BroadbandSoHo
Verizon MDU FTTP Overview

Document Description:

The enclosed document was created to give a basic overview of Verizon's FTTP PON , and technology terms behind there Fios product in regards to the MDU / MTU environment.

DISCLAIMER : This page was created as a basic technical overview of Verizon's FTTP service for new field technicians interested in this technology , and to help you recognize some of the visible equipment that gives you a sign that service is being deployed in your area. Within this document I will make reference to some manufacturers and illustrate their products.

Do NOT reproduce any of the below pictures or information out of its context listed below. Please don't email us with any questions out of context listed below as we can't discuss any other technical issues or speculation of vendor companies. All text listed below is solely the opinion of BroadbandSoHo , and based on the overall architecture of a PON , and integration into an existing telco architecture. This page will be updated when we have the chance to expand on further topics and company hyperlinks of service updates.

If you have any questions regarding this document or require more in-depth technical information , you may visit our website tutorials.

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FiOS Communities

The speed of FiOS℠ will **change your life**

Calling all creative geniuses. Gaming gurus. Movie junkies. Telecommuting kingpins. Get the life-changing speed of FiOS.

The Enhanced Communities group is an extension of Verizon's breakthrough plan to revolutionize broadband services with fiber-to-the-premise (FTTP) technology that brings high-capacity fiber-optic network links directly to homes , MDU's and businesses. Verizon's Enhanced Communities group installs fiber once -- in new communities as they are being built – which means no future construction is required to update the network.

What's in your PON ?

FTTH / FTTP (Fiber to the Home / Fiber to the Premise) is a fiber-optic broadband triple play service (Voice/Data/Video) currently in deployment throughout the U.S. by various RBOC's such as AT&T , Verizon and individual city municipalities. The architecture of this deployment is known as PON (Passive Optical Network) , this is a completely passive (the signal is transported by laser with no electronics) network consisting of fiber optic cabling , passive splitters , attenuators , and couplers (These direct listed items are also referred as the ODN - Optical Distribution Network elements) that distribute an optical signal through a branched topology to an ONT (Optical Network Terminal). This architecture is a point-to-multipoint system that allows a maximum of 32 ONT's to be serviced , with a OSP topology of 1x32 Home Run Split , 1x4 to 1x8 Distributed Split , or 1x8 to 1x4 Distributed Splitter build out.

Elements of a Passive Optical Network

Aerial / Buried ODN Installation Types

Pre-terminated Drop Cables

- Greenfield – New building construction will feature FTTP where possible, instead of initially installing copper phone lines.
- Overlay – Involves installing new fiber to replace existing copper-wire networks on a market-by-market basis, with fiber run to the home or small-to-medium-sized business based on market demand.
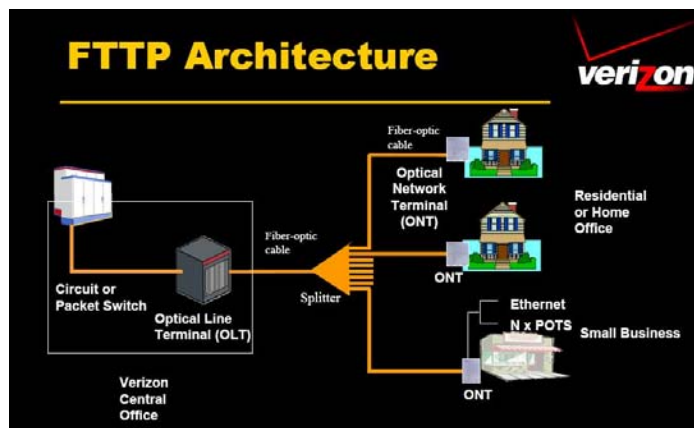
PON consists of the following

OLT ~ Optical Line Terminal , is the networks control card. This card resides in the local CO (Central Office) cross connected to the video and data networks that will be delivered to your home , it consists of a special DFB (Distributed Feedback) calibrated laser that is always on. This control card acts as a traffic signal to the remote ONT's for complete data / video throughput upstream and downstream.

ODN ~ Optical Distribution Network , is part of the OSP architecture components. The actual fiber-optic cabling , passive splitters , FDH , attenuators and couplers.

Fiber Distribution Hub

FDH ~ Fiber Distribution Hub , is the cross point for the Fiber CO Trunk and Distribution Fiber to the individual homes. This hub can come in various configurations but the RBOC's configuration will generally be the 144 / 216 user format and designed to be a plug and play cross connect panel for the home connections.

ONT ~ Optical Network Terminal , this is the CPE (Customer Premise Equipment) endpoint of the ODN. The ONT is an Optical to Electrical to Optical device , that delivers your triple play services. It will replace your existing copper NID (Network Interface Device) and your existing coax , POTS services will be cross connected to it. Since we understand that a PON is completely passive the endpoint must obtain an AC voltage.
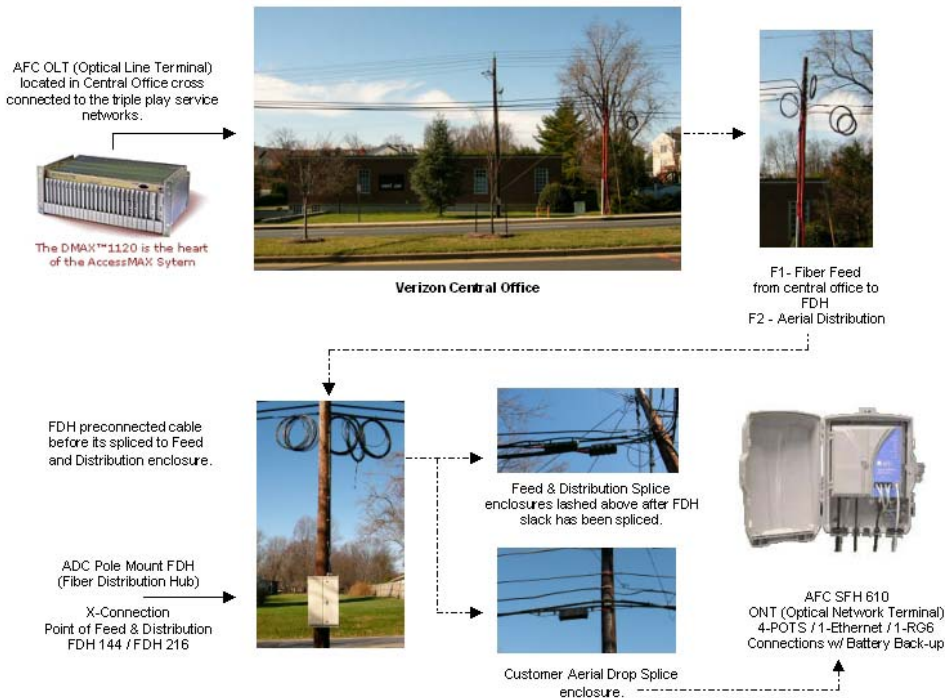
Technology & Installation

Professional Installation
by a Verizon Technician.

FTTx is not a new technology , it has been around for sometime within the RBOC's , as years have passed the technology has advanced along with the reduction cost of fiber , creating what is the broadband craze of today. With this sudden craze and endless possibility of bandwidth , you should keep in mind a few several things. Fiber has the ability of offering a huge bandwidth , but within a PON there are several formats with limitations. These formats are APON (ATM-PON) , EPON (Ethernet-PON) , and GPON (Gigabit-PON) each has a unique set of features and transport process.

AFC OLT (Optical Line Terminal) located in Central Office cross connected to the triple play service networks.

The DMAX™1120 is the heart of the AccessMAX Sytem

Verizon Central Office

F1- Fiber Feed from central office to FDH
F2 - Aerial Distribution

FDH preconnected cable before its spliced to Feed and Distribution enclosure.

ADC Pole Mount FDH (Fiber Distribution Hub)

X-Connection
Point of Feed & Distribution
FDH 144 / FDH 216

Feed & Distribution Splice enclosures lashed above after FDH slack has been spliced.

Customer Aerial Drop Splice enclosure.

AFC SFH 610
ONT (Optical Network Terminal)
4-POTS / 1-Ethernet / 1-RG6
Connections w/ Battery Back-up

GPON (Giga-Bit) PON FSAN / ITU-T G.984

Full Service Support – including voice, TDM, Ethernet (10/100 BaseT), ATM, leased lines, wireless extension and more.

Support for various bitrate options using the same protocol, including symmetrical 622 Mbit/s, symmetrical 1.25 Gbit/s, 2.5 Gbit/s downstream and 1.25 Gbit/s upstream and more.

Strong Operation, Administration, Maintenance and Provisioning (OAM&P) capabilities offering endtoend service management.

*Same as APON with these advancements

APON (Asynchronous Transfer Mode) PON FSAN / ITU-T G.983

Fiber Cable Span no more than 20Km (12Miles) of Single-mode fiber

Asymmetrical 622 (OC-12) / 155 (OC-3) Mbs bandwidth per OLT path of 32 ONT's

OLT - WDM (Wave Division Multiplexing)

1550nm (1480-1580) for downstream

1310nm (1260-1360) for upstream

TDM (Time Division Multiplexing) of ATM packets

1:32 Passive Splitter OSP Topology

AXS2200 Optical Line Terminal (OLT) is designed to deliver the power of both Gigabit and Broadband Passive Optical Networking (GPON and BPON) and Digital Subscriber Line.

GPON (Motorola) will be Verizon FiOS newly deployed standard moving forward this year. Existing APON (AFC/Tellabs) will continue also , therefore certain regions will contain a mixed architecture.

GPON will deliver 2.5Gbps service , with a 1x32 ratio , it can deliver 75MBps per house for triple play service.

MDU Installations … *Can it really be done ?*

YES - It has always been feasible , the two major field installation hurdles , now achieved have been the cost effectiveness of the MDU build-outs *(In the Apartment / On the Floor / In the Basement*) along with a proper ONT for the MDU infrastructure.

They now have options ~ The new Motorola & Tellabs ONT product line not only brings new service and installation features to the SFH (Single Family Home) , but have created a very robust MDU ONT product line. Some of the major technology advancements are MoCA (short for Multimedia over Coaxial Alliance) , this technology allows for delivery of data over Cat5 (Ethernet) or existing in-home coaxial cable , this is a major advancement for the field technician installation. This will allow for the technician to scale back there installation time dramatically using the existing in-home coax cable. The next major advancement has been with creating an ONT that will distribute the triple play service via VDSL w/ POTS. The Motorola MDU ONT has a unique counterpart to this feature with their RG (Residential Gateway) which is in the form of a set-top box. Here's a brief description of the new ONT's along with the services they offer.

Tellabs 1600 – MDU ONT's

621 – 16 Pots / 8 Ethernet / 1 Video

625 – 16 Pots / 8 VDSL / 1 Video High Output

641 – 16 Pots / 8 Ethernet / 4 T1's / 1 Video

Motorola 6000 – MDU ONT

12/24 Pots ~ 8/16 Ethernet ~ 1 Video High Out

How can I get my property submitted for Fios service ?

Visit the following link
http://communities.verizon.com

Tellabs 1600 – SFH ONT Series

611 – Replaced the existing 610
612 - Supports MoCa

Motorola SFH ONT 1000 Series ⟶

1000V – ONT w/4 Pots , 1 Ethernet , 1 RG6 Video
1000M - supports the delivery of data over Cat5 (Ethernet) or existing in-home coaxial cable (MoCA).
1000G – GPON supports the delivery of interactive video through IPTV or RF overlay, and data delivery over Cat5 (Ethernet) or existing in-home coaxial cable (MoCA).