Preparing OFC Network Densification for 5G

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R&M

Customer Premises Optical Connectivity - An Overview

- The total number of FTTH-FTTB users in Asia is increasing every year and the increment is more than year before.
- Service providers are in race to bring faster “ready to use” services to their customer.
- Respond to the customer’s request with faster, easier, reliable and low cost solutions as deployment cost continue to drop
- Customer premises connection is most critical and most expensive section of FTTx network
- Installer wants fast and easy assemble materials, less dependency of special tools, low loss performance while operator’s concern on long reliable solution and less fault rate to reduce operation and maintenance cost.

Customer Premises Optical Connectivity Solutions- An Overview…

- Various Solutions and technology to use for customer premises connection as:
- Mechanical Splice- field Assemble
- Fusion splice: drop cable with pigtail or drop with connector fusion splice ready connector
- Pre-terminated drop cable.

19" (ETSI) Panels

Connectivity

SCM ODF

“ Several solution and technology developed by R&M and all products and techniques are giving solutions to installer’s, customer’s and financer’s needs” .

Passive components

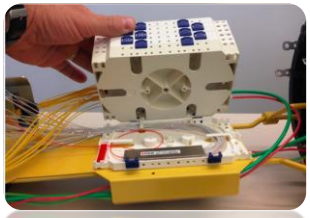
3U Modules

Assemblies

Raceway

Customer Premises Optical Connectivity Integrating with Smart City

- Fundamental Infrastructure for Smart City projects can be integrated over Fiber to the Home communication networks
- To deliver uninterrupted voice, high speed internet, high-end video(HD/4K/8K).
- The Fiber network can provide unlimited bandwidth to support future proof connectivity solutions with bundled services through the life of the Home/Building.
- The fiber based smart cities infrastructure can potentially integrate multiple network of smart grid, offload mobile traffic through wi-fi, backhauling 3G/4G/5G system with fiber to the antennas solutions, smart metering system and high speed internet



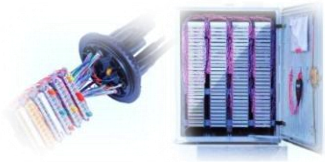
Standard closure

GSC closure

SCM closure

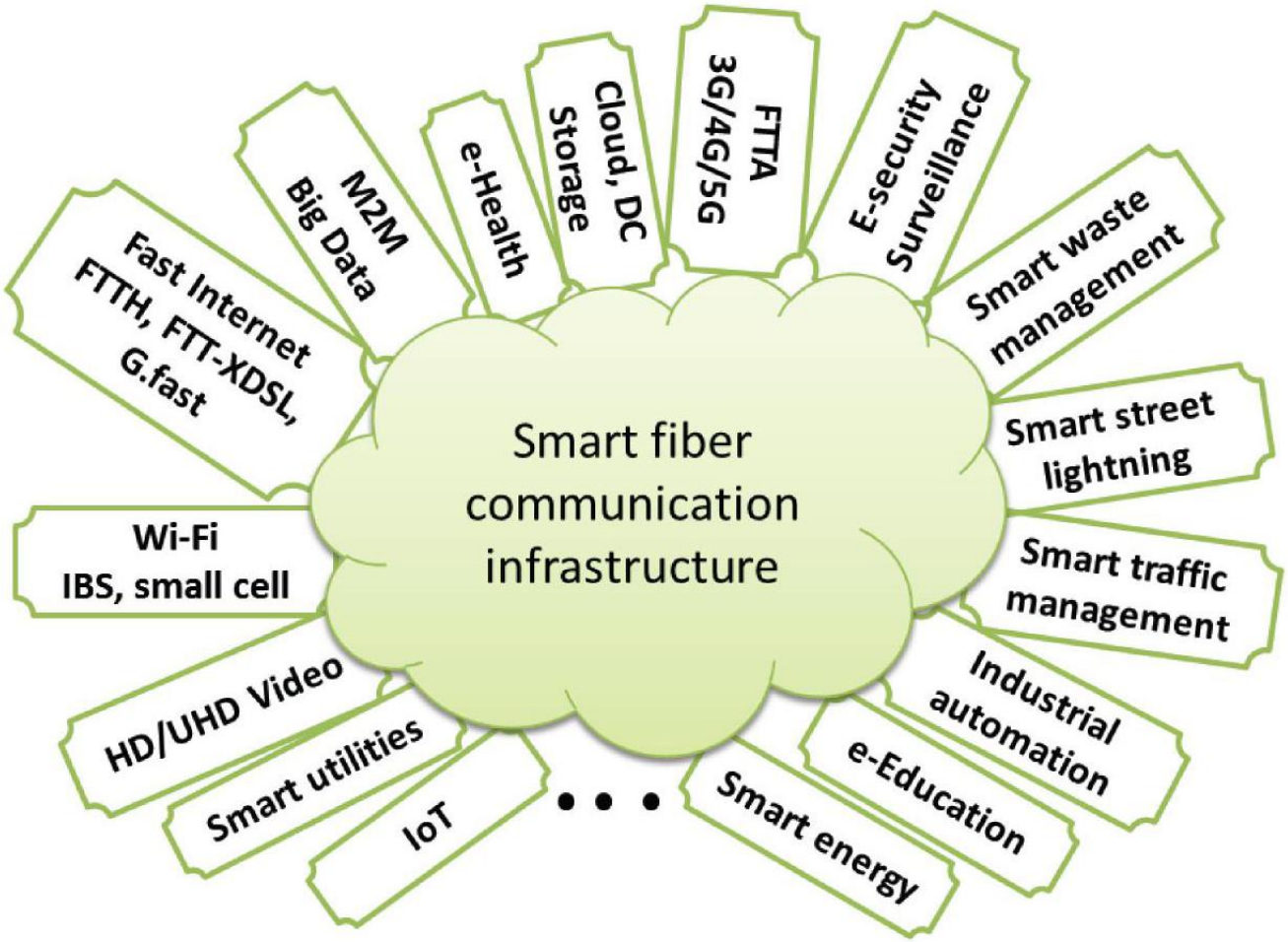
Boxes

SYNO closure



Copper solutions

Smart Integrated fiber communication infrastructure



Courtesy FTTH APAC Council

Technology Challenges and Policy Enablers

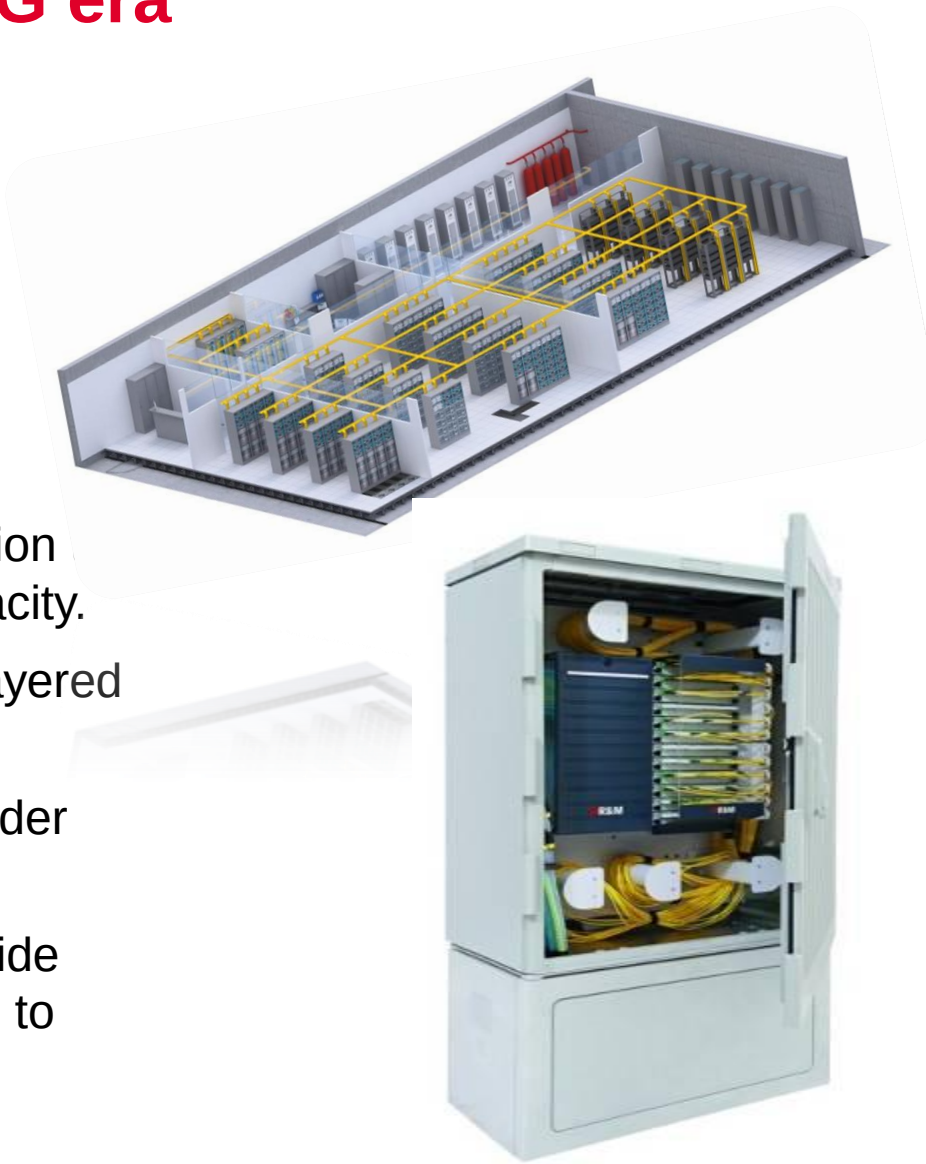
- Spectrum needs: Additional radio spectrum for mobile networks to meet the increased capacity and coverage demands of 5G
- Density: 5G will need more base station to meet the performance required. Combining macro sites with smaller base stations and using a range of radio access technologies including LTE-A, Wi-fi and any future 5G technologies.
- Siting: The need to densify network infrastructure deployments that involve the location of potentially hundreds of thousands of new small cells and related technologies will increase pressure on local governments to review applications for siting.
- To reduce CAPEX and OPEX, operators will rely more on self-organizing networks (SON), Network function virtualization(NFV), Software defined networking (SDN) and Heterogeneous networks (HetNets) in order to dynamically balance the loads and QoS within their network per user and per service, and also to account for the growing number of IoT devices.

Network Densification in 5G era

- Adding capacity to a network:

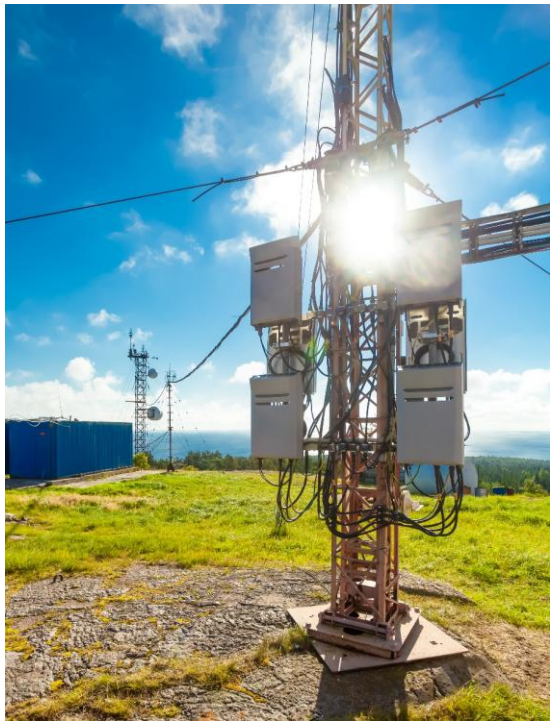
1. Buying more spectrum
2. Making that spectrum more efficient
3. Densifying the network

- Adding more cell sites is directly proportion to increase the amount of available capacity.
- Deployment of Heterogeneous or multilayered network
- Deploy additional lower-power nodes under the coverage area of a microcell
- The picocell layer does not need to provide full-area coverage, and can be deployed to increase capacity and achievable data rates where needed.



Wireless Infrastructure Product Offering

Backhaul Connectivity

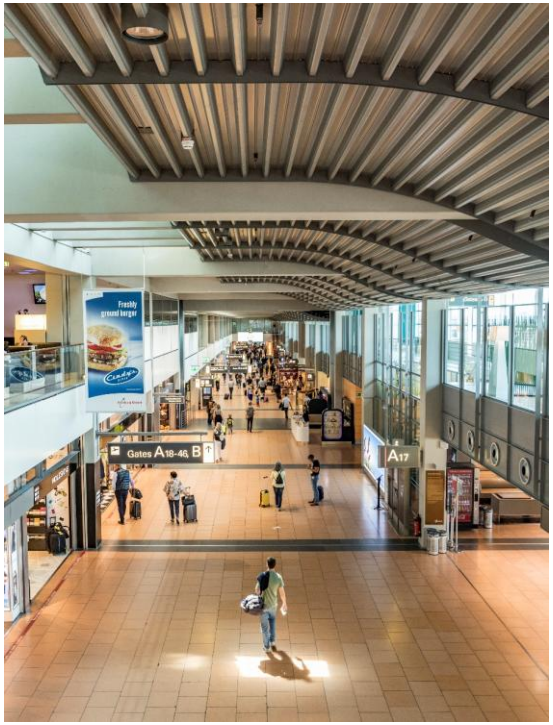


Fiber connectivity solutions for wireless backhaul in both central office and outside plant environment.

Cell Site Installation

Selected offering of Fiber to the Antenna products for remote radio installations which are tailored to customer's need.

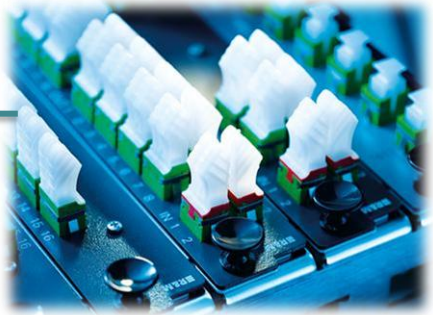
Small Cell & D A S



Passive optical LAN (POLAN) infrastructure solutions for public venues requiring advanced wireless technologies.

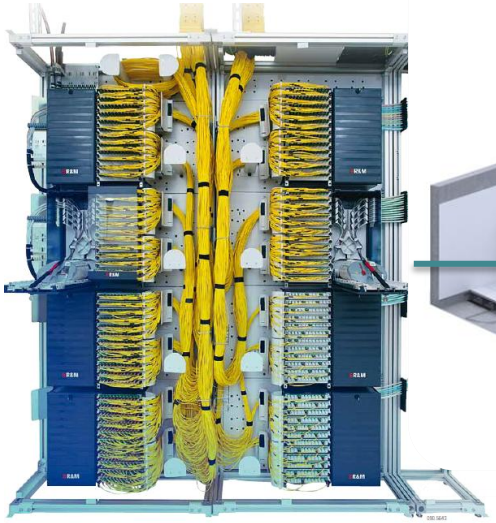
Backhaul Connectivity – Central Office solutions

Cable routing

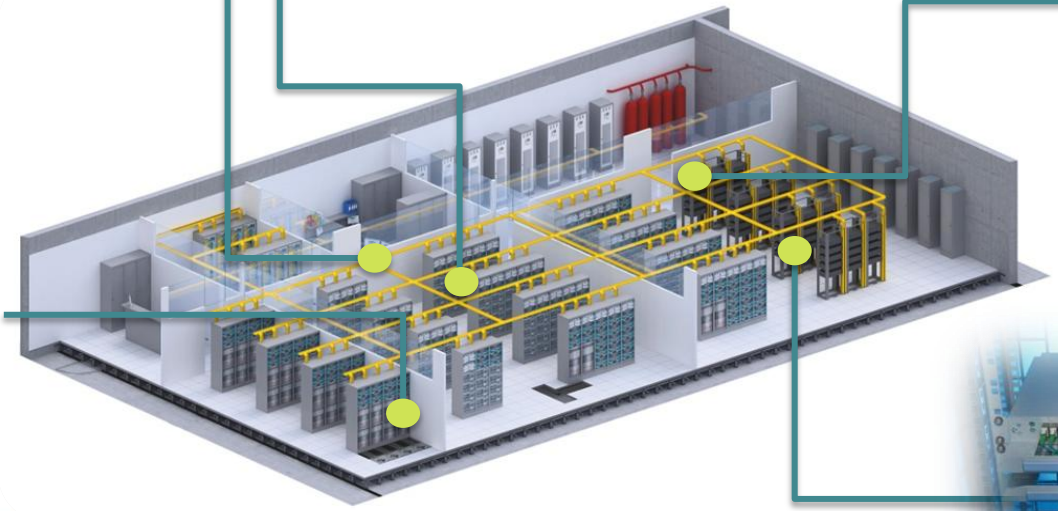


Splitters and WDM’s

Trunk / Breakout cables and Patch Cords



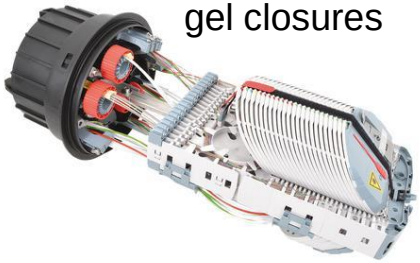
ODF systems



19" Patch Panels

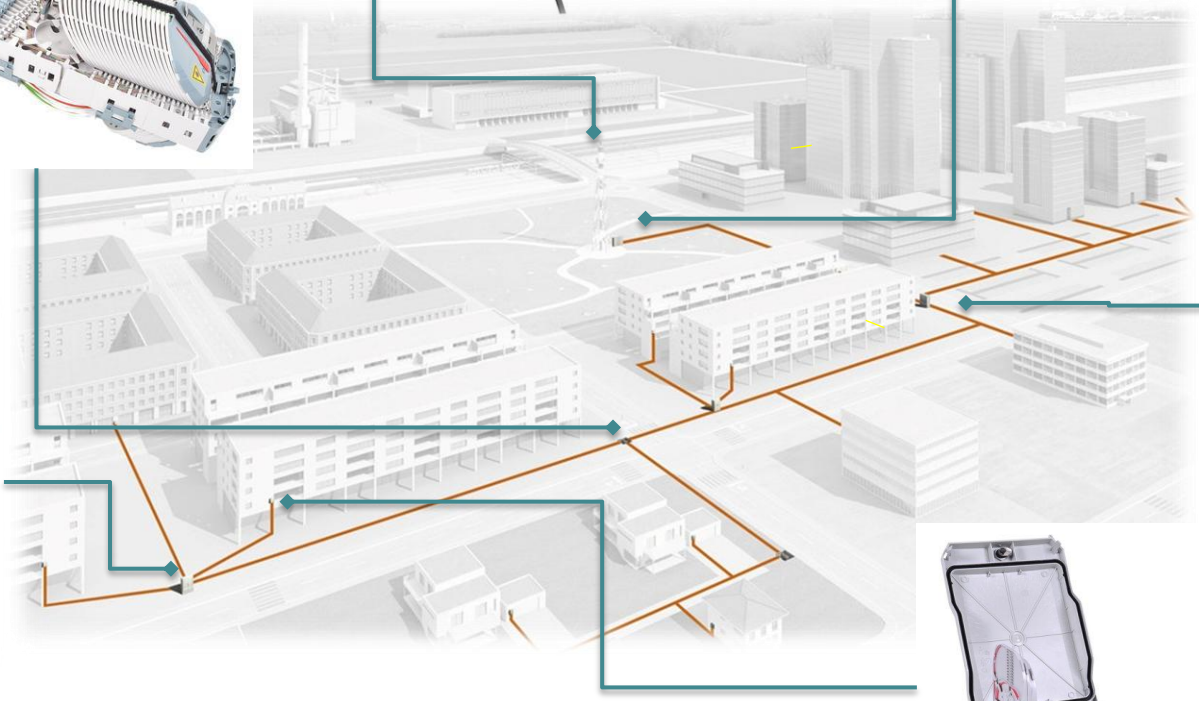
Backhaul Connectivity – Outside plant solutions

SYNO fiber optic gel closures



cable systems

19” Patch Panels



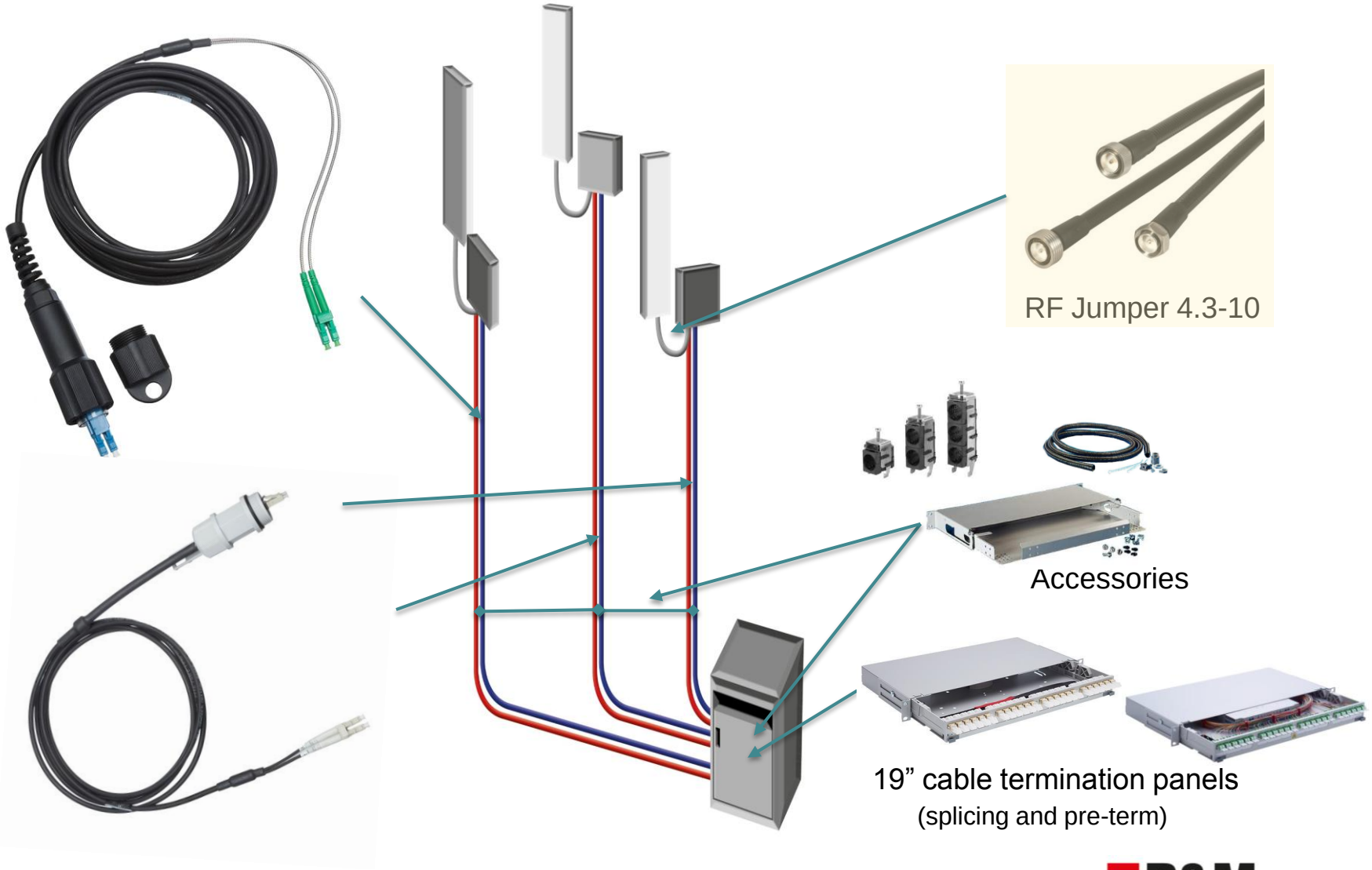
Cross Connection Cabinets

Distribution boxes

High density fiber street cabinets

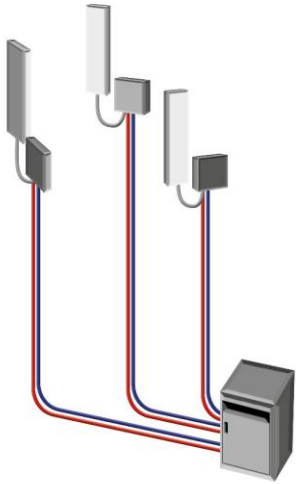
Cell Site Installation – Front Haul Connectivity

discrete feeder solution



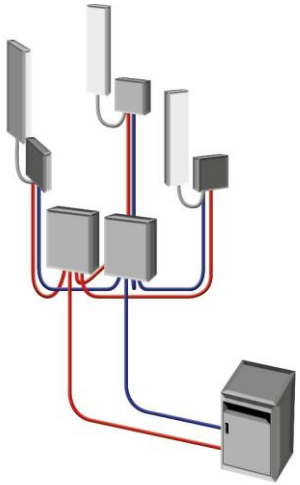
Product Roadmap

1. Discrete power feeder solution – PTTA



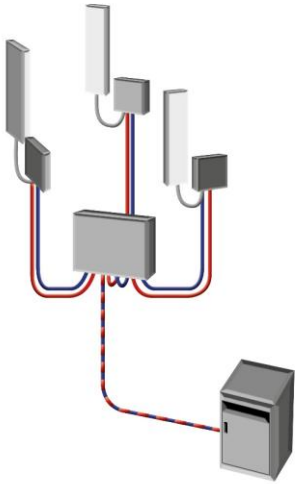
- 2 core power cables (4 mm^2 to 16 mm^2)

2. Discrete trunking solution – Junction Box



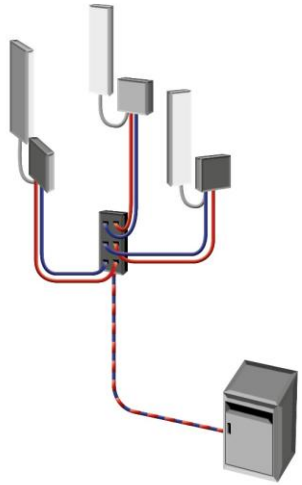
- Multi riser fiber cable
- Multicore power cable
- Junction box FO + CU
- Circuit breakers
- Surge protection

3. Hybrid trunking solution – Junction Box



- Hybrid riser cable
- Pre-assembled hybrid cabling systems
- Hybrid junction box (up to 4 or 8 RRH)

4. Hybrid connector head solution



- Pre-connectorized hybrid cabling solution
- Hybrid connector head (Copper + Fiber Optic)

2018

Small Cell and Distributed Antenna Systems

3 Polaris 6

Splash Outlet

1

2 Polaris

6 Netscale

7 MTP Trunk

8 LC Jumper

Splash sleeve

1. Distribution head outdoor Jumper cord outdoor
2. distribution box indoor
3. WDM junction box outdoor
4. Donor antenna outdoor
5. Antenna indoor
6. FMS distributor indoor
7. Multifiber Trunk cable in- & outdoor
8. Horizontal Link cable (coax or FO)
9. Feeder cable outdoor

SYNO

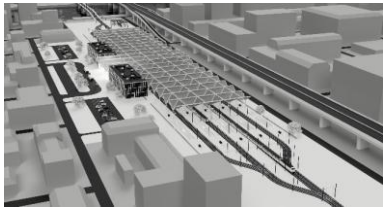
CWDM

R&M

Distributed Antenna System DAS application areas

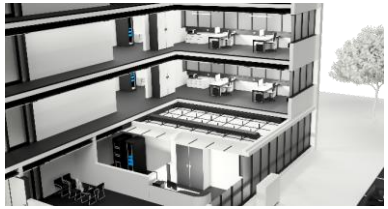
Airport

Train station

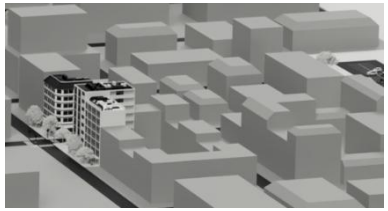


Shopping mall

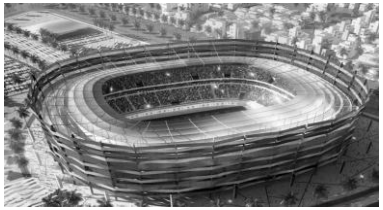
Office building



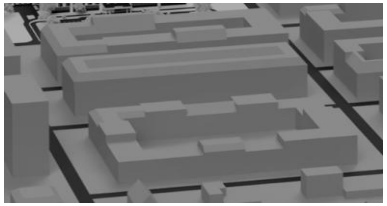
Historic center



Sport stadium



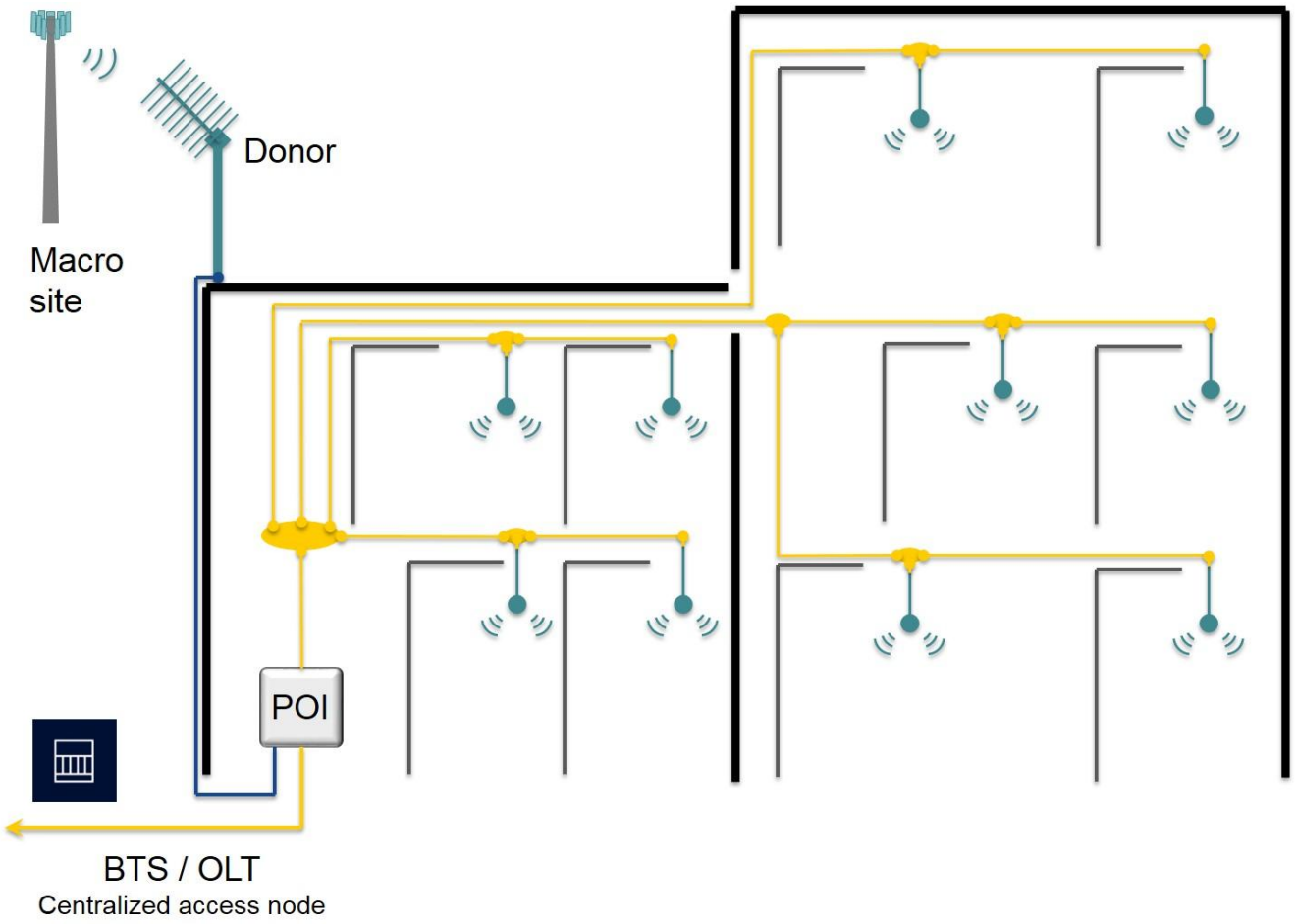
University campus

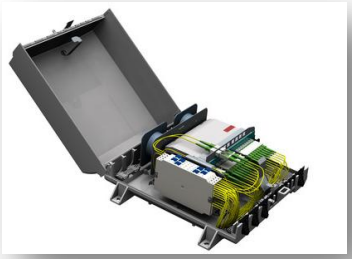


Hospital

R&M

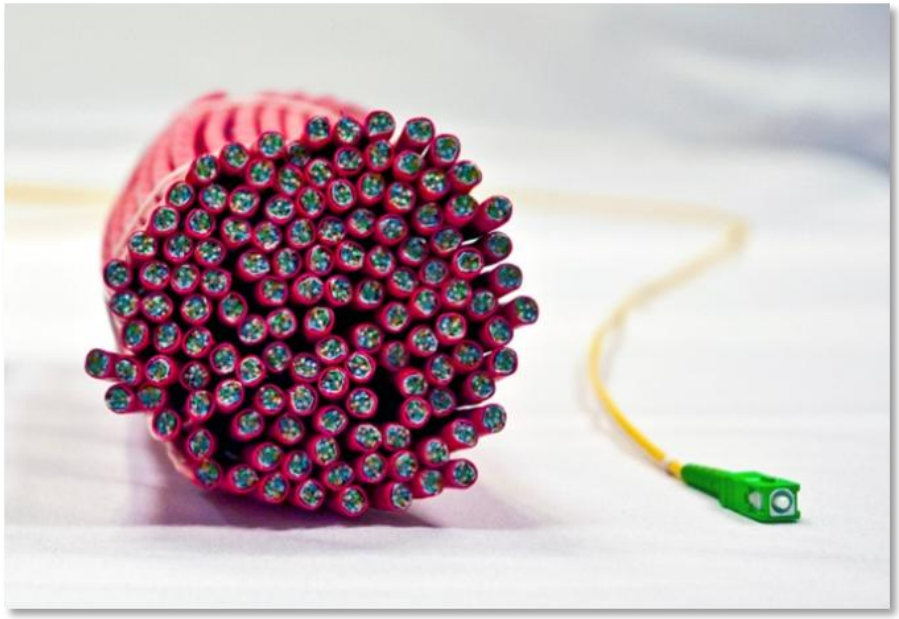
Passive Optical LAN bridges the DAS gap





Reasons for POLAN

- smaller volume
- longer distances
- longevity
- keeps up bandwidth demand
- proven technology
- cost saving CAPEX + OPEX



Nutshell

- These future-ready optical fiber infrastructures support or converge, DAS, WiFi and PON applications such as point of sale, surveillance cameras, business management systems (BMS) and more.
- A single, comprehensive fiber infrastructure that supports multiple technologies allows reduced cost when combining systems that would traditionally be deployed separately
- Fiber provides virtually limitless bandwidth to withstand current and future data demands
- Extended life of system: can upgrade the technology equipment without replacing the infrastructure
- One key challenge for operators is the reduced latency requirement (<1ms), which will be important for virtual reality (VR) scenarios, real time traffic related control such as V2X, connected and autonomous cars, etc
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Thank you for your attention