

# Real-Estate Developers and Contractors

Gated Communities, Multi-Family Complexes, Shopping Malls...

- ◆ **High capacity 2.488Gbps Down /1.244Gbps Up**
- ◆ **GPON network exclusive to the development differentiates the development from others that do not have a GPON network**
- ◆ **Ability to provide lower-priced bulk-contracted Internet, Video, Voice service to tenants**
- ◆ **Supports Over-the-Top (OTT) services to tenants like in-building and garden Wi-Fi, utility metering, amenities control, security monitoring etc**
- ◆ **Can operate services for the management of the development over this network**
- ◆ **Secure 128-bit Encryption (AES)**
- ◆ **Opportunity to revenue share with Bulk ISP, IPTV, Broadcast video provider**



GPON FTTx technology is so cost-effective that it makes the business case for it to be used by real-estate developers to provide ‘differentiating’ broadband service to residents in both their ‘Greenfield’ and ‘Brownfield’ Developments - Gated Community, Multi-Family apartment complexes, retail shopping malls and commercial high-rises. In many instances these tenants would have sub-standard broadband from the local telecom and cable service providers if the developers did not do this.

## FTTx Architecture

The most optimal FTTx architecture for real-estate developments, whether residential or commercial, is the ‘Fibre-to-the-Premise’. The fibre is run in conduits to and then inside the premise of Single-/Multi-family/Multi-tenant buildings using ITU-T G.652D fibre in the outside plant and bend-insensitive G.657 fibre from the curb to the ONT.

## Optical Splitting

The typical approach is to use two-stage splitting. For MDU building with many units on each the floor, say 8 to 16, would have a splitter placed on each floor with a split count for the number of endpoints on the floor plus a few extra for growth. MDU buildings with few units on each the floor, say 4 to 8 would have a splitter

shared between 2 or 3 floors depending on the height of the building. Used less frequently but very fibre lean is to use linear bus ODN using asymmetrical 1x2 splitters to reach widely spaced endpoints such as Wi-Fi hotspots, CCTV cameras in common areas, Digital signage/ billboards and exterior building CCTV video surveillance cameras and exit door sensors. The end result is a leaner communications infrastructure over using copper with no per floor powered and cooled Data Rooms/Closets.

## ONT Placement

G.657 fibre is run to each location in the building. These locations are the ‘endpoints’ where the GPON ONT is placed. At these endpoints the ONT is placed on the desktop, under the desk, on the wall or in a wiring closet depending on the ONT type and its application.

## Integral Power Outage Tolerance

An ONT can alert the OLT of an imminent power failure versus a fibre cut or a connector disconnect. ONTs with mission critical connections can be equipped with a Battery Backup UPS to decouple the GPON from the building’s backup generator.

## Service Model

N:1 VLAN (MEF E-Tree), where a single VLAN is shared among multiple subscribers, and 1:1 VLAN (MEF E-Line), where a single VLAN is dedicated for a single subscriber, and TLS (MEF E-LAN) multipoint-to-multipoint transparent LAN service models are supported, but N:1 is the preferred service model, with PPPoE or DHCP

Authentication and Authorization depending on the bulk internet provider.

### Services offered by Developer to Tenants

Real Estate developers can obtain Internet, Video and Voice under bulk agreements with ISPs and provide high-speed connectivity to these over the fibre GPON network built exclusively for their tenants. The developer can then run dedicated over-the-top (OTT) services for use by the tenants on this same GPON network, such as in-building and garden Wi-Fi, utility metering, amenities control, game rooms, etc.

### Services for managing the Development

The developer can also run services the management of the development such as building access management, remote heating and lighting management, HD CCTV, remote amenities management (elevators, gym, pool, doors and windows, fire etc.).

### Optional Value-add Services

Having a GPON network as part of the development permits the offering of on-demand bandwidth, social pricing for minimal universal internet connection, home security for apartment tenants, health monitoring for elderly tenants, community portals and even LAN-type services between business tenants.

### QoS

GPON offers 2.488 Gbps on the downstream and 1.244 Gbps on the upstream; this bandwidth is distributed

fairly among the end users attached to the PON. Within the total bandwidth allocation for a particular subscriber, the service provider can control the bandwidth allocated for each of the services to which the user subscribes using IEEE802.1ad CoS (Class of Service).

### Security

The GPON medium is inherently secure, employing 128-bit AES (Advanced Encryption Standard) to encrypt both downstream and upstream Data and voice and decrypting only the data and voice that addressed authenticated and authorized ONT.

### ISP and Content Connections

Alphion GPON OLTs can connect to the ISP, IPTV and VoIP network with 2x/4x 10GE and 4x/8x 1GE SNI Ethernet Links, fibre or copper. The SNI interfaces support link aggregation and 1+1 redundancy, etc.

### Management

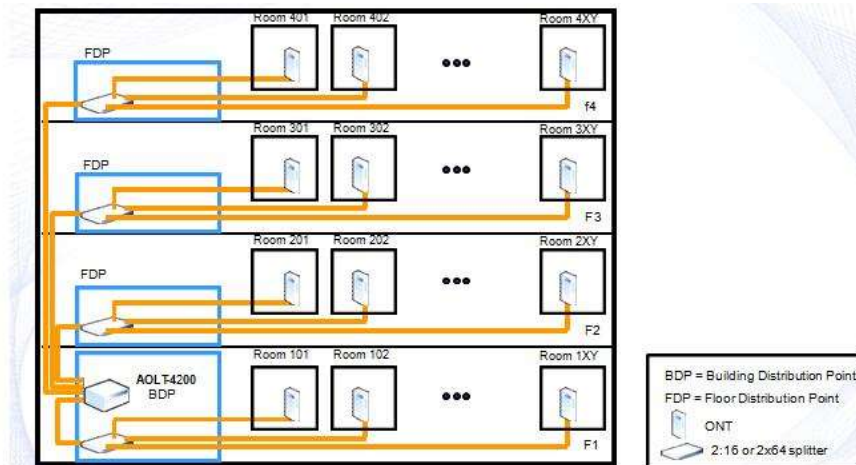
An Alphion GPON network is managed by Alphion's Element management system (AEMS) that communicates to Alphion's AOLT-4000/4200 series GPON OLTs over SNMP. The AEMS is very intuitive to use and can be run on a Windows Machine, a SUN server etc, depending on the network size.

### Future-proof

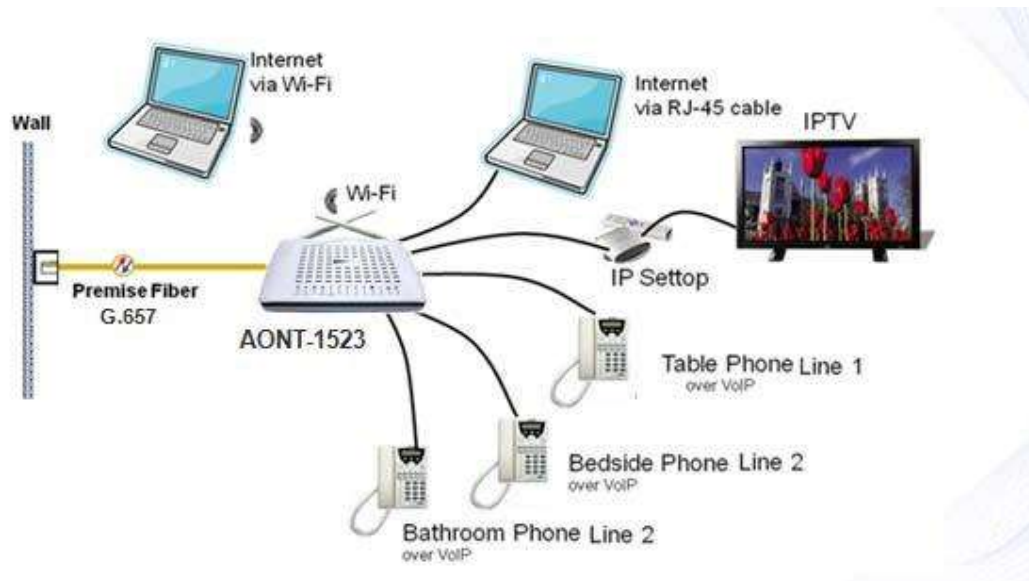
Future proof fibre topology - GPON ODNs are XG-PON and NGPON2 ready

### Real-World Real-Estate Developers and Contractors GPON Networks

The figure below illustrates the fibreing and the location of the GPON OLT and associated ONTs for a real-estate developer's 4-story apartment building. The ONTs are 4xGE, 2xFXS POTs, Wi-Fi with optional 8-hour battery backup. The GPON OLT is shown located in the bottom floor of this building but it could just as well be in another building in the complex.



The figure below illustrates the connectivity in the tenant's premise. It is also possible to connect to the TV over Wi-Fi (IEEE802.11n) with using a Wi-Fi IPTV setup box.



Solution	Benefits
<ul style="list-style-type: none"> <li>◆ Last mile fibre with GPON Technology 2.488Gps Down / 1.244Gbps Up</li> <li>◆ GPON ONT for residential with minimum 2 1GE ports for Internet &amp; IPTV, 2xFXS VoIP Voice ports and IEEE802.11b/g/n Wi-Fi</li> <li>◆ GPON ONT for commercial tenant minimum 1GE</li> <li>◆ PPPoE or DHCP Authentication &amp; Authorization depending if bulk internet from Local Exchange or Cable ISP</li> <li>◆ Offer Virtual LAN interconnection between commercial tenants using Alphion's OLT's local switching capability</li> <li>◆ Passive tree and branch ODN with multi-stage splitting</li> <li>◆ Up to 128 ONTs per PON, but typically 32 or 64</li> <li>◆ Deploy Type-BPath protection for high construction areas or where commercial tenants are running mission critical operations</li> </ul>	<ul style="list-style-type: none"> <li>◆ Eliminate the need to build and maintain a telephony copper infrastructure, including loop powering</li> <li>◆ Better energy management of common areas translates to lower utility bills</li> <li>◆ Fibred New developments sell-out faster</li> <li>◆ Tenants are willing to pay more to live on a fibred property</li> <li>◆ Higher rental occupancy seen with fibred properties</li> <li>◆ Improved security with PTZ HD CCTV and sensors decreases vandalism and maintains value of assets</li> <li>◆ Lower Total Cost of Ownership (TCO) over copper</li> </ul>