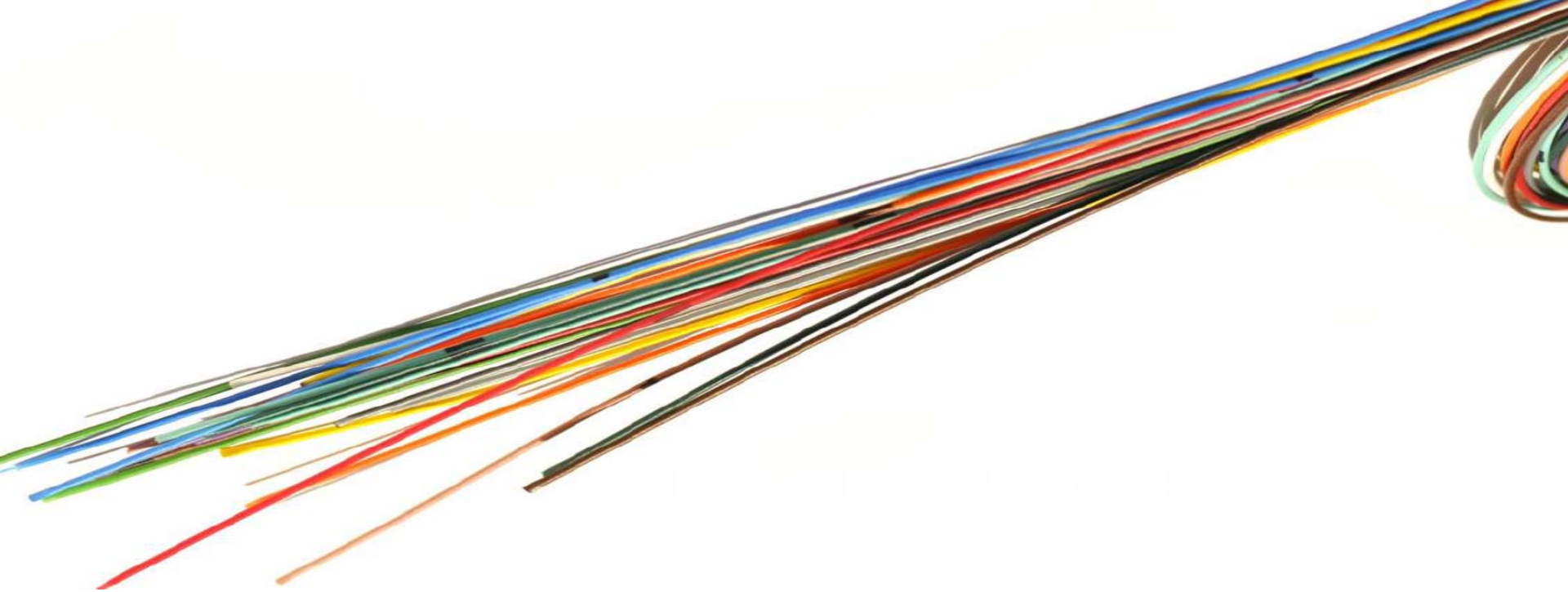
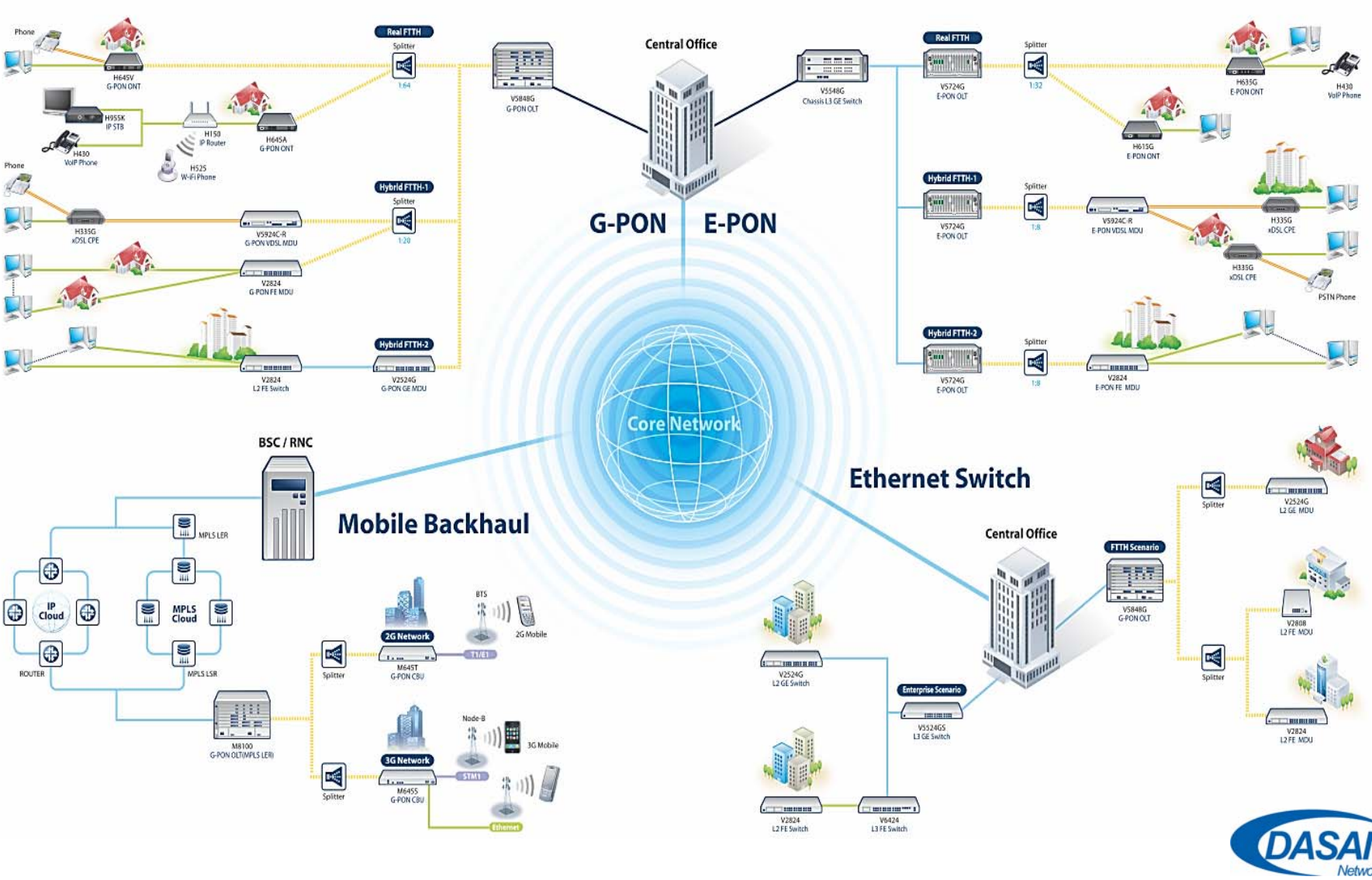


No one can exactly predict what technologies will develope in the coming years. So the best best is to prepare for everthing

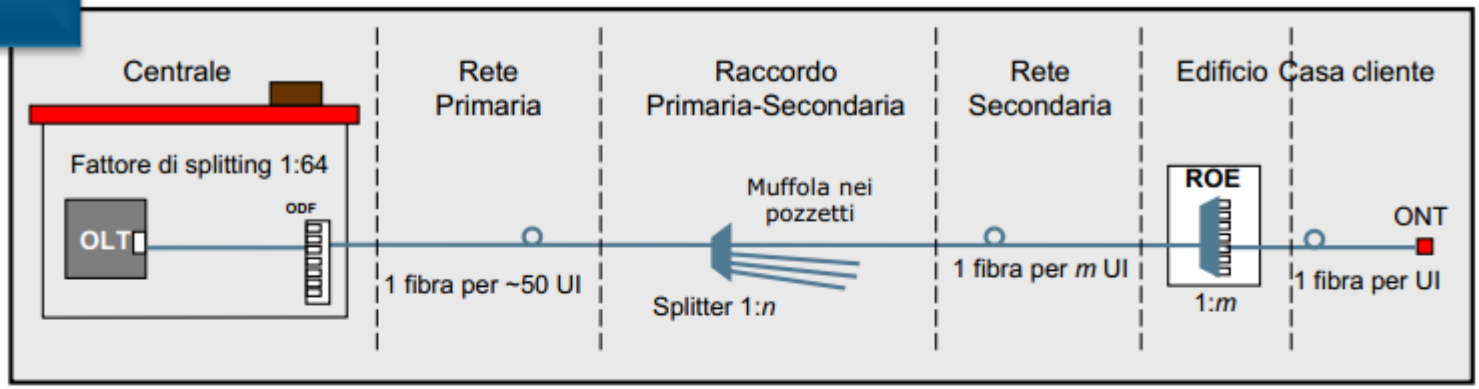
[Richard Jean-Pierre]

Start Bit®
Communications

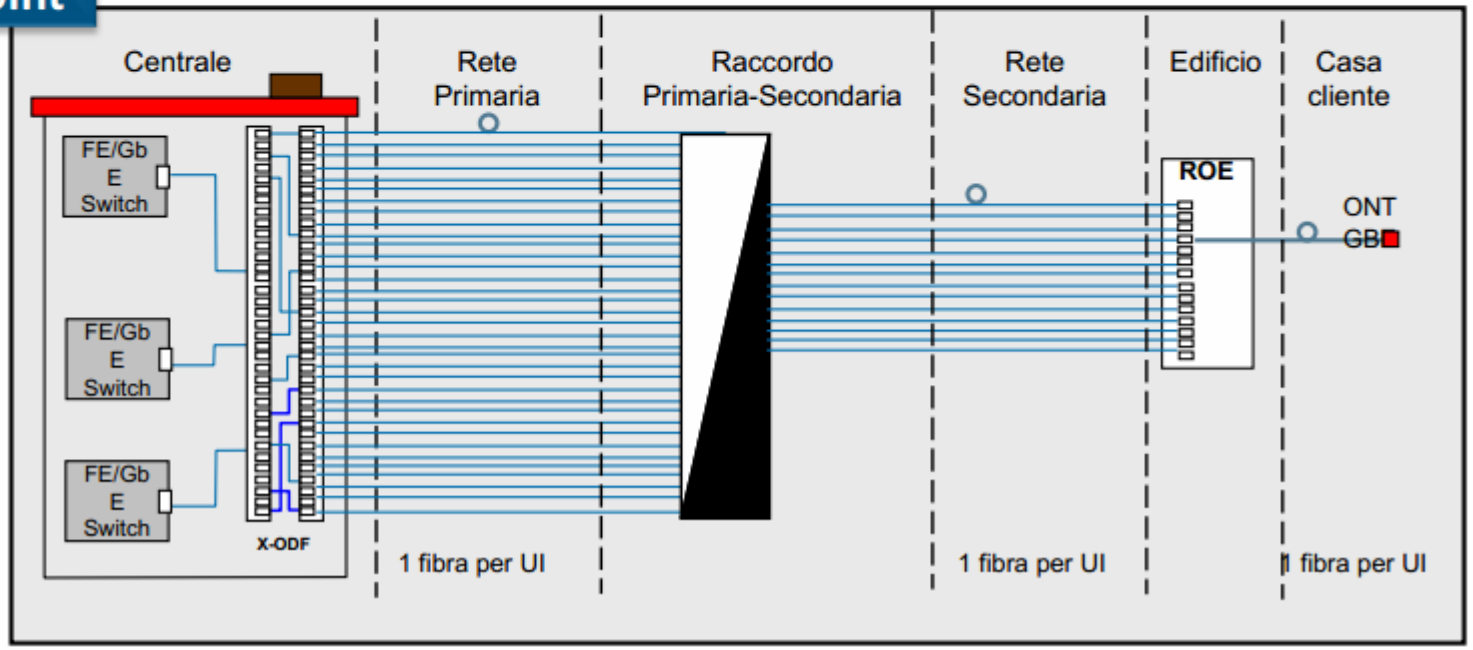


DASAN Networks

GPON



Point to Point



GPON Solution

V5824G: OLT 8xGPON + 2x10Gbit + 8xSFP 1G 1U

- INTERFACE:
  - 8-Port GPON (SFP)
  - 2-Port 1GE/10GE (SFP+)
  - 8-Port 1GE Combo (SFP, RJ45)
  - 1-port FE for management
  - 1-port RS232 for console
- Pluggable Dual/Redundancy PSU module
- 19" Rack Size with 1RU Height
- WEB MGMT

General

General
- CPU : 600MHz
- Flash : 64MB
- SRDAM : DDR2 256MB
- Switching chip:

- MAC : 32K
- active VLANs: 4K
- L3 Host Table : 8K
- IPv4/IPv6 LPM Entries : 12K
- L2 Multicast Group : 4K
- FP : 3K Rules

GPON Interface
- 8 x GPON (SFP)

Ethernet interface
- 8 x GE Combo (SFP, RJ45)
- 2 x 10GBase-R (SFP+)

Management Interface
- 1 port MGMT 10/100Base-T
- 1 port console RS-232

Software Features

Function
- Standard Ethernet Bridging
- Link Aggregation
- LLDP
- SP, WRR, WDRR, WRED
- Cos/QoS acc. to 802.1p, DSCP/TOS, IP
- SA/DA
- IGMP Snooping
- ContentAware Filter Processing
- SNMP v1/2/3
- Port Mirroring
- GMRP & GVRP
- **Web Management**
- IUT-T G.984.4 OMC

Hardware Features

Physical dimensions [WHD]
- 432 x 44 x 300mm (Approximately)

Power
- Power consumption estimation:
  Approximately 70W

Operating environment
- Normal operating temperature:
  -20℃ ~ +60℃
- Storage and transport temperature:
  -40℃ ~ +80℃
- Normal Humidity: 0% ~ 90%

System Feature

Image	Description	Switching Capacity
	▪ High-end 40 ports PON OLT ▪ 40 ports G-PON OLT ▪ 40 ports E-PON OLT ▪ 19" Chassis with 7U ▪ 8 x 100/1000Base-X + 4 x 10G XFP ▪ Provide 16K L3 entry ▪ Redundant power supply	**296 Gbps**

Key Features

General
- Flash: 72MB
- SDRAM: 1GB DDR2
- System Spec.
  - MAC: 32K
  - IPv4 LPM/Host: 12K/16K
  - L2/L3 Multicast: 1K/4K
  - ACL ingress/egress: 4K/4K
  - QoS: 8 Cos/port, SP, WRR, DWRR
- 19" Chassis with 7U Height
- Estimated Maximum Power Consumption
  - 390W (10 SIU_GPON4R+2 SFU+2 NIU)

G-PON Interface
- **40 x 2.5G G-PON**

E-PON Interface
- **40 x 1G E-PON**

Network Interface
- **8 x 100/1000Base-X**
- **4 x 10GbE**
- Support various XFP Transceiver

Indicators/Alarms
- Link/Act , 1G Speed LED indicator

Management Interface
- 1 port 100BaseTx & 1port RS-232
- Remote control (CIU)

Function
- ITU-T G.984 G-PON
- IEEE 802.3ah E-PON
- Standard Ethernet Bridging
- Active/standby redundancy
- Link Aggregation
- Spanning Tree: STP, RSTP, MSTP
- SP, WRR, DWRR
- Cos/QoS acc. to 802.1p, DSCP/TOS, IP SA/DA
- IGMP Snooping
- RIPv1/2, OSPFv2, BGPv4, IS-IS
- IGMPv3, PIM-SM/SSM
- SNMPv1/v2/v3
- Optical monitoring
- PON redundancy
- Clock Sync: BITS, IEEE 1588, Sync E
- CPLD remote upgrade

V8500: 160 GPON OLT ports

Carrier class GPON OLT multi-service chassis

- 3.52 Tbps non-blocking layer 3 switching
- 160 GPON ports per chassis
- 8 10GbE uplink ports (XFP)
- SIP and MGCP VoIP support
- Full electronic, power and optical redundancy
- Real-time network traffic monitoring and analysis
- Support for 10G-EPON
- 16-GPON ports per card
- L3 features

	H645G	H640G	H640GV-03	H640GW-02	H640GR-03	H640RW-02
LAN	1x10/100/1000	4x10/100/1000	4x10/100/1000	4x10/100/1000	4x10/100/1000	4x10/100/1000
POTS/VoIP	N/A	N/A	2xFXS	2xFXS	2xFXS	2xFXS
WiFi	N/A	N/A	N/A	2x2 b/g/n 300Mb/s	N/A	2x2 b/g/n 300Mb/s
"F" CATV	N/A	N/A	N/A	N/A	✔	✔
Router/NAT	✔	✔	✔	✔	✔	✔

DASAN Networks

GPON Stick H640SFP

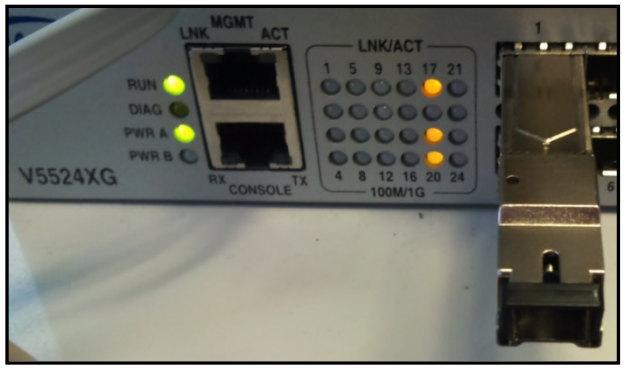
SFP with build in GPON ONT chipset.

Extended Temperature

Aplication:

-Business customers

-Wireless backhaul

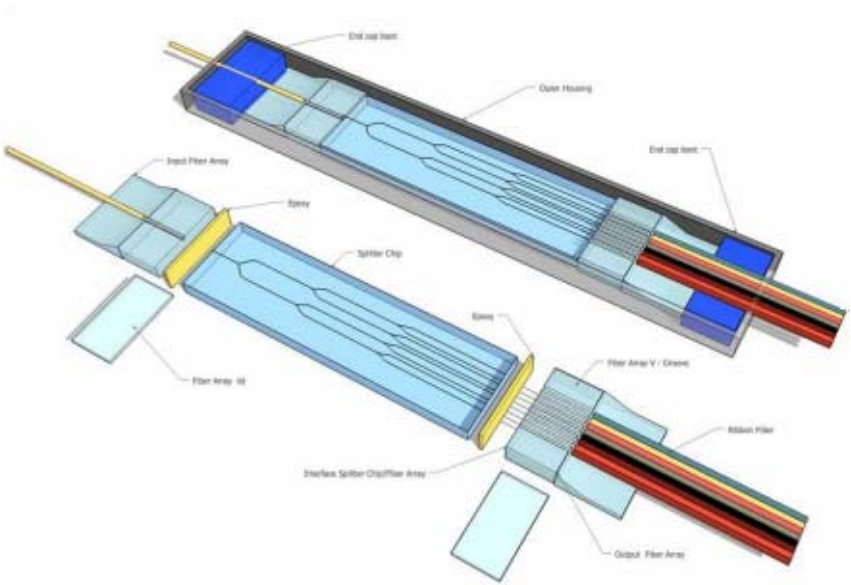


- GPON - Gigabit Passive Optical Network.
- The only active network elements are OLT (Optical Line Termination) and ONT / ONU (Optical Network Termination / Unit)
- PON utilizes Tree network topology
- Offers data rates of up to 2.5 Gbps downstream and 1.2 Gbps upstream.
- Provides extended reach (compared to xDSL)

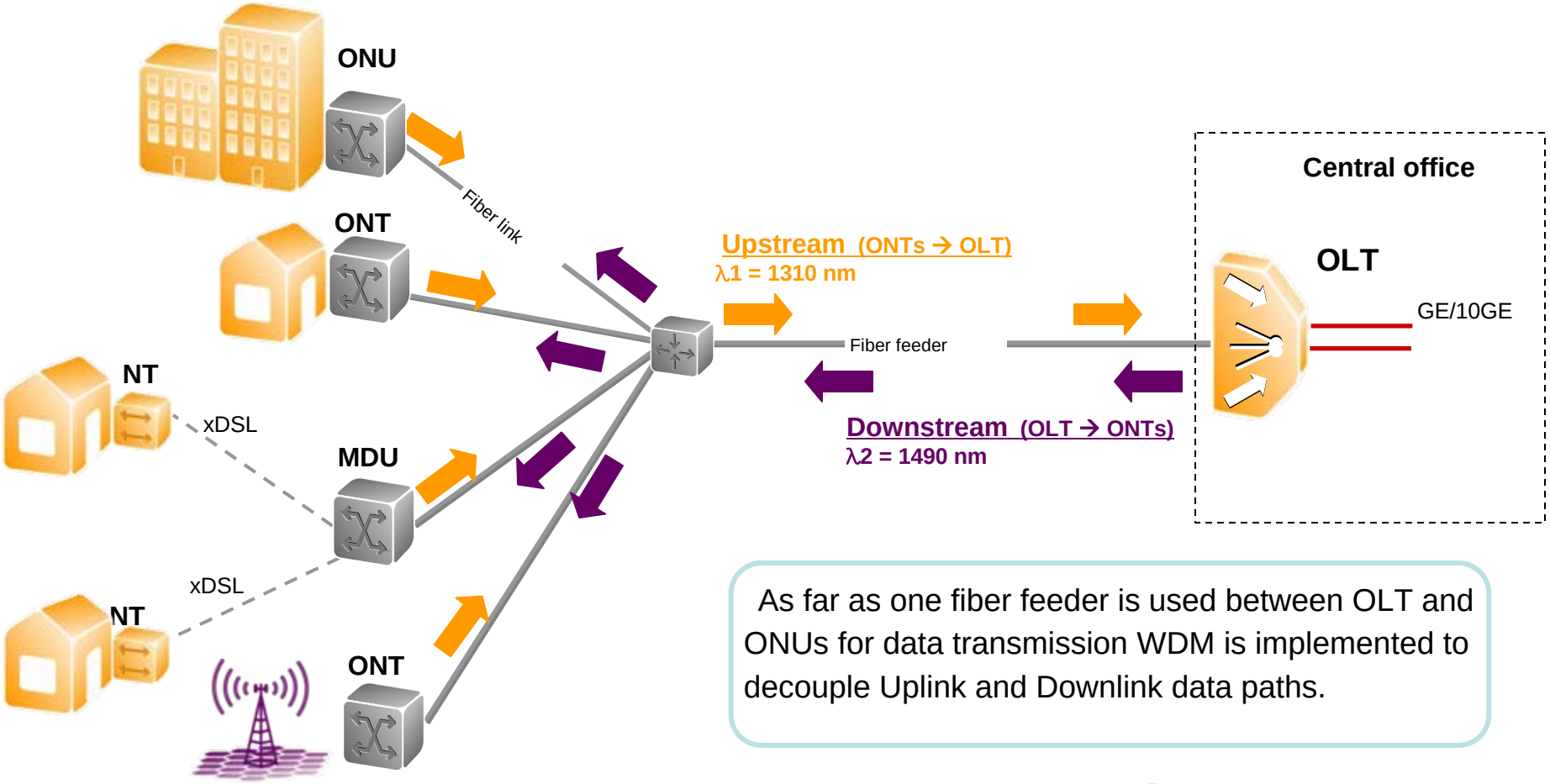
PON – elements

- Active (need power supply)
  - OLT (Optical Line Terminal)
  - ONT/ONU (Optical Network Unit/Terminal)
- Passive (no power is needed)
  - Spliters –
    - FBT – symetrical and asymetrical; up to 1:5
    - PLC symetrical; up to 1:256

$$dB = 10 \cdot \log\left(\frac{Power\_in}{Power\_out}\right)$$



Overall GPON Data Transmission Approach



As far as one fiber feeder is used between OLT and ONUs for data transmission WDM is implemented to decouple Uplink and Downlink data paths.

Infrastructure – Fiber Optic

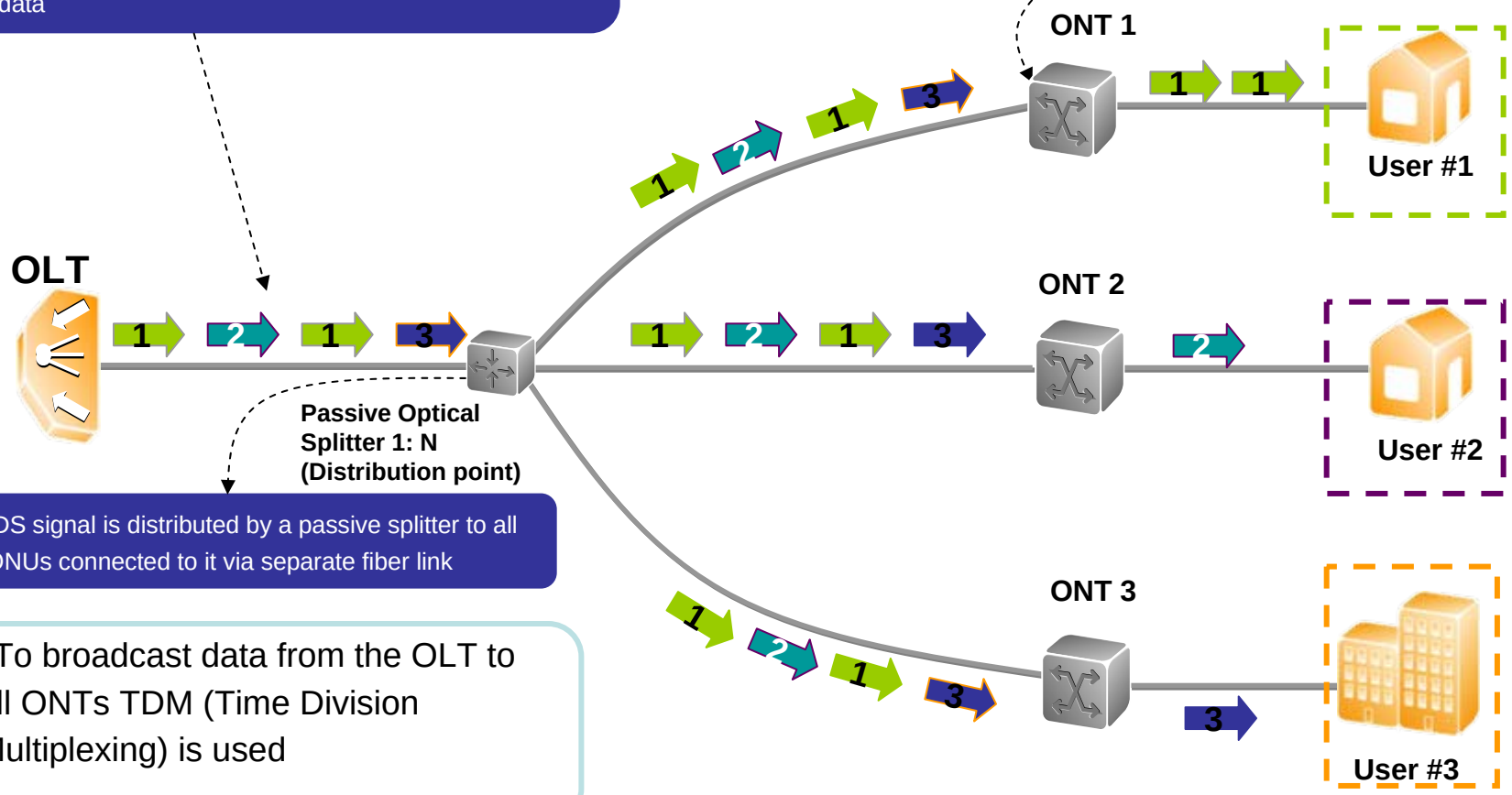
- **Passive Optical splitter**
- **NT – Network Termination**

- **OLT – Optical Line Termination**
- **ONT – Optical Network Termination**
- **ONU – Optical Network Unit**
- **DSL – Digital Subscriber Line**

Downstream Data Transmission (TDM)

- OLT broadcasts data to every ONU using TDM approach
- TDM – continuous data stream divided into frames
- Optionally FEC coding and AES encryption are applied to the user data

- Every ONT receives each DS frame and picks up only that data addressed to it by the OLT
- FEC decoding and /or AES decryption algorithm applied if required



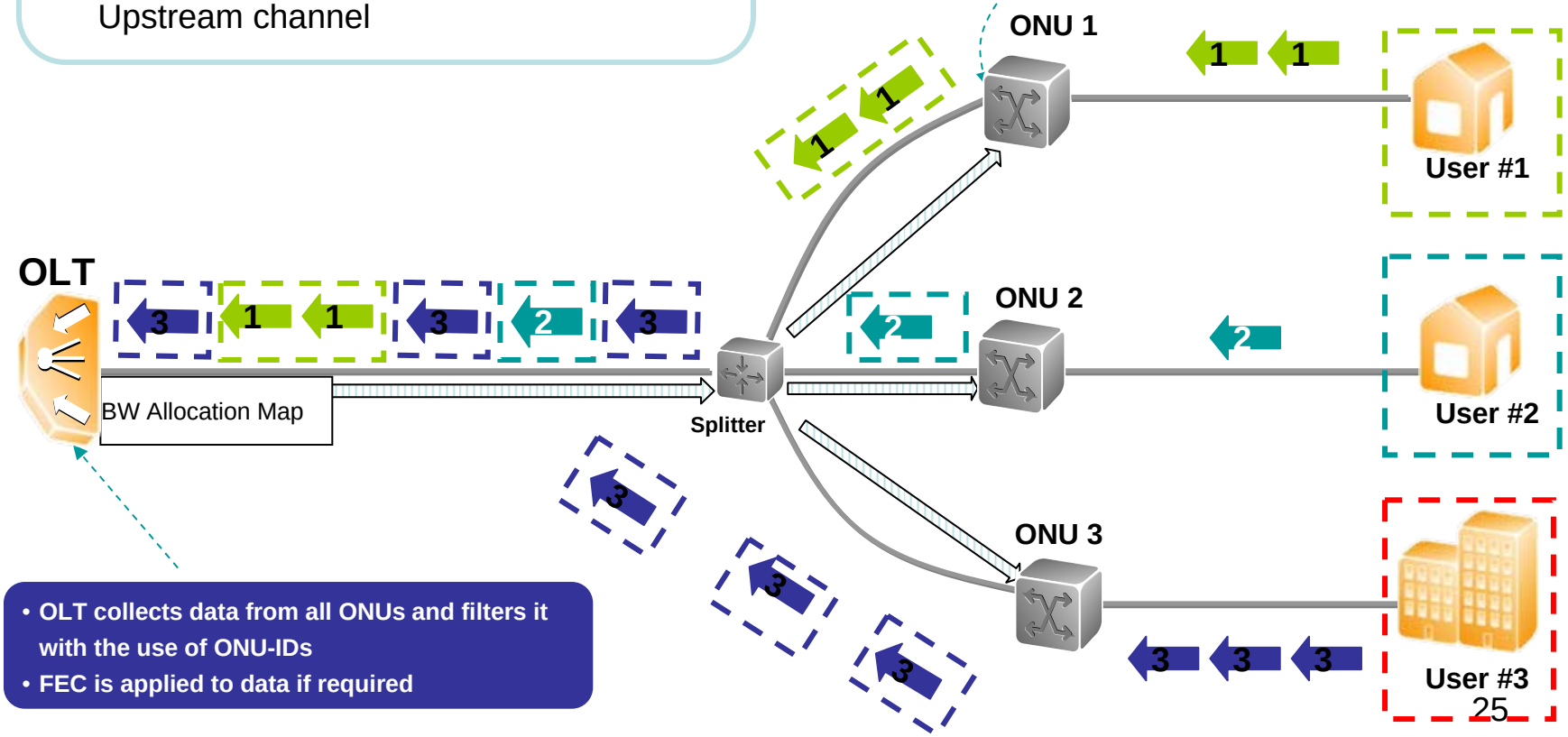
- DS signal is distributed by a passive splitter to all ONUs connected to it via separate fiber link

To broadcast data from the OLT to all ONTs TDM (Time Division Multiplexing) is used

Upstream Data Transmission (TDMA)

To provide multiple access to a single fiber link for all connected ONUs Time Division Multiple Access (TDMA) architecture is implemented for the Upstream channel

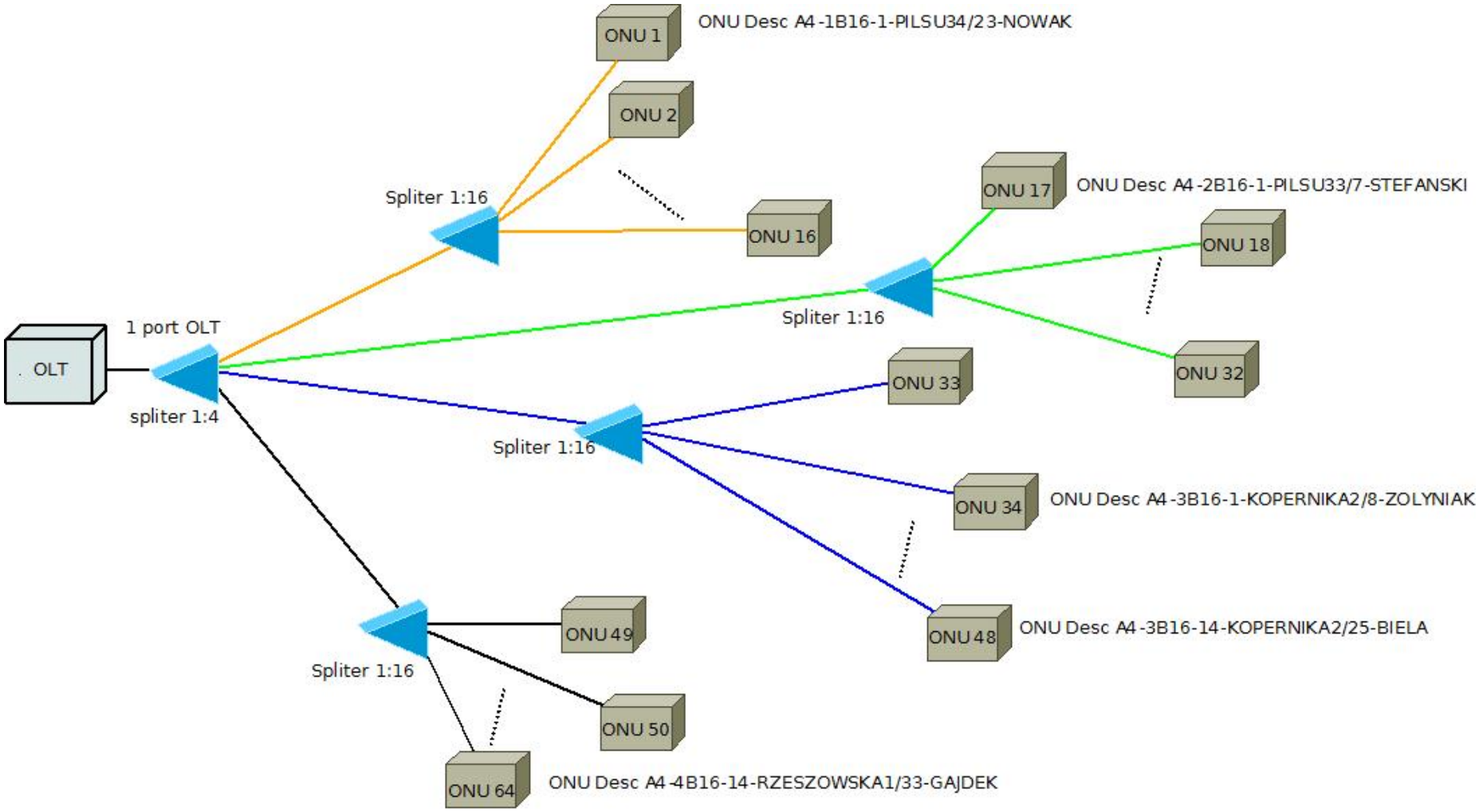
- ONU receives data from the user ports and combines them into bursts
- For synchronization purposes each ONU transmits its data in a strict accordance with the Bandwidth Map generated by OLT
- Using DBA mechanism OLT can rearrange US BW to provide more resources to those ONU tightly loaded with traffic.
- For synchronous transmission within TDMA stream each ONU introduces equalization delay.



- OLT collects data from all ONUs and filters it with the use of ONU-IDs
- FEC is applied to data if required

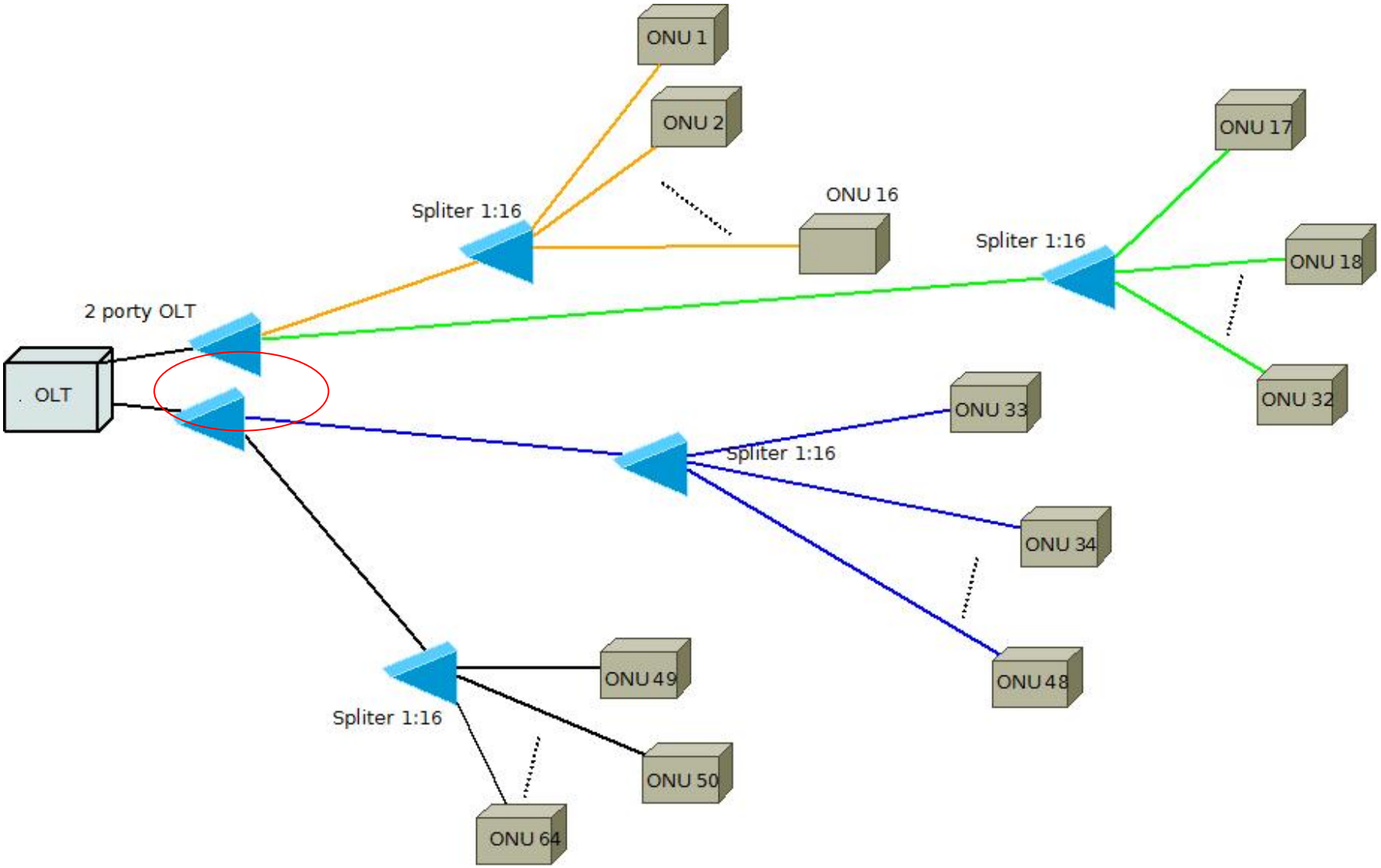
Stage 1

Network Division



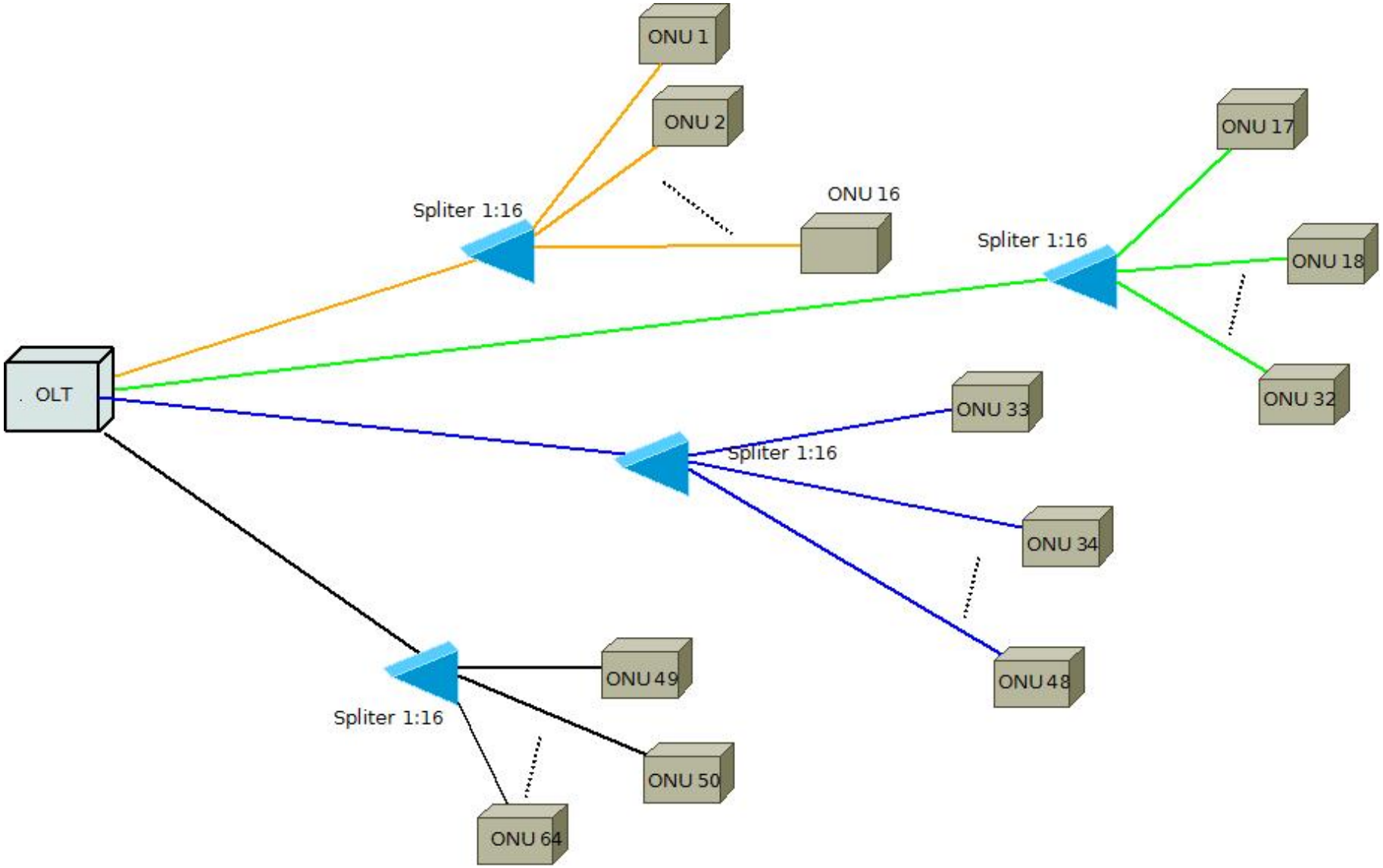
Stage 2

Network Division

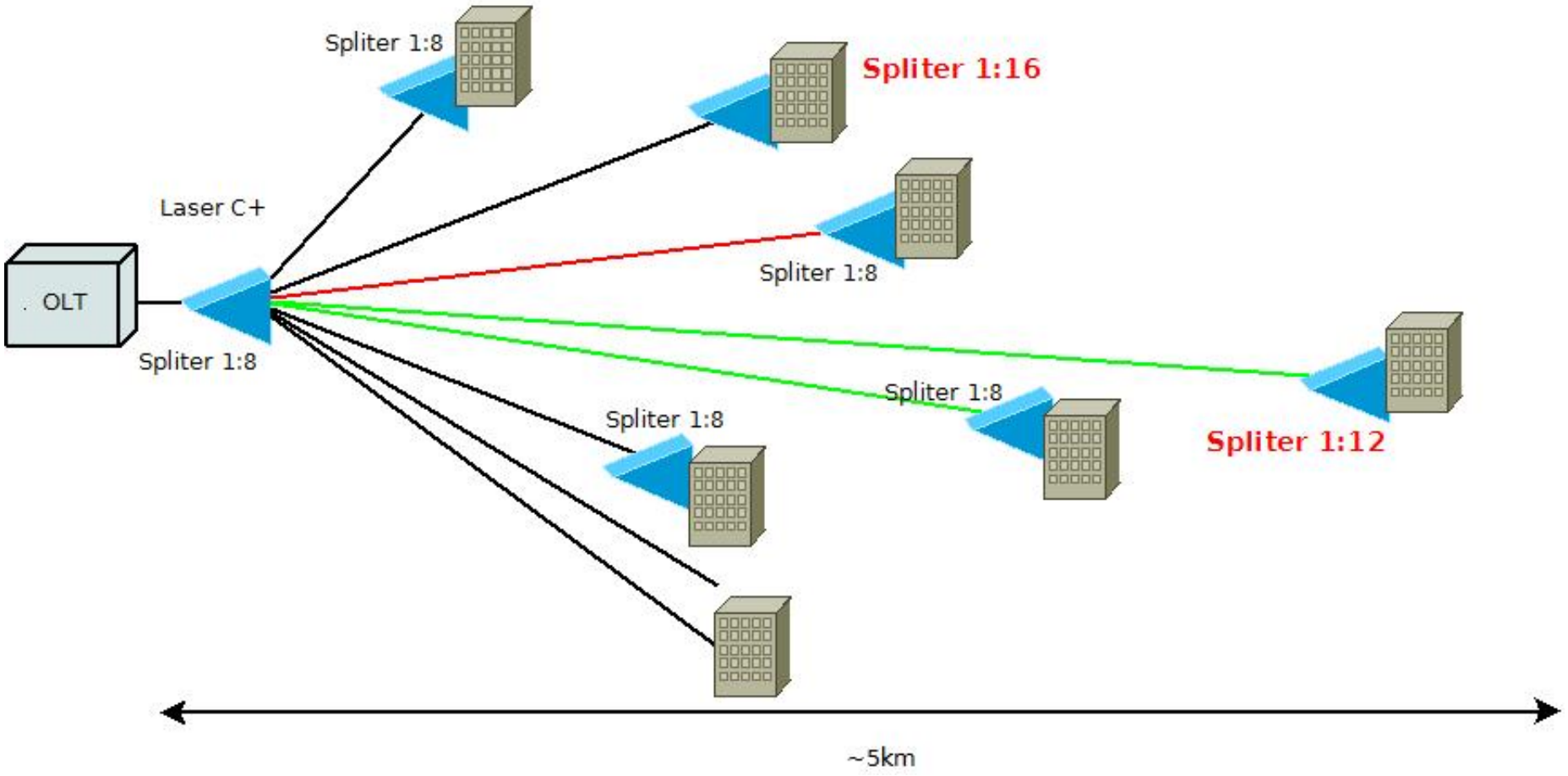


Stage 3

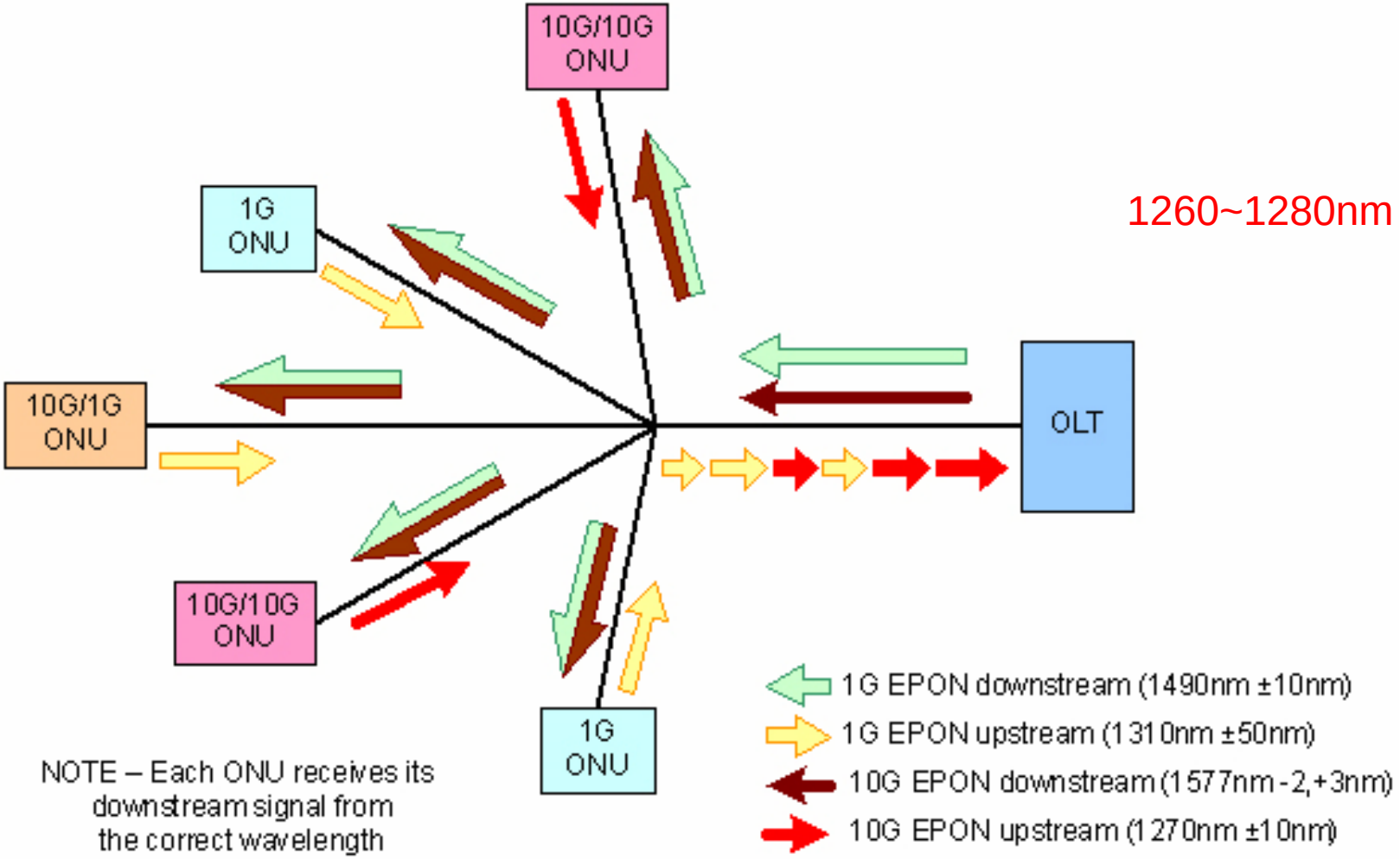
Network Division



Network Division

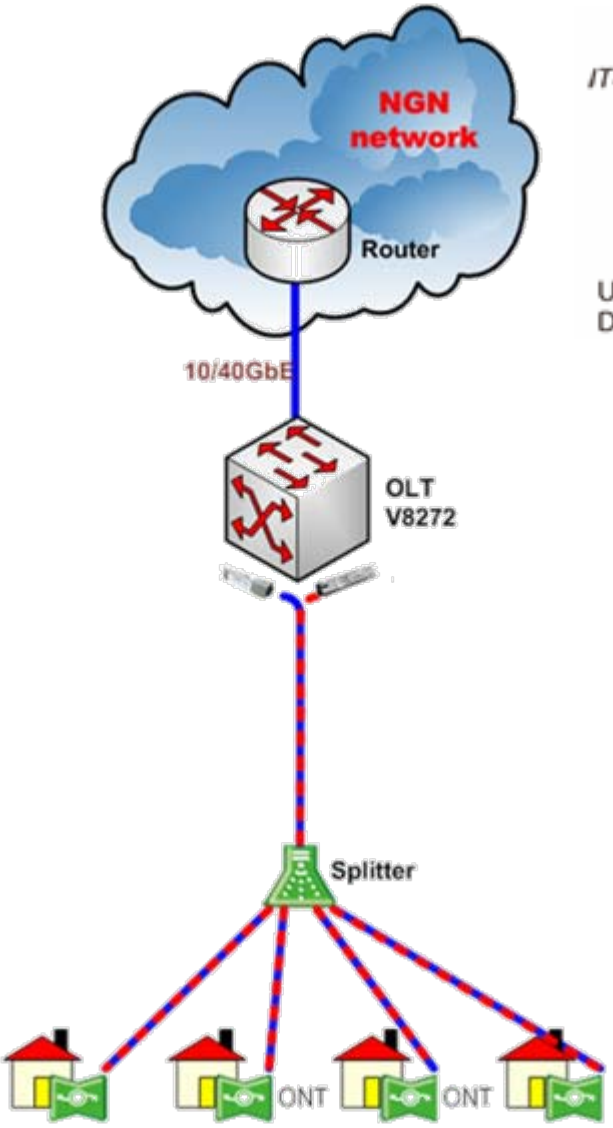


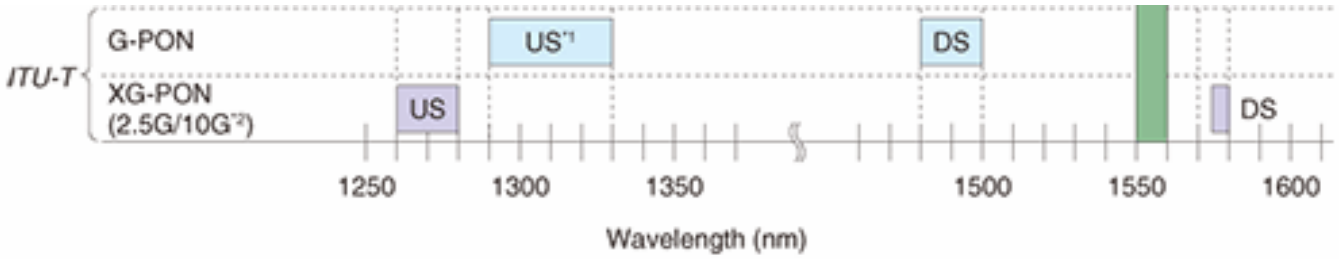
GEPON with 10G-EPON



XG-PON1 / XG-PON2

XG-PON1 = 10G Downstream / 2.5G Ups
XG-PON2 = 10G Downstream / 10G Upst





US: upstream
DS: downstream

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HOME FTTX TEST & MEASUREMENT EQUIPMENT DESIGN CABLE/MSO NETWORK DESIGN MOBILE BACKHAU

Home > Business > GPON leads access market growth through 2016, says Dell'Oro Group

GPON leads access market growth through 2016, says Dell'Oro Group

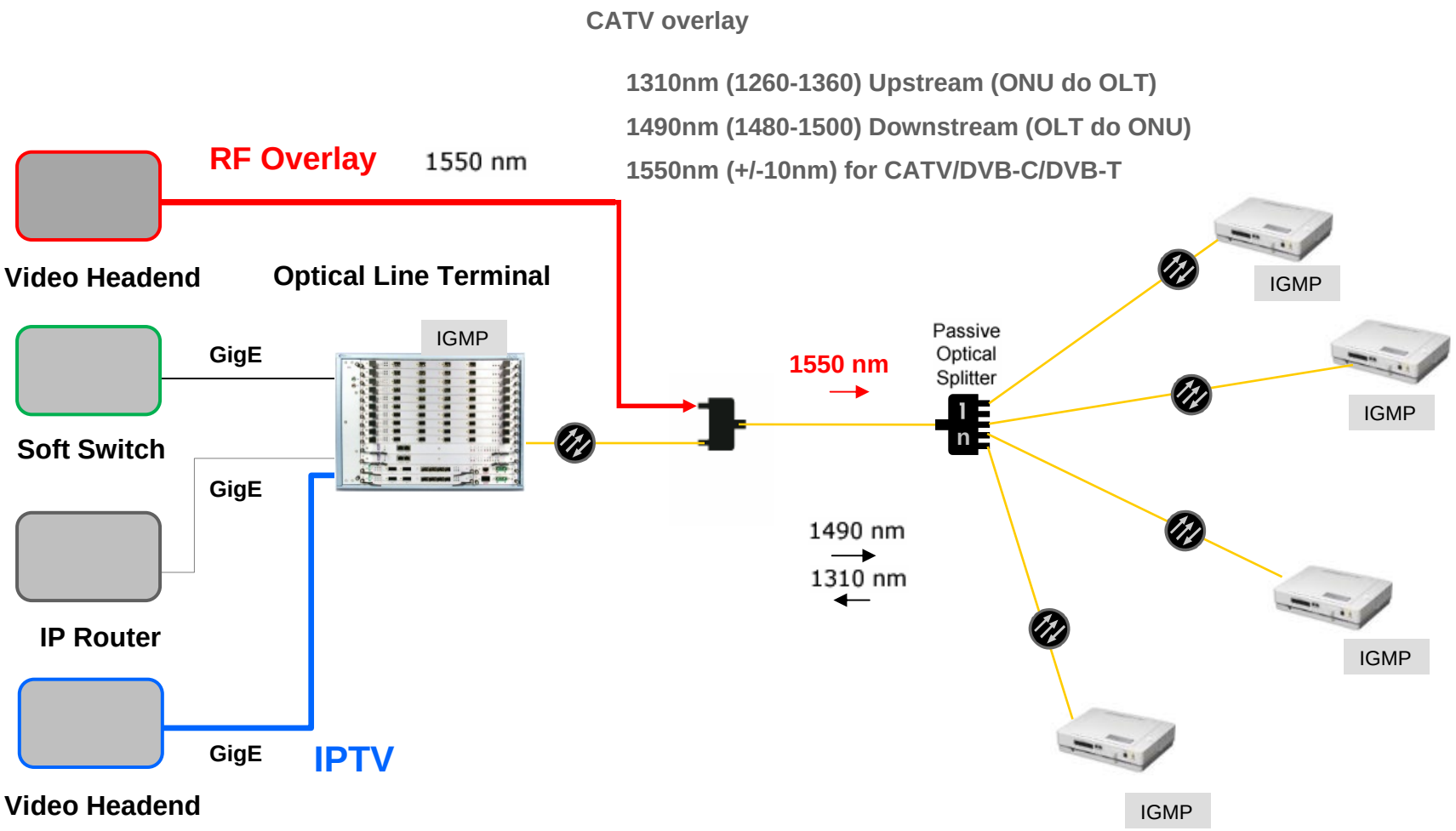
August 16, 2012
Lightwave Staff

A new five-year forecast by Dell'Oro Group predicts increased sales of **GPON optical line terminals (OLTs)**, DOCSIS 3.0 CMTS and VDSL infrastructure equipment through 2016. Driven by growing bandwidth requirements, the report say that GPON will show the fastest growth, followed by CMTS and VDSL, offsetting a trend of declining revenue for slower-speed ADSL equipment.

"Our forecast for **GPON** growth is driven by deployment in China as well as increasing projects in other global regions," says Steve Nozik, principal analyst of access research at Dell'Oro Group. "For CMTS, growth will be driven by rapidly increasing Internet traffic, competition with telecom service providers, and an increasing focus on the small and medium-sized business market among cable operators as well as a migration to IP video service."

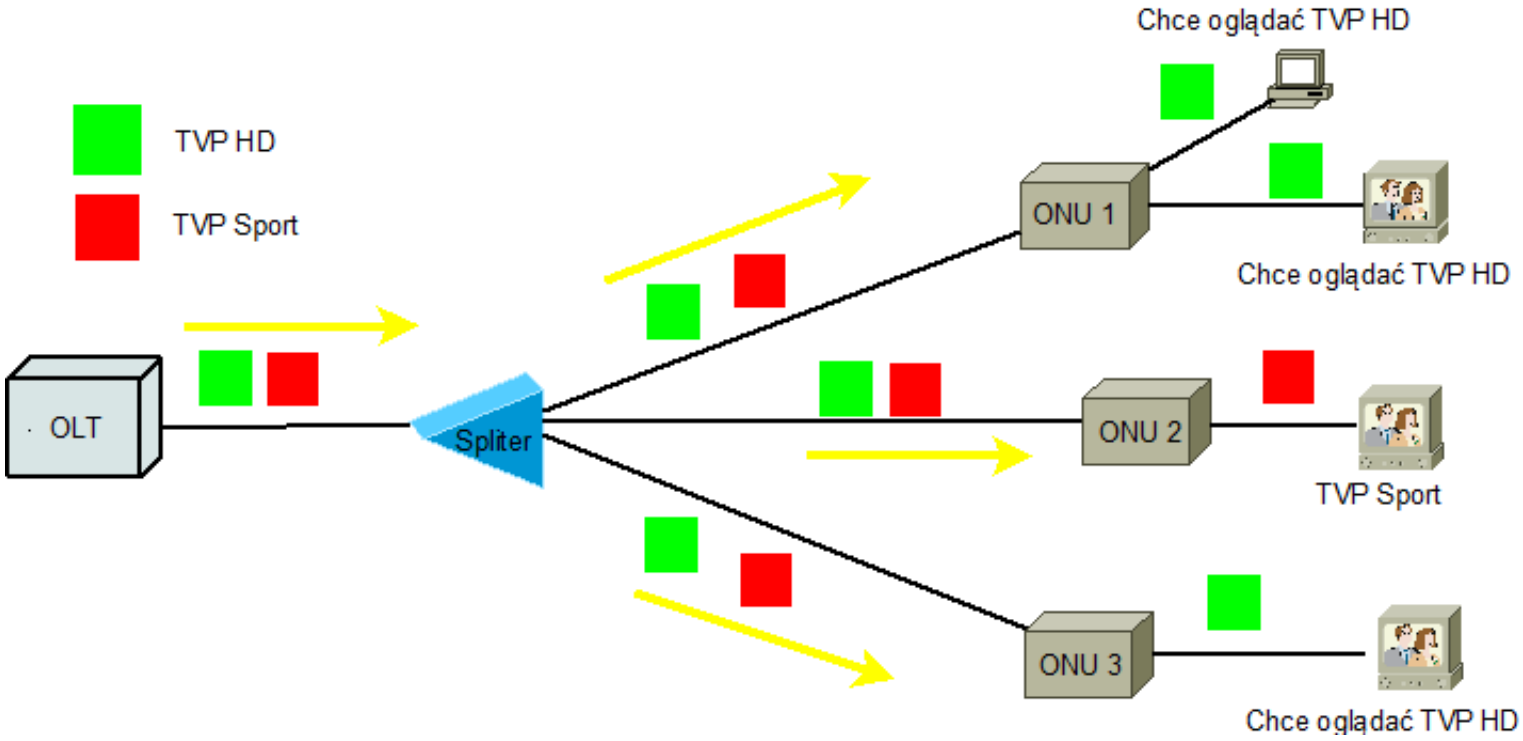
The report also expects DOCSIS to continue as the primary cable broadband technology for at least the next five years due to additional channel bonding being used to meet increasing bandwidth needs. VDSL growth will be driven by its higher bandwidth capabilities in association with emerging vectoring technology aimed at extending the life of copper infrastructures by eliminating crosstalk.

GPON with TV services



GPON with IPTV/multicast

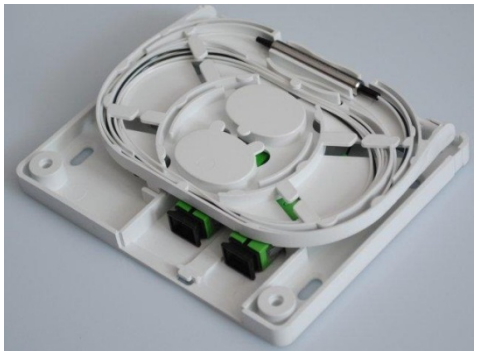
- FTTH is great for IPTV
- Multicast is the term which is connected with ISO/OSI L3 not L2. DASAN has implement proper multicast support based in GEM-port 4094
- More customers watching same channel – less bandwidth needed

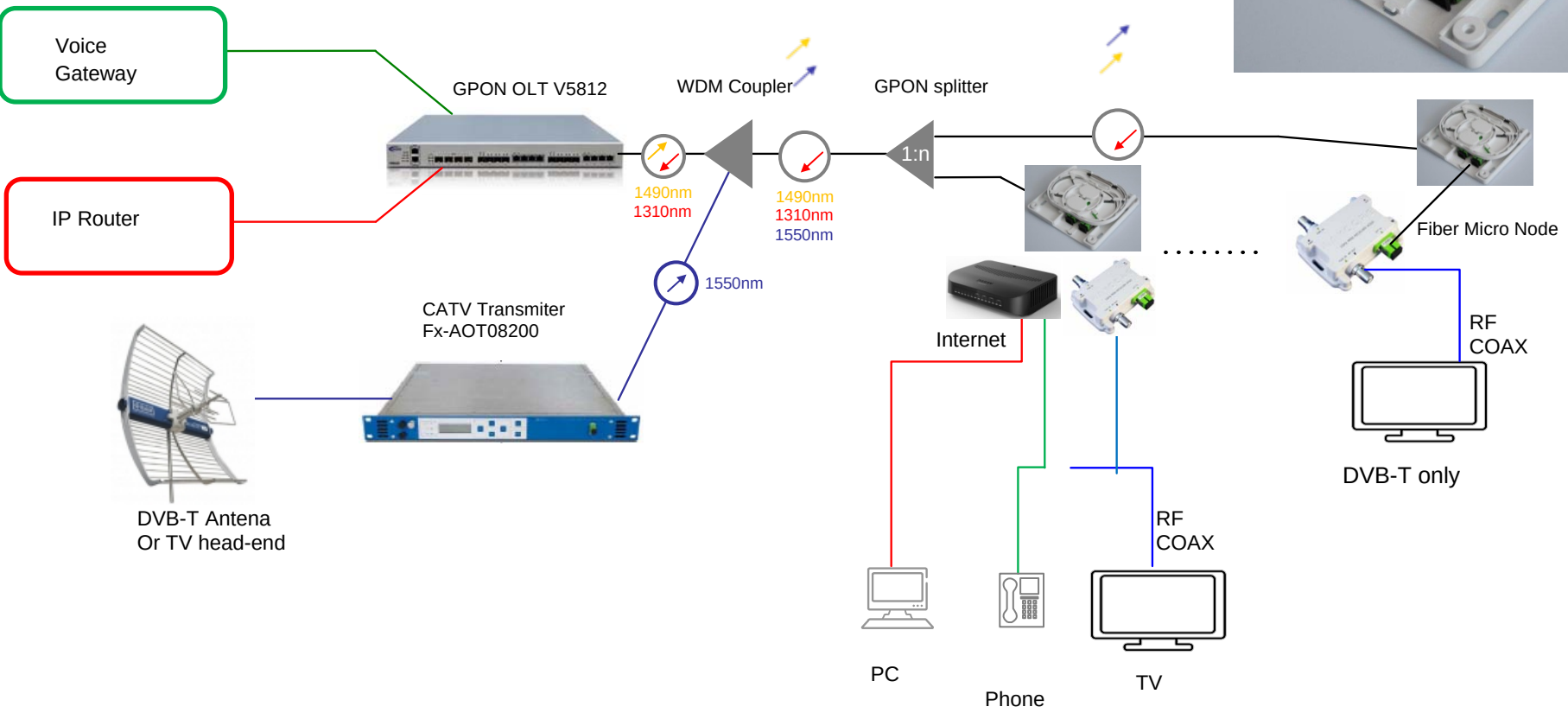


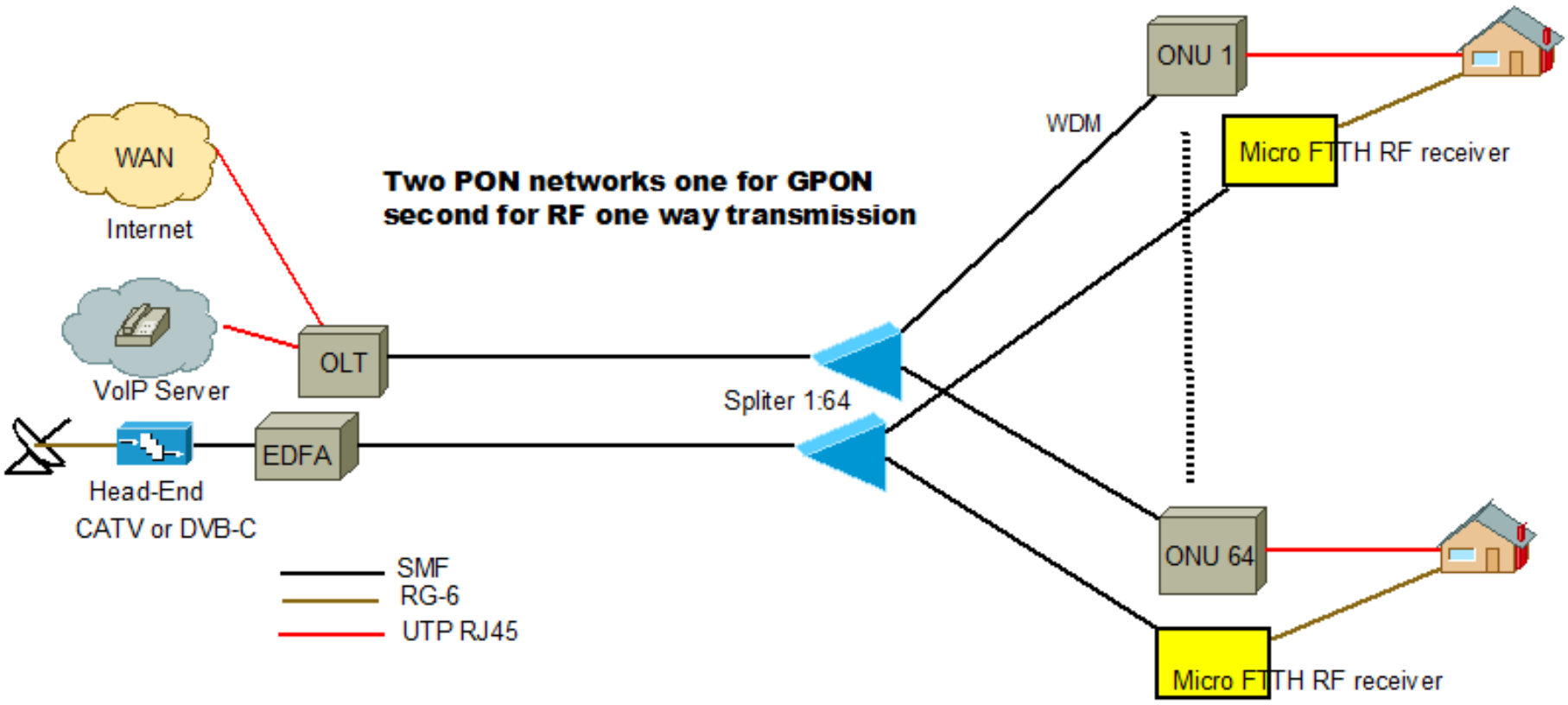
DVB-T to the House cooperative

- Socket fee / maintains fee instead of own antenna
- Some of the building forbidden own antennas
- 1-wiring in the building

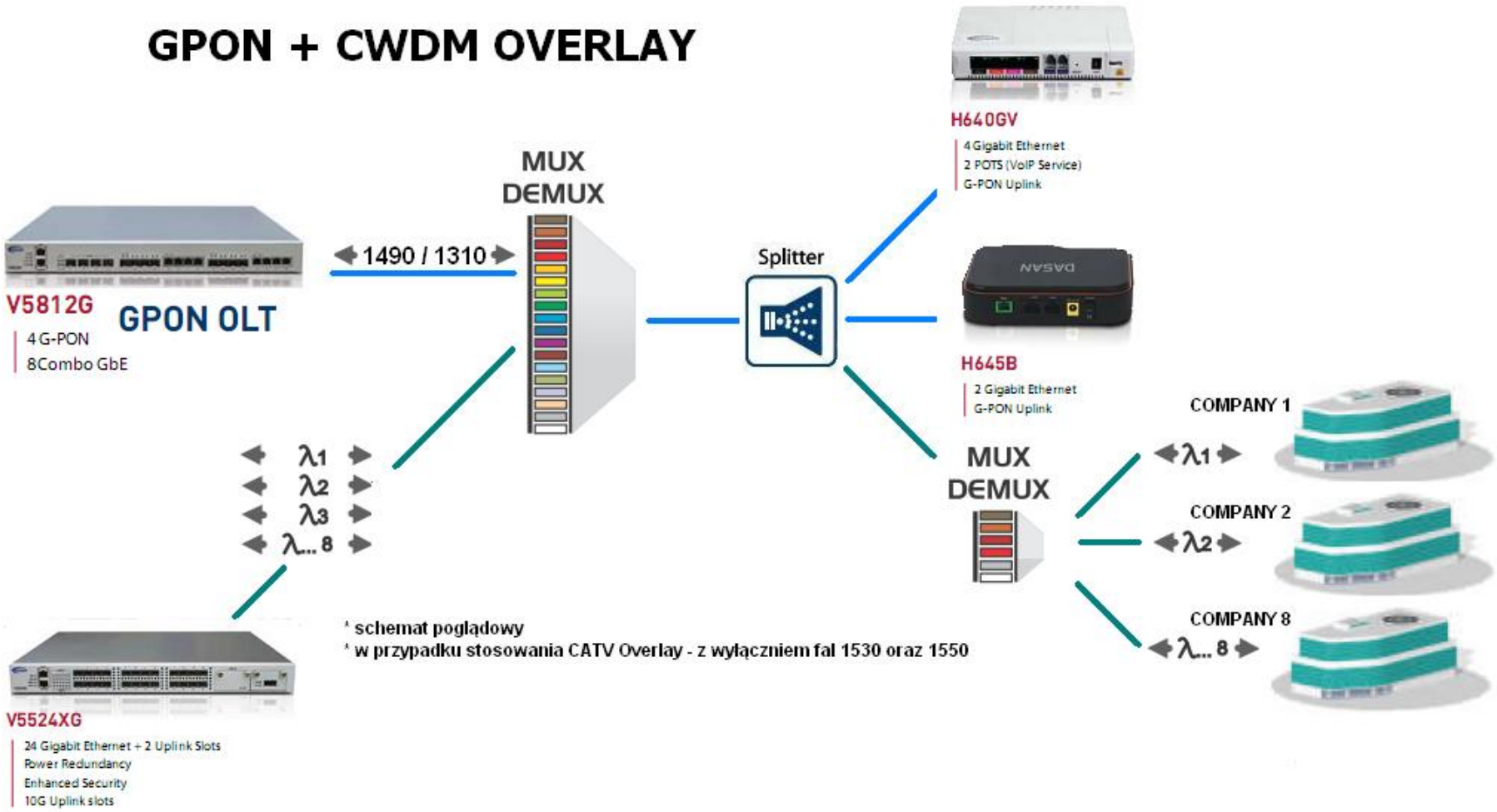
Passive box with triplexer inside



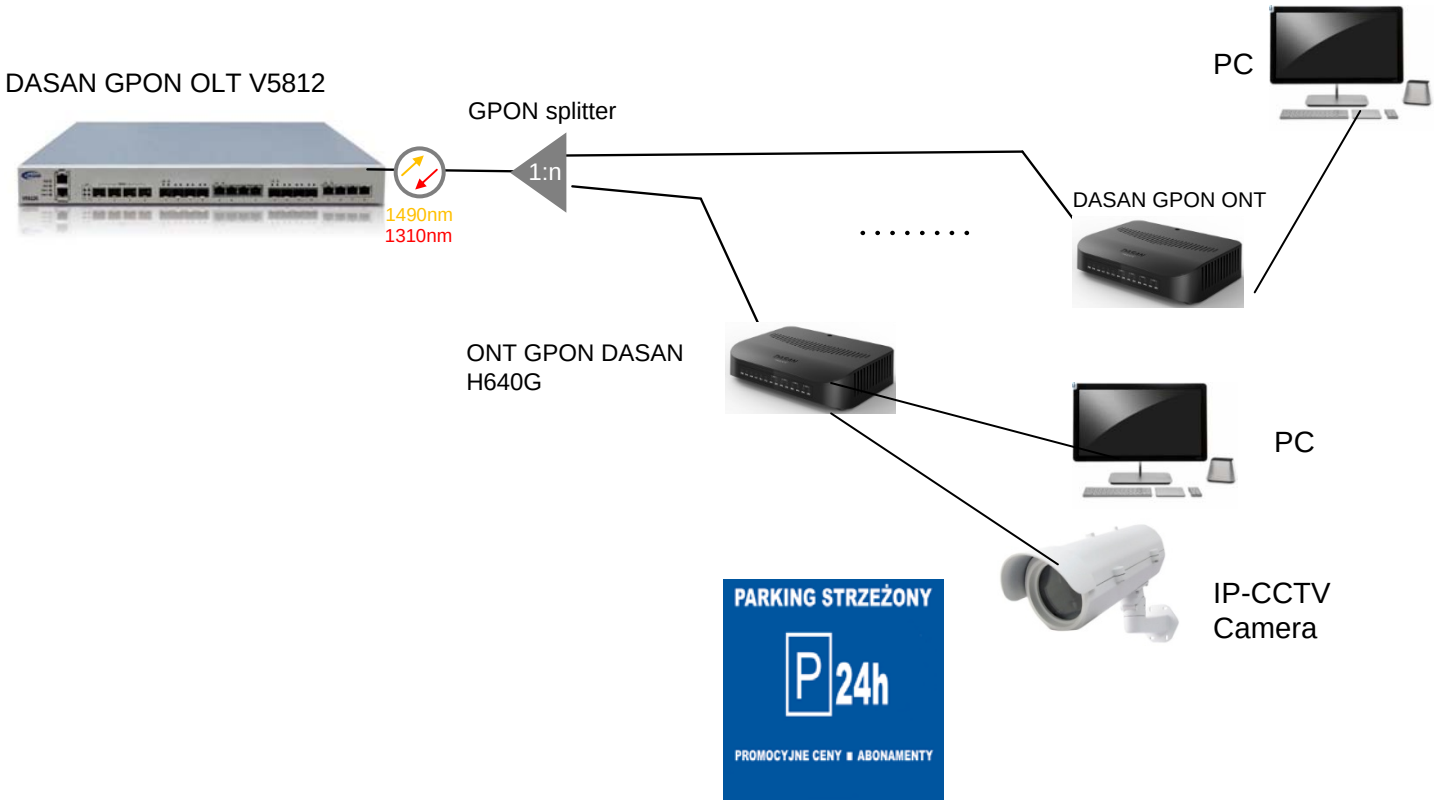



WAN
Internet
VoIP Server
Head-End
CATV or DVB-C
OLT
EDFA
Two PON networks one for GPON
second for RF one way transmission
Spliter 1:64
WDM
ONU 1
ONU 64
Micro FTTH RF receiver
Micro FTTH RF receiver
SMF
RG-6
UTP RJ45

GPON z CWDM Overlay



GPON: with CCTV monitoring



Thank You!