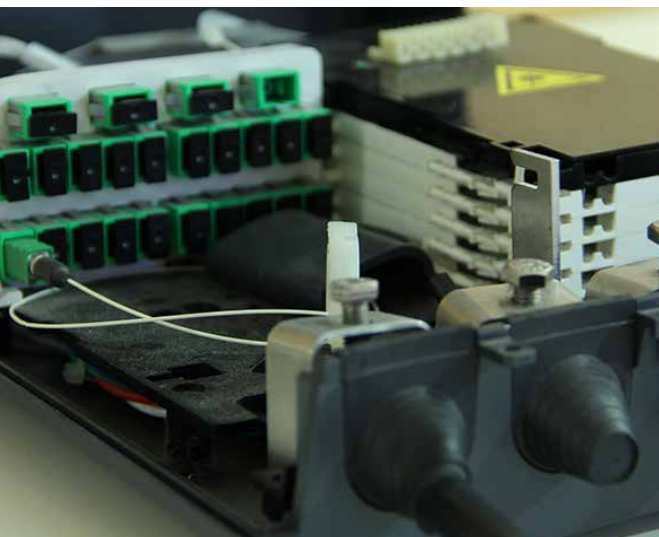


Ultra-Fast Broadband



Altice Labs
Headquarters
and R&D Facilities,
Aveiro - Portugal



Altice Labs

Formally launched as Altice Labs in January 2016, this company holds over 70 years of technical expertise in developing Telecom equipment and solutions with carrier-grade performance, operating under different market brands.

Altice Labs is currently an European reference supplier for the Telecom market, holding and evolving a solid portfolio in the end-to-end access network domain.

Having built a dynamic innovation ecosystem over the past decades, Altice Labs relies on strong cooperation with key stakeholders, including universities and academia, R&D institutions, regulatory and standardization bodies, reference customers, and market vendors.



Customer Footprint



Altice Labs' footprint in the technology market covers the globe, gathering a final customer base of around 250 million end users.



For the Upcoming Future

Services



Information



Infrastructure



Tools

- New services with optimized agents focusing on individuals
- Cross-Industry / Cross-layer integrated communications
- Merge computing, navigation, and perception

Trends

- Smart cities
- Mobility as a Service (MaaS)
- Mixed Reality
- User-centric service integration

- AI-driven decision-making
- New data-driven values and services
- Security

- Big Data
- AI
- Real-Time Signal processing
- Pattern and semantic data analysis

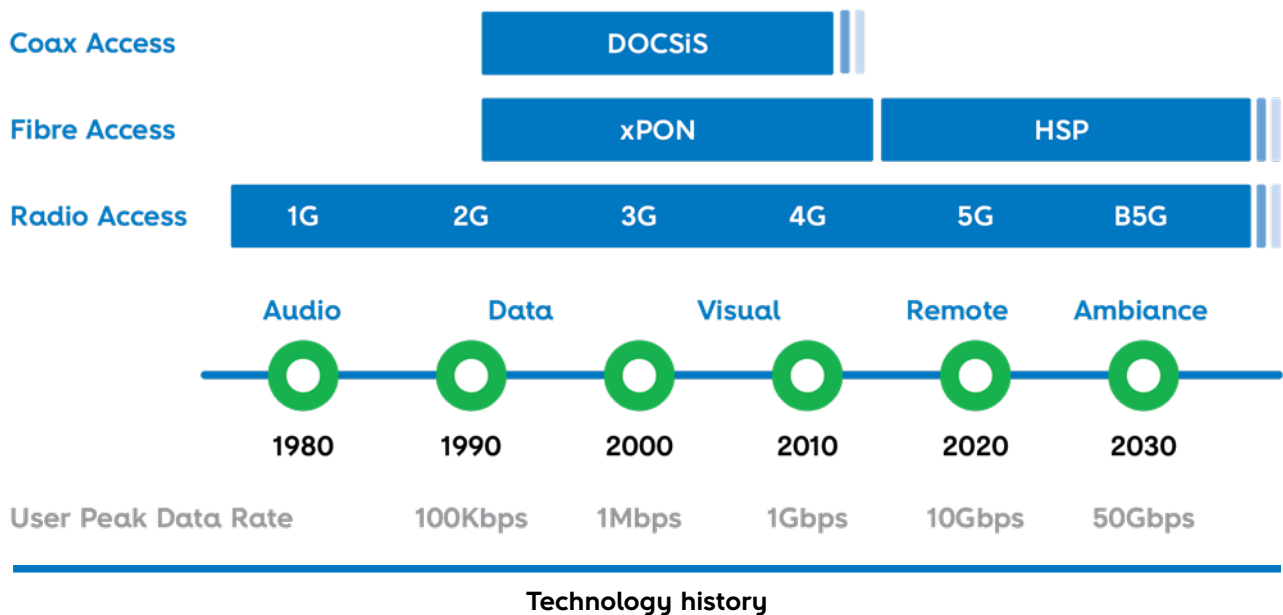
- Everything is connected and generates data
- Open network that aims to create and integrate new ecosystems
- Network as a commodity, seamlessly integrated into the OS environment
- Fiber network as a major component

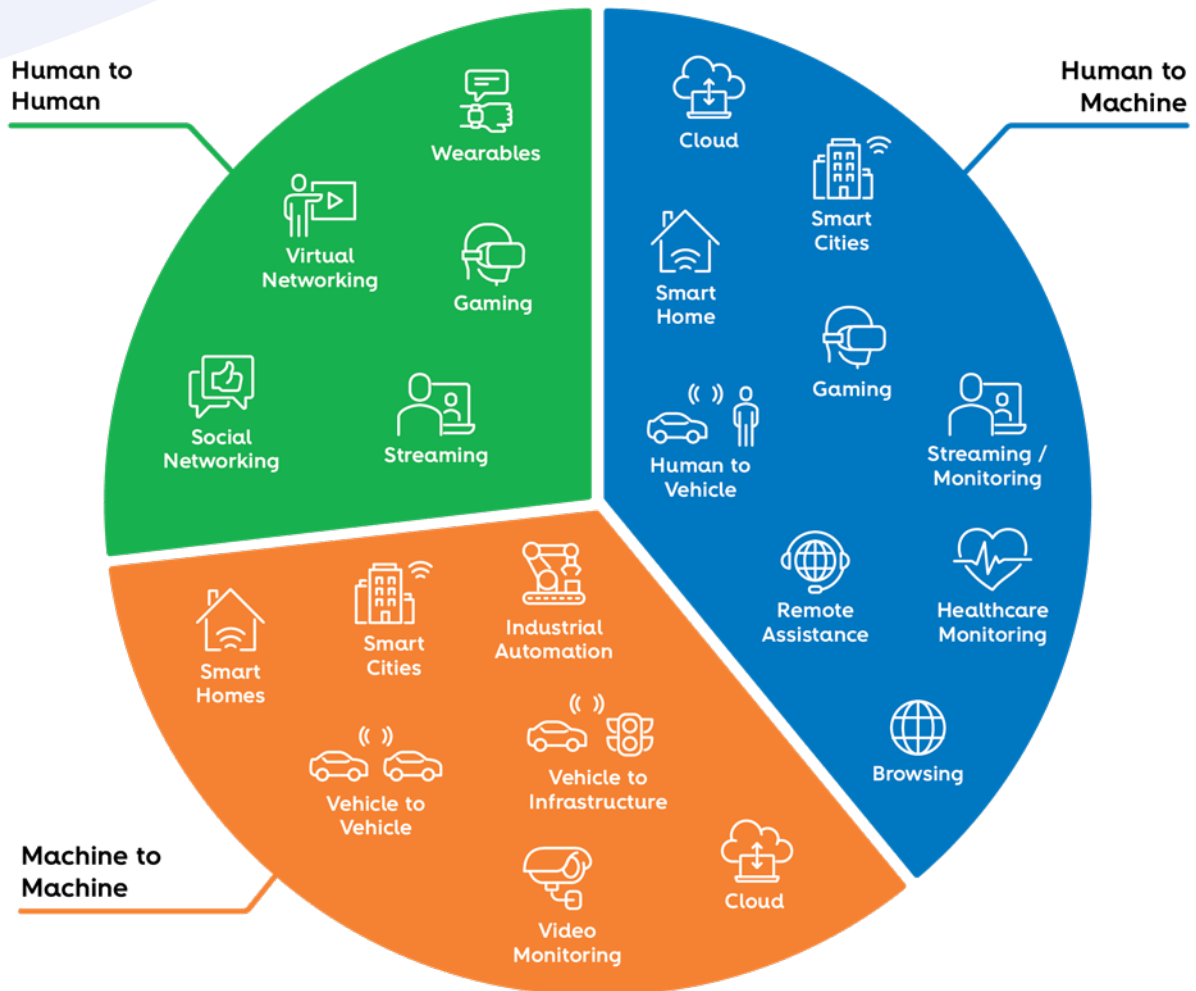
- Humans
- Devices
- Infrastructures

Technology and Service Evolution

Telecom networks are at the core of everyday life activities and services.

Businesses and individuals rely on a high availability performance for the present and future project plans.





Service portfolio

A Single Brand, a Full Set of Solutions

This portfolio comprises Central Office active and passive hardware equipment, Customer Premises Equipment, Outside Distribution Network elements, a Network Management System, Operation Support Systems, and professional engineering services that include delivery, setup, configuration, go-live training, maintenance, and support 24/7.

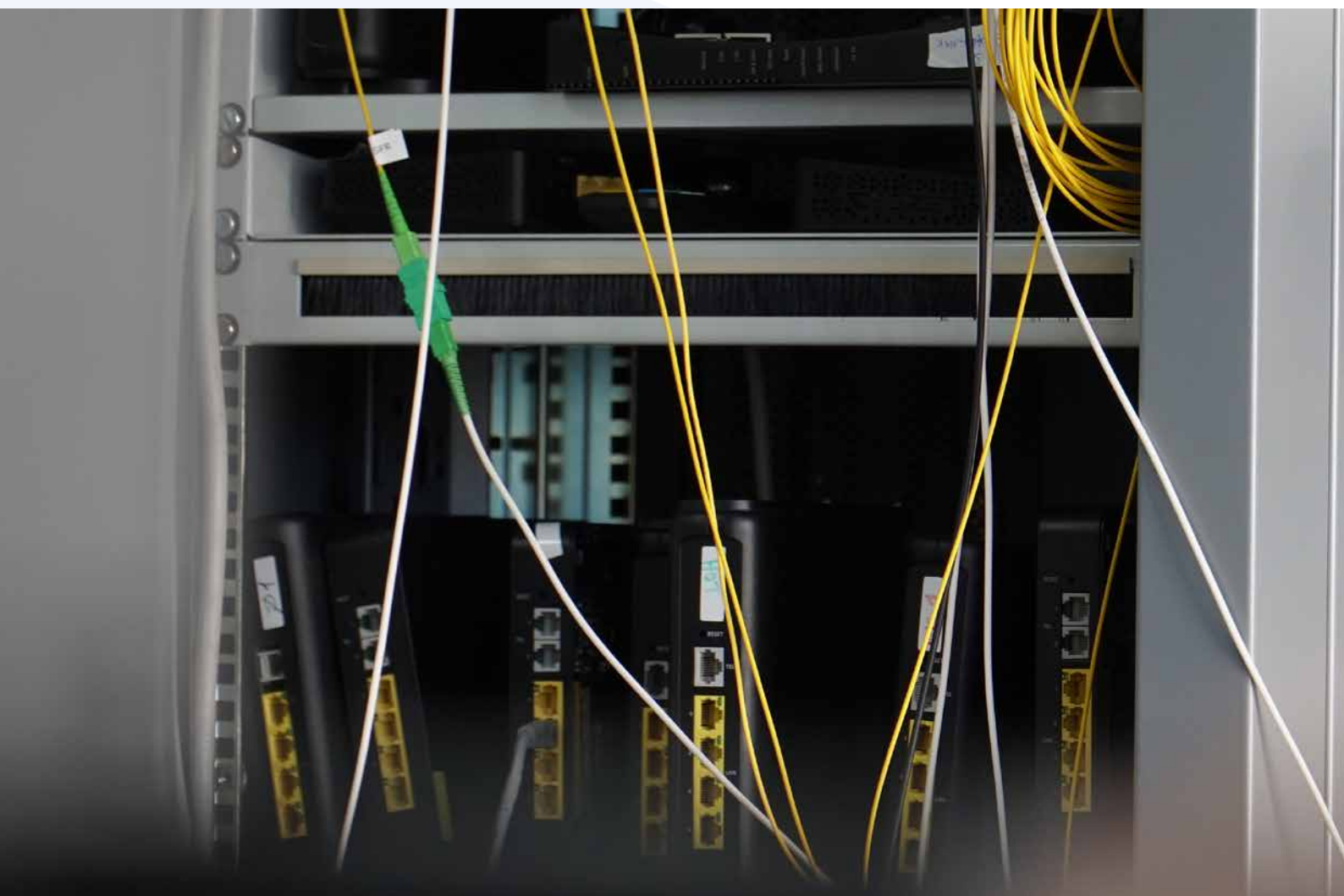


Table of Contents

FTTx Architecture	12
PON Standard Evolution	14
Central Office	18
Customer Premises Equipment	38
Network Management System	66
Operations Support Systems	72
5G Solutions	84
Optical Distribution Network	94
Test Labs and Quality Control	126
Engineering Services	130
Maintenance and Support Services	134
Altice Labs Value-Added Ecosystem	138

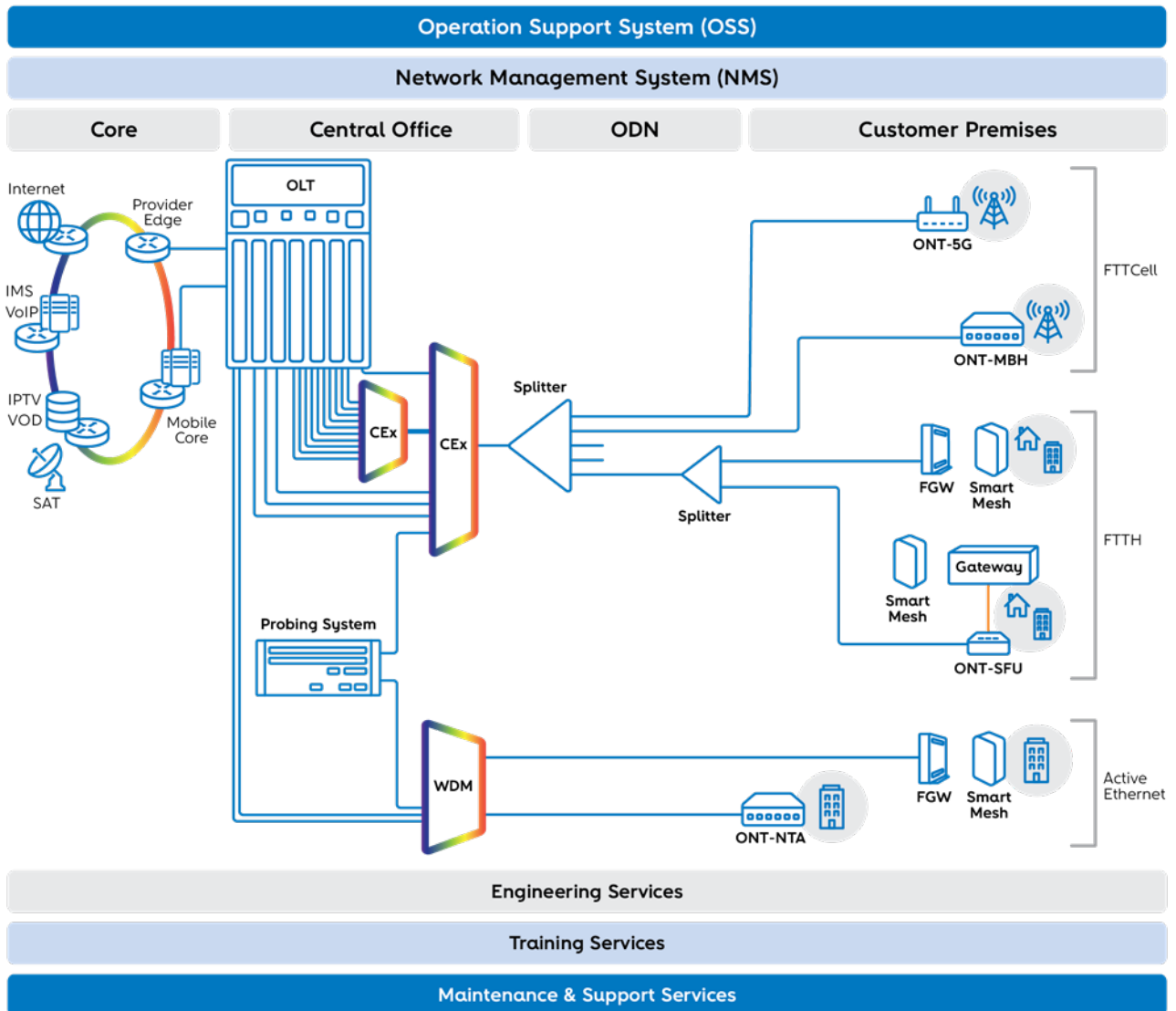


FTTx Architecture

Altice Labs owns relevant experience in FTTx deployments worldwide, acting as a market vendor with a full-suite xPON portfolio that includes hardware, software, and highly skilled engineering services, ensuring resilient and future-proof network implementations with optimized TCO.

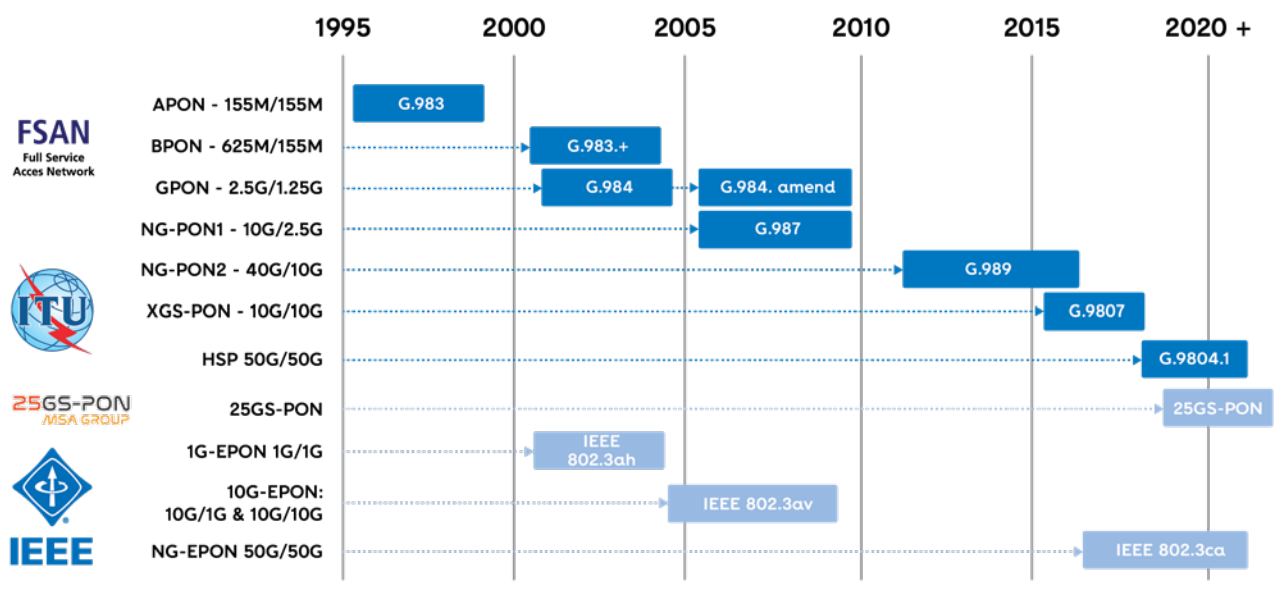
Altice Labs' solutions solve the entire fiber access network domain, simultaneously attending **Retail**, **Wholesale**, and **Mobile** market segments.





PON Standard Evolution

PON has been massively adopted in access network deployments worldwide and is currently the most suitable and reliable option for FTTx networks. Due to its resilience and high-capacity performance, it is the prime choice to support the ever-increasing need for services such as IPTV, high-quality OTT video streaming, landline, and mobile data.



PON standard evolution

Our product portfolio aligns with the reference standardization bodies and relevant technical forums, ensuring the best technology selection and full product conformity.

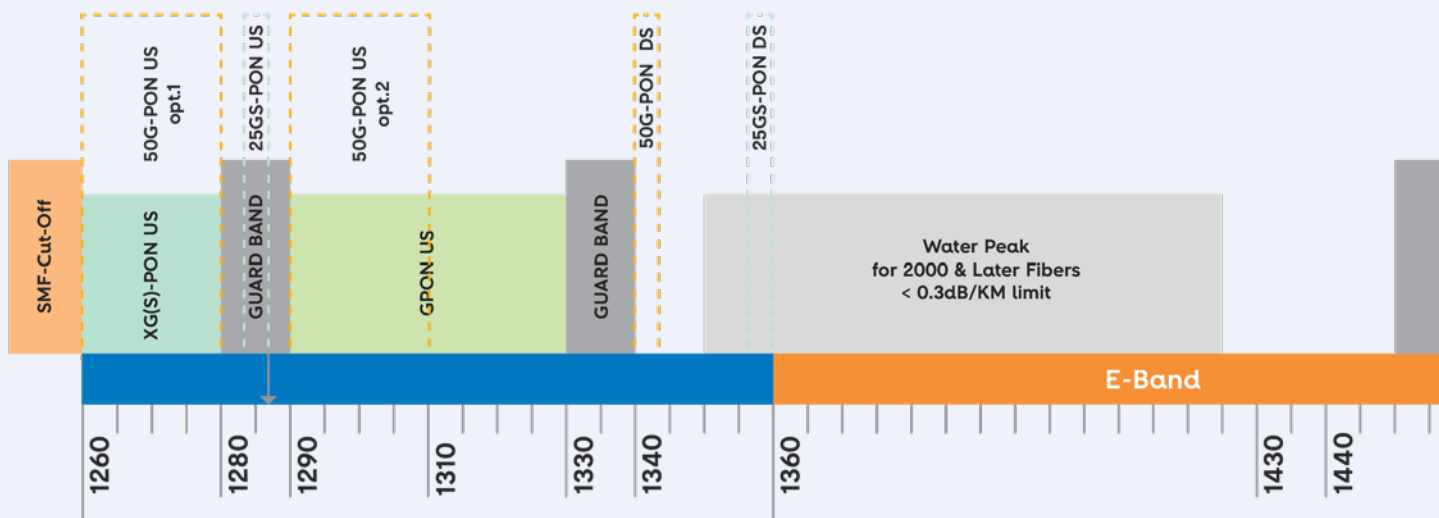
From the Central Office to the customer's premises, active equipment solutions support the current xPON ITU recommendations with GPON (ITU-T G.984), XGS-PON (ITU-T G.9807), and NG-PON2 (ITU-T G.989). The product roadmap also aligns with 25GS-PON from the MSA group and Higher Speed PON HSP (ITU-T G.9804) recommendations.

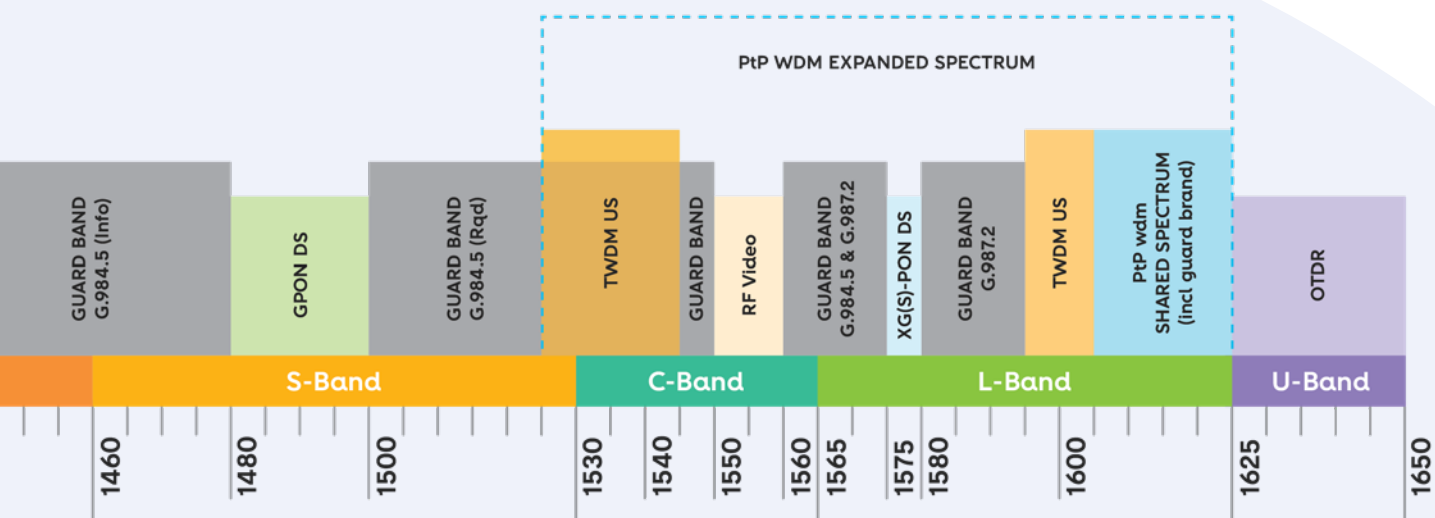
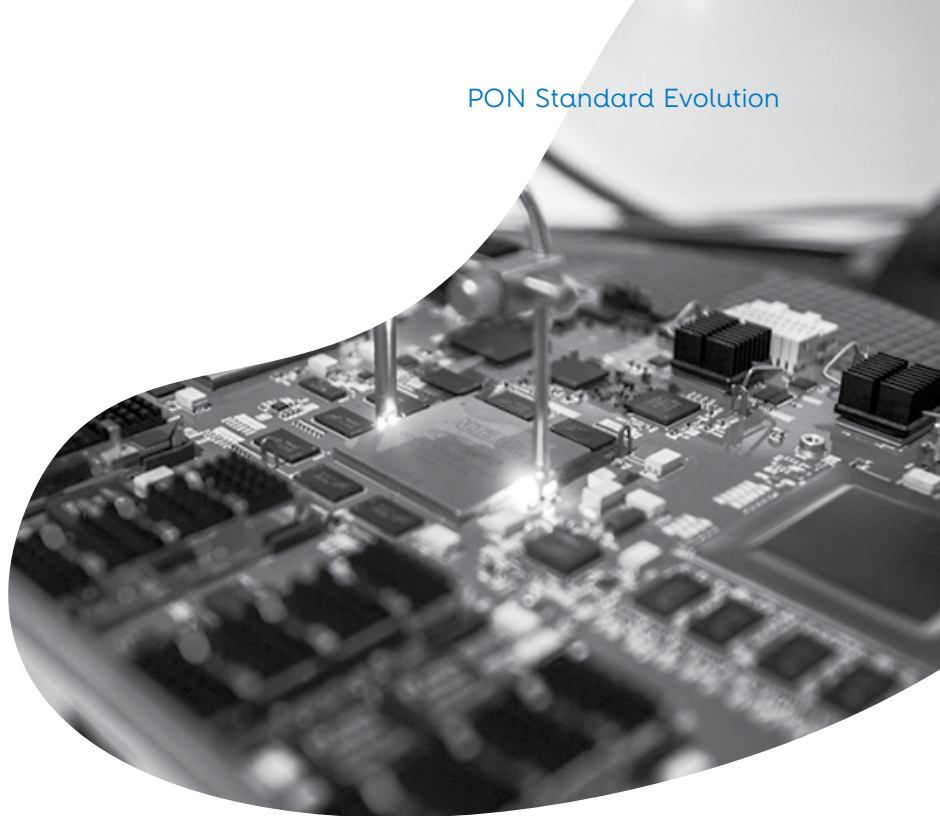
	Bit Rates Gbps (DS/US)*		Wavelengths (nm) (DS/US)*		Optics	Power Budget	Frame Structure
GPON	2.5	1.25	1490	1310	Fixed Wavelength	B+ (28dB) C+ (32dB) D (35dB)	GEM
XG-PON	10	2.5	1577	1270	Fixed Wavelength	B+ (28dB) C+ (32dB) D (35dB)	XGEM
XGS-PON	10	10	1577	1270	Fixed Wavelength	B+ (28dB) C+ (32dB) D (35dB)	XGEM
NGPON2	4x10	4x2.5	1596.34	1532.68	Fixed or Tunable Wavelength	N1 (29dB), N2 (31dB)	XGEM
	4x10	4x10	1597.19	1533.47			
	Could go till 8 wavelengths	Could go till 8 wavelengths	1598.04	1534.25			
			1598.89	1535.04			
25GS-PON	25	25/10	1358	1286 +1/-2	Fixed	N1 (29dB) N2 (31 dB)	XGEM
50G-PON	50	50/25/12.5	1342	1310 / 1270	Fixed	N1 (29dB) N2 (31 dB)	XGEM

PON technology comparison

* DS - Downstream, US - Upstream

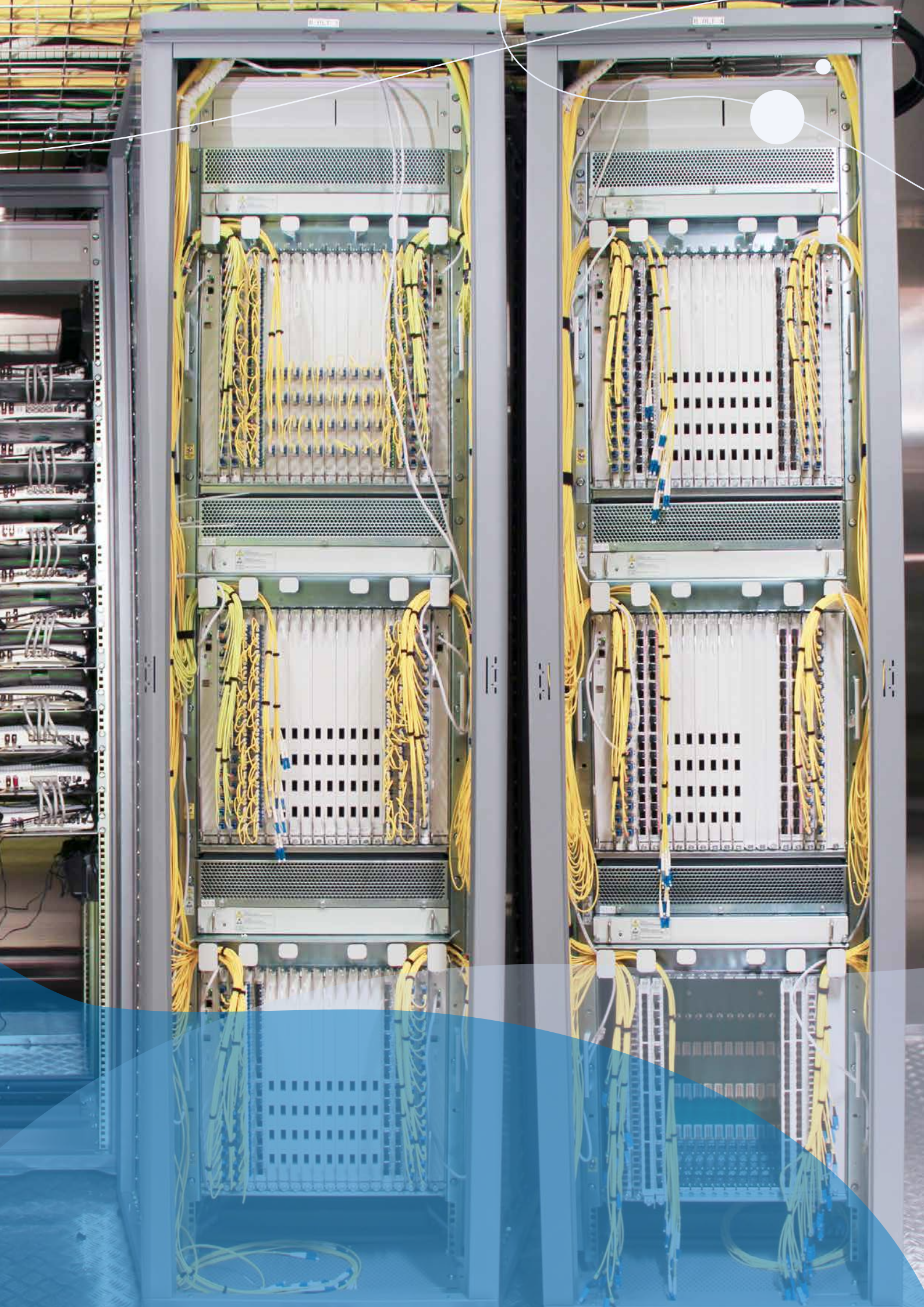
Coexistence Along the ODN







CENTRAL OFFICE

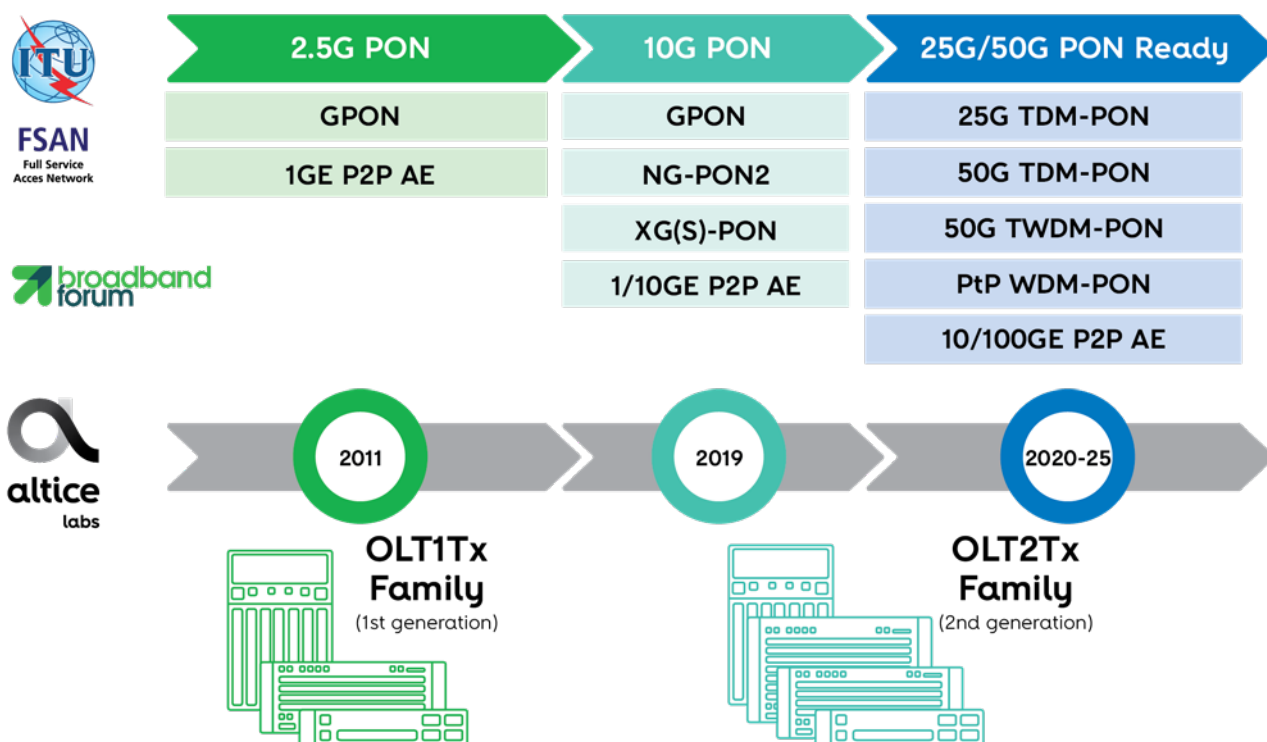


Central Office Overview

Altice Labs' Optical Line Terminal (OLT) equipment is one of today's most suitable and scalable solutions, offering Network Operators and Service Providers a flexible and cost-effective approach to implementing Passive Optical Networks (xPON).





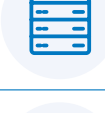
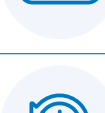
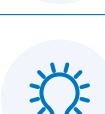

This equipment supports all the fiber access needs of Fixed, Mobile, and Convergent networks, supporting Video (IPTV, OTT TV, and RF Overlay), Data, High-Speed Internet (HSI), and Voice (VoIP) services.

Initially based on the ITU-T G.984.x GPON recommendation, our OLT solutions fully support next-generation PON architectures as defined by the ITU-T G.987.x (XG-PON1), ITU-T G.9807.1 (XGS-PON), ITU-T G.989.x (NG-PON2) and ITU-T G.9804 (Higher Speed PON) recommendations.

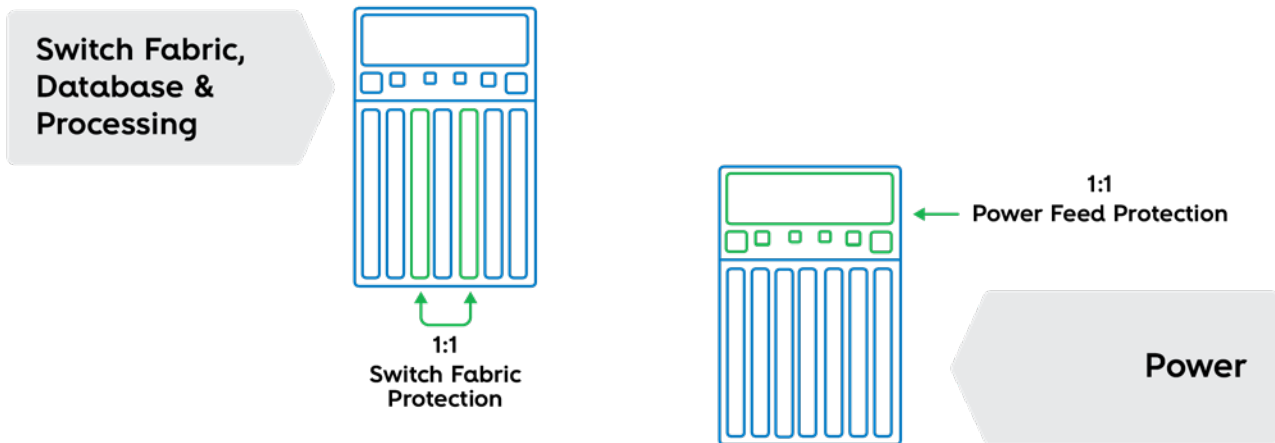


Altice Labs Central Office overview

Main Benefits and Added Value

Density	Leading density: 256 xPON / 256 10GE / 768 1GE ports from a single node		Improved cost efficiency and flexibility
Versatility	GPON, XG(S)-PON, TWDM-PON from the same chassis; Multi-PON Modules (MPM) available; Ethernet P2P (1GE, 10GE, 100GE) interfacing available		Management of all customers on the same platform
Redundancy	Common element protection, ring and link aggregation protection, Type B network protection		Extreme availability performance
Manageability	End-to-end Zero-Touch Provisioning (ZTP) capabilities		Increased operation efficiency
Interoperability	Fully interoperable with third-party ONTs		Freedom to choose: true multi-vendor
Virtualization	Seamless evolution towards a fully compliant SDN/NFV environment		Ready for virtualization
Future-Proof	Allowing next-gen 25G/50G Higher Speed PON technologies		Investment protection
Slicing	Virtual Network Operators (VNOs) can share the same physical infrastructure		New business models

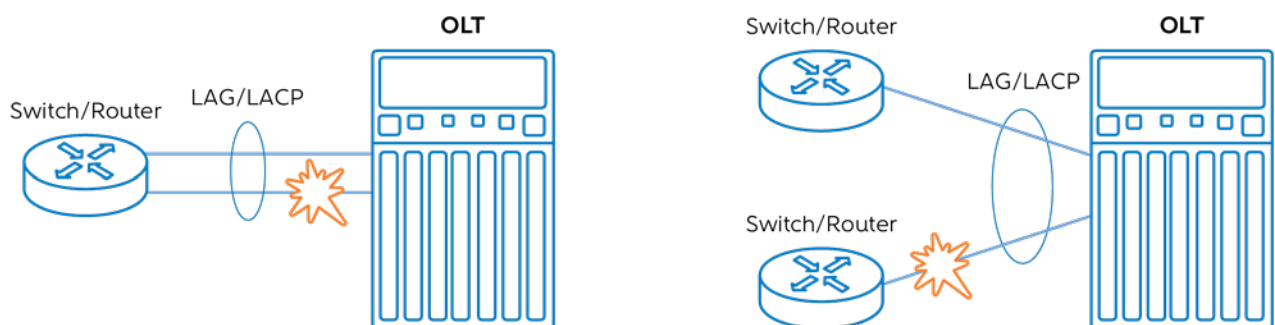
Common Element Protection



Common Element Protection

Automatic protection switching is achieved in less than 50ms.

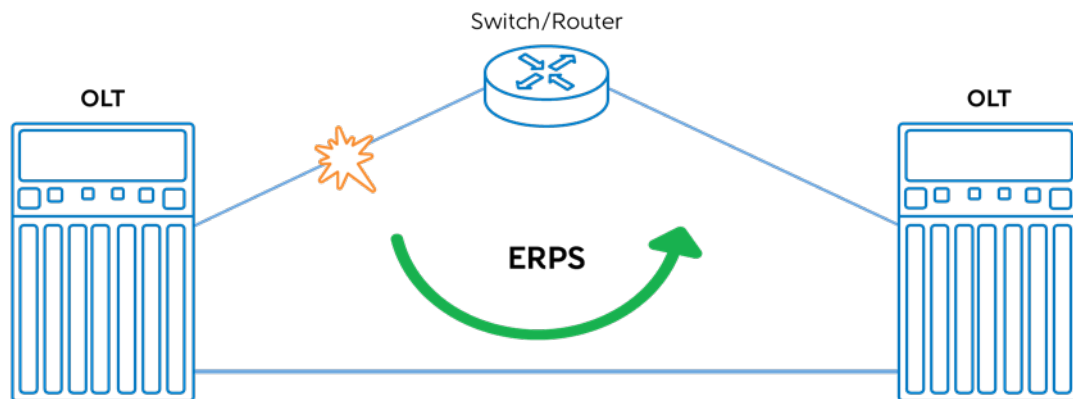
Link Aggregation



Link Aggregation

- Traffic in the uplink ports is configured to flow through different physical ports simultaneously (typically 50/50). In case of LOS in one of the uplink ports, the traffic still flows, although with just half of the capacity.

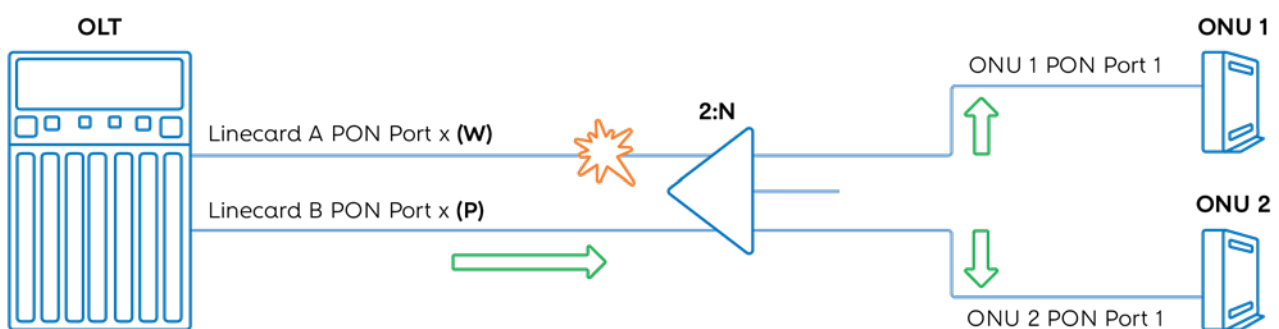
Ring Protection



Ring Protection

When LOS is detected within an OLT uplink port, the traffic is redirected in the opposite direction in less than 50ms, according to Ethernet Ring Protection Switching (ERPS ITU-T G.8032).

Type B Protection

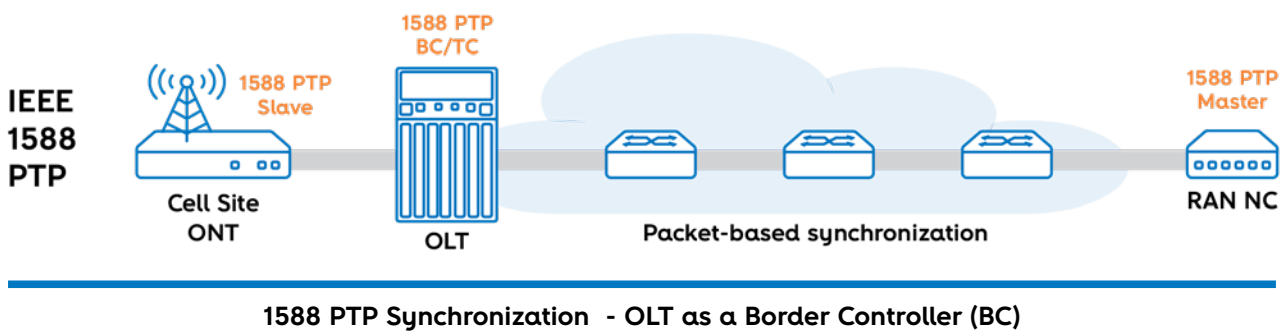
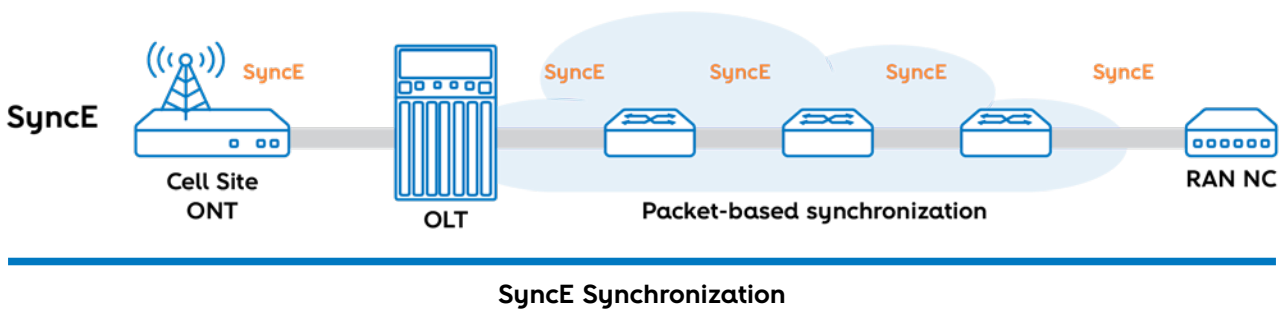


Type B Protection

- The OLT uses two PON ports (Working and Protection). In the case of LOS in the W port, the traffic will automatically switch to the P port in less than 50ms.

Synchronization

Synchronization is relevant to all communication devices. Synchronous Ethernet (SyncE) ITU-T G.826x and Precision Time Protocol (PTP) of IEEE 1588v2, with relevant profile parameter attributes defined in ITU G.827x, are available and ready to be configured to improve network timing performance, especially in critical application scenarios where latency variation and network consistency are prime issues.



Time and phase synchronization over PON - OLT as a telecom boundary clock (T-BC)

SyncE	IEEE 1588V2 (PTP)
Initially deployed to save dedicated sync TDM E1 circuits	Initially deployed for critical sync industrial applications
Delivers Frequency reference	Delivers Frequency, Phase and Time references
Ethernet Physical Layer dependent	Physical Layer independent
Not affected by packet network traffic constraints	Affected by packet network traffic constraints (e.g. Frame delay)
Not for legacy networks (hardware/interfaces need to be upgraded). Constraints between operators and national borders	Improved latency and jitter resiliency, achieving nanoseconds high precision
Both may coexist (SyncE for frequency reference delivery and IEEE 1588 for time reference delivery)	

PON technology comparison

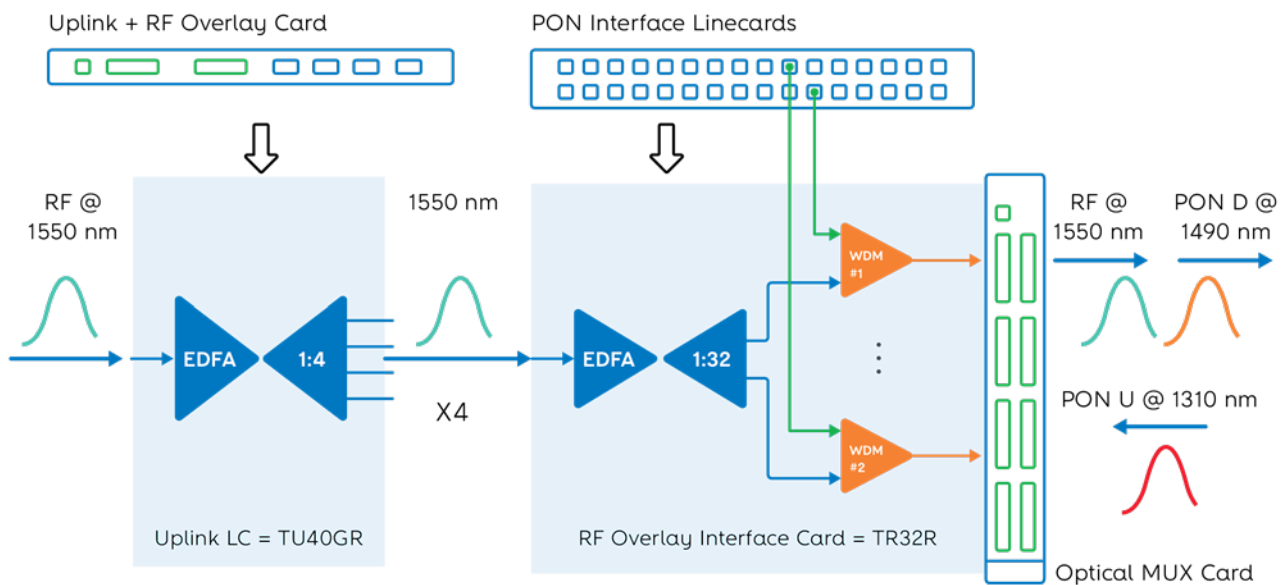
SyncE and PTP are necessary to support stringent Midhaul/Fronthaul scenarios

The diagram illustrates a Packet Core Network Architecture. On the left, a **Data Server** connects to an **MPLS Node** via an **E1/T1** interface. Another **MPLS Node** connects to the same **MPLS Node** via an **E1/T1** interface. A **BSC/RNC/xGW** connects to an **MPLS Node** via an **E1/T1** interface. These **MPLS Nodes** are part of an **MPLS Aggregation** cloud. A **Central Exchange** (represented by a blue 'X' icon) connects to the **MPLS Aggregation** cloud via an **E1/T1** interface. The **MPLS Aggregation** cloud connects to an **OLT** (Optical Line Terminal). The **OLT** connects to a **Splitter**. The **Splitter** connects to two **ONT-NTA** (Optical Network Terminal - Network Termination Area) devices. One **ONT-NTA** connects to a **Cell site** via an **nxE1** interface. The other **ONT-NTA** connects to a **PBX** (Private Branch Exchange) via an **E1/T1** interface. The **PBX** connects to a **Telephone**. The **ONT-NTA** also connects to a **Modem** via an **E1/T1** interface. The **Modem** connects to a **Customer Device** via a **Data** interface.

The diagram illustrates a converged network architecture. On the left, an **Internet** (represented by a globe) connects to an **OLT** (Optical Line Terminal). The **OLT** is also connected to two **Headend** units: **RF Headend** and **IPTV Headend**. The **RF Headend** is connected to the **OLT** via a **1550nm** optical line. The **OLT** connects to a **FGW** (Forwarding Gateway). The **FGW** is connected to the **Internet** and also to a **VoIP** (Voice over IP) phone. The **FGW** is connected to three different service groups: **OTT** (Over-the-Top) via **Ethernet**, **IP** (Internet Protocol) via **Ethernet**, and **RF** (Radio Frequency) via **Coaxial**. The **OTT** group includes a laptop. The **IP** group includes two **STB** (Set-Top Box) units and two desktop monitors. The **RF** group includes two desktop monitors. The **Coaxial** connection is labeled with an ellipsis (...).

26

RF Overlay Features

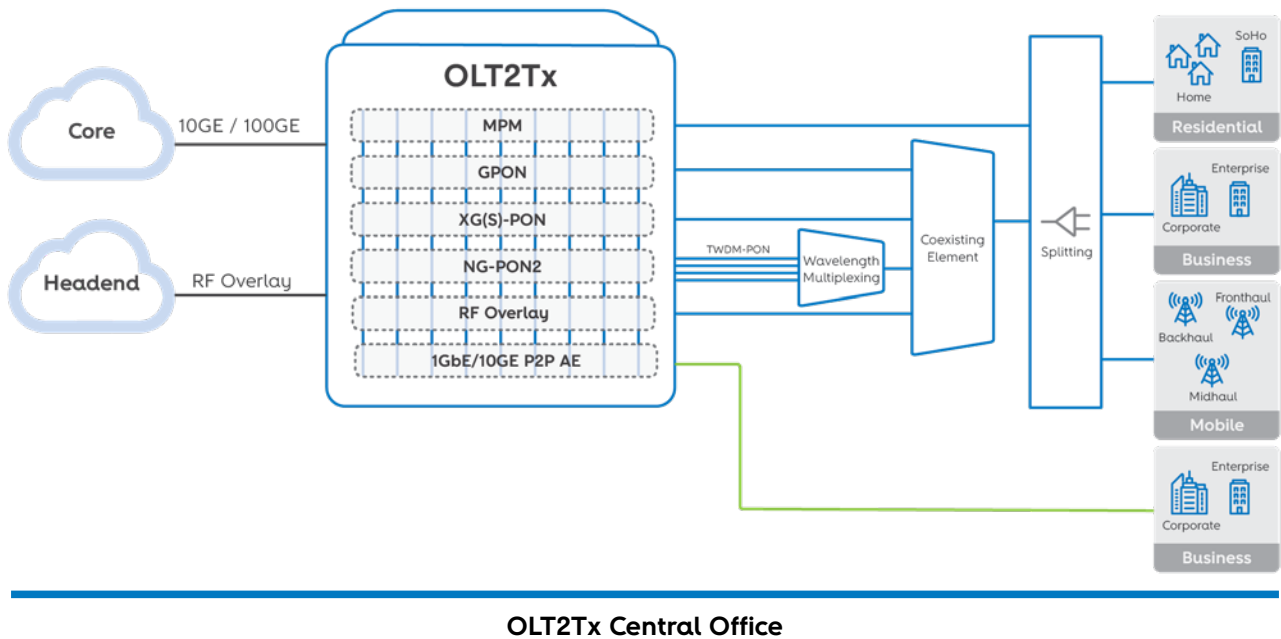


RF Overlay Capabilities (xPON use case)

The 1550nm optical RF Overlay signal received at the OLT is preamplified, split, and multiplexed with an xPON signal delivered to the Outside Distribution Network (ODN).

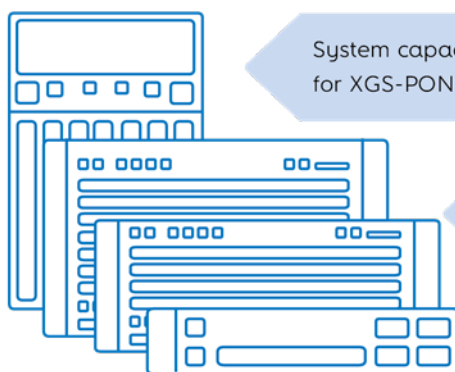
- RF Overlay optical distribution over xPON through integrated functions of the OLT.
- Up to 128 xPON ports with integrated RF Overlay.

OLT2Tx Interconnection



The OLT2Tx equipment family supports GPON, XG(S)-PON, NG-PON2, and PtP 1GE/10GE to solve the entire needs of the access network domain, covering Residential, Business, and Mobile market segments. The OLT2Tx chassis are also prepared for next-generation PON technologies such as 25GS PON (MSA) or 50G PON (g.hsp).

OLT2Tx Future-Proof Platforms



System capacity increase towards native support for XGS-PON and NG-PON2 technologies

Single node service integration (B2C, B2B and MBH)

Multi-Terabit Optical Access

Ultra-high bandwidth

- Higher speed PON ready (25GS-PON/50G PON)
- Up to 400Gbps/slot backplane capacity
- Nx100GE Uplink Interfacing
- NG-PON2 / XGS-PON / GPON
- Active Ethernet (PtP) 10G/1G

High reliability

- Common parts redundancy (Power / Switch Fabric / Uplinks)
- LAG / LACP Uplink Protection
- Type B Protection for the ODN side

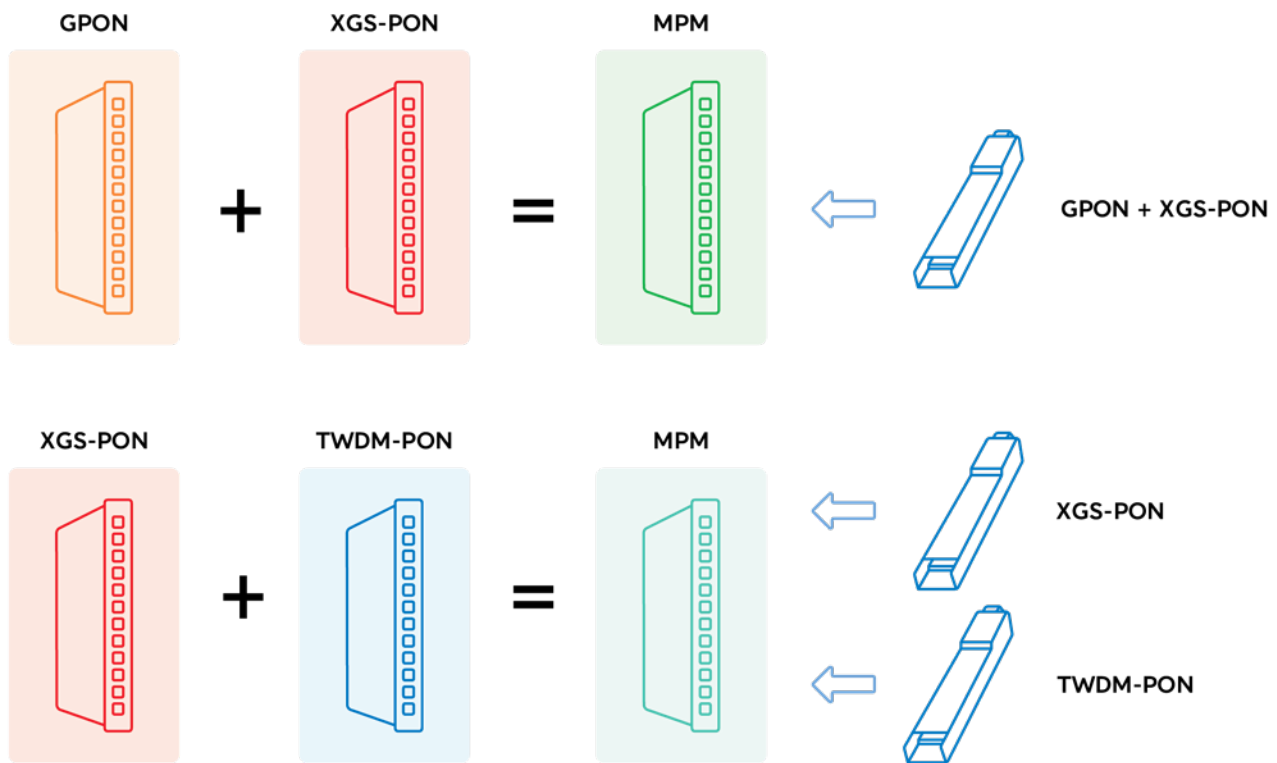
Virtualization & Slicing

- Seamless migration towards a fully virtualized network environment
- Several Virtual Network Operators can share the same infrastructure

OLT2Tx motivation requirements

High Level of Flexibility with Multi-PON Modules

Save your investments and achieve a smooth technology migration by delivering more than one technology within the same line card.



High-level line card flexibility

High-Density PON

Altice Labs has recently revealed a market-patented novel Dual SFP that can duplicate PON port density over a regular GPON or XGS-PON interface.

- The first PON SFP in the market with double density;
- Combines two OLT transceivers in a single SFP housing;
- For the GPON technology, it employs two 1490 nm CW downlink DFB lasers operating at 2.488Gbps and two 1310 nm optical burst mode receivers incorporating ADP/TIA optics for maximum sensitivity;
- For the XGS-PON technology, it employs two 1577 nm CW downlink EML lasers operating at 9.953 Gbps and two 1270 nm optical burst mode receivers incorporating ADP/TIA optics for maximum sensitivity.



With this Dual SFP, our 1RU OLT2T0E equipment can deliver 32x GPON or 32x XGS-PON interfaces instead of 16.

OLT2T0E



32x GPON or 32x XGS-PON

10G PON Central Office



[Download datasheet](#)

Scan the QR code to view more information

OLT2T4

- Multi-Terabit Optical Access Shelf | Dual Star High Availability Architecture
- Dual redundant switch fabric and uplink modules
- 16 Service slots | 2 Uplink slots | 2 Switch fabric and uplink slots
- Size: 19" x 15RU x 240mm/9.4" (WxHxD)
- Redundant power supply and removable fan tray
- Controlled Environment: 5% - 95% Humidity and -5°C to +45° Temperature Range
- Service slots: 256x GPON/XG(S)-PON (MPM), 256x NGPON2, 768x FE/GE, 256x 10GE

10G PON Central Office



[Download datasheet](#)

Scan the QR code to view more information

OLT2T3

- Multi-Terabit Optical Access Shelf | Dual Star High Availability Architecture
- Dual redundant switch fabric and uplink modules
- 8 Service slots | 2 Switch fabric and uplink slots
- Size: 19" x 7RU x 240mm/9.4" (WxHxD)
- Redundant power supply and removable fan tray
- Hardened Environment: 5% - 95% Humidity and -40°C to +65° Temperature Range
- Service slots: 128x GPON/XG(S)-PON (MPM), 128x NGPON2, 384x FE/GE, 128x 10GE

10G PON Central Office



[Download datasheet](#)

Scan the QR code to view more information

OLT2T2

- Multi-Terabit Optical Access Shelf | Dual Star High Availability Architecture
- Dual redundant switch fabric and uplink modules
- 4 Service slots | 2 Switch fabric and uplink slots
- Size: 19" x 4RU x 240mm/9.4" (WxHxD)
- Redundant power supply and removable fan tray
- Hardened Environment: 5% - 95% Humidity and -40°C to +65° Temperature Range
- Service slots: 64x GPON/XG(S)-PON (MPM), 64x NGPON2, 192x FE/GE, 64x 10GE



[Download datasheet](#)

Scan the QR code to view more information

OLT2T0E

- Compact Optical Access Shelf
- Size: 19" x 1RU x 240mm/9.4" (WxHxD)
- Redundant power supply and removable fan tray
- Hardened Environment: 5% - 95% Humidity and -40°C to +65° Temperature Range
- Service slots: 16x GPON/XG(S)-PON (MPM)

10G PON Central Office



[Download datasheet](#)

Scan the QR code to view more information

OLT2T0

- Compact Optical Access Shelf
- Size: 19" x 1RU x 240mm/9.4" (WxHxD)
- Redundant power supply and removable fan tray
- Hardened Environment: 5% - 95% Humidity and -40°C to +65° Temperature Range
- Service slots: 8x GPON/XG(S)-PON (MPM)

GPON Central Office



[Download datasheet](#)

Scan the QR code to view more information

OLT1T3

- Multi-Terabit Optical Access Shelf | Dual Star High Availability Architecture
- Dual redundant switch fabric modules
- 18 Service/Network slots ("Any Card / Any Slot") | 2 Switch fabric slots | 2 Uplink slots
- Size: 19" x 14RU x 240mm/9.4" (WxHxD)
- Redundant power supply and removable fan tray
- Controlled Environment: 5% - 95% Humidity and -5°C to +45° Temperature Range
- Service slots: 256x GPON, 768x FE/GE

GPON Central Office



[Download datasheet](#)

Scan the QR code to view more information

OLT1T1

- Multi-Terabit Optical Access Shelf | Dual Star High Availability Architecture
- Dual redundant switch fabric modules
- 3 Service slots | 2 Switch fabric and uplink slots
- Size: 19" x 3RU x 240mm/9.4" (WxHxD)
- Redundant power supply and removable fan tray
- Hardened Environment: 5% - 95% Humidity and -40°C to +65° Temperature Range
- Service slots: 48x GPON, 144x FE/GE



[Download datasheet](#)

Scan the QR code to view more information

OLT1T0

- Compact Optical Access Shelf
- Size: 19" x 1RU x 240mm/9.4" (WxHxD)
- Redundant power supply and removable fan tray
- Hardened Environment: 5% - 95% Humidity and -40°C to +65° Temperature Range
- Service slots: 8x GPON



The image features two pieces of network equipment. In the foreground, a blue Alcatel-Lucent DSLAM (DSL Access Multiplexer) is visible, with a label that includes the 'altice' logo and technical specifications. Behind it, a black 10G Ethernet switch is shown, featuring a 'RESET' button, a 'TEL' port, four yellow 'LAN' ports numbered 1-4, a '10G' port, a 'USB' port, an 'ON/OFF' power switch, a 'PON' port, and a 'PWR.' indicator. A large blue diagonal graphic overlays the bottom half of the image, serving as a background for the title text.

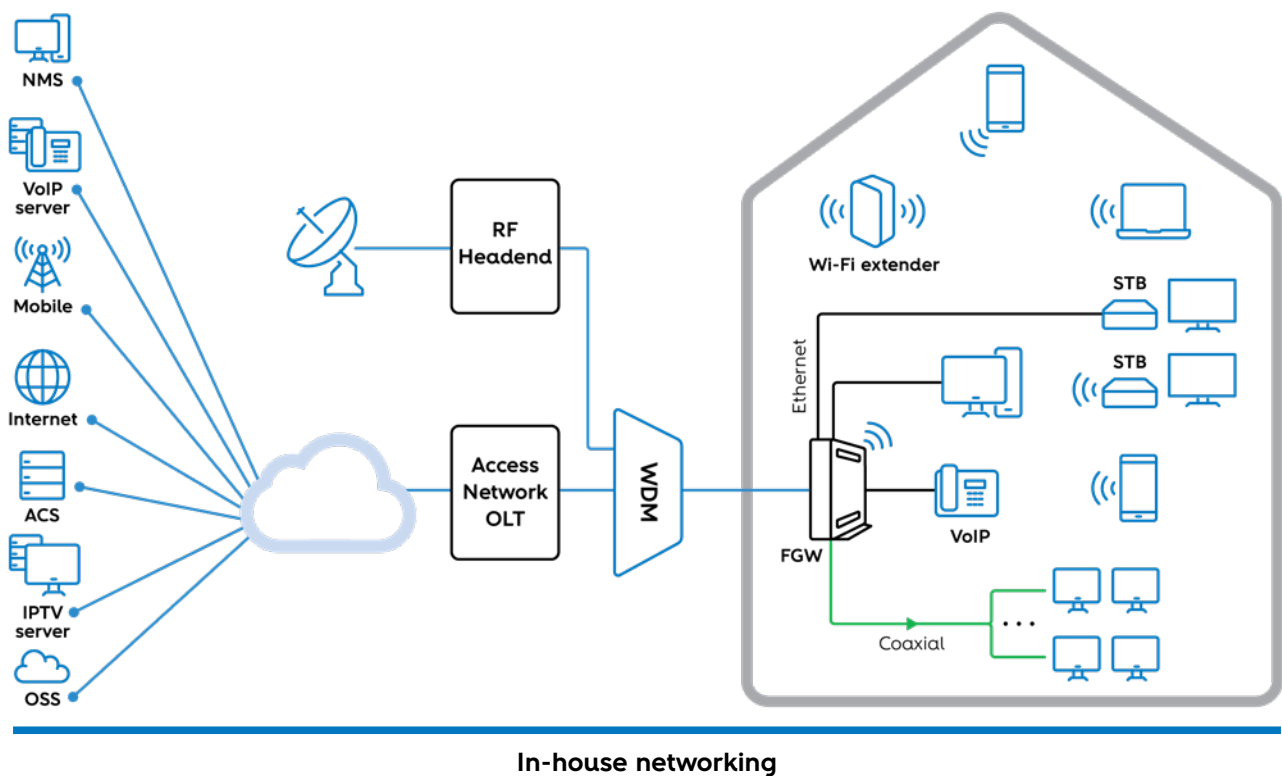
CUSTOMER PREMISES EQUIPMENT



Customer Premises Equipment

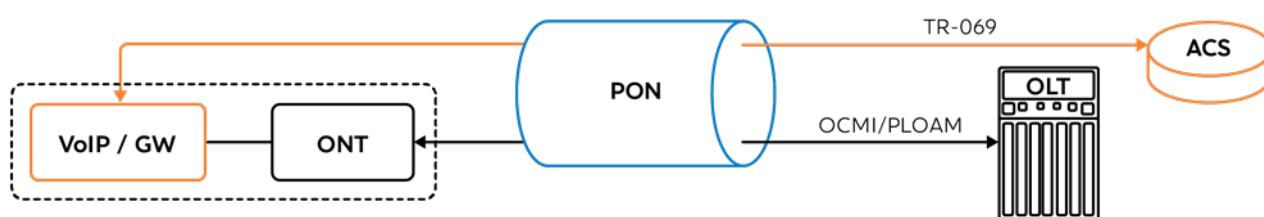
Altice Labs has significant experience developing Customer Premises Equipment solutions for home, business, and mobile environments, focusing mainly on Passive Optical Network (xPON) terminal equipment.

Our Optical Network Terminals support multi-play services based on ITU-T rec. G.984 (GPON), G.987 (XG-PON), G.9807.1 (XGS-PON), and G.989 (NG-PON2) standards, enabling High-Speed Internet (HSI), IPTV, VoIP, RF Overlay, and Wi-Fi services via standardized interfaces.





According to ITU standards, the ONT Management and Control Interface (OMCI) is available at the management level. The TR-069 protocol is also available, allowing L3 features to be remotely mass-configured, troubleshoot, and managed by an Auto Configuration Server (ACS).

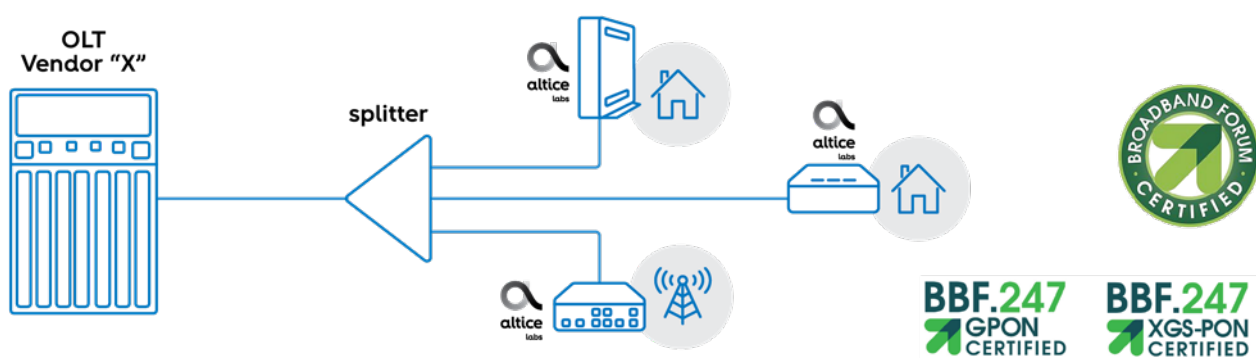


Remote management through TR-069

Mass remote management through OMCI and TR-069 standards offers full remote control without user intervention; TR-142 defines a Virtual UNI between the OMCI and TR-069 management domains.

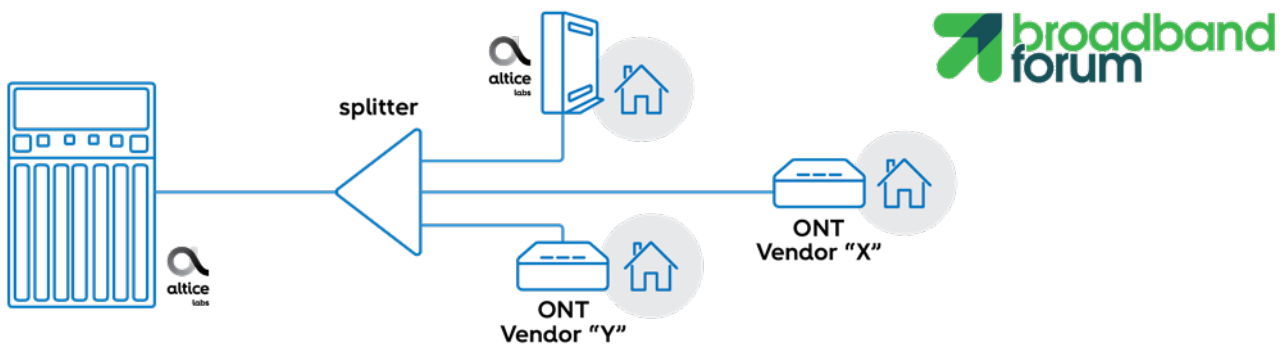
NADM is the ACS platform of Altice Labs devoted to retail and wholesale markets. This platform can manage millions of devices in real time.

Altice Labs was one of the first vendors worldwide to achieve the Broadband Forum BBF.247 certification at the ONT level, allowing and promoting a truly multi-vendor environment that can be easily configured to differentiate the residential and business offers.



ONT interoperability scenario

The multi-vendor ONT scenario, as defined by Broadband Forum WT-255, is also supported by our OLT portfolio.



OLT interoperability scenario

Regardless of 1G PON or 10G PON equipment families, Altice Labs fits Fiber-to-the-Home (FTTH), Fiber-to-the-Cell (FTTC), and Fiber-to-the-Distribution Point (FTTDP) deployment scenarios. At the same time, some of our CPE devices cover Active Ethernet scenarios.

The ONT portfolio may also be classified into three different equipment segments:

Bridging Family (simple L2 bridging devices) - This equipment family is suitable for low-cost xPON fast deployments, delivering a reliable service using a third-party gateway or a network termination point for mobile backhaul scenarios.

Gateway Family (with L2/L3 gateway features) - This equipment family is the right choice for full in-house multi-play service delivery, enabling Voice, Video, and Data over a single PON terminal equipment. This equipment family has built-in routing features that avoid needing an external third-party gateway. It also includes several wireless standard interface options, essential for complete and enhanced in-house/in-building Wi-Fi coverage. Wi-Fi 802.11 b/g/n/ac/ax/be standards cover 2.4GHz, 5GHz, and 6GHz bands complying with the Wi-Fi 7 standard.

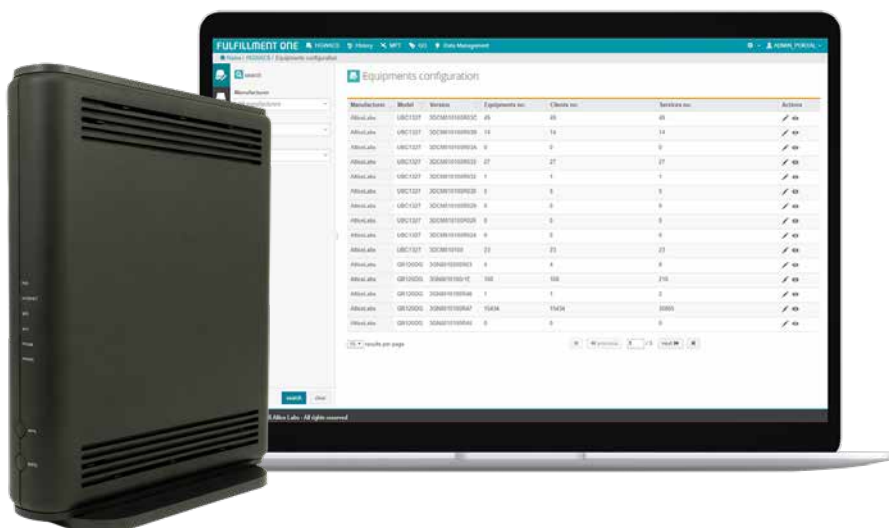
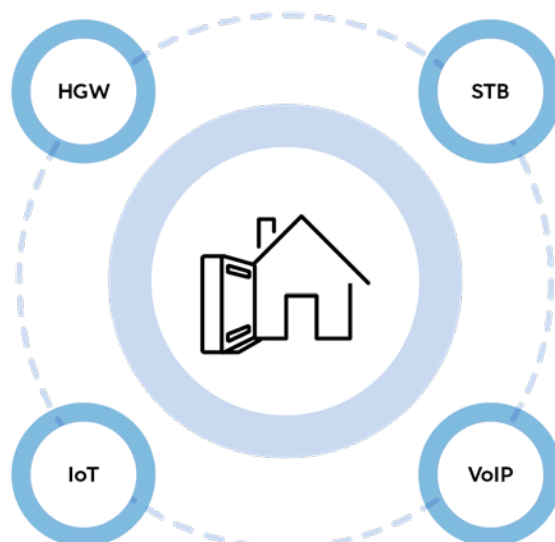
Dedicated Services Family (legacy traffic transport) - This equipment family brings dedicated terminals into next-generation xPON infrastructures. Circuits like E1/T1 and IoT standardized interfaces may be collected and transported over a Point-to-Point/Point-to-Multipoint logical circuit scenario. In addition, dedicated synchronous protocols such as SYNC-E and PTP1588v2 are available for mobile backhaul and wholesale applications.

Device Management Solution

Altice Labs' Device Management solution applies to residential and corporate networks. It supports several device types and vendors, enabling real-time management of millions of devices.

This solution is ready to support CPE virtualization scenarios (vCPE, uCPE). It combines the configuration of physical (PNF) and virtual (VNF) components of a device and allows the composition of services that span both domains in a transparent and seamless approach. This solution provides APIs for easy integration with OSS fulfillment and assurance processes.

- CPEs management
- Easy deployment of new services supported by CPEs
- Optimized bulk operations
- Complete protocol support for integrations
- Ready for the virtualization of CPE functions
 - NFV

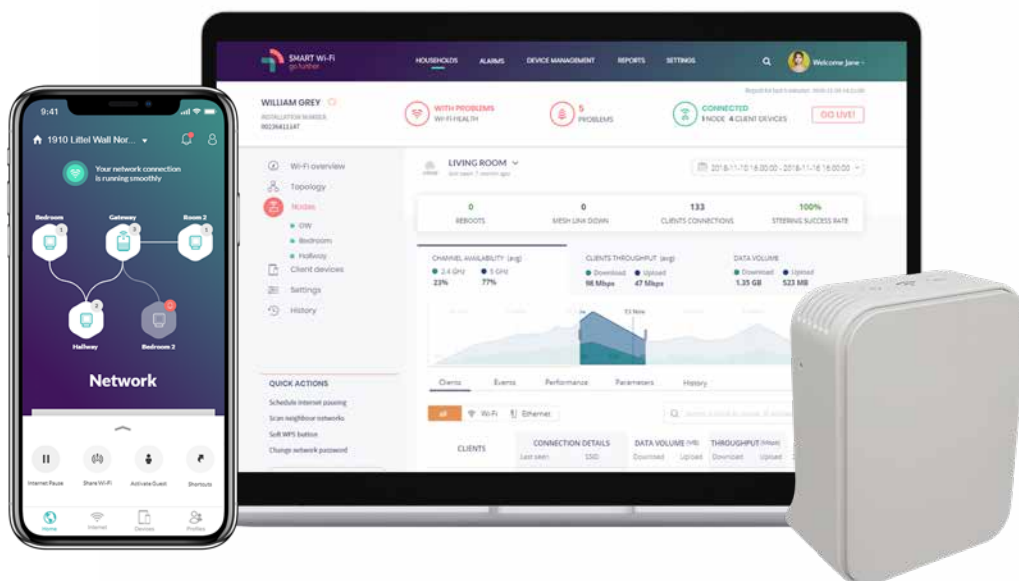


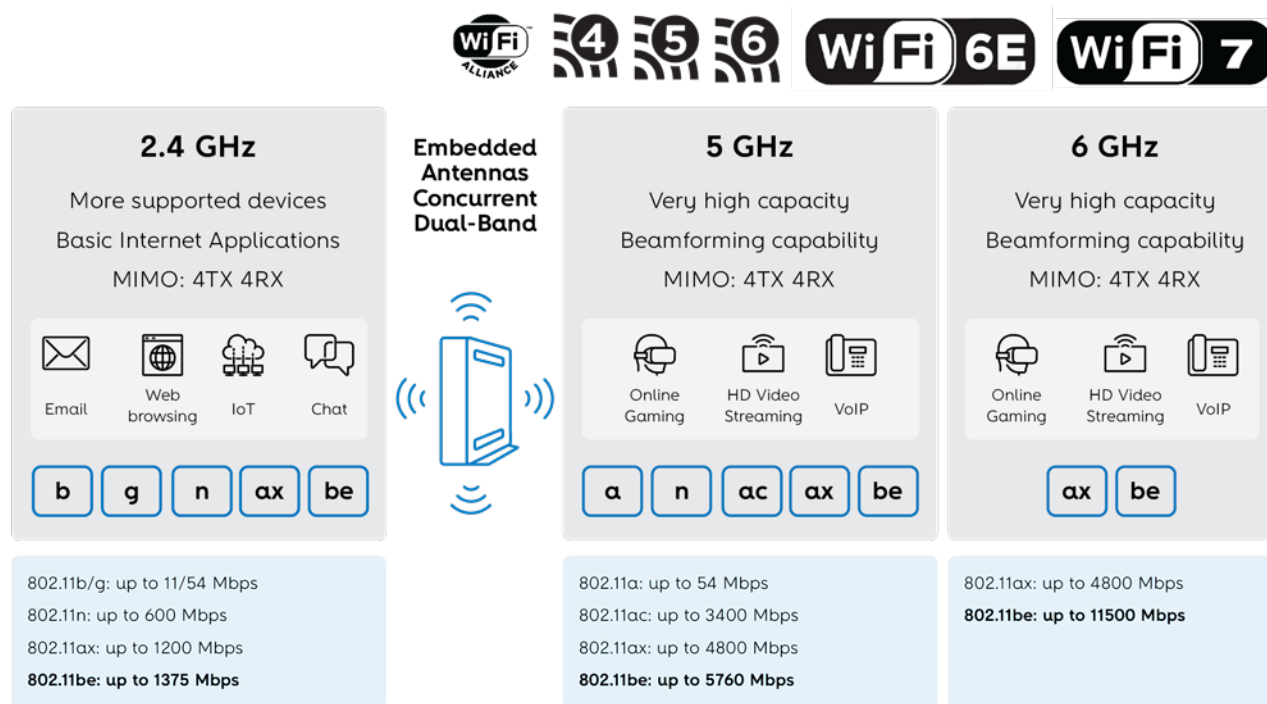
Smart Wi-Fi Solution

Wi-Fi is a crucial service in every home, expected to ensure fast and reliable network access while providing a quality user experience.

The Wi-Fi service is challenging for the operator since the visibility of quality and problem-solving within consumers' homes is limited. Altice Labs' Smart Wi-Fi solution bridges this gap with a cloud platform that provides high visibility of the Wi-Fi service in every home. This solution allows you to leverage Wi-Fi remote control services from an intuitive mobile app and a cloud portal for operator and end-user profiles.

- Management platform for Wi-Fi mesh networks
- Real-time monitoring, diagnosis, and optimization
- Improvement of steering algorithms through analytics and machine learning
- Controls for operators and end-customers
- Extenders and HGW device management





Wi-Fi specifications

To boost the CPE portfolio specifications, the RDK-B software framework has been added to the Fiber Gateway equipment family. RDK-B is an open-source software development framework and a market reference for network operators.

With RDK-B running inside the CPE product family, Altice Labs looks forward to optimizing and unifying the CPE software development procedures along with Wi-Fi, xPON, and DOCSIS products, taking significant profit from its main technical advantages.

RDK-B drastically increases flexibility and unification in the product development cycle while decreasing the product's Time-to-Market.. This new feature is also an opportunity for CPE enrichment with IoT, Analytics, SDN, and other third-party applications now available for straightforward integration within the box.

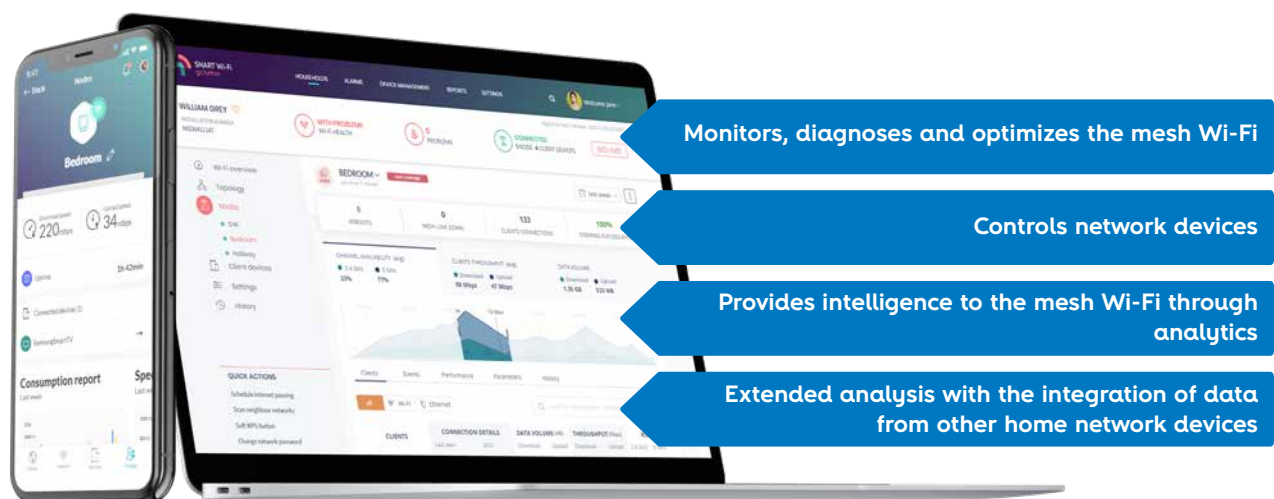


Smart Mesh Wi-Fi, an Enhanced Wireless Experience

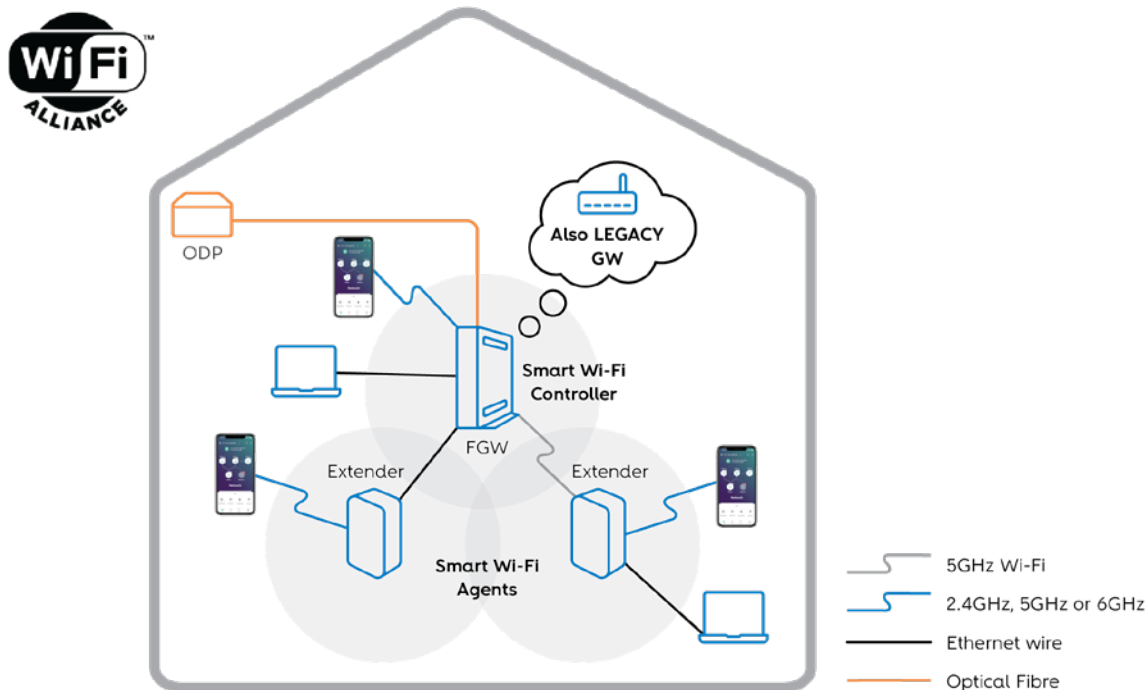
The massive increase in connected devices has resulted in a drastic demand for Wi-Fi connectivity throughout the house. Consumers own multiple mobile devices, including IoT and smart home-connected products that require quality airtime and uniform Wi-Fi coverage in house and outdoor areas. Traditionally, Wi-Fi home deployments include a single Wi-Fi Access Point (AP) or router, which may or may not fully envelop the desired capacity and coverage area. Increased mobility and throughput, improved efficiency and capacity, reduced interference, easier AP placement, and network configuration are vital for enhancing Wi-Fi networks.

Altice Labs has dedicated significant attention to in-house Wi-Fi coverage scenarios and has developed a Smart Mesh Wi-Fi certified solution based on Wi-Fi EasyMesh™ from Wi-Fi Alliance®. The solution incorporates hardware (main router, e.g., FGW, and Smart Mesh Wi-Fi AP extenders), a mobile user app (Android and iOS), and a unified cloud-based portal to configure, manage, and report the Wi-Fi mesh ecosystem. The FGW and Smart Mesh Wi-Fi APs run local software (local Controller, local Agent, and a Smart Mesh Wi-Fi Management agent) to provide a high-performance state-of-the-art Wi-Fi network.

Wi-Fi EasyMesh™ networks utilize multiple APs that work together to ensure complete Wi-Fi coverage, with full user mobility, in all home areas, keeping a consistent performance and a high-quality user experience.



Smart Mesh Wi-Fi Cloud Platform and Mobile App

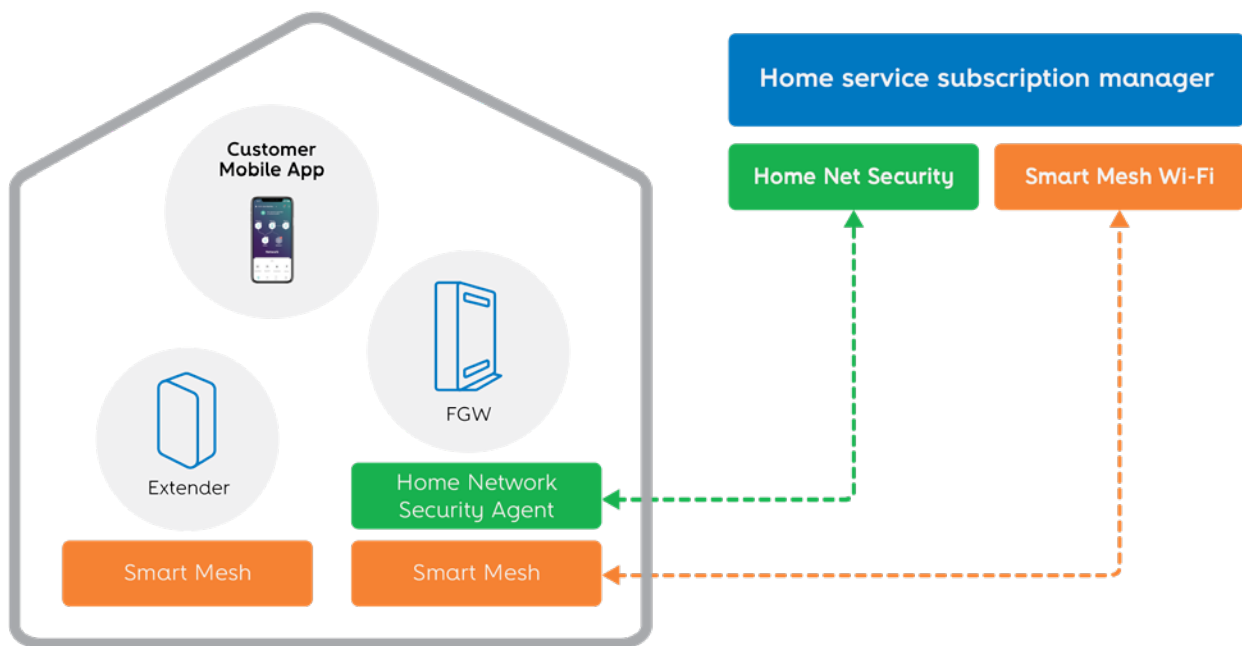
**Smart Mesh Wi-Fi network topology****Hardware Extenders**

- High-performance HW solution based on the new IEEE 802.11be @ 2.4GHz, 5GHz and 6GHz
- Interoperable mesh solution compliant with Wi-Fi Alliance® Multi-AP specification
- Optimal QoS and throughput performance
- Wireless and wireline (Ethernet) backhaul connections used to link the extenders to the FGW
- Patented enhanced steering and traffic load balance features

Cloud Platform and Mobile App

- Central monitoring, diagnostics and optimization of the Smart Mesh Wi-Fi
- Remote control of network devices
- Intelligence provided to the Wi-Fi mesh through analytics
- Live troubleshooting, device management, and full visibility of home networks and CPEs
- Smart Wi-Fi management through the mobile app everywhere inside and outside the home network

Home Network Security (HNS)



Alongside the Smart Mesh Wi-Fi functionalities, which include service connectivity and monitoring aspects, the Home Network Security component provides new security features:

- Device fingerprinting
- Antivirus integration
- Browsing protection
- Virtual hot patching
- Home LAN protection
- Internet parental control
- On-the-go security

These features may be enabled and controlled through the customer mobile app that uses the home service subscription manager as the real-time service broker.

GPON



GS0100G



GS0110G



GS1000G



GS1100G

ONT-SFU

- L2 Based service
- Options for RF Overlay and voice interfaces
- Multi-play service support
- ITU-T G.984.x and G.988 compliant
- Size: 35/1.4 x 143/5.6 x 103/4.1 (HxWxD mm/")
- Weight: 158 g / 0.35 lb

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more information

GPON



GS0100GP



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ONT-SFU-GP

- L2 Based service
- Multi-play service support
- ITU-T G.984.x and G.988 compliant
- Size: 27/1.1 x 102/4.0 x 102/4.0 (HxWxD mm/")
- Weight: 131 g / 0.29 lb

GPON



GR241AG



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GR140CG



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Fiber Gateway Wi-Fi 5

- L2 + L3 Based service
- Wi-Fi 5: Wi-Fi 802.11 b/g/n @2.4GHz + 802.11 n/a/ac @5GHz
- FXS Voice
- 10/100/1000Base-T LAN interfacing
- USB
- RF Overlay (optional)
- Multi-play support
- Embedded Voice, RF Overlay, Wi-Fi and USB interfacing
- Mass remote management through OMCI (G.988) and TR-069 standards, offering full remote control without user intervention

GPON



GR141IG



GR140IG

Fiber Gateway Wi-Fi 6

- L2 + L3 based services
- ITU-T G.984.x and ITU-T G.988 compliant and TR-069 supported
- Multi-play service support
- 4x 10/100/1000Base-T LAN interfacing (1Gbps LAN wire speed)
- 1x FXS Voice interfacing
- 1x USB Type C
- 1x RF Overlay (Optional)
- Wi-Fi 6: Wi-Fi 802.11 b/g/n/ax @2.4GHz + 802.11 n/a/ac/ax @5GHz
- Size: 222/8.74 x 45/1.77 x 190/7.48 (HxWxD mm/")
- Weight: 700 / 1.54 (g/lb)



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GPON



GR240JH



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Fiber Gateway Wi-Fi 6E

- L2 + L3 based services
- ITU-T G.984.x and ITU-T G.988 compliant and TR-069 supported
- Multi-play service support
- 3x 10/100/1000Base-T LAN interfacing (1Gbps LAN wire speed)
- 1x 2.5GBase-T LAN interfacing
- 2x FXS Voice interfacing
- 1x USB Type A
- Wi-Fi 6E: Wi-Fi 802.11 b/g/n/ax @2.4GHz + 802.11 n/a/ac/ax @5GHz + 802.11 ax @6GHz
- Size: 245/9.7 x 80/3.2 x 210/8.3 (HxWxD mm/")
- Weight: 745 / 1.64 (g/lb)

GPON



GR240NHR



GR240OH



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Fiber Gateway Wi-Fi 7

- L2 + L3 based services
- ITU-T G.984.x and ITU-T G.988 compliant
- Matter and TR-069/098/104/111/140/142/143 /181 supported
- Multi-play service support
- Size: [192.8 x 92.6 (base) x 185]mm/ [7.6 x 3.6 (base) x 7.3]"
- Weight: 1081/2.4 (g/lb)

GR240NHR Model

- 3x 10/100/1000Base-T LAN interfacing (1Gbps LAN wire speed)
- 1x 2.5GBase-T LAN interfacing
- 2x FXS Voice interfacing
- 1x USB Type C
- Wi-Fi 7: Wi-Fi 802.11 b/g/n/ax/be @2.4GHz + 802.11 n/a/ac/ax/be @5GHz + 802.11 ax/be @6GHz

GR240OH Model

- 4x 10/100/1000Base-T LAN interfacing (1Gbps LAN wire speed)
- 2x FXS Voice interfacing
- 1x USB Type A
- Wi-Fi 7: Wi-Fi 802.11 b/g/n/ax/be @2.4GHz + 802.11 n/a/ac/ax/be @5GHz

10 GPON



XSS0200I



XSS0100K



XSS0200J



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XSS0100KP



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ONT-SFU

- L2 based services
- ITU-T G.9807.1 and ITU-T G.988 compliant
- Multi-play service support
- 10Gbps LAN interfacing
- Size: 40/1.6 x 210/8.3 x 210/8.3 (HxWxD mm/")
- Weight: 483/1.06 (g/lb)

ONT-SFU-KP

- L2 based services
- ITU-T G.9807.1 and ITU-T G.988 compliant
- Multi-play service support
- 10Gbps LAN interfacing
- Size: 27/1.1 x 102/4.0 x 102/4.0 (HxWxD mm/")
- Weight: 131/0.29 (g/lb)

10 GPON



XSR150DX



XSR151DK

Fiber Gateway Wi-Fi 6

- L2 + L3 based services
- ITU-T G.9807.1 and ITU-T G.988 compliant and TR-069 supported
- Multi-play service support
- 4x 10/100/1000Base-T LAN interfacing (1Gbps LAN wire speed)
- 1x 1/2.5/5/10G SFP (1/10GBase-T/X)
- 1x FXS Voice interfacing
- 1x USB Type C
- 1x RF Overlay (Optional)
- Wi-Fi 6: Wi-Fi 802.11 b/g/n/ax @2.4GHz + 802.11 n/a/ac/ax @5GHz
- Size: 245.8/9.7 x 44.8/1.8 (80.6/3.2 including base) x 210.0/8.3 (HxWxD mm/")
- Weight: 800/1.76 (g/lb)



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10 GPON



XSR250GK



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Fiber Gateway Wi-Fi 6E

- L2 + L3 based services
- ITU-T G.9807.1 and ITU-T G.988 compliant and TR-069 supported
- Multi-play service support
- 4x 10/100/1000Base-T LAN interfacing (1Gbps LAN wire speed)
- 1x 10GBase-T LAN interfacing
- 2x FXS Voice interfacing
- 1x USB Type A
- 1x RF Overlay (Optional)
- Wi-Fi 6E: Wi-Fi 802.11 b/g/n/ax @2.4GHz + 802.11 n/a/ac/ax @5GHz + 802.11 ax @6GHz
- Size: 245/9.7 x 80/3.2 x 210/8.3 (HxWxD mm/")
- Weight: 957 / 2.13 (g/lb)

10 GPON



XSR140LNR



XSR240LNR



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Fiber Gateway Wi-Fi 7

- L2 + L3 based services
- ITU-T G.9807.1 and ITU-T G.988 compliant and TR-069 supported
- Matter and TR-069/098/104/111/140/142/143 /181 supported
- Multi-play service support
- 2x 10/100/1000Base-T LAN interfacing (1Gbps LAN wire speed)
- 1x 2.5GBase-T + 1x 10GBase-T / 2x 10Gbase-T (optional)
- 1/2x FXS Voice interfacing
- 1x USB Type C
- Wi-Fi 7: Wi-Fi 802.11 b/g/n/ax/be @2.4GHz + 802.11 n/a/ac/ax/be @5GHz + 802.11 ax/be @6GHz
- Size: [192.8 x 92.6 (base) x 185]mm/ [7.6 x 3.6 (base) x 7.3]"
- Weight: 1081/2.4 (g/lb)

10 GPON



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ONT-MBH

- L2 based services
- ITU-T G.984.x, ITU-T G.9807.1 and ITU-T G.988 compliant
- 19" Rackmount option
- 10Gbps LAN interfacing
- SYNC-E & 1588v2 synchronization protocols
- Redundant power feed
- Size: 45/1.8 x 315/12.4 x 205/8.1 (HxWxD mm/")
- Weight: 994/2.19 (g/lb)



Wi-Fi Extenders



D2150G



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Scan the QR code to view more information

Wi-Fi 5 Extender

- Access Point + Controller features
- Wi-Fi Alliance® Multi-AP Specification Embedded
- Wi-Fi 5: Wi-Fi 802.11 b/g/n @2.4GHz + 802.11 n/a/ac @5GHz
- 2x 10/100/1000Base-T interfacing
- Size: 113/4.45 x 86/3.39 x 40/1.57 (HxWxD mm/")
- Weight: 210/0.46 (g/lb)

Wi-Fi Extenders



D2260G



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Wi-Fi 6 Extender

- Access Point + Controller features
- Wi-Fi Alliance® Multi-AP Specification Embedded
- Wi-Fi 6: Wi-Fi 802.11 b/g/n/ax @2.4GHz + 802.11 n/a/ac/ax @5GHz
- 2x 10/100/1000Base-T interfacing
- Size: 113/4.45 x 86/3.39 x 40/1.57 (HxWxD mm/")
- Weight: 210/0.46 (g/lb)

Wi-Fi Extenders



D222AH



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Scan the QR code to view more information

Wi-Fi 6E Extender

- Access Point + Controller features
- Wi-Fi Alliance® Multi-AP Specification Embedded
- Wi-Fi 6E: Wi-Fi 802.11 b/g/n/ax @2.4GHz + 802.11 n/a/ac/ax @5GHz + 802.11 ax @6GHz
- 1x 10/100/1000Base-T
- 1x 1/2.5GBase-T interfacing
- Size: 198/7.80 x 94/3.70 x 185/7.28 (HxWxD mm/")
- Weight: 422/0.93 (g/lb)

Wi-Fi Extenders



D27GBHP

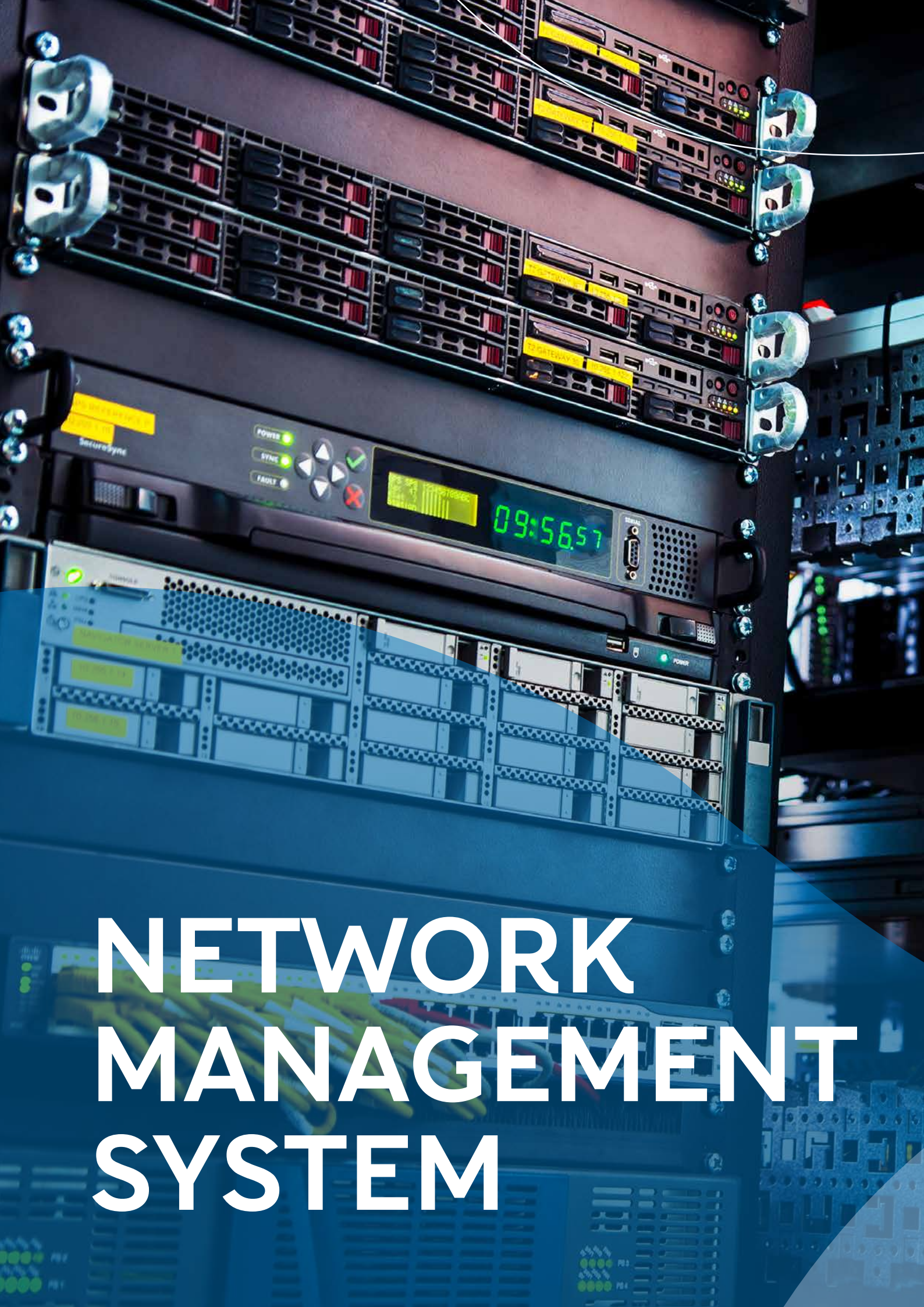


[Download datasheet](#)

Scan the QR code to view more information

Wi-Fi 7 Extender

- Access Point + Controller features
- Wi-Fi Alliance® Multi-AP Specification Embedded
- Wi-Fi 7: Wi-Fi 802.11 b/g/n/ax/be @2.4GHz + 802.11 n/a/ac/ax/be @5GHz + 802.11 ax/be @6GHz
- 1x 10/100/1000Base-T interfacing
- 1x 2.5GBase-T interfacing
- Size: [174.3 x 71.6 (base) x 170]mm / [6.9 x 2.8 (base) x 6.7]”
- Weight: 500/1.10 (g/lb)



NETWORK MANAGEMENT SYSTEM



Network Manager and Controller

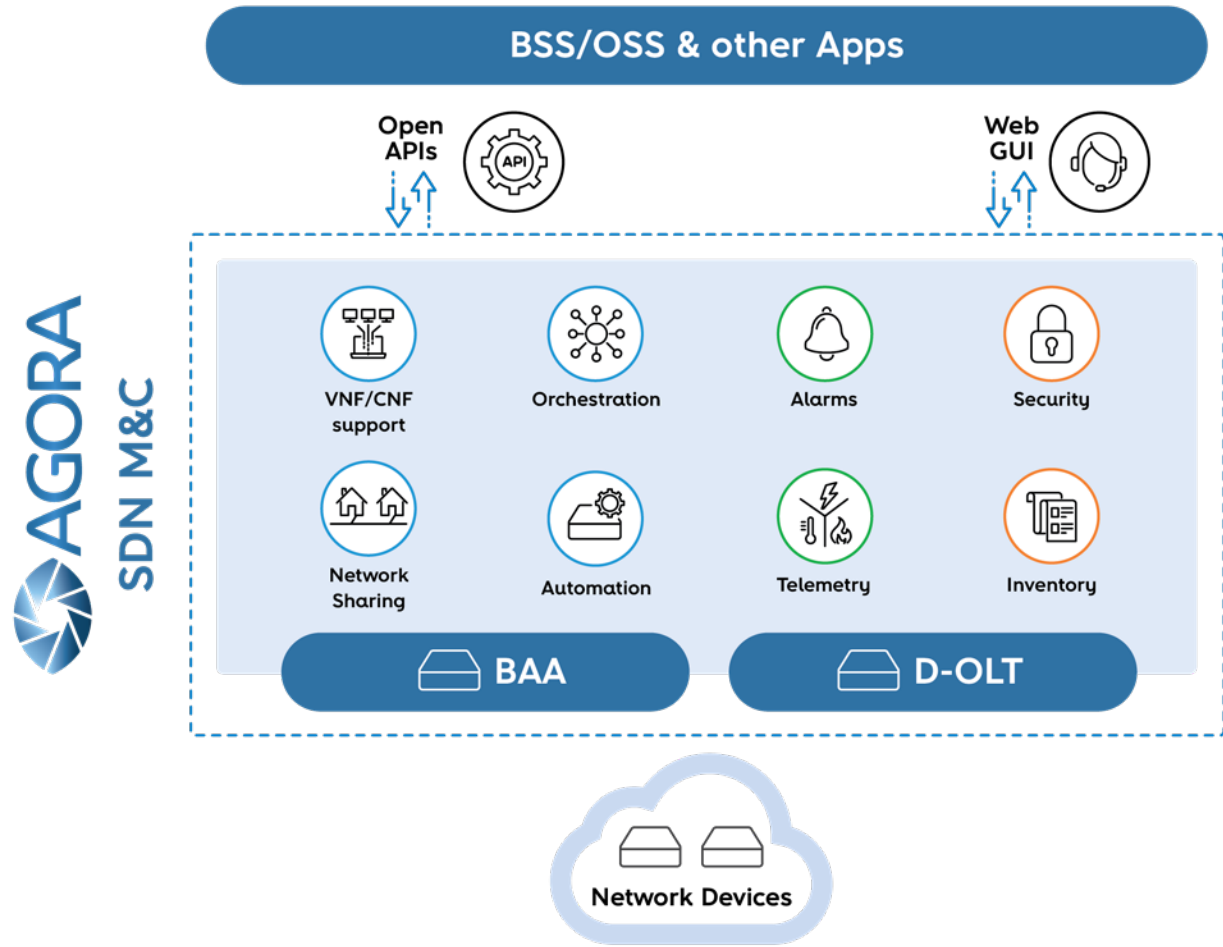
Optimizing network operations is critical for telecom stakeholders and investors as it allows significant value from live network infrastructures without compromising service quality.

AGORA, Altice Labs' Management and Control platform, is the solution to manage all network resources centrally and remotely in a reliable and efficient manner. Offering a suite of web-based applications supported by current industry standard technologies, AGORA aims to provide a set of key features for network management operations, including network provisioning, maintenance, and monitoring, providing all Fault, Configuration, Accounting, Performance, and Security (FCAPS) functionalities for all network elements.

A laptop displaying the AGORA equipment management interface. The interface shows a table with columns for 'Equipment', 'Status', 'Location', 'Type', 'Model', 'Serial', and 'Actions'. The table lists various equipment items with their respective details and status indicators. The interface is clean and professional, with a blue header and a white body.A laptop displaying the AGORA configuration management interface. The interface shows a table with columns for 'Configuration', 'Status', 'Location', 'Type', 'Model', 'Serial', and 'Actions'. The table lists various configuration items with their respective details and status indicators. The interface is clean and professional, with a blue header and a white body.

AGORA can fully manage network infrastructures, from basic serial and IP devices to more complex access network technologies such as xPON. Small dozens to millions of devices can be centrally and remotely managed in a “pay-as-you-grow” model, scaling along with the business.

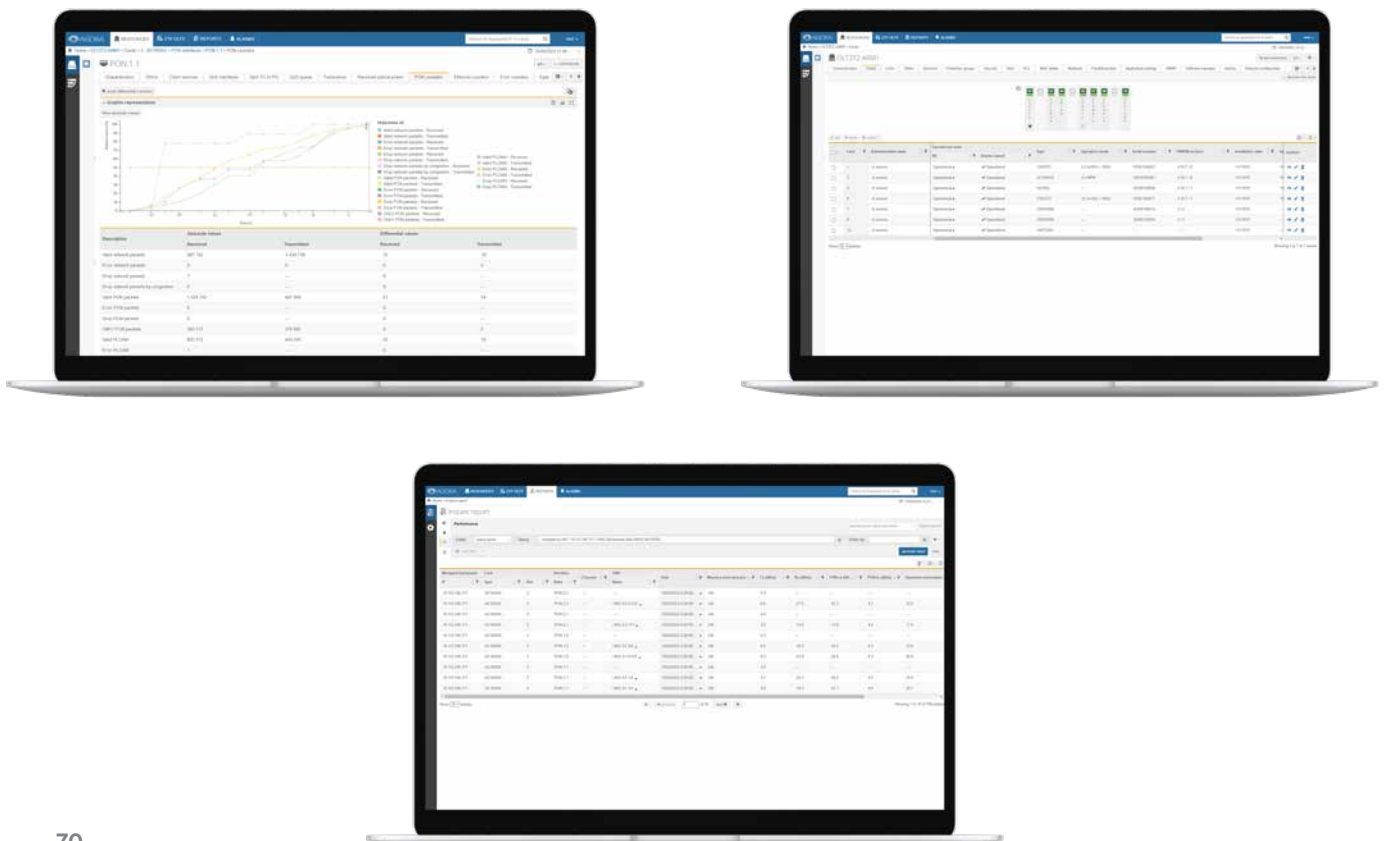
AGORA’s applications and services infrastructure level can be available in bare metal, Virtual Machine (VM), or micro-service cloud-based environments, customized to meet the specific needs of each customer via a modular, flexible, and scalable delivery model.

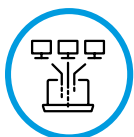


A fully featured standardized set of Northbound Interfaces (NBI) and open APIs enable network programmability and automation processes, promoting a simple and fast integration with external Operation Support Systems (OSS) and Business Support Systems (BSS).

An intuitive, customizable, and user-friendly web-based interface simplifies and optimizes all network operations, focusing on each user group.

Southbound Interfaces (SBI) handle complete Fault, Configuration, Accounting, Performance, and Security tasks for managing multi-technology network elements coexisting within a single or across several management domains. AGORA leverages the potential of next-generation access Software-Defined Networks (SDNs), providing a common platform for the operator to manage legacy or third-party devices using a Broadband Access Abstraction (BAA) Layer and Disaggregated OLT (D-OLT) access nodes, supporting Virtual Network Functions (VNFs) or Containerized Network Functions (CNFs), such as a TR-477 compliant disaggregated OLT. AGORA promotes a seamless coexistence and evolution of new management architectures, avoiding the disruption between the past, present, and future xPON field deployments, totally aligning with major relevant technical forums such as the Broadband Forum (BBF) and the Open Networking Foundation (ONF).





VNF/CNF support

Extended support of D-OLT nodes to new Virtual Containerized Network Functions, allowing faster and more flexible rollouts of network infrastructures.



Network Sharing

Several Virtual Network Operators (VNOs) can share the same network infrastructure, supporting new and optimized business models.



Orchestration

All the collected data feeds the orchestration engines, optimizing operational procedures and enhancing overall network performance and efficiency.



Automation

Closed-loop operations, mainly targeted for carrier-class management of large-scale deployments, improve network efficiency and responsiveness.



Alarms

Powerful and centralized alarm management allows quick identification and response to issues, ensuring uninterrupted service delivery.



Telemetry

Comprehensive environmental metrics monitoring covers network components, including indoor racks, outdoor cabinets, and other passive entities and infrastructures, ensuring optimal network operation in different conditions.



Security

Highly granular authorization control in all tasks and the most recent and updated secure communication protocols protect against potential threats by ensuring only authorized users can access specific functionalities.



Inventory

Up-to-date network component inventory (together with alarm management) maintained by the system, allowing efficient operation by tracking the status and location of the network elements.

The image features a close-up of a hand touching a tablet screen. On the screen, a white padlock icon is visible. The background is a deep blue, overlaid with a semi-transparent blue geometric shape that contains faint, glowing network diagrams and icons like a magnifying glass and a lightning bolt. The overall aesthetic is modern and technological.

OPERATIONS SUPPORT SYSTEMS



NOSSIS One

Overview

NOSSIS One is a complete OSS “best-of-breed” suite following the best market practices for this area.

With a cloud-native, open, and modular architecture, NOSSIS One exposes standard APIs and provides off-the-shelf multi-technology packs for a large number of network vendors, enabling fast integration with the ecosystems where it operates.

NOSSIS One supports the main operational processes covering the Inventory, Fulfillment, and Assurance functional areas, being ready for traditional telco (fixed, mobile) networks, IT networks, and new virtualized ones.

Using AI and ML across multiple domains, NOSSIS One enables automation, bringing autonomy and streamlining operations.

The NOSSIS portfolio also includes specific solutions for device management scenarios for new home networks and CPEs (including TR-069 and other dedicated protocols), and emerging technologies like the Smart Mesh Wi-Fi with a Smart Wi-Fi management solution.



NOSSIS One architecture



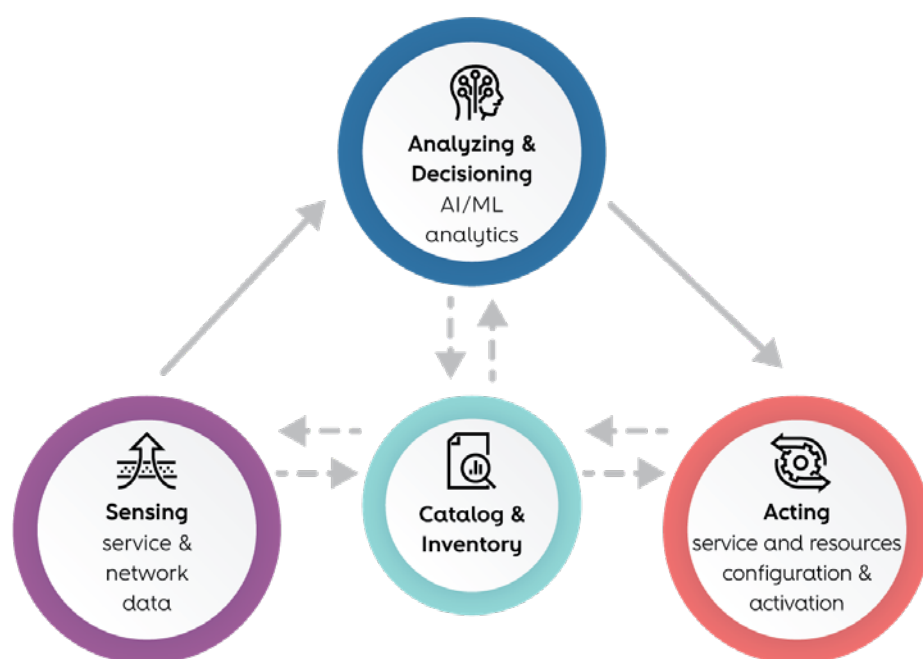
With a new architecture and paradigms, NOSSIS One is ready to manage the latest Ultra-Fast Broadband technologies and service requests. The main benefits of this evolved OSS solution (enabling autonomous and intelligent operations) are the following:

- **High flexibility** and **cost-effective** solutions built in a cloud-native platform
- Complete OSS functional areas enabling **closed-loop** operations
- **Time-to-market** delivery speed supporting new services and technologies
- **AIOps** powering smarter operations
- Ready for **5G** and **virtualization**
- **Smooth and fast integration** through Standard APIs



The Autonomous Operations Concept

Autonomy is the ultimate step on the evolutionary path of operations. The goal is to implement a fully automatic and autonomous cycle (sense, analyze, decide, and act) across multiple network domains and services without human intervention. NOSSIS One helps operators pursue autonomy, addressing the need for elasticity and agility to support new network technologies and adapt to an always-evolving ecosystem of new network interactions and business rules. With a cognitive layer powered by advanced AI and ML analytics over live data, NOSSIS One addresses what is happening, why it is happening, and what needs to be done.

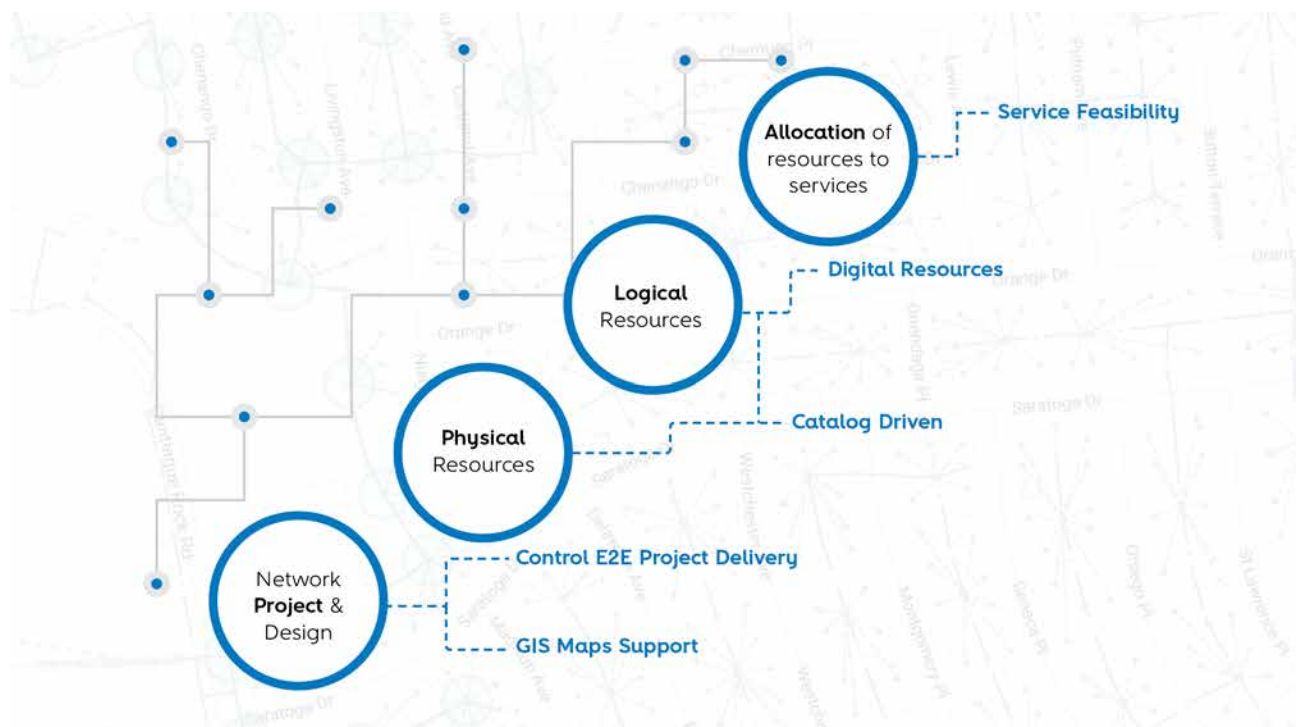


"Autonomous Operations" concept

An automated orchestration enables the creation of services across different network domains. Combined with AI analytics, it allows full closed-loop automation and reduces network and service operation costs, minimizing human intervention and implementing self-healing, while proactively fixing any detected problems.

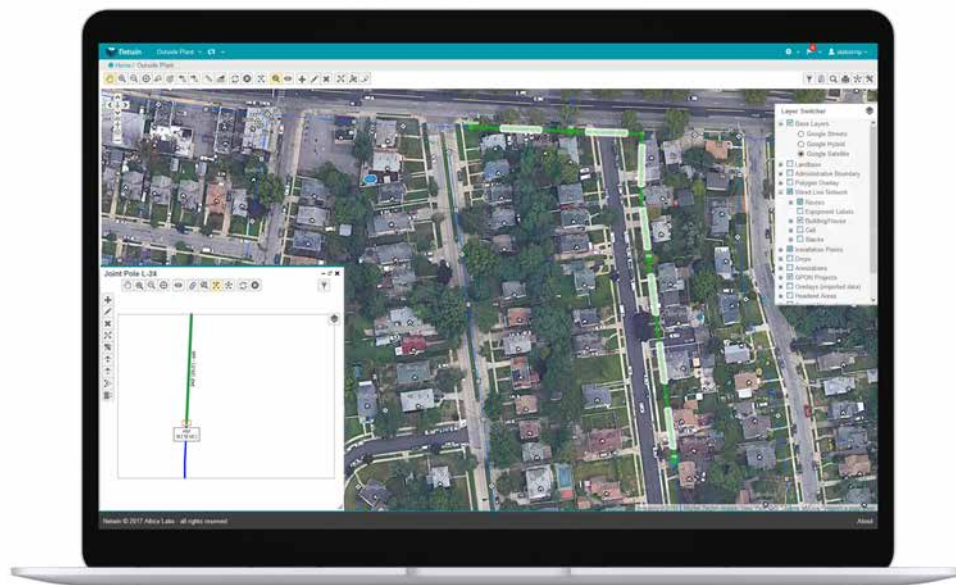
NOSSIS Inventory

- A centralized and unified catalog that supports all services and resources, from “traditional” CSPs to Digital Services, and enables an agile onboarding of new ones for the new Ultra-Fast Broadband.
- A dynamic inventory with up-to-date information, new virtualized networks, and real-time data, exposing APIs to be used by all operational activities and automated processes.
- An Intelligent Network Development support tool that provides operational efficiency whenever new (physical) infrastructures are needed.



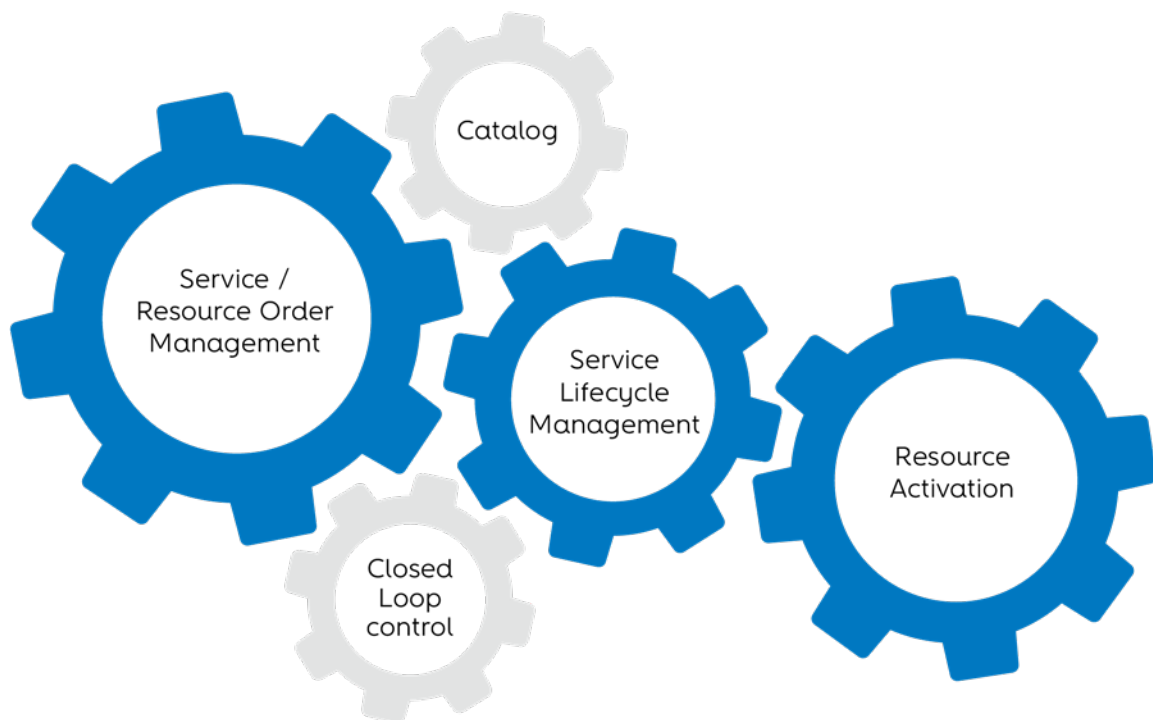
NOSSIS Inventory Main Features

- Service and resource catalogs
- Intelligent network planning and designing tools
- Multilayer inventory from physical to logical resources
- Multi-technology for physical and virtualized networks
- Feasibility and resource allocation
- Exposed APIs for resource/service inventory



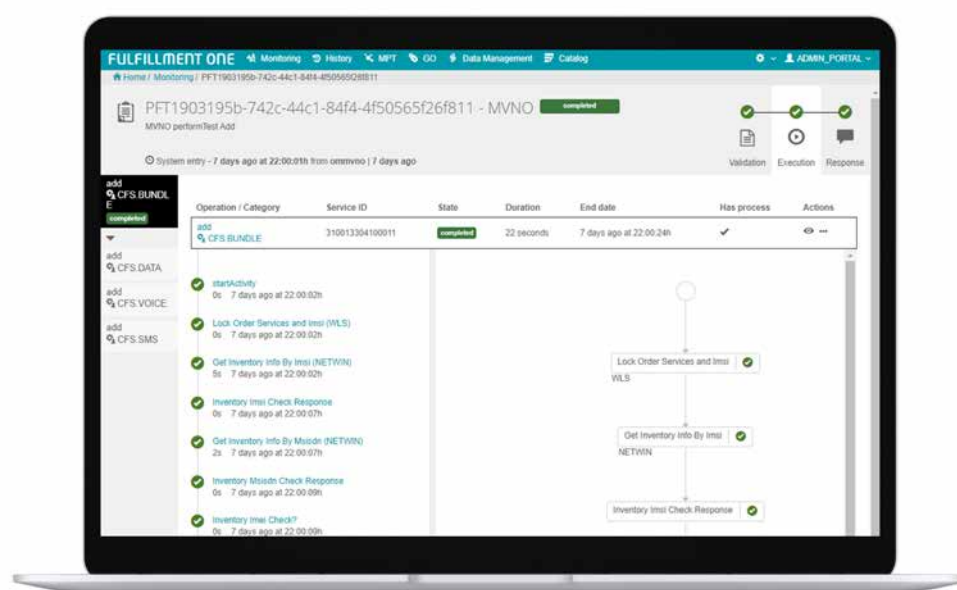
NOSSIS Fulfillment

NOSSIS Fulfillment coordinates the full range of technical provisioning activities by orchestrating complex cross-domain services over traditional telco networks and SDN, NFV, and cloud. It manages automatic and manual activities, ensuring the correct delivery of a service or group of services (bundle). Its modular architecture allows fast onboarding of new services through a catalog-driven approach and exposed APIs that enable fast integrations. A full stack service is prepared for the new Ultra-Fast BB provision needs.



NOSSIS Fulfillment Main Features

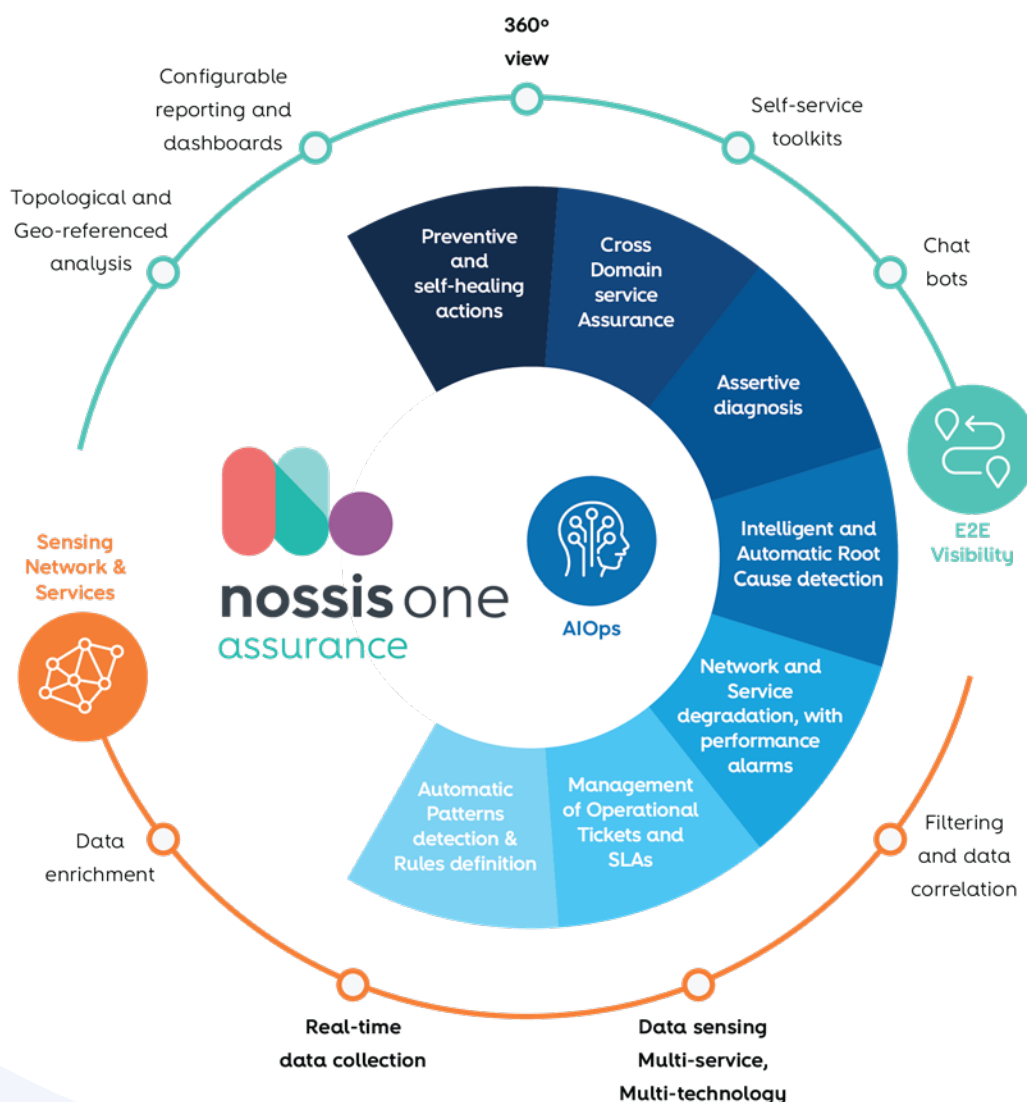
- Multi-domain service/resource order orchestration
- End-to-end service lifecycle management
- Service catalog-driven
- Workflow definition and management
- Manual tasks and manual error handling support
- Closed-loop control, auto-repair and self-healing
- Multi-protocol service activation plug-ins
- Open NBI APIs enabling easy integration



NOSSIS Assurance

NOSSIS Assurance manages complex multi-technology and multi-domain networks, prioritizing customer experience.

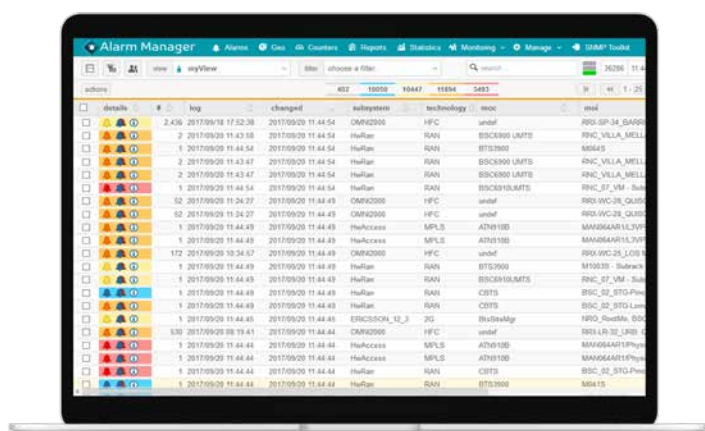
With this module, you can achieve excellence in E2E visibility, providing your teams with assertive diagnostics, accurate KPIs and alerts, automated root cause detection, operational tickets, and SLA management, leveraging and anticipating real-time service alarms. With powerful and configurable dashboards and an intelligent AI and ML engine, this module provides insights that enable an automatic preventive and self-healing actuation, closing the loop.



NOSSIS Assurance Main Features

Fault and Problem Management

- Real-time data collection and heterogeneous events acquisition
- Centralized collection and filtering
- Intelligent and automatic root cause detection
- Alarm correlation for root cause detection
- Prediction scenarios enabled by intelligence
- Toolkits for self-customization of new data sources and correlation rules
- TTK creation and integration
- Management of all operational tickets and SLAs
- Highly configurable and strongly auditable
- Configurable reports and dashboards



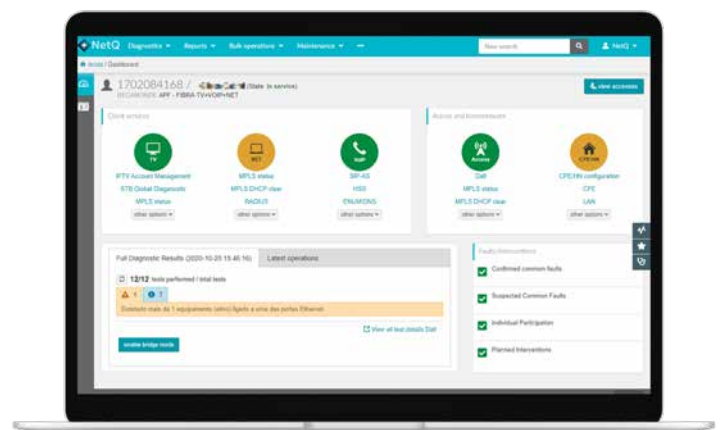
Performance and QoS

- Intelligent E2E monitoring and performance management
- Powerful analytics through KPIs/ KQIs
- Off-the-shelf performance packs
- Performance alarms for network and service degradation
- Proactive supervision
- Toolkit for data collection (Network Telemetry)



Test and Diagnostic

- Automated E2E diagnostic
- Tests and diagnostics in real time
- Specialized front-ends for FO, BO and Field Force
- Guiding scripts for problem solving
- Suggestions for automated repair actions
- Off-the-shelf BOTs and self-care integrations





5G SOLUTIONS



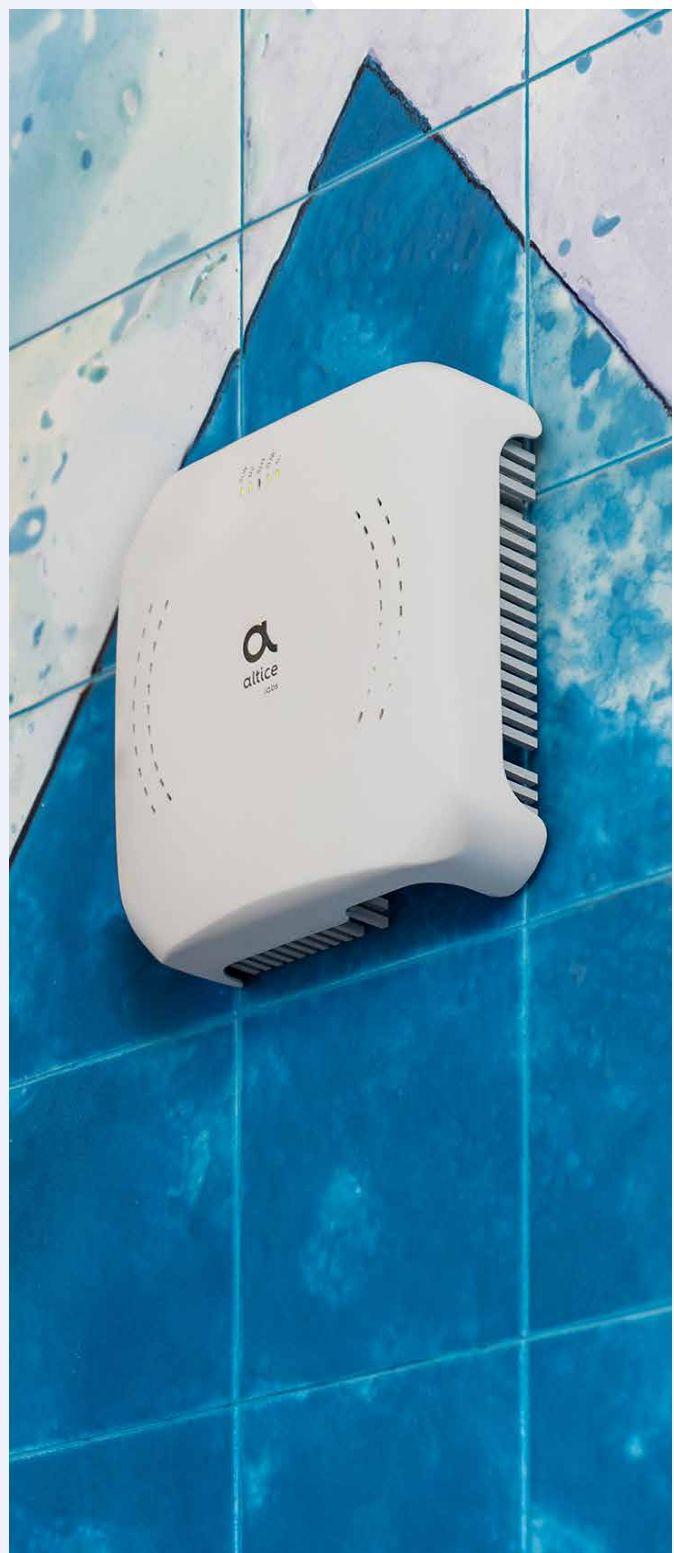
A Novel Approach to Boost 5G Deployments

The next decade will be heavily impacted by 5G. The evolution towards 5G represents a landmark in terms of the convergence of infrastructures, networks, services, and applications.

Enabling the entire 5G environment presents challenges for network topologies and its supporting technologies. Fixed and Mobile Networks and infrastructures must evolve to accommodate the imminent needs.

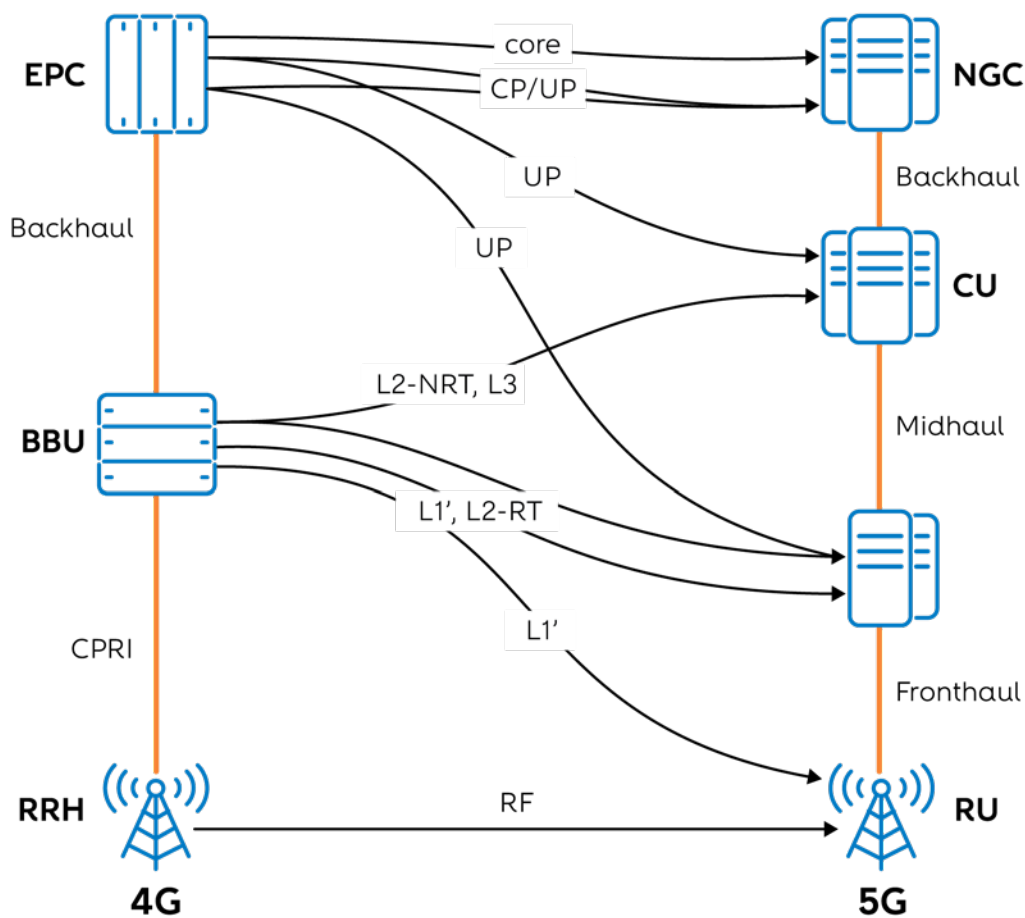
To guarantee the desired Quality of Service (QoS) mainly in terms of throughput, latency, and capacity demands, the deployment of 5G technology must combine the low and high-frequency spectrum, which requires a much higher degree of cell densification; a smaller cell size leads to a higher number of cell sites needed to provide coverage for the same geographical area.

The flexibility and virtualization of the 5G Radio Access Network (RAN) architecture will put additional pressure on the landline infrastructure in terms of capillarity and capacity; converged transport architectures (xHaul) and, in particular, fiber structures and technologies will become the strongest allies of 5G and B5G technologies to cope with the increasing demands.



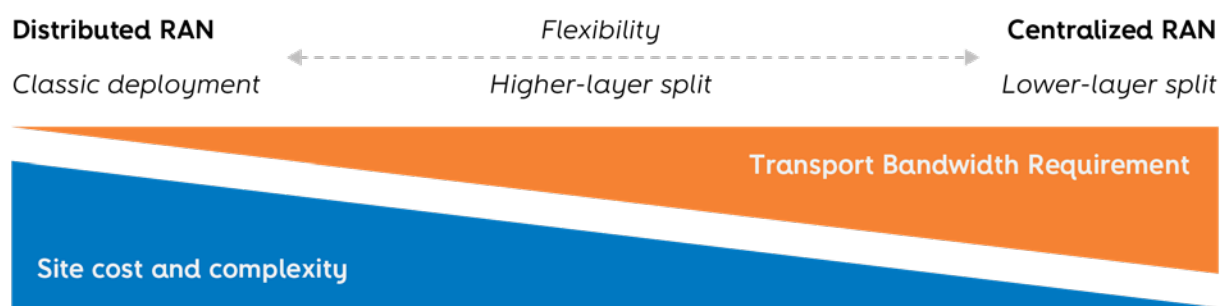
Evolving from a 4G to a 5G architecture

The mobile network evolution from the 4G eNB architecture promotes a disaggregation of the 5G gNB into Central Unit (CU), Distributed Unit (DU), and Radio Unit (RU) network components. This new architecture facilitates virtualization of the RAN, adjusts computing resource assignment across network entities, and increases flexibility in the fronthaul/midhaul line rate requirements and solution complexity, while meeting latency and capacity demands. This new architecture also builds upon the deployment of the RAN using open interfaces (Open Radio Access Network) to promote interoperability between the various RAN components.



Evolution from 4G eNB to 5G gNB based on ITU-SG15 Q2

The optimal location for each network component of the RAN is a trade-off between coordination gain from functional centralization and latency, and bandwidth requirements in the transport network (see figure below). Centralizing RAN functions requires high transport capabilities (both high bandwidth and low latency), which allows for the centralization of all high-layer processing functions and coordination gain. Contrarily, a distributed RAN architecture softens transport requirements but implies higher site cost, complexity, and limited coordination between cells.



Complexity/Cost vs. Transport Bandwidth requirements trade-off based on the functional splitting point

	Fronthaul Split 7.2	Fronthaul Split 6	Midhaul	Backhaul
Medium	eCPRI	eCPRI	Ethernet	IP
Protocol	Open Fronthaul interface 7.2x	nFAPI	F1 Interface	NG/S1 Interface
Range	Up to 20 kms	Up to 80 km	Up to 80 km	Up to 200 kms
Latency	< 250μs	< 250μs	< 1ms	< 40ms
Bandwidth	Up to 86 Gbps	Up to 4 Gbps	Up to 4 Gbps	Mostly, user data traffic

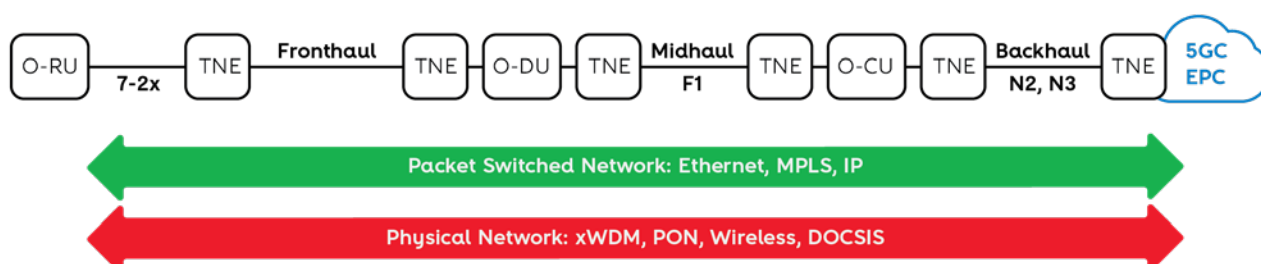
5G main architecture options to be considered

5G networks will enable a new set of services that can be categorized into three different classes: enhanced Mobile Broadband (eMBB), Ultra Reliable Low Latency Communications (URLLC), and massive Machine Type Communications (mMTC). This diversity of new services and their different and often antagonist requirements imply the need for new or enhanced versions of RAN and transport networks.

These requirements will have a significant impact on the underlying network. To achieve a massive 5G deployment with the necessary number of cell sites to meet the demand for new eMBB services, the MNOs need to rely as much as possible on the expansion and capillarity of the transport network. To host new uRLLC and mMTC applications efficiently, MNOs face additional challenges in latency and reliability demand while managing a vast number of connected devices (need for a seamless integration of regional data centers and distributed computing) closer to the endpoints in the network. The most flexible and efficient transport architecture to meet these requirements leans on a converged transport network architecture comprising the fronthaul, midhaul, and backhaul (xHaul).

Transport Slice	Description	Transport Flows	Bandwidth Requirement	Timing Sensitivity Requirement	Reliability Requirement
TS-1	Fronthaul	7.2x CUS-plane, RoE	High	High	High
TS-2_1	Data plane for Backhaul of URLLC service of Operator A	F1-U, S1-U, N3, X2/Xn-U	Medium	High	High
TS-2_2	Data plane for Midhaul, Backhaul of Operator A	F1-U, S1-U, N3, X2/Xn-U	Medium	Medium	High
TS-3	Control plane for Midhaul, Backhaul, Management plane	7.2x M-Plane, F1-C, S1-C, N2, X2/Xn-C, Management	Low	Low	Low

To support an xHaul architecture, the transport network can be deployed in different ways: either using only packet-switched solutions (deployed from the cell site to the core network, e.g., MPLS, Ethernet, or IP-based) or mixing it with other technologies (e.g., xWDM, PON, DOCSIS, or microwave radio links in the access to develop the end-to-end network).

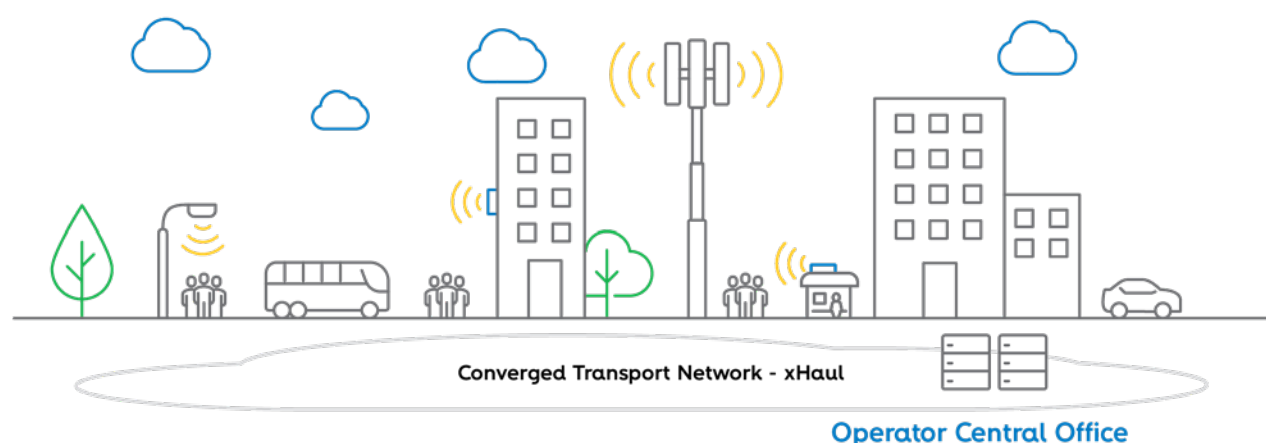


5G Small Cells Deployment Scenarios

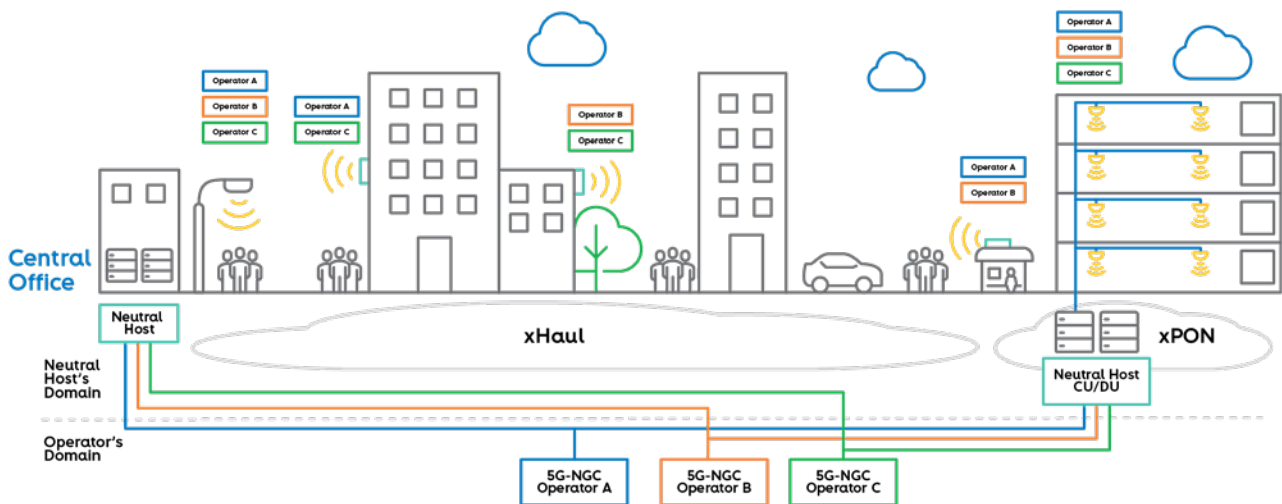
The 5G deployment approach can be relevant in many practical use cases as network operators, Neutral Host Providers (NHP), and private network owners aim to promote 5G cell densification and extend the coverage of their current mobile networks.

Network operators will rely on small cell deployment to capitalize on the following:

- The possibility of a more manageable and less expensive 5G network densification through the deployment of outdoor 5G small cells;
- Increased network flexibility (capacity/coverage enhancement and interoperation with installed technologies) and reduced complexity of network expansions (easier deployment and adaptability to aesthetically sensible areas - concealable solution).

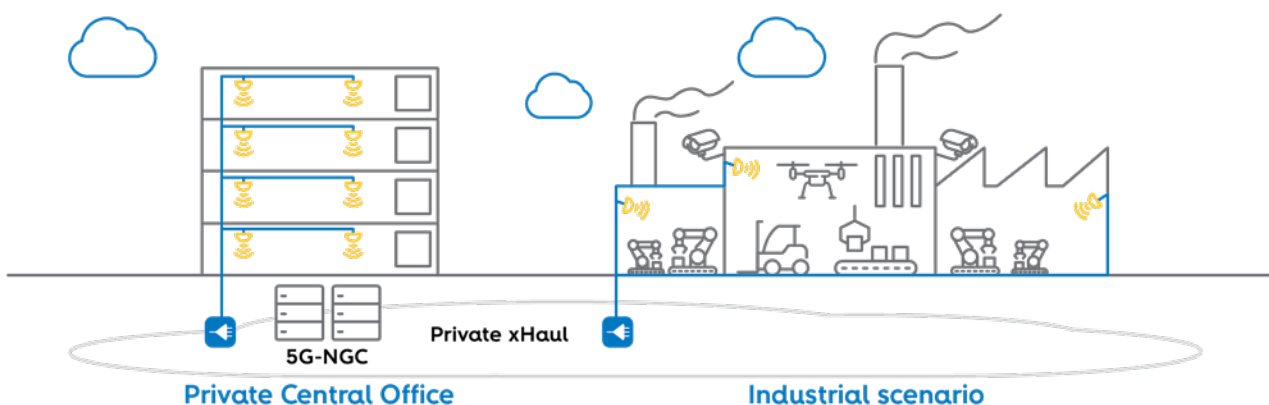


NHP, a third-party non-operator entity, will arise especially to deploy 5G small cells in urban centers, historical downtowns, or public buildings. Considering the lack of business cases for large MNOs to invest in their own network densification or local regulation constraints, an opportunity is presented for NHPs to deploy a network to be rented to the different MNOs and potentially reduce operators' OPEX and CAPEX.



Many large enterprises, businesses, and public entities that want to control security or guarantee QoS are exploring private 5G networks, independent E2E small/medium-sized 5G networks, and utilizing 5G small cells, which may be of interest, particularly in the following contexts:

- Industrial centers that require critical communications - availability, reliability, QoS, and security;
- Large companies and facility owners that require secure networks, high throughput, and QoS;
- Municipalities aiming to deploy smart city solutions.



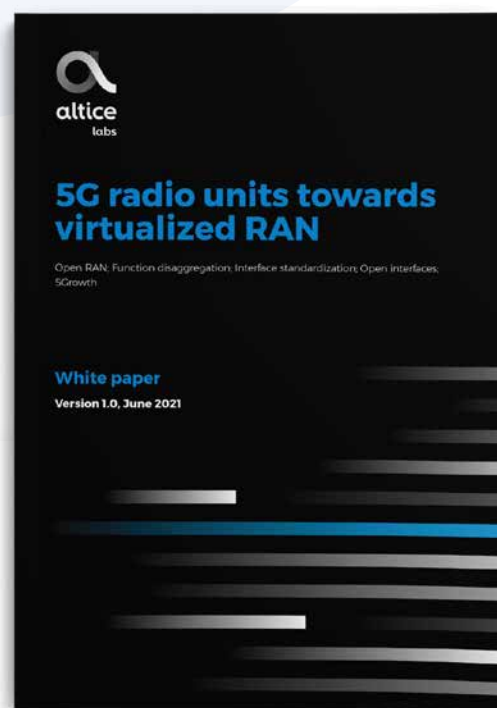
Altice Labs is positioned to deliver an efficient, scalable, and integrated xHaul architecture. Agnostic to the adopted transport technology, we provide a complete end-to-end 5G small cell solution, leveraging in-house 5G Radio Units developed to cope with fully flavored 5G and Beyond 5G (B5G) mobile networks.

White Paper

“5G radio units towards virtualized RAN”

The arrival of 5G is being regarded as the engine to enable Communication Service Providers (CSPs) to reconsider the traditional models. CSPs are exploring innovations and new operating models to drive fundamental changes in the way new networks are built.

In this context, the virtualization of Radio Access Network (RAN) and the adoption of open interfaces are hot topics with growing market interest.



[Download whitepaper](#)

Scan the QR code to read this whitepaper

5G Small Cells



[Download datasheet](#)

Scan the QR code to view more information

5G-A700A2/5G-A700B2/5G-A700C2

- Indoor 5G small cells for n78 band
- MIMO 4x4 (BW up to 100MHz)
- 256QAM / 64QAM (DL/UL)
- Electrical (RJ45) and optical (SFP+) interface for fronthaul (split7.2@O-RAN)
- Sync: LLS-C3 (PTP)
- Integrated antennas
- 235/9.25 x 235/9.25 x 69/2.72 (HxWxD mm/")
- <2.15Kg / 4.74lb



[Download datasheet](#)

Scan the QR code to view more information

5G-Y720A3/5G-Y720B3/5G-Y720C3

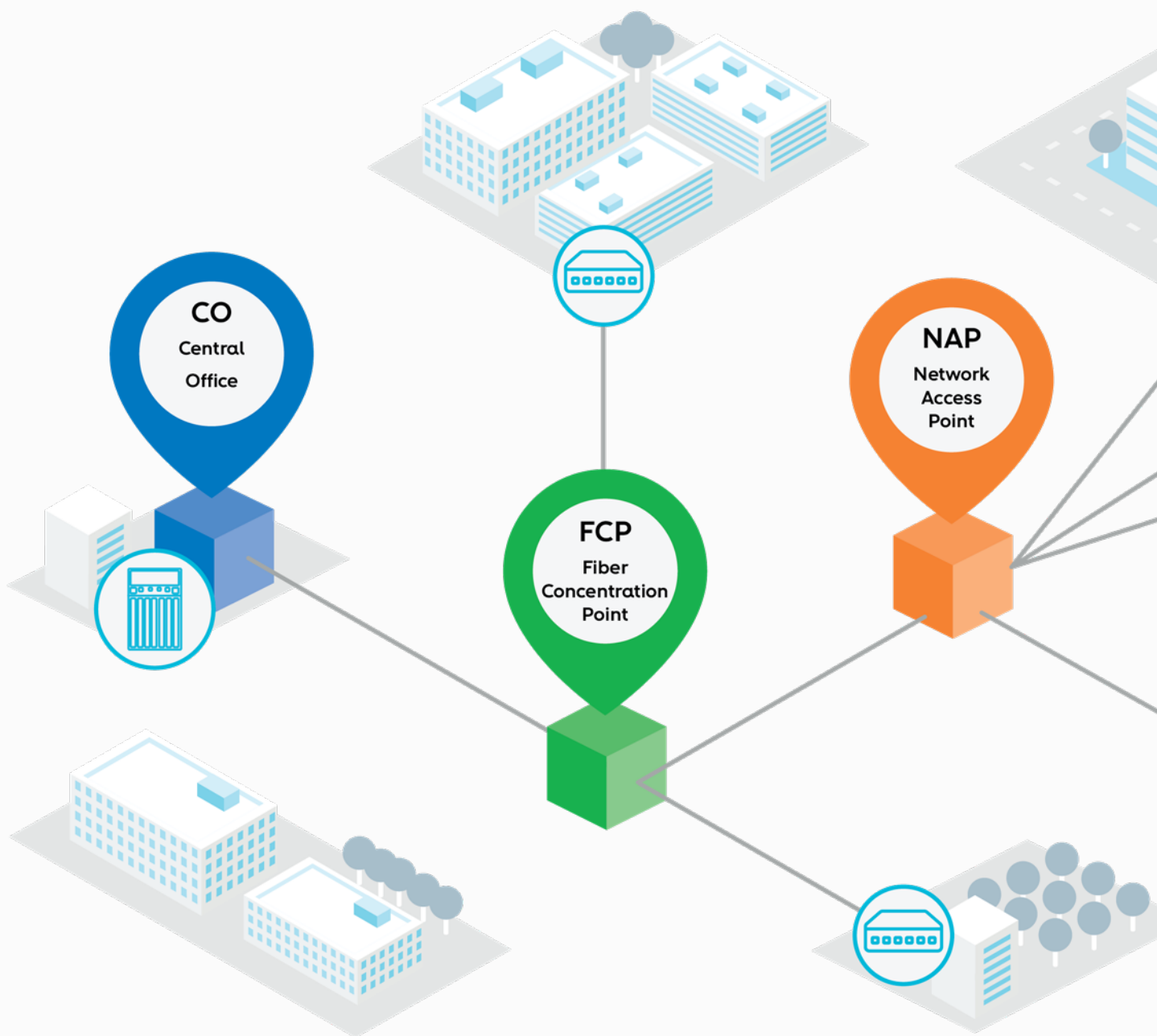
- Outdoor 5G small cells for n78 band
- MIMO 4x4 (BW up to 100MHz)
- 256QAM / 64QAM (DL/UL)
- 2x SFP+ (10Gbps interface)
- Sync: LLS-C3 (PTP)
- 385x250x120 mm
- 8/17.6 (9/19.8 with mounting kit)

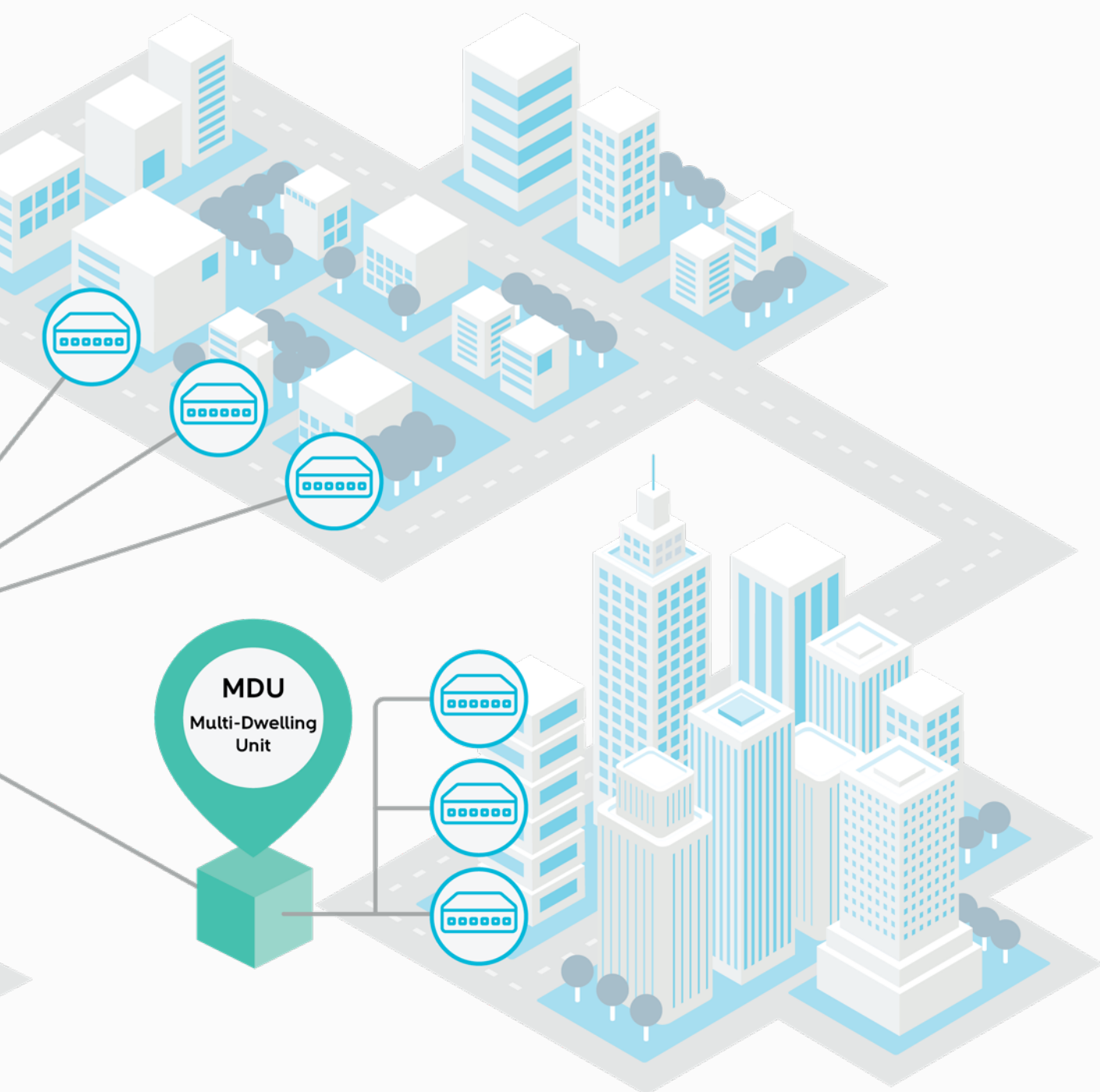
The background image shows a close-up of an optical distribution network. On the left, a vertical metal rod with several black, ring-like components is visible. To the right, a rack of equipment with green ports and white cables is partially shown. A large, semi-transparent blue shape covers the bottom half of the image, serving as a backdrop for the title text.

OPTICAL DISTRIBUTION NETWORK



Optical Distribution Network (ODN) Products





ODN Products

The Optical Distribution Network (ODN) is at the core of communication paths, affecting performance, reliability, and scalability. Altice Labs provides a wide range of products with high service customization capability.



Central Office

- Racks, subracks;
- Splitters;
- Optical Distribution Frames (ODF);
- Outside cabinets for distributed Central Office.



Fiber Concentration Point

- Feeders to distribution networks;
- Splitting and splicing closures;
- Pole, duct or cabinet mounting;
- Modular solutions extensible up to 1120 splices.



Network Access Point

- Distribution to drop networks (ODP);
- Modular solutions extensible up to 144 splices;
- G.652D cabling compatible;
- IP54 / IP67 dust and water intrusion certified.



Multi-Dwelling

- Single or multi-operator;
- Extensible modular solutions (48 to 192 splices, 12 to 144 SC/APC);
- G.652D cabling compatible;
- IP54 / IP67 dust and water intrusion certified.

Central Office

The Central Office (CO) is the nucleus of the network; it starts all the fiber cables and hosts the active equipment (OLTs and others). It is designed to optimize resources and be flexible, simplifying future expansions.

General features:

- Scalability;
- Compact solutions;
- Easy installation and maintenance;
- Integrated fiber management/patching;
- ETSI 19/21" standards.

Standardized or highly customized solutions co-created with customers and optimized over several years of field operation.



Central Office

Racks

OLT Rack

- Fully customizable for OLT systems;
- Integrated power distribution unit;
- Power and alarm cabling system;
- Different locking system possibilities;
- Cabling management;
- Customizable color (std: RAL7035).



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Scan the QR code to view more information



Type	Dimensions(HxWxD)mm	Capacity
33000NG	2000x600x300mm	42RU 19"
36000NG	2200x600x300mm	47RU 19"
B300	2200x600x300mm	47RU 19"
B600	2200x600x600mm	47RU 19"

Central Office

Racks

Datacenter Rack

- Datacenter;
- Front doors with removable side covers;
- Roof and bottom with adjustable opening and protective foam for cable entry,
- Adjustable feet;
- Manufactured according to IEC 60297-1, DIN 41494, BS 5954 e EIA-310-D;
- Left side mats with socket strip fixation along the entire height;
- Maximum capacity of 500kg with wheels and 1300kg with feet;
- Customizable color (std: RAL9005).



[Download datasheet](#)

Scan the QR code to view more information

Type	Dimensions(HxWxD)mm	Capacity
Datacenter	2200x800x1100mm	47RU 19"
Datacenter	2200x800x1200mm	47RU 19"
Datacenter	2200x600x1100mm	47RU 19"
Datacenter	2000x800x1100mm	42RU 19"
Datacenter	2000x600x1000mm	42RU 19"
Datacenter	2000x800x1000mm	42RU 19"
Datacenter	2000x600x600 mm	42RU 19"
Datacenter	2000x800x600 mm	47RU 19"

Central Office

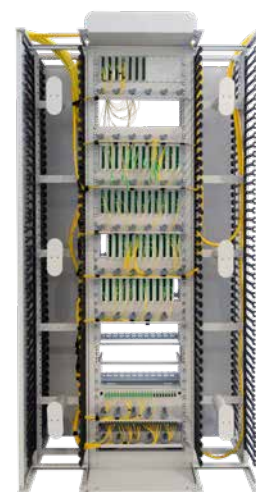
Racks

Optical Distribution Rack

- Optical distribution frames;
- Double frontal door system with transparent glass or mesh holes and key lock;
- Removable side and back panels for easy access;
- Optical fiber guidance with $R > 30\text{mm}$;
- Frontal patch cord organizers;
- Ceiling for cable input with adjustable opening and protective foam;
- Inner rotating structure for easy user access to the installed equipment;
- Customizable color (std: RAL7035).



BSP / ODF Series



OGC Series



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Scan the QR code to view more information

Type	Dimensions(HxWxD)mm	Capacity
720 BSP/ODF	2000x800x600mm	38RU 19"
720 OGC	2000x800x600mm	38RU 19"
1150 BSP/ODF	2200x800x600mm	43RU 19"
1150 OGC	2200x800x600mm	43RU 19"
OGC RT	2200x1000x600mm	43RU 19"

Central Office

Wall Mounting Rack

Rack Mounting 6/9 RU | Rack Wall Fixing 3/5 RU

- Installation of telecommunications equipment;
- Material: zincor/galvanized steel;
- Prepared for wall mounting/fixing;
- Customizable color (std: RAL7035).



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Rack Mounting 6RU



Rack Wall Fixing 3/5 RU

Type	Dimensions(HxWxD)mm	Capacity
Rack Mounting	350x555x500mm	6RU 19"
Rack Mounting	400x600x500mm	9RU 19"
Rack Wall Fixing	146x487x352mm	3RU 19"
Rack Wall Fixing	234x487x352mm	5RU 19"

Central Office

Patch/ Splice/ Split Panels

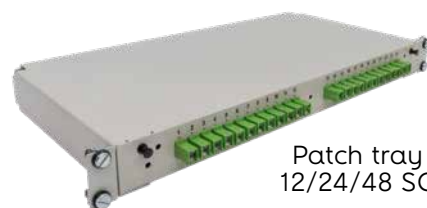
Patch tray 12/24/48 SC | Subrack 1/ 3RU - 4/ 7/ 14 HP | Patch panel 24 SC

- Fiber termination, patching and splitting shelves;
- Material: plastic/zincor;
- Fitted with or without optical adapters;
- Port identification;
- Fixing accessories;
- Customizable color (std: RAL7035).

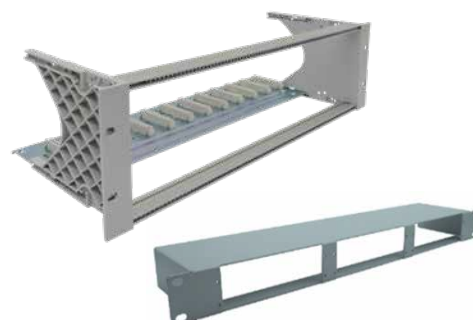


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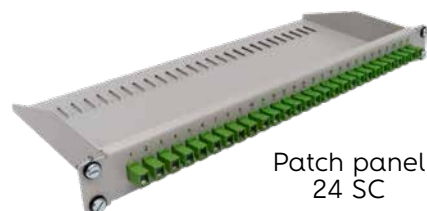
Scan the QR code to view more information



Patch tray
12/24/48 SC



Subrack 1/ 3RU
- 4/ 7/ 14 HP



Patch panel
24 SC

Type	Dimensions(HxWxD)mm	Capacity
Patch tray	44x490x230mm	1RU 19" 12/24 or 48
Subrack	44x490x50mm	1RU 19" 24HP for splice/split modules
Subrack	130x490x200mm	3RU 19" 84HP for splice/split modules
Patch panel	44x490x200mm	1RU 19" 24

Central Office

Patch/ Splice/ Split Modules

Splice Mod 3RU 4/ 7HP 12SC | Patch Mod 3RU 7HP 12Adapt | Split Mod 3RU 4/ 7/ 14HP | Split Mod 3RU 4/ 7HP Pre-connect

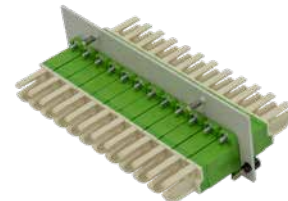
- Fiber termination, patching and splitting frames;
- 4, 7 or 14HP options;
- Includes pigtails, adapters, splice tray or splitters;
- Customizable port identification;
- Fixing accessories.



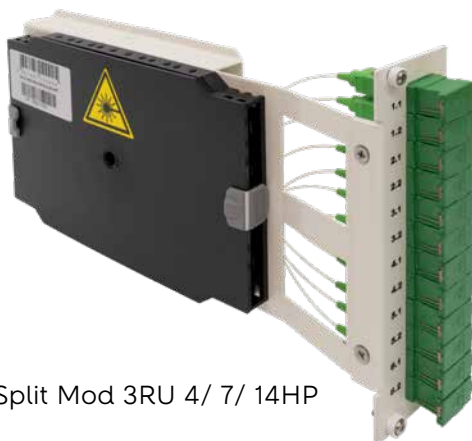
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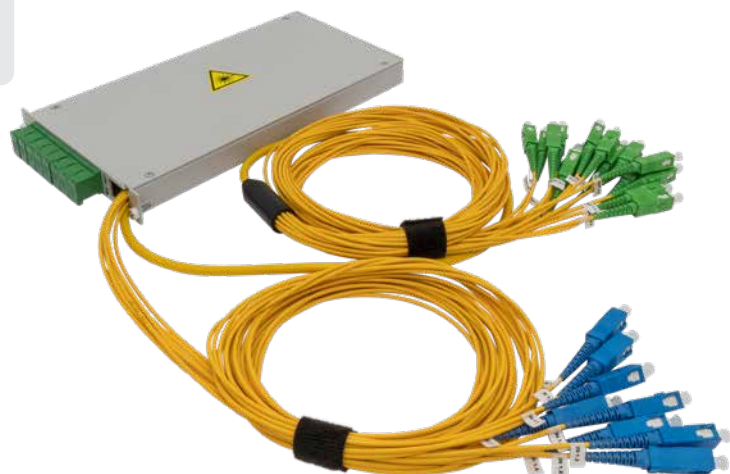
Splice Mod 3RU 4/
7HP 12SC



Patch Mod 3RU
7HP
12Adapt



Split Mod 3RU 4/ 7/ 14HP



Split Mod 3RU 4/ 7HP Pre-connect

Central Office

Patch/ Splice/ Split Modules

Type	Dimensions(HxWxD)mm	Capacity
Splice mod	130x35x220mm	3RU 7HP with 12 SC/APC adapters G.652D
Splice mod	130x35x220mm	3RU 7HP with 12 SC/APC adapters G.657A1
Splice mod	130x20x220mm	3RU 4HP with 12 SC/APC adapters G.652D
Splice mod	130x35x220mm	3RU 7HP with 12 E2000 adapters G.652D
Split mod	130x35x230mm	3RU 7HP with 6x2:2 SC/APC
Split mod	130x70x230mm	3RU 14HP with 1x2:16 SC/APC
Split mod	130x35x230mm	3RU 7HP with 2x1:2 SC/APC
Split mod	130x70x230mm	3RU 14HP with 1x1:32 SC/APC
Split mod	130x35x120mm	3RU 7HP with 2x1:4 SC/APC in 2mm patch cord with 3M in ABS box
Split mod	130x35x120mm	3RU 7HP with 1x1:32 SC/APC in 2mm patch cord with 3M in ABS box
Split mod	130x20x220mm	3RU 4HP with 8x2:2 with SC/UPC and SC/APC connectores
Split mod	130x20x220mm	3RU 4HP with 8x1:2 with SC/UPC and SC/APC connectores
Patch mod	130x20x200mm	3RU 4HP 19" with 12 SC/APC adapters
Patch mod	130x35x200mm	3RU 7HP 19" with 12 SC/APC adapters
Patch mod	130x35x200mm	3RU 7HP 19" with 12 E2000/APC adapters

Central Office

Cable Management

Fiber Organizer 19" | Fiber Subrack | Fiber Storage Tray

- Install splice or split modules;
- Fiber management system;
- Material: plastic, zincor or steel sheet;
- Supports for fiber R>30mm;
- Fixing accessories;
- Customizable color (std: RAL7035).



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Type	Dimensions(HxWxD)mm	Capacity
Fiber organizer	55x515x75mm	1RU 19"
Fiber Subrack	178x515x222mm	Subrack 3RU 19" 84HP for splice/split modules plus 1RU Fiber storage tray
Fiber storage tray	50x483x292mm	1RU 19", Fiber storage subrack rear
Fiber storage tray	47x483x300mm	1RU 19", Fiber storage subrack front
Fiber storage tray	44x481x236mm	1RU 19", Fiber storage slide tray with spools and fiber routing for left and right sides
Fiber storage tray	44x482x243mm	1RU 19", Fiber storage tray with spools and fiber routing

Central Office

Delivers a decentralized service in high or low population density areas.

Covers the preferred area with all services.

Provides robustness, security, and scalability. It's resistant to environmental damage, vandalism, insect and rodent attacks, and other similar threats.

General features:

- Compact solutions;
- Modular design with hard body double walls;
- Multiple colors;
- Pole, wall, or floor installation.

Standardized or highly customized solutions for different markets (USA, France, etc.).



Central Office

Outdoor Cabinets

GPON OUTDOOR CABINET 3000V2

- Compact active equipment;
- Designed for one OLT2T0 equipment;
- Suited for service delivery in low-density areas;
- Provides robustness, security and flexibility;
- Modular design;
- Thermal and electrical efficiency;
- Hard body double wall;
- Open door locking system;
- Door locking in 3 points;
- IP55 protection level;
- 2 subracks for splitting and splicing of optical fiber terminations;
- Pole, wall, and floor installation;
- Working temperature between 40°C to 55°C.



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Type	Dimensions(HxWxD)mm	Capacity
Outdoor Cabinet 3000V2	800x500x400mm	Max. Equipment capacity 19"/9RU (320mm equip. depth)

Central Office

Outdoor Cabinets

GPON OUTDOOR CABINET 6000

- Active equipment;
- Compact solution;
- Embedded heat exchange and climate control;
- Modular design;
- Hard body double walls;
- AC/DC converter with battery backup;
- Power distribution unit;
- 4 subracks for split/splice/WDM/Cex;
- Incorporated cabling management;
- IP55 protection level.



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Type	Dimensions(HxWxD)mm	Capacity
Outdoor Cabinet 6000	1326x1250x580mm	20RU in 19/21" + 20RU in 19/21"

Central Office

Outdoor Cabinets

GPON OUTDOOR CABINET 6001

- Active equipment;
- Compact solution;
- Embedded heat exchange climate control;
- Modular design;
- Hard body double walls;
- Open panels locking system;
- Panels locking system with 2 points with duo high security cam locks;
- Isolated batteries compartments;
- 1 subrack for primary;
- 3 subracks for split/splice/WDM/CEX;
- Incorporated cabling management;
- IP55 protection level.



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Type	Dimensions(HxWxD)mm	Capacity
Outdoor Cabinet 6001	900x1829x600mm	17+16RU in 19"

Central Office

Outdoor Cabinets

GPON OUTDOOR CABINET 18000

- Active equipment;
- Compact solution;
- Modular design;
- Air conditioning system up to 4000W;
- Hard body double walls;
- Door locking system with 2 points and prepared for operator's key lockers;
- Incorporated cabling management;
- Module for up to 12 batteries 12V/170Ah;
- IP55 protection level.



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Type	Dimensions(HxWxD)mm	Capacity
Outdoor Cabinet 18000	1825x2180x716mm	2x33 + 4x18RU in 19/21"

Central Office

Outdoor Cabinets

OUTDOOR CABINET AR32

- Active equipment;
- Separated AC power compartment;
- Door stays for each door;
- Document power pockets and laptop holder;
- Central fiber cable management;
- Battery tray;
- No permissible points for vandalism;
- Lifting eye bolts for easy deployment;
- Robust RC2 double cylinder swing handle;
- Air exchange thermal solution;
- Outer parts can be removed without interruption of service;
- Open door alarm;
- Base plates with cable glands and rubber grommets;
- Standards: IP55 (EN 60529), IK10 (EN 60068-2-75), RC2 (EN 1627), and Class 4,1 (ETSI EN 3000191-4);
- Mounting directly in a concrete base or socket.



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Scan the QR code to view more information

Type	Dimensions(HxWxD)mm	Capacity
Outdoor Cabinet AR32	1600x2000x500mm	2x 19" 22RU



Fiber Concentration Point

The OSP network is divided into transition points (FCP, NAP, and MDU components), which create flexibility points across the feeder, distribution, and access network.

General features:

- Flexibility and scalable solutions;
- Modular design;
- Multi-access enclosures;
- Pole, wall, or manhole installation.

Standardized or highly customized solutions for different markets (USA, France, etc.).



Fiber Concentration Point

Cabinets

**FCP SRO-18RU | FCP SRO-288OF
PRE- CONNECTORIZED | FCP
SRO-25RU | FCP MINI-SRO-152OF |
SRO768 UP-GF**

- Optical distribution for FTTx networks;
- Modular solutions;
- Built-in cabling management;
- Standard splitter modules;
- Pole or ground installation accessories;
- IPx4 protection rating;
- Customizable color (std: RAL7035).



[Download datasheet](#)

Scan the QR code to view more information



FCP SRO-18RU



FCP MINI-SRO-152OF



SRO768 UP-GF

Fiber Concentration Point

Cabinets

Type	Dimensions(HxWxD)mm	Capacity
SRO 432 1D RT	1200x750x500mm	18RU 19"
SRO 288 1D RT	1200x750x500mm	18RU 19"
SRO 144 1D RT	1200x750x500mm	18RU 19"
SRO 576 RT + Cable	1100x750x500mm	25RU 19"
SRO 288 1D RT + Cable	1200x750x500mm	288OF + 7/14HP splitter modules
SRO 576 1D RT	1100x750x500mm	25RU 19"
SRO 432 1D RT	1100x750x500mm	25RU 19"
Mini SRO PM	680x520x450mm	152OF + 4HP splitter modules
SRO768 UP-GF w/ Pedestal	1065x785x322mm 2015x785x322mm w/ plinth	768 client

Fiber Concentration Point

Split Enclosures

JSO-ORG/SPLIT | JSO-144/ 288/ 432/ 720 | JRO-128/34 SC | JFO 24-144OF

- Multi-access optical enclosures;
- Modular solution;
- Splicing capacities from 24 to 720OF;
- Different port configurations: 4+1; 6+1;
- Mechanical port or shrink sleeve port options;
- Fiber management compliant G652 (R<=30mm);
- Multi-color trays;
- Installation on wall, pole, manhole, or strand;
- Protection level IP68;
- Customizable color (std: RAL9005).



JSO-ORG SPLIT

JSO-144 288 432 720



JRO-128/34 SC

JFO 24-144OF



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Scan the QR code to view more information

Fiber Concentration Point

Split Enclosures

Type	Dimensions(HxWxD)mm	Capacity
JRO 6+1 PM	610x Ø 225mm	128SC + Up to 360OF
JRO 34SC/APC 1:32 PWM 2+2+1M	480x Ø256mm	120OF + splitter 1x1:32
JSO288 SC PWM	630x Ø225mm	288 to 432OF
JSO720 SC PWM	790x Ø225mm	720OF
JSO288 144FO SC SM(6+1)M	480x Ø210mm	144 to 288OF
JSO720 SC PWM P4+1	790x Ø225mm	720OF
JSO432 SC PWM P4+1	630x Ø225mm	432OF
SPLICE ORG JSO SC 12OF GR	124x132x4,5mm	12OF
SPLIT ORG JSO 1:4 BK	124x132x4,5mm	1x1:4
SPLIT ORG JSO 1:8 BK	124x132x4,5mm	1x1:8
SPLIT ORG JSO 1:16 BK	124x132x4,5mm	1x1:16
SPLIT ORG JSO 1:32 BK	124x132x4,5mm	1x1:32
JFO144 24OF SE PWM 4+1	450x Ø230mm	24 to 144OF
JFO48 SC PL SM 4+1	480x Ø180mm	48OF
JFO144 SC PL SM 6+1	450x Ø180mm	144OF



Network Access Point

ODP Boxes

ODP-12/24 EXTERNAL | ODP-16 EXTERNAL IP67 | ODP-34SC/APC 1:32 EXTERNAL | ODP-12 INTERNAL | HUP16/2

- Distribution network and drop connection to the client;
- Scalability;
- 8, 12, 16, 24, 32 customers;
- Several configurations are available, according to the client's needs: with or w/o adapters, with or w/o locker, with or w/o splice trays, splitters, etc.
- Mechanical fastening for easy opening/closing;
- Wall, pole or manhole mounting accessories.



[Download datasheet](#)

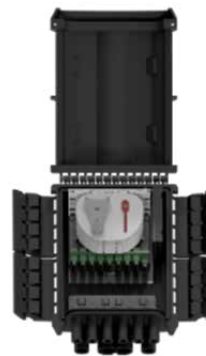
Scan the QR code to view more information



ODP-12/24 EXTERNAL



ODP-16 EXTERNAL IP67



ODP-34SC/APC 1:32 EXTERNAL



ODP-12 INTERNAL



HUP16

Network Access Point

ODP Boxes

Type	Dimensions(HxWxD)mm	Capacity	Note
PDO12 EXT PL 48FO PWM	265x150x71mm	48OF	(2x24)48 splices/Max. 96 splices (4x24)
PDO16 SUB PL 72FO PWM	450x Ø230mm	72OF	Loop possibility
PDO24 EXT PL 72FO 4+2	265x235x90mm	Up to 144OF	4 splice trays R30 for network distribution and 2 trays for network drop
PDO12 SC/APC INT PL 12OF	153x105x66mm	12OF	With 12 SC/APC adapter
CRO 34SC/APC 1:32 WM 4+2+1M CQ	380x245x130mm	Up to 60OF + 1x1:32 splitter	With 34 SC/APC adapter
HUP16/2	173x111x(64 or 32mm)	8/2 ANT crimp splice protector	With LC duplex adapt with or without pigtail

Multi-Dwelling Unit

Multi-Dwelling Unit

MDU12/24 SC ADAPT | MDU24 SPLICE | MDU24/48 SC ADAPT | MDU72/144 SC ADAPT

- Building terminal box or optical distribution point for FTTH networks;
- Stackable with similar boxes;
- 2 compartments: one for fiber termination and one for patching;
- Several configurations are available, according to the client's needs: with or w/o adapters, with or w/o locker;
- Cable strength member fixing;
- Wall mounting accessories;
- Customizable color (std: RAL9001).



MDU24/48 SC
ADAPT



[Download datasheet](#)

Scan the QR code to view more information

Type	Dimensions(HxWxD)mm	Capacity
PDO24 INT P 24 SC/APC 24OF 2LK	155x330x75mm	24OF
PDO24 INT P 12 SC/APC 12OF 2LK	155x330x75mm	12OF
PDO48 INT P 48 SC/APC 48OF 2LK	155x330x105mm	48OF
PDO48 INT P 36 SC/APC 36OF 2LK	155x330x105mm	36OF
PDO12 INT M 96OF	268x340x108mm	96OF
PDO12 INT M 72OF	268x340x108mm	72OF

Multi-Dwelling Unit

Terminal boxes

DROP BOX SC ADAPT | DROP BOX SPLICE | OUTLET2 SC ADAPT | OUTLET2 SPLICE

- Transition point between the external network and the active equipment;
- Compact design and easy installation;
- Drop cable entrance available;
- Several configurations available according to the client's needs: with or w/o adapters;
- Wall fixing accessories;
- Fast cover fitting (screwless).



[Download datasheet](#)

Scan the QR code to view more information



DROP BOX SPLICE



OUTLET2 SC Adapt



OUTLET2 LC Duplex

Type	Dimensions(HxWxD)mm	Capacity
DROP BOX SC/APC	40x110x20mm	1 splice /SC Adapt
DROP BOX SPLICE	40x110x20mm	1 splice
OUTLET2 1SC/APC INT PL WM	14,3x83,6x80,4mm	Max. 2 splices
OUTLET2 2SC/APC INT PL WM	14,3x83,6x80,4mm	2 splices
OUTLET2 1FO WM	14,3x83,6x80,4mm	Max. 2 splices
OUTLET2 2FO WM	14,3x83,6x80,4mm	2 splices/SC or LC Duplex Adapt

A close-up, low-angle shot of a computer keyboard. The keys are white and slightly raised, set against a dark background. A thin, white, curved line arcs across the top right of the image. A large, semi-transparent blue shape, resembling a stylized 'L' or a corner, covers the bottom half of the image, serving as a background for the text.

TEST LABS AND CONTROL



Test Labs and Quality Control

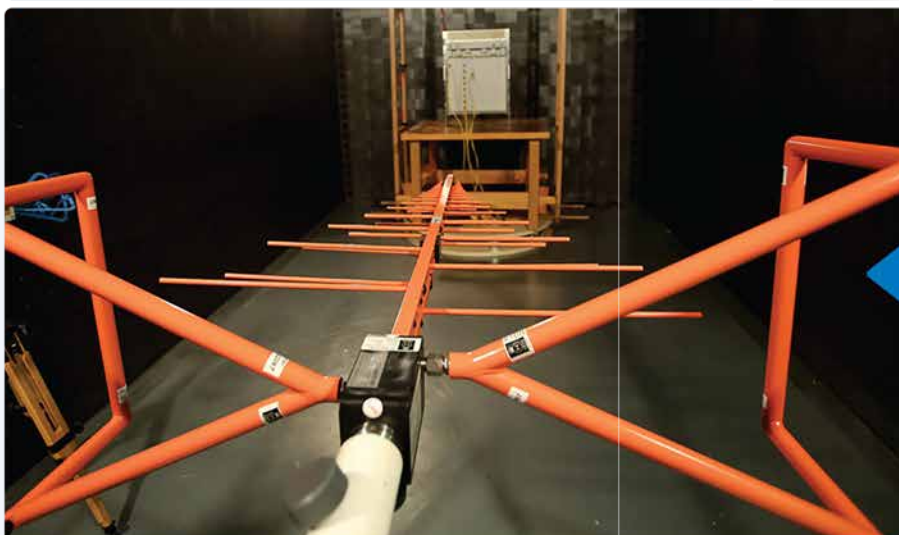


Development Design

After product specification, the development process starts with schematics and PCB (Printed Circuit Board) design, followed by micro-electronics development and simulation, prototypes bring-up and unitary tests. Altice Labs develops PCBs that are among the most complex in the world.

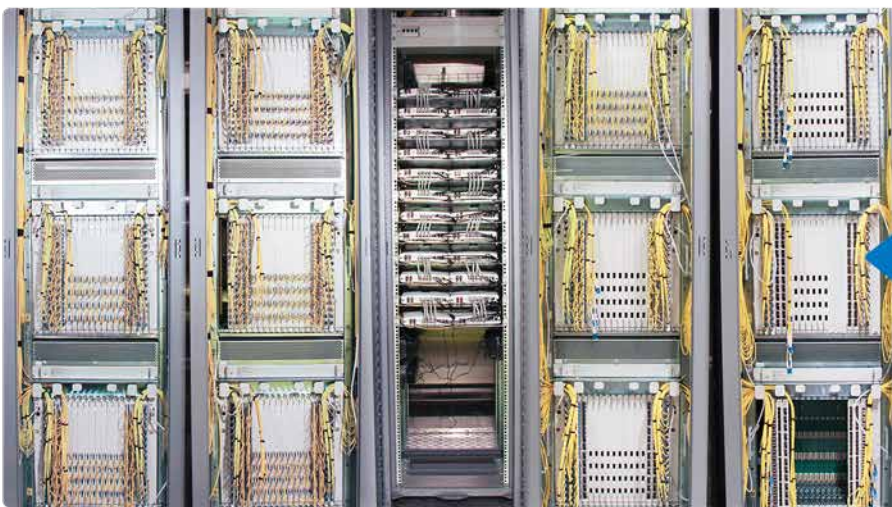
Test & Industrialization

Quality assurance is guaranteed by hardware, software and systems validation in simulated highly loaded networks, according to specific functional and non-functional requirements.



Conformance and Interoperability

Electromagnetic compatibility testing (EMC), CWMP – CPE WAN management protocol (TR069), GPON interoperability, Wi-Fi, ADSL/ADSL+ interoperability, interworking compatibility with telecommunication networks, acoustic – voice terminals and CWMP – CPE WAN management protocol (TR069). This lab also certifies CPEs from different vendors.



Reliability Demonstration

The product Reliability Demonstration Test (RDT) is a process to demonstrate that the calculated MTBF (Mean Time Between Failures) is coherent with the system's life cycle behavior. This test is achieved through accelerated aging by continuous temperature cycling, with simulated traffic, while being continuously monitored by external test equipment through automation.

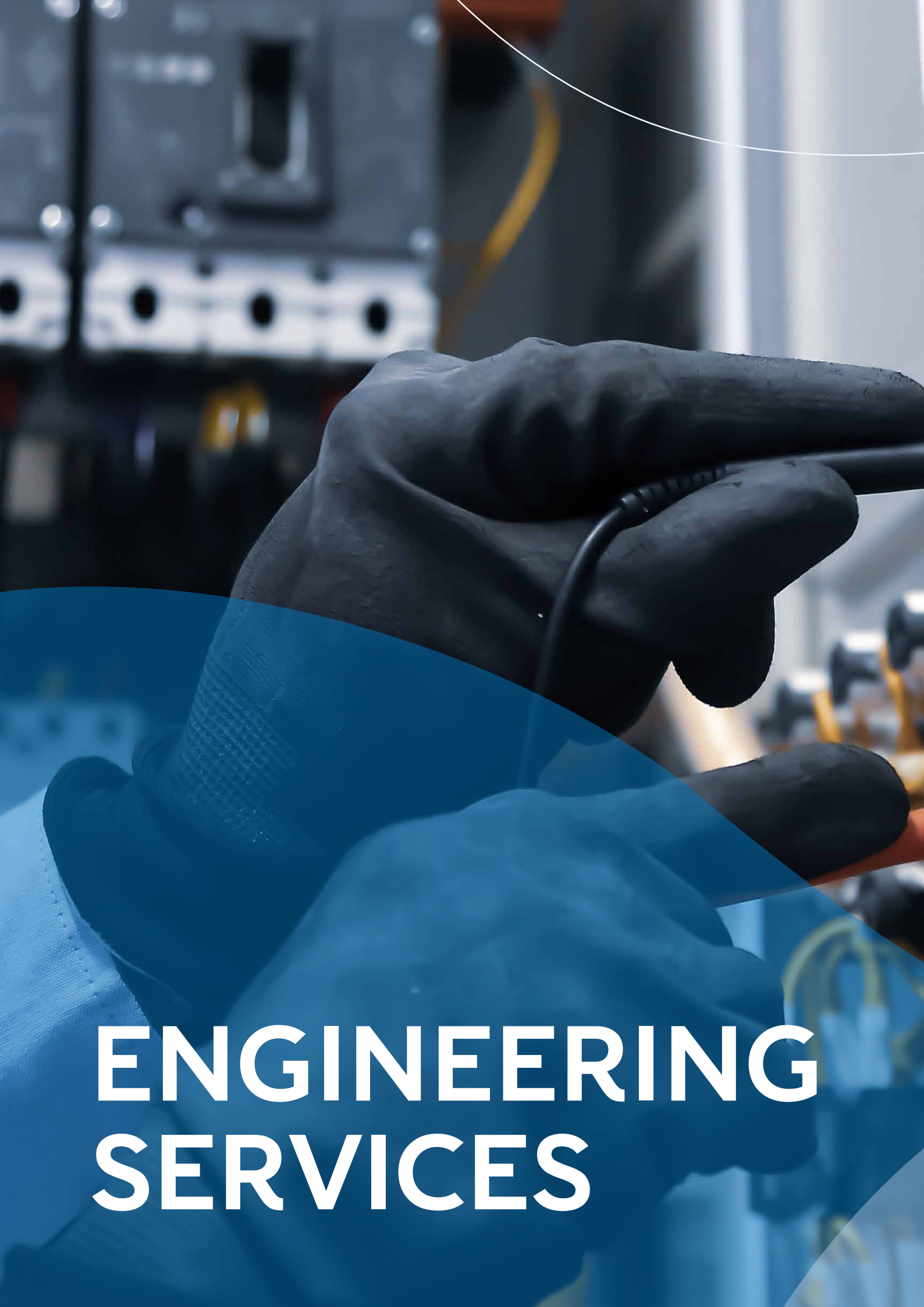
Environmental and Mechanical Certification

Certification: user safety testing (IEC 60950-1), environmental (Ka, climatogram), mechanical (vibration), resistibility. This lab also certifies products from different vendors.



Prototype Production

Complete assembly line designed for prototypes and pre-series, with high flexibility to improve downtime, to change between productions, and capable of handling all sorts of electronic components. Fully automated for surface-mounted devices and semi-automated for conventional components. The assembly quality is assured by automatic optical inspection.



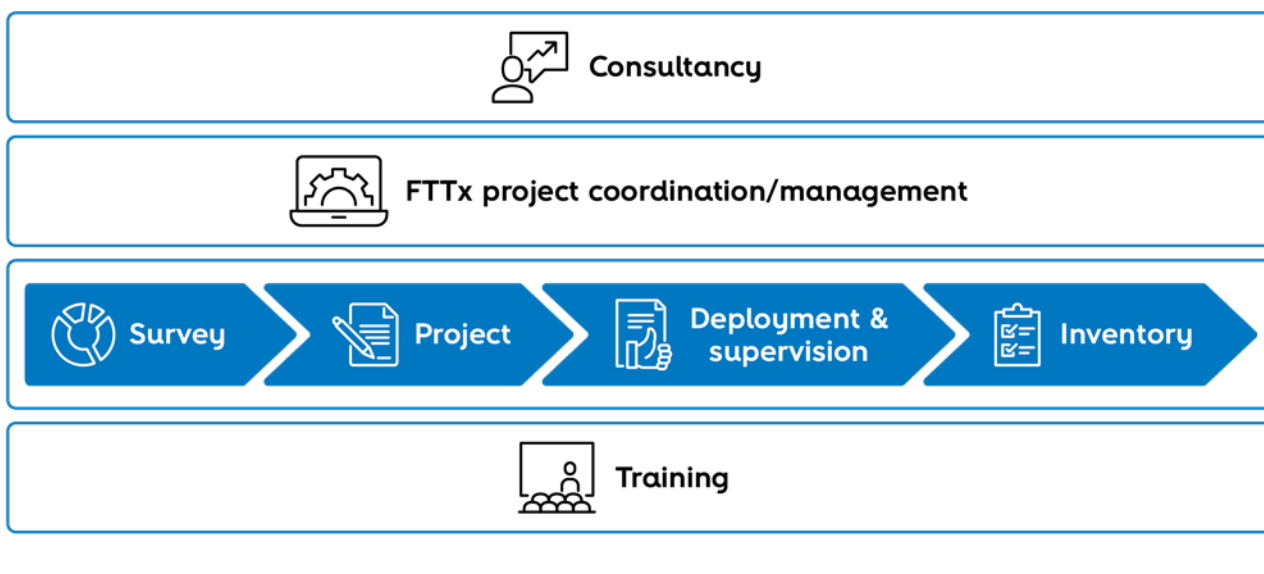
ENGINEERING SERVICES



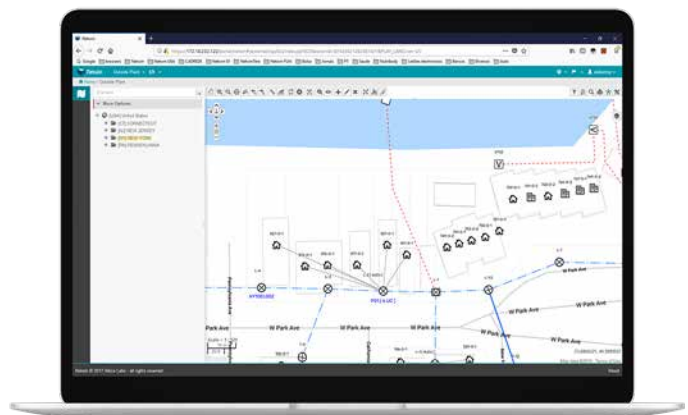
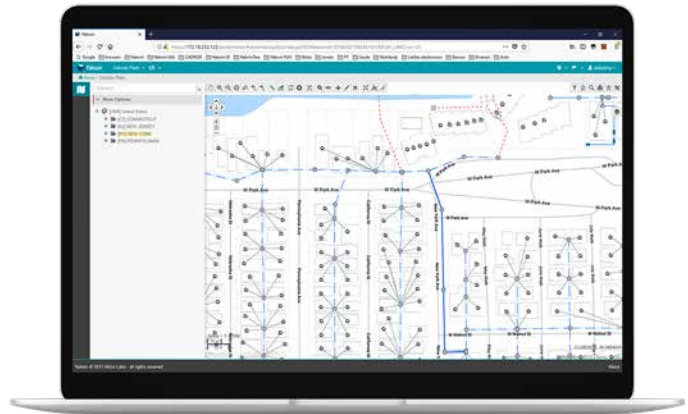
Highly Skilled Team with a Proven Track Record

Altice Labs holds a proven track record of highly skilled engineering service delivery. From the beginning of the FTTx project plan until the field deployment rollout, our teams seek excellence, pursuing the best practices and tools while ensuring a successful business plan for all stakeholders.

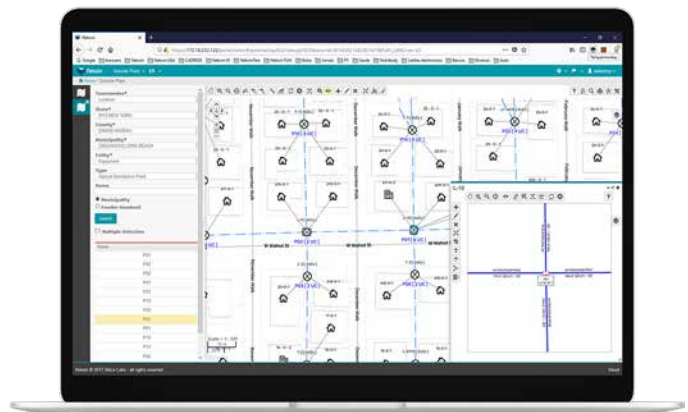
- Consultancy, audit, and network design of P2P and P2MP Outside Distribution Network
- Specially skilled teams for Project Coordination, Project Management, and Contract Supervisory
- Full cycle of FTTx service operational tasks, which include Survey, Project, Deployment, and Inventory
- Rollout speedup and optimization of the Total Cost of Ownership (TCO)
- Pay-as-you-grow business models, future-proof investments, and hardware optimization
- Comprehensive training programs



Engineering Services Portfolio



Aiming to deliver a differentiated and value-added service, Altice Labs uses the best-of-breed market tools to implement a recursive cycle following Survey, Project, Deployment and Supervision, Inventory, and Audit phases, as described in the Operation Support Systems section of this portfolio.





MAINTENANCE SUPPORT SERVICES

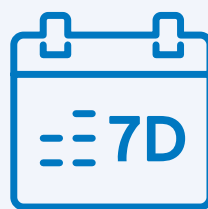


Highly Skilled Support Team with Relevant Know-How and Experience

Highly skilled technicians provide after-sales services supported by the best market tools, according to dedicated contract specifications.

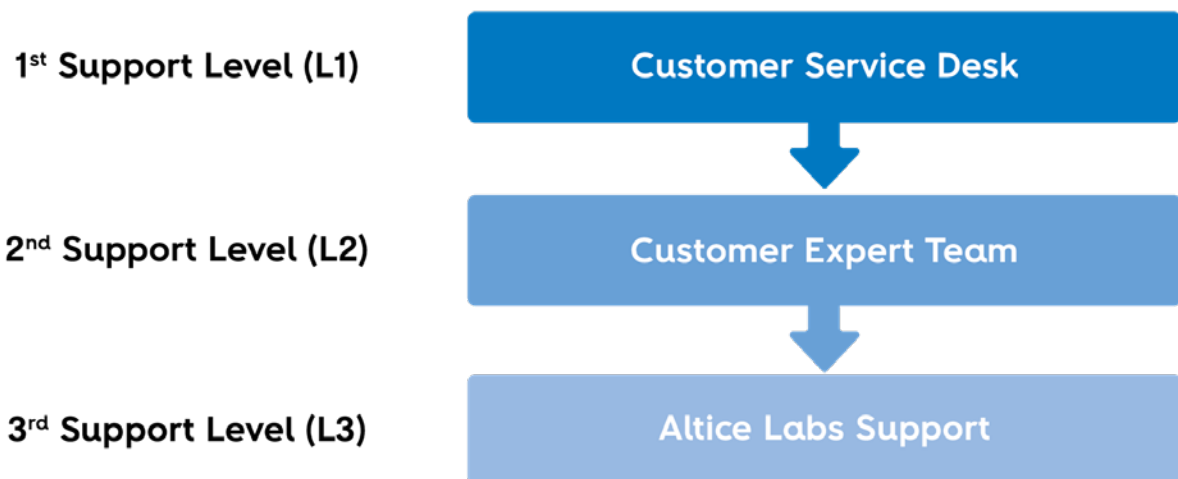
The following after-sales **service components** are available:

- **Maintenance and Support** – reactive activity for failure recovery and defects/errors correction of the object under contract;
- **Preventive Maintenance** – proactive activity designed for early detection and avoidance of potential failures in the object under contract;
- **Operation** – configuration, parameterization, and administration activities over the object under contract;
- **Hardware Repair** – reactive assistance in case of hardware failure;
- **Advanced Hardware Replacement** – fast replacement of faulty hardware by spares. This service includes adequate spare management procedures.



**Round-the-clock (24h/7d) post
sale service portfolio**

According to the Information Technology Infrastructure Library (ITIL), Altice Labs has defined three levels of support for incident management framed within the operation procedures of our networks.



Incident management support levels

Additional dedicated support models can be addressed upon mutual agreement.

Several service levels can be selected, considering the corresponding Service Level Agreement (SLA) availability and response times.



Gold



Silver



Bronze

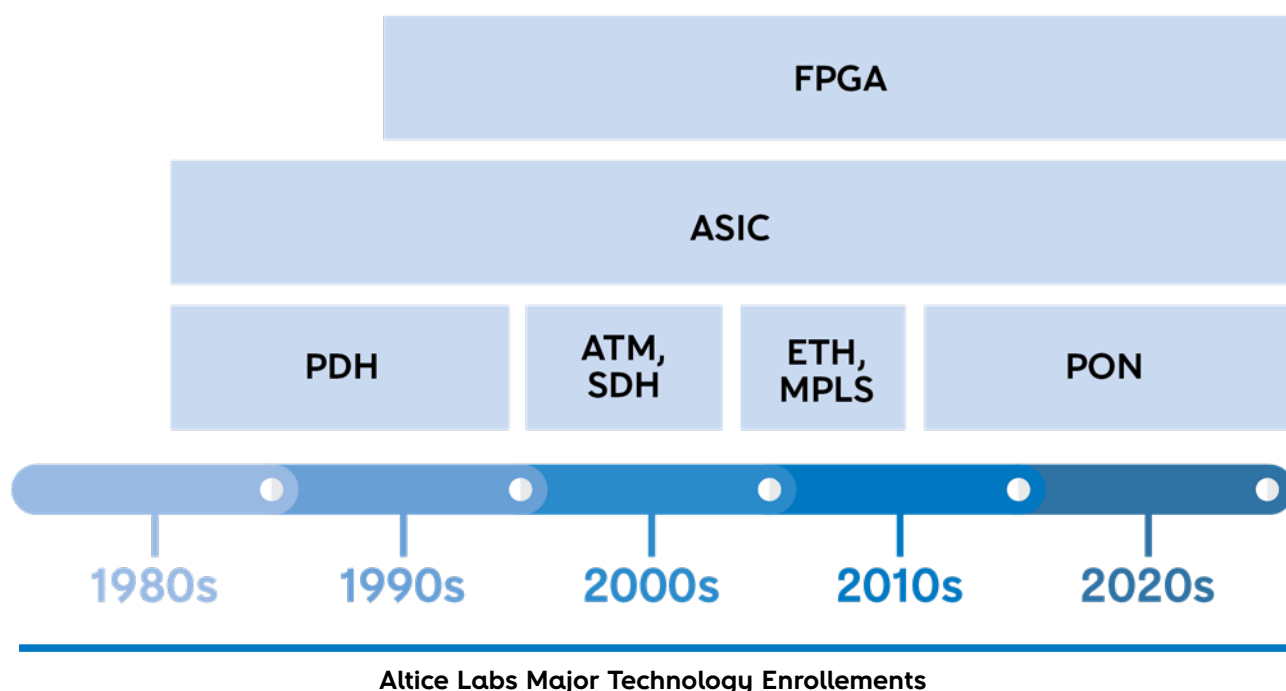


ALTICE LABS VALUE-ADDED ECOSYSTEM



Value-Added Ecosystem

Over the past years, our development teams have undergone new challenges and achievements towards complete technology portfolios. Today's PON product line results from all the experience translated over strong FPGA and ASIC expertise.



As a telecom market vendor and a valuable technological partner, Altice Labs' current market position totally and closely commits to service excellence delivery in each customer solution.





All specifications subject to change without notice | Altice Labs | UltrafastBroadbandCatalog_ALB_EN_V5.3

About Altice Labs

Delivering key telecommunications technologies since 1950, Altice Labs has been shaping the future of technology, enabling Communications Service Providers and Enterprises to offer advanced and differentiated services to their customers and users.

Altice Labs is an innovation and transformation catalyst supported by a strong and dynamic Innovation Ecosystem. Through technology, we are committed to improving people's lives and how companies do business.



www.alticelabs.com