Prospects and Problems GPON Technology over Ethernet Technology

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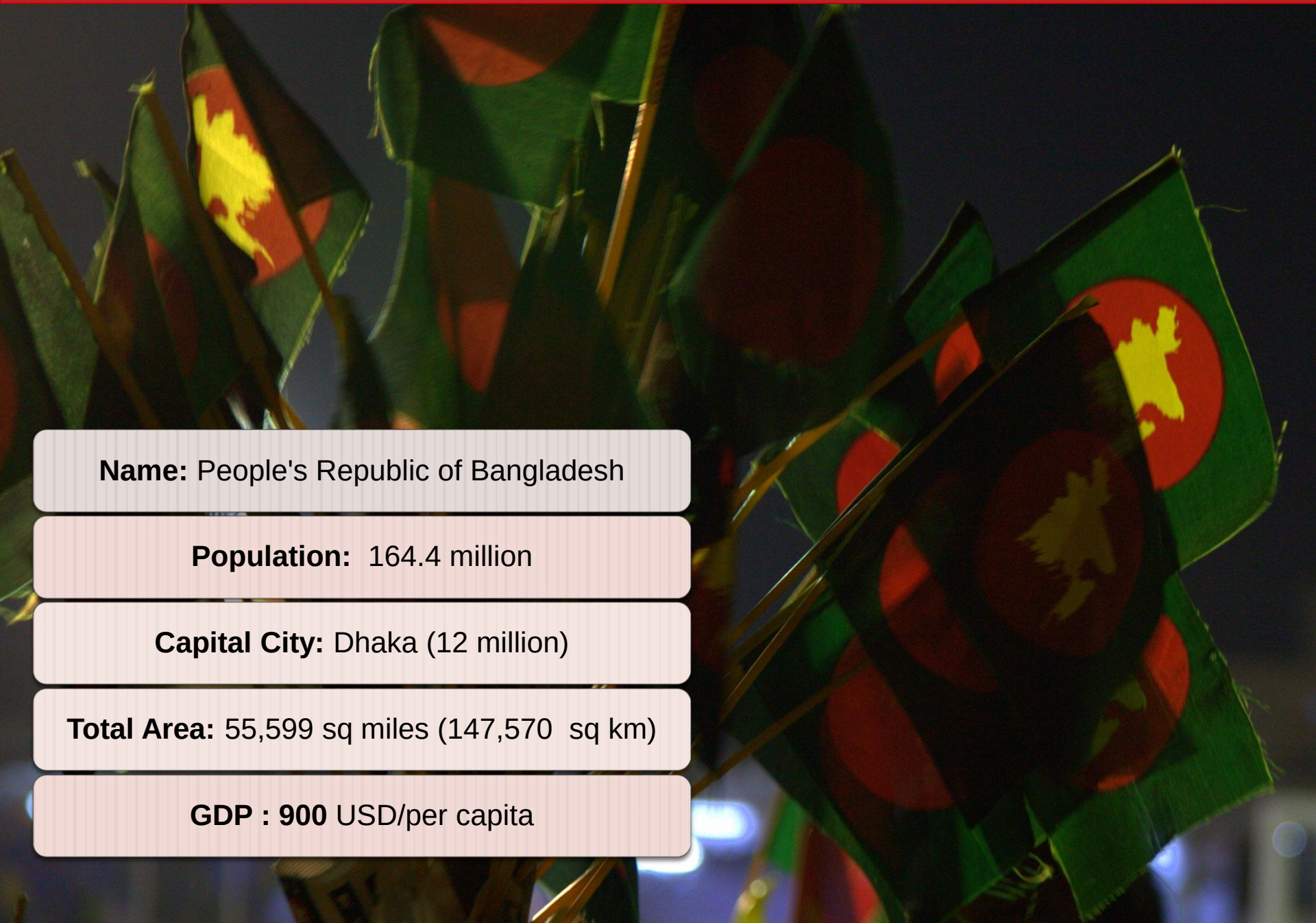
SANOG 23 Conference
Thimpu, Bhutam

Fiber @ Home

Bangladesh :



Name: People's Republic of Bangladesh

Population: 164.4 million

Capital City: Dhaka (12 million)

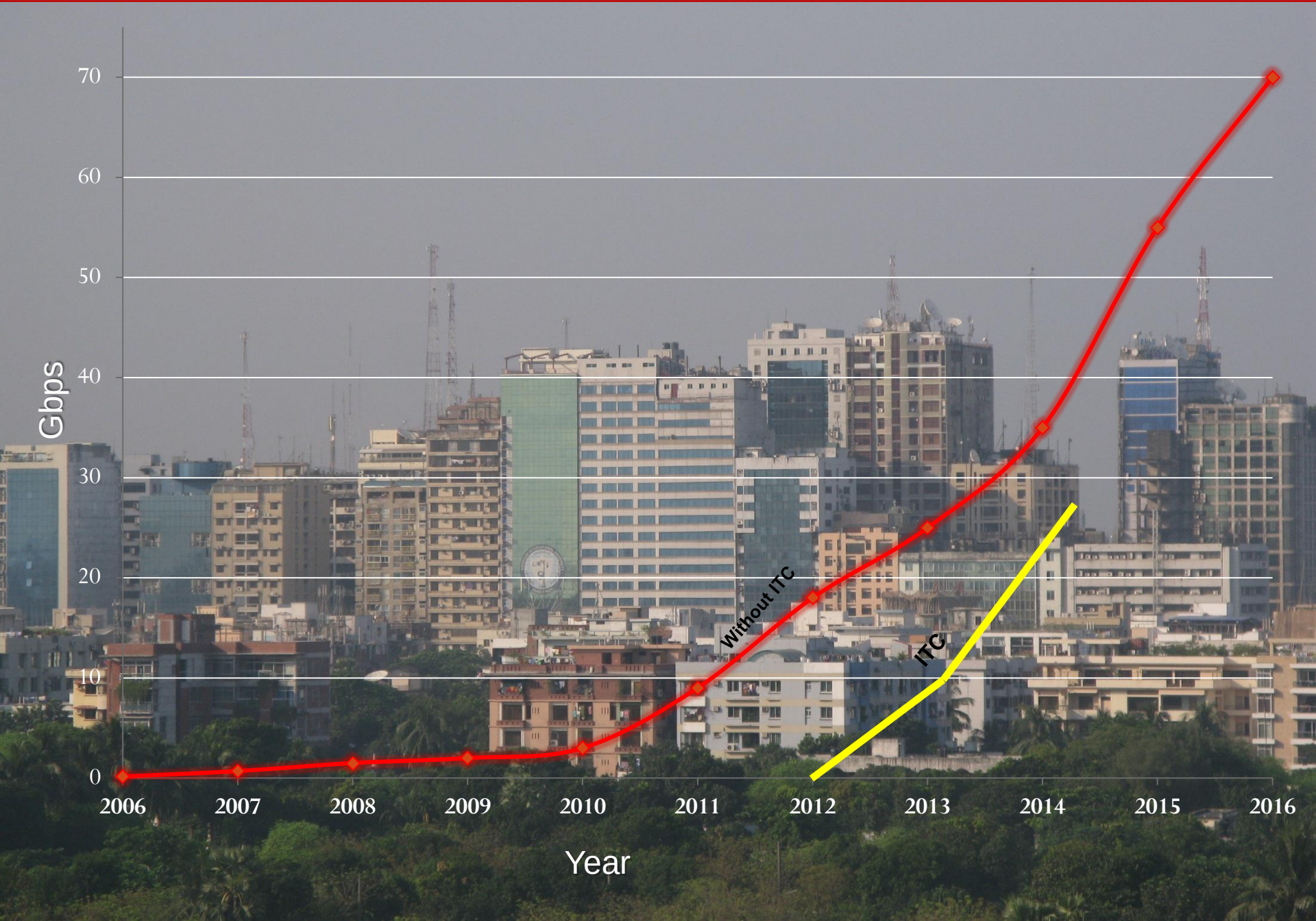
Total Area: 55,599 sq miles (147,570 sq km)

GDP : 900 USD/per capita

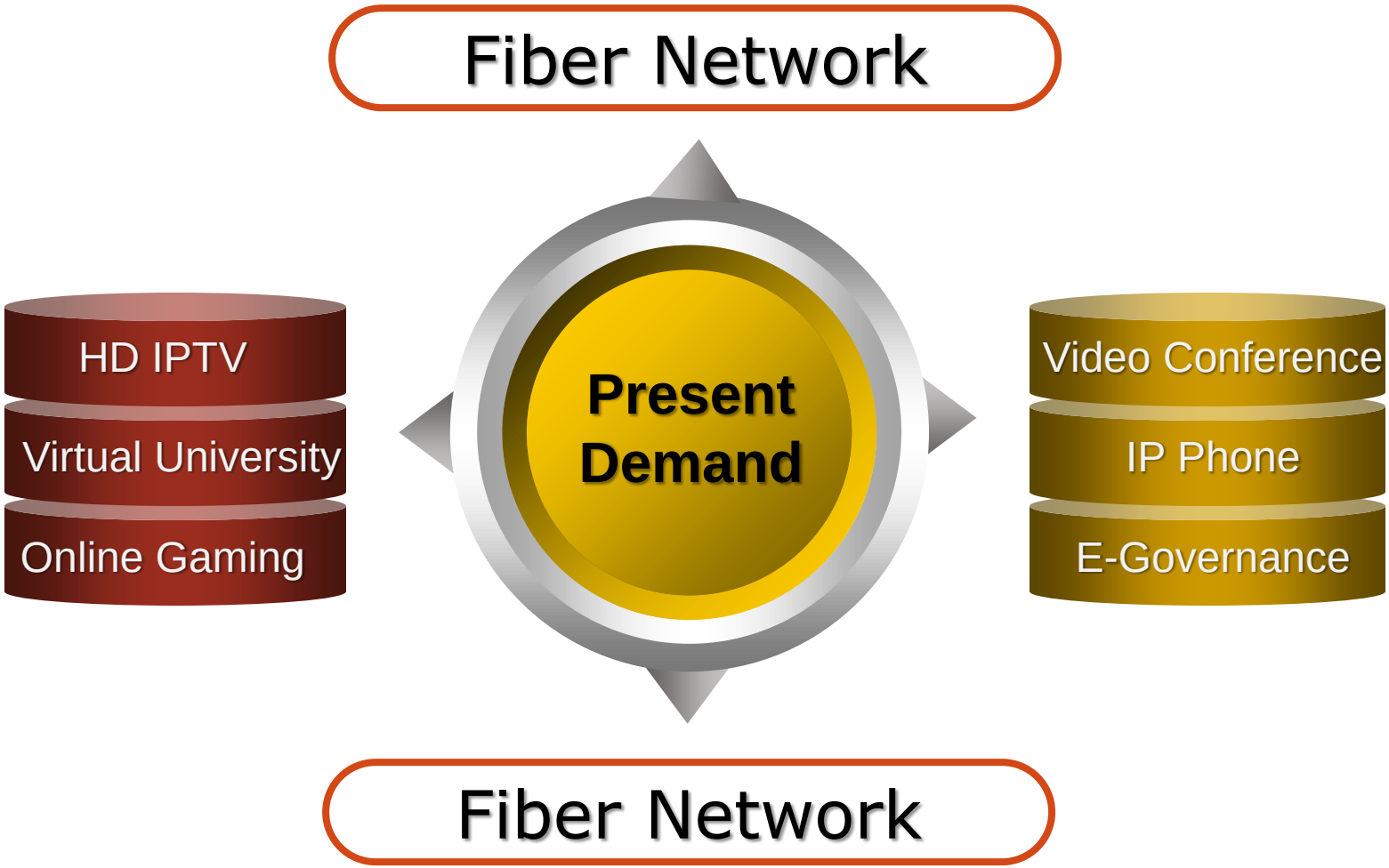
Telecom Environment in Bangladesh

- Teledensity : 47.80 %
- Internet density : 7.10 %
- Network Coverage : 98% (through wireless)
- 26 Type – 832 Operators
- Cell Phone Operator : 6
- BWA (Wimax) : 2
- ISP : 359
- NTTN : 2

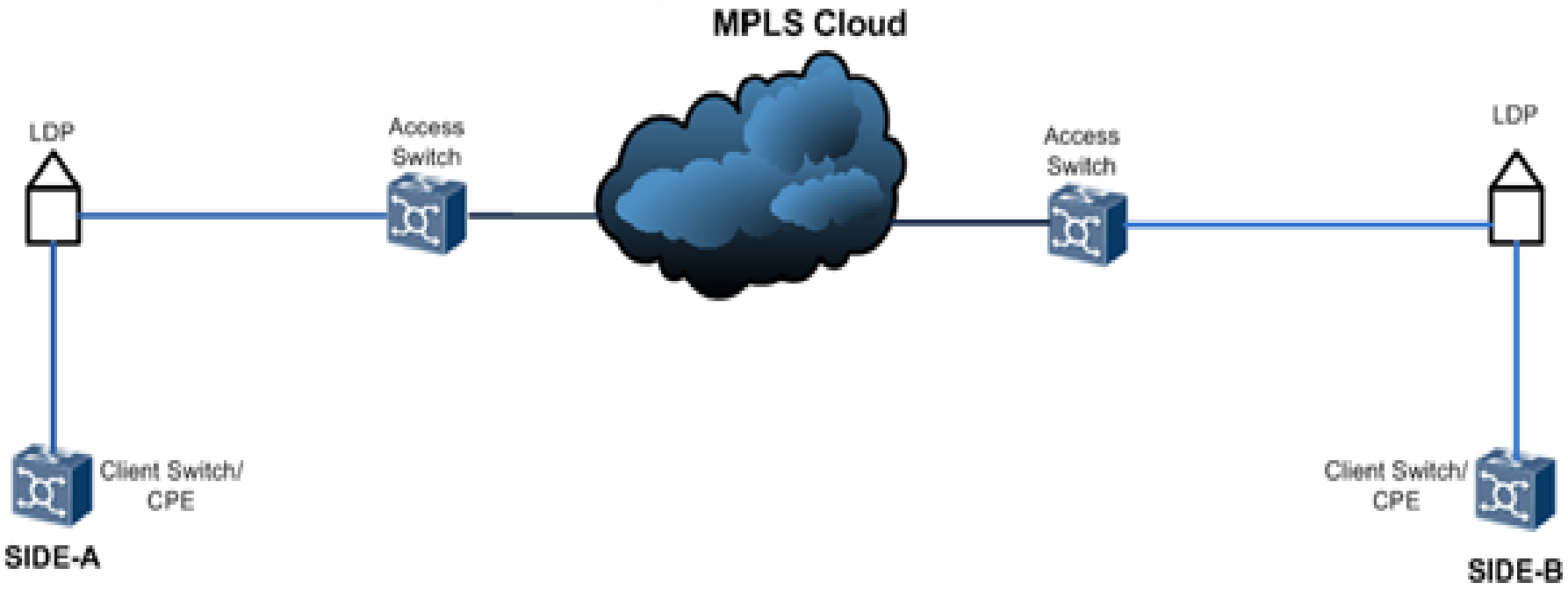
Internet Bandwidth Usage Growth :



Present Need of Bangladesh :



Legacy Ethernet Switch Network:



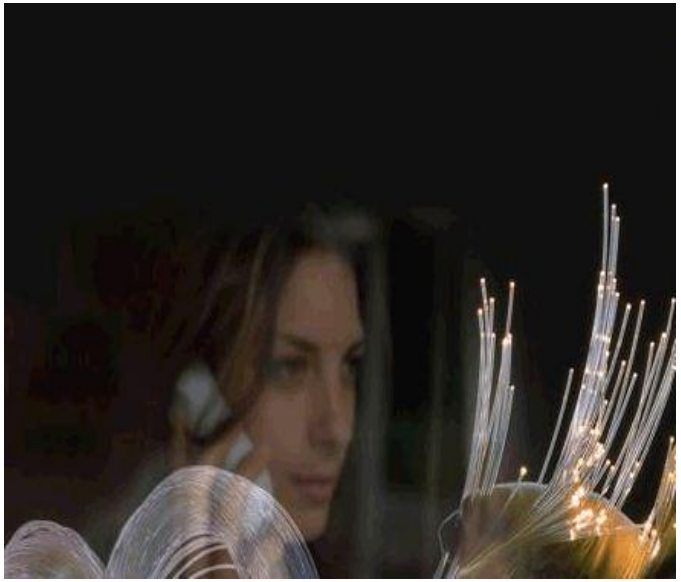
Traditional Ethernet Connectivity

Problems With Switch Network :

- Not Cost Effective
- Underground Fiber Network is Costly
- O&M – Decentralized
- Limited Fiber Network Resources
- Triple Play Service is Not Available
- TDM Backhauling is Expensive

Challenges to Migrate the Present Network :

- 253+ Active ISP
- Multiple ISP in Single Building
- Multiple Type Services of an ISP
- Layer-2 Network (QinQ, Vlan Maping, Staking)
- Migrating to Layer-3 Network



FTTx by GPON Technology

Solution

FTTx

- Fiber to the *x* (FTTx) is a generic term for any broadband network architecture using optical fiber to replace all or part of the usual metal local loop used for last-mile telecommunications.

GPON

- GPON or Gigabit Passive Optical Network is an optical technology based on the industry standard ITU-TG.984x which was ratified in 2003.
- This technology was originally developed to provide high speed Ethernet services for residential and small business customers. It supports higher rates, enhanced security, and choice of Layer 2 protocol (ATM, GEM, Ethernet).

How GPON works

- GPON has a downstream capacity of 2.488 Gb/s and an upstream capacity of 1.244 Gbp/s that is shared among users.
- Encryption is used to keep each user's data secured and private from other users.

Types of FTTx :

- FTTN (fiber to the node or fiber to the neighborhood)
- FTTC (fiber to the curb or fiber to the cabinet)
- FTTP (fiber to the premises)
- FTTB (fiber to the building or fiber to the basement)
- FTTH (fiber to the home). etc

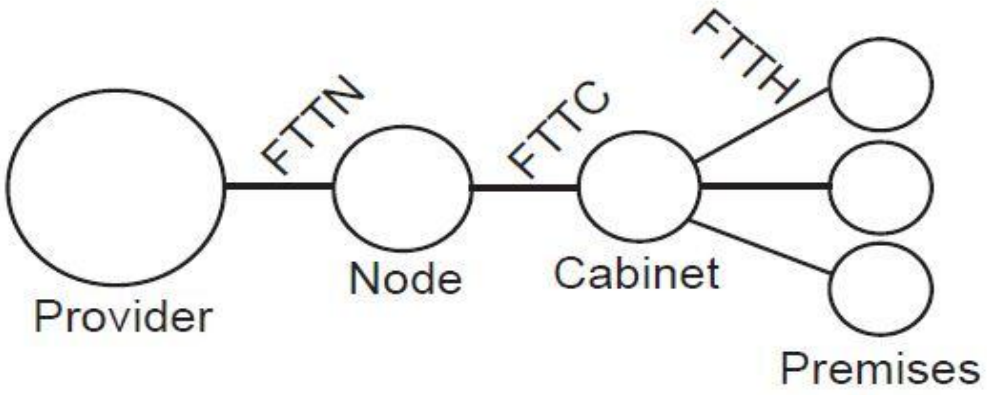


Figure: FTTx

FTTx Network :

OLT (Optical Line Terminal)

(In Central office)

Splitter (1:16 or 1:32)

(In LDP-Local Distribution Point)

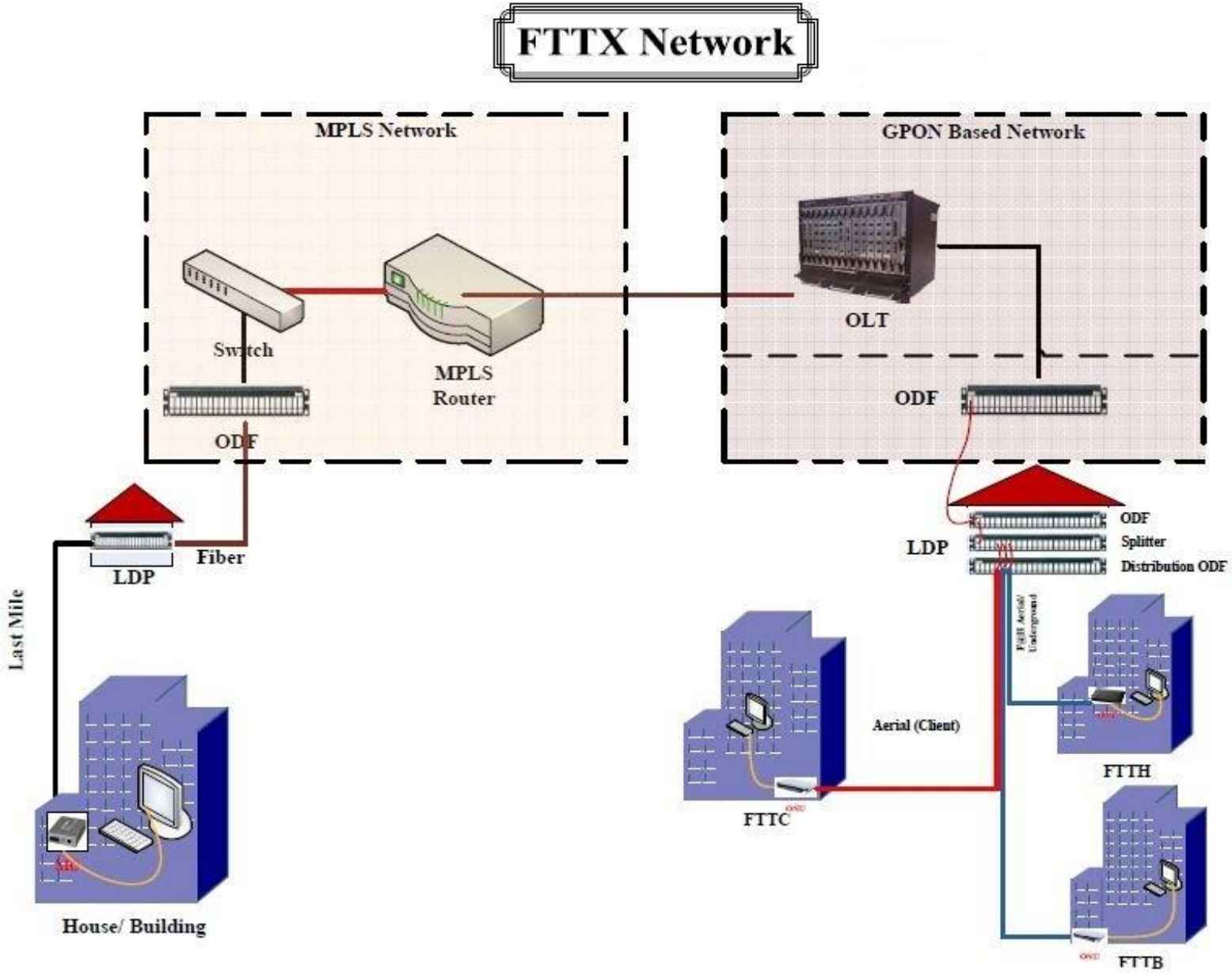
ONU (Optical Network Unit)/ONT (Optical Network Terminal)

(In BDB-Building Distribution Box/Clients Home/ Building basement)

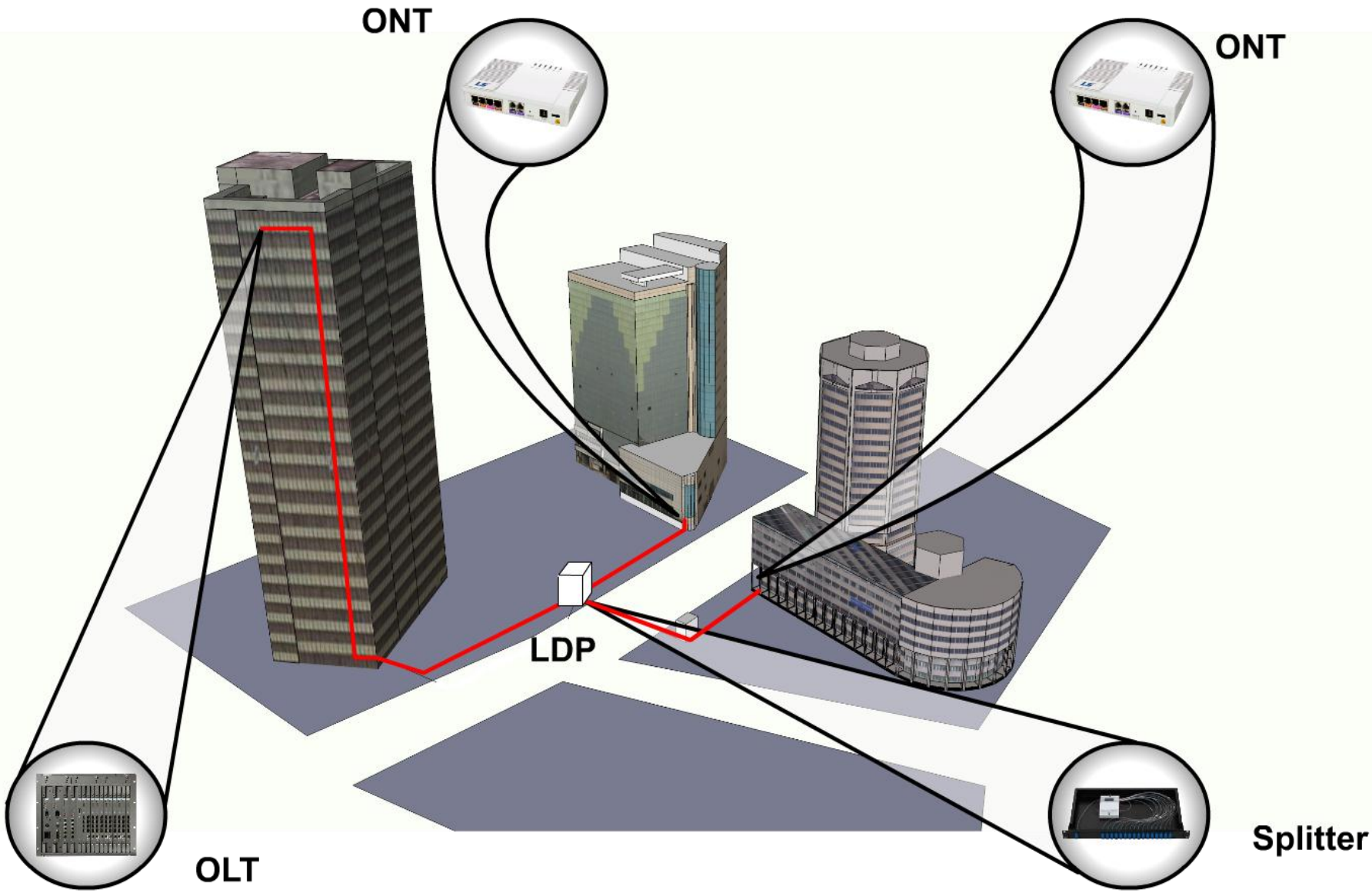
End Device

(Laptop/Desktop/Switch/Router etc.)

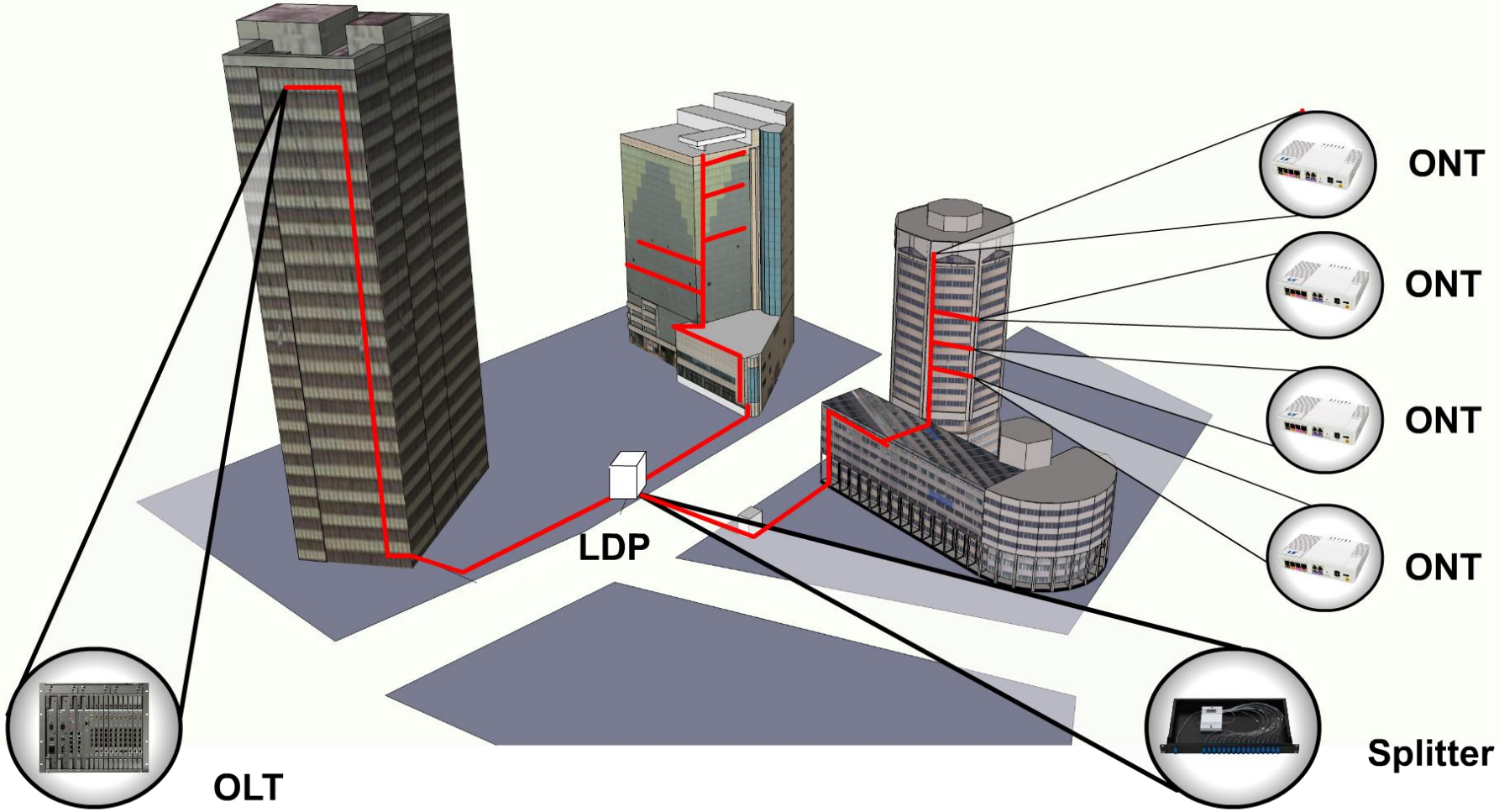
FTTx Network In Bangladesh :



FTTB Format :

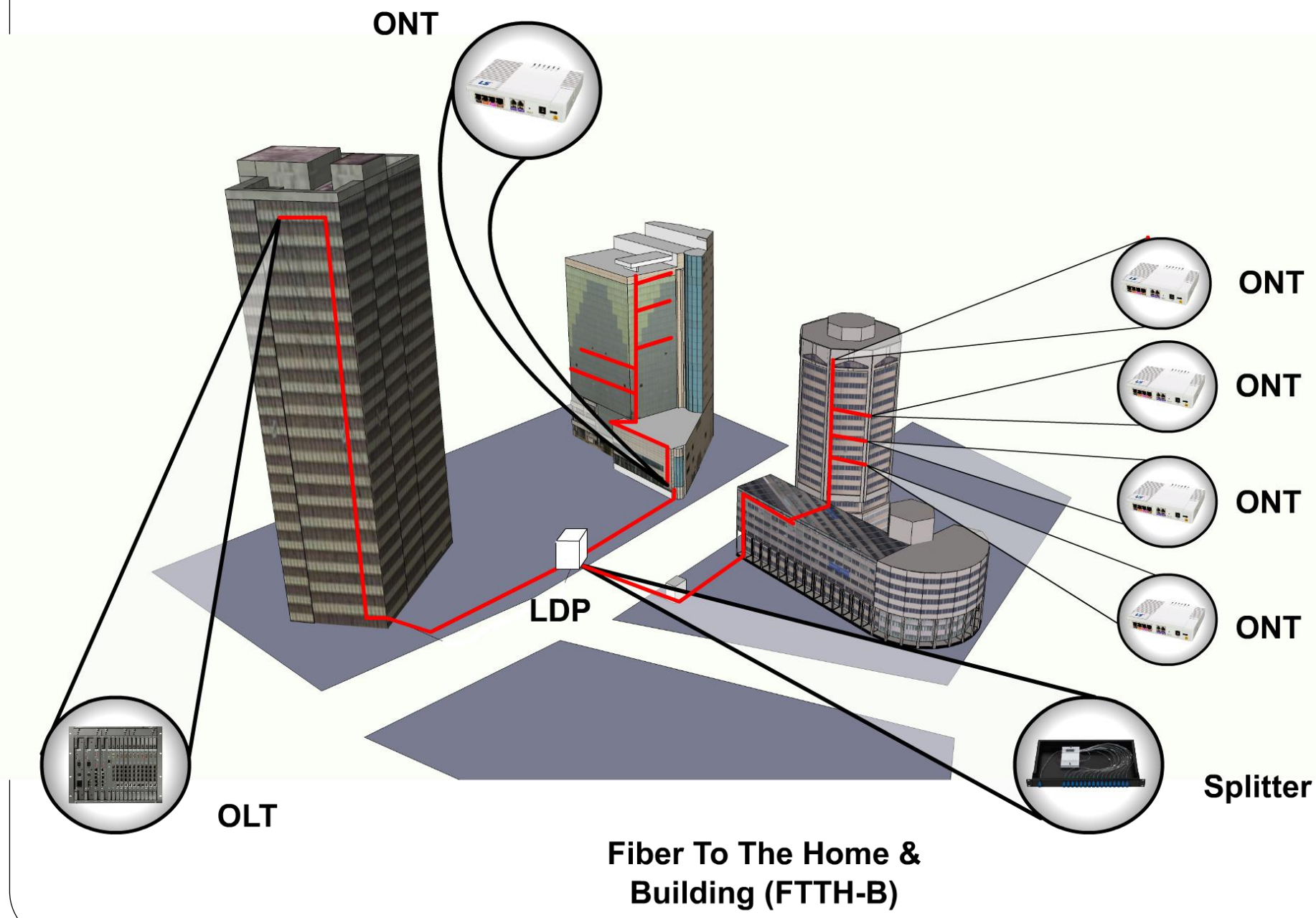


FTTH Model :



Fiber To The Home
(FTTH)

FTTB and FTTH Model : User Choice Network



Fiber To The Home &
Building (FTTH-B)

Pilot Project : FTTx Project in Dhaka City

FTTx Pilot Project in Dhaka City

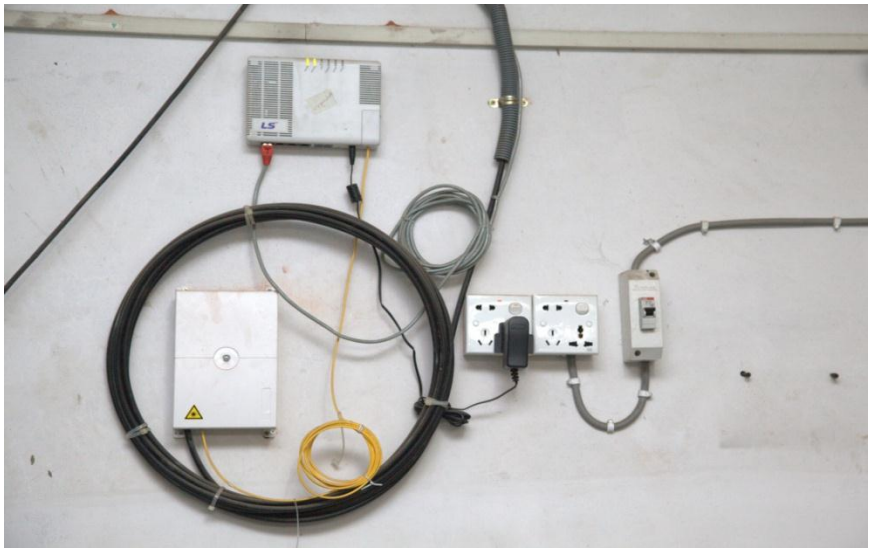
- Ducting & Cabling Area : 23 km
- Total Subscriber Approx : 3000
- **Commenced on April 2009**
- Commissioned : Feb., 2010

FTTx Network – Local Distribution Point

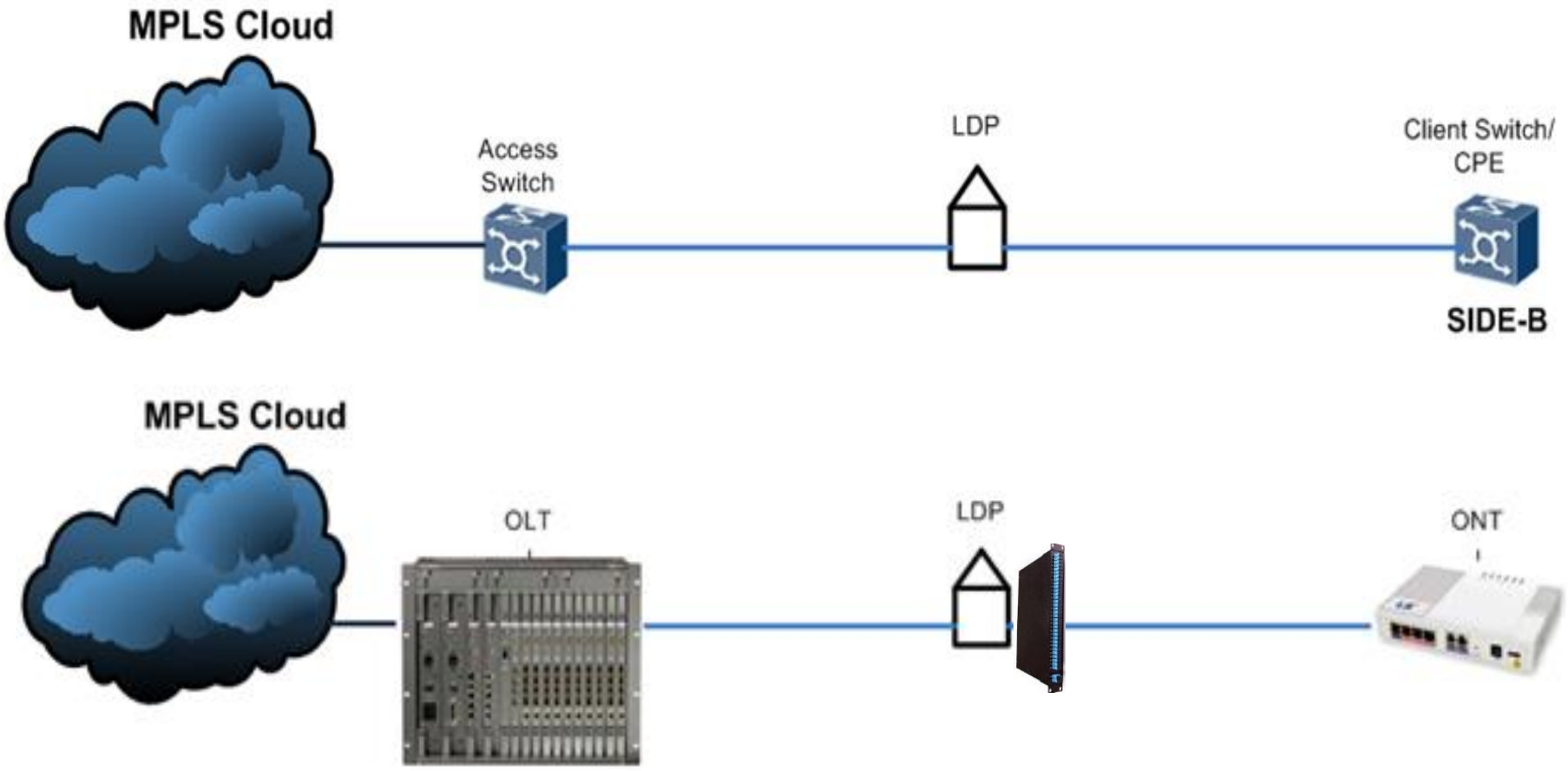
32 LDPs of a Pilot Project in Dhaka City

All LDPs Contain Splitters

ONT replaced of a pilot project of a FTTx Area :

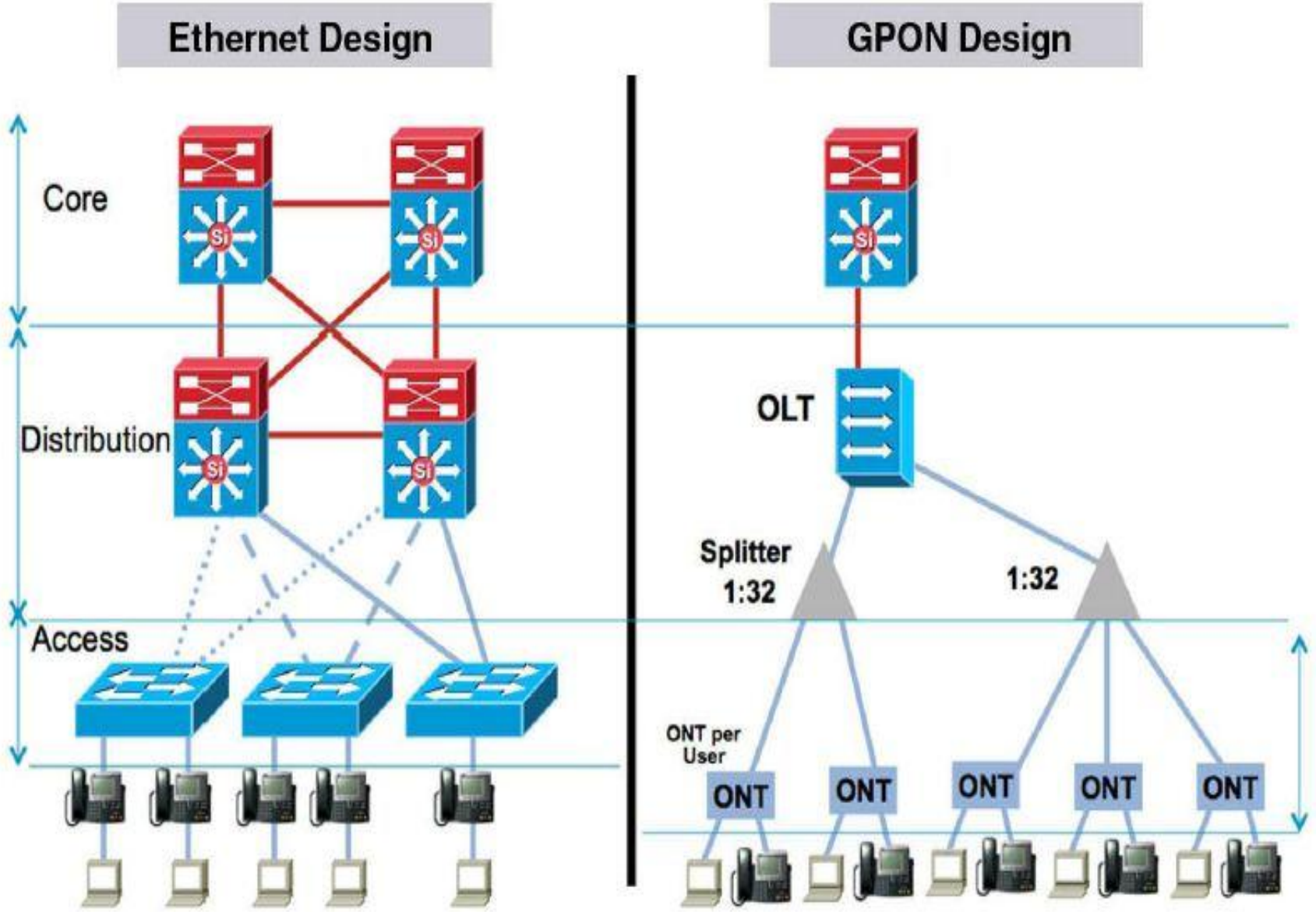


Typical Switch Vs. GPON Network:

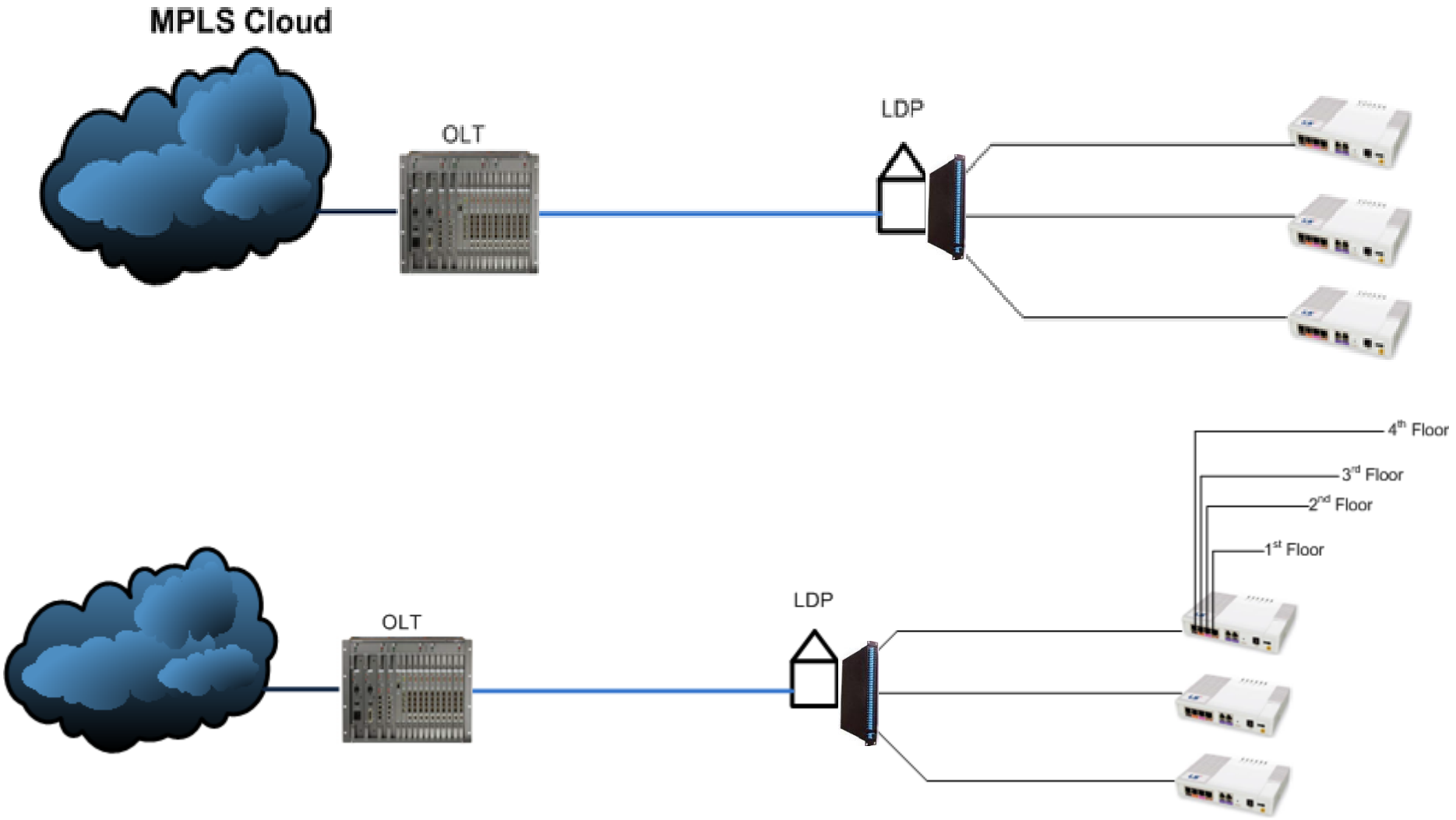


Ethernet Vs FTTx Connectivity

Switch Network Vs. FTTH : Comparison



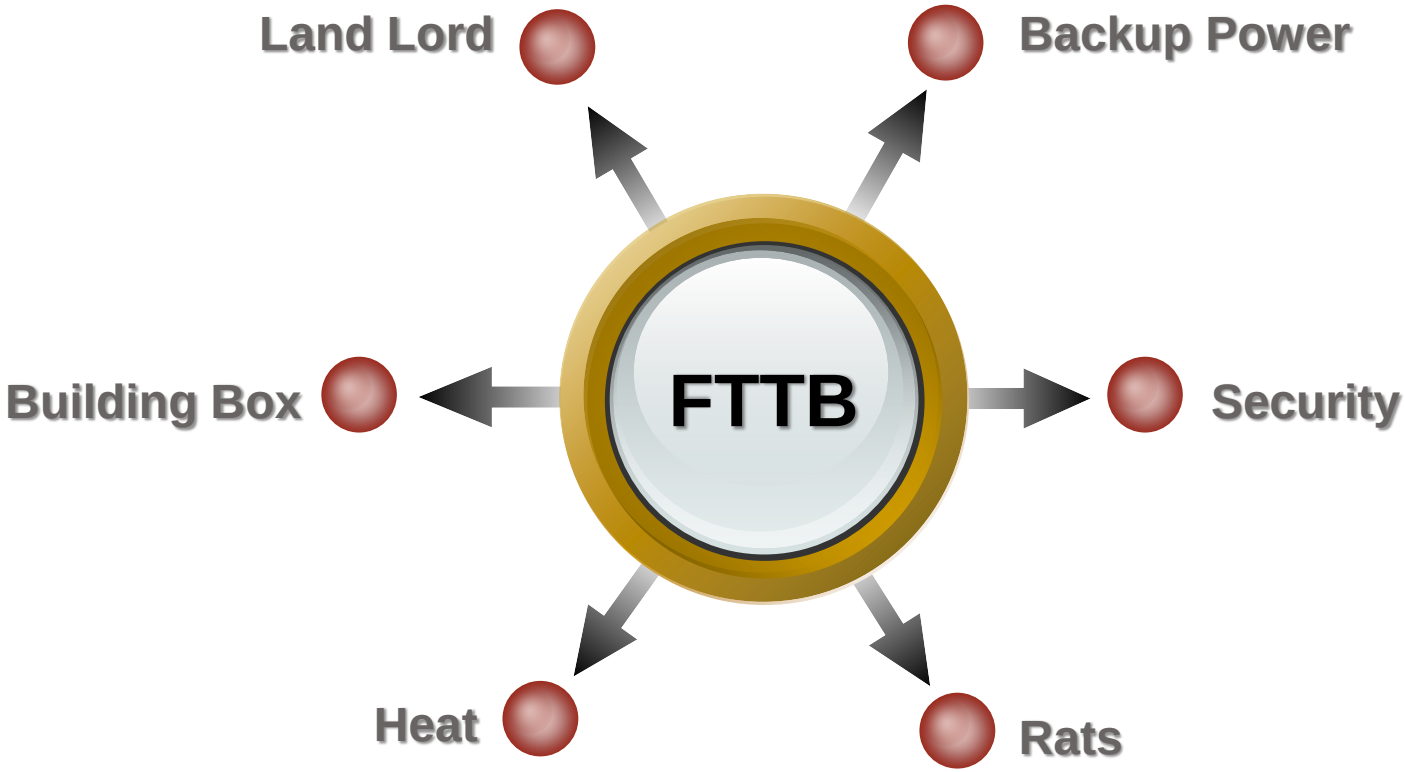
FTTH Vs. FTTB :


MPLS Cloud
OLT
LDP
4th Floor
3rd Floor
2nd Floor
1st Floor
OLT
LDP

Challenges With GPON :

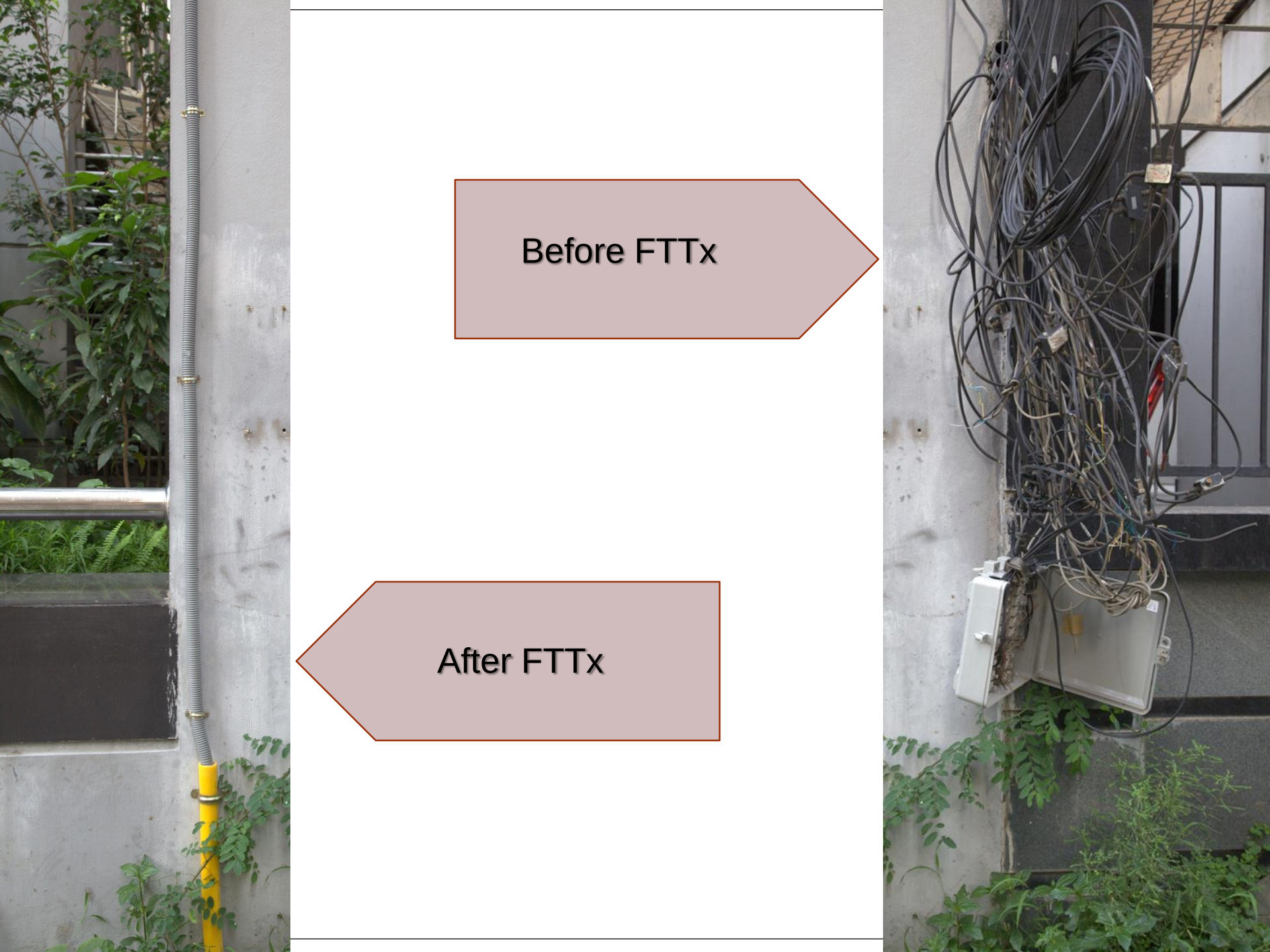
- ONT Price
- Splitter Price
- IOP with Multi Vendor ONTs
- BTS (TDM) Backhauling

Problem with FTTB model :



Prospects of FTTx :

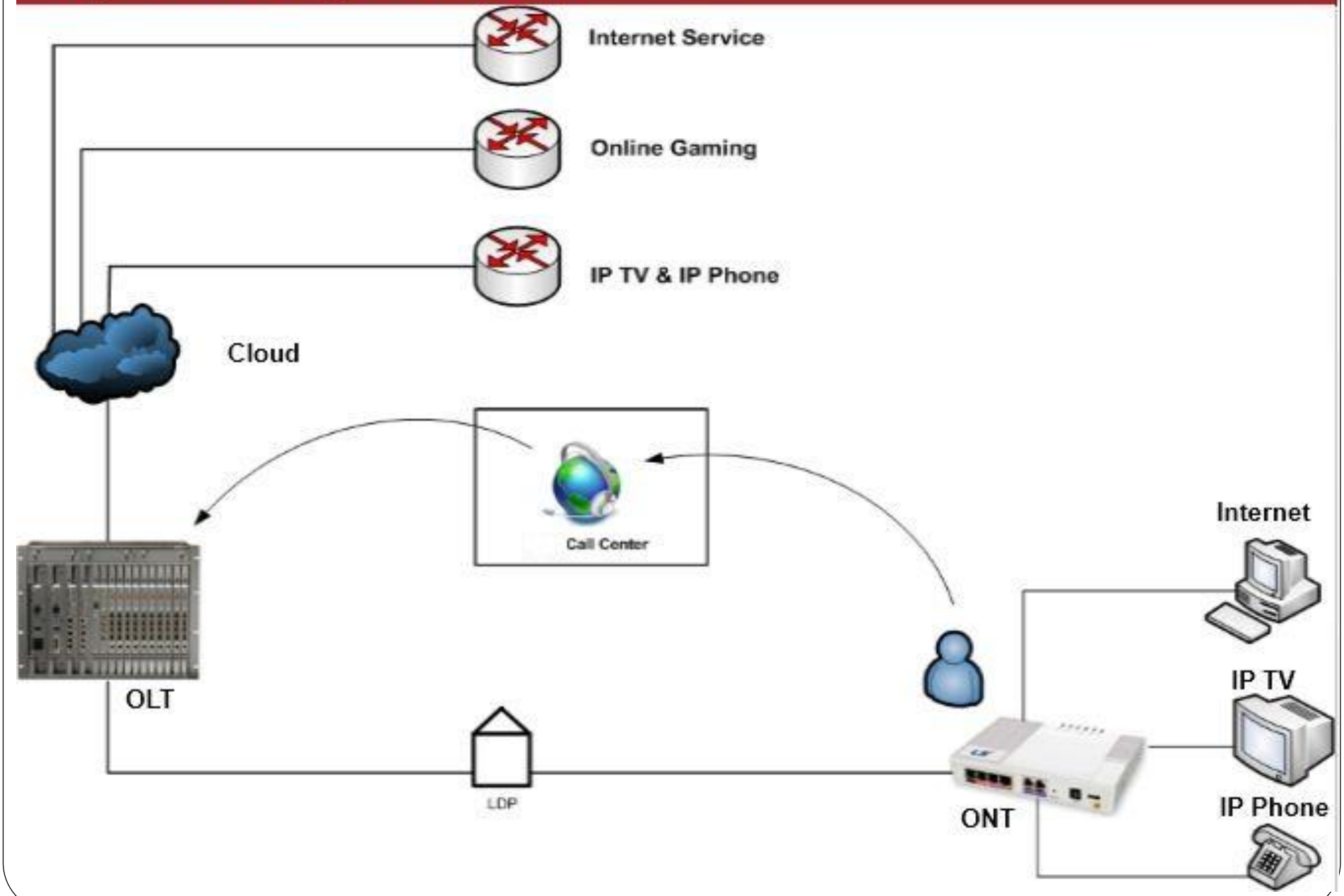
- Low cost
- Faster than others like DSL, Dial Up
- Virtually unlimited bandwidth
- Single fiber to the end user with triple play
- FTTH features local battery backup and low-power consumption.
- Reliable, scalable, and secure
- Easy to troubleshoot
- No active components from the CO to the end user


Before FTTx
After FTTx

Benefits of FTTx Network in Bangladesh :

- User Driven Network – Any Time Any Service
- Single 24/7 Call Center for all ISP
- Easy & Centralized O&M
- Cost Effective – Minimum 40% Less.
- Service Concentric Network

Any Time Any Service :

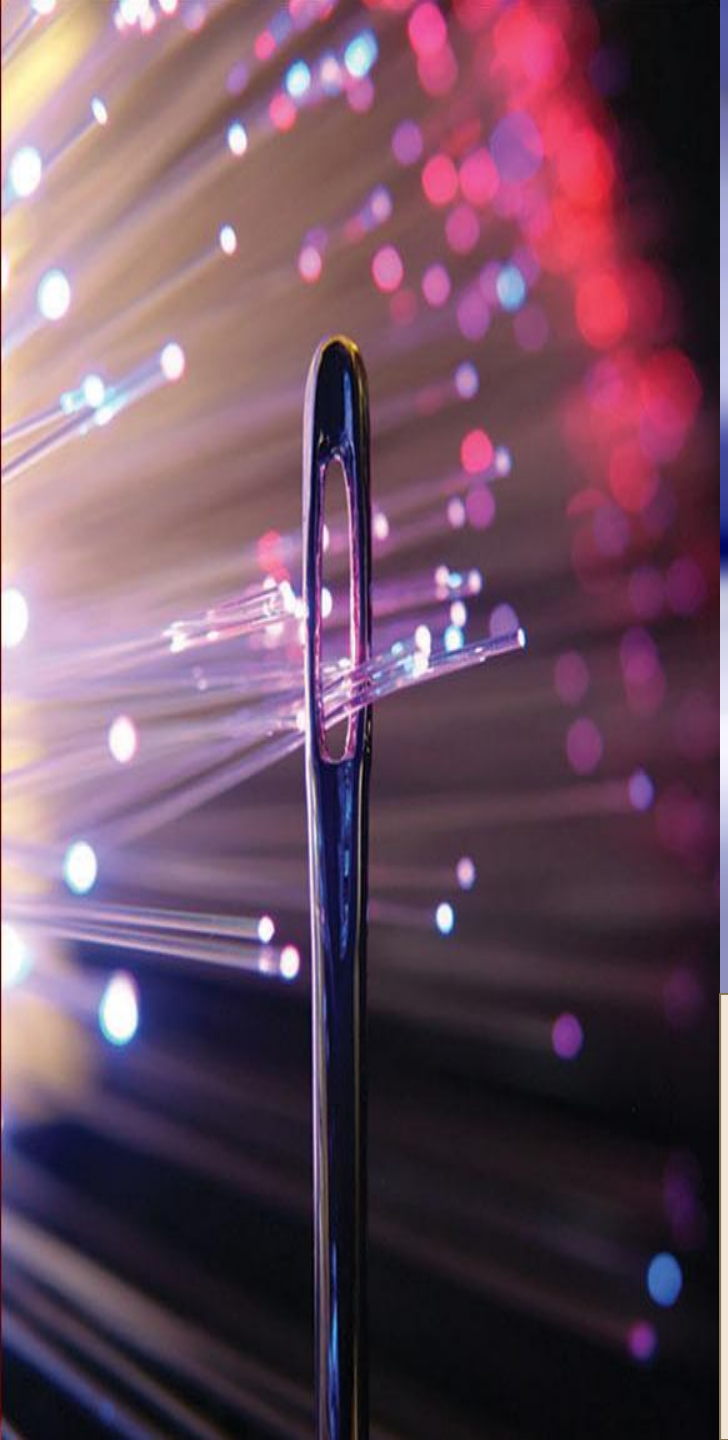


Achievement of Bangladesh with FTTx Network :

- Connected WiMAX Base Stations
- Ready for 3G BTSs
- 190 ISPs Up & Running
- Layer 2 & 3 Capable Network
- Ready for IPTV Services

Future Plan with FTTx Network in Bangladesh :

- Online Gamming
- Video on Demand (VoD)
- Social Networking
- Different type of Value Added Service
- IPTV Services



Thank You

Q & A