Hospitality Industry

Hotels and Resorts

- **High capacity 2.488Gbps Down /1.244Gbps Up**
- **Quadruple-play – Internet, Video, Voice, Wi-Fi**
- **1GE High Speed Internet support**
- **Transparent LAN service (TLS) (MEF E-LAN) for departmental LAN interconnection with optional Local switching to keep traffic from leaving the network**
- **Secure Advanced 128-bit Encryption (AES)**
- **Leaner Infrastructure with no per floor Data Rooms/Closets**
- **Lower Total Cost of Ownership (TCO) over coaxial cable, twisted pair copper or point-to-point fibre approaches**
- **Ability of current installations to co-exist with future PON standards on the same ODN**

PON is the best solution for providing broadband to the hotels and resorts compared to copper based coaxial cable or twisted pair solutions that bandwidth limited and susceptible to noise or point-to-point carrier Ethernet solutions that require many more fibres and many more optical transceivers (laser & detector). As an example for N endpoints, PON requires 1 (bi-directional) fibre + (N+1) transceivers versus 2N fibres + 2N transceivers for point-to-point fibre.

The most optimal broadband access PON-based technology solution today is GPON. GPON's Higher Bandwidth and Efficiency equals lower per endpoint and lower cost per bit of Bandwidth, over other PON implementations GE-PON with its 1Gbps down and 1Gbps up.

FTTx Architecture

The FTTx architecture for the Hospitality segment is referred to as 'Fibre-to-the Desktop', which is essentially "Fibre-to-the-Premise".

Optical Splitting

The typical approach is to use two-stage splitting. MDU buildings 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.

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), 1:1 VLAN (MEF E-Line), 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 & Authorization depending on bulk internet provider.

Broadband Services

Services that exploit's GPON's high bandwidth and low latency can be offered day one, such as up to 1Gbps "Gigabit" Internet, Symmetrical data connections, 300Mbps Wi-Fi Hotspots, HD Tele-presence feeds, HD CCTV cameras and more.

Guest Room Services

Some typical guest room services Alphion GPON equipment has been used for is Internet Access, HDTV/VoD, Door Entry card reader, Analogue Phone, Security sensor, VoIP Phone and Mini Bar.

Conference Suites &Public Area Services

Some typical Conference Suites & Public Area services Alphion GPON equipment has been used for is Internet Access, Audio Visual Systems, Wireless Access Points, Digital Signage, CCTV camera and VoIP phones.

Admin Offices Services

Some typical Administrative office services Alphion GPON equipment has been used for is Door Entry card Reader, Internet for Admin PC's, EPoS, VoIP Phones, CCTV Camera, and Network Printers.

Local Switching

Alphion's GPON OLTs supports local switching between users if so configured. This provides the option to keep data traffic between users, such as on departmental VLANs, for example in the administrative office totally in-building. The Default is no local switching.

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 for that addressed authenticated and authorized ONT.

ISP and Content Connections

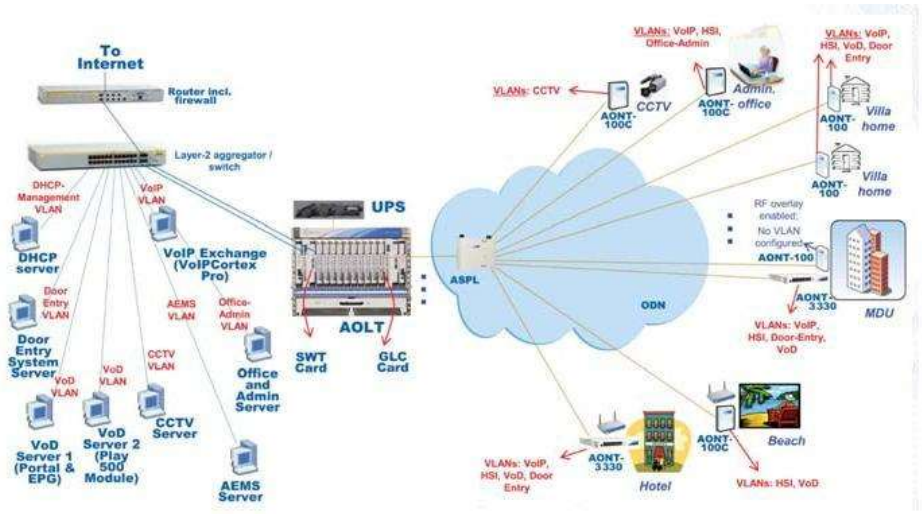
Alphion GPON OLTs can connect to the ISP, IPTV and VoIP network with 2x/4x 10GE and 4x/8x 1GE SNI Ethernet Links, fibre or copper. The SNI interfaces support link aggregation and 1+1 redundancy, etc.

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.

Real-WorldHospitality Accommodation Industry GPON Networks

The figure below is of an Alphion GPON Hospitality Network deployed on an Island Resort. The deployed ONTs included are a 4xFE+ 2xFXS + 1RF ONT (chose external Wi-Fi AP), a 24xFE MDU ONT and 24FE + 24FXS MDU ONT.



The figure below illustrates the connectivity for the guest rooms, guest villas, conference suites, public areas and administrative offices.

The VoIP was offered on an IP PBX with SIP Digest authentication for security, the IPTV was Unicast SDTV 4Mbbps, while the door entry system was of very low but required high availability. The CCTV was unicast SDTV 4Mbps. The Administrative offices were on separate VLANs from the Guest, conference and common area VLANS but still required Internet Access. The Wi-Fi access points were for providing internet access in public areas in the resort and at the beach club. In this particular example the internet connection to the resort was over Microwave radio while the RF video was sourced from satellite and trans-coded, then converted to optical and amplified for delivery over GPON's RF video overlay wavelength.

Solution

- **Last mile fibre with GPON Technology2.488Gps Down / 1.244Gbps Up**
- **Guest Room & Villas 4FE+2VOIP- +1RF ports with Wi-Fi as option**
- **Conference & Public areas – 24xFE +24FXS MDU or 24xFE MDU if no analog phones required**
- **Administrative offices – 24xFE +24FXS MDU or 24xFE MDU if only VoIP phones**
- **Typically 32 splitper PON**
- **PON feeder run in a physical Fibre ring around for maximum flexibility and to permit Type B protection**

Benefits

- **Lower OPEX with a single infrastructure for both guest and administrative offices but with High security with GPON's downstream and upstream 128-bit AES encryption**
- **Lower operational expense thancopper infrastructure**
- **High Speed Internet and High Quality video and voice but could provide analog broadcast TV using GPON's RF video Overlay feature**
- **All connections in a single management domain**
- **Migration path to high bandwidth services as they become available**

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