



OLT Product Line

Next Generation
OLT

Description

PT Inovação's Optical Line Terminal (OLT) portfolio offers the broadest and most scalable solution on the market today offering network service providers a flexible and cost effective approach for passive optical network architectures.

These equipments are intended to solve all your fiber access needs in terms of retail as well as wholesale clients.

It complies with ITU-T G.984x and is able to serve multiplay services, namely Voice (VoIP), Data (High Speed Internet - HSI), TV (IPTV and RF Overlay) of up to 16384 client premises (assuming a 1:64 Splitting ratio) from a single chassis.

Initially based on the ITU-T G.984.x (GPON) recommendation, PTInS's OLT solution is nowadays evolving towards next generation PON architectures as defined by the ITU-T G.987.x (XG-PON1), ITU-T G.988.x (OMCI) and ITU-T G.989.x (NG-PON2) recommendations, whether for the central office and/or for the customer premises equipments.

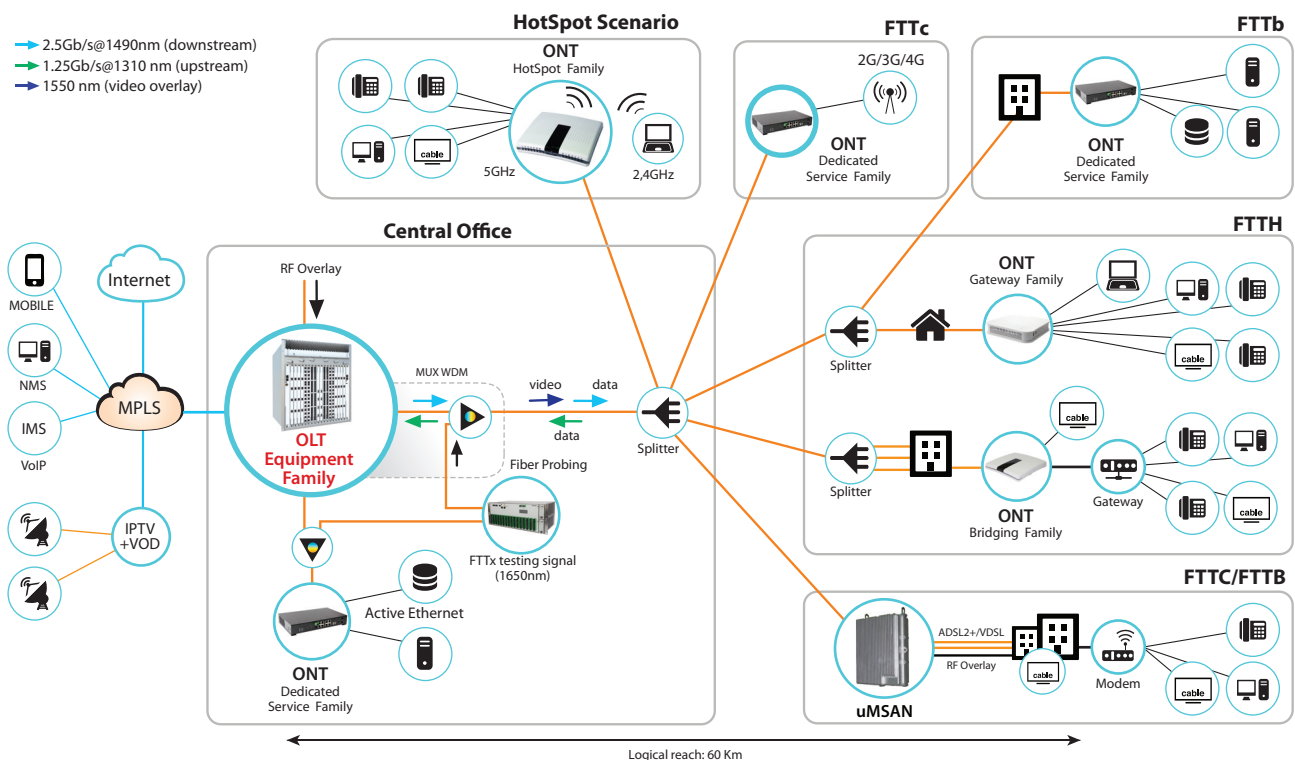
Reference Point-to-Multipoint (P2MP) FTTx topology scenarios covers Fiber-to-the-Home (FTTH), Fiber-to-the-Building (FTTB), Fiber-to-the-Curb (FTTC), Fiber-to-the-cell (FTTc) and Fiber-to-the-business (FTTb).

Ethernet service customers are also addressed by P2P links and Ethernet interfaces with dedicated bitrate allocation.

Up to 864 client premises can be supported at the P2P topology from a single chassis.

Wholesale and enterprise services are addressed through Business Ethernet VBES/TLS Services (Vlan Business Ethernet Services/Transparent VLAN Services).

Architecture



OLT Product Line

OLT Equipment Family

From the rural / low density scenarios with only 8 PON ports equipment (OLT1T0) up to urban / extremely high density 256 PON ports equipment (OLT1T3) as the best-of-breed market offer in terms of future proof central office. For the middle range OLT portfolio is able cover dedicated scenarios for compact 48 PON ports (OLT1T1) and sub-urban 112 PON ports (OLT1T2).

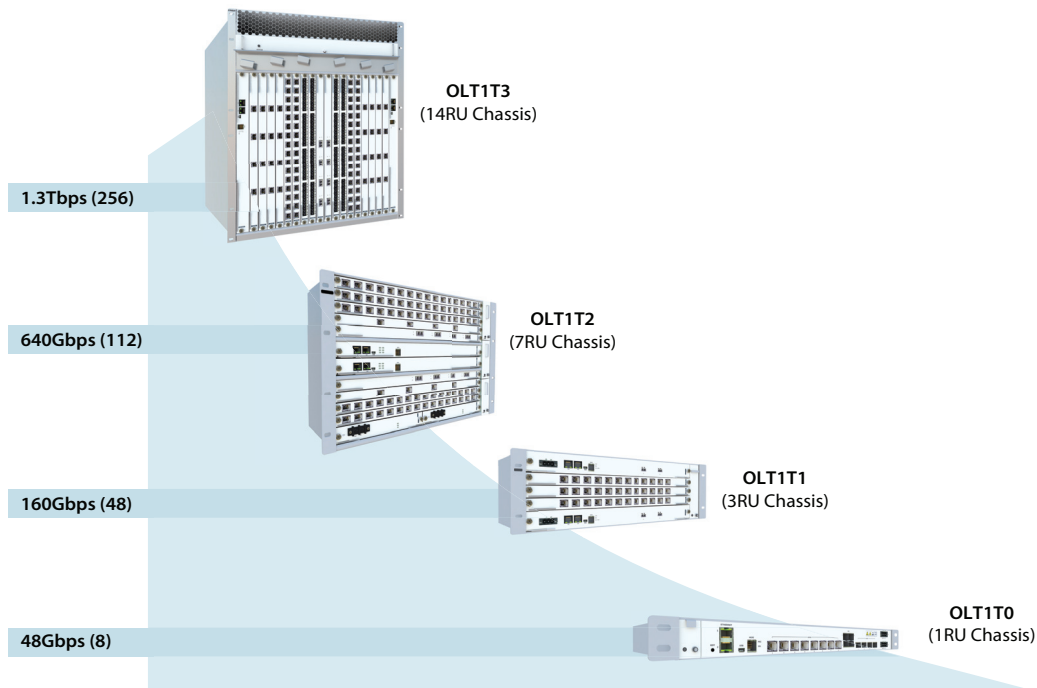
OLT equipment family systems are reliable modular Optical Line Termination (OLT) equipments specially devoted for fiber network infrastructures either Point-to-Point (P2P) Active Ethernet (AE) or Point-to-Multipoint (P2MP) FTTx Gigabit Passive Optical Network (GPON) architectures as well as assuring next generation PON technologies as XGPON-1 and NGPON2 (TWDM PON).

In parallel with the Voice, Data and Video services, our OLT equipments enables the transport of analog video services (RF Overlay) by combining and amplifying the analog video signal within the same optical transmission fiber.

Carrier class TDM services bridging are also available by means of using dedicated network termination equipments.

The OLT is a reliable high availability system that uses common element 1+1 protection (Power, Control, Switching and Processing) and load balancing LACP at the Uplink interfaces. Ethernet Ring Protection Switching (ERPS) mechanisms are available for access network upper layers interconnection. Security is also an issue and Advanced Encryption Standard (AES) is system available. Multicast and IGMPv2/v3 snooping with proxy reporting are both system ready and enablers for a flexible IPTV service delivery. For the client side, type B redundancy for GPON ports is available according to G.984.

OLT Systems Family



OLT Equipment Family Description

| Features | OLT1T3 | OLT1T2 | OLT1T1 | OLT1T0 |
|---------------------------------|------------|------------|------------|---------------|
| Chassis | 14 U | 7 U | 3 U | 1 U |
| Number of line card slots | 18 | 9 | 3 | Pizza-box |
| Backplane: Physical BW per slot | 12 x 10GbE | 12 x 10GbE | 12 x 10GbE | N/A |
| GPON ports (max) | 256 | 112 | 48 | 8 |
| Active Ethernet GbE ports (max) | 864 | 432 | 144 | 8 ✓ |
| GPON + RF Overlay | 128 | 48 | 32 | 8 via RFOVAMP |
| 10GbE | 8->72 | 4->36 | 4 | 4 |
| 100GbE | Roadmap | Roadmap | N/A | N/A |

Services & Features

OLT equipment family systems are able to support the provision of the following services:

- NGN voice services: VoIP and ToIP softswitched controlled, including IP Centrex services and SIP Trunk services
- Internet services –High speed internet in the order of Mbit/s to Gbit/s, with traffic prioritization and differentiation
- Enhanced Multimedia Communications such as voice, presence, unified messaging, localization, Caller ID with IPTV, controlled by an IMS CSCF(Call Session Control Function) platform,
- Corporate services:
 - TDM emulation services for E1 transport according to MEF-8 (CESoETH);
 - Carrier Ethernet services based on MEF 10.1 (E-LINE, E-LAN).
- Mobile Backhaul:
 - Applicable to WiMAX, 2G, 3G and 4G (LTE) networks
 - Support transparent synchronism signals (frequency, phase and time) transport according to NTP and PTP Protocols (IEEE 1588 v2 and telecom profile)
 - Provide BITS interface for the connection of an external MHz or Mbps clock reference
- Video services:
 - IPTV
 - RF Video
- Residential multiplay services:
 - Voice: Voice over IP (VoIP);
 - Internet: High Speed Internet Services;
 - RF Overlay: Service layered Analog Video using a dedicated and standardized wavelength (1550nm);
 - IPTV: transport of Digital Video Services;

• Business services:

- Business Ethernet Services TLS (Transparent VLAN Services)
- BitStream (enterprise).

OLT equipment family systems enable a group of security features that avoid anti-DOS (Denial of Service) attacks and fake customer trojan mechanisms, namely: ACLs; MAC duplication; MAC/IP spoofing; broadcast rate control and user isolation.

Standards & Protocols

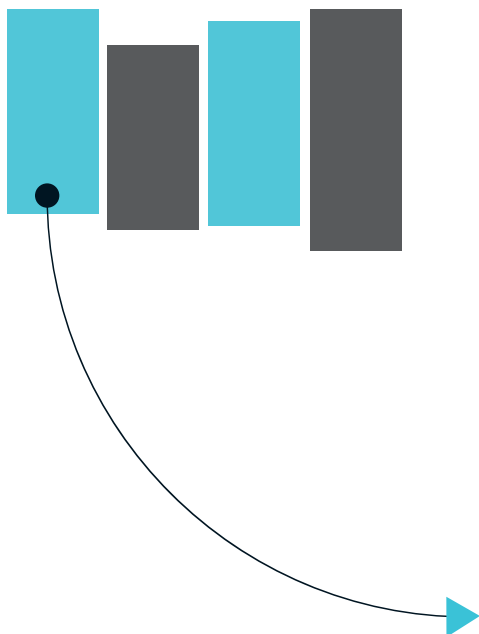
ITU-T Recommendation G.984, ITU-T Recommendation G.987, ITU-T Recommendation G.8261, ITU-T Recommendation G.8262, MEF-8 (CESoETH), MEF 10.1 (E-LINE, E-LAN), IEEE 1588 v2, ERPS G.8032, BBF.247 – GPON certification program OLT interoperability, BBF TR.156 – Using GPON in the context of TR.101, IEEE 802.1Q VLAN tagging, IEEE 802.1P (VLAN QoS 4096 VLAN), Per Port QoS/CoS mapping according to IEEE 802.1q and IEEE 802.1p, IEEE 802.1ad Provider Bridges, IEEE 802.1w Rapid Spanning Tree, IEEE 802.1x Authentication, IEEE 802.1ad Q-in-Q y VLAN stacking, IEEE 802.1v VLAN by protocol/by port, IEEE 802.3x Flow Control, IEEE 802.3ad Link Aggregation – Load balancing by the interfaces in LAG, IGMP v2 (RFC2236), IGMP V3 (RFC 3376) RFC1350 TFTP protocol, RFC0959 FTP protocol, RFC1305 NTP protocol, SFF-8472 Specification for Diagnostic Monitoring Interface for Optical, Xcvrs, Rev 9.5, June 1-2004, RFC2131 DHCP, RFC3046 DHCP Relay Agent Info (Option 82), RFC3315 Dynamic Host Configuration Protocol for IPv6 (DHCPv6), RFC6221 Lightweight DHCPv6 Relay Agent.

Common Features

| | |
|--|---|
| GPON (ITU-T G.984.4) and Security | <i>Downstream/Upstream bit rate: 2,488/1,244 Gbps, Advanced Encryption Standard (AES), Forward Error Correction (FEC), Up to 64 ONT/Us per PON, T-CONTs: 512 per PON, GEM port-IDs: 4096 per PON, Logical Range: 60 km, Maximum Differential Distance: 20 km.</i> |
| L2 layer | <i>Services: 1:1, N:1 (TR-156i3), VLAN-ID conversion to GEM port-ID, Transparent: Add/change S-TAG and C-TAG, Load balancing LACP, Priority bits (p-bits) included in changes, Performance: GPON full wire speed.</i> |
| Synchronism | <i>SYNC-E, IEEE1588v2/PTP,</i> |
| IPTV features | <i>IGMPv2/v3 snooping with proxy reporting, multicast, IPTV streams forwarding: 1024.</i> |
| Management | <i>- Local management by HTTP Web Browser - Remote using SNMP and HTTP protocols. - CPE remote management over OMCI G.984.4 channel.</i> |
| Interoperability | <i>OLT family systems assure layer 2 and layer 3 interoperability with the transport segment of the network, according to Rec BBF TR-156.</i> |
| Environment | <i>Compliant with partly temperature - controlled locations recommendation as stated by ETSI ETS 300 019-1-3 Class 3.2 -5°C to +45°C, 0 - 95% of Relative Humidity range</i> |
| EMC | <i>Compliant with at ETSI EN 300 386 recommendation</i> |
| Power Supply | <i>Voltage range is from -40,5 VDC to -57,0 VDC compliant with ETSI EN 300 132-2 V2.1.1 (2003-01) recommendation. Earth connections comply with ETSI ETS 300 253 : January 1995 recommendation.</i> |

OLT Product Line

NEXT Generation OLT



ABOUT PT Inovação

PT Inovação has been for more than 65 years a fundamental lever for delivering advanced digital and communication services.

Innovation is in our DNA and Communications Service Providers, market leaders around the world, count on our innovative portfolio to gain competitive advantages in the market and improvements in companies' processes.

Knowledge is the raw material that we transform into advanced solutions with an innovation approach supported on an ecosystem built around R&D entities and industrial partners.

Take a journey with us at www.ptinovacao.pt and discover how to boost your business!