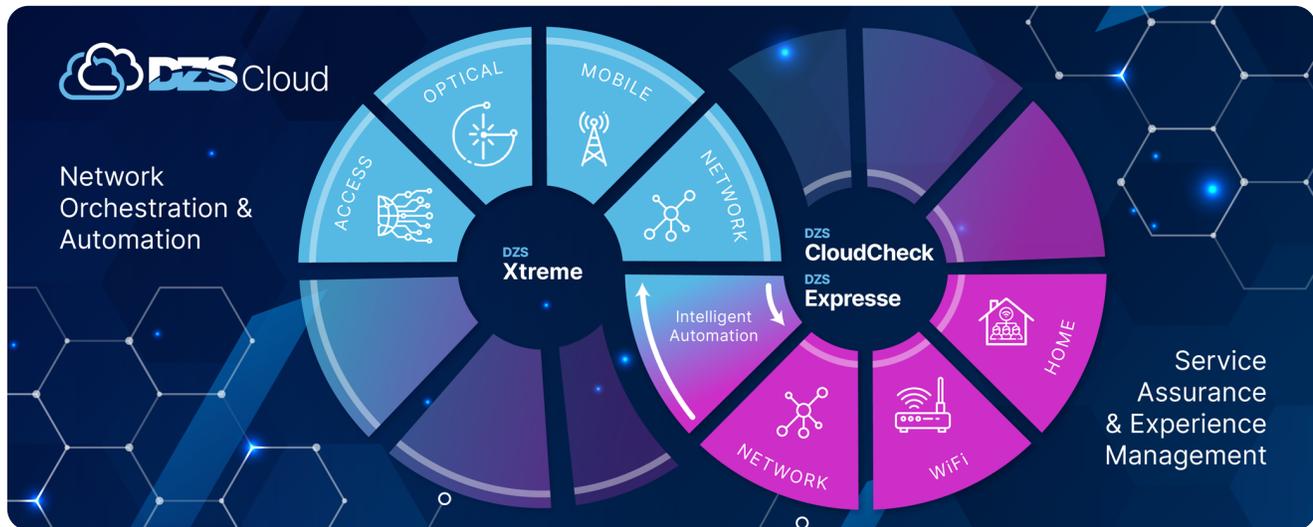
The results are dramatic, including reduced support times, truck rolls, and support costs while providing subscribers with experience control and self-service capabilities and operators with new revenue opportunities through new services and targeted marketing. DevOps support greatly facilitates the onboarding of new services and equipment, whether DZS or 3rd party, from months to days.

Combining globally deployed DZS Express service assurance (DSL and PON) and DZS CloudCheck

WiFi experience management software with our pioneering DZS Xtreme network orchestration and automation software provides a unique value proposition for multi-vendor service provider network environments.

DZS Cloud EDGE software solutions empower service providers to automate, orchestrate and optimize their network performance, and leverage advanced data analytics to improve customer satisfaction, increase revenue and build customer loyalty.

DZS Cloud for Network Orchestration, Automation, Assurance and Experience Management



DZS Xtreme simplifies the creation, deployment and management of end-to-end connectivity services including access, transport and 5G slices across multi-vendor network elements, network functions and cloud infrastructure.

In addition, DZS Xtreme dramatically reduces integration cycles for new equipment types, vendors and applications that are added to the network. With these attributes, DZS Xtreme empowers in-house IT and DevOps teams to design and launch innovative new services at a fraction of the time and cost while also dramatically reducing costs for operationalizing new equipment.

DZS Xtreme enables service providers to create new revenue opportunities with the enhanced ability to quickly bring innovative services to market fast and realize a high Return on Investment (ROI).

DZS CloudCheck and DZS Expresse uniquely transform how service providers manage, optimize, and deliver new services that enhance the subscriber experience. Expresse has pioneered the access-network assurance category for service providers globally for over a decade and currently manages tens of millions of connected homes.

This software solution optimizes the end-to-end, subscriber quality-of-experience with real-time monitoring, diagnosis, and resolution of performance issues in multi-vendor access networks. CloudCheck is the DZS subscriber management software, optimizing WiFi performance and providing subscribers with a menu of capabilities including parental controls, network performance analytics, security protection and new in-home services.

By integrating with the three DZS broadband portfolio pillars of Access EDGE, Optical EDGE, and Subscriber EDGE, Cloud EDGE unlocks the door to transforming today's service provider into tomorrow's experience provider, giving them the competitive edge, they need to thrive in their markets.



Support Services

The operation and maintenance of modern telecommunications networks is a complex task. A variety of network elements of different generations and configurations must be maintained.

It is more critical than ever before for broadband service providers to have 24/7 access to support resources for all network elements.

- **Education & Training**
- **Service Level Agreement (SLA)**
 - Universal Access to DZS Technical Support, Software Fixes, Online Resources, and extended Warranty
- **Remote Professional Services**
 - Configurational changes
 - Network Audits
 - Subscriber Moves / Adds / Changes
 - SW Upgrades
 - 24/7 Help Desk
- **On-Site Professional Services**
 - Dedicated Support Engineer / Resident Engineer
 - Engineer, Furnish, & Install (E,F & I)
- **Managed Services**
 - FiberLAN “GPON in a box” w/ Remote Monitoring
 - Data Collection Engines
 - Network Health Reports
 - NOC as a Service



DZS is dedicated to supporting service providers in maximizing the reliability and uptime of their networks. To ensure reliable and high-quality network operations, DZS offers a variety of standard services, and will develop custom-tailored services for its customers as required:

- Global and Local Technical Assistance Services (7 x 24)
- Professional and Installation Services
- Training Services
- Local Hardware Repair and Return
- On-Site Engineering Services

In addition to our industry-leading products, DZS provides a comprehensive offering of exceptional professional services that include 7x24x365 maintenance and technical support, software updates, technical training, along with network design and consulting services. Our engineering and support staff embody the same values of quality and performance that are reflected in our products and corporate culture.

Find Out More

For more information visit our website

Visit [dzsi.com](https://www.dzsi.com)



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