FTTx System Overview (MA5800)

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Objectives

- Upon completion of this course, you will be able to:
  - Describe FTTx Network structure
  - Outline FTTx product functions
  - Describe MA5800 Application Solutions

Contents

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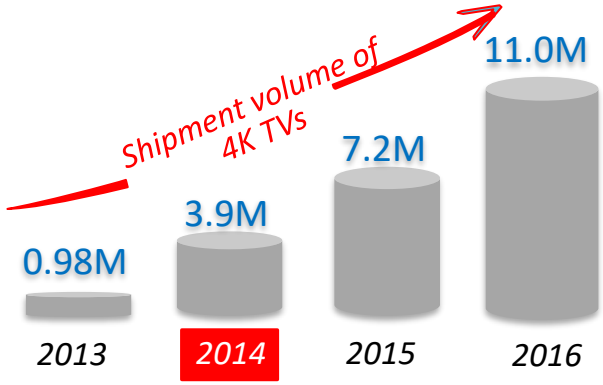
Service Trend 1: 4K TV and Competition Call for 100M–1G Bandwidth

Service need: 4K TV & content are rising，100Mbps becomes basic offer

23 models

of 4K TVs are available on Jingdong online shop



100M

4K TV = 3840 x 2160 (60 FPS) Bandwidth requirement: 40–120M

Brasil 2014

The 2014 FIFA World Cup is broadcasted in 4K.

NETFLIX amazon

Netflix and Amazon claimed that all their original programs produced in 2014 were in 4K.

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Service Trend 2: FMC is Accepted by the Industry

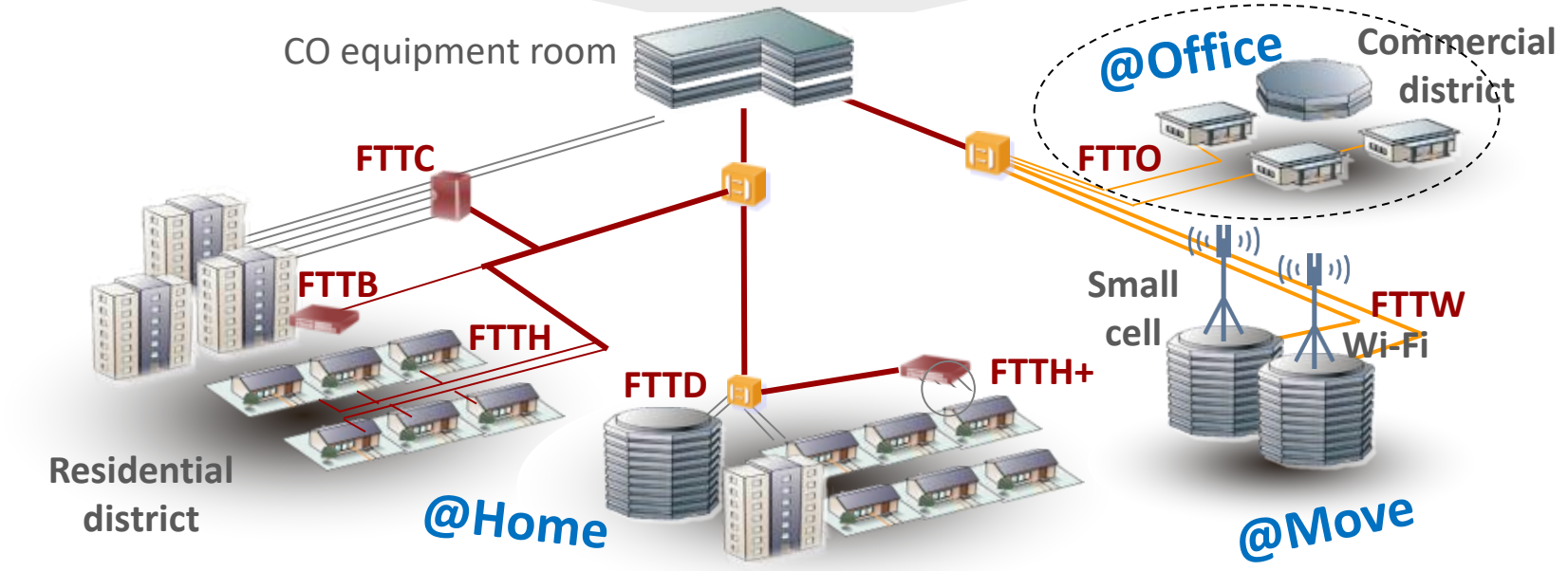
Class 1: fixed and mobile service provider

Invest in both mobile and fixed networks and develop MBB using advantages in the fixed network domain.

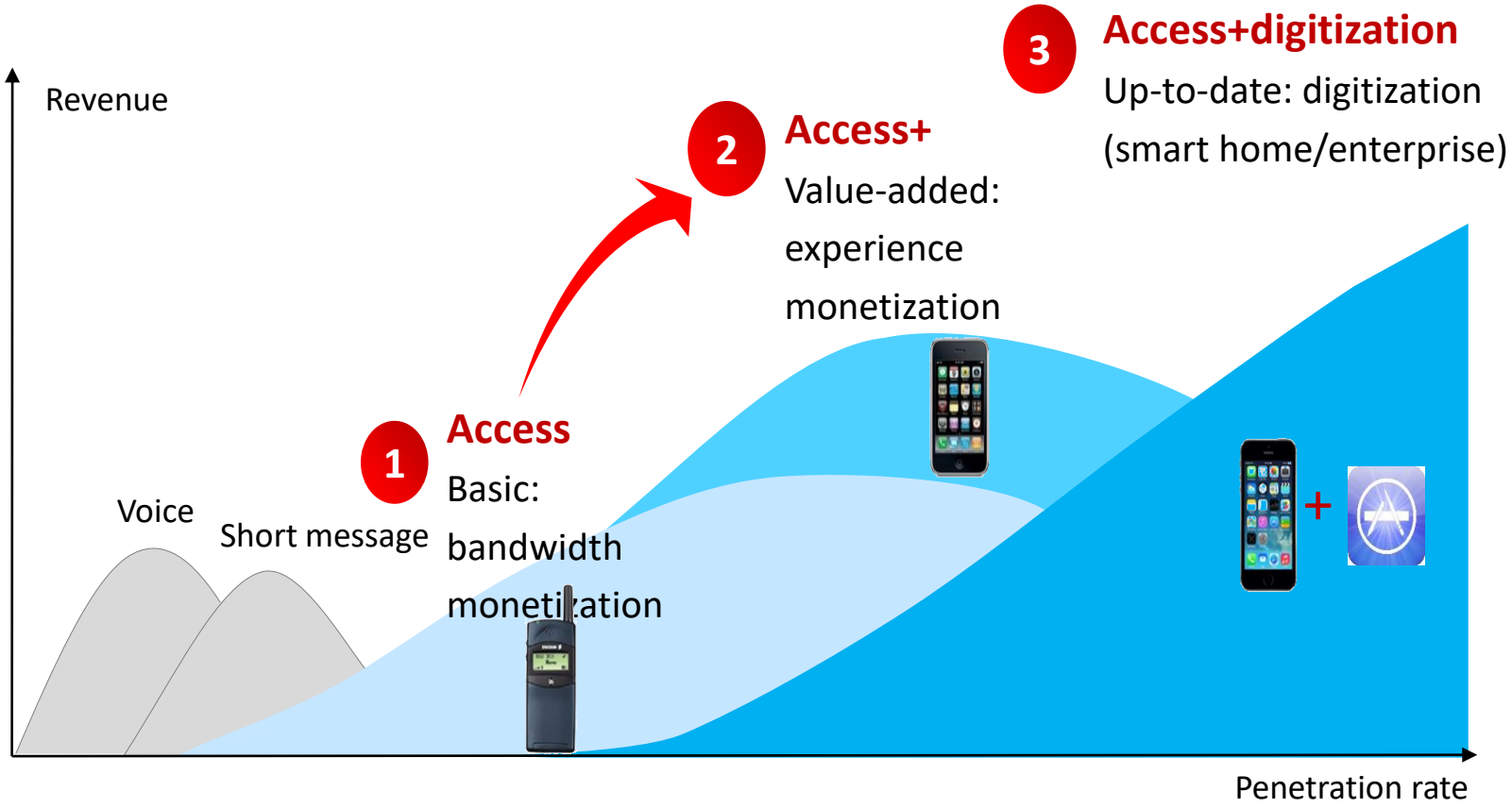
Class 2: mobile service provider

Make up for the weakness in the fixed network domain through purchasing and building (independently and cooperatively) fixed networks.

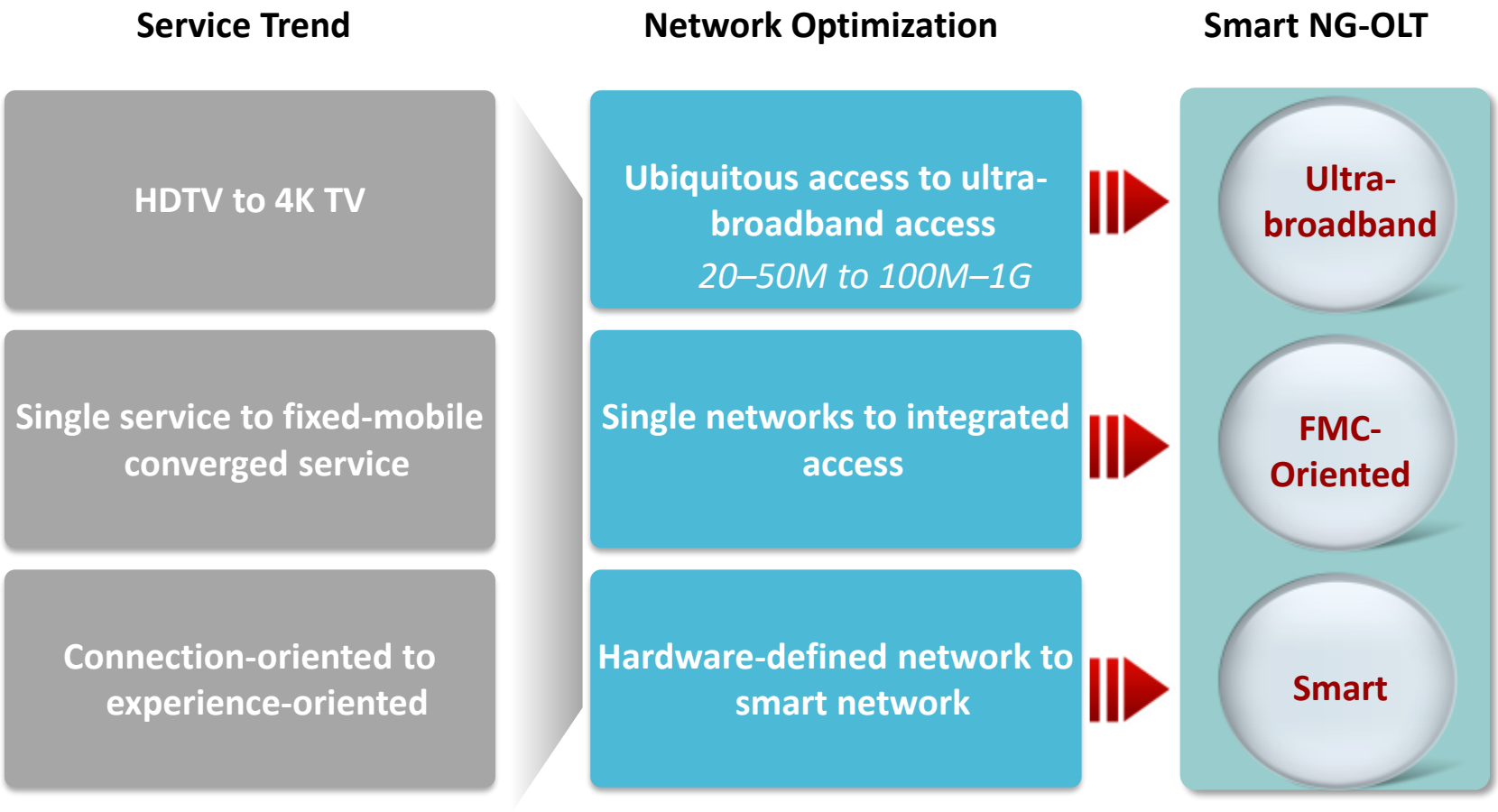
An integrated full-service network is required for full-service operation



Service Trend 3: Highlighting User Experience



Smart NG-OLT Helps Building Broader, Faster, Smarter Access



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Building Broader, Faster and Smarter Access with Smart NG-OLT MA5800

Smart NG-OLT MA5800

Ultra-broadband

- 32K users with 100Mbps non-blocking to enjoy 4K TV
- Large capacity XG-PON, TWDM PON, WDM PON

FMC-Oriented

- Full-service PON/P2P access, home, office, mobile haul
- Integrate OLT and aggregation switch into one platform

Smart Capability

- Programmable and virtualization, deliver new services quickly
- SDN-based smart services, simplify O&M, reduce OPEX

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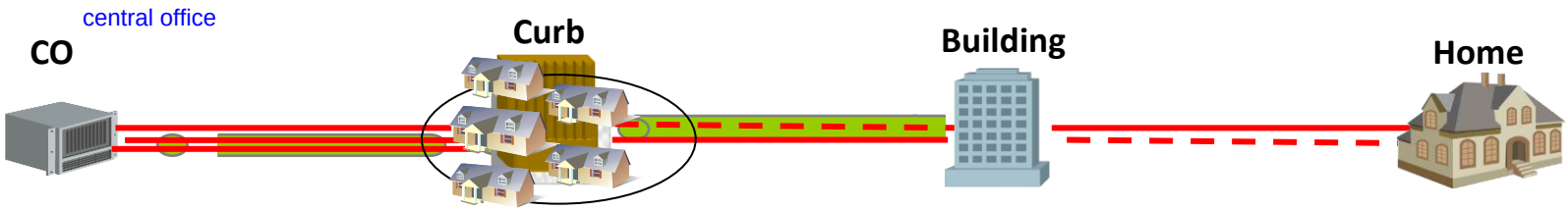
FTTx Solution - Products



- Large OLT
- Medium OLT

- Medium xPON uplink MSAN
- Medium xPON uplink DSLAM
- Outdoor cabinet

- xDSL+POTS MDU
- LAN+POTS MDU

- Bridging ONTs
- Bridging + Voice ONTs
- Gateway ONTs

OLT | **MxU** | **ONT**

- **Integrated management**
  - All the GPON series products can be management by **iManager U2000** unified NMS

Questions

- Which scenarios can MA5800 network support?

ultra broadband
fmc oriented
smart capability

fttx

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FTTx Solution - Involved Equipment

- FTTx Solution consists of OLT, MDU and ONT products.

Type		Device	Scenario
OLT		MA5800-X17/MA5800-X7	All Scenario
MxU		MA5620/MA5626, MA5622A/MA5623, MA5623A, MA5612A, MA5616, MA5652	FTTB/FTTC
		MA5612, MA5628	FTTO
		MA5698	FTTM
ONT	Bridge ONT	HG8010	FTTH
	Bridge+Voice ONT	HG8110, HG8240, HG8242, HG8240B	
	Gateway ONT	HG8240R, HG8245, HG8247, HG8447, HG8245T, HG8247T	

MA5800-X17/MA5800-X7

- The MA5800 multi-service access module is the industry's first smart OLT that employs a distributed architecture, and is the industry’s most advanced OLT for next-generation passive optical network (NG-PON), meeting the demand for an intelligent access network with faster broadband, wider coverage, and smarter connection to deliver better service experience to users.

MA5800 Product Family: For 1G access and Future Proof

MA5800-X17

- 11U height , 21 inch width, 300mm slim design
- 2*control slots, 17*service slots , 2*DC input

MA5800-X7

- 6U height , 19 inch width, 300mm design
- 2*control slots, 7*service slots , 2*DC input

MA5800-X2

TBD.

- 2U height , 19 inch width, 300mm design
- 2*control slots, 2*service slots , 2*DC/1*AC input

High Bandwidth

- Uplink: GE/10GE/40GE(2016)/100GE(2017)
- Line Card： PON, 10G PON, 40G PON, WDM-PON, P2P

High Capacity

- 17K FTTH users

High Reliability

- Redundancy for every component

Smart

- Centralized management of massive ONUs

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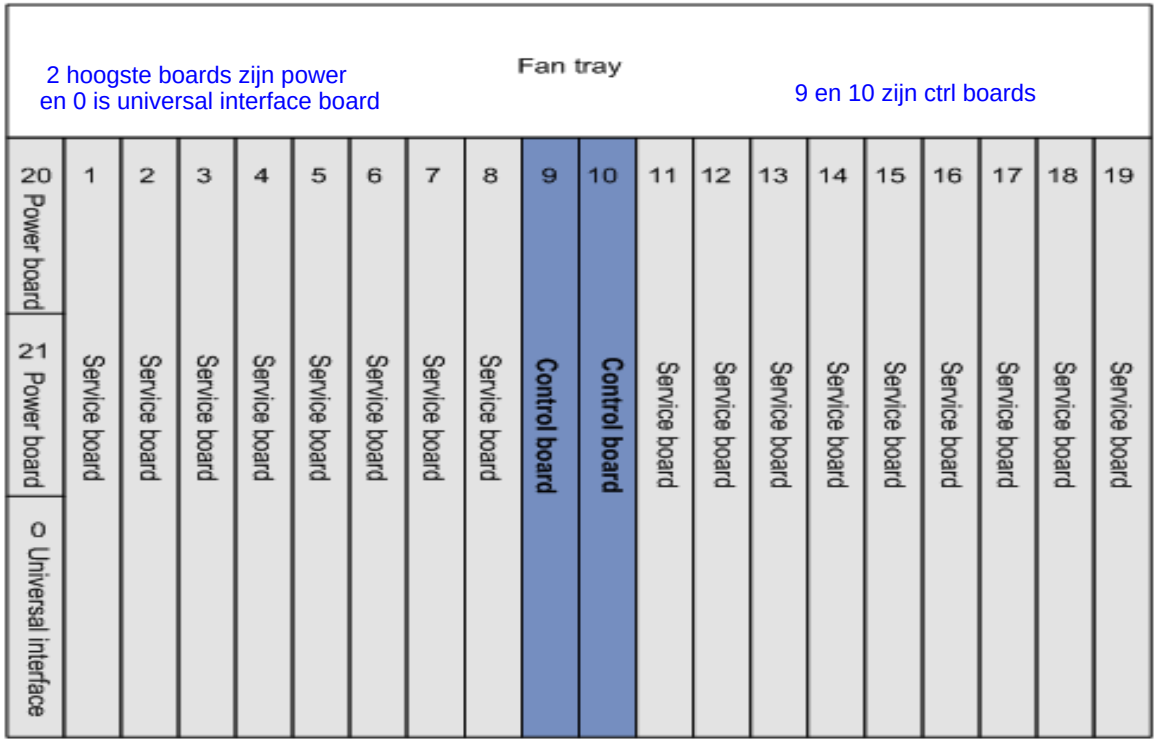
MA5800-X17 Service Subrack

- It provides the intelligent access network with faster broadband, wider coverage, and smarter connection to deliver better service experience to users.
  - Mounting brackets for installation
  - A fan tray on top
  - **22 slots** in total

MA5800-X17 Service Subrack

- An MA5800-X17 service subrack provides 22 slots, including 2 slots for control boards, 2 slots for power boards, 1 slot for the general purpose input/output (GPIO) board, and 17 slots for service boards.



MA5800-X7 Service Subrack

- It provides the intelligent access network with faster broadband, wider coverage, and smarter connection to deliver better service experience to users.
  - Mounting brackets for installation
  - A fan tray on top
  - **12 slots** in total

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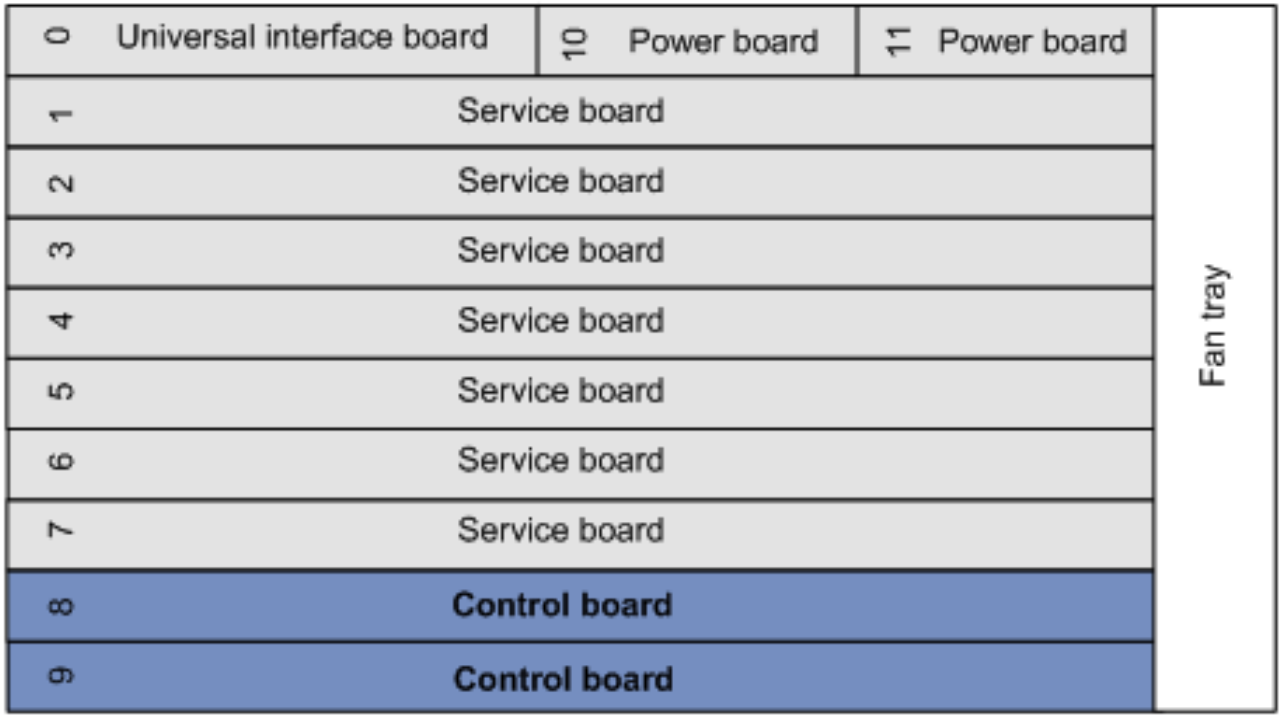
MA5800-X7 Service Subrack

- An MA5800-X17 service subrack provides 22 slots, including 2 slots for control boards, 2 slots for power boards, 1 slot for the general purpose input/output (GPIO) board, and 17 slots for service boards.

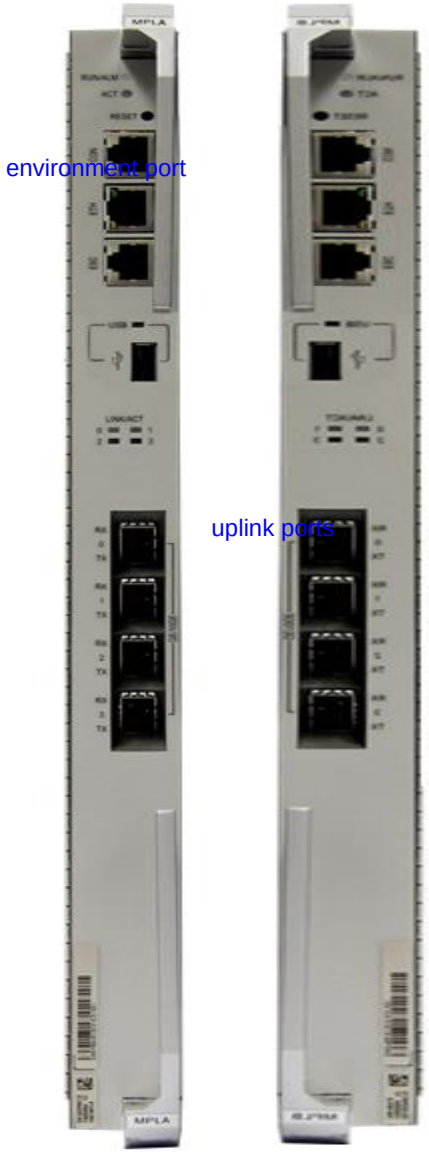


MA5800-X17/MA5800-X7 Board List

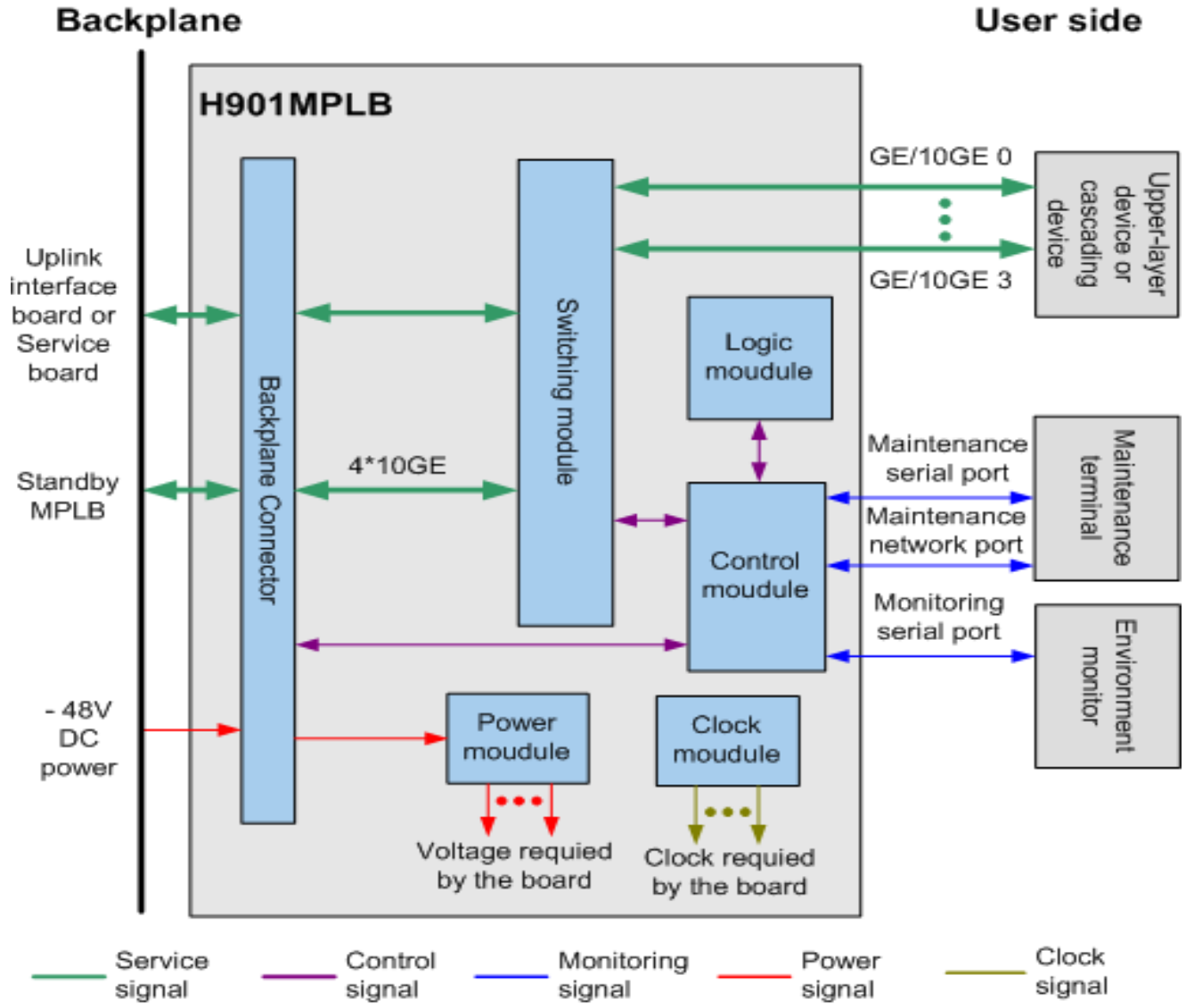
Board Type		Board Name
Control Board (SCU)		MPLB
Upstream Interface Board (GIU)	GE/10GE Ports	NXED
Universal Interface Board (GPIO)		CIUA
Power Board		PILA
Service Board	GPON	GPHF, GPSF
	10G GPON	XGHD
	TDM	EDSH
	P2P	OGHK
	Ethernet	OXHD

Control Board – Interface

Port	Function	Connection
CON (RS-232 serial port)	Supports local and remote maintenance	Use the local maintenance serial port cable to connect to the serial port of the maintenance terminal.
ETH (10/100M Base-T maintenance network port)	Supports local and remote maintenance	Use the network cable to connect to the Ethernet port of the maintenance terminal.
ESC (RS-485 monitoring serial port)	Provides the environment monitoring channel.	Use the environment monitoring cable to connect to the serial port of the monitored device.
GE/10GE optical ports	Connect to subscriber terminals or work as upstream ports.	Use the optical fiber to connect to the peer device.
USB	Reserved	Connected to the USB 2.0 storage device.



Control Board – Working Principle



Control Board – LED

RUN ALM: running status LED	
Green: on for 1s and off for 1s repeatedly	The board works in the normal state.
Red: on for 0.25s and off for 0.25s repeatedly	The board is starting up.
Orange: blinks	A high-temperature alarm is generated.
Red: on	The board is faulty.
ACT: active LED	
Green: on/off /	The board is active/standby.
LINK: link/data status LED	
Green: on	A connection is set up on the port.
Green: blinks	Data is being transmitted.
Yellow: off	No connection is set up on the port.
USB: USB port status LED	
Green: steady on	The USB device is recognized normally.
Green: blinks	The USB device exchanges data with the control board.

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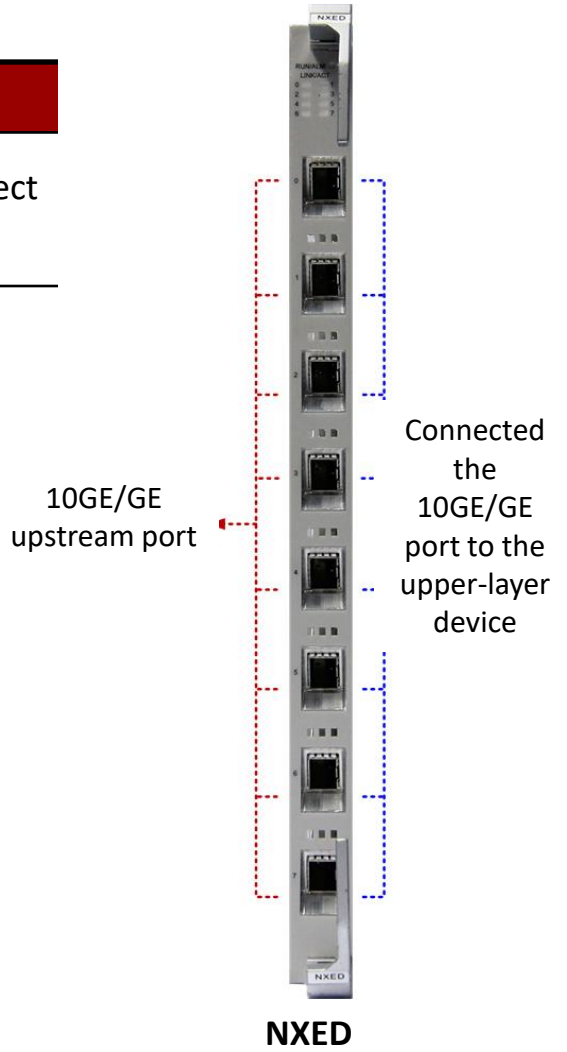
Control Board – Daughter Board

Daughter Board	Corresponding MPL Board	Function
H901CKUA	H901MPLB	• Implements clock processing and provides the stratum-3 clock for the system.

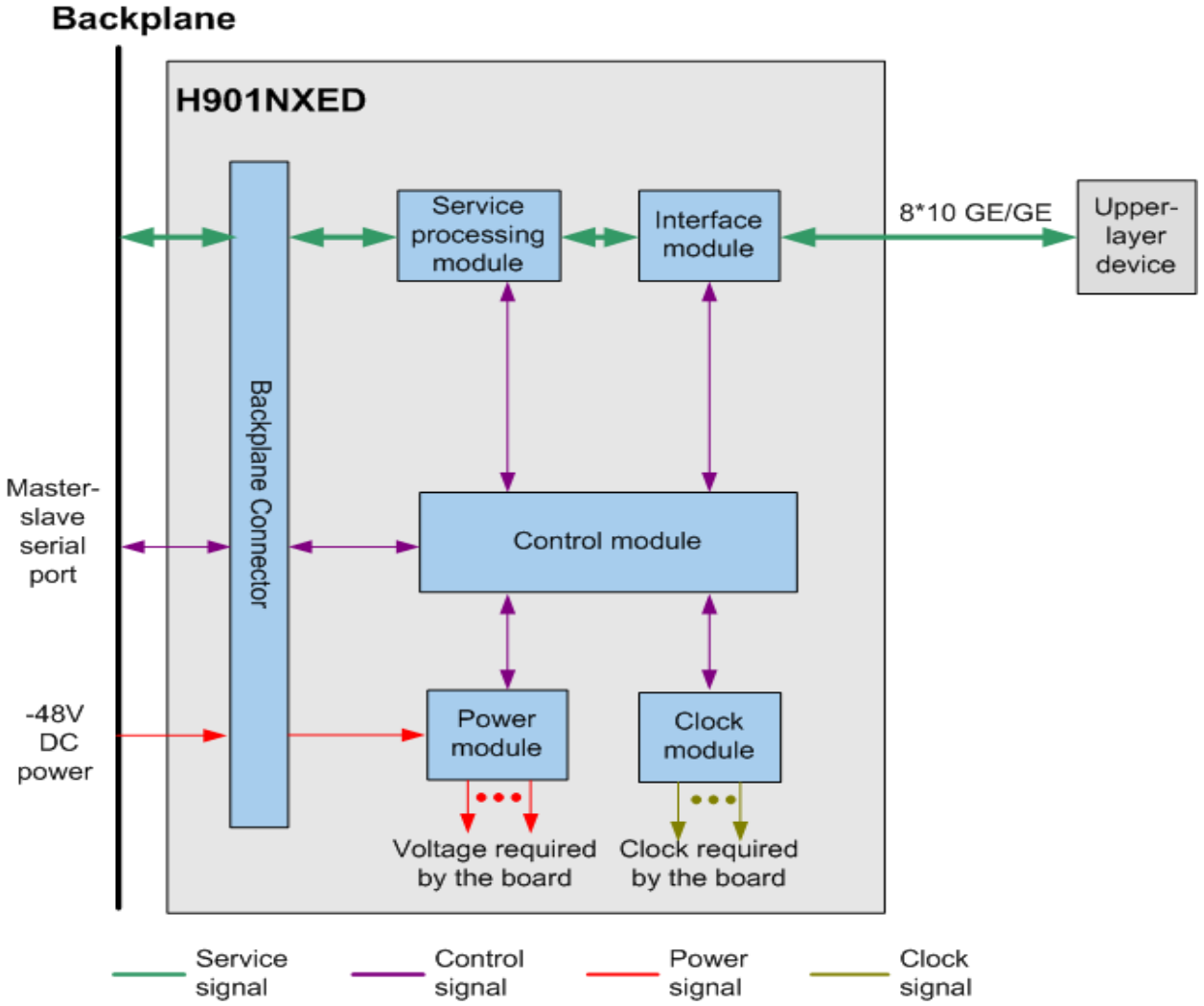
Upstream Board – Interface

Port	Function	Connection
GE/10GE optical ports	Connect to subscriber terminals or work as upstream ports.	Use the optical fiber to connect to the peer device.

- The H901NXED board supports the following features and specifications:
  - 8 ETH SFP ports that support 10GE/GE optical modules
  - Line clock used as the system clock
  - A maximum of 80 Gbit/s non-convergence upstream bandwidth
  - Ethernet clock synchronization
  - High-temperature protection
  - Board power-off for energy conservation



Upstream Board – Working Principle

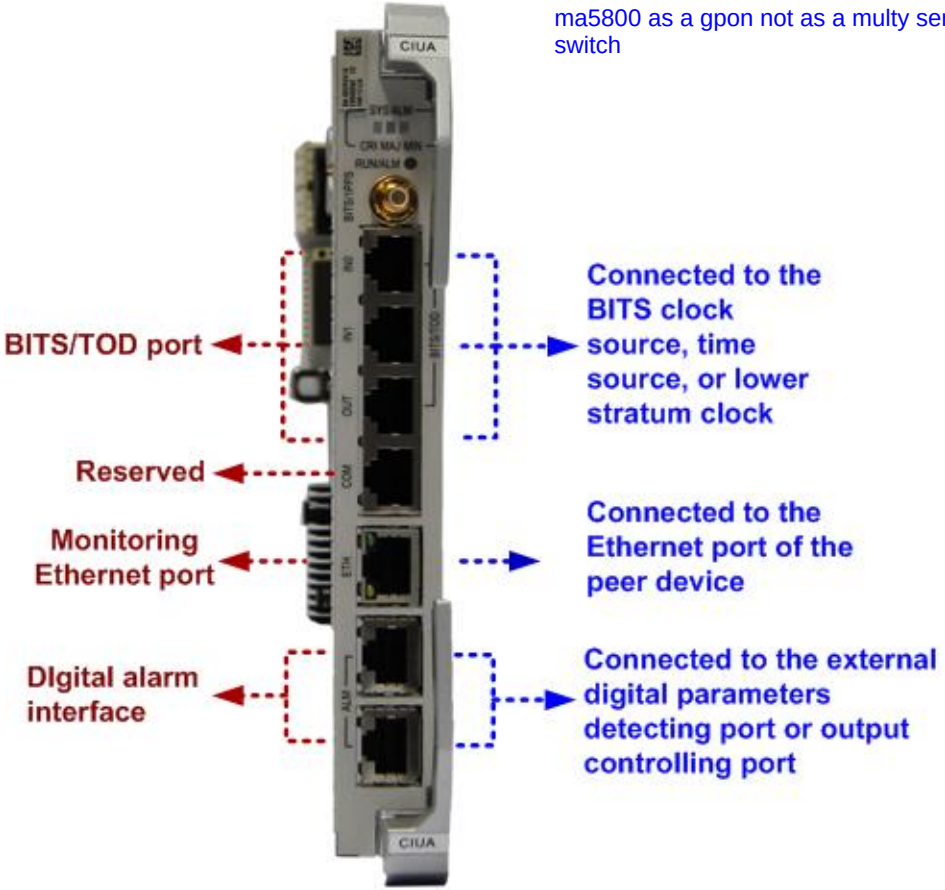


Universal Interface Board – Interface

we dont use this because

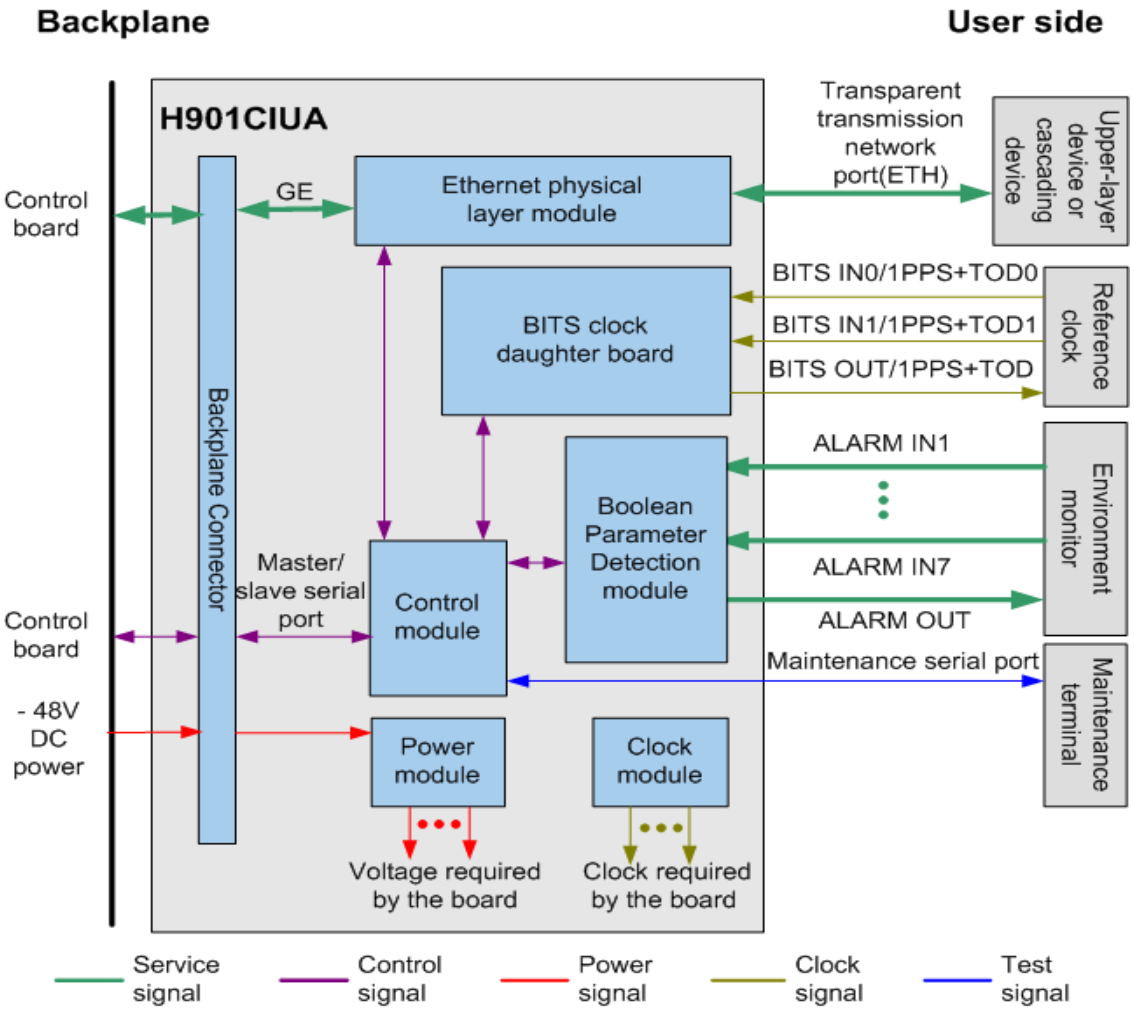
ma5800 as a gpon not as a multy service switch

- The H901CIUA board supports the following functions:
  - Seven inputs of alarm digital parameters and one output of digital controlling parameters
  - Two inputs of 2 Mbit/s or 2 MHz BITS clock signals
  - Two inputs of 1 PPS+TOD time signals
  - One output of 2 Mbit/s or 2 MHz clock signals
  - One output of 1PPS time signals
  - External monitoring Ethernet port to transparently transmit monitored data
  - RS485 port to transparently transmit data
  - Multiple working modes, such as tracing, holdover, and free-run



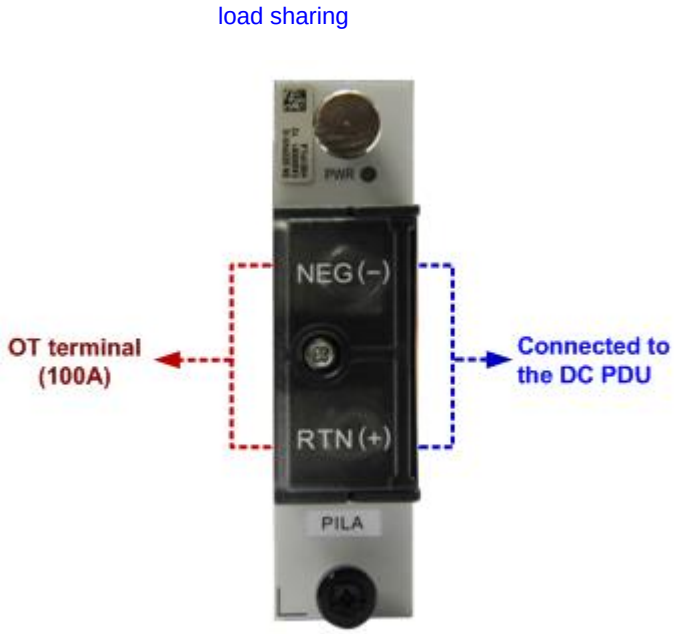
CIUA

Universal Interface Board – Working Principle



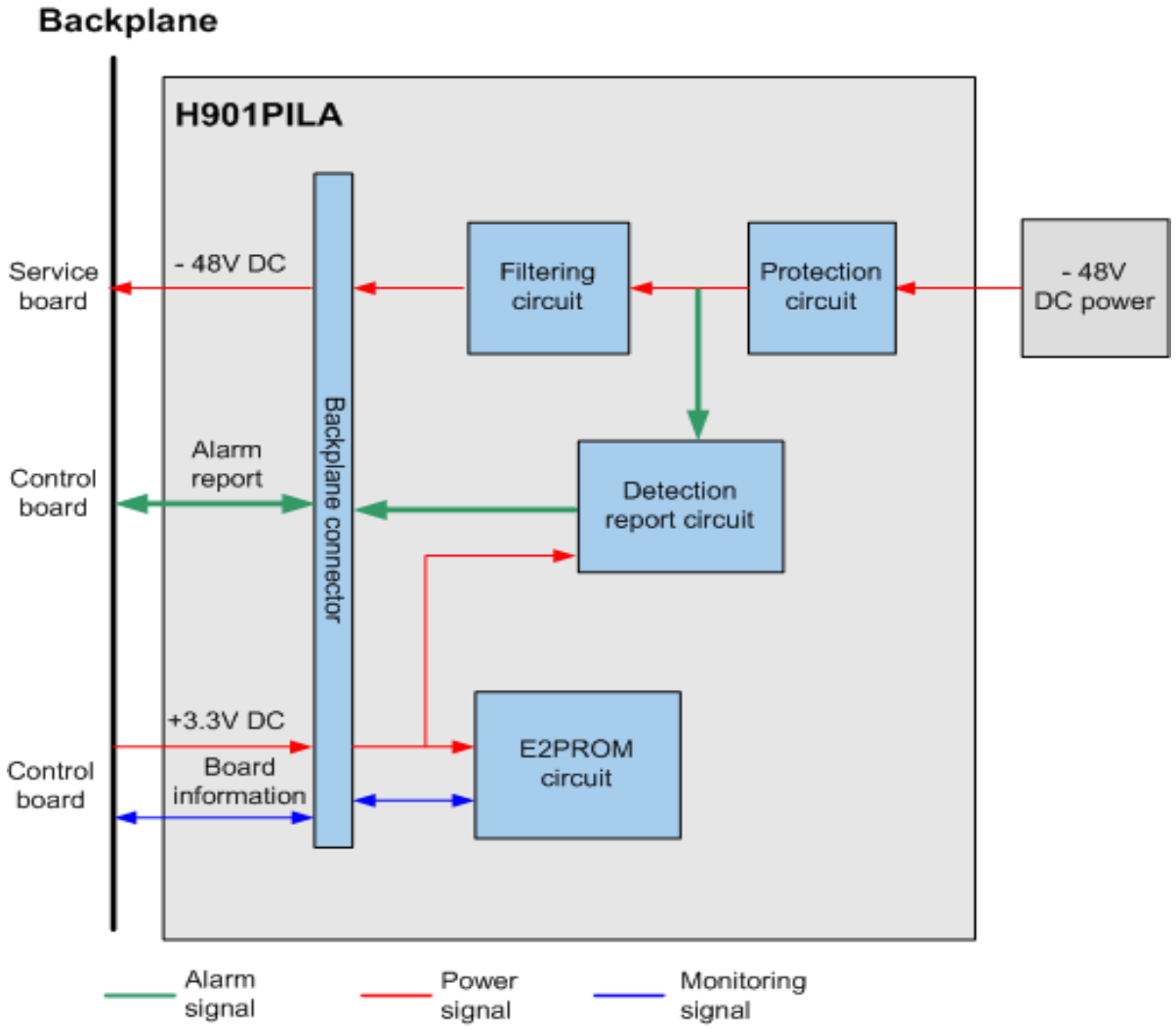
Power Board – Interface

- The H901PILA board supports the following features and specifications:
  - One -48 V DC power input
  - Filtering and current-limiting for the power input port
  - Power input detection and protection fuse fault detection
  - Reporting of the protection alarm and board online signal



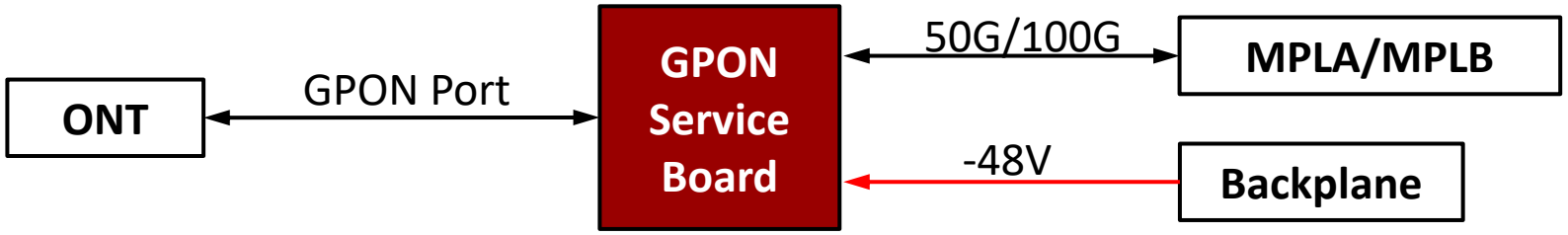
PILA

Power Board – Working Principle

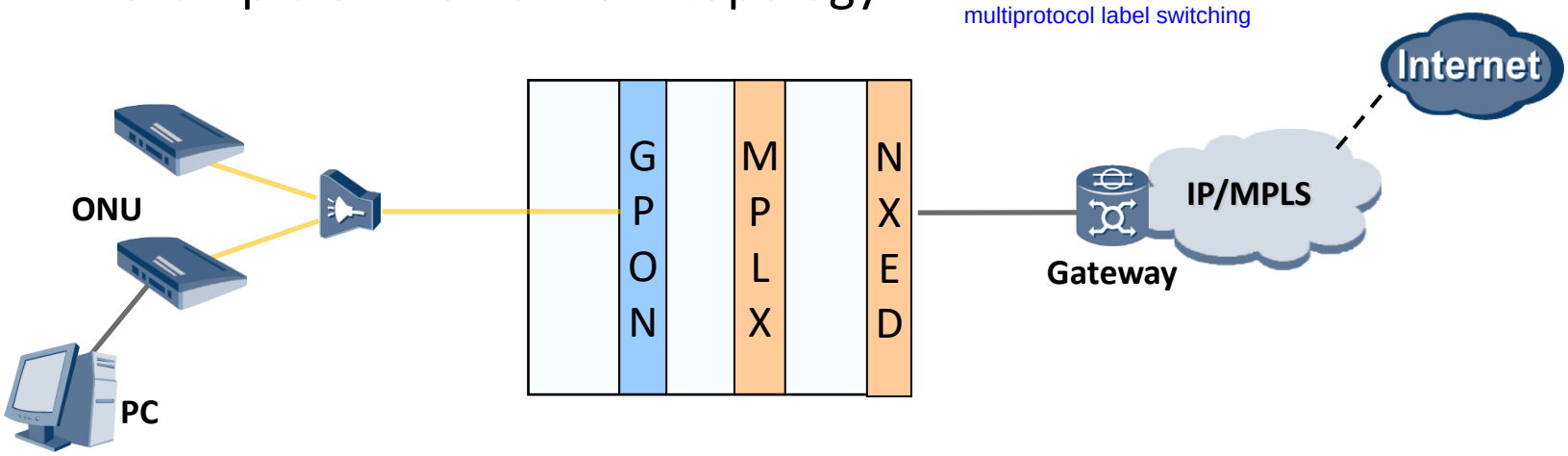


GPON Service Board

- External connections of the GPON service board



- An example of the network topology



GPON Service Board

- GPON service boards work together with ONTs to provide GPON access services
- Differences between GPON service boards:

Board	Number of Ports	Optical Module	Max Split Ratio
GPHF	16	SFP (Class B+ and Class C+)	1:128

128 klanten per port

whats the difference
power related

more power related to distance and attenuation

GPHF

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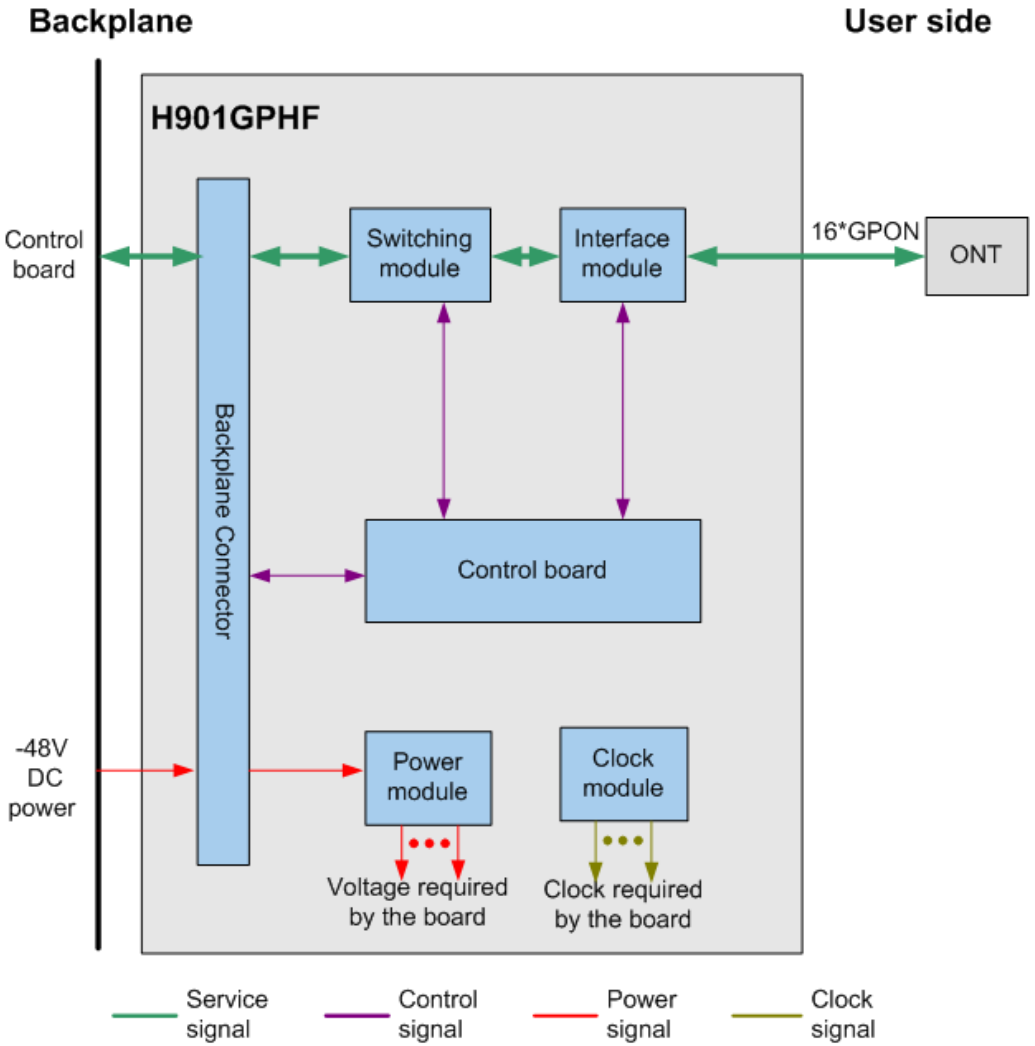
GPON Service Board - Working Principle



10G GPON Service Board

- The H901XGHD board is a 8-port 10G GPON Interface Board. It works together with the optical network terminal (ONT) to provide 10G GPON access services.

Board	Number of Ports	Optical Module	Max Split Ratio
XGHD	8	SFP	1:128

XGHD

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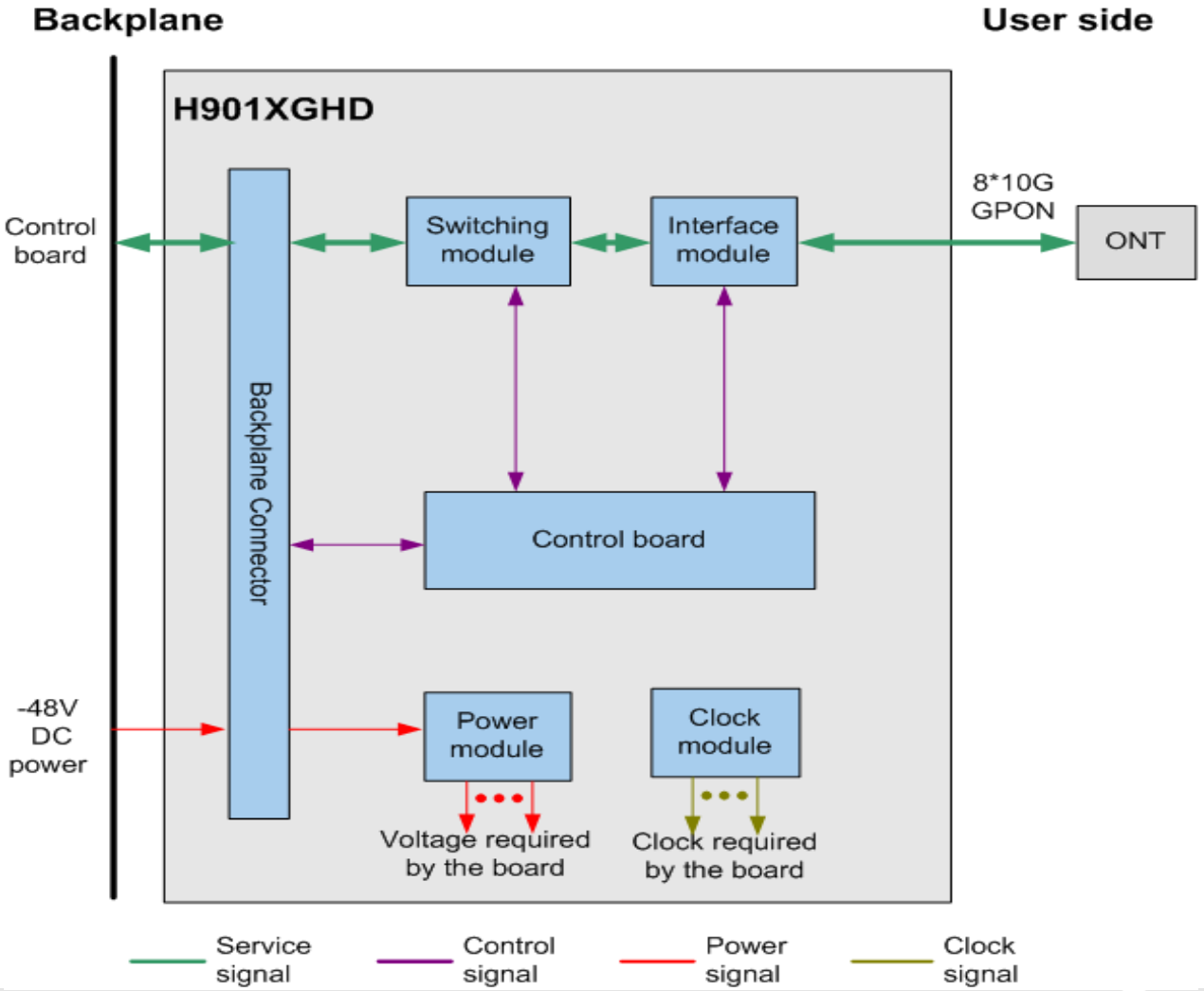
10G GPON Service Board - Working Principle



Questions

- Which service board can deal with GPON service?

ont

gphf and xghd

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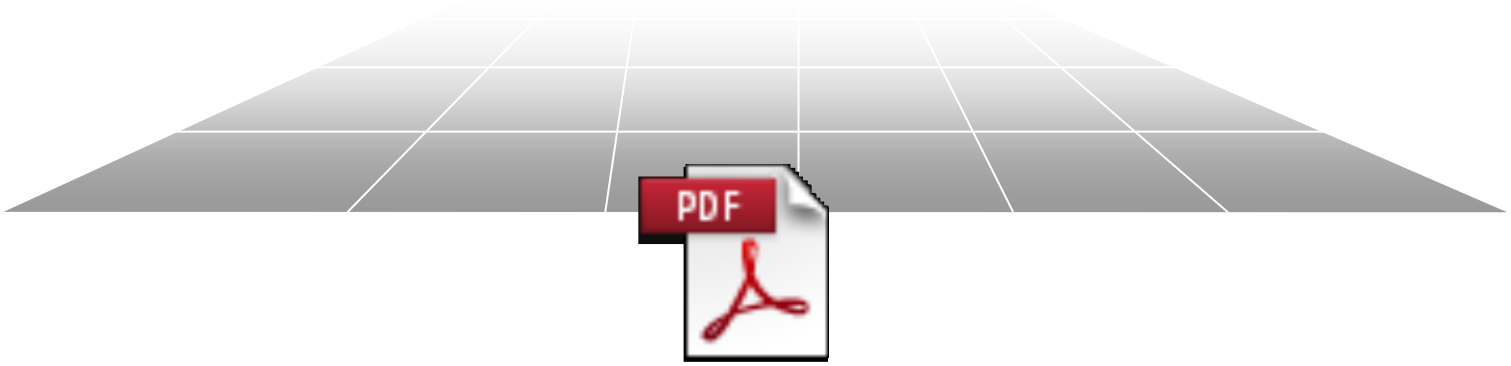
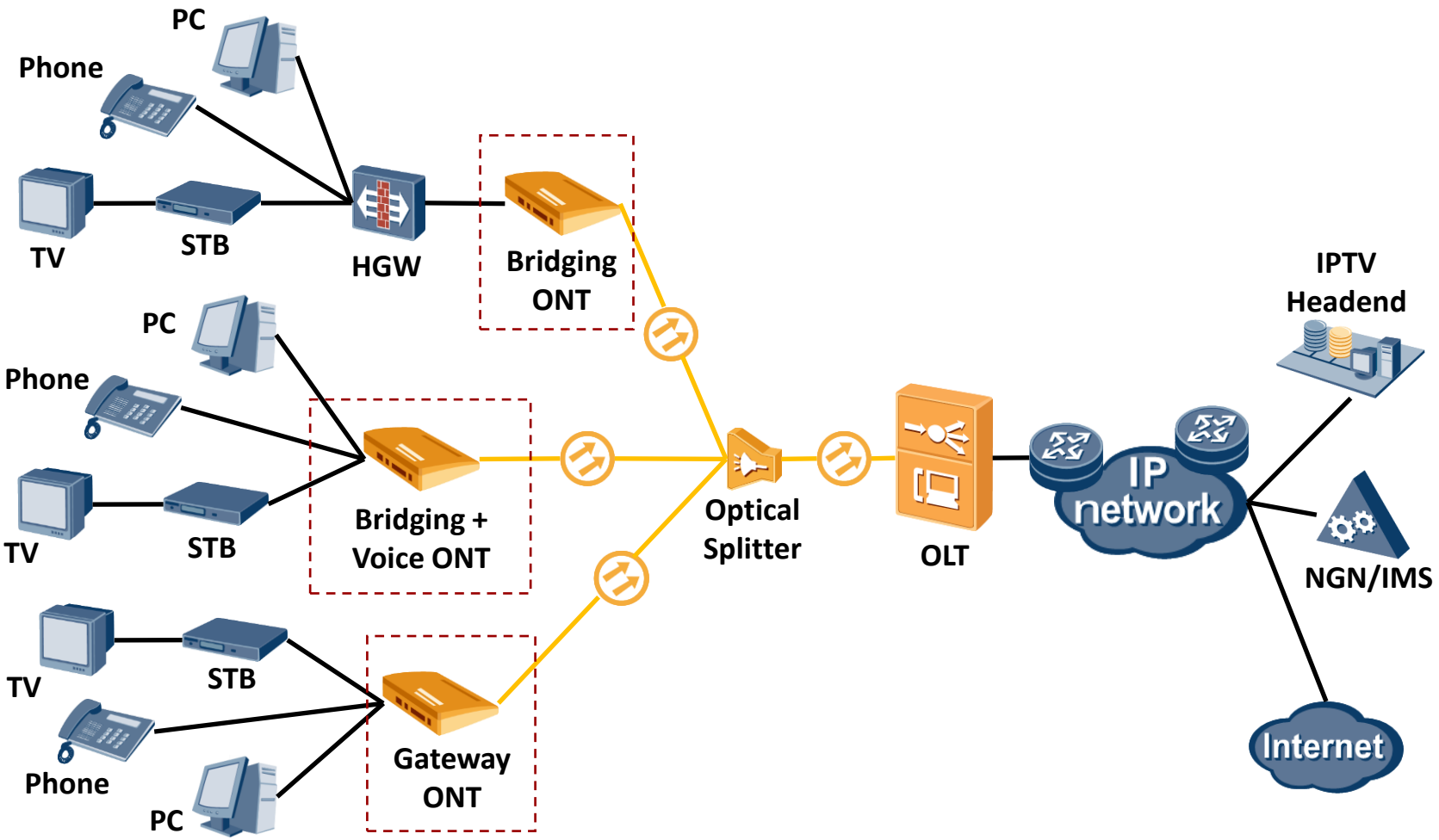
ONT Series



HG8245W5

ONT Network Applications



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Questions

- Which are the ONT Network Applications?

make possible implement

- Describe the ports in ONT HG8245W5

model hg8

2 ports
4 eth
5w5 wifi

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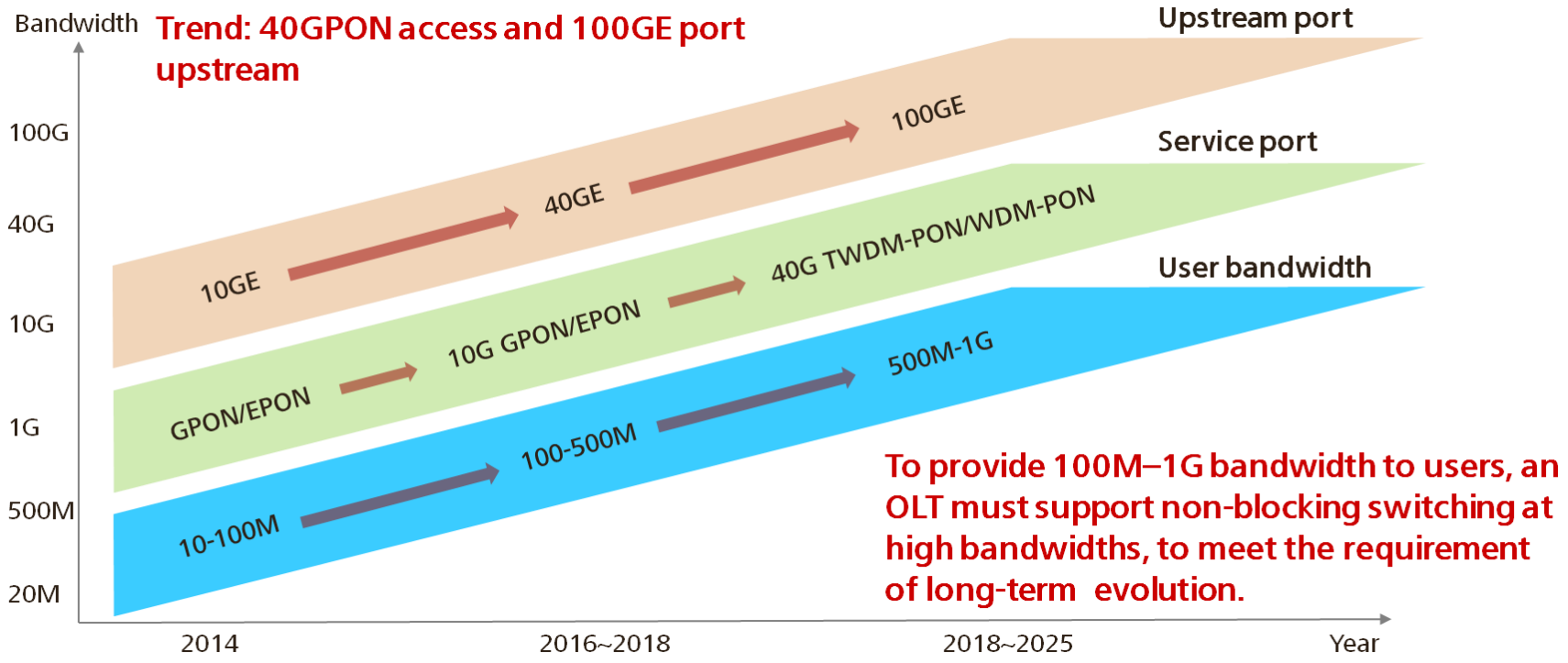
Smooth Evolution of Access in Next 10 Years



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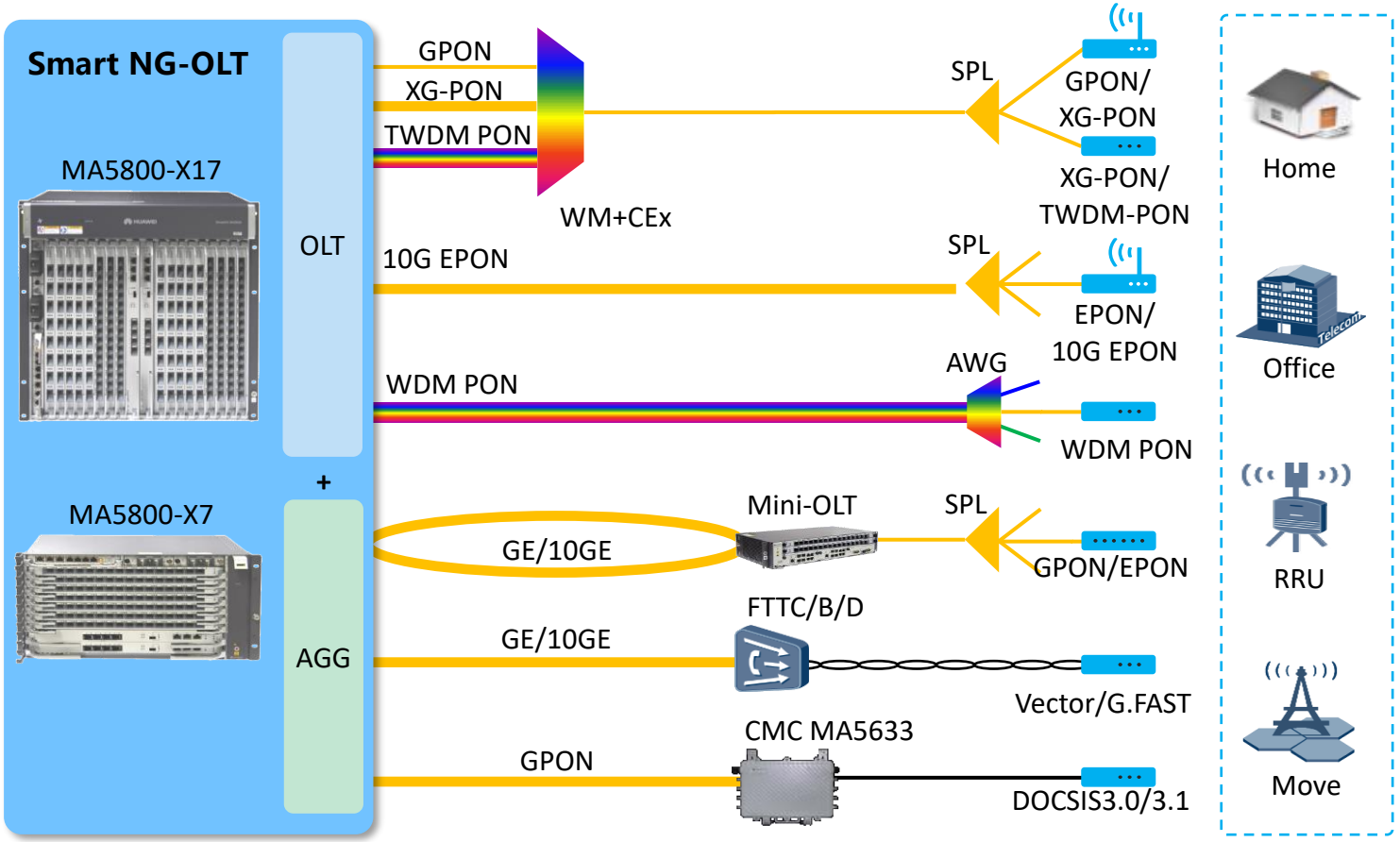
Smart NG-OLT Supports Full Service Convergence, FMC



10GPON SUMMARY

Items	10G GPON
Line rate	Ds: 10Gbit/s; Us: 2.5Gbit/s
Max bandwidth per ONT	Ds: 10Gbit/s; Us: 2.5Gbit/s
Advantages	✓ Mature standard and industry chain, able to scale commercial deploy. ✓ Could hybrid with TWDM-PON, Smooth evolution
Disadvantages	✓ Not support Symmetrical 10G for both Ds/Us, application scenario limited
Scenario	Able to scale commercial deploy after GPON era: ✓ Home, office, mobile

Questions

- Describe MA5800 Application Solutions

tlo provide all the resource needed to support service needed on the ont

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Summary

In this course, we have learned:

- FTTx Hardware, such as OLT, MxU and ONT;
- FTTx scenarios, such as FTTH, FTTB/C, FTTO and FTTM;
- MA5800 solutions, such FMC-Oriented.

Thank you

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