GPON Doctor 10k7

New generation GPON Analysers for FTTH access with GPON or XGSPON architectures.

ALBEDO

Three Models: 4k7 / 9k7 / **10k7**

		4K7	9K7	10K7
Capture	Inference of PON topology: ONU IDs, GEM ports	●	●	●
	Real-time detection of activity on GEM ports	●	●	●
	Capture and interpretation of PLOAM messages	●	●	●
	Capture and interpretation of OMCI messages	●	●	●
	Capture and interpretation of Bandwidth Maps for ONT discovery	●	●	●
	Capture and interpretation of Bandwidth Maps for bandwidth allocation on operation	●		●
	Real-time capture mode	●	●	●
	Background capture mode	●	●	●
	Scheduled capture mode	●	●	●
	Messages color scheme to facilitate visualization and analysis of the capture	●	●	●
	Capture exportable to CBIN5 format	●		●
	Capture exportable to CBIN6 format		●	●
	Capture exportable to XML format	●	●	●
	Powerful filtering system for visualization and capture analysis	●	●	●
Analysis engine	PON characterization - Topology - PON parameters - ONU status (ID, timing parameters, keys negotiated, operation status, Alloc-IDs and GEM ports)	●	●	●
	List of discovered OMCI entities. Interpretation of their attributes and values	●	●	●
	Generation of accurate E/R diagrams	●	●	●
	TU-T G.988 reference integrated: quick access to the entity's definition	●	●	●
	Evaluation of conformity with ITU-T G.984 and generation of a list of specification violations	●		●
	Evaluation of conformity with ITU-T G.9807 and generation of a list of specification violations		●	●
	Evaluation of conformity with ITU-T G.988 and generation of a list of specification violations	●	●	●
	Characterization of type and level of violations discovered	●	●	●
	Direct access to the messages of the entities presenting nonconformities	●	●	●
	Exportable analysis in HTML format	●	●	●
User traffic extraction	Extraction of user traffic of up to 6 simultaneous GPON through virtual Ethernet interface over USB 3.0	●		●
	Extraction of XGSPON user traffic through virtual Ethernet interface over USB 3.0		●	●
Bandwidth monitor	Bandwidth used per port	●	●	●
	Bandwidth assigned per Alloc-ID	●	●	●
	Bandwidth utilized per ONU	●	●	●
	Real-time graphical visualization	●	●	●
	Exportable to CSV	●	●	●
Link integrity monitor	Upstream FEC errors monitor	●		●
	Downstream FEC errors monitor	●		●
	Downstream HEC errors in SFC, OC, HLend, BWMap and XGEM header		●	●
	Upstream HEC errors in Fixed FS Header and XGEM header. BIP errors		●	●
	Real-time graphical visualization	●	●	●
	Exportable to CSV	●	●	●
Automation	Integrated CLI for remote operation and/or integration into automated certification or verification workflows	●	●	●
	Protocol: Telnet	●	●	●
	Configurable port	●	●	●
Interfaces	USB 3.0	●	●	●
	SFP GPON ONT SC/PC TX 1310 nm / RX 1490 nm B+ (2.5Gbps)	●		●
	SFP GPON OLT SC/UPC TX 1490 nm / RX1310 nm (1.25Gbps)	●		●
	SFP+ XGSPON ONT SC/UPC TX 1270 nm / RX1577 nm (9.953Gbps)		●	●
	SFP+ XGSPON OLT SC/UPC TX 1577 nm / RX1270 nm (9.953Gbps)		●	●

● Included

● Included in GPON license

● Included in XGSPON license

Main **Applications**

- Troubleshooting operator GPON & XGS-PON deployments
- GPON & XGS-PON network optimisation
- Interoperability analysis between OLT and ONT vendors
- GPON & XGS-PON chipset development
- Real-time IP services traffic extraction
- Automation of GPON test plans

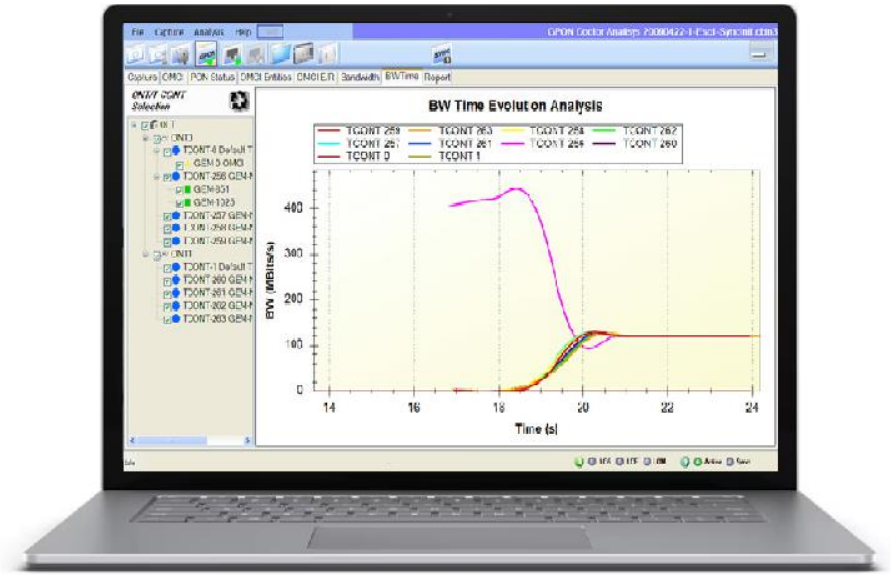
Capture & extraction

- GPON Doctor 4k7
  - Downstream: SFP single mode 1490nm @2,5Gbps
  - Upstream: SFP single mode 1310nm @1,25Gbps
  - RJ45 interface for traffic extraction
- GPON Doctor 9k7
  - Down: SFP single mode 1578nm @10Gbps
  - Ups: SFP single mode 1270nm @10Gbps
  - RJ45 interface for traffic extraction
- GPON Doctor 10k7
  - 1: DS XGSPON: SFP single mode 1578nm @10Gbps
  - 2: US XGSPON: SFP single mode 1270nm @10Gbps
  - 3: Reserved for future use
  - 4: DS GPON: SFP single mode 1490nm @2,5Gbps
  - 5: US GPON: SFP single mode 1310nm @1,25Gbps

GPON Doctor 4k7 / 9k7

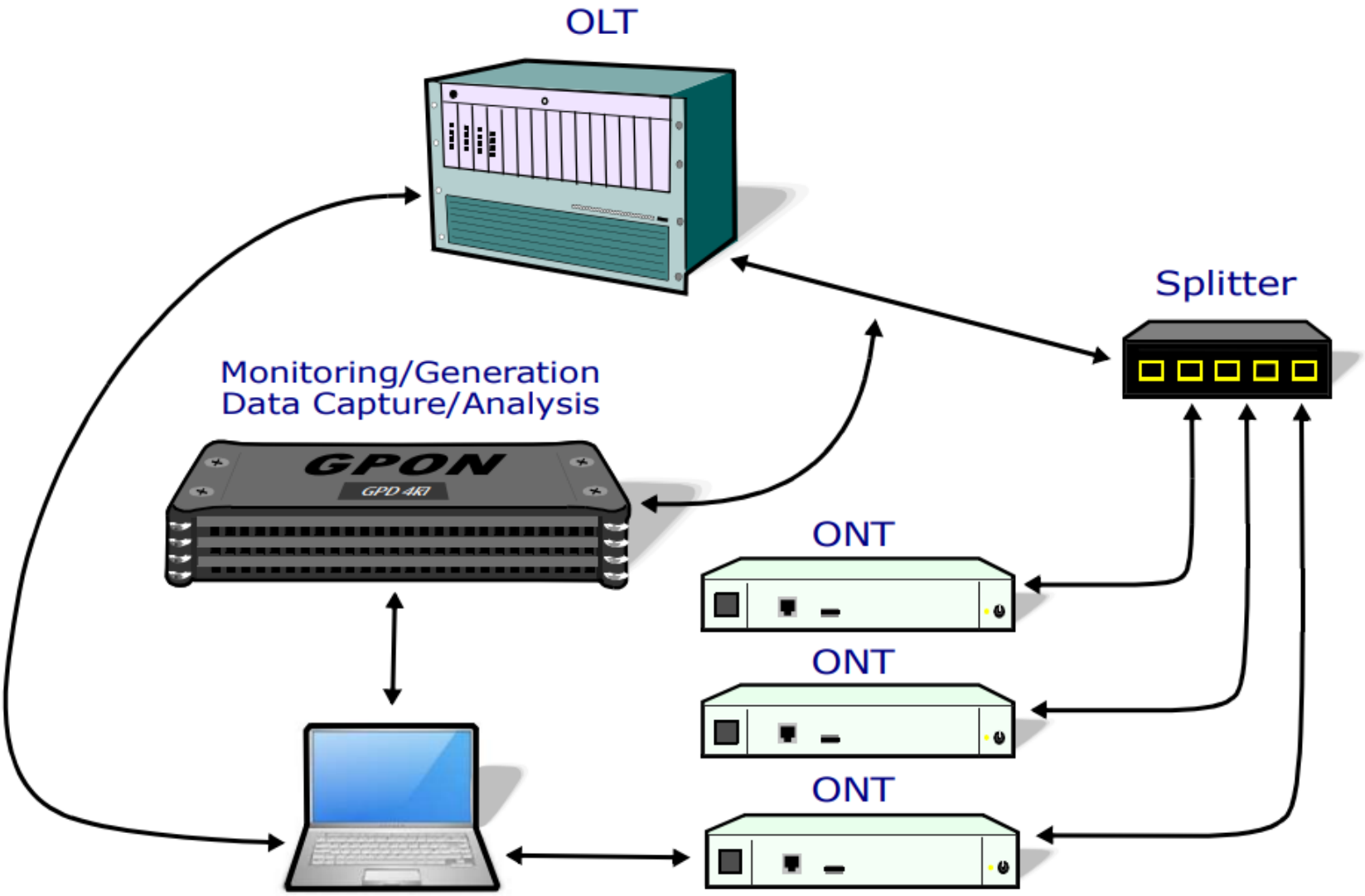
GPON Doctor 10k7

GPON Doctor in Operation

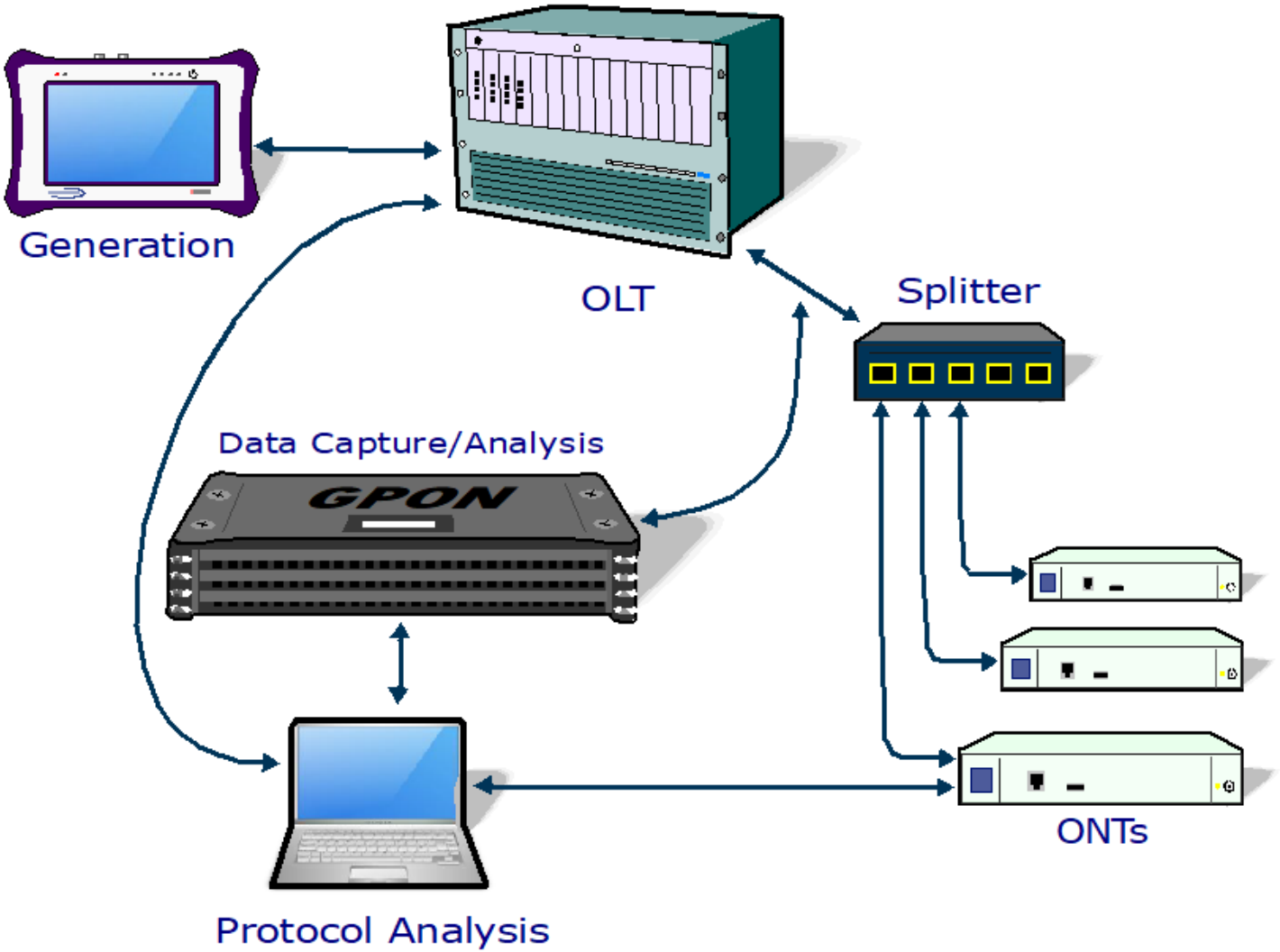


- Gigabit Ethernet Capture/Management Port: QinQ VLAN Transparent/Stripping configurable
- WiFi 802.11ac interface, both for sniffing and IP management purposes
- IP Services Real-Time Extraction port: 1000Base-T External network protocol analyser plugin
- USB 3.0 to easy transfer data, traces and reports (all range)

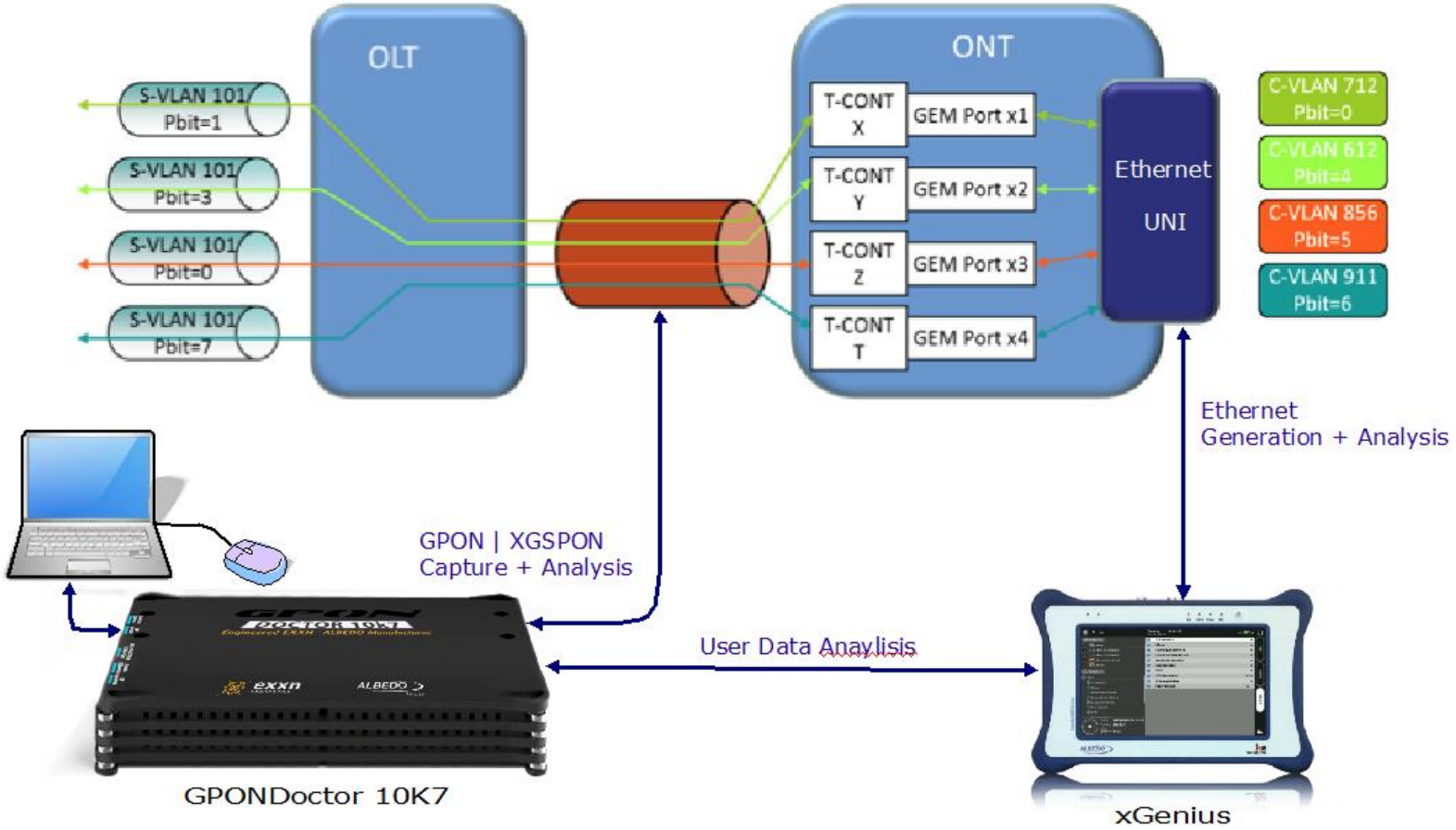
GPD 10K7 in **GPON** networks



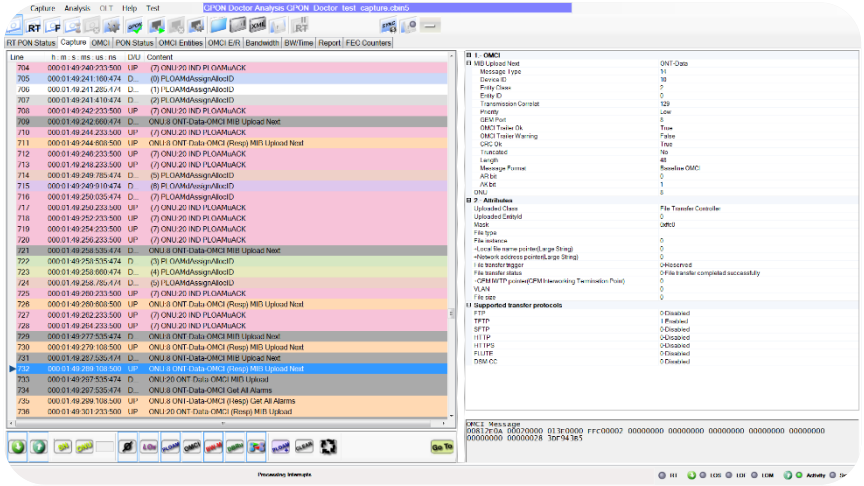
GPD 10K7 in **XGSPON** networks

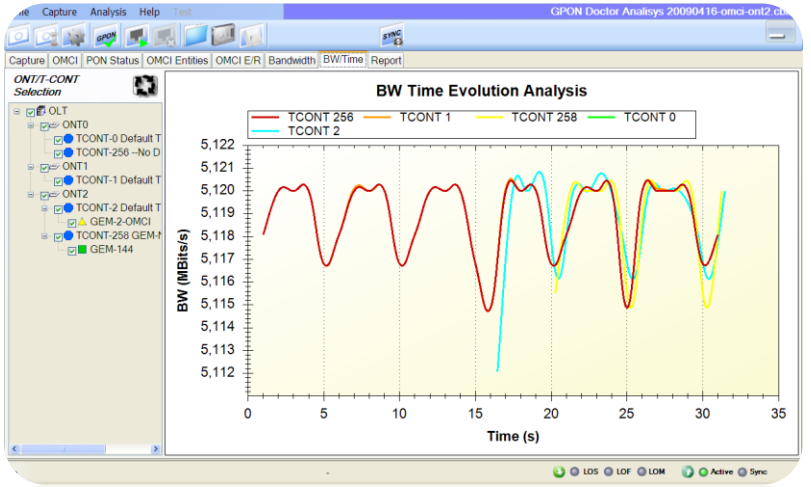


GPD **10K7** in **GPON** & **XGSPON** networks



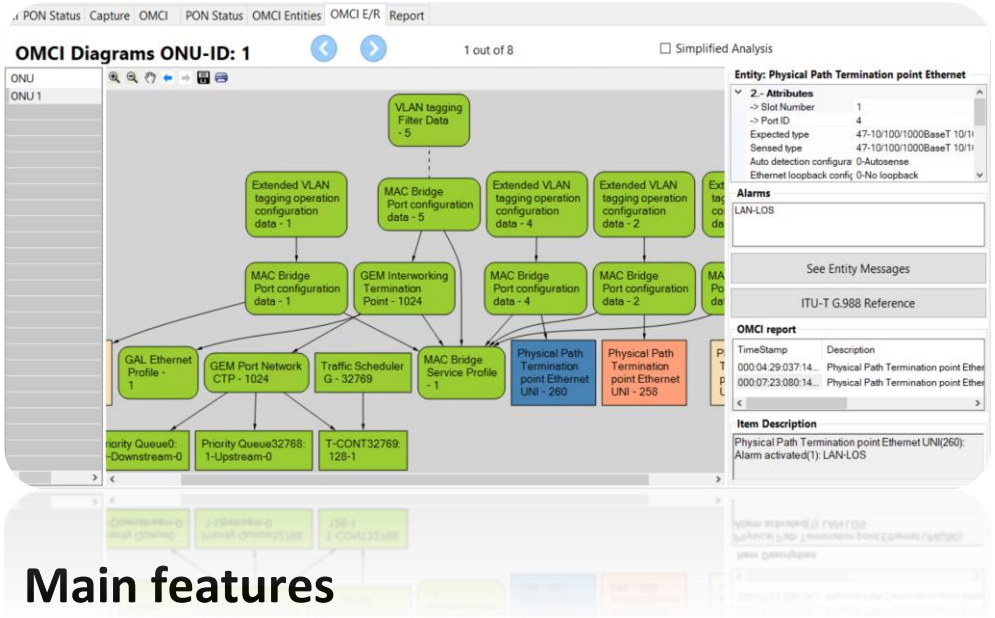
Use cases

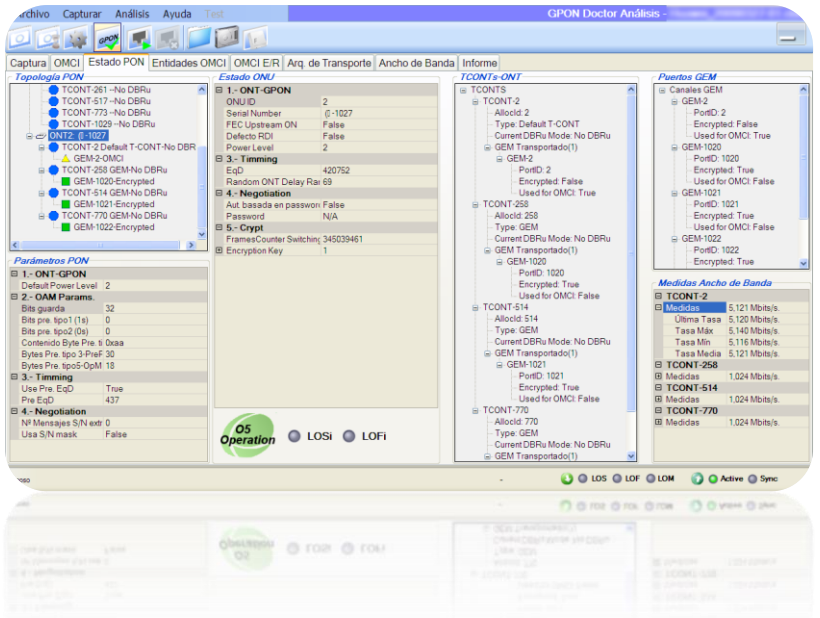




- Fundamental tool for optimisation of GPON network deployment
- Events, deviation diagnosis and analysis for deployed GPON networks
- Interoperability troubleshooting between multi-vendors equipment coexisting in a telco access network
- Analysis of user traffic within the GPON through the Ethernet interface
- ITU-T G984.x, G988 interoperability test (GPON)
- ITU-T G.9807.1/G.987.2/G.987.3/G.988 interoperability test (XGSPON)
- GPON issues delimitation within an FTTH network.
- Full knowledge of the PON state and all its active elements (OLT/ONTs)

Technical Specifications

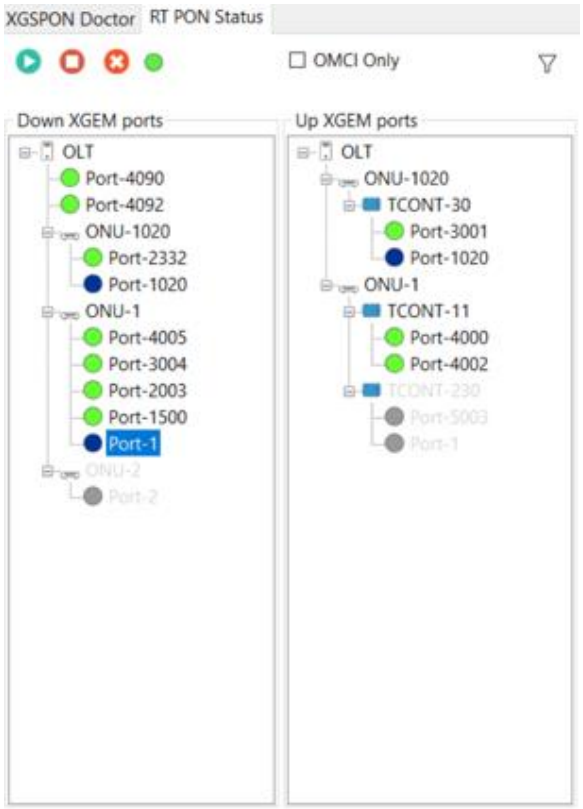




Main features

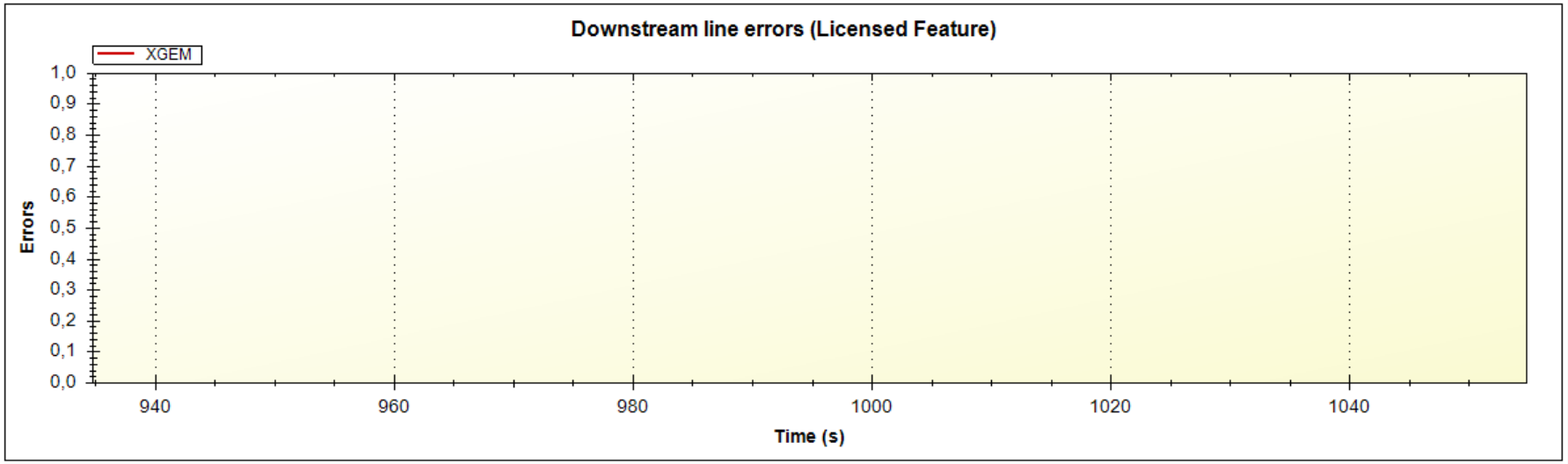
- Capture of GTC frames
- Real-time capture of PLOAM + OMCI + Negotiation BWMaps
- Several capture modes:
  - Real time
  - Scheduled
  - Full
- Displays the PON topology: ONUs, T-CONTs, Ports
- Reports ONTs state
- Report of inconsistencies and violations of ITU-G.984.x/G988
- Real-Time IP Services regeneration and monitoring: Multicast Video, Voice
- Runs on Windows 10 Pro

Feature: **PON topology**

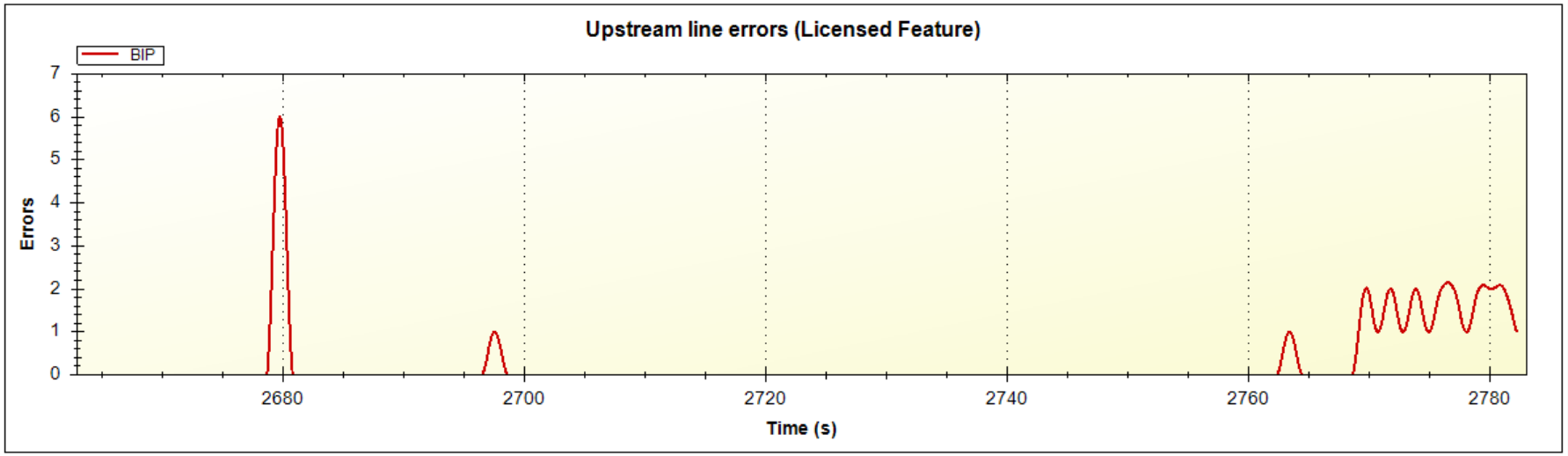


- Downstream hierarchy: ONTs and Ports detected
- Upstream hierarchy: ONTs, T-CONTs, and Ports detected
- Port Activity

Feature: **Link Integrity**



SFC and OC HEC: 0 / 0 / 16,86 M Uncorrectable / Correctable / Received
HLend and BWMap HEC: 0 / 0 / 11,59 M Uncorrectable / Correctable / Received
XGEM header HEC: 0 / 0 / 142,72 G Uncorrectable / Correctable / Received

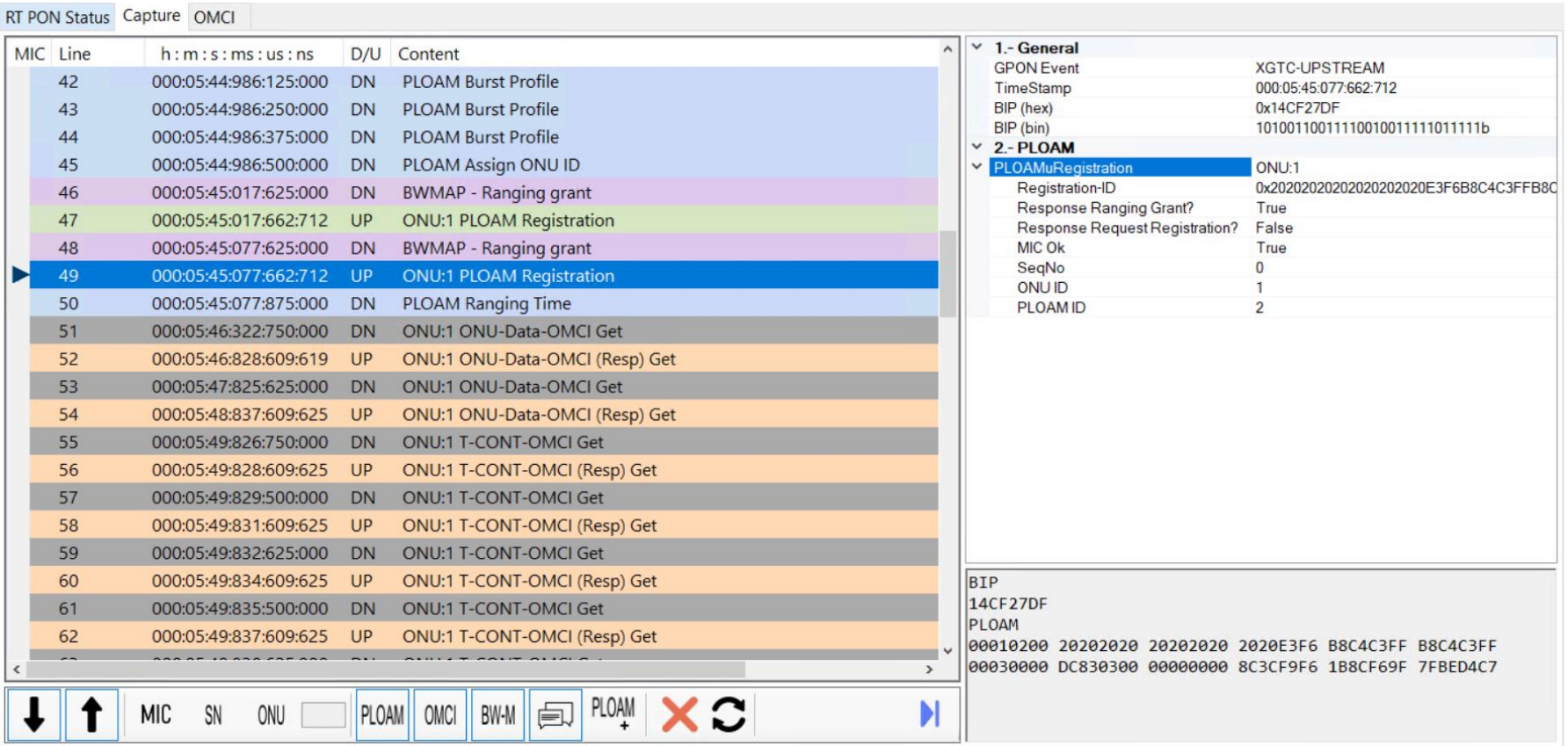


Fixed FS Header HEC: 0 / 0 / 5,40 M Uncorrectable / Correctable / Received
XGEM header HEC: 0 / 0 / 208,97 M Uncorrectable / Correctable / Received
BIP: 29 / 5,40 M Errors / Bursts

Feature: **Bandwidth monitor**

- Assigned to a T-CONT
- Utilisation: Port, ONU, Aggregated

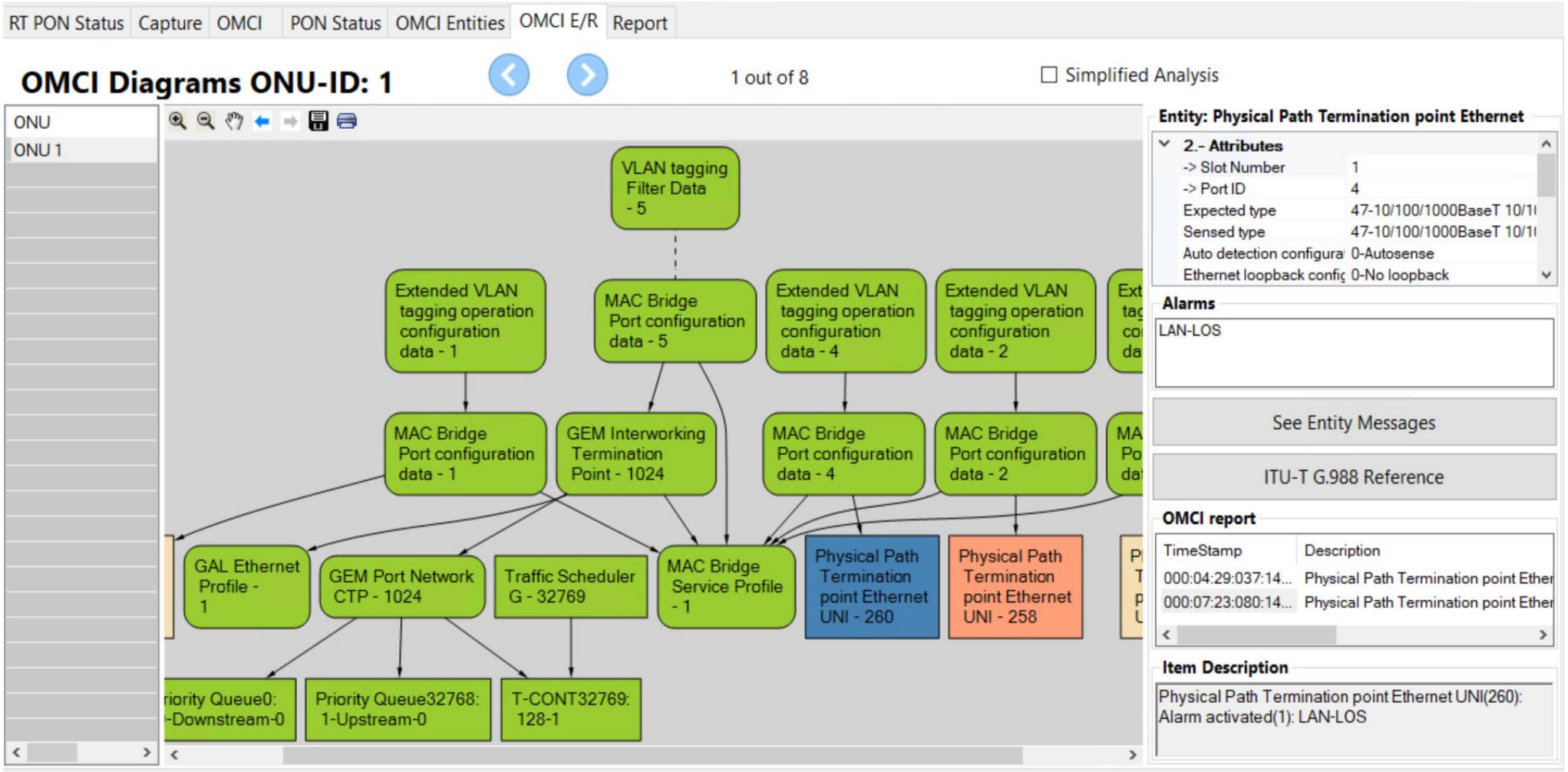
Feature: **Capture**



- Real Time capture:
  - PLOAM and OMCI messages
  - BWMAPs: SN Request and Ranging grant
  - Message interpretation

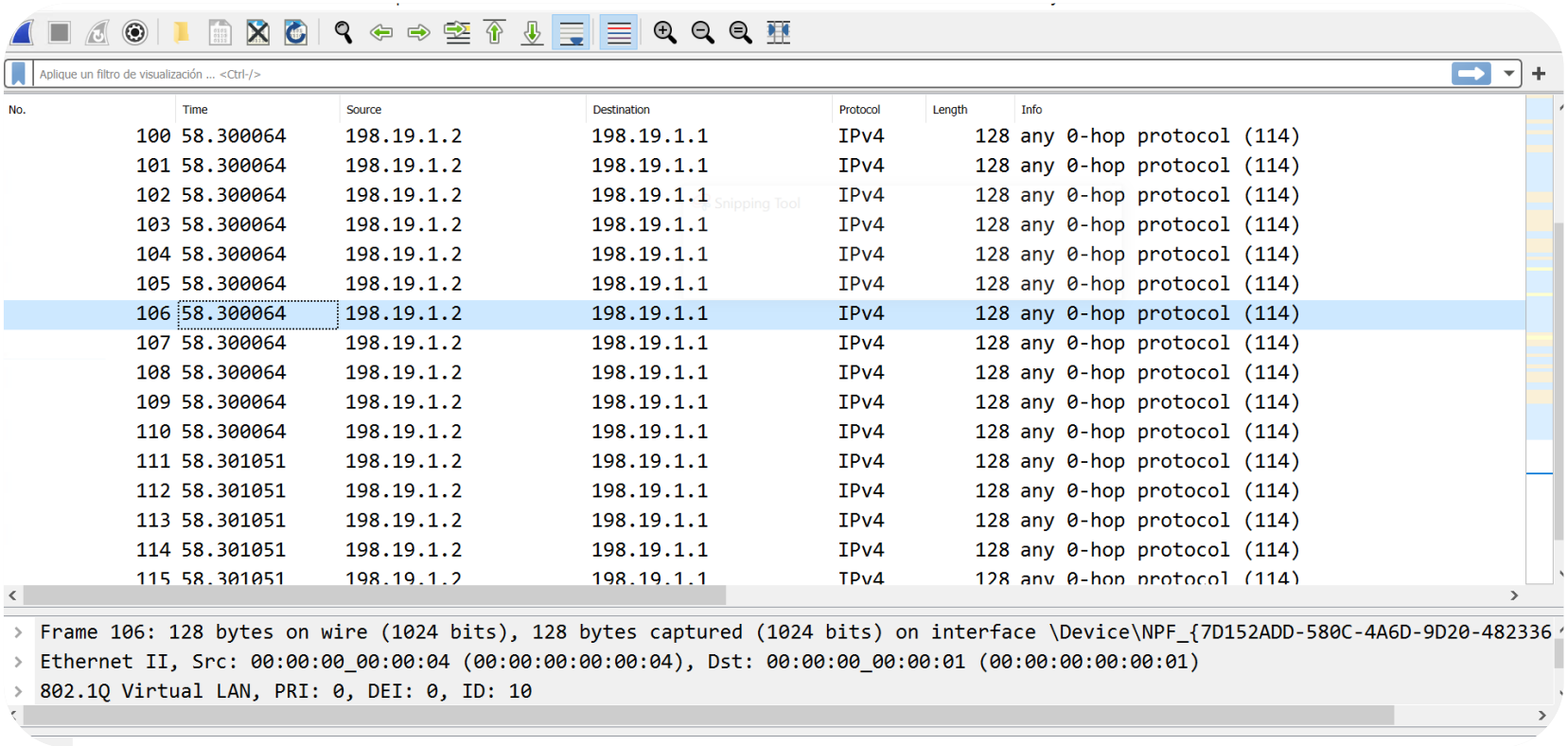
- Full Capture
  - All GTC messages

Feature: **Analysis**

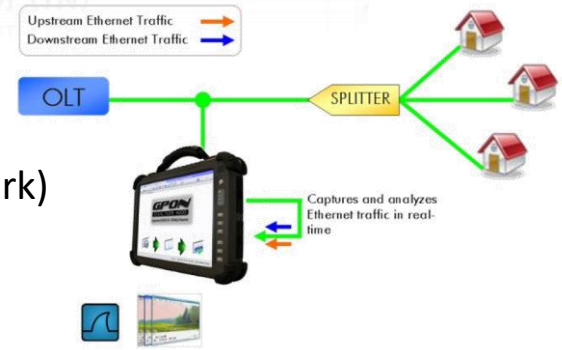


- OMCI E/R diagrams
- Issues detection

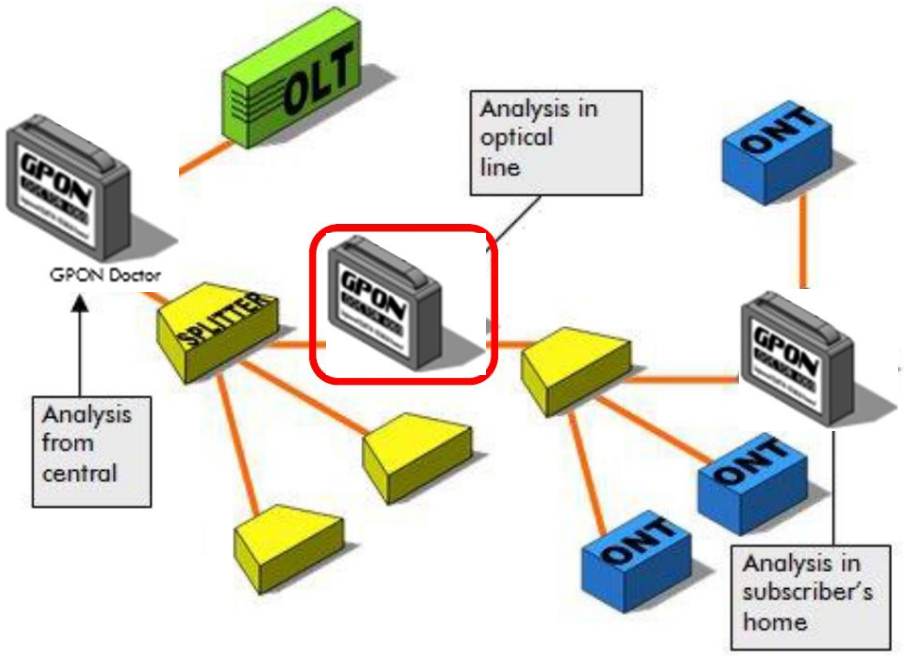
Feature: **Traffic Extraction**



- Unlimited ports in downstream and upstream
- Extracted traffic ready to be analysed with a third-party App (WireShark)



Typical setup for testing in PON: **colorless splitter**



GPON DOCTOR

GPON UP

GPON DOWN

ONT

OLT

Future GPON services offered by **Albedo**

- GPON and XGSPON network (remote) diagnostic assistance
- Advanced GPON and XGSPON training
- Customized development of automated test suites
- Tailored development of new functionalities

That' all

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ALBEDO

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