Passive Optical LAN (PoL)
Case Study Cordis Hotel

Presented by Vaea Wright (AFL)

With comments from Raymond Chan (Cordis)

Agenda

❖ Why POL for Cordis?

❖ What Is a Passive Optical LAN?

❖ Gigabit Passive Optical Network (GPON)

❖ Operation and Management

❖ Value Proposition – Passive Optical LAN

❖ Introduction of Raymond Chan IT Manager Cordis Hotel

Why Passive Optical LAN for Cordis?

The Benefits

❖ No Cabinets on any of the room floors

❖ Over 400 rooms to be cabled

❖ Split ratio 1:64 (Not 1:16)

❖ Fire penetrations needed

❖ No room for copper cabling

❖ Pre terminated cable used for ease of deployment

❖ Central management of system

❖ Future proofed infrastructure and 20+ km reach

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What Is A Passive Optical LAN?

Passive Optical LAN

❖ The Passive Optical LAN is a new application for an existing and proven technology (GPON)

❖ GPON networks are Passive Optical Networks that share a single mode fibre to offer point-to-multipoint network connectivity to subscribers using passive optical components.
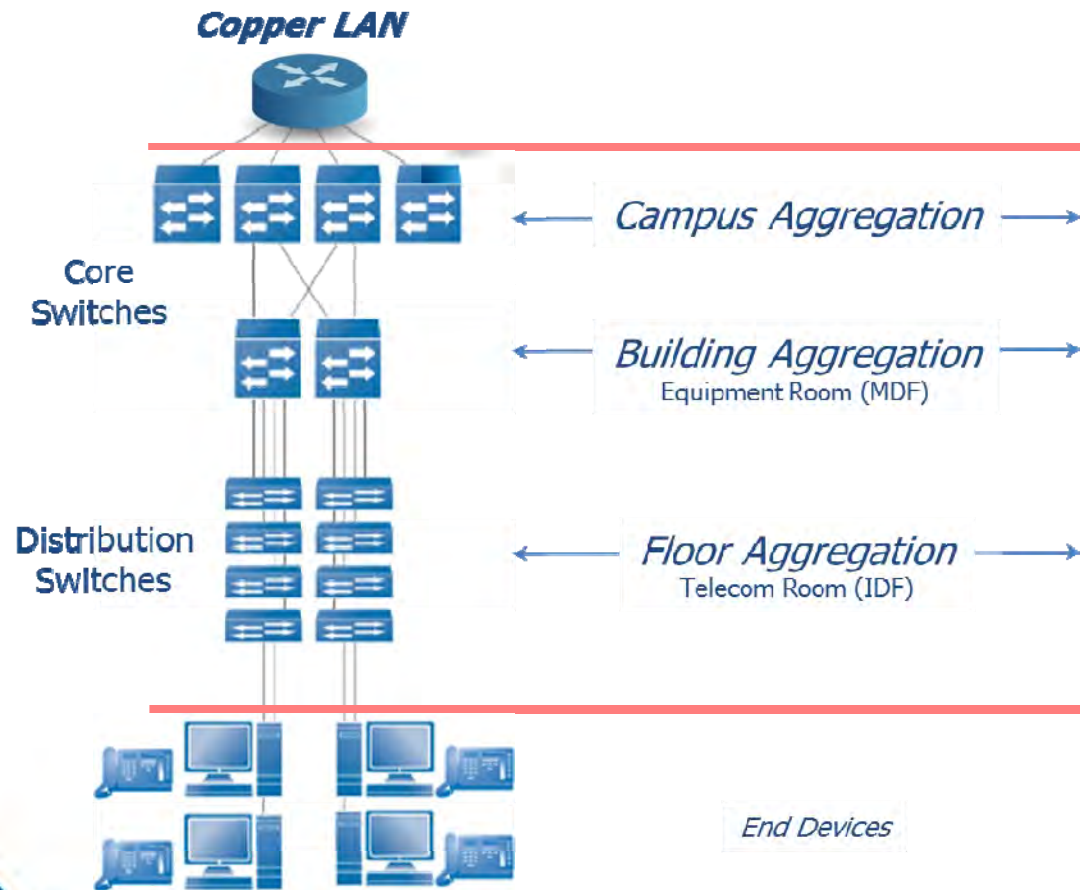
BiCSi

Passive Optical LAN
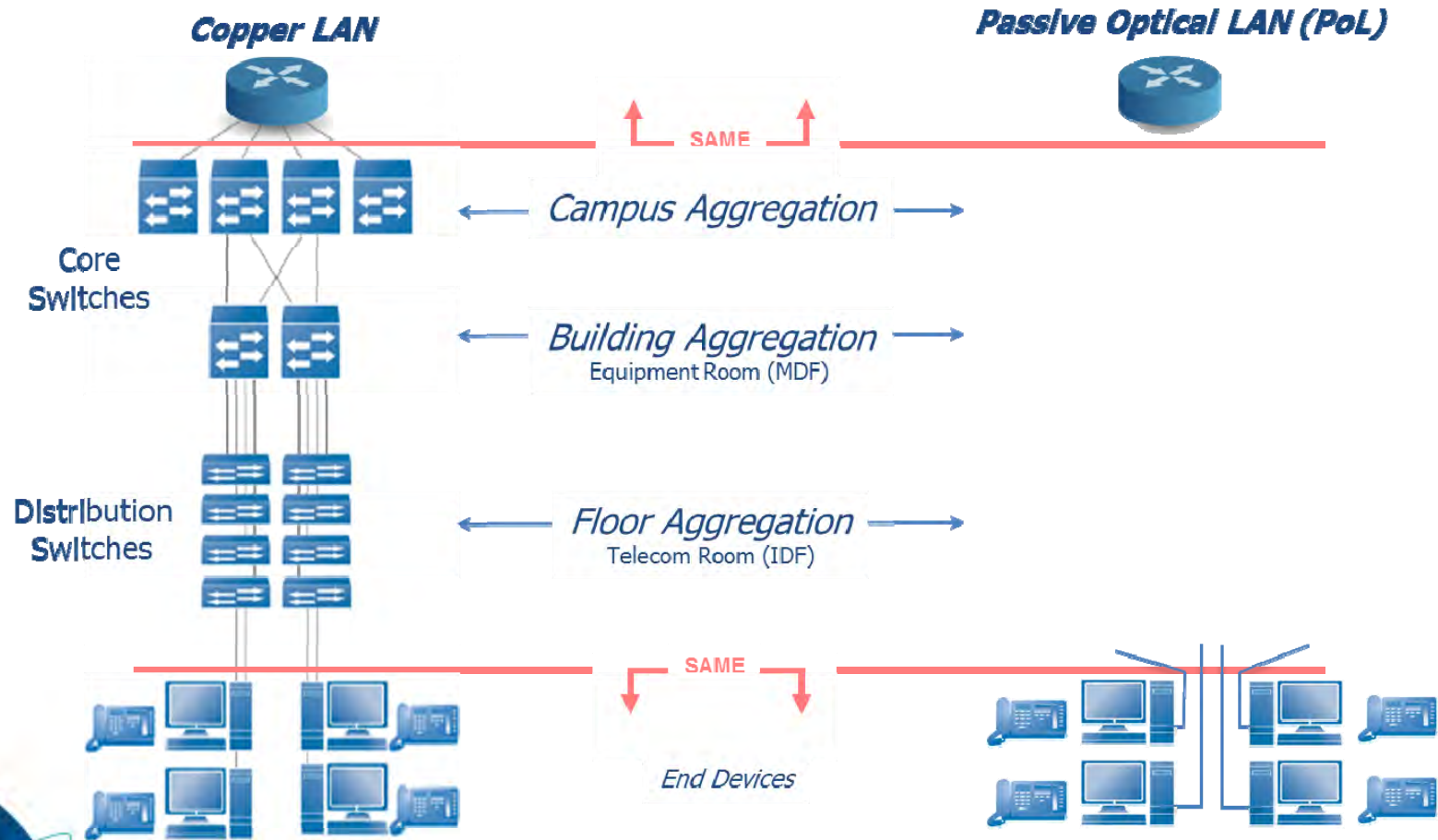
❖ GPON was Initially designed as a replacement for Service Provider's copper based access networks to allow …

    ❖ Higher bandwidth

    ❖ Better reach

    ❖ Increased reliability

    ❖ Lower CAPEX and OPEX

    ❖ A future proof infrastructure
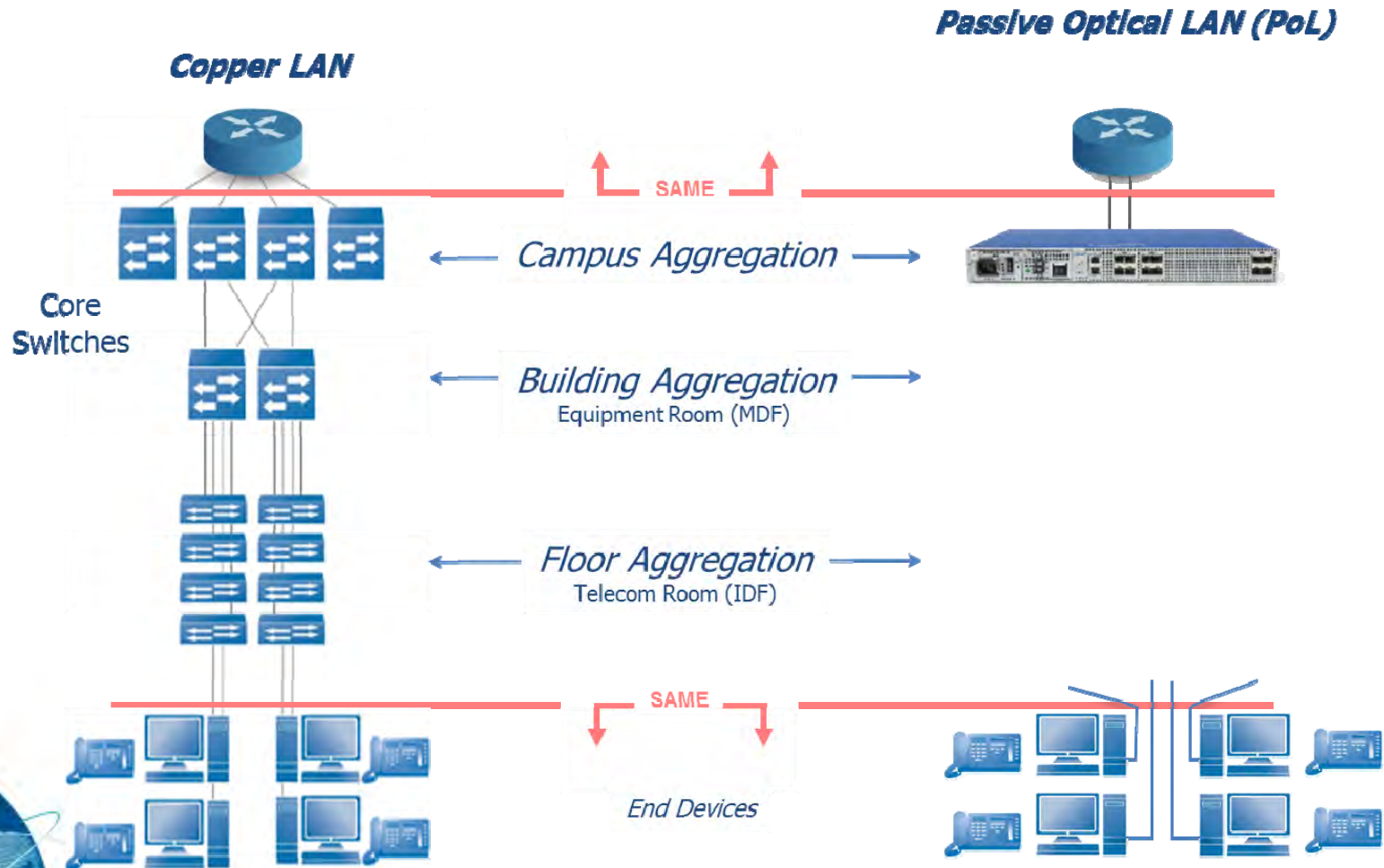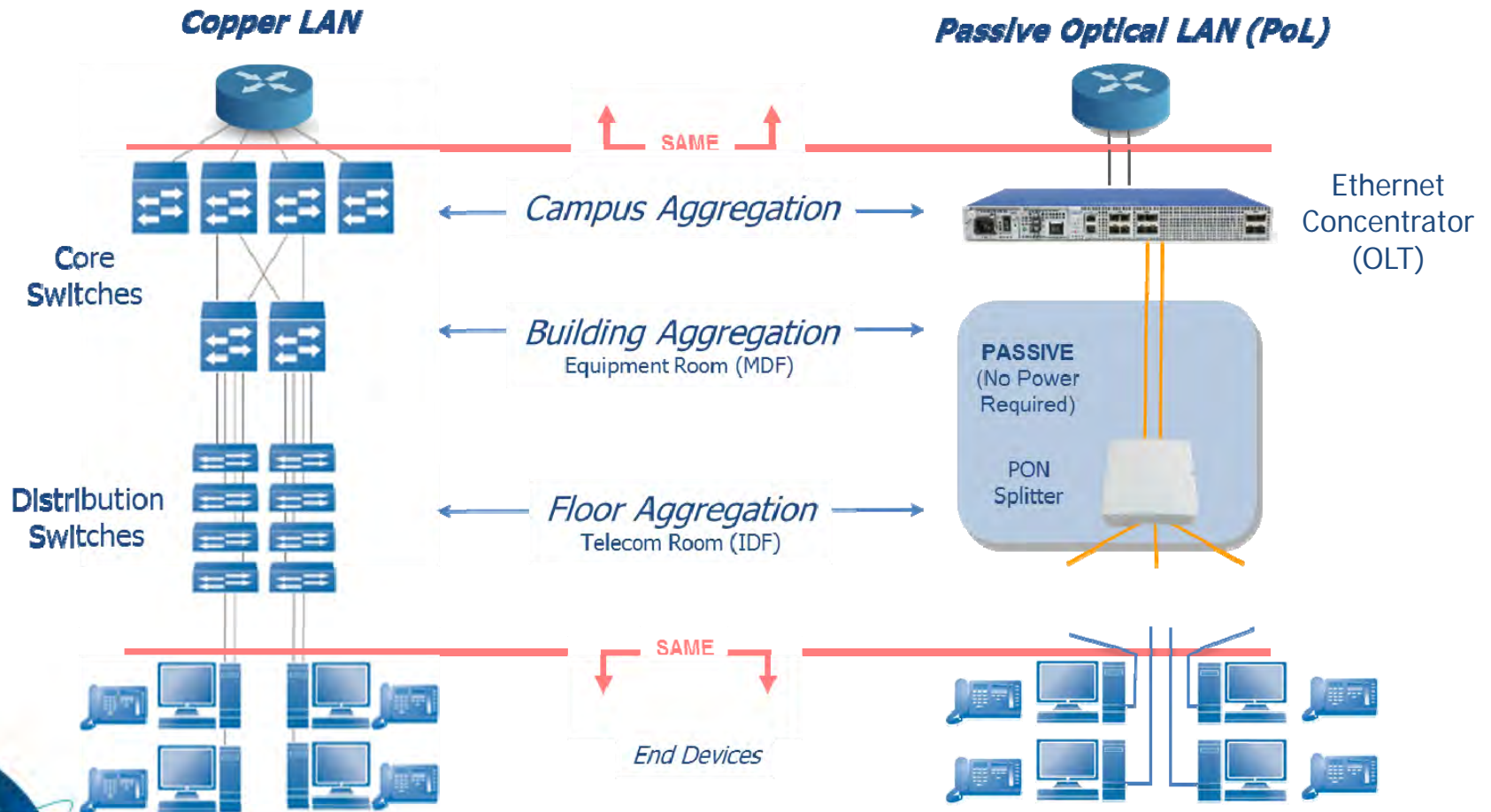
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Copper V Passive Optical LAN

Copper LAN
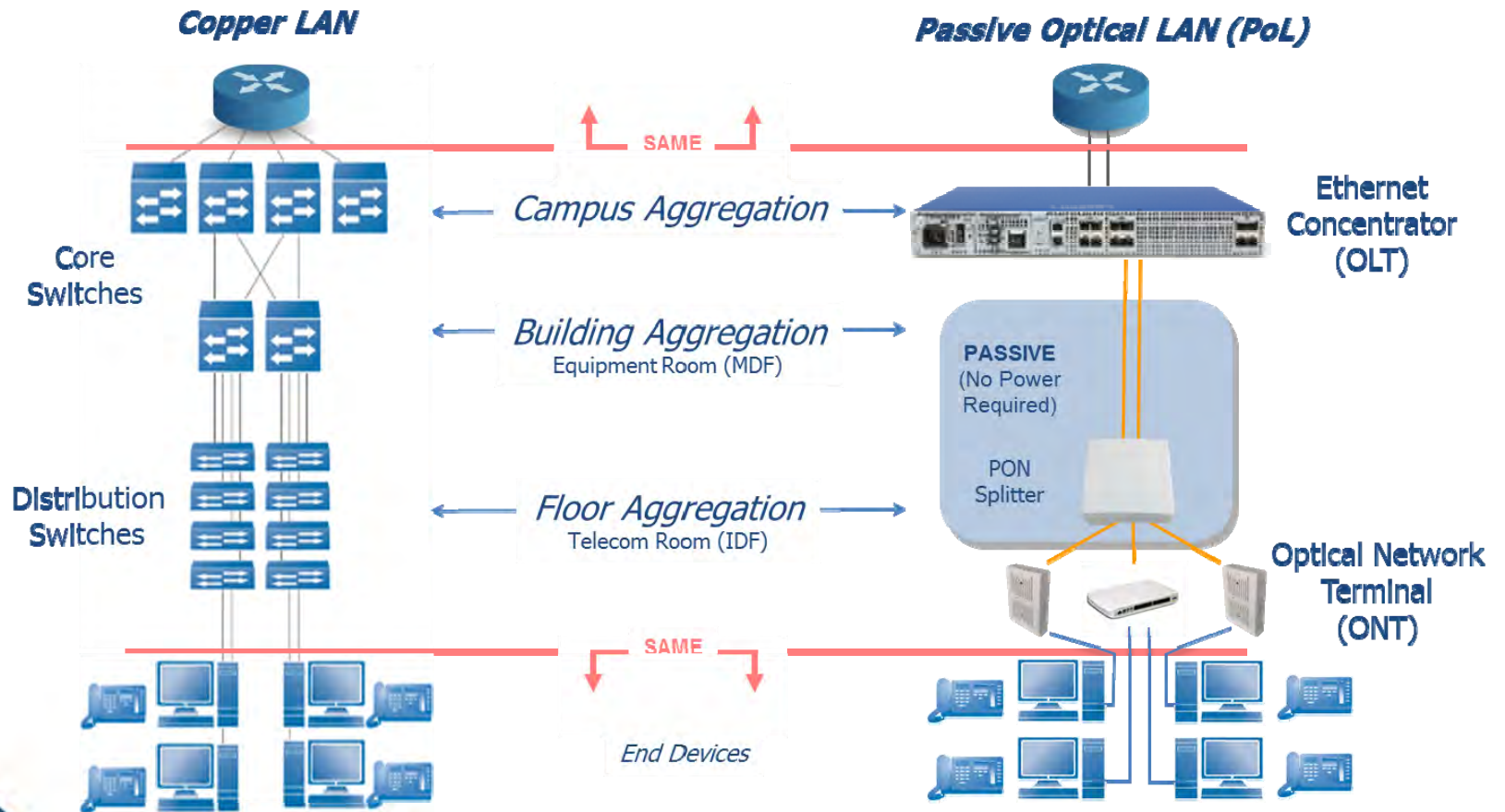
Core
Switches

Campus Aggregation

Building Aggregation
Equipment Room (MDF)

Distribution
Switches

Floor Aggregation
Telecom Room (IDF)

End Devices

BiCSi

Copper V Passive Optical LAN

Copper LAN — Passive Optical LAN (PoL)

Core Switches — Campus Aggregation — SAME

Distribution Switches — Building Aggregation / Equipment Room (MDF)

Floor Aggregation / Telecom Room (IDF)

End Devices — SAME

Copper V Passive Optical LAN

Copper LAN

Passive Optical LAN (PoL)

SAME

Campus Aggregation

Core Switches

Building Aggregation
Equipment Room (MDF)

Floor Aggregation
Telecom Room (IDF)

SAME

End Devices

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Copper V Passive Optical LAN

Copper LAN

Passive Optical LAN (PoL)

SAME

Ethernet Concentrator (OLT)

Campus Aggregation

Core Switches

Building Aggregation
Equipment Room (MDF)

PASSIVE
(No Power Required)

Distribution Switches

Floor Aggregation
Telecom Room (IDF)

PON Splitter

SAME

End Devices

Copper V Passive Optical LAN

Copper LAN

Passive Optical LAN (PoL)

SAME

Campus Aggregation

Ethernet Concentrator (OLT)

Core Switches

Building Aggregation
Equipment Room (MDF)

PASSIVE
(No Power Required)

PON Splitter

Distribution Switches

Floor Aggregation
Telecom Room (IDF)

Optical Network Terminal (ONT)

SAME

End Devices

Gigabit Passive Optical Network (GPON)

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GPON - The Underlying Technology

❖ Passive Optical Network *(FiberLAN)* is based on GPON (Gigabit Passive Optical Network) technology

❖ GPON is an industry standard recognized by the following organizations:

 ❖ **ITU -** International Telecommunication Union

 ❖ **FSAN** - Full Service Access Network

 ❖ **BICSI -** Building Industry Consulting Service International

❖ **GPON** is a **proven** technology & has been deployed in thousands of networks worldwide.

 ❖ Originally developed for carrier environments to provide:

 ❖ **Ease** of Management

 ❖ A **Future proof** infrastructure

 ❖ **Cost effective** & **Low Maintenance** delivery method of Data, Voice, & Video.

Applications

Desktop Computer

Analog Phone

VoIP Phone

WIFI Access Point

Surveillance Camera

Video Conferencing

Analog / Digital Video

Sensors / Monitoring

Passive Optical LAN (PoL)

Optical Line Terminal (OLT)

PASSIVE (No Power Required)

PON Splitter

Optical Network Terminal (ONT)
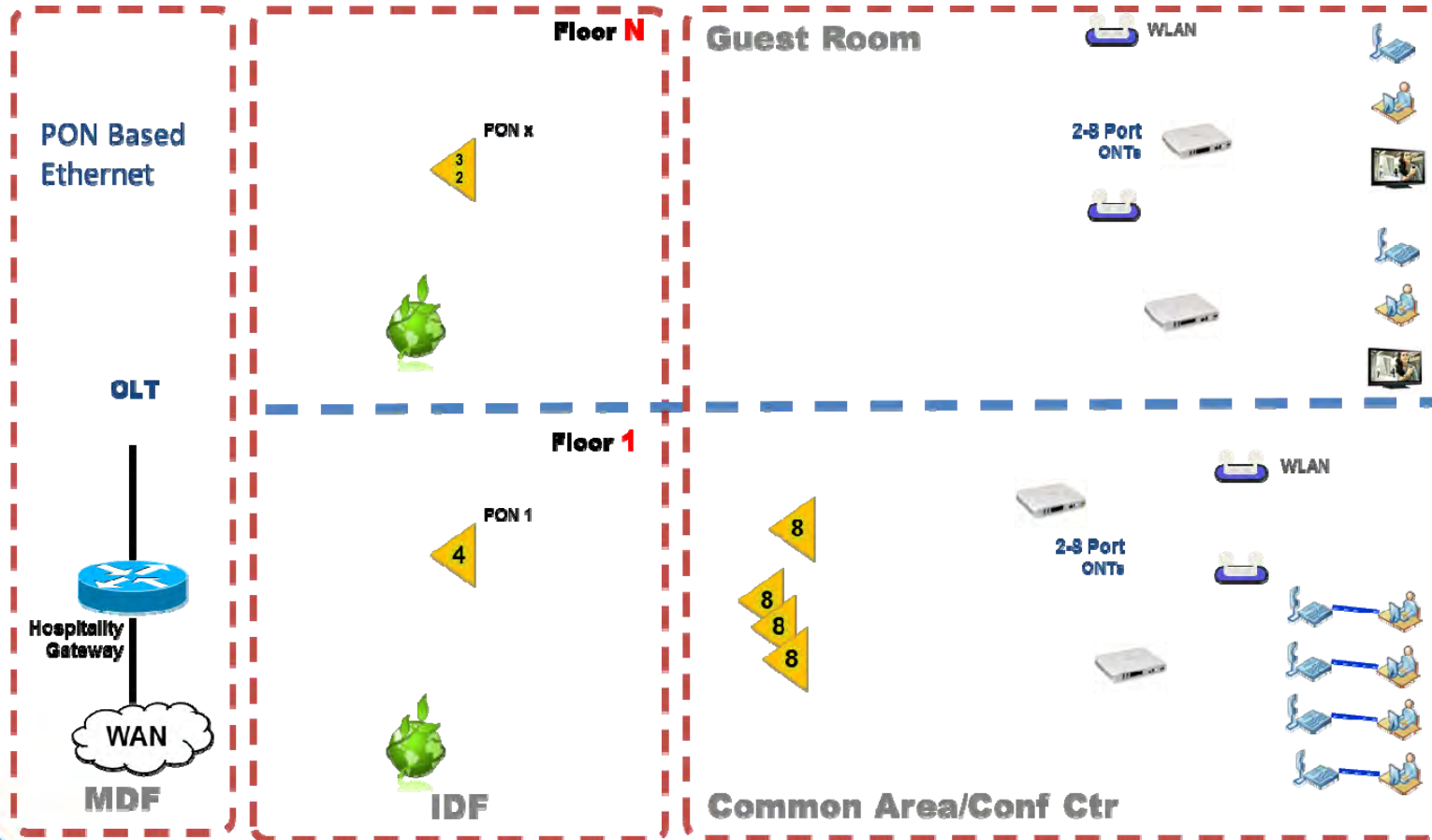
Copper Network

Copper Network

Copper Network

Copper-based Ethernet

Hospitality Gateway

WAN

MDF

IDF

Floor N

Guest Room

Long PoE Cables

WLAN

Long CAT-6/6

Heavy Duty Cable Trays

Floor 1

Long PoE Cables

WLAN

Heavy Duty Cable Trays

Long CAT-6/6

Common Area/Conf Ctr

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Network

Floor N

Guest Room

WLAN

Floor 1

WLAN

Hospitality Gateway

WAN

MDF

IDF

Common Area/Conf Ctr

Fibre Network

PON Based Ethernet

OLT

Hospitality Gateway

WAN

MDF

Floor N

IDF

Guest Room

WLAN

Floor 1

WLAN

Common Area/Conf Ctr

Fibre Network

Fibre Network
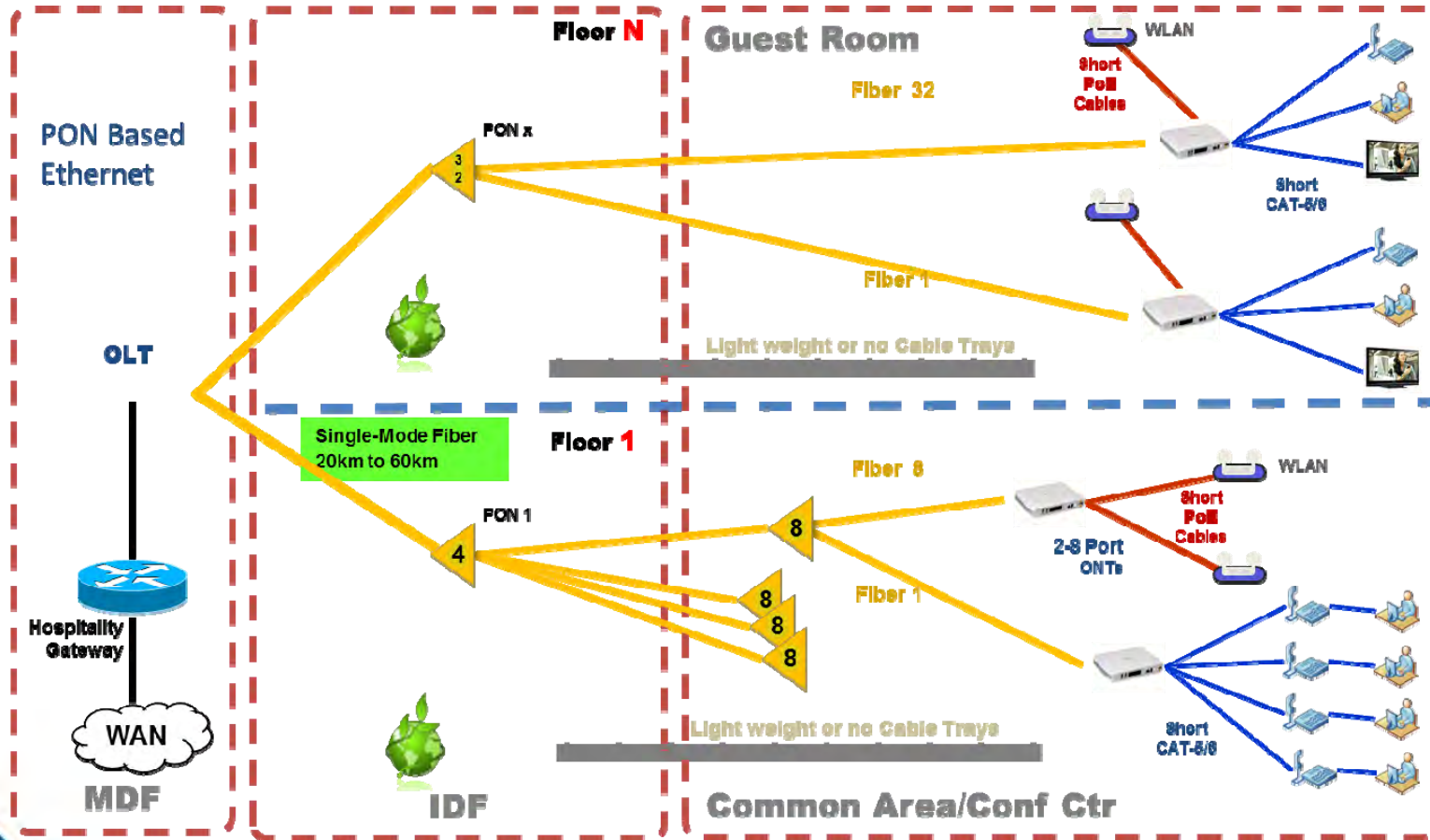
Copper V Fibre Network
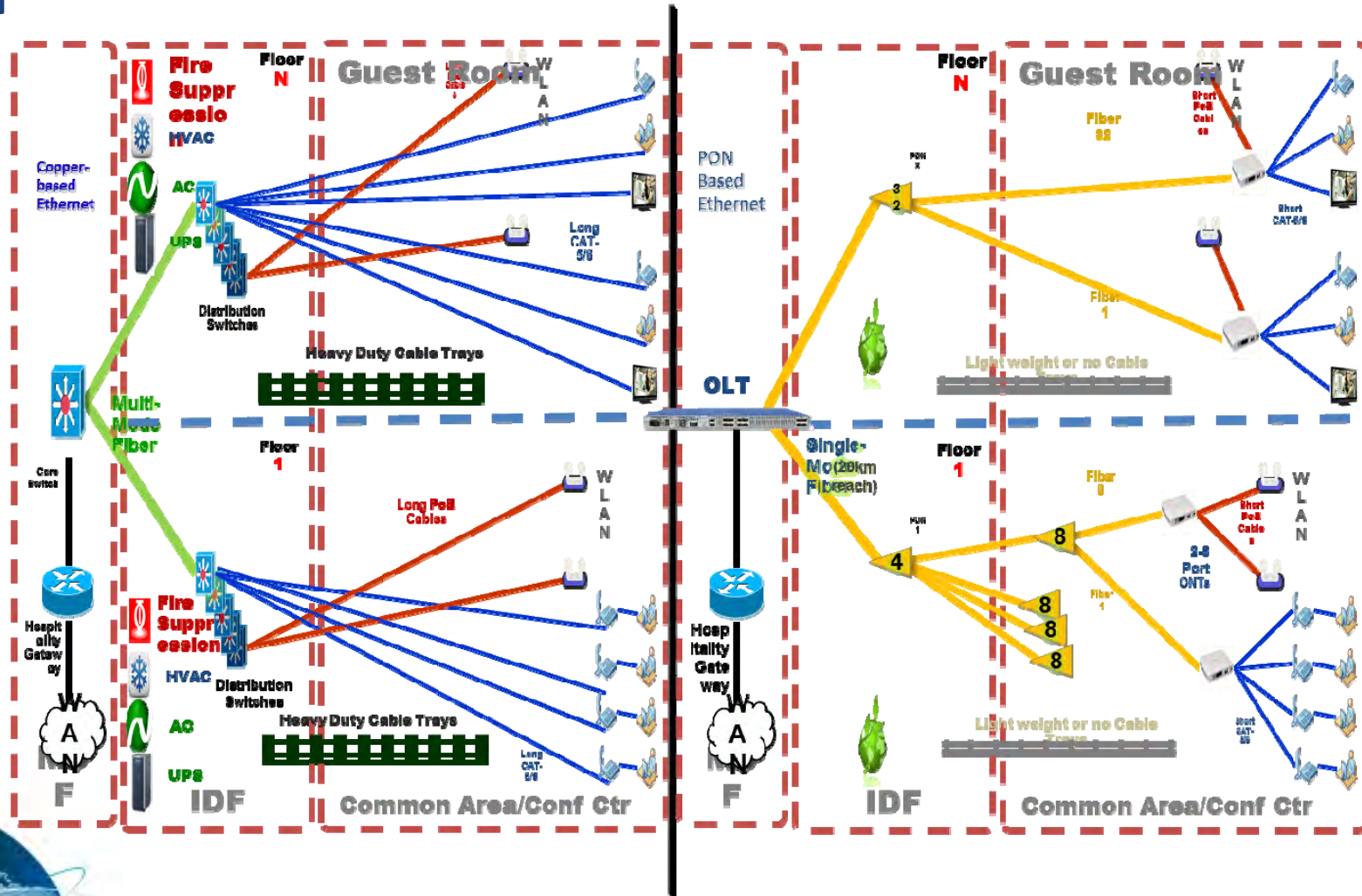
Deployment in Cordis Hotel

Task

To provide an alternative to Structured Cabling for the deployment of High Speed Access Networks for in-building deployment

ONT

Passive Splitters

Fiber (SMF)
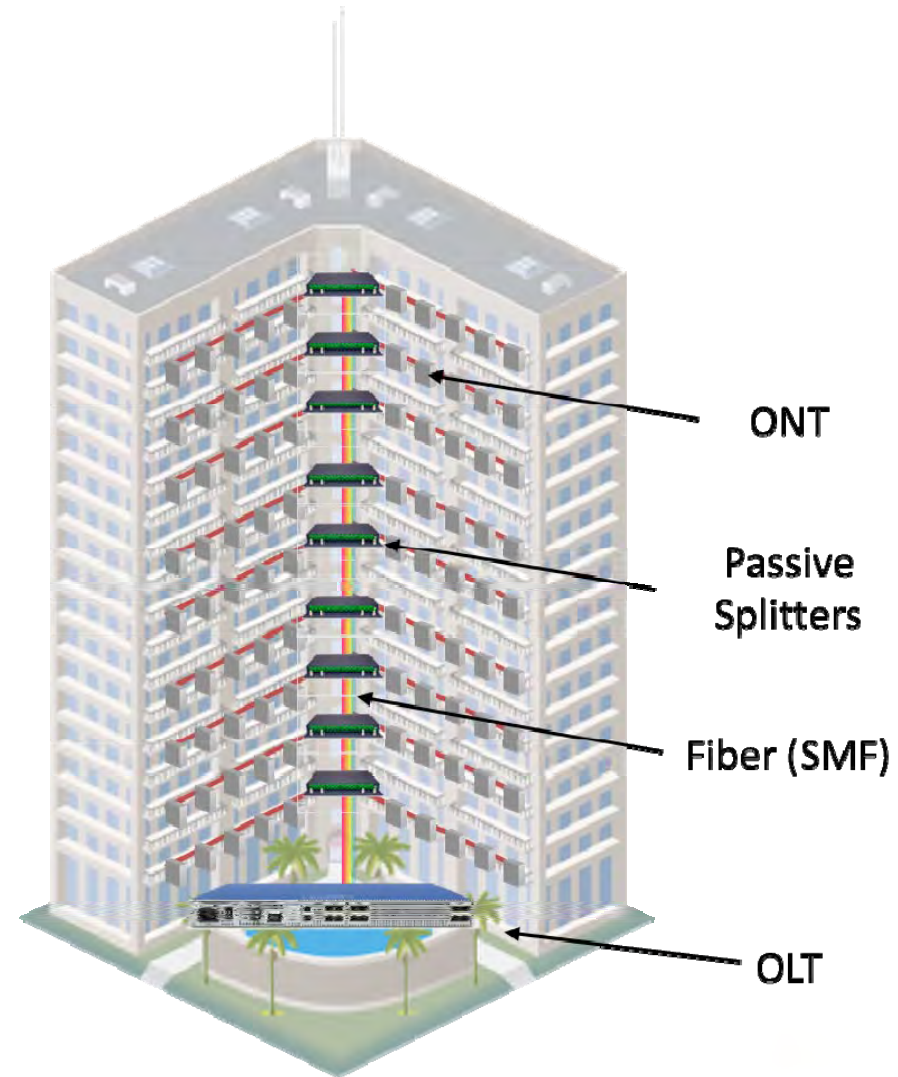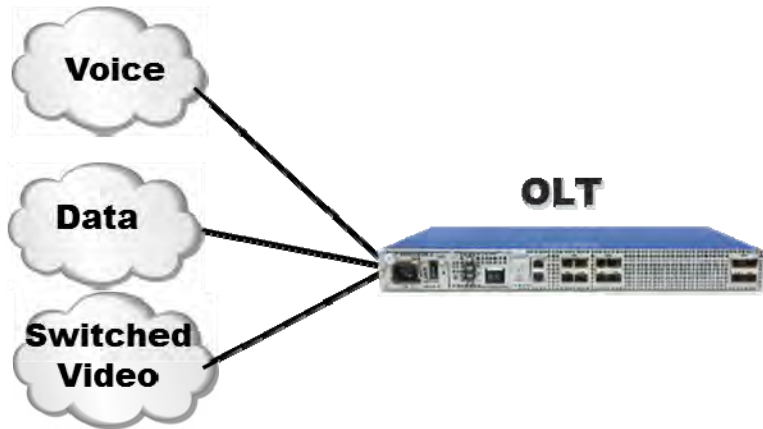
OLT

GPON Operation
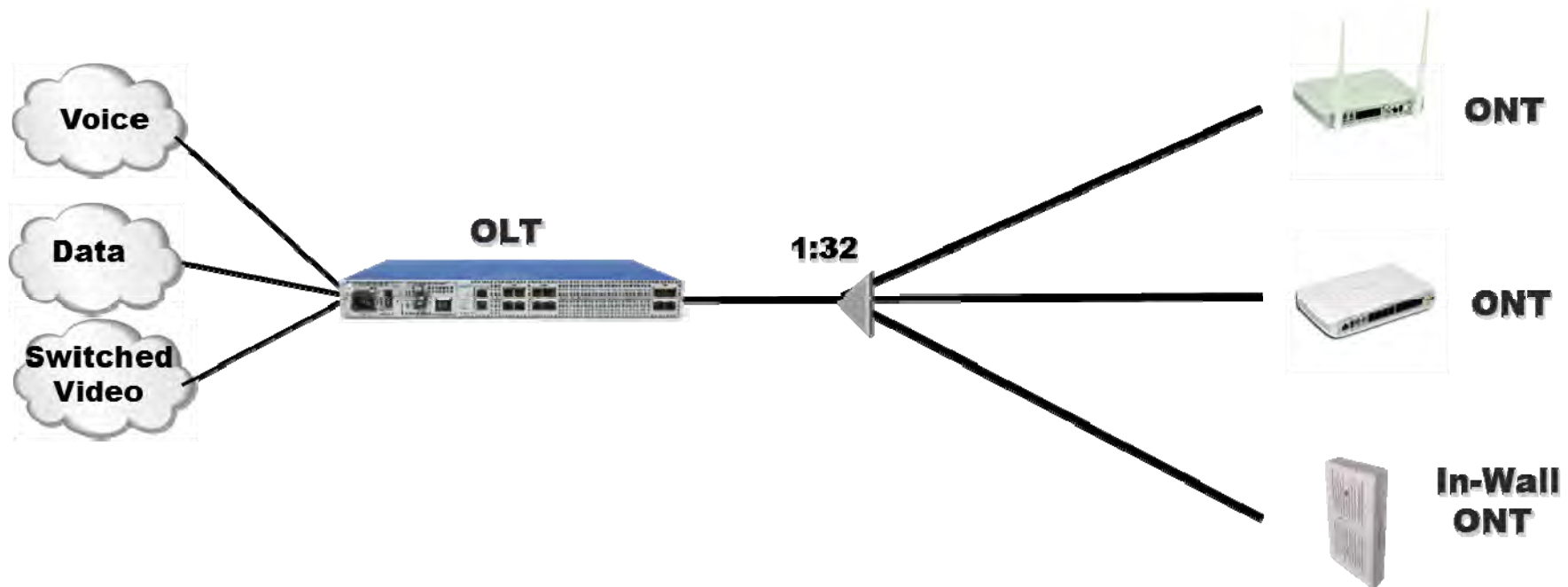
GPON Operation

GPON Operation
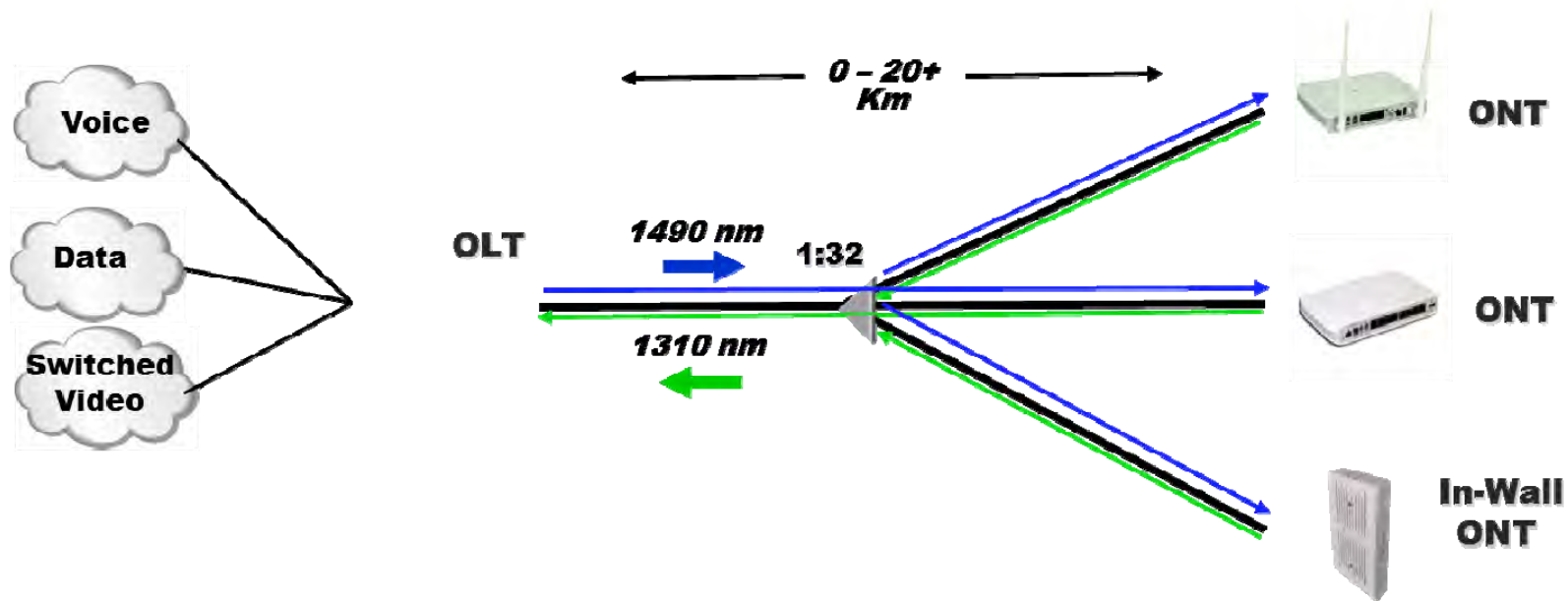
Each PON supports a single optical fibre carrying 2 wavelengths at the rates of 2.4Gbps Downstream and 1.2Gbps Upstream

- ❖ Up to 64 ONTs
- ❖ Default span of 20km, can be extended to 60Km
- ❖ 1490nm downstream (Broadcast) carrying Voice, Data and Switched Video traffic
- ❖ 1310nm upstream (TDMA) carrying Voice, Data and Video Signaling traffic

GPON Operation
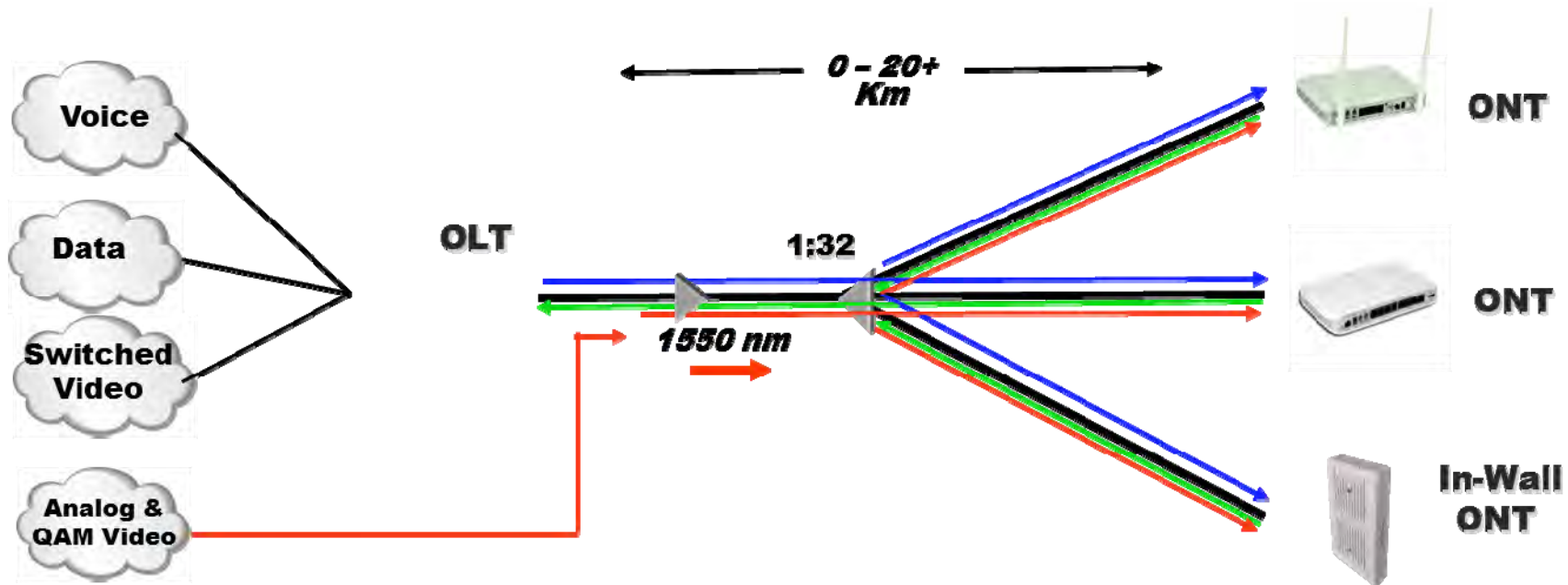
GPON Standard Supports Overlay Wavelengths within the 15xx range

❖ Currently used to support RF-based video delivery

❖ In the near future will be used to support DWDM services

GPON Operation
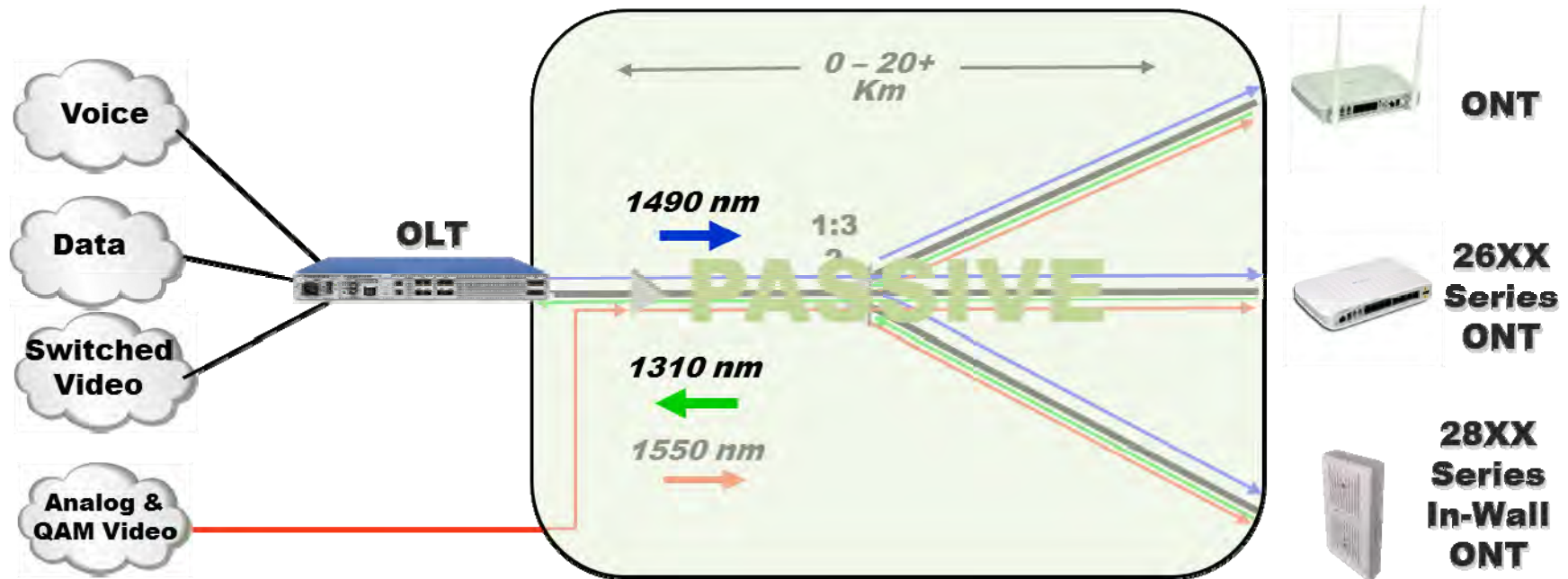
Optical Lan Options

Option 2: Point-to-point (AE)
    + Dedicated full GE per port

Optical Ethernet Switch

• POL is highly flexible to accommodate both models

Option 1: Point-to-multipoint (GPON)
    + On-demand full GE per port
    + Less expensive
    + Less cable
    + Less equipment

Passive Splitter

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Operation and Management

Operational Advantage
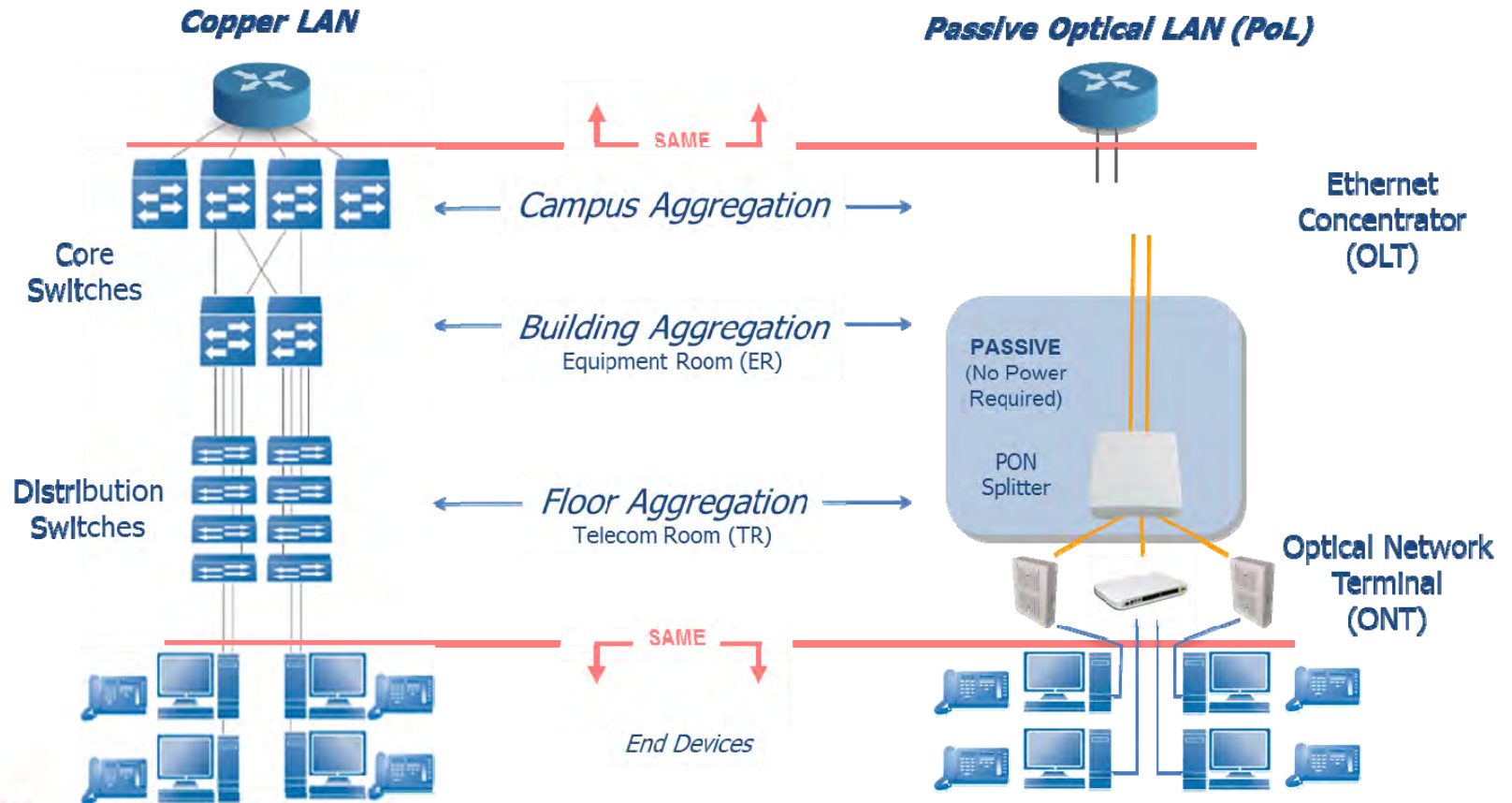
Operational Advantage
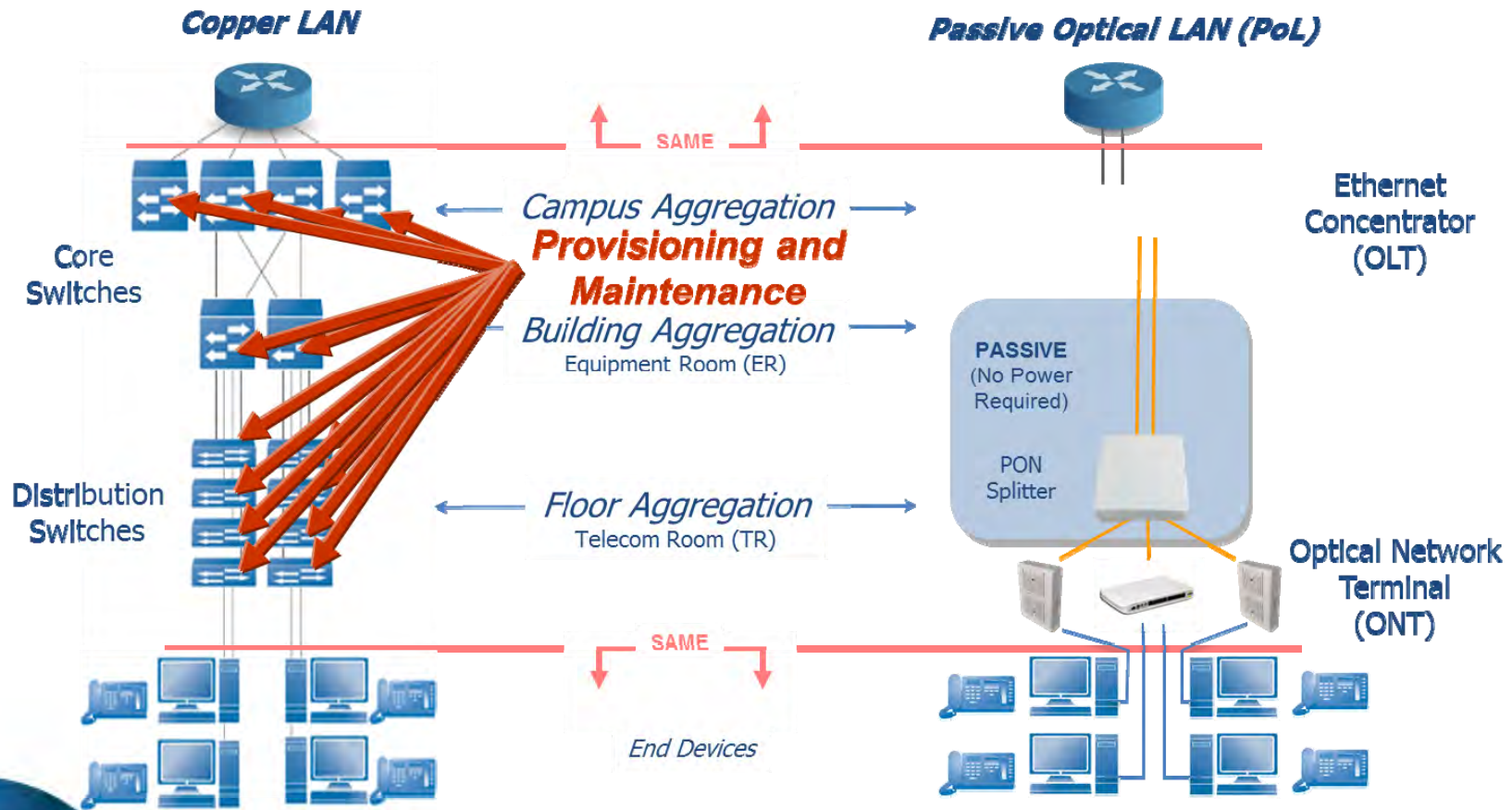
Operational Advantage
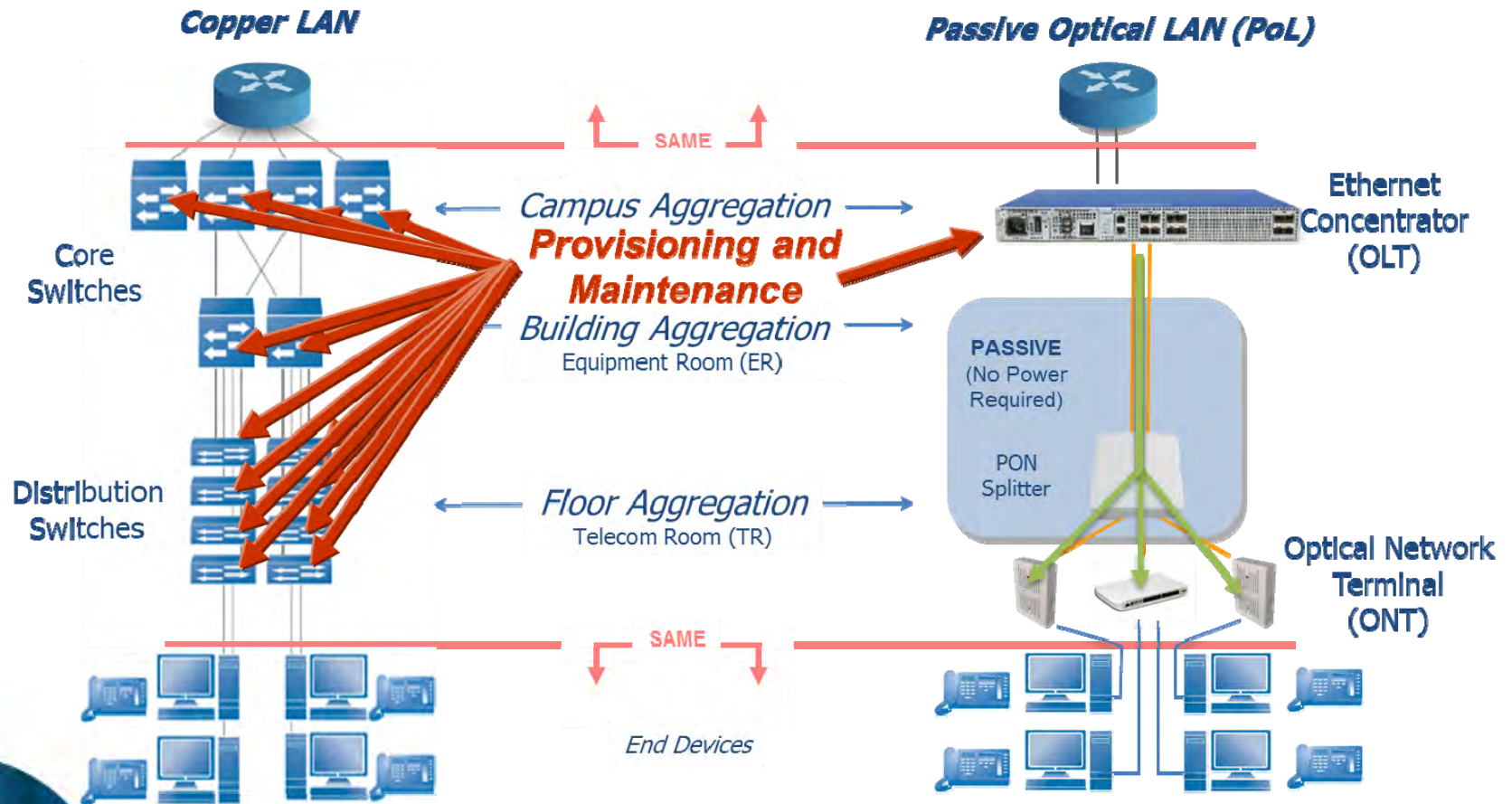
FiberLAN Management (FL/OLTs)

Planned GUI — Graphical User Interface

Remote CLI — TELNET/SSH CLI interface

Local CLI — SERIAL CLI interface

FL-108 OLT

Optical LAN Redundancy (Type B)

Port Protection

Fibre-cut Protection

- Fibre is protected on long run
- SFP Port also protected
- Hitless recovery

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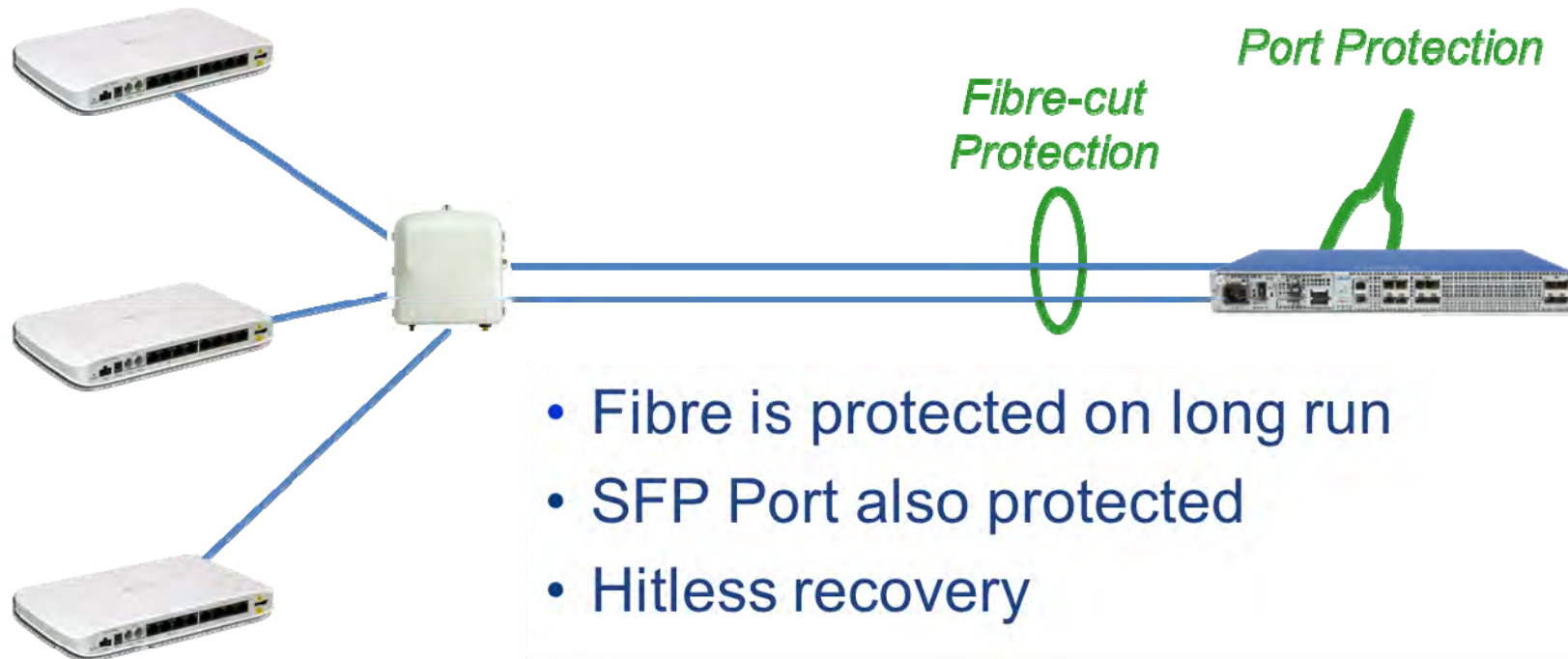
Prioritisation and Rate Limiting
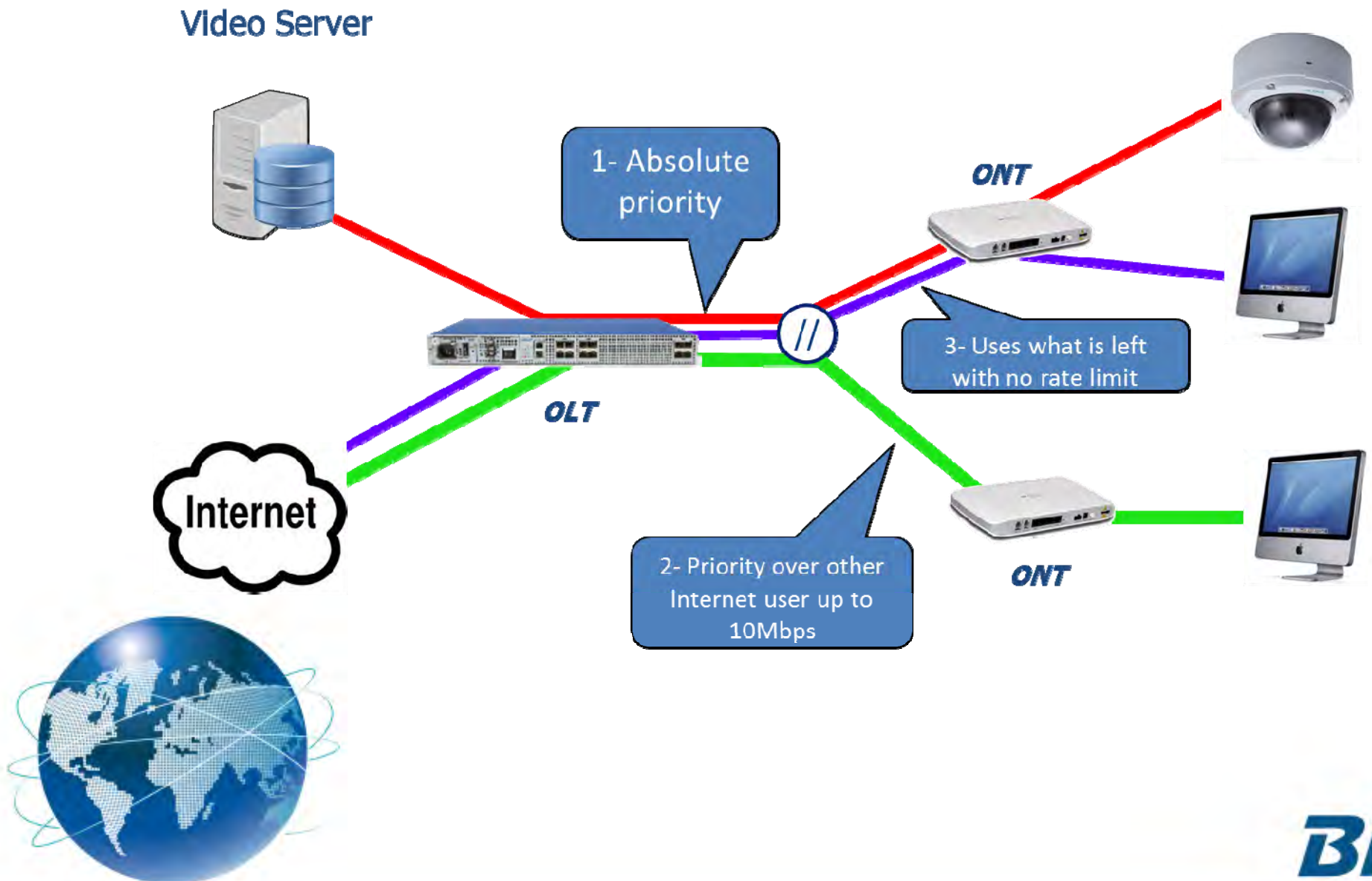
The Value Proposition

Optical LAN Advantages
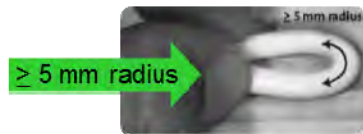
Lower Capital Expenditure

From This

To This

Up to 60% Less

Smaller, Lighter and Stronger

Riser Rated Cables	Fibre Optic Cable	Tier 1 Vendor Category 5e UTP	Tier 1 Vendor Category 6a UTP
10G Distance	40 km	45 m	100 m
Cable OD	2.9 mm	5.7 mm	7.5 mm
Weight	4 lb / 1000 ft	22 lb / 1000 ft	39 lb / 1000 ft
Minimum Bend Radius	5 mm	22.8 mm	30 mm
Tensile Strength (Installation)	48 lbf	25 lbf	25 lbf

Relative Cable Diameter Comparison

Fibre
2.9 mm
5.7mm
7.5 mm

Relative Bend Radius Comparison

Fibre
5 mm
22.8 mm
30 mm

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