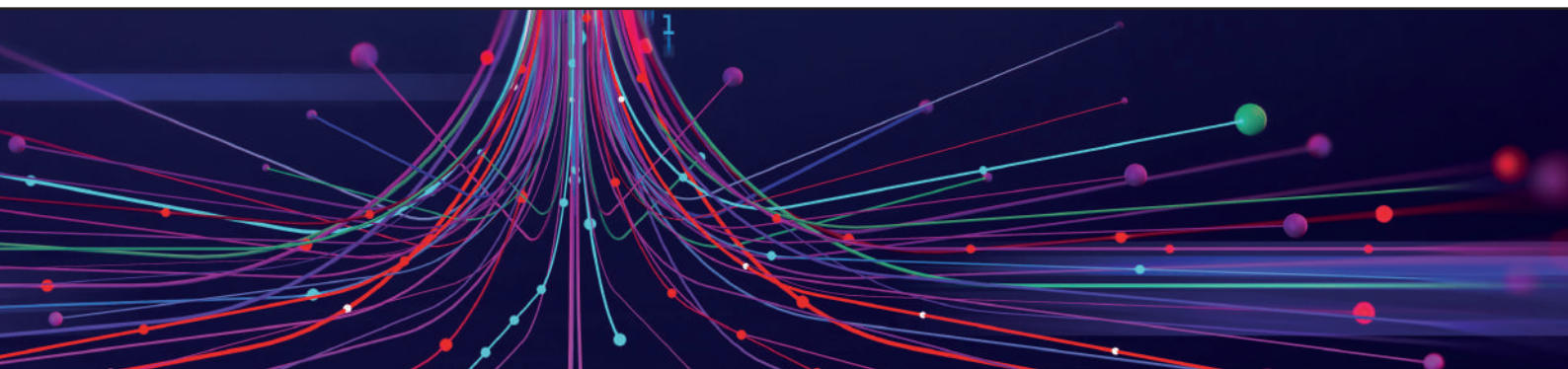**FRACARRO**

GPON SOLUTIONS

Gigabit Passive Optical Network

Design support
Technology
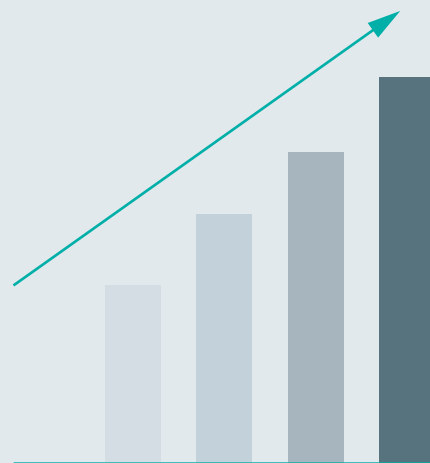Configuration
Testing
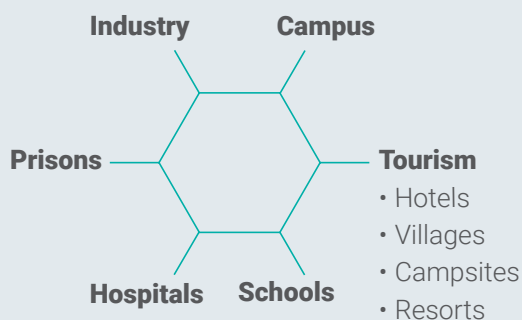Assistance

Introduction to GPON networks

TECHNOLOGY

The continuous **demand for connectivity and the distribution of services on IP networks** has made it necessary to adopt a technology capable of satisfying, today and tomorrow, the increasing use of bandwidth.

The **GPON** (Gigabit Passive Optical Network) **solution**, also used by telecom at metropolitan level and made of 9/125 singlemode passive optical fibre, represents the answer to these needs.
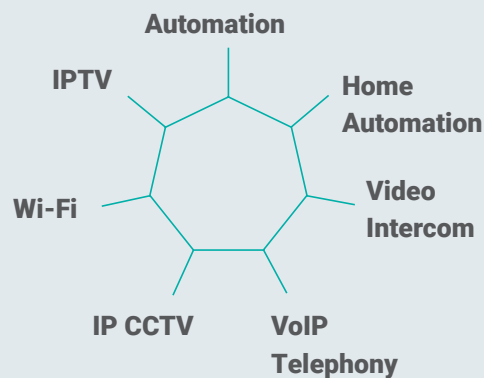
Thanks to its **point-to-multipoint structure** it is ideal for applications in **business and hospitality contexts** (such as hotels, villages, campsites or resorts), but also in the tertiary sector, to provide connectivity and transport services such as Wi-Fi, IPTV, CCTV, VoIP; the available bandwidth is particularly wide: 2.5 Gbit/s in download and 1.25 Gbit/s in upload, with the possibility of managing 10G bit/sec (XG-PON), 40G bit/sec and beyond.

The areas of application

- Industry
- Campus
- Prisons
- Tourism
  - Hotels
  - Villages
  - Campsites
  - Resorts
- Hospitals
- Schools

Distributed IP services

- Automation
- IPTV
- Home Automation
- Wi-Fi
- Video Intercom
- IP CCTV
- VoIP Telephony

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System architecture

Fracarro GPON solutions integrate and distribute systems and services based on IP protocol; for this reason, the infrastructure is made up of active devices capable of managing the connection of the different servers and controllers and of the different network logics.

ROUTER
For the management of network logics

SERVER and CONTROLLER
For services distributed in the structure

SWITCH CORE
To manage the connection of server and controller

OLT - Opticale Line Termination
The GPON network manager

PON - Passive Optical Network
Box, splitter, singlemode fibre, etc.

ONT - Opticale Network Termination
The device that translates the fibre into RJ45

DISTRIBUTION OF SERVICES
In rooms, apartments, offices and technical rooms
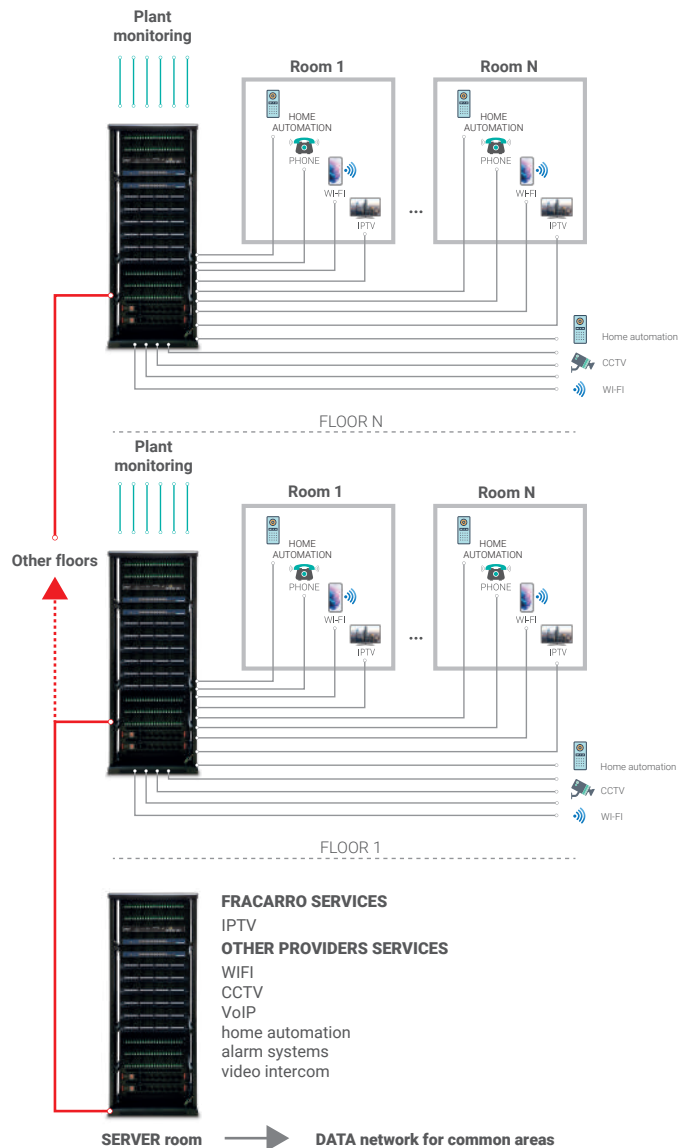
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Conventional **ETHERNET** network
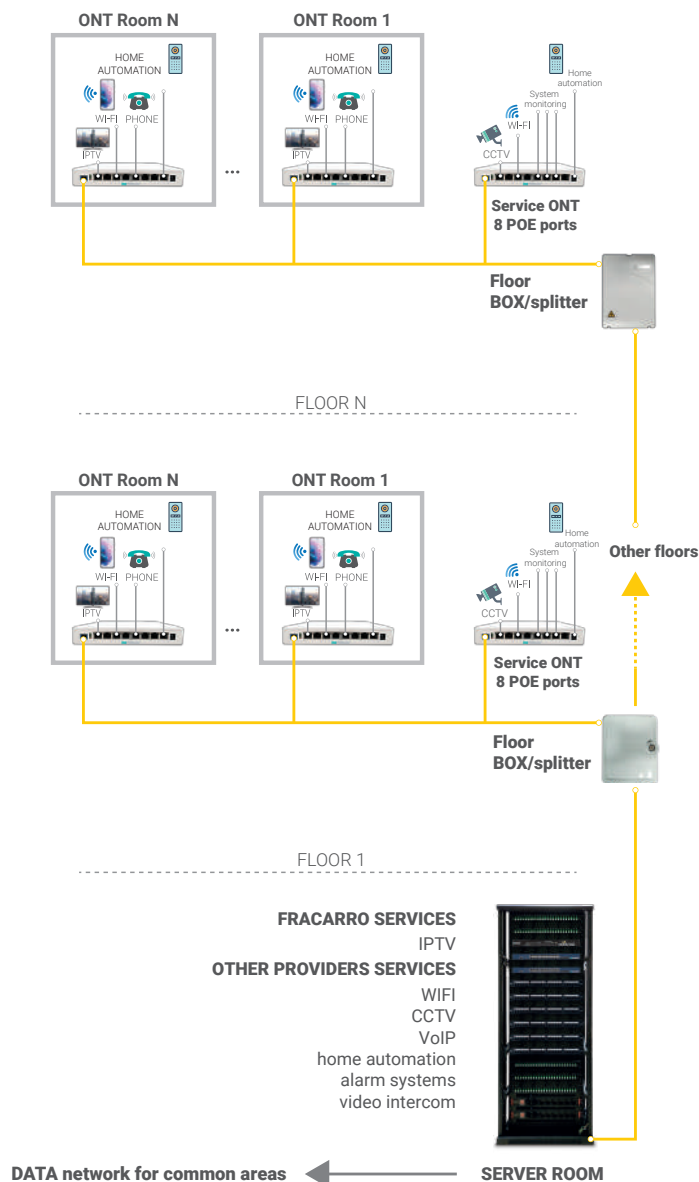
Conventional installation:
- a dedicated technical room and a rack for each floor
- active switches for each floor
- UPS lines
- cooling plant
- wire ducts sized for the volume of cables
- scheduling of installation work
- long installation times

Less reliable system:
any malfunction of a switch results in a disservice for all the rooms and offices on the floor.

Plant monitoring

Room 1   **Room N**

HOME AUTOMATION   HOME AUTOMATION
PHONE   PHONE
WI-FI   WI-FI
IPTV   IPTV

Home automation
CCTV
WI-FI

FLOOR N

Plant monitoring

Room 1   **Room N**

Other floors

HOME AUTOMATION   HOME AUTOMATION
PHONE   PHONE
WI-FI   WI-FI
IPTV   IPTV

Home automation
CCTV
WI-FI

FLOOR 1

FRACARRO SERVICES
IPTV
OTHER PROVIDERS SERVICES
WIFI
CCTV
VoIP
home automation
alarm systems
video intercom

SERVER room ⟶ **DATA network for common areas**

GPON network

ONT Room N | **ONT Room 1**

HOME AUTOMATION
WIFI PHONE
IPTV

...

Home automation
System monitoring
WI-FI
CCTV
Service ONT 8 POE ports

Floor BOX/splitter

FLOOR N

ONT Room N | **ONT Room 1**

HOME AUTOMATION
WIFI PHONE
IPTV

...

Home automation
System monitoring
WI-FI
CCTV
Service ONT 8 POE ports

Other floors

Floor BOX/splitter

FLOOR 1

FRACARRO SERVICES
IPTV
OTHER PROVIDERS SERVICES
WIFI
CCTV
VoIP
home automation
alarm systems
video intercom

DATA network for common areas ← **SERVER ROOM**

GPON-type installation:
- a single rack in the server room
- passive small boxes/splitters per each floor
- elimination of the technical rooms on the floors
- copper cable reduction
- labour reduction
- reduction of installation times

More reliable system: any malfunction of an ONT results in the disruption of a single room or office.

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Advantages of the GPON solution

The Fracarro GPON solution allows the creation of latest generation IP systems, with a series of important advantages in terms of innovation and safety.

Future-proof infrastructure
The GPON system is open to technological developments because it will always be possible to convey new services through the fibre optic network. Choosing a GPON system means designing long-lasting systems, without fear of system obsolescence, with the guarantee of preserving the investment for many years.

Simplification
Thanks to its point-to-multipoint structure, the GPON system makes it possible to streamline the system, with significant savings in terms of space, materials, installation times and costs:
- no floor or zone racks are required and therefore no technical room is required for their housing;
- since it is a passive network, there are no active floor or zone devices. In this way, energy consumption is limited, dedicated UPS lines are not required and you can count on greater system reliability since the passive devices are not subject to malfunctions;
- no cooling systems are required with a reduction in energy consumption;
- fewer materials are required (copper, channel, pipes, etc.);
- installation times decrease;
- labour costs are reduced.

Scalability
The GPON solution adapts perfectly to the real needs of the customer; it is in fact possible to implement new services at any time, thanks to the bandwidth capacity of the singlemode fibre and the technological evolution of the active equipment.

Signal immunity
The use of optical fibre ensures perfect immunity to electromagnetic disturbances and interference, increasing the degree of efficiency and reliability of the system.

Lightning protection
Thanks to the characteristics of the fibre optic distribution, GPON systems allow the preservation of active equipment in the event of adverse weather events.

Long distribution lines
The GPON system considerably increases the possibility of connecting the active ONT equipment with the server room, reaching up to 20 km, well beyond the 90-meter limit of copper connections.
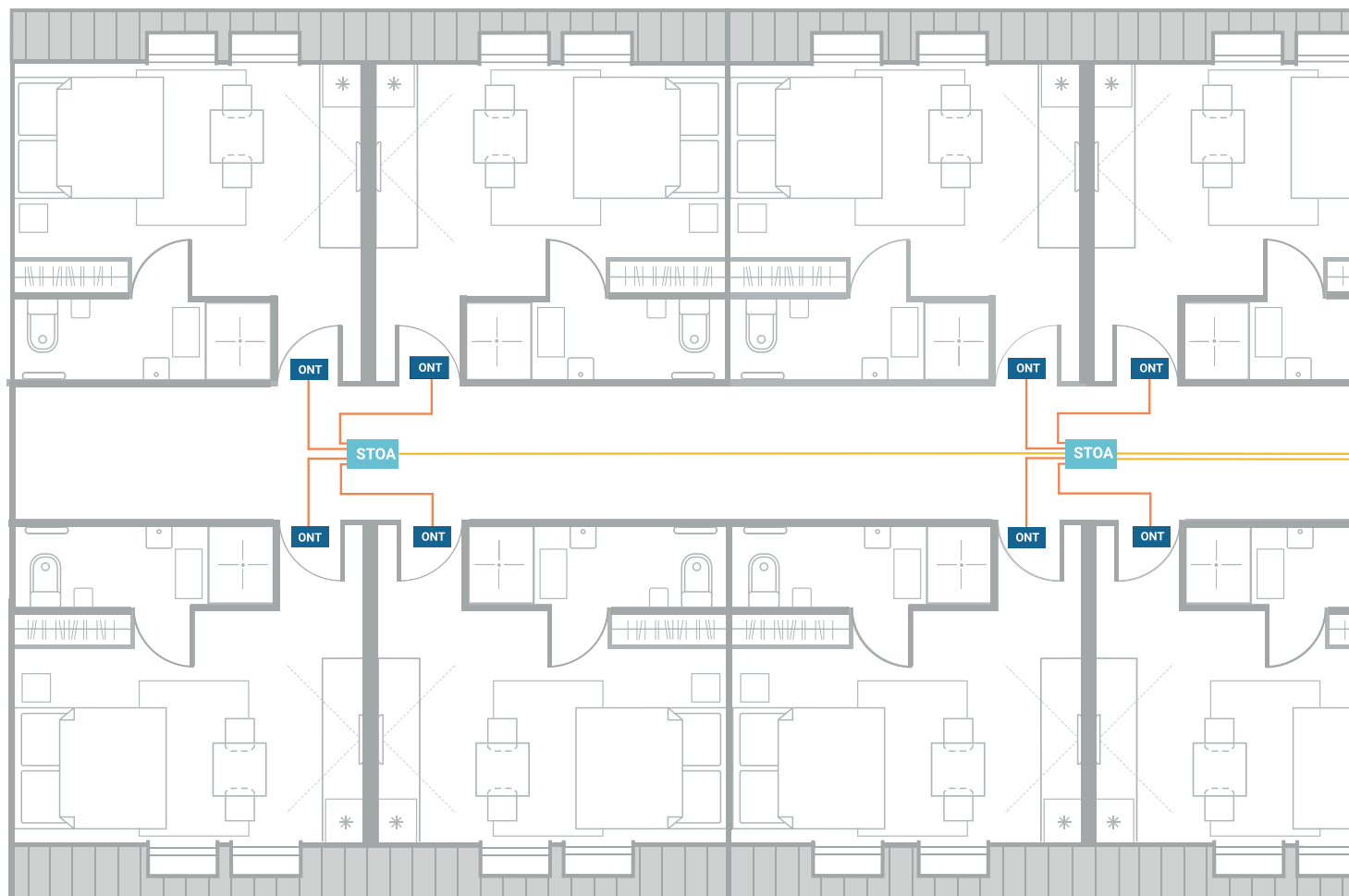
Reliability and performance
The GPON solution is also an advantageous choice in terms of efficiency, because it uses new generation systems that allow maximum performance in the distribution of connectivity and services.

Safety
With GPON systems, data protection is guaranteed thanks to dynamic bandwidth management and encrypted traffic.

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Architectural scheme

KEY

CORRIDOR

9/125 Singlemode fibre
Room optical patch cord
higher 5/10/20m services
BOX floor splitter
STOA serving rooms
TECHNICAL **ONT** 8 PoE ports

ROOM

Patch cord cat. 6 or higher
Cavo rame CAT.6 or more
4/8 **ONT** ports for room services
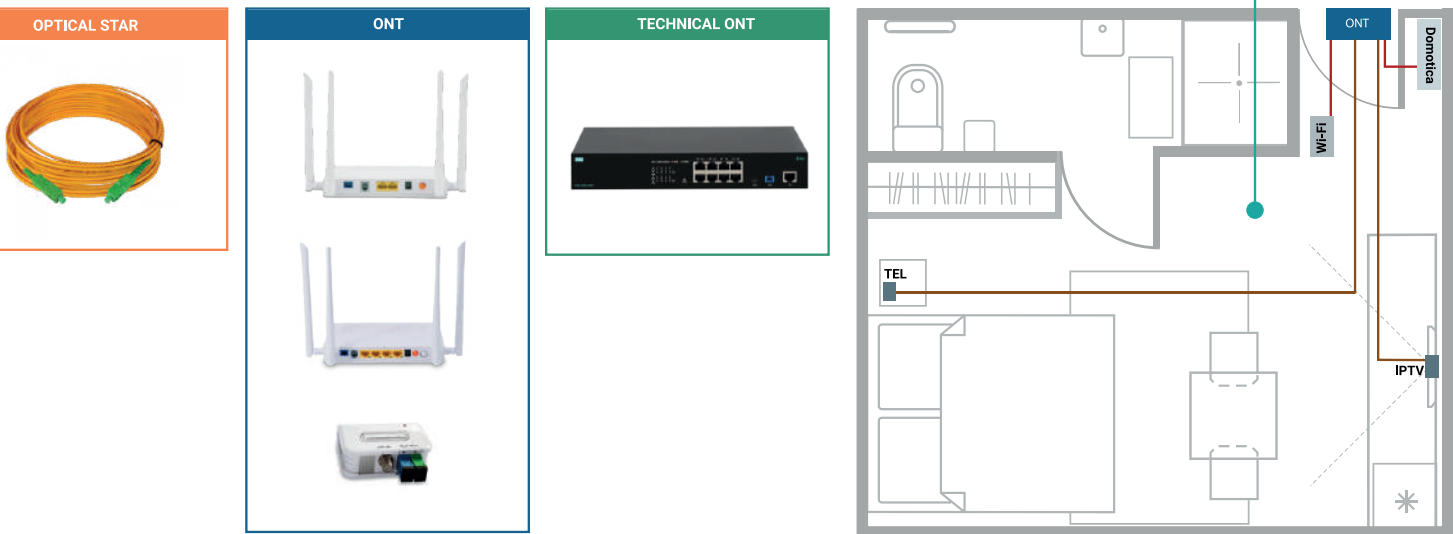RJ45 IPTV and telephone user point
WI-FI
Home Automation

STOA: Apartment Termination Box

BOX

STOA

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Service area

BOX

ONT

ONT

ONT

ONT

STOA

STOA

ONT

ONT

ONT

ONT

OPTICAL STAR

ONT

TECHNICAL ONT

ONT

Domotica

Wi-Fi

TEL

IPTV

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Passive infrastructure

Fracarro's offer for passive GPON infrastructure includes a rich series of high quality solutions, always updated and easy to install.

INDOOR SOLUTIONS

Fibre optic
- optical drawers
- optical boxes
- splitters
- optical fibres of various sizes, according to CPR regulations
- optical patch cords, adapters, etc.
- equipment for installation: splicing machines, certifiers, etc.

Conventional networks
- rack cabinets
- patch panels
- termination boxes
- cable category 6, 6a, 7, etc., according to CPR regulations
- patch cords and modules for the different categories of cable
- pliers, certifiers, etc.

OUTDOOR SOLUTIONS - PROJECT BASED
- street boxes
- gel cable joints
- tube, microtube, tritube
- optical fibres of various sizes
- blowing machines

Systems with passive devices
With Fracarro passive products it is possible to implement solutions that adapt to different architectural and environmental needs: from the vertical ones for hotels, offices and in general for the tertiary sector, to the horizontal ones for villages, campsites, resorts, and industry. All according to the legislation for the reference sector.

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Active devices

For every connectivity need, Fracarro supplies all the active equipment necessary for the creation of the different types of GPON networks, such as FTTR (Fibre to the Room) or FTTD (Fibre to the Desk), for the distribution of heterogeneous services.

CENTRAL SYSTEMS - OLT

Designed to manage networks up to 20 km in extension, each GPON control unit is supplied to meet the requirements of the individual project, both in terms of size and reliability: from control units with 4 or 8 PON ports for smaller installations, to modular ones, able to manage an increasing number of ONTs.

FIELD EQUIPMENT - ONT

Each Fracarro ONT receiver has been designed to meet the different connectivity needs depending on the type of environment:
· hotel rooms;
· common areas;
· offices;
· technical rooms.

ONTs are available with:
· 2, 4, 8 Giga Ethernet ports;
· 8 Giga Ethernet PoE ports, serving devices to be powered remotely, eg. access points and IP cameras;
· Pots ports, to manage analog telephones on VoIP telephone exchanges;
· Embedded Wi-Fi, to manage wireless connectivity in small and medium-sized structures.

ETHERNET SWITCH

For the management of servers and controllers in the server room and the connection of utilities in the common areas, Fracarro has different types of active network devices, suitable for the number of devices that can be connected and the level of service required:
· 24, 48 ports;
· with SFP ports for fibre connection;
· with and without PoE service;
· with service level L2 and L3;
Also available are routers for managing network logics and interconnecting services.

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Fracarro IPTV solution

In addition to being a partner for the networking world, for almost 90 years **Fracarro** has been synonymous with the **reception and distribution of RF and IP signals** also for **multi-user systems.**
Fracarro centralized solutions are made with high quality products and are the result of over 20 years of research and development in this sector.

NEW GALAXIA HEAD-END

GALAXIA is the new Fracarro professional solution to carry out multi-user systems. Extremely **modular and flexible**, it meets all the needs of distribution of Satellite and Digital Terrestrial contents (also other contents coming from external sources). There are several fields of application: **hospitality** (hotels, villages, campsites, resorts) **educational** (schools, university campuses), **health** (hospitals, nursing and retirement homes), **prisons, ships, institutional buildings** and in general all collective structures.
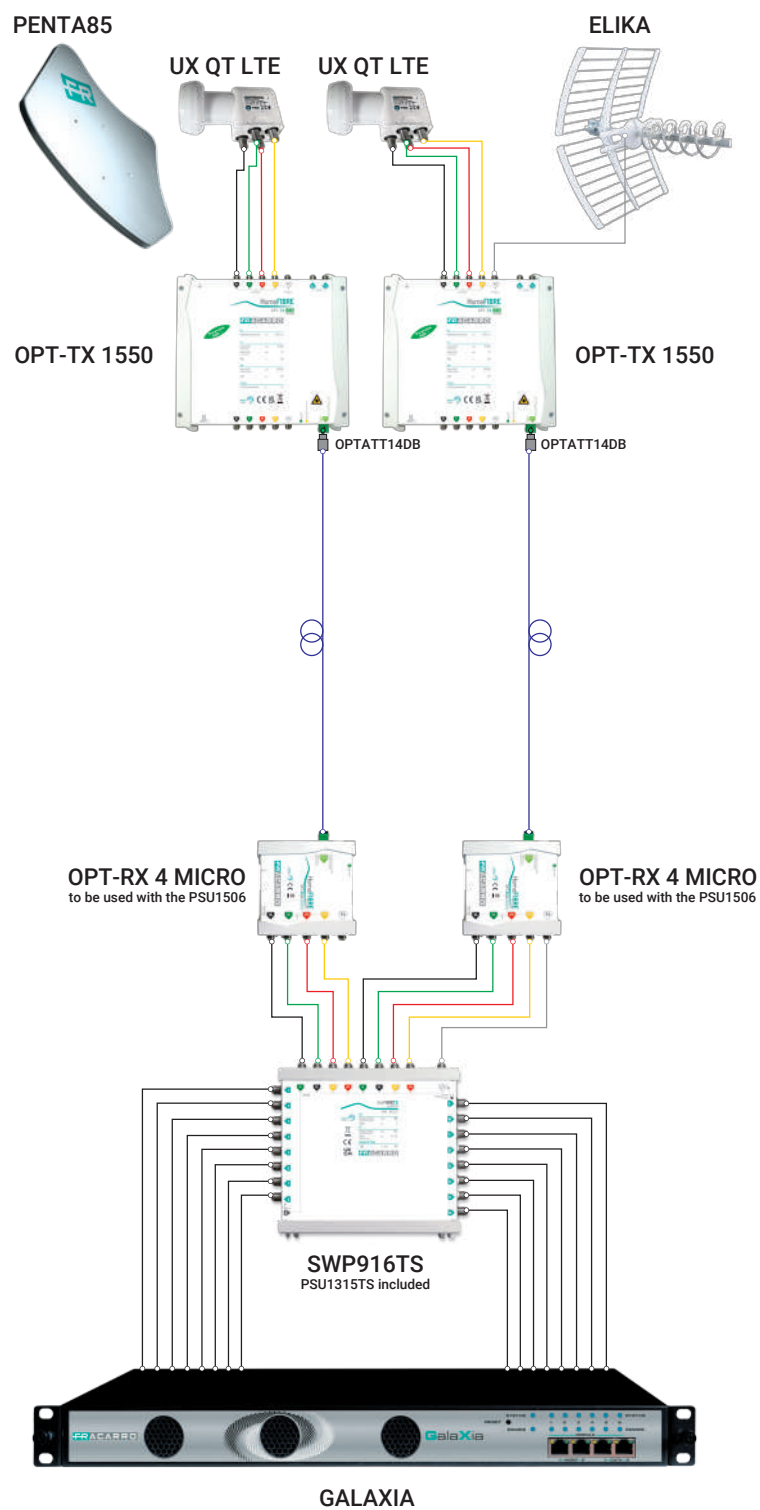**The GALAXIA head-end allows you to manage not only the contents received from satellite or digital terrestrial antennas, but also those coming from an IPTV system, making them available again for coaxial distribution or multicast IPTV.**

Ideal for distributing IPTV programs through a GPON infrastructure, the head-end is characterized by a series of important advantages:

- 1U Standard Rack 19 "mechanics
- double redundant power supply as standard
- forced ventilation
- possibility to insert hot modules (hot-swap)
- 4 RJ45 GE ports on the front (2 for management, 2 for the IPin/out stream)
- natively supports up to 120 IPTV inputs and 120 IPTV outputs (SPTS/MPTS)
- management of different sources (DVB-S2/S2X, DVB-T2, DVB-C, HDMI, descrambling, etc.)
- management of the advanced parameters of each individual program (PID filtering, SID, NIT, LCN, ONID, etc.)
- management via the integrated web interface (configuration, maintenance, etc.)
- ideal for distributing IPTV content through GPON infrastructure
- supports SNMP protocol

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Example of an IPTV system

PENTA85

ELIKA

UX QT LTE   UX QT LTE

OPT-TX 1550   OPT-TX 1550

OPTATT14DB   OPTATT14DB

OPT-RX 4 MICRO
to be used with the PSU1506

OPT-RX 4 MICRO
to be used with the PSU1506

SWP916TS
PSU1315TS included

GALAXIA

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Fracarro always by your side

With **over 20 years of experience in the field of optical fibre**, Fracarro is the ideal partner for the definition, activation and management of GPON solutions. Specialized technicians are available to professionals at every stage of the installation, with a rich range of services.

RESOURCES FOR DESIGNERS

Fracarro supports design studios in the development of data distribution solutions for each type of project, providing all the technical and economic information necessary for the preparation of the BOM. Depending on the type of structure, services and design information (architectural and electrical), Fracarro technical dept. defines the distribution aspects and sizes the active equipment to provide a complete constructive solution made of:

- project
- network logic
- BOM
- Products data sheets
- economic budget

Fracarro is present with its agents and distributors in over 50 countries and periodically organizes update and training webinars on new technologies and related solutions.

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SUPPORT FOR INSTALLERS

The Fracarro sales network and distributors are able to support installers in the construction of special systems, both on site and remotely.

Plant start-up from remote

The start-up of the plants represents a delicate phase of all networks, be they traditional or GPON. Fracarro supports its customers, with advanced networking skills, especially in the logical organization phase, acting as the ideal technical interlocutor for professionals who need a connection to the data network on site. In fact, Fracarro deals with the definition of the **IP-plan**, that is, the network logics that allow you to manage remotely the distribution of the requested services safely.
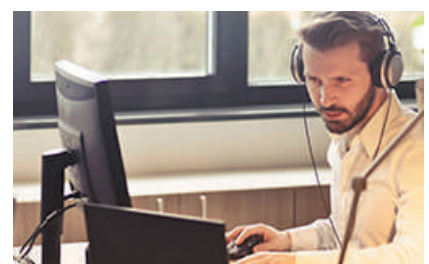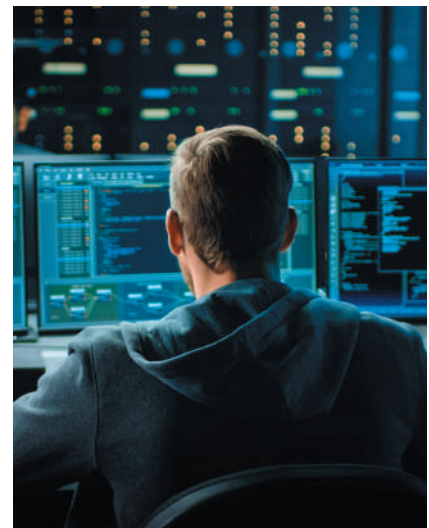
Even in the **configuration and testing phase**, Fracarro remotely offers all the support in the implementation of the solution and in the activation of services in total safety and continuity.

Assistance

Fracarro assistance service is available to answer any technical request.

Contacts

info@fracarro.com

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