V8102

Compact GPON OLT for high-density passive optical networks

V8102

- ■ High-density chassis with up to 32 GPON ports via SFPs
- ■ Connects up to 4,096 residential and business subscribers (1:128 split ratio)
- ■ Up to 2x 320 Gbps layer-3 non-blocked switch fabric
- ■ Optimised for VoIP, IP-TV, high-speed internet data
- ■ Fully redundant system architecture
- ■ Supports a wide range of different SFP/SFP+ modules for customised connections
- ■ Network management with UNEM/INAS

The V8102 is a modular, compact 2 HU GPON OLT platform.
It provides flexible and high capacity PON access and redundant 4x 10 GbE uplinks, scalability and line rate performance with 2x 320 Gbps non-blocking switch fabric.
Due to the highly flexible hardware configurations with GPON units, users can fully customise it to local network requirements.

For GPON, the PON layer is terminated on the interface unit and translated to Ethernet uplink to be transported through an Ethernet/IP environment. The V8102 can be equipped with two service interface units and two combined network interface/switch fabric units. For improved system reliability, it adopts the design of full redundancy architecture with dual SFUs (Switch Fabric Unit) and PSUs (Power Supply Units).

■ PON benefits

The PON technology adds support for new applications, services, and deployment scenarios. Among these changes are improvements in data rate and reach performance, diagnostics, and stand-by mode, to name a few.

The V8102 introduces a point-to-multipoint concept with the PON technology, which enables a cost-effective FTTx service.

16-port GPON interface units (SFP optic modules)
SIU 1
SIU 2

Switching Fabric and 4-port
10G Ethernet network interface unit
Switching capacity: 320 Gbps
1-port RS-232 for console access
1-port GTX for NMS
SFU A
active
SFU B
standby
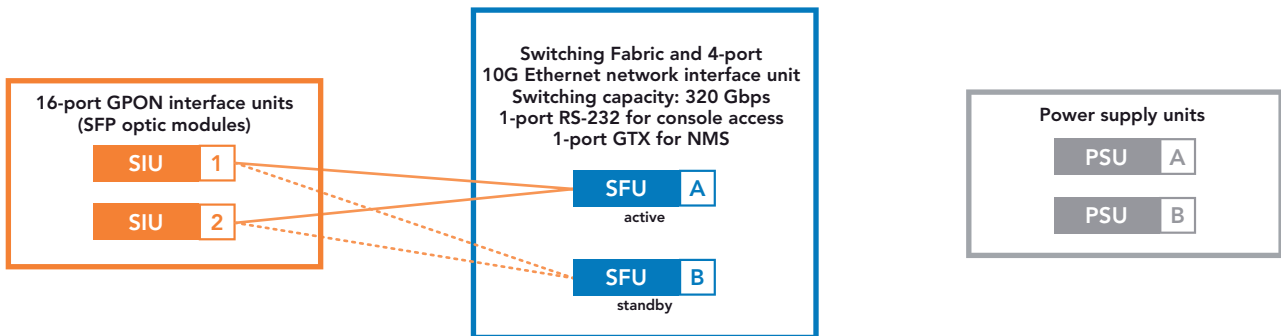
Power supply units
PSU A
PSU B

Figure 1: Redundant system architecture

The reason why PON is considered as a cost-effective solution is its usage of a passive splitter rather than an active switching system.

The benefits of the passive splitter are as follows:

- No power supply is needed
- No maintenance is needed
- The splitter does not need any fibre optic transceiver

■ Dynamic Bandwidth Allocation (DBA)

In GPON V8102 supports DBA algorithms based on two kinds of methods:
Non-Status Reporting (NSR) and Status Reporting (SR), both NSR and SR DBA (G.984.3).

Through Dynamic Bandwidth Allocation (DBA), a PON can be oversubscribed for upstream traffic.

■ Equipment options

The V8102 is a robust chassis that can be equipped with different plug-in units to fullfill the demands of mid-size access points. So the access node can be optimally adopted to the local requirements.

The maximum expansion stage is:

- 2 Subscriber Interface Units (16 SFPs per unit)
- 2 Core Units: Combined Network Interface/Switch Fabric Unit
- 2-slot: Power Supply Unit

■ Maximum reliability

To additionally increase the system reliability, V8102 supports redundant operation. In this case dual core units will be used. Figure 1 illustrates the redundancy scheme used for the V8102.

The active core unit is internally linked to all GPON units. The switch receives traffic from the GPON units and updates their own forwarding database in the same manner so that they can keep identical data to make a forwarding decision. The active switch can send traffic back to the interface units and receive traffic from these for address learning.

The power feeding of the V8102 is provided by up to two power supply units (PSUs), which can be installed redundantly to guarantee highest availability.

Network architecture

V8102 is a network element, which includes the necessary service adaptation functions to support the delivery of multiple services, such as Ethernet, IP telephony, and video services. V8102 provides robustness in operation. Adding or removing ONTs doesn't affect traffic of subscribers on other ONTs even on the same OLT port. Up to 128 ONTs can be attached to a GPON OLT port via passive optical splitter.

An ONT connects the user specific network to PON.
The ONT can be occupied by a single subscriber and also can be a gateway of the local network.

There are different possible deployment topologies for PON networks, which differentiate from each other basically from the place the optical fibre is terminated. Depending on the subscriber type and desired topology of the network, the operator may adopt:

- FTTH (Fibre to the Home)
- FTTB (Fibre to the Building)
- FTTC (Fibre to the Curb)

In case of very high bandwidth requirement per user, scenarios without splitters offering 2.5 Gbps/1.25 Gbps or 1.25 Gbps/1.25 Gbps (downstream/upstream) data rate can also be deployed by connecting only one single user on a GPON port.

Network management

Large scale GPON deployments with V8102 can easily be operated with the network management systems UNEM/INAS.

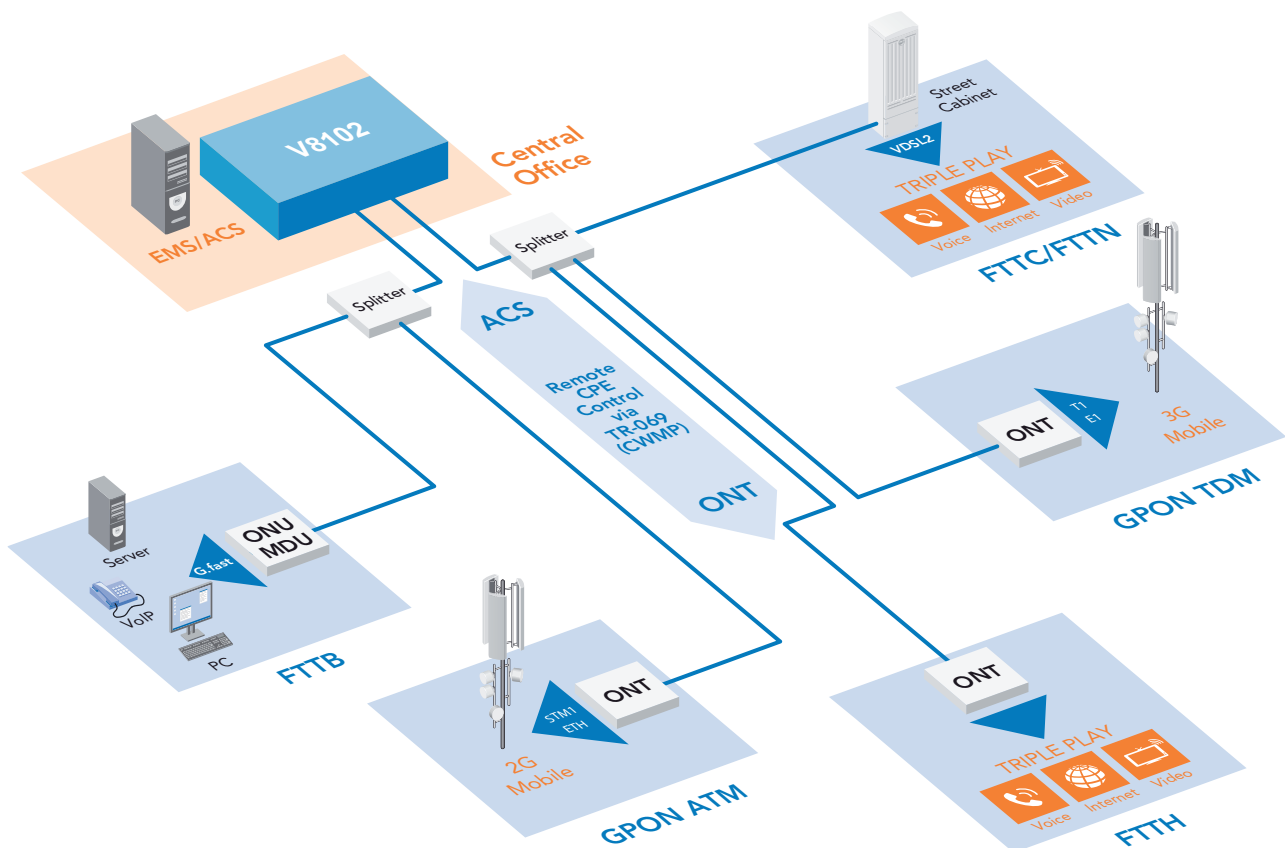Local or remote configuration by CLI and SNMP is supported by V8102 as well.

Figure 2: Different network architectures with V8102

Technical data

General	
Function	Modular GPON OLT
Slots for GPON units	2
Slots for combined network/switch units	2
Slots for power supply units	2

GPON unit	
Number of interfaces per unit	16x GPON SFP
Redundancy	Yes, with two core units
Laser type	Laser diode class 1 (defined in IEC 60825-1)
GPON OLT compliancy	Class B+ according to ITU-T G.984.2
	Class C+ according to ITU-T G.984.2

Core unit	
Number of trunk interfaces per unit	4 x 10GBase-R (SFP+)
Redundancy (hot-standby)	yes
Standards supported	Standard Ethernet bridging, link aggregation, 4 k active VLANs for 802.1Q tagged frame
Spanning Tree Protocol supported	STP, RSTP, MSTP
Jumbo frame supported	Up to 9 k
Layer-3 features	8 k/4 k routing entries for IPv4/IPv6, RIPv1/v2, OSPFv2, BGPv4, Virtual Router Redundancy Protocol (VRRP)
Multicast features	IGMPv2/v3, IGMP snooping, Multicast VLAN Registration (MVR)

Quality of Service	
Standards supported	Traffic scheduling (SP, WRR, DRR), 8 queues per port, egress shaping
	Queue mapping according to ingress/egress port, MAC, 802.1Q, 802.1p, ToS/DSCP, IP SA/DA, TCP/UDP
	Access control lists based on port, MAC address, EtherType, IP SA/DA, IP multicast address, TCP/UDP

Security	
Standards supported	Storm control for broadcast, multicast and unknown unicast packets
	802.1x MAC/port-based authentication, DoS protection, outband management, IP source guard, Secure SHell (SSH)

Management	
Interface position	On core units
Ethernet interface for local management	10/100/1000Base-T (RJ45)
Serial interface	CLI RS-232
Standards supported	Serial/Telnet (CLI), SNMPv1/v2/v3, DHCP server, client, relay with option 82, single IP management, RMON, Syslog, Link Layer Discovery Protocol (LLDP)
ONT management	ITU-T G.984.4 ONT Management & Control Interface (OMCI)
	Remote ONT/ONU management
	Automatic ONT ranging

Mechanics	
Dimensions (W x H x D)	443.8 mm x 88.5 mm x 280.0 mm

Power supply	
Input voltage	-48 V DC

Operation environment	
Operation temperature	-20 to 55°C
Humidity	0 % to 90 % (non-condensing)