

## **FTTH Council - Definition of Terms**

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### **INTRODUCTION**

The mission of all the FTTH Councils in North America, Europe and Asia-Pac 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 that, while no doubt useful to individual organisations for their specific purposes, lack precise definitions.

This is of particular concern when different research organisations 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 Council's (North-America, Europe, Asia-Pacific). To promote consistency when commissioning or commenting on research the Councils' members will confine themselves to those terms defined in this document.

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

### **THE TERMS**

#### **Fiber-to-the-Home (FTTH)**

"Fiber to the Home" is defined as a telecommunications architecture in which a communications path is provided over optical fiber cables extending from the telecommunications operator's switching equipment to (at least) the boundary of the home living space or business office space.

This communications path is provided for the purpose of carrying telecommunications traffic to one or more subscribers and for one or more services (for example Internet Access, Telephony and/or Video-Television).

This definition excludes architectures where the optical fiber terminates in private space before reaching the home living space or business office space and where the access path continues to the subscriber over a physical medium other than optical fiber (for example copper loops).

This definition excludes architectures where the optical fiber cable terminates in public space (for example an operator's street-side cabinet) and where the access path continues to the subscriber over a physical medium other than

optical fiber (for example copper loops). It is acknowledged that other parties such as the US FCC make specific concessions for such architectures.

However, for the formal communications of the Councils, architectures that are excluded by this definition are NOT Fiber-to-the-Home.

### **Fiber-to-the-Building (FTTB)**

“Fiber to the Building” is defined as a telecommunications architecture in which a communications path is provided over optical fiber cables extending from the telecommunications operator’s switching equipment to (at least) the boundary of the private property enclosing the home or business of the subscriber or set of subscribers, but where the optical fiber terminates before reaching the home living space or business office space and where the access path continues to the subscriber over a physical medium other than optical fiber (for example copper loops).

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 home living space or business office space FTTB can be converted to full FTTH. Such a conversion is desirable as FTTH provides better capacity and longevity than FTTB.

This communications path is provided for the purpose of carrying telecommunications traffic to one or more subscribers and for one or more services (for example Internet Access, Telephony and/or Video-Television).

This definition excludes architectures where the optical fiber cable terminates in public space (for example an operator’s street-side cabinet) and where the access path continues to the subscriber over a physical medium other than optical fiber (for example copper loops).

However, for the formal communications of the Councils, architectures that are excluded by this definition are NOT Fiber-to-the-Building.

### **Cable Plant Topology**

The cable plant which connects the operators’ premises and subscribers’ premises can be deployed in the following different topologies:

“**Point-to-Point**” (P2P) cable plant provides optical paths from the telecommunications operator’s switching equipment to a single contiguous location such that the optical paths are dedicated to traffic to and from this single location. In generic terms this is a star topology.

“**Point-to-Multipoint**” (P2MP) cable plant provides branching optical paths from the telecommunications operators switching equipment to more than one contiguous location such that portions of the optical paths are shared by traffic to and from multiple locations. In generic terms this is a tree topology.

“**Ring**” cable plant provides a sequence of optical paths in a closed loop that begins and ends at the telecommunications operators switching equipment and connects a series of more than one contiguous location such that portions of the optical paths are shared by traffic to and from several locations.

A location is identified as being within the boundaries of the private property enclosing the home, business or premise of the subscriber or set of subscribers.

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.

### **Access Protocol**

Access Protocols are the methods of communication used by the equipment located at the ends of the optical paths to ensure reliable and effective transmission and reception of information over the optical paths. These protocols are defined in detail by the standards organisations 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:

“**EP2P**” defined as Ethernet over P2P 100baseFX, 100baseLX, 100baseBX, 1000baseLX and 1000baseBX in IEEE 802.3ah

“**EPON**” defined as Ethernet PON 1000basePX in IEEE802.3ah (Note that the expression Gigabit EPON is synonymous with EPON.)

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

“**GPON**” defined as Gigabit PON in ITU-T 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 service provider, 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 has exclusive use of the FTTH network.

**“Open Access (Packet)”** refers to the situation where multiple retail service providers may use the FTTH Network by connecting at a packet layer interface 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 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 FTTH Network 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 a duct network covering a substantial region by drawing or blowing their fiber cables through the shared ducts, and compete to offer their services.

## User Categories

FTTH/FTTB Networks may deliver services to the following categories of users:

**“Residential”** refers to private users in their homes. Residential users may live in **“MDU”** (multi-dwelling units such as apartments/condominiums) or **“SFU”** (single family dwelling units such as stand-alone houses/villas/landed property).

**“Business”** refers to large (corporate), medium, and small (Small Business, Small Office Home Office) business users. Businesses may occupy **“MTU”** (multi-tenanted units such as office blocks/towers) or **“STU”** (single-tenanted units such as a stand-alone office building or warehouse).

## Network Size

The size of FTTH/FTTB Networks is described in the following terms:

The number of **“Homes/Premises Passed”** is the number of residential and business premises to which an operator can currently deliver FTTH access within the operator’s standard service activation period (for example 30 days) should the owners/occupiers sign a contract for an access service. Typically new service activation will require the installation and/or connection of a drop cable from the street or basement to the home or office, and the installation of subscriber premises equipment.

This definition excludes premises that cannot be connected without further installation of substantial cable plant such as feeder and distribution cables to reach the area in which a potential new subscriber is located.

The number of “**Homes/Premises Connected**” is the number of residential and business premises to which an operator is supplying FTTH access under a commercial contract.

The “**Take-up Rate**” or “**Take Rate**” for a network is calculated by the simple division of “Home/Premises Connected” by “Home/Premises Passed”, and is expressed as a percentage.

## Services

FTTH/FTTP Networks are used to deliver the following services.

“**Internet**” refers to use of the Public Internet for exchanging email, web-browsing, etc..

“**Voice**” refers to the exchange of human conversations by use of “**IP**” or “**Other**” encoding and transport protocols. (This category does not include Voice carried over the Public Internet.)

“**Video**” refers to the exchange of visual material by use of “**IP**”, “**RF**” (carried via a separate optical wavelength) or “**Other**” encoding and transport protocols. (This category does not include Video carried over the Public Internet.)

Applications other than those listed above are categorized as “**Other**”.

## CONCLUSION

The intention of this document is to make it possible for Council Members and the FTTH industry to speak a common language when discussing FTTH statistics and network characteristics.

No doubt Council members and other stakeholders will feel the need to use a wide range of terms for technical solutions, concepts, and models. This document does not discourage this activity, as it is inherent in the free flow of communication on which our industry thrives.

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 underpins the more general expressions.

With regards to Market Research however, in order for research by different organisations conducted in the same or different regions to be meaningfully compared, it is essential that these terms are used and no others.