The cheapest and reliable EPON solution on the market

PON (Passive Optical Network) is the most popular technology used to build efficient and affordable to maintain access grid. Considering the huge development of services e.g. Triple Play (the Internet, TV, Phone) and greater demands for a band **PON** technology is the best choice.

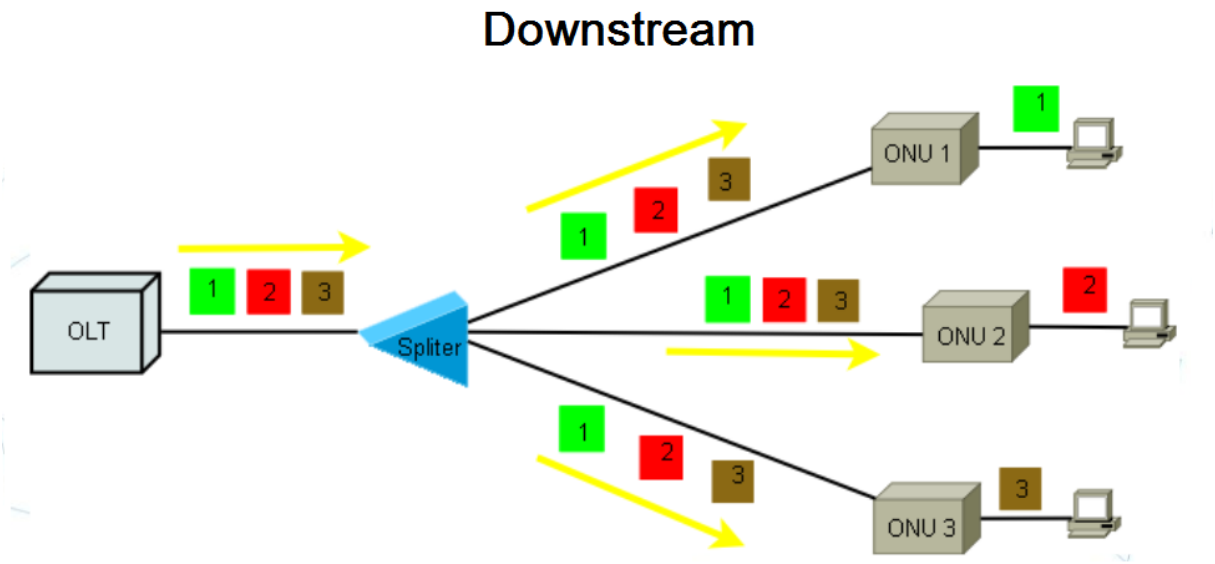
Building a network based on the **PON** standard **(EPON, GPON)** has many advantages, and probably the biggest advantage is associated with the word "**passive**".

Practically, the entire network structure is built on passive components. On the other hand, active devices appear only at the central point in the network (OLT) and at the end customer (ONT/ONU), and all that is between is just optical fiber and other passive components e.g. splitters.

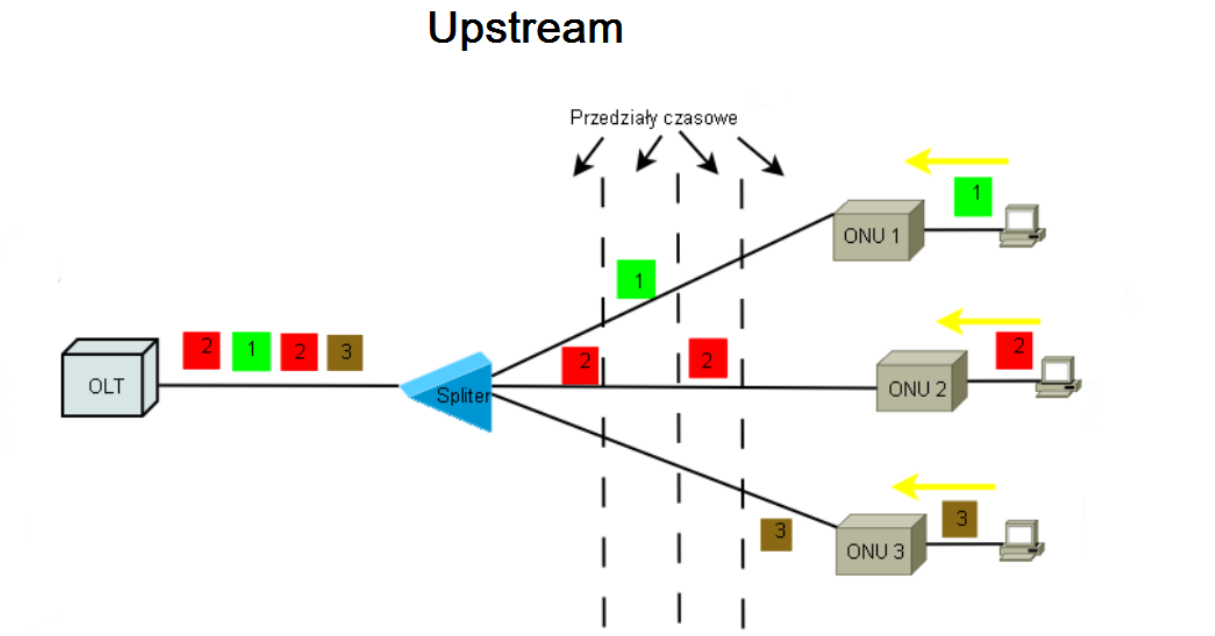
It is also important to use TDMA technology which enables for a very efficient use of a particular band and dynamic resources' allocation based on the current customer requirements at a specific time. Briefly, TDMA is a technique which uses one physical channel. This channel is divided into time slots which are then assigned to the individual users.

<u>The mechanism of action is very simple:</u>

At the moment of transmission from OLT to clients (downstream) data is being send to all CPEs ONU/ONT. These CPEs take the decision concerning data filtering and forwarding it to the appropriate recipient.



In the opposite way - upstream – OLT allocates the right amount and duration of time slots basing on delays and CPEs' buffer status. That's why a particular band is dynamically split with respect to the real requirements of each ONU/ONT.



You should also know that all PON networks are divided into 5 classes depending on the attenuation of fiber optical lines. This is clearly illustrated in the table below:

Network class	A	B	B+	C	C+
Minimum attenuation of a line between OLT and ONU	5dB	10dB	13dB	15dB	18dB
Maximum attenuation of a line between OLT and ONU	20dB	25dB	28dB	30dB	31dB

Another advantage of **EPON** network is the fact that is uses the structure of BPON network, so that you can transfer ethernet frames. In this case data is transmitted at the speed of 1Gb/s in both ways. EPON network also allows you to connect up to 32 devices, and with the minimum ratio of 1:16 optical power budget is 24 db.

PON networks consist of several main components:

OLT – Optical Line Terminal – This is a concentrator, central unit which aggregates and controls the traffic, and processes packets.

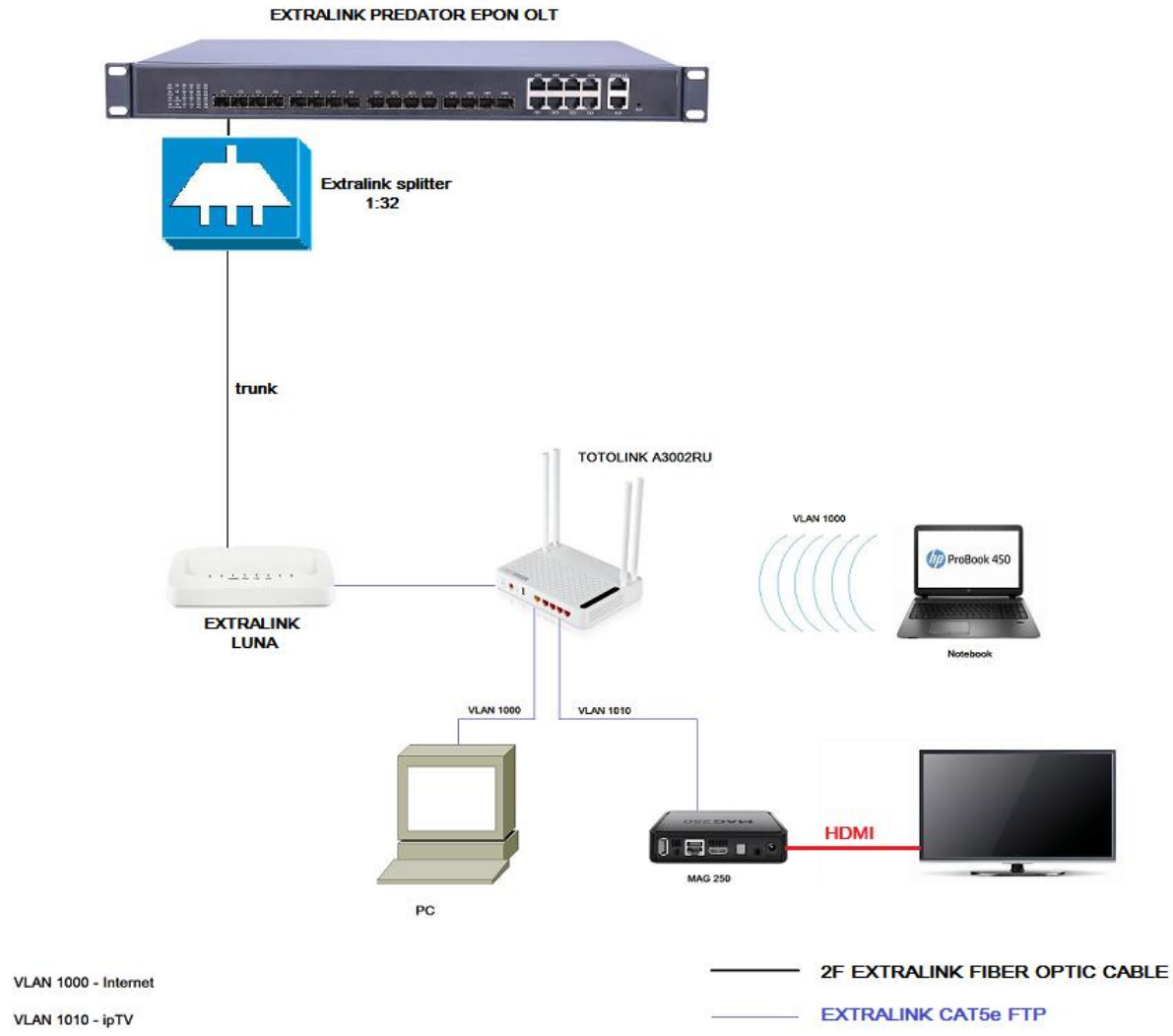
ONT – Optical Network Terminal – The device intended for the end customer. Its job is to transmit data, voice and video.

ONU – Optical Network Unit – This device is designed for a larger number of receivers. It may contain more ethernet or gigabit interfaces. ONU supports POTS (analog telephony) and it can create WiFi network.

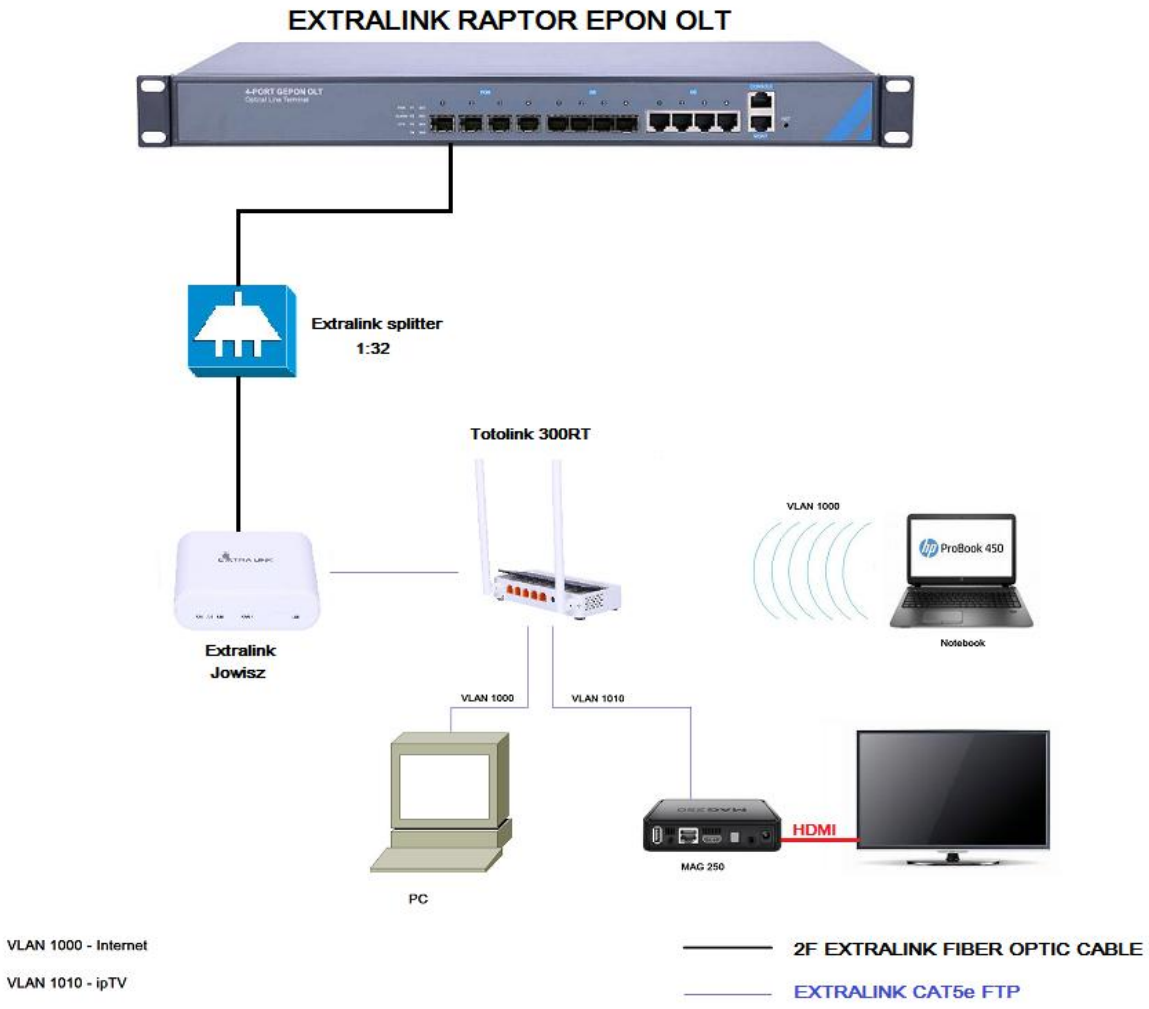
Splitter – A passive optical device that allows you to divide the signal from the optical fiber to another fibers reaching next splitters or ONT/ONU. Available divisions: from 1:2 to 1:128.

ODN – Optical Distribution Network – It is a network of optical fibers extending between the OLT, splitters and ONU/ONT. The most important is that this network should be guaranteed by the adequate power budget because this factor has a bearing on its range.

In order to meet the demands of customers www.anteny24.pl offered the cheapest and highly reliable devices, so you can build EPON network shown in the following diagrams.



Scheme 1



Scheme 2

As you can see in order to build this network we used EXTRALINK and TOTOLINK devices and as a central unit we used new Extralink Predator OLT (scheme 1).

PREDATOR

8X GIGABIT PON PORTS/ 8X GIGABIT UPLINK PORTS/ 8X SFP PORTS

- **8 PON ports**
- **Connects to 512 ONU (with 1:64 splitter)**
- **8 GE ports and 8 SFP ports serving as uplink and operating in combo mode**
- **Layer 2 aggregation**
- **Supports MAC Address: 8K**
- **Support for VLANs: 4096**
- **Supports 256 multicast groups**
- **Automatic detection and registration of ONU**
- **Dynamic bandwidth allocation**
- **Management: TELNET, CLI**
- **Management via EMS (Element Management System) based on standard SNMP protocol**
- **Two power supplies for redundancy**

Model	PREDATOR 8 PON
PON Chipset	Cortina-CS8022
PHY Chipset	Broadcom-BCM54685
FLASH	Spansion-S29GL128P10TFI01
RAM	HYNIX-H5PS1G63JFR---128MB
CPU Chipset	BCM53314

Of course OLT is also available in 4 port version (scheme 2)

RAPTOR

4X GIGABIT PON PORTS/4X GIGABIT UPLINK PORTS/4X SFP PORTS

- **4 PON ports**
- **Connects to 256 ONU (with 1:64 splitter)**
- **4 GE ports and 4 SFP ports serving as uplink and operating in combo mode**
- **Layer 2 aggregation**
- **Supports MAC Address: 8K**
- **Support for VLANs: 4096**
- **Supports 256 multicast groups**
- **Automatic detection and registration of ONU**
- **Dynamic bandwidth allocation**
- **Management: TELNET, CLI**
- **Management via EMS (Element Management System) based on standard SNMP protocol**

Model	RAPTOR 4 PON
PON Chipset	Cortina-CS8022
PHY Chipset	Broadcom-BCM54685
FLASH	Spansion-S29GL128P10TFI01
RAM	HYNIX-H5PS1G63JFR---128MB
CPU Chipset	BCM53314

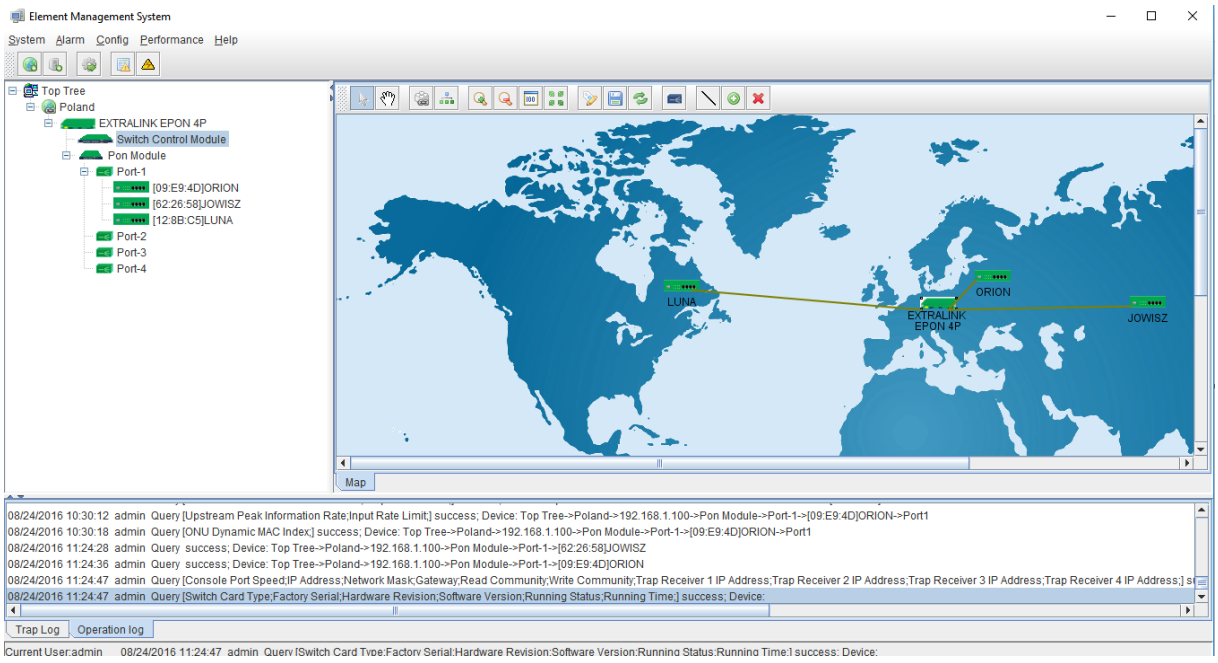
The most interesting feature of these OLTs is that they have the ability of managing the entire structure of devices via **EMS** (Element Management System). **EMS** is an integrated platform of devices management designed on the basis of standard SNMP protocol.

Thanks to **EMS** system, administrators can efficiently manage and configure network devices, for example, you can quickly add or remove further ONU units.

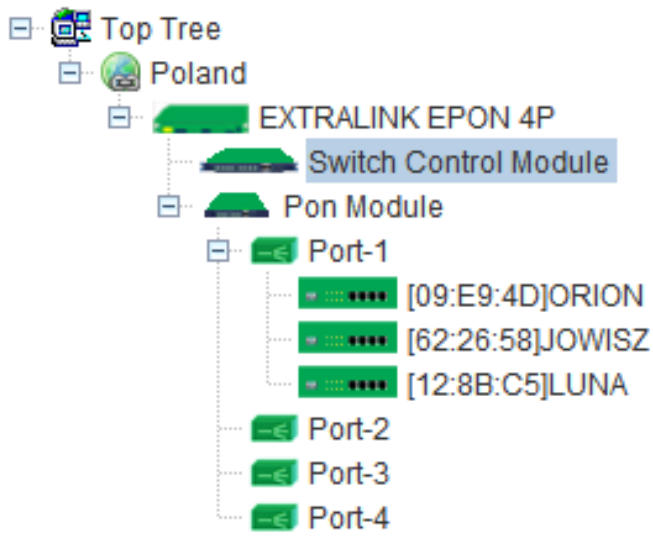
In addition, the EMS has:

- Automatic detection of ONU / OLT
- Automatic registration
- Option of connections testing
- Attribution of MAC addresses
- Loopback test and filter
- Bandwidth control
- Control of multicast stream

EMS also supports TR-069 standard (WAN Management Protocol), by which the ACS server can perform automatic remote configuration and collect the data necessary for network diagnostics.

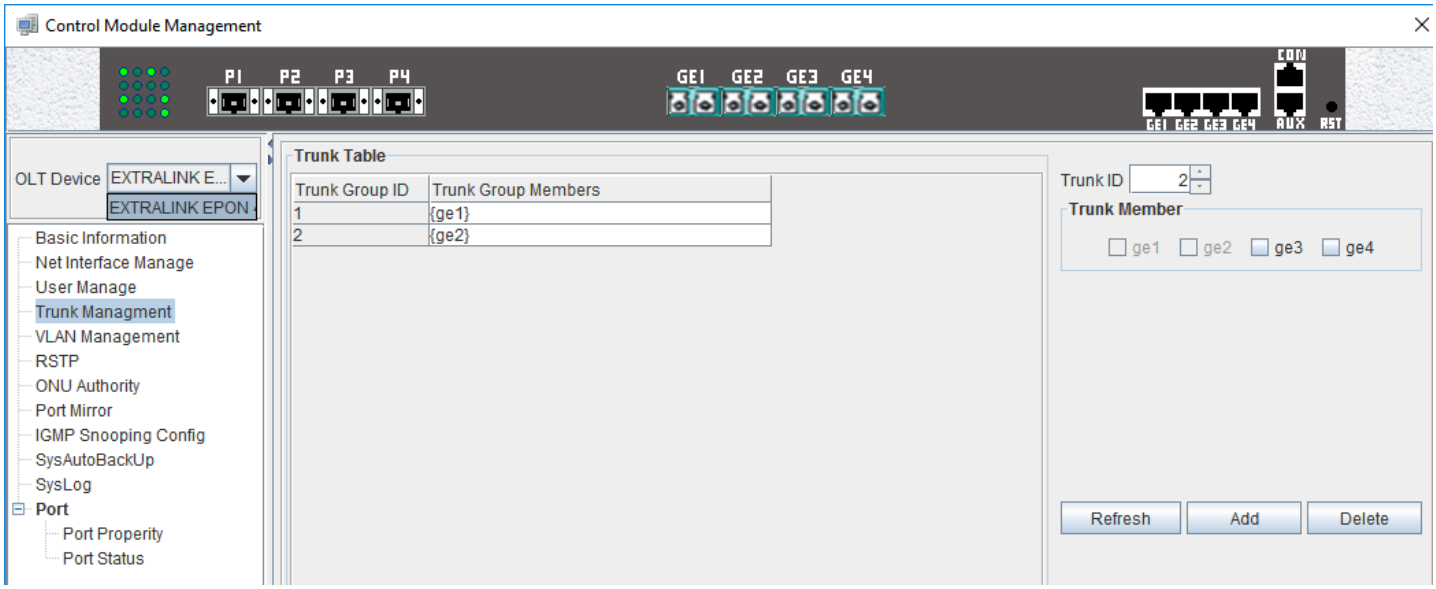


Device management via the EMS platform is user friendly because the interface is very clear and you can easily find all connected devices.

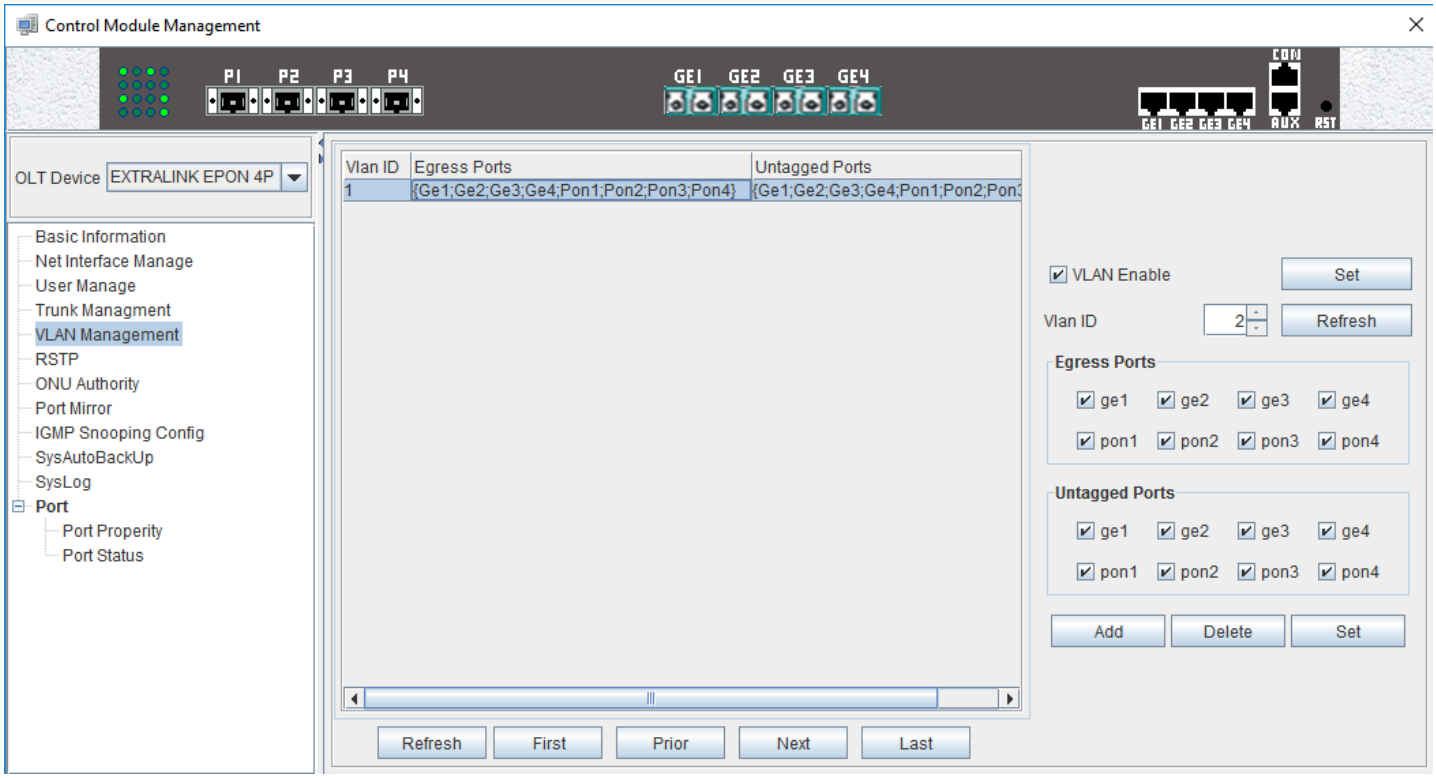


EMS platform allows you to get access to the detailed configuration of OLT:

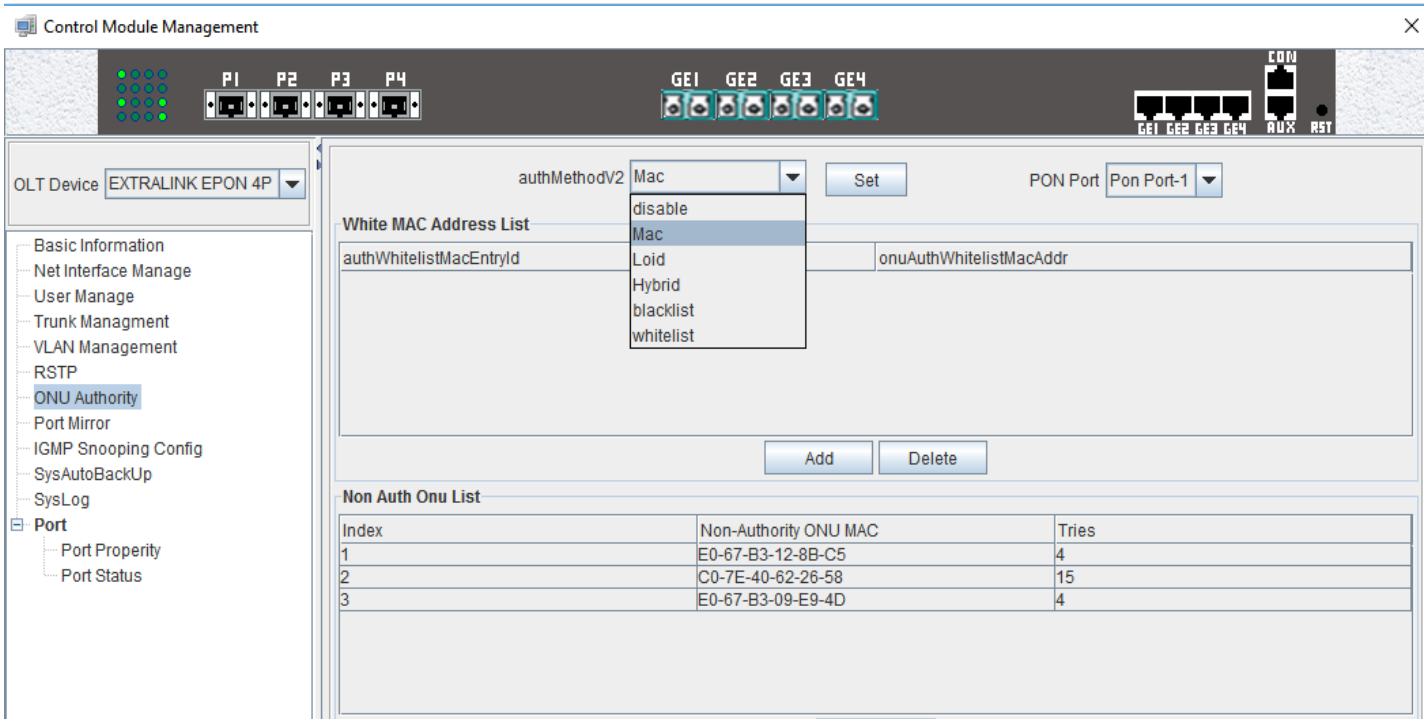
Trunk Management



VLAN Management



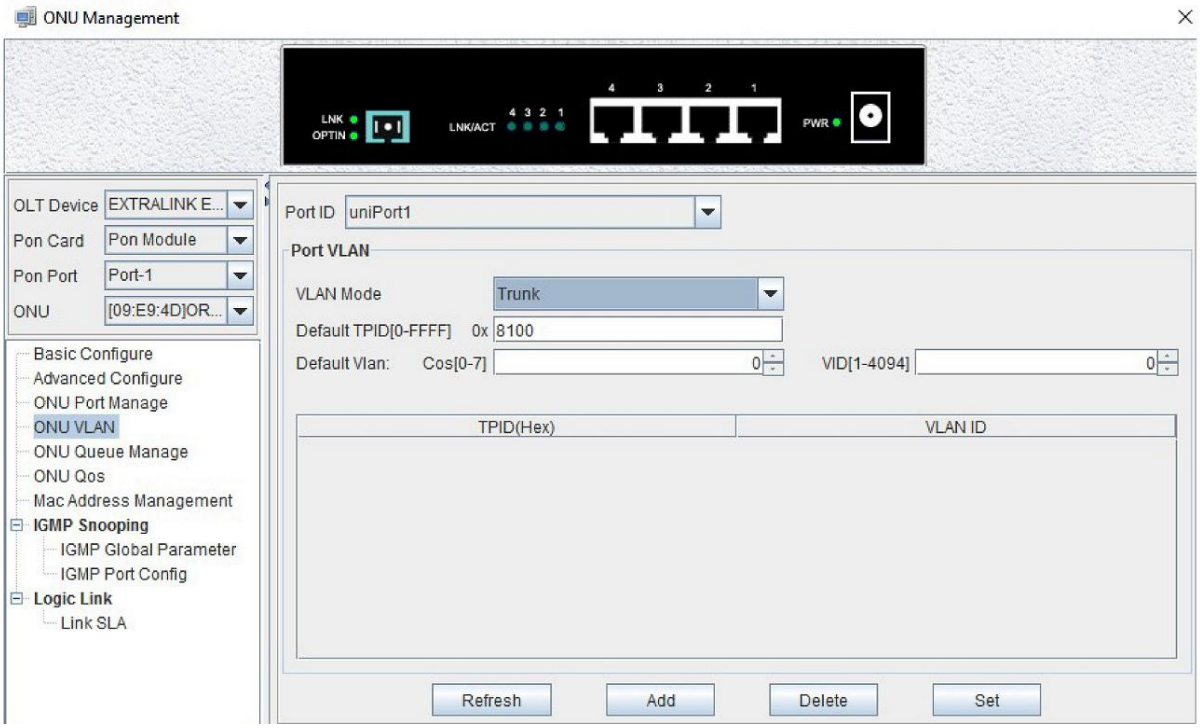
ONU Authority

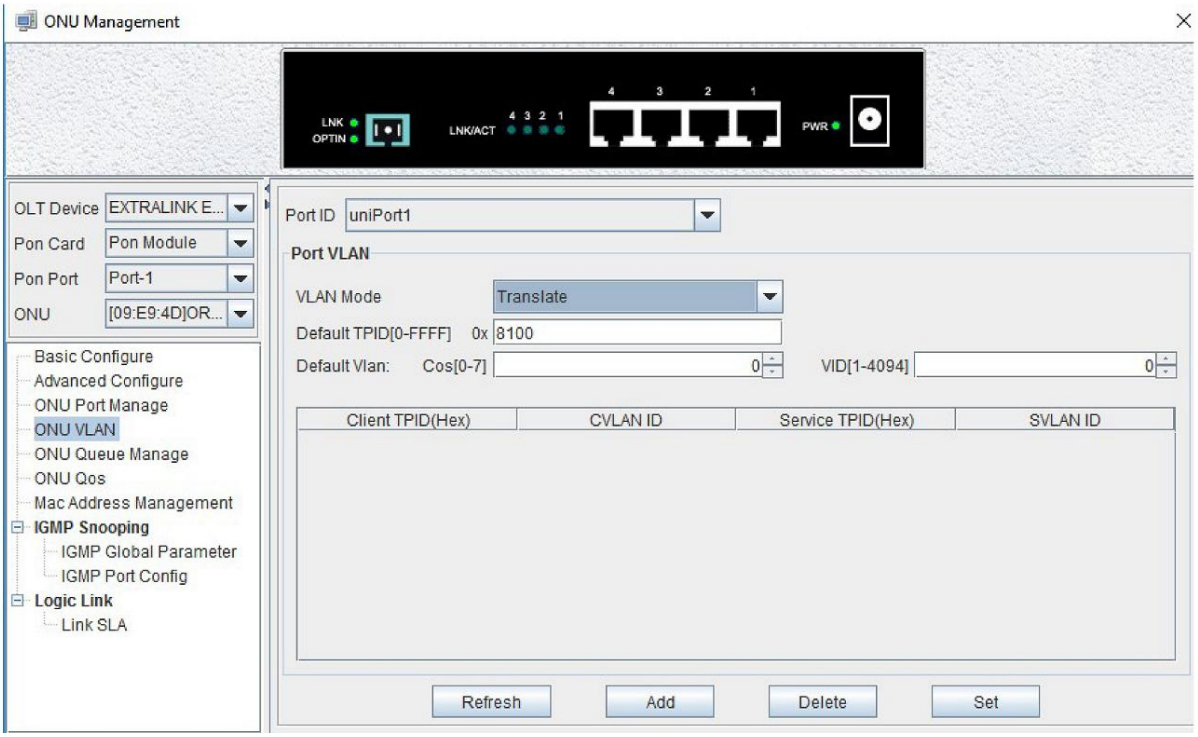


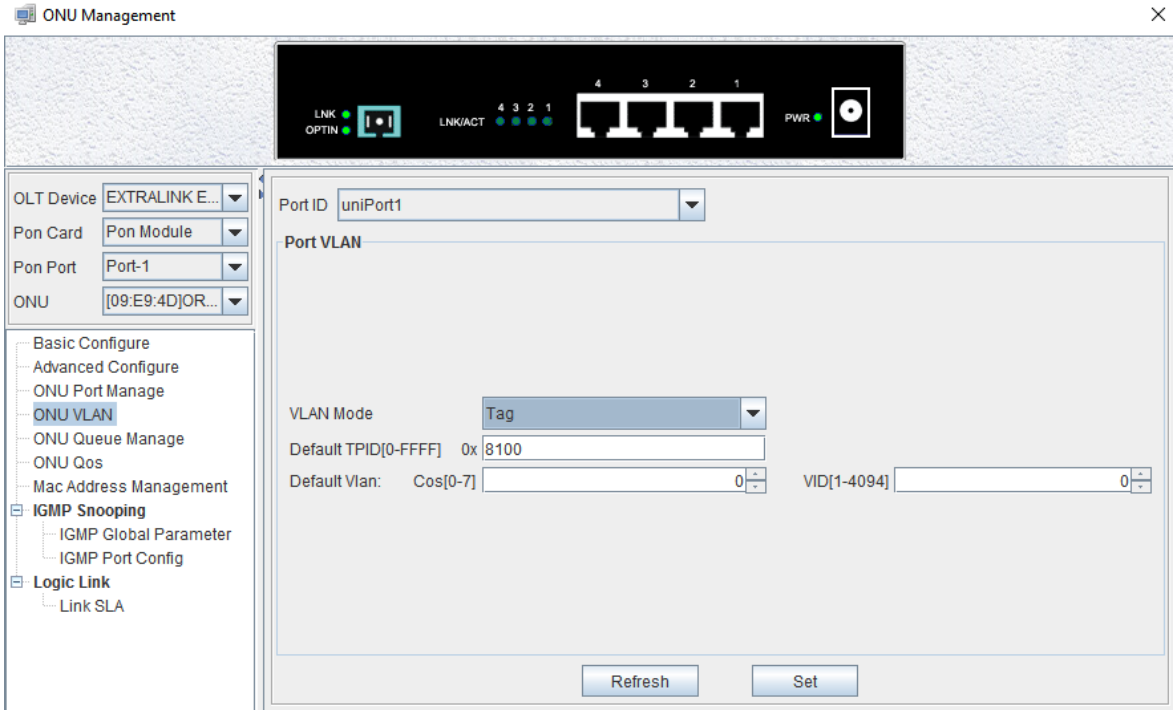
Apart from the configuration of OLT you have access to the detailed configuration of ONU's CPEs where you can remotely configure all essential functions.

For example, you can remotely adjust the speed of the input port for a specific group of packets: broadcast, multicast, unicast flooded etc.

You can remotely configure VLAN network with the help of proper modes: Transparent, Tag, Translate and Trunk:




ONU Management
LNK
OPTIN
LNK/ACT
4 3 2 1
PWR
OLT Device
EXTRALINK E...
Pon Card
Pon Module
Pon Port
Port-1
ONU
[09:E9:4D]OR...
Basic Configure
Advanced Configure
ONU Port Manage
ONU VLAN
ONU Queue Manage
ONU Qos
Mac Address Management
IGMP Snooping
IGMP Global Parameter
IGMP Port Config
Logic Link
Link SLA
Port ID
uniPort1
Port VLAN
VLAN Mode
Translate
Default TPID[0-FFFF]
0x
8100
Default Vlan:
Cos[0-7]
0
VID[1-4094]
0
Client TPID(Hex)
CVLAN ID
Service TPID(Hex)
SVLAN ID
Refresh
Add
Delete
Set


ONU Management
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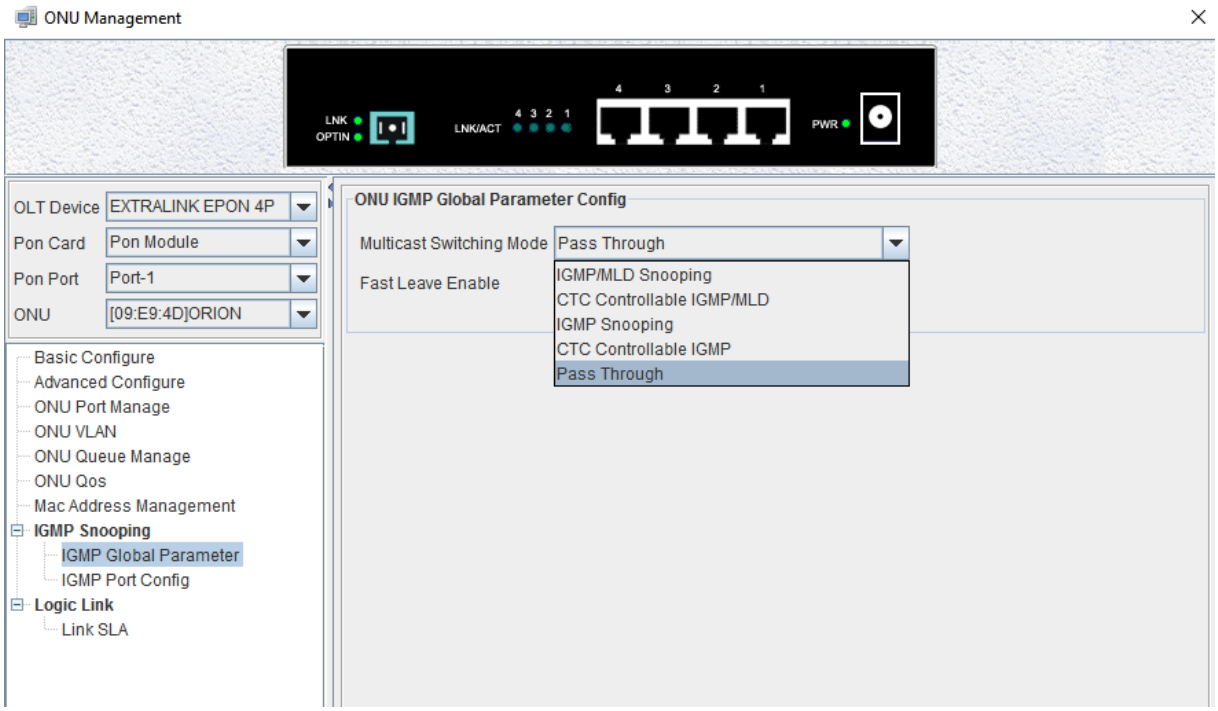
ONU
[09:E9:4D]OR...
Basic Configure
Advanced Configure
ONU Port Manage
ONU VLAN
ONU Queue Manage
ONU Qos
Mac Address Management
IGMP Snooping
IGMP Global Parameter
IGMP Port Config
Logic Link
Link SLA
Port ID
uniPort1
Port VLAN
VLAN Mode
Tag
Default TPID[0-FFFF]
0x
8100
Default Vlan:
Cos[0-7]
0
VID[1-4094]
0
Refresh
Set



Then through the **1:32 EXTRALINK PLC SPLITTER SC/UPC 900um** behind the OLT we plugged **ONU EXTRALINK LUNA EPON 1GE** in the bridge mode (scheme 1) **EXTRALINK JOWISZ ONU EPON 1GE CORTINA CHIPSET** (scheme 2).

EXTRALINK

LUNA

LUNA

EPON/1GE

- BRIDGE FUNCTION /ROUTING/NAT
- 1 X GIGABIT ETHERNET
- 1 X EPON OPTIC INTERFACE

  SYMMETRIC 1.25GBPS UPSTREAM/DOWNSTREAM
  SC SINGLE-MODE FIBER SPLIT RATIO: 1:64
  TRANSMISSION DISTANCE 20KM

- CHIPSET ZTE

I won't describe particular functions of **Extralink LUNA EPON 1GE** because the detailed description of a device, along with the test can be found in the previous article - https://www.anteny24.com/epon-1ge-extralink-luna-test

After ONU we installed **TOTOLINK A3002RU** router (scheme 1) and **TOTOLINK N300RT** (scheme 2) due to the fact that we want to "drag" one vlan to the IPTV and the second one to the Internet. **TOTOLINK A3002RU** can perform above mentioned functions very well. Moreover, it has gigabit ports

and as the only router it achieved pretty good results in ac1200 test https://www.anteny24.com/the-comparison-of-cheap-routers-ac1200-standard

TOTOLINK N300RT also perfectly supports vlans and IPTV. It operates on N300 band but in conducted tests N300RT showed a great potential. https://www.anteny24.com/low-cost-router-test-n-300mbps-standard

In addition, all **TOTOLINK** products have **36 months of warranty !**

OK…and now the most important part

The premise of this article was to create a reliable EPON network incurring the lowest possible costs of structure building and connecting the end customer.

Therefore, we offer our **customers** the following sets:

Photo	Name
	EXTRALINK PREDATOR
	EXTRALINK 1:32 PLC SPLITTER SC/UPC 900UM
	EXTRALINK LUNA EPON 1GE
	TOTOLINK A3002RU AC1200
	IPTV STB MAG250
	EXTRALINK CAT5E FTP OUTDOOR 305M
	2F EXTRALINK FIBER OPTIC CABLE

Photo	Name
	EXTRALINK RAPTOR
	EXTRALINK 1:32 PLC SPLITTER SC/UPC 900UM
	EXTRALINK JOWISZ EPON 1GE
	TOTOLINK N300RT
	IPTV STB MAG250
	EXTRALINK CAT5E FTP OUTDOOR 305M
	2F EXTRALINK FIBER OPTIC CABLE

In order to confirm that we offer the cheapest and yet the most efficient EPON solution on the market we propose you to contact with our sales managers who will help you with your order.

Click the link below to contact with our sales managers:

https://www.anteny24.com/contact-details

Author: Leszek Błaszczyk
Translation: Łukasz Sikora