



FTTH Council - Definition of Terms

Version 3.0
September 2011

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INTRODUCTION

The mission of all the FTTH Councils in North America, Europe and Asia Pacific includes the communication to stakeholders in our respective regions of the extent of usage of FTTH throughout the world and forecasting the growth of FTTH.

This task has been made difficult by the proliferation of terms and acronyms while no doubt useful to individual organizations for their specific purposes, lack precise definitions.

This is of particular concern when different research organizations choose their own definitions when conducting research. As a consequence it becomes impossible to compare the research on FTTH between different regions, or between different studies of the same region.

This document defines the terms used by all the FTTH Councils (North America, Europe, Asia Pacific).

It is common in the industry to refer to systems that bring optical fiber close to the subscriber premises as *FTTx*. FTTx is a generic term where optical fiber replaces copper in the access network. This documents explicitly defines FTTH and FTTB in which the fiber terminates inside or no more than 2 m from the subscriber's home or building.

This document specifically aims to reduce the terms used to a subset that are well defined, adequate and useful.

However, to be successful, the terms defined in this document must be used frequently and consistently. Thus, all Council members and other stakeholders such as operators, analysts, journalists, and government and regulatory staff are encouraged to use these terms as the well-defined vocabulary that underpin the more general expressions.

With regards to market research, however, in order to compare the research conducted by different organizations in the same or different regions, it is essential that these terms are used and not interchanged with other. The FTTH Councils will assure that the definitions of this document will be used for their market research.

THE TERMS

Supporting definitions:

“**Premise**” is a home or place of business. In a multi-dwelling unit¹ each apartment is therefore counted as one premise.

“**Subscriber**” is a premise that is connected to a network and uses at least one service on this connection under a commercial contract.

“**Homes Passed**” is the potential number of premises to which a Service Provider has capability to connect in a service area. Typically new service activation will require the installation and/or connection of a drop cable from the homes passed point (e.g. fiber-pedestal, manhole, chamber, utility-pole) to the premises, and the installation of subscriber premises equipment at the premises. This definition excludes premises that cannot be connected without further installation of substantial cable plant such as feeder and distribution cables (fiber) to reach the area in which a potential new subscriber is located.

“**Homes Connected**” is the number of premises which are connected to a network.

“**Penetration Rate**” equals “Homes Connected” divided by the number of premises in a service area.

“**Connect Rate**” equals “Homes Connected” divided by “Homes Passed”.

“**Take Rate**” equals “Subscribers” divided by “Homes Passed”.²

Fiber-to-the-Home³ (FTTH)

“Fiber to the Home” is defined as an access network architecture in which the final connection to the subscriber’s premises is Optical Fiber.

The fiber optic communications path is terminated on or inside the premises for the purpose of carrying communication services to a single subscriber.

In order to be classified as FTTH, the access fiber must cross the subscriber’s premises boundary and terminate

- inside the premises, or
- on an external wall of the subscriber’s premises, or
- no more than 2m from an external wall of the subscriber’s premises.

¹ multi-tenant unit in some countries

² It is expressed as a percentage. “Take rates” can be based on each type of service, for example, data take rates, video take rates, and voice take rates, or triple/quadruple services take rates

³ Important note: This document uses the American English spelling “fiber”. The FTTH Council Europe uses the British English spelling “fibre” in their communication. This is seen to be the same.

FTTH may deliver just one service, but generally delivers several such as data, voice and video.

This FTTH definition excludes architectures where the optical fiber terminates in a public or private space before reaching the premises and where the access path continues to the subscriber over a physical medium other than optical fiber (for example copper loops, power cables, wireless and/or coax).

Fiber-to-the-Building (FTTB)⁴

“Fiber to the Building” is defined as an access network architecture in which the final connection to the subscriber’s premises is a physical medium other than Optical Fiber.

The fiber optic communications path is terminated within the building for the purpose of carrying communication services for a single building with potentially multiple subscribers.

It is implicit that in order to be classified as FTTB, the fiber must at least

- enter the building, or
- terminate on an external wall of the building, or
- terminate no more than 2m⁵ from an external wall of the building, or
- enter at least one building within a cluster of buildings on the same property, or
- terminate on an external wall of one building within a cluster of buildings on the same property, or
- terminate no more than 2m from an external wall of one building within a cluster of buildings on the same property.

FTTB may deliver just one service, but generally delivers several such as data, voice and video.

This FTTB definition excludes architectures where the optical fiber cable terminates in a public space more than 2m from an external wall of one building (for example an operator’s street-side cabinet) and where the access path continues to the building over a physical medium other than optical fiber (for example copper loops, power cables, wireless and/or coax).

⁴ FTTB construction is a transitional form commonly used as a means to deliver services to existing buildings in conjunction with associated FTTH construction (for example for new buildings). By introducing fiber cables from the fiber termination point to the premises FTTB can be subsequently converted to full FTTH. Such a conversion is desirable as FTTH provides better capacity and longevity than FTTB.

⁵ See footnote in FTTH section

SOME MORE TERMS

Network Topology

The cable plant which connects the operator's premises and subscriber's premises.

It can be deployed in the following different topologies:

“Point-to-Point” (P2P⁶, Pt-Pt, or PtP) cable plant provides optical fiber paths from a communication node located outside of the building to a single premise - such that the optical paths are dedicated to traffic to and from this single location.

“Point-to-Multipoint” (P2MP⁷) cable plant provides branching optical fiber paths from a communication node to more than one premise (or building) - such that a portion of the optical paths are shared by traffic to and from multiple premises. This branching is typically realized through power or wavelength splitters.

“Ring” cable plant provides a sequence of optical fiber paths in a closed loop that connects a series of communication nodes.

Note that from these definitions it is not possible to identify the access protocol used over the cable plant.

It is possible for a network to be built so that a common cable plant can include a mix of different topologies or be re-configured over time to support different topologies, to allow for mixed user categories, to allow access diversity for reliability, and for future flexibility and network longevity.

Feeder Network

It is the fiber cables network deployed from the Central office OLT to the first splitter in the field in a PON architecture

Distribution Network

It is the fiber cables network deployed from the splitter to the Curb in a PON Architecture.

Drop Cable

It is the fiber cable connecting the subscriber to the curb box and into the network

⁶ the abbreviation P2P is sometimes also used to describe peer-to-peer-networks, e.g. to exchange files over the internet. This P2P is not connected to the point-to-point definition in this document.

⁷ P2MP is often referred as “Passive Optical Network” (PON), whereby the path from the active or powered communication node to the terminating fiber location has no active or powered elements.

Access Protocol

Access Protocols are the methods of communication used by the equipment located at the communication nodes and at the subscriber's premises (or buildings) to ensure reliable and effective transmission and reception of information over the optical paths. These protocols are defined in detail by the standards organizations that have created them, and are recognized and implemented by manufacturers around the world.

The Access Protocols in use today for FTTH Networks and the optical portion of FTTB Networks are:

“**EFM**” defined as Ethernet in the First Mile in IEEE 802.3ah

“**EP2P**” defined as Ethernet over P2P in IEEE 802.3ah

“**EPON**” defined as Ethernet PON in IEEE802.3ah (Note that the expression Gigabit EPON is synonymous with EPON.)

“**BPON**” defined as Broadband PON in ITU-T Recommendation G.983

“**GPON**” defined as Gigabit PON in ITU-T Recommendation G.984

“**OTHER**” access protocols such as proprietary or pre-standard access protocols may be noted for the purpose of completeness in research.

Network Usage

FTTH/FTTB networks may be dedicated to the services of a single retail or wholesale service providers, or made available to many retail service providers, who may connect to the network at the packet, wavelength or physical layer.

“**Exclusive Access**” refers to the situation where a single retail service provider (who may or may not be the network operator) has exclusive use of the FTTH network.

“**Open Access (Packet)**”⁸ refers to the situation where multiple retail service providers may use the FTTH network on an equitable base by connecting at a packet layer interface and compete to offer their services to end users.

“**Open Access (Layer2)**”⁹ refers to the situation where multiple retail service providers may use the FTTH network on an equitable base by connecting at a layer2 VLAN interface from OLT or an aggregation point and compete to offer their services to end users

⁸ In many cases this is also called “Bitstream Open Access”

⁹ In many cases this is also called “Bitstream Open Access”

“Open Access (Layer3)”¹⁰ refers to the situation where multiple retail service providers may use the FTTH network on an equitable base by connecting at a layer 3 IP or MPLS layer interface from OLT or an aggregation point and compete to offer their services to end users

“Open Access (Wavelength)” refers to the situation where multiple retail or wholesale service providers may use the FTTH network on an equitable base by connecting at a wavelength layer interface and compete to offer their services.

“Open Access (Fiber)” refers to the situation where multiple retail or wholesale service providers may use the infrastructure by connecting at a physical layer (“dark” fiber) interface and compete to offer their services.

“Open Access (Duct)” refers to the situation where multiple retail or wholesale service providers may share the use of infrastructure covering a substantial region by drawing or blowing their fiber cables through the shared ducts, and compete to offer their services.

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“Open Access Flexibility point” refers to the concentration point where multiple retail or service providers may connect via their feeder cables and access Layer1 feeder fiber connectivity to each household . This Concentration or flexibility point may be located at the building or cabinet or ODF

¹⁰ In many cases this is also called “Bitstream Open Access”