

GPON SOLUTION

Gigabit Passive Optical Network

Technology
Advantages
System Structure
Professional Services

Italian innovation
 SINCE 1933

FRACARRO

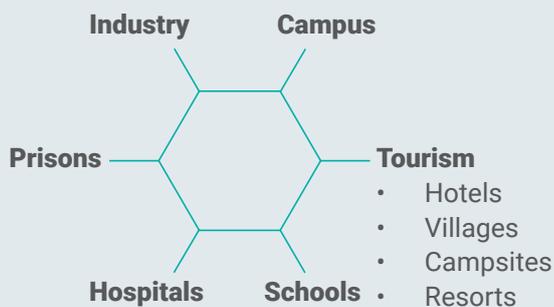
GPON Solution

The **GPON solution** represents the technological standard that makes it possible to replace the traditional copper LAN network with **fiber optics extended to every single room**, ensuring high performance and maximum reliability.

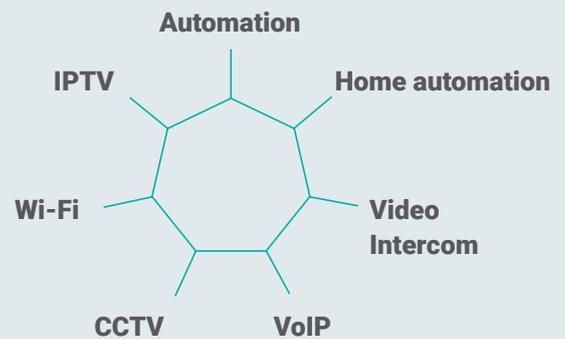
Its **point-to-multipoint architecture** makes it particularly suitable for applications in business and hospitality environments (such as hotels, resorts, campgrounds, or holiday villages), as well as in the tertiary sector, providing connectivity and transporting high-speed services at 2.5 Gbit/s downstream and 1.25 Gbit/s upstream, scalable up to 10 Gbit/s (XGS-PON) and beyond.

The **Fracarro GPON solution** combines the innovation of fiber optics with deep expertise in video transmission, aiming at the **convergence of services** ranging from IPTV to RF overlay, Wi-Fi, VoIP, CCTV, home automation, BMS, and more, while still ensuring modularity and scalability.

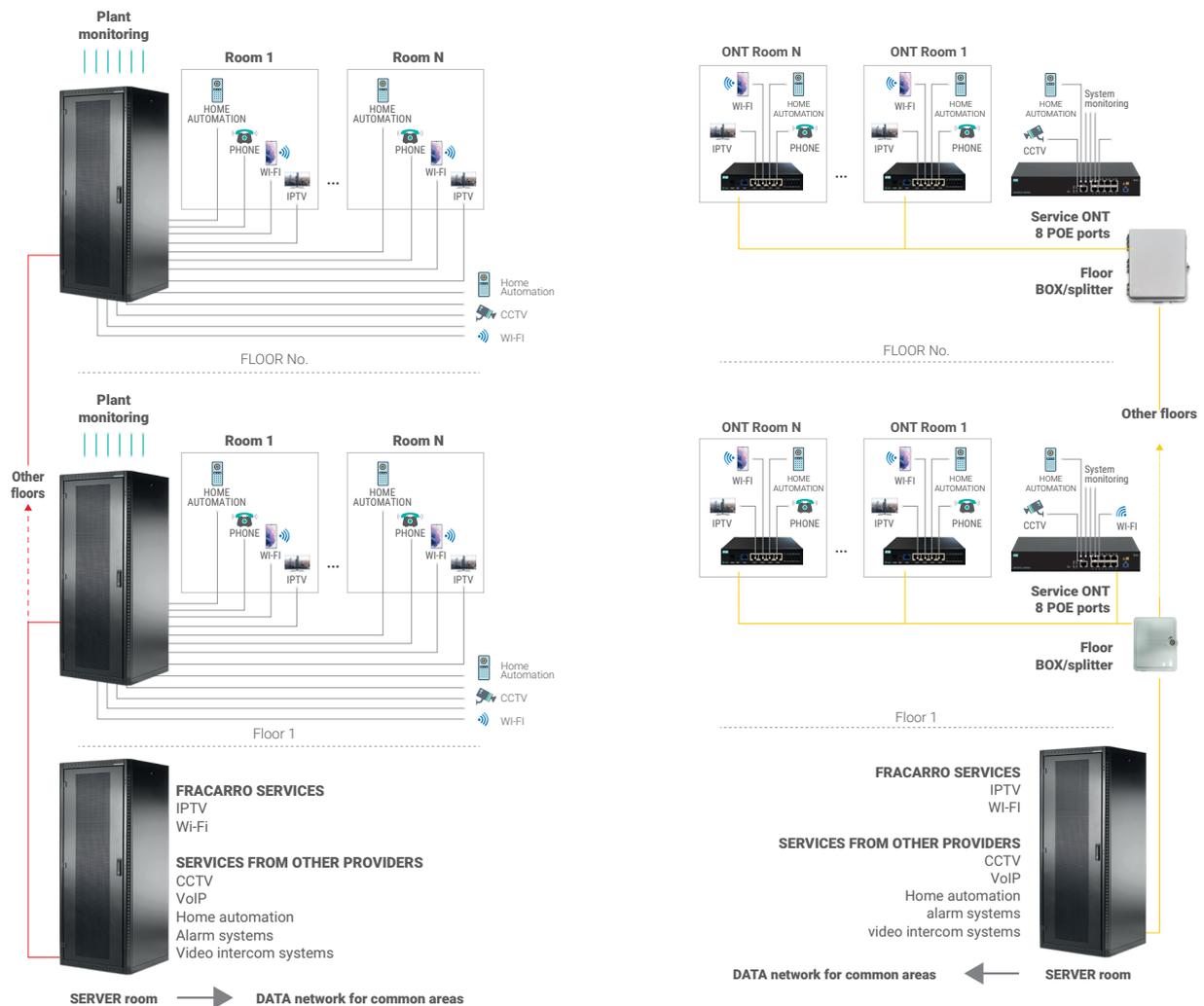
Areas of Application



Distributed IP Services



Ethernet vs. GPON Network Comparison



Conventional System:

- A dedicated equipment room and a rack on each floor
- Active switches on each floor
- UPS lines
- Cooling system
- Cable trays sized according to cable volume
- Planned installation work scheduling
- Long installation times

Less Reliable System:

A malfunction of a single switch can result in service disruption for all rooms and offices on that floor.

GPON System:

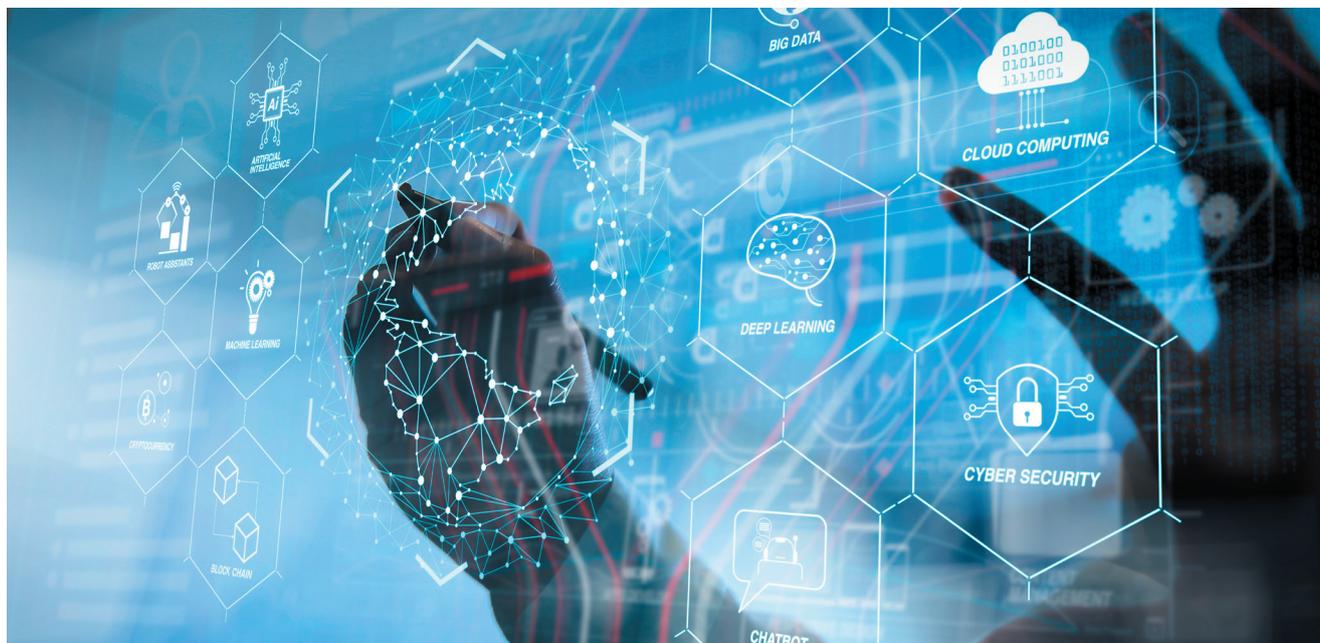
- A single rack in the server room
- Small-sized passive boxes/splitters on each floor
- Elimination of equipment rooms on each floor
- Reduced distribution infrastructure
- Less copper cabling
- Reduced labor
- Shorter installation times

More Reliable System:

A malfunction of a single ONT affects only one room or office.

Advantages of the GPON Solution

The Fracarro GPON solution enables the deployment of next-generation IP systems, offering a range of significant advantages in terms of innovation and security.



Future-Proof Infrastructure

The GPON system is open to technological evolution as the fibre optic network can always support new services can always be delivered over the fiber optic network. Choosing a GPON system means designing long-lasting installations without worrying about system obsolescence, ensuring that your investment is preserved for many years.

Simplification

Thanks to its point-to-multipoint architecture, the GPON system streamlines the installation, providing significant savings in terms of space, materials, time, and installation costs:

- No floor or area racks are required, eliminating the need for dedicated technical rooms.
- As a passive network, no active devices are needed on floors or in specific zones, reducing power consumption, eliminating the need for dedicated UPS lines, and improving system reliability since passive components are not prone to malfunctions.
- No cooling systems are required, leading to lower energy consumption.
- A reduced quantity of materials is needed (copper, conduits, pipes, etc.).

Scalability

The GPON solution perfectly adapts to the client's actual needs; new services can be implemented at any time, thanks to high bandwidth capacity of single-mode fiber and the technological evolution of active devices.

Signal Immunity

Using fiber optics ensures complete immunity to electromagnetic interference and other disturbances, increasing the system's efficiency and reliability.

Lightning Protection

Thanks to the characteristics of fiber optic distribution, GPON systems help protect active equipment during adverse weather events.

Long Distribution Distances

The GPON system greatly extends the connection range between ONT devices and the server room, reaching up to 20 km—far beyond the 90-meter limit of copper connections.

Security

GPON systems guarantee data protection through dynamic bandwidth management and encrypted traffic.



High reliability

Reliability and Performance

Fracarro's PON technology, combining the high performance of OLT devices (GPON, XGSPON) with a ring network architecture, enables the implementation of **high-reliability solutions** that ensure the operational continuity of the system, even in the most critical scenarios. Type-B protection can be managed on PON ports of a single OLT or across different OLTs, even those located in separate server rooms.

Hospitality



Advantages

- Service Convergence
- Simplified Installations
- Easy Maintenance

The **Fracarro GPON solution** supports the **hospitality** market by improving data distribution within lodging facilities, optimizing space, and reducing traditional copper cabling in favor of fiber.

Equipment rooms on each floor, for example, are no longer necessary, and ceiling spaces can be fully dedicated to electrical, mechanical, and specialized systems, resulting in **savings on materials, installation time, and labor.**

Every aspect of the GPON solution is also designed to give IT managers **maximum flexibility** in configuring and managing the network.

Multicast Distribution

Fracarro's deep expertise in the TV sector allows it to offer solutions based on the **Multicast protocol**, ensuring smooth and consistent IPTV distribution even in the most demanding situations.

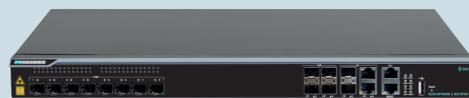


CENTRAL ACTIVE DEVICES - OLT

Devices for management of hospitality installations, from small to large-scale systems.



OLTG-1P2G1SW
code 287858



OLTG-8P4GC2S
code 287792



The services distributed in guest rooms converge onto a single fiber.

- **Room ONTs** are equipped with 4 PoE/PoE+ ports; through structured cabling, they can power VoIP telephones and access points, manage IPTV channels, and control in-room automation (RMS). The 2 FSX ports also allow the management of analog phones.

- **Technical ONTs** on each floor, with 8 PoE/PoE+ ports, handle services for common areas such as CCTV, access points, home automation gateways, BMS, and more.

Thanks to centralized management via the OLT, ONTs can be configured individually for specific customizations or through profiles for more efficient and faster maintenance.

PERIPHERAL DEVICES - ONT

Distribution of in-room and common area services, including analog telephony.



ONTG-4GP2F-S
code 287831

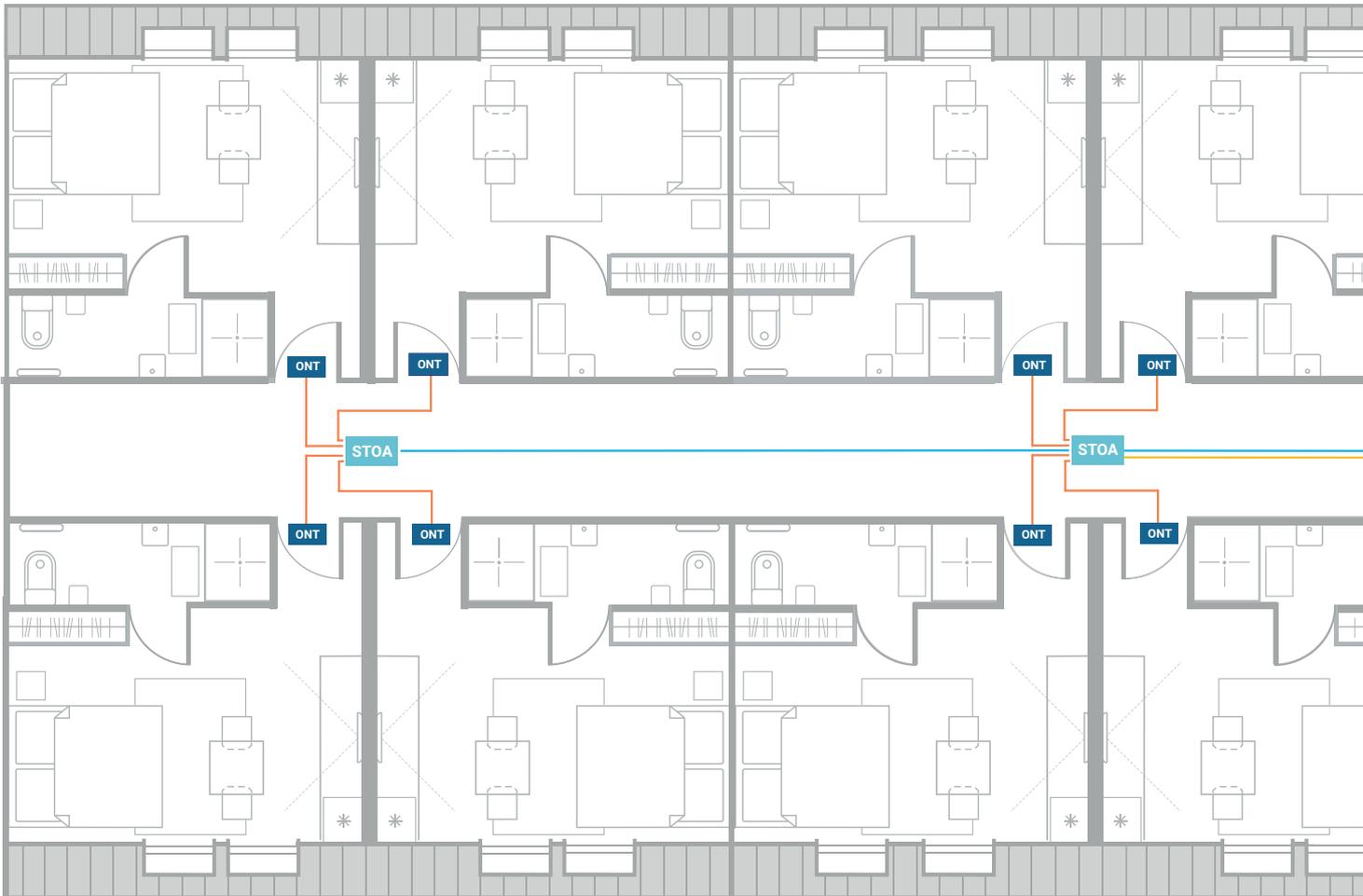


ONTG-8GP-M
code 287794



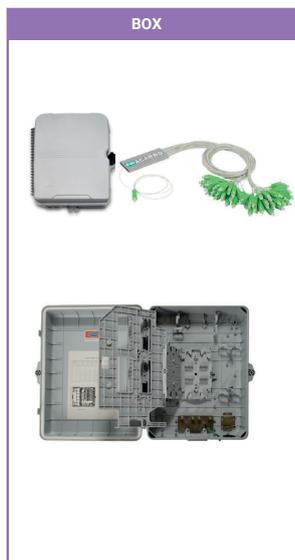
ONTG-4G1FTW-H
code 287793

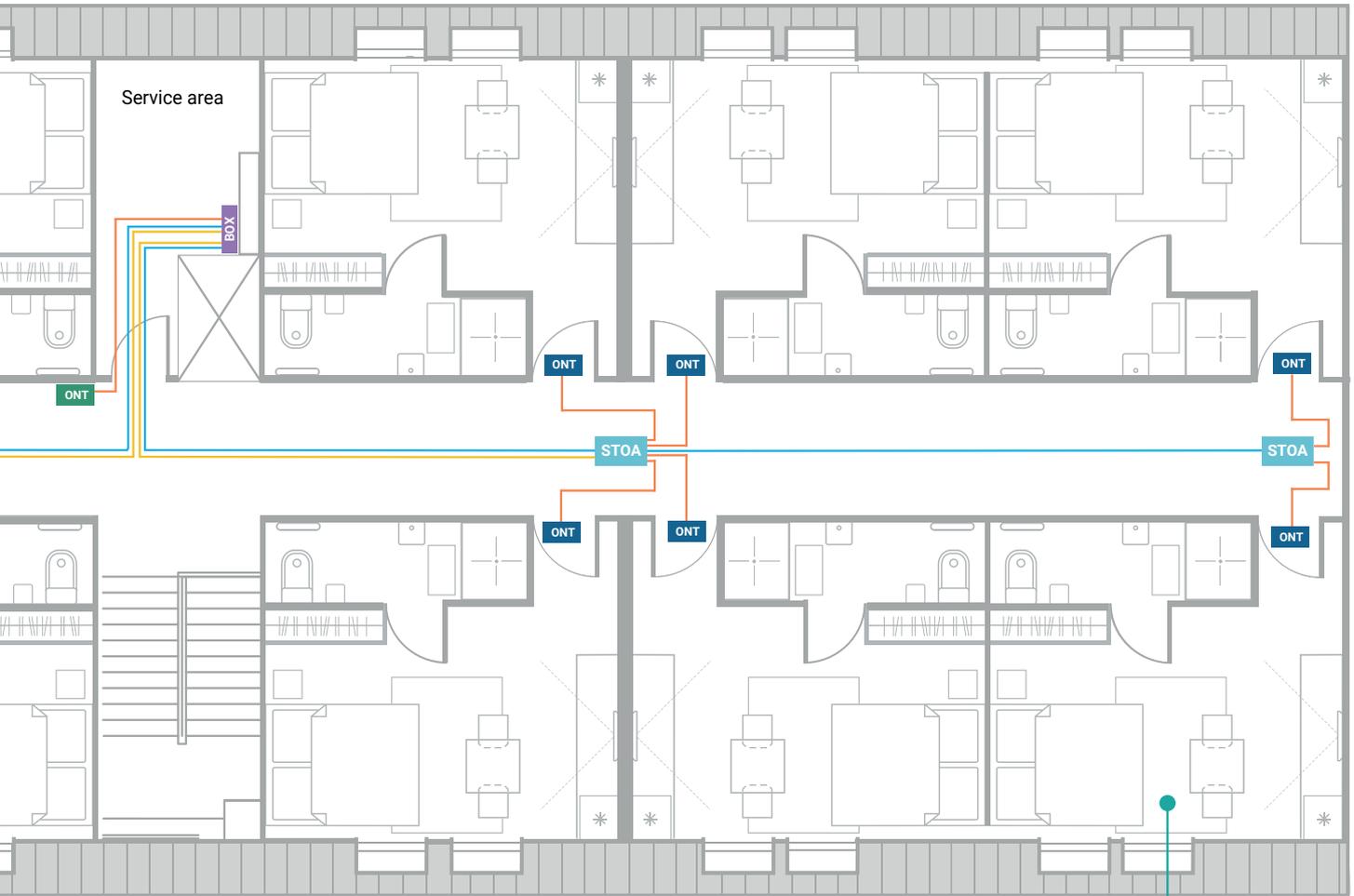
Example of a GPON Hospitality



LEGENDA CORRIDOR

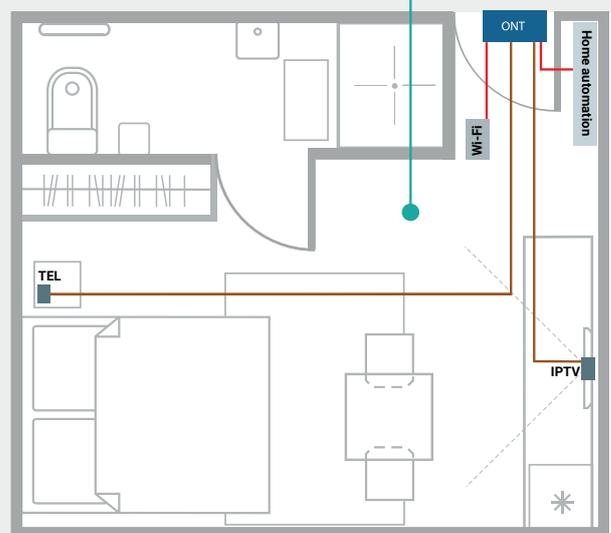
- Single-mode fiber 9/125
- Single-mode fiber 9/125
- Optical patch cord for room 5/10/20 m
- BOX Floor splitter **BOX**
- STOA **STOA** serving the rooms
- ONT **ONT** with 8 PoE ports





LEGENDA ROOM

- Cat 6 or higher patch cord
- Cat 6 or higher copper cable
- 4/8-port ONT for room services
- RJ45 user outlet IPTV and telephone
- Wi-Fi
- Home automation



Hospitals, Schools, and Rehabilitation Centers



Advantages

- Reduced Electromagnetic Fields
- Precautionary Principle
- Safety
- High Reliability

The **electromagnetic neutrality** of fiber in hospital, school, and correctional environments represents an advantage in terms of safety, environmental improvement, and system reliability.

The Fracarro GPON solution leverages these features to address:

- **Regulations for reducing electromagnetic fields:** the use of fiber optics ensures the protection of medical equipment and the well-being of patients.
- **Precautionary principle:** eliminating racks and active devices in common areas reduces noise, dust, and bacteria carried by fans.

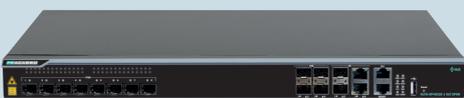
- **Strict safety regulations:** placing devices in the rooms they serve reduces the risk of tampering and damage.

ONT devices are PoE fanless to minimize environmental impact. Their placement in individual rooms ensures greater **system reliability:** in case of a malfunction, the issue is confined to the affected room.

Adopting a **high-reliability network design**, both active and passive, minimizes the likelihood of service interruptions.

ACTIVE DEVICES

Devices for managing the system and services in guest rooms and common areas.



OLTG-8P4GC2S
code 287792



ONTG-4GP2F-S
code 287831



ONTG-8GP-M
code 287794

Ships and Ferries



Advantages

- Reduced Volume
- Greater Space Efficiency
- Service Convergence
- High Reliability

The **passive fiber optic solution** offers numerous **advantages** in the maritime sector as well. The drastic reduction of copper cabling and the number of equipment rooms required on decks results in significant cost savings, lower overall system weight, reduced energy consumption, and greater operational efficiency. Additionally, optimizing technical spaces frees up valuable areas for commercial and service functions.

Further advantages of the fiber optic solution

- **Distances up to 20 km** between the server room and ONTs, without the need to drill through hull

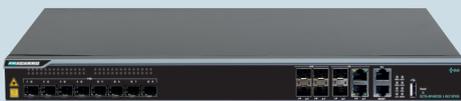
compartments.

- Point-to-multipoint topology, using passive boxes and splitters instead of racks on the decks.
- **Up to 70% reduction in copper cabling**, decreasing oxidation-related issues.
- **Convergent architecture**: a single fiber optic cable reaches each cabin.

Inside the cabin, only a 4- or 8-port PoE ONT is required to power and connect onboard devices. To ensure system operation, the Fracarro solution supports high-reliability features implemented on both passive and active GPON network devices.

ACTIVE DEVICES

Devices for managing the system and services in common areas.



OLTG-8P4GC2S
code 287792



ONTG-4GP-S
code 287788



ONTG-8GP-M
code 287794

Industry



Advantages

- Continuity of Service
- Service Convergence
- Bandwidth Guarantee

In industrial buildings, the main challenges in implementing signal distribution systems involve often unfavorable environmental conditions, the need to cover long distances, and the requirement to ensure a system with high continuity and operational efficiency.

The Fracarro GPON solution addresses these needs with:

- **Passive PON fiber optic infrastructure** immune to electromagnetic interference from high-power industrial machinery, inverters, etc.
- Elimination of racks and related active devices in

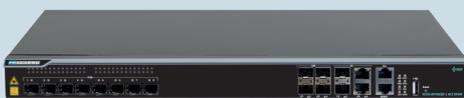
favor of passive optical splitters.

- Distances up to 20 km between racks and ONTs, compared to 90 m with copper.
- **Service convergence:** machine-mounted ONTs can manage PLCs, CCTV, IIoT, VoIP, and more.
- **Guaranteed bandwidth and low latency** to manage services with different priorities according to their level of criticality.

High-reliability implementation, both passive and active, in the Fracarro GPON solution ensures continuous service and top performance for all connected services.

ACTIVE DEVICES

Devices for managing the system and services at the machine level and overall operations.



OLTG-8P4GC2S
code 287792



ONTG-4GP-S
code 287788



ONTG-8GP-M
code 287794

Residential



Advantages

- System Convergence
- Common Area Safety
- Centralized Maintenance

In **multi-dwelling buildings with FTTH fiber optic** multiservice systems, the **Fracarro GPON solution** can be integrated to support IP video intercom, CCTV, and centralized system management services.

The benefits are significant: superior signal quality, simplified infrastructure, and reduced operating costs, with the ability to effectively expand the range of services offered to end users.

Fracarro's IP video intercom solution involves installing an Optical Line Terminal (OLT) in the building's equipment room, capable of managing up to 128 devices, connecting video intercoms and door panels.

The system also allows management of **cameras for monitoring** common areas, as well as **technological systems**, enabling remote control of photovoltaic systems, boilers, HVAC, and BMS.

ACTIVE DEVICES

Devices for managing up to 256 apartments and for services in common areas.



OLTG-2P2G1SW
code 287857



GPON RX BASIC
code 287616



ONTG-4GP-S
code 287788

GPON Infrastructure

PASSIVE DEVICES

Fracarro's offering for passive GPON infrastructure includes a wide range of fiber optic and conventional network solutions, suitable for both indoor and outdoor use. These include:

- Rack Cabinets
- Optical Boxes
- Optical Splitters
- Cca and B2ca Fiber Optics
- Category 6 and 6a Copper Cables
- Tools



CENTRAL ACTIVE DEVICES - OLT

Designed to manage networks up to 20 km in length, each GPON central unit is supplied to meet the specific requirements of each project, both in terms of size and reliability: from OLTs (Optical Line Terminals) with 1, 2, 4, or 8 PON ports for smaller installations, to modular units capable of managing an increasingly large number of ONTs.



OLTG-1P2G1SW

code 287858

OLT for data distribution in small networks: **1 x PON** port (SFP C++ included), uplink: 2 GE ports, 1 SFP+ 10GE port, integrated power supply.



OLTG-2P2G1SW

code 287857

OLT for data distribution in small to medium networks: **2 x PON** ports (SFP C++ modules included), uplink: 2 x GE ports and 1 x SFP+ 10GE port, with an integrated power supply.



OLTG-4P4GC2S

code 287791

OLT for data distribution in medium-sized networks: **4 x PON** ports, uplink: 4 x GE/SFP combo ports, 2 x SFP+ 10GE ports, dual power supply included for high reliability.



OLTG-8P4GC2S

codice 287792

OLT for data distribution in medium- to large-sized networks: **8 x PON** ports, uplink: 2 x GE ports, 2 x SFP ports, 4 x SFP+ 10GE ports, dual power supply included for high reliability.



PERIPHERAL DEVICES - ONT

Each Fracarro ONT (Optical Network Terminal) receiver is designed to meet different connectivity needs depending on the environment: hotel rooms, common areas, offices, and equipment rooms. Below are some models:



ONTG-4GP-S

code 287788

ONT for data distribution over the passive fiber optic infrastructure, equipped with 4 ports supporting PoE/PoE+ (PoE budget 60W). 4 × 10/100/1000 GE PoE ports.



ONTG-4GP2F-S

code 287831

ONT for data distribution over the passive fiber optic infrastructure, equipped with 4 ports supporting PoE/PoE+ (PoE budget 60W) and 2 FXS ports for analog telephony. 4 × 10/100/1000 GE PoE, 2 × FXS (RJ11).



ONTG-8GP-M

code 287794

ONT for data distribution over the passive fiber optic infrastructure, equipped with 8 ports supporting PoE/PoE+ (PoE budget 120W). 8 × 10/100/1000 GE PoE.



ONTG-4G1FTW-H

code 287793

ONT for data distribution over the passive fiber optic infrastructure, equipped with 4 GE ports, 1 analog telephone port, RF TV output, and dual-band access point. 4 × 10/100/1000 GE, 1 × FXS (RJ11), WiFi 2.4/5 GHz.

SFP MODULES - SMALL FORM FACTOR PLUGGABLE

The Fracarro range includes the GPON SFP module, required for managing data traffic on a single PON port, and the 10 Gigabit SFP module for interconnecting the various central devices.



OLTG SFP C++

code 287797

SFP GPON class C++, compact and hot-swappable.



SFP 10G LC SM

code 287761

SFP+ 10GE for uplink or trunk connections between switches.

Switch



ETHERNET SWITCH

Designed for excellence in IPTV distribution, **Fracarro switches** offer flexibility, high performance, and are optimized for the **Multicast protocol**. With advanced support for IGMP Snooping and Querier functions, they ensure efficient bandwidth management, preventing network congestion. SFP ports provide reliability and scalability through fiber connections for stacking, uplinks, and high-speed backbone links.



Series 9

Layer 3 switches, useful as a **central hub** for managing connections to servers, controllers, and central units.



FSW-924F-2XC (code 287856)

24 SFP+ fiber ports, 2 x QSFP28

FSW-948C-6SFP+ (code 287764)

48 x 10/100/1000 GE ports, 6 x SFP+

Series 8

Layer 2+ switch for managing **medium- to high-traffic networks**, with 10 Gigabit backbone connections.



FSW-824-4SFP+ (code 287765)

24 x 10/100/1000 GE ports, 4 x SFP+

FSW-848-4SFP+ (code 287766)

48 x 10/100/1000 GE, 4 x SFP+

FSW-824P-4SFP+ (code 287767)

24 x 10/100/1000 GE, PoE 370W, 4 x SFP+

FSW-848P-6SFP+ (code 287768)

48 x 10/100/1000 GE, PoE 370W, 6 x SFP+

Series 7

Layer 2 switch for managing **small networks**, with 1 Gigabit backbone connections.



FSW-708P-2SFP (codice 287771)

8 x 10/100/1000 GE, PoE 120W, 2 x SFP

FSW-724-4SFP (codice 287769)

24 x 10/100/1000 GE, 4 x SFP

FSW-724P-4SFP (codice 287770)

24 x 10/100/1000 GE, PoE 370W, 4 x SFP

WiFi solutions

ACCESS POINT AND CONTROLLER

Fracarro Wi-Fi solutions enable the deployment of medium- and high-density wireless systems and are designed to support 802.11a/b/g/n/ac/wave2/ax protocols, handle high throughput, and manage strong access contention. Thanks to **access points** with integrated omnidirectional MIMO antennas, Fracarro Wi-Fi solutions provide maximum wireless coverage, allowing easy and balanced access to services.

Access point management is handled by high-performance **hardware controllers** developed on a multi-core platform, ensuring Wi-Fi system reliability. This allows centralized control of access points, automatic channel management, wireless frequency adjustment, and seamless roaming.



WAP6-2GE-CM-HD

code 287773

Indoor access point, 2 × 10/100/1000 GE ports, up to 128 users per band, WiFi 6, maximum bitrate 1775 Mbps.



WAP6-1GE-EXT-HD

code 287786

Outdoor access point, 1 × 10/100/1000 GE port, up to 128 users per band, WiFi 6, maximum bitrate 3000 Mbps.



WCTRL-128-SFP

code 287774

Controller with 8 × 10/100/1000 GE ports, 2 × GE/SFP 1 GE combo ports, capable of managing up to 128 access points.



WCTRL-256-SFP+

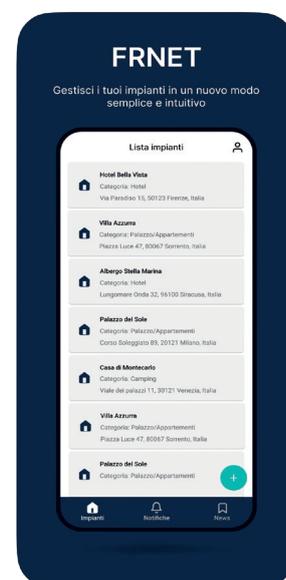
code 287775

Controller with 8 × 10/100/1000 GE ports, 2 × SFP+ 10GE ports, capable of managing 256 access points. Additional licenses allow the controller to reach a maximum capacity of 2048 access points.

Network Monitoring

Fracarro's offering for conventional and GPON networks includes an advanced monitoring service that allows centralized oversight of heterogeneous architectures composed of independent and diverse devices. All network points—from TVs to cameras, phones to access points, and including home automation and all IP services—are monitored to identify and resolve potential malfunctions before end users even notice an issue.

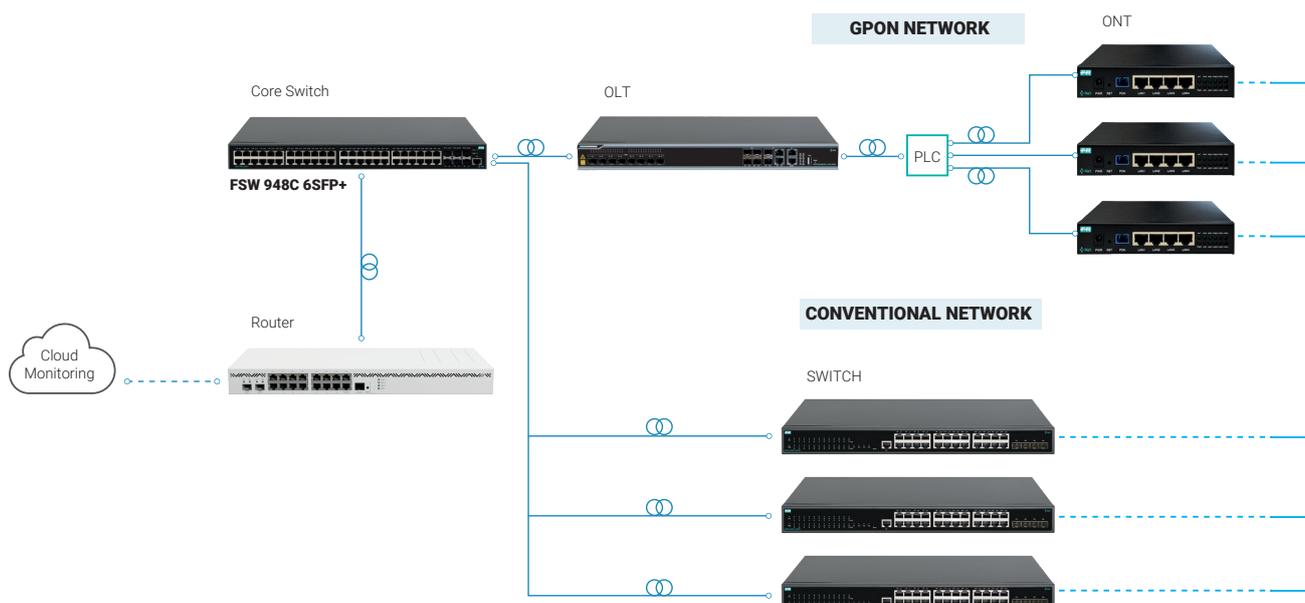
Monitoring can be managed through the **FRNET application**, which provides basic information about which device is not functioning and what the potential problem might be. For network specialists, a comprehensive and detailed web interface is also available, enabling precise analysis of all system parameters.



ADVANTAGES OF THE MONITORING SERVICE

- Uses Fracarro CLOUD
- Push notifications on the FRNET app to report malfunctions
- Email notifications for verification by the system administrator
- Single control center for all IP devices connected to the network
- Proactive problem resolution
- Availability of remote support, with qualified personnel present on location

MONITORING INFRASTRUCTURE



Fracarro always by your side

With over **20 years of experience in fiber optics**, Fracarro is the ideal partner for the design, deployment, and management of GPON solutions. Specialized technicians are available to professionals at every stage of system implementation, offering a comprehensive range of services.

RESOURCES FOR DESIGNERS

Fracarro supports design firms in developing data distribution solutions for every type of project, providing all the technical and economic information needed to prepare a detailed bill of quantities.

Depending on the type of facility, services, and design information (architectural and electrical), Fracarro's technical office defines distribution aspects and sizes active devices to provide a complete construction solution, including:

- Design support
- Network logic
- Bill of materials
- Product datasheets
- Budget estimates

SUPPORT FOR THE INSTALLER

Fracarro is able to support installers in the implementation of specialized systems remotely. In addition to pre-cabled solutions that simplify system installation, Fracarro provides services including:

- Fiber splicing
- Fiber certification
- Antenna installation and alignment
- Compliance certification
- **Network configuration service**
- **After-sales support**



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