



Fiber To The Office (FTTO) For Future-Proofed, Energy-Efficient and Economical Premise Cabling

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Agenda



- Modern Data Networks
- Cabling Technologies
- Fiber To The Office (FTTO)
- Why FTTO
- Question & Answer



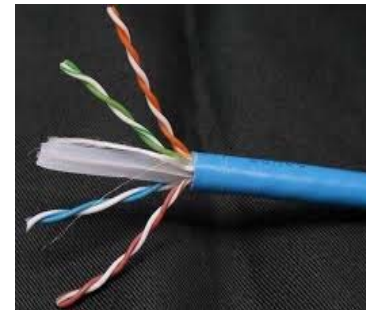
Modern Data Networks

- High performance infrastructure
- Flexibility
- Fault tolerance
- Security
- Investment protection
- Economic efficiency
- Green and sustainable



Media Options

- Twisted pair copper cables
- Fiber optic cables
- Coaxial cables
- Wireless



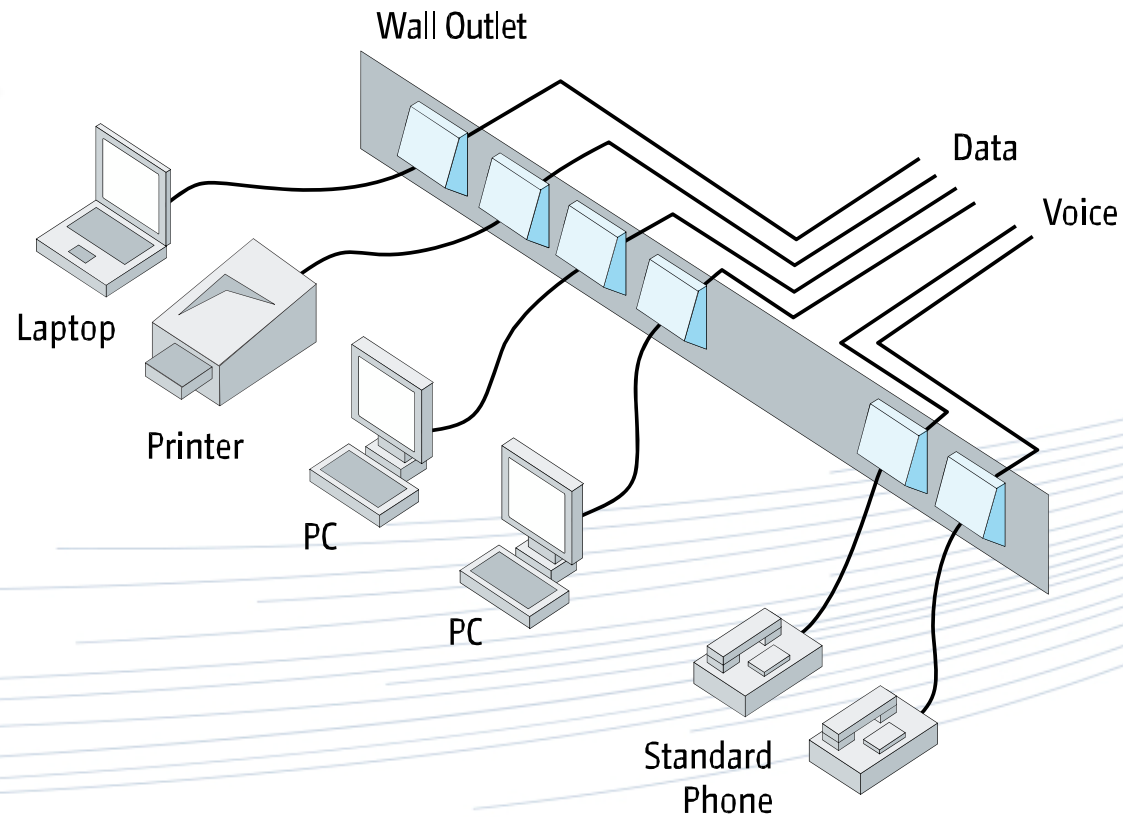


Copper Based Structured Cabling

- Structured Cabling Network – Copper
- Structured Cabling Network – Fiber
 - Passive Optical LAN (POLAN)
 - Fiber To The Office (FTTO)



Copper Based Structured Cabling



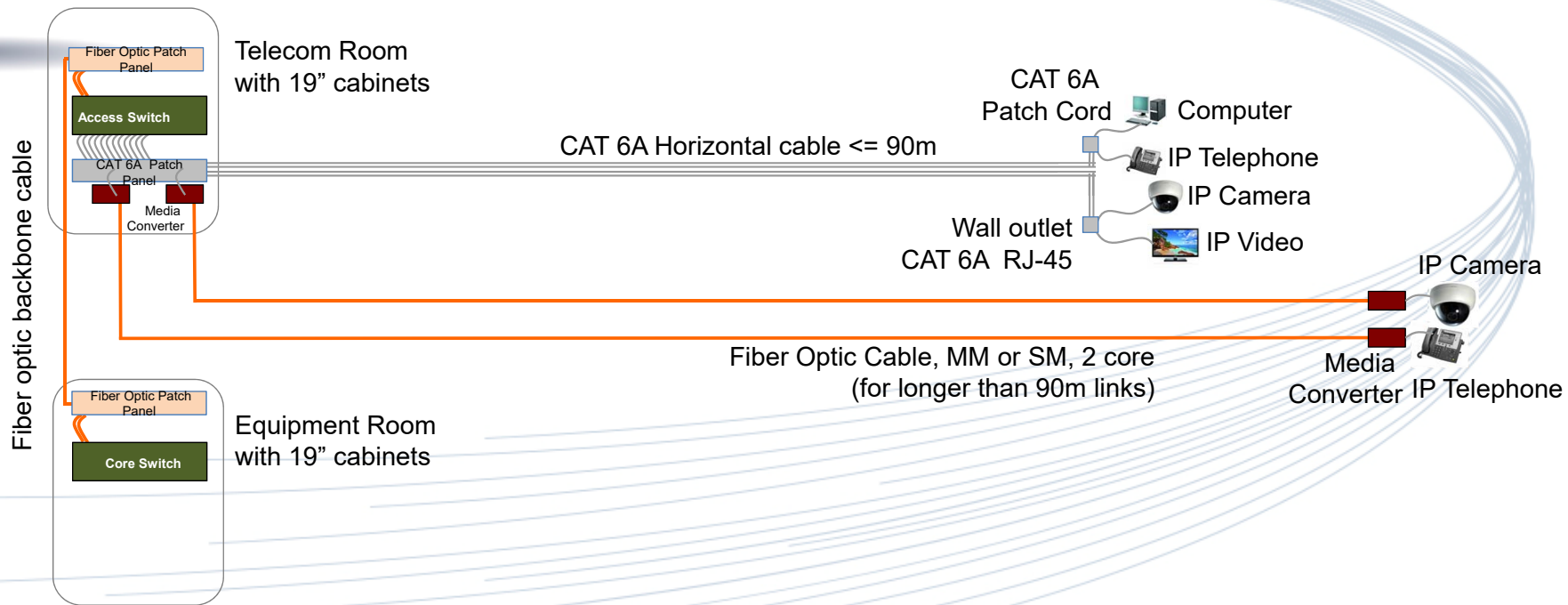


Copper Based Structured Cabling

- Strict length limitations (90 m)
- Many wiring cabinets for termination
- High fire load and susceptibility to EMI
- Electromagnetic and radio frequency interferences
- Average bandwidth per user is limited
 - one central switch port is shared by up to 24 or 48 users



Copper Based Structured Cabling





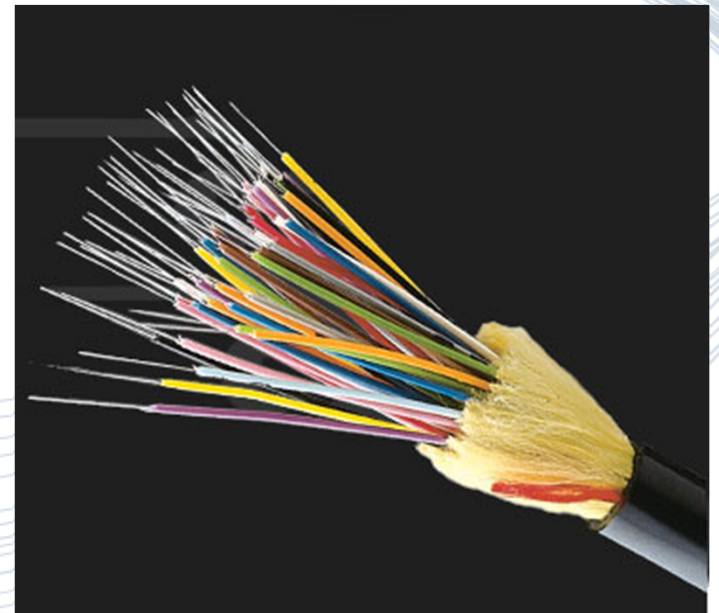
Future Proofed LAN Solutions

- Applications on LANs keep increasing
- Scalable infrastructure for future-proof solution
- Optical fiber is the best medium
- Fiber based LAN concept combines the advantages of fiber with the requirements of modern enterprise networks



Advantages of Optical Fiber

- Higher data rates
- Larger line lengths
- Freedom from EMI/RFI
- Smaller pathways
- High security





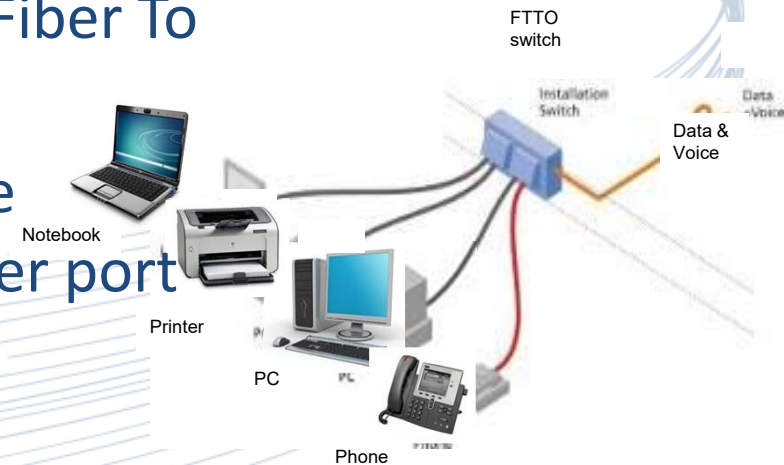
Advantages of Fiber Based SCN

- Future-proof (scalable, flexible, sustainable)
- Investment protection/life cycle
- Secure network
- Low investment cost
- Low maintenance cost/simple administration
- Quick and simple realization
- Up to 70% less energy consumption



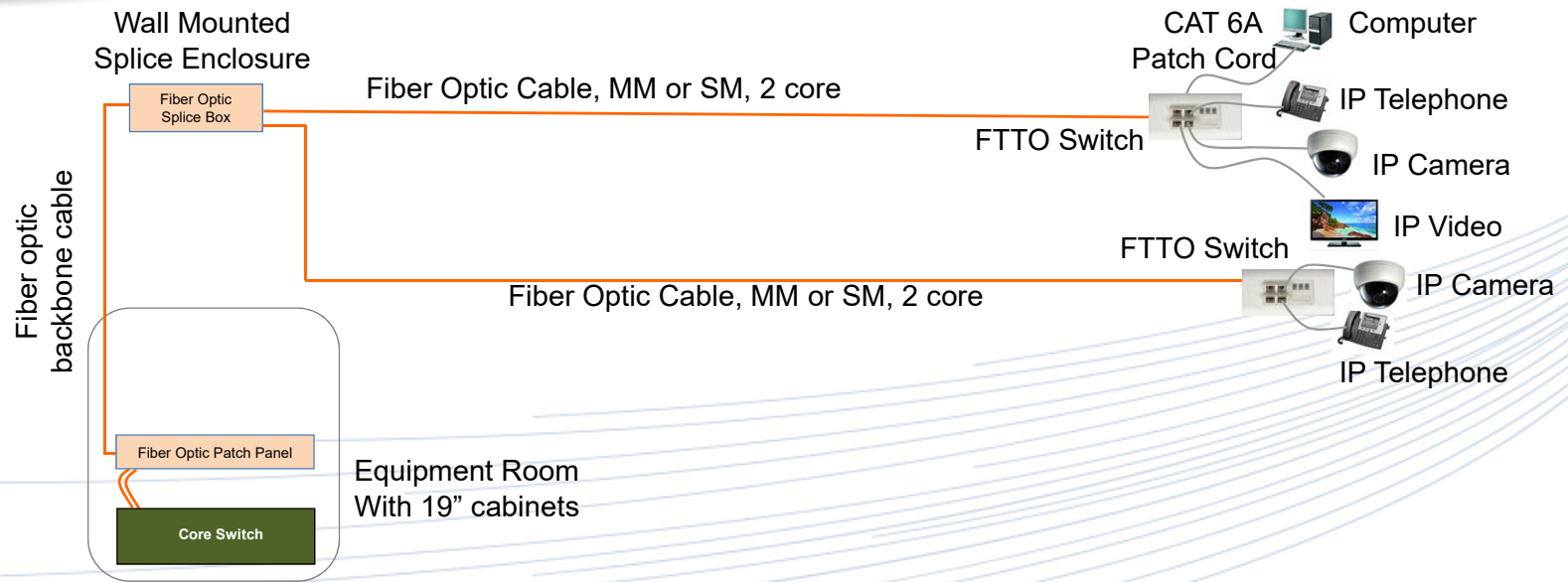
Fiber Based Structured Cabling

- Fiber is distributed to the workplace (connection point)
- Fiber to copper conversion via intelligent Fiber To The Office (FTTO) micro-switches
- Up to four twisted pair (TP) devices can be connected via the micro-switch to one fiber port
- Power over Ethernet (PoE+)
- Simple and flexible network roll-out





Fiber Based Structured Cabling





Fiber Based Structured Cabling

- No need for floor telecom rooms
- 60% less installation time
- Low cable volume
- High bandwidth reserves thanks to fiber
- No grounding or earthing problems
- No problems with electromagnetic interference
- Simple redundancy up to the network outlet

Up to 40% less TCO (Total Cost of Ownership)

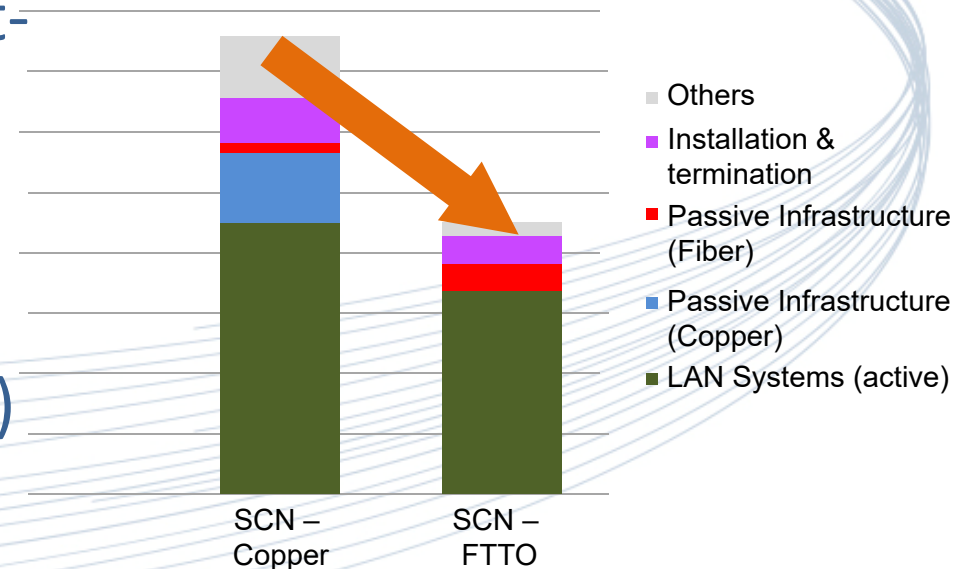




FTTO Reduces Cost

FTTO Makes Gigabit Ethernet Cost-Effective for medium to large IT-Infrastructures

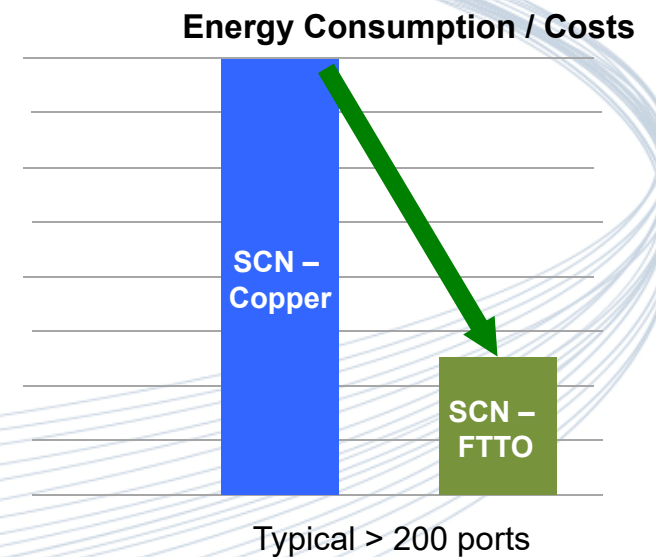
- CAPEX (Capital expenditure)
- OPEX (Operational expenditure)
- Flexibility





FTTO – Green and Sustainable

- FTTO saves up to 70% in energy costs
- FTTO is the greenest network solution
- No need for energy hungry floor distribution rooms
 - Less power consumed
 - Less active equipment also means less CO2-Footprint and less impact on the environment
 - Less technical rooms also means more useable area





Fiber Requires Less Energy

Due to fibre physics, less energy is required to transport data over fibre.

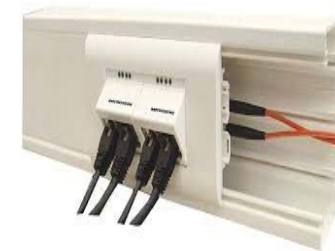
- Fibre transmission can halve energy requirements in comparison with traditional copper cabling solutions.
- Fibre optic cables can carry signals with much less energy loss than copper cable as copper wires lose signal energy as heat ($P=I^2R$) due to their resistance



FTTO Consumes Low Power

Micro FTTO switch consumes low power, i.e. 0.5 – 1 W per port for data transmission

- as against 3-4 W per port for traditional rack mounted switches



0.5-1 W/port



3-4 W/port



FTTO is Energy Efficient

FTTO micro-switches support
“Eco-Mode” and Energy
Efficient Ethernet (IEEE 802.3az)



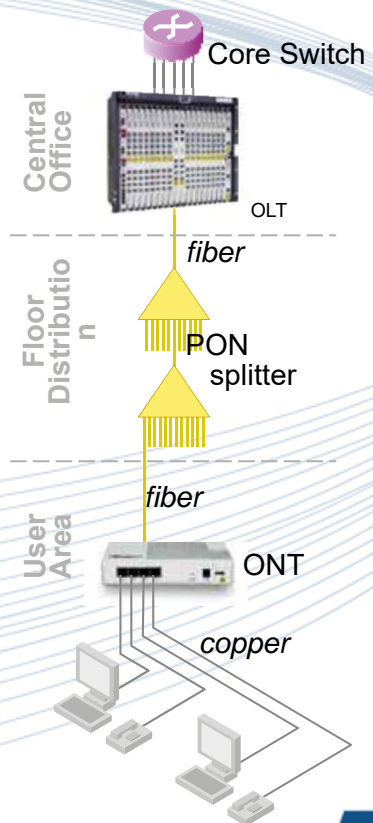
Energy
Efficient
Ethernet



POLAN

- Passive Optical LAN
- Originated from WAN
- Similar to FTTH
- Uses PON components in an indoor environment
- Optical fiber (single mode) is deployed almost all the way to the end user

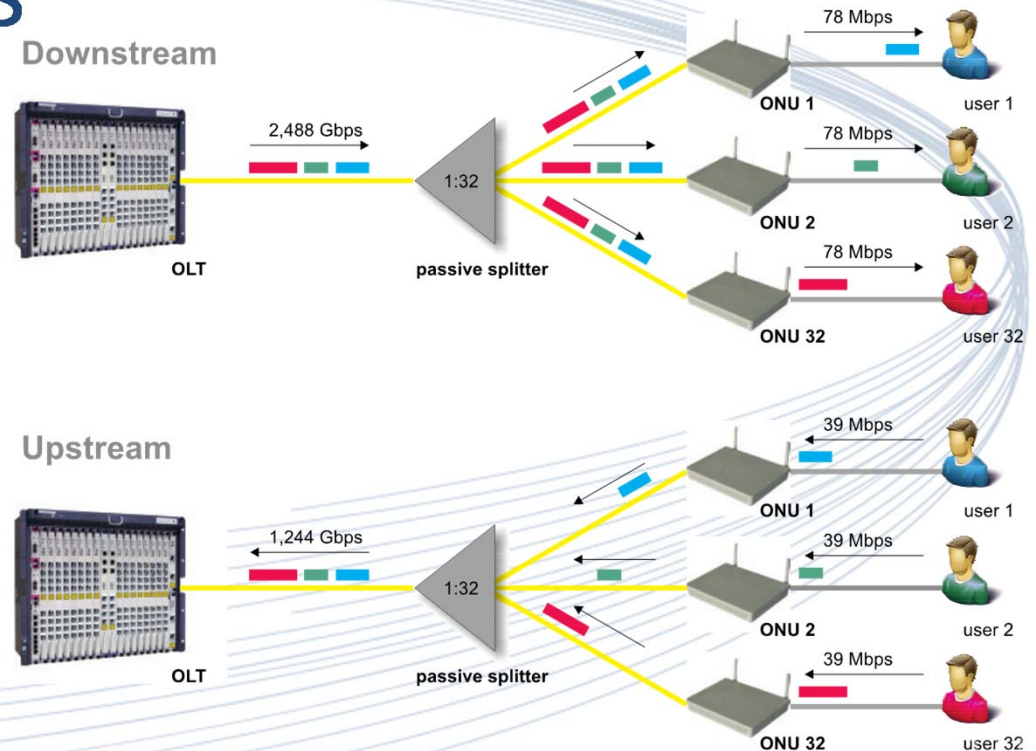
Passive Optical LAN (POLAN)





POLAN Disadvantages

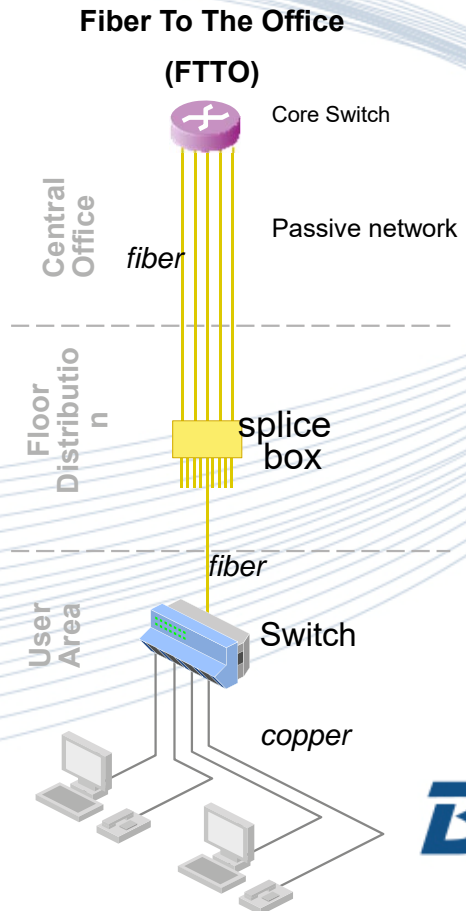
- Shared bandwidth
- Time Division Multiplexing
- OLT/ONT from single vendor
- Link upgrades
- Building automation services





Fiber To The Office (FTTO)

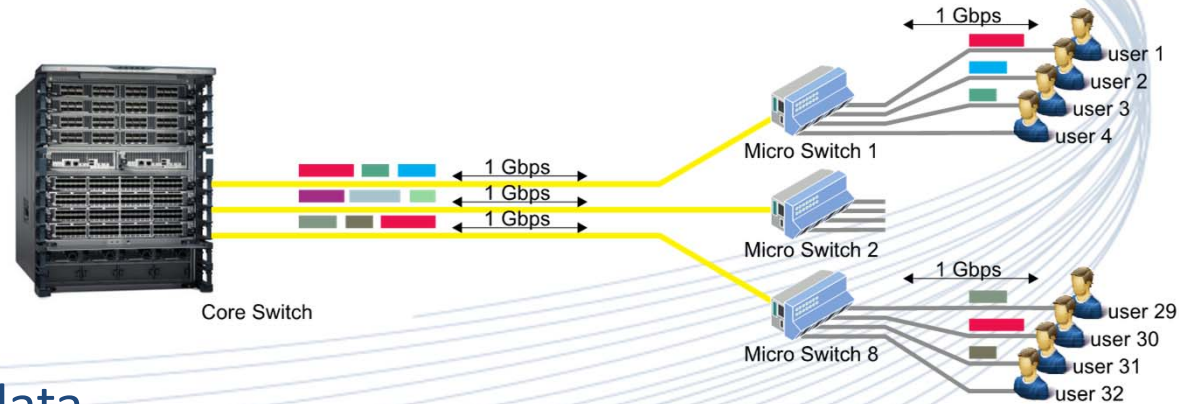
- Developed for LAN sector
- Ethernet Switches at central position
- Future proof concept
- Gigabit performance





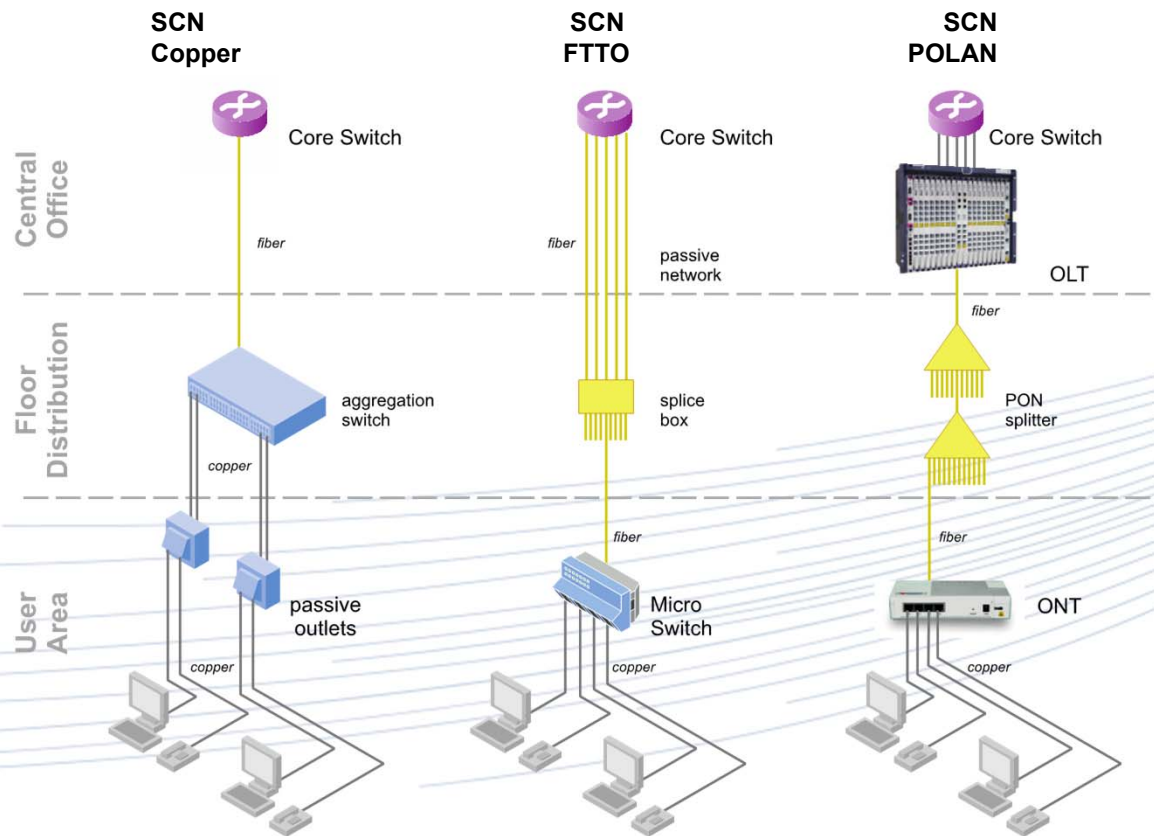
FTTO Advantages

- 1 Gb shared by only 4 users, dynamic allocation
- Multi vendor products can be used
- Cabling infrastructure is application-neutral
- Selective upgrades to higher data rates (10G)
- Support multiple redundancy options





Comparison of Technologies



FTTO Switch



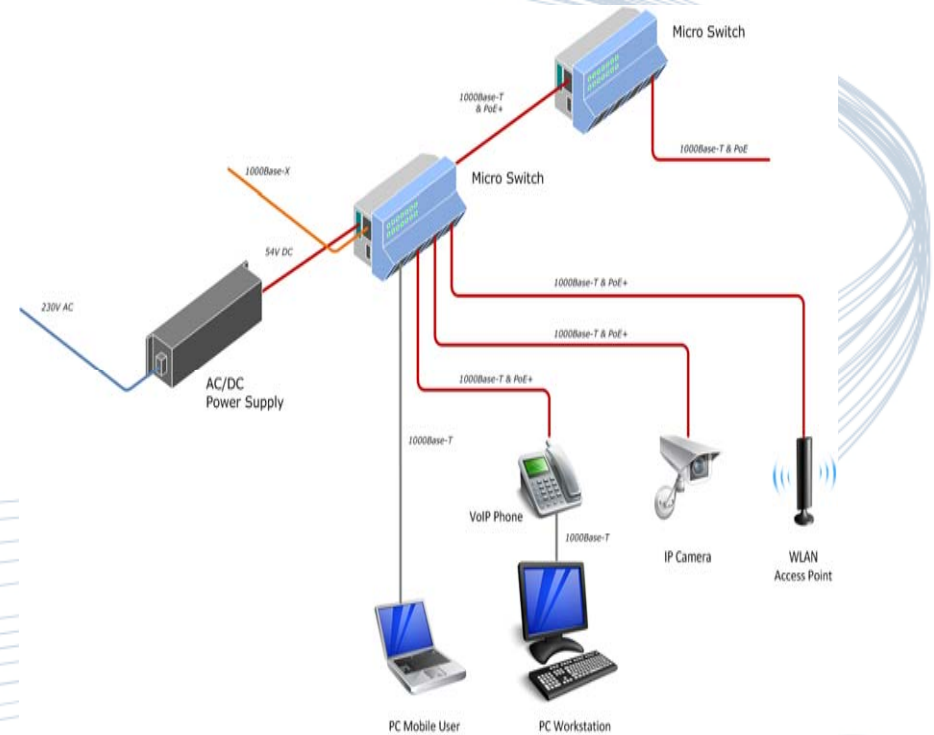
- Easy installation and operation
- Compact dimensions, universal 45x45 design
- Universal snap-In mounting into
 - Cable trunks, sub-floor boxes, wall boxes
 - In wall / desktop (desktop box, laboratory unit)
 - Distribution racks (DIN-rails)
- Simple configuration and monitoring via network management





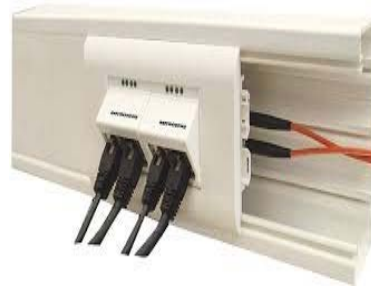
FTTO Power Supply and PoE+

- IEEE Std. 802.3at, compatible according to PoE+ (802.3at)
- Up to 30 W per end device
- min. operating voltage 50V (typ. 54V)





FTTO Installation Options





FTTO is Standard Compliant

ANSI/TIA-568.1-D

- Standardised as Centralized cabling
- Singlemode cable can now be used in horizontal

EN 50173

Recognized as collapsed backbone cabling

ISO 11801

Recognized as FTTD and centralized optical architecture (COA)

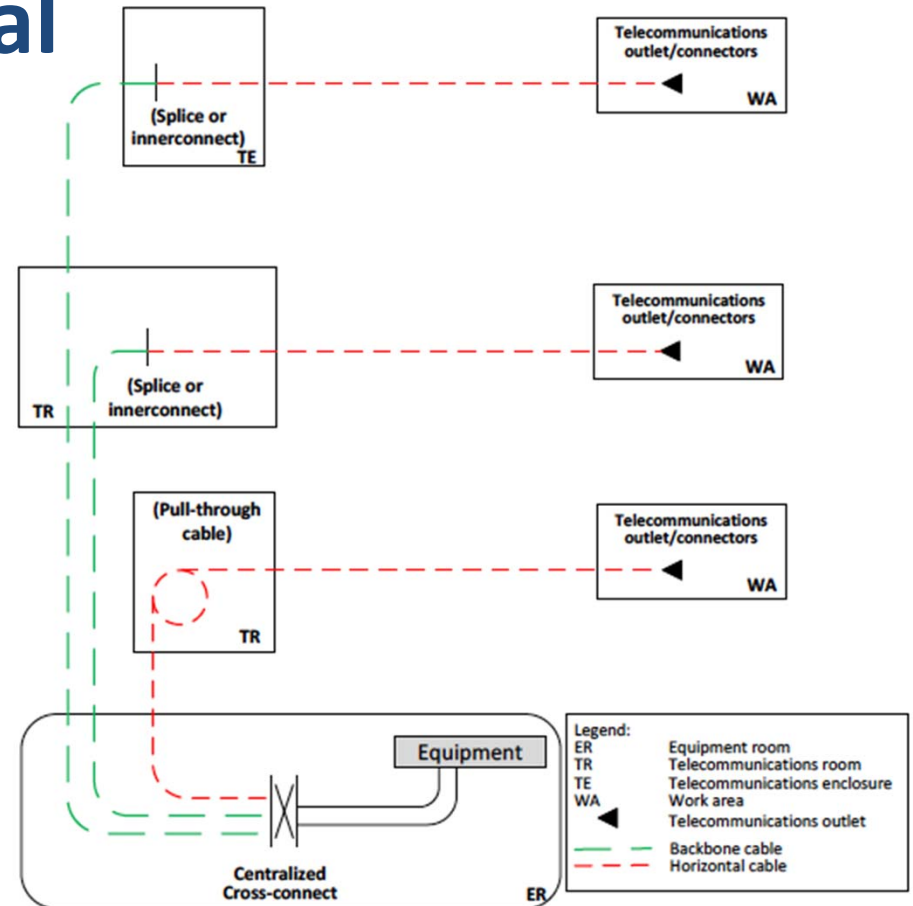


Centralized Optical Fiber Cabling

ANSI/TIA-568.1-D

Commercial Building
Telecommunications Cabling

Standard

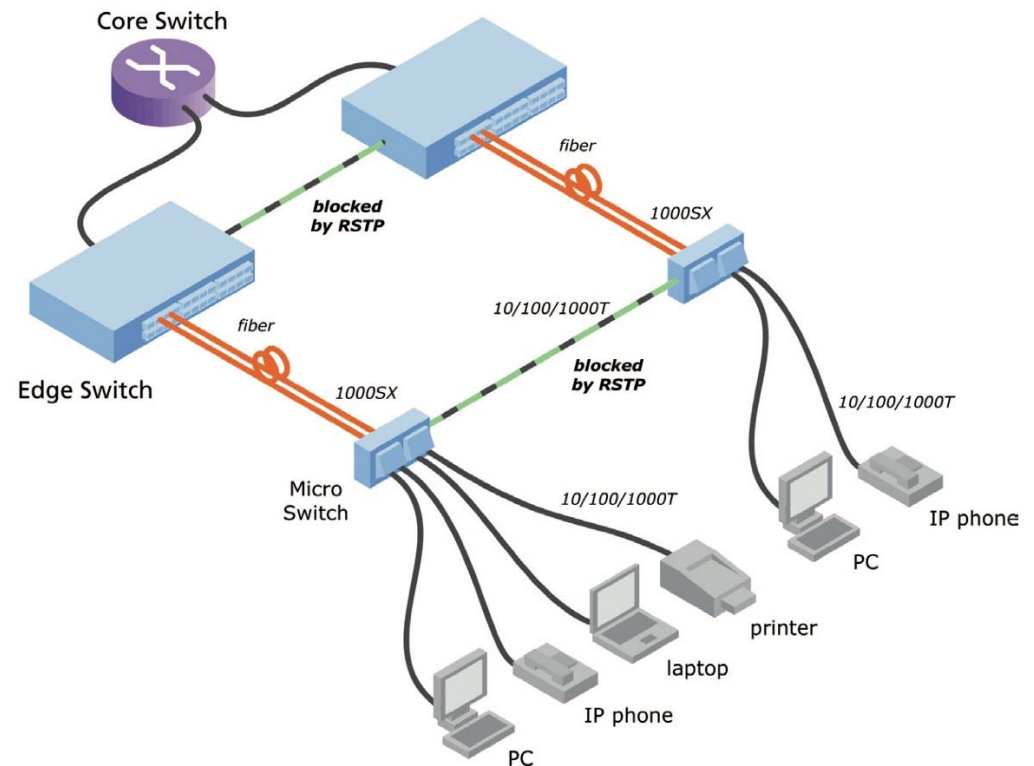




FTTO Redundancy – Variant 1

Classical FTTO with Cascading via Copper

- The simplest form of redundancy: Two micro switches are connected via a copper patch cable

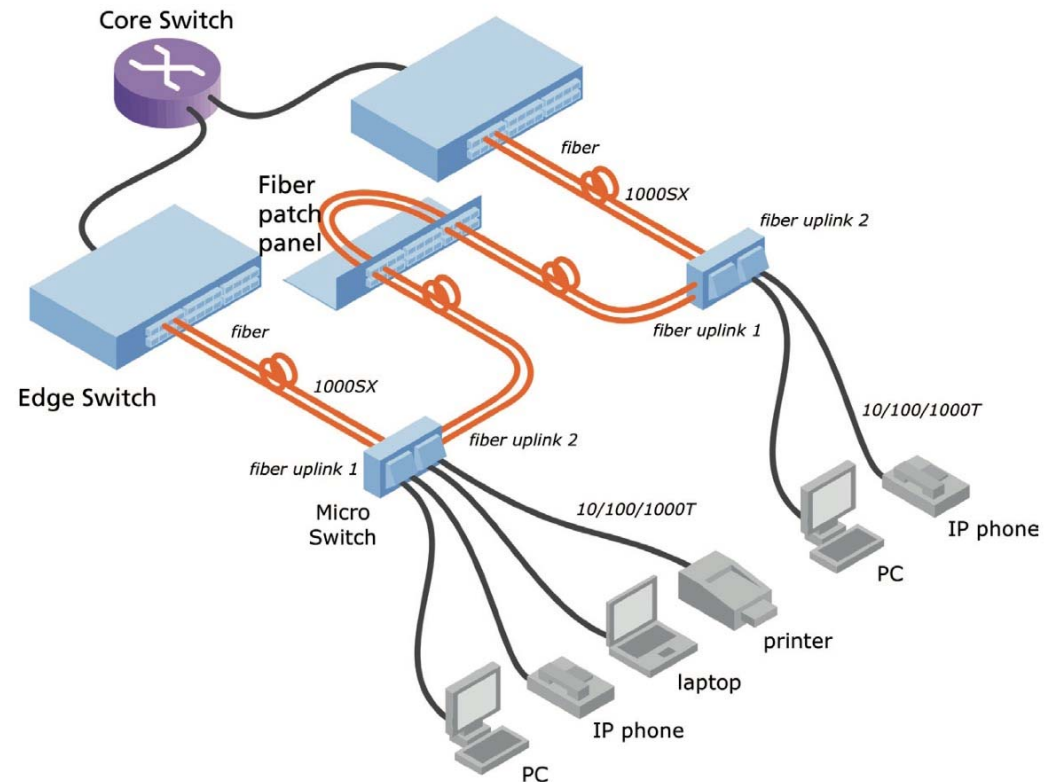




FTTO Redundancy – Variant 2

Classical FTTO with Cascading via Fiber Optics

- Cascading via fiber optics: One port of a micro switch is connected with a core switch, the second with another micro switch

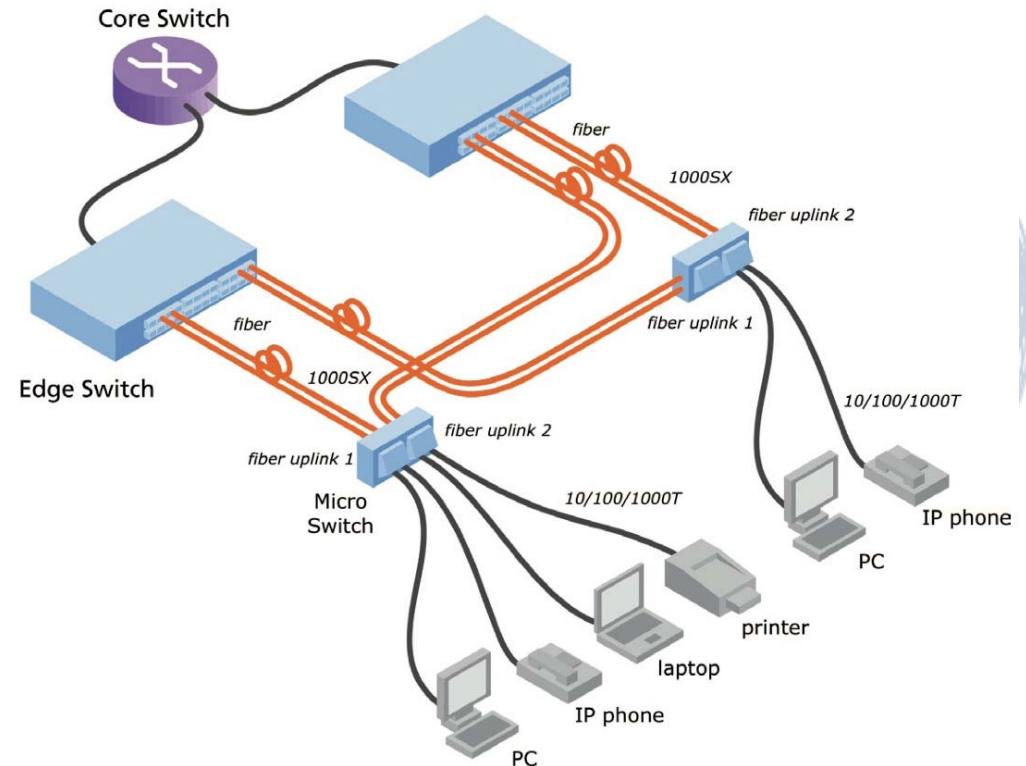




FTTO Redundancy – Variant 3

Classical Dual Homing –
Double Fiber Connections

- Dual homing: micro switch with two mutually independent fiber optic connections, connected with two separate switches

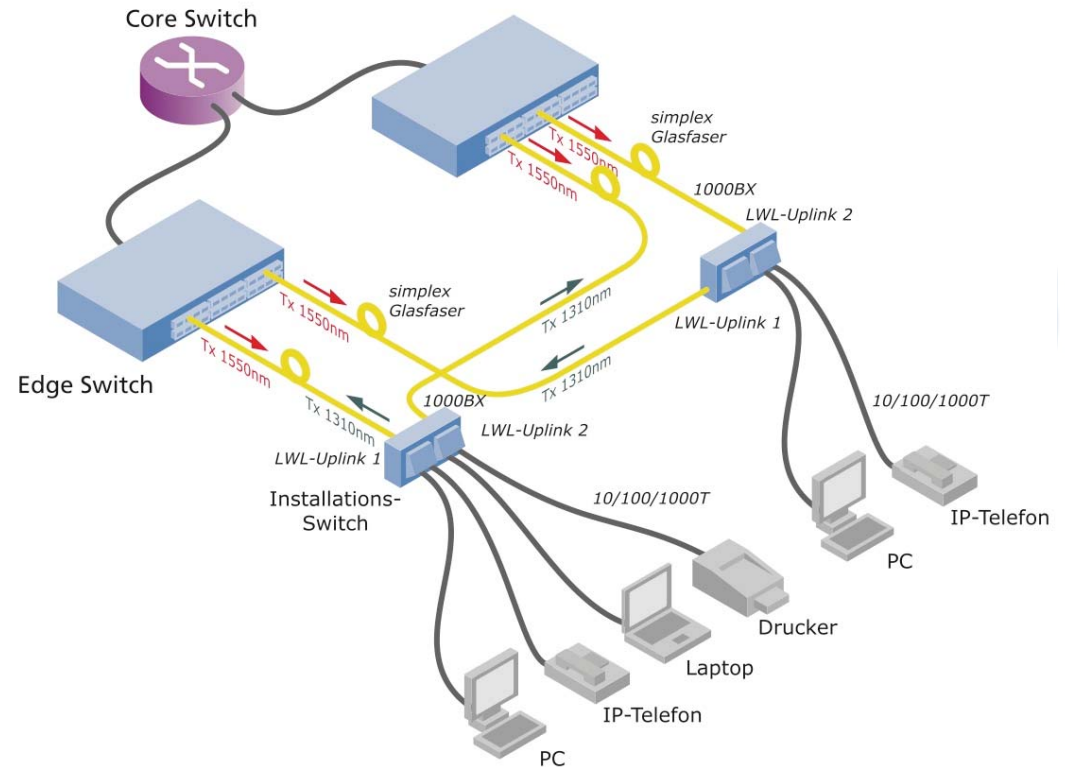




FTTO Redundancy – Variant 4

Dual Homing with Single Fiber

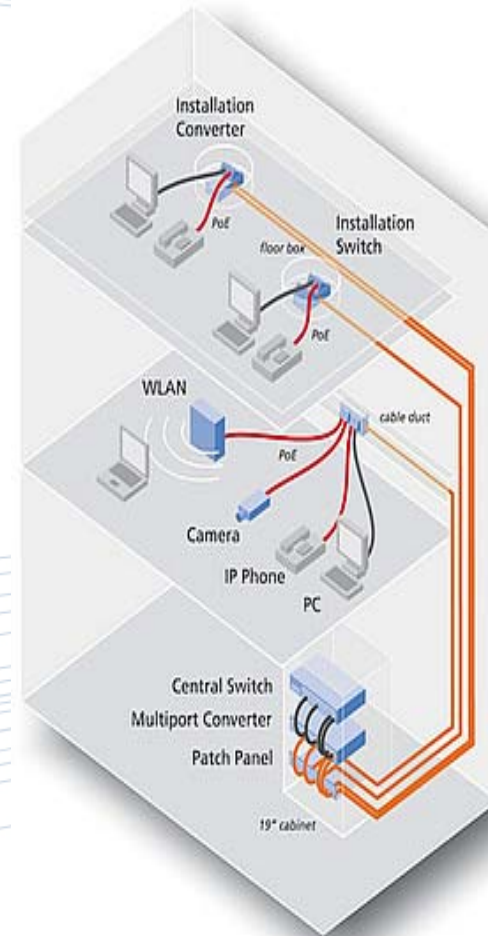
- Dual homing with single fiber: switches with BiDi-SFPs





FTTO for Commercial Buildings

- Future proof hardware
- Reduced energy consumption
- Flexible configuration management
- Tamper proof housing
- Innovative installation concept

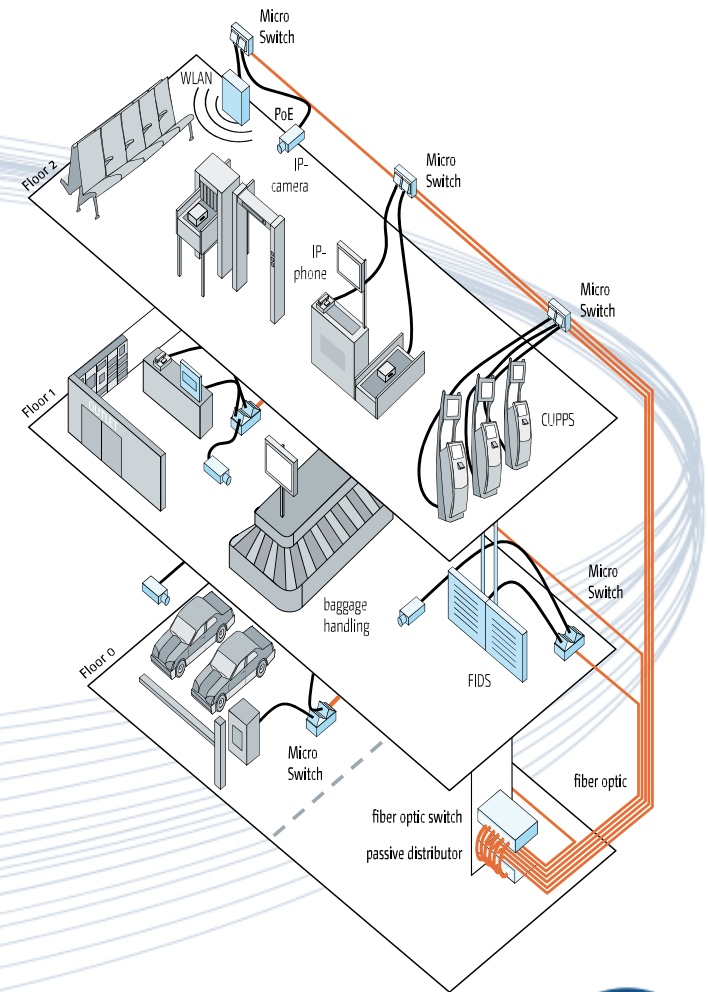




FTTO for Airports

Reliable in-house networking architecture for airports

- Almost no length limitations
- Minimal wiring cabinets needed
- No EMI susceptibility and very high network reliability
- Easily expandable by using downlink port

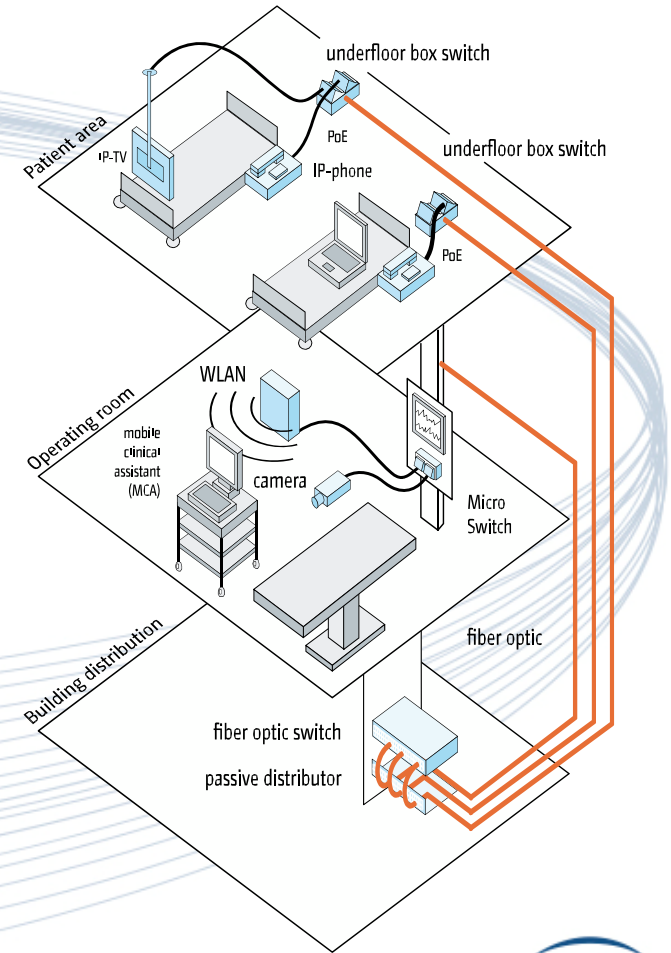




FTTO for Healthcare

Flexible applications for triple play throughout the entire clinical environment

- Applications in patient care, operating theatre and administrative areas
- Direct integration into ceiling-mounted units
- Integration of IP-based call systems
- Suitable for IP-based patient monitoring

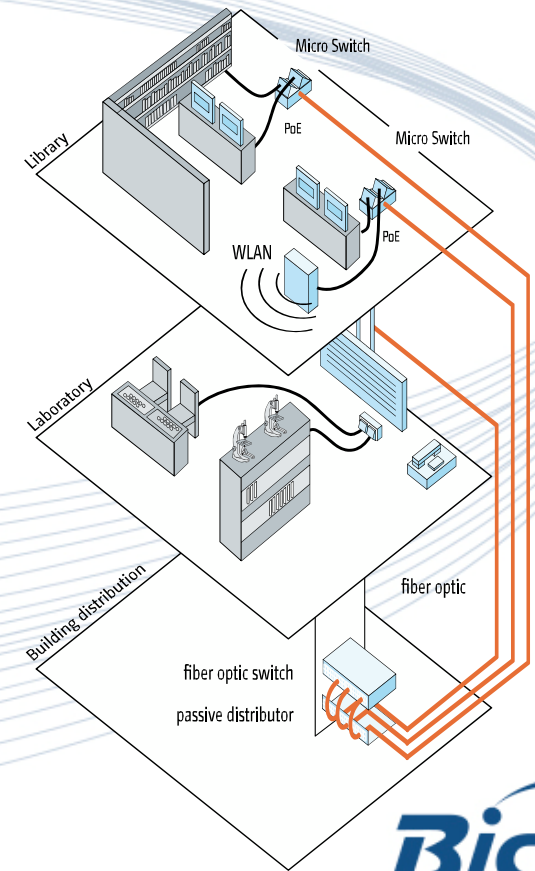




FTTO for Campus/Universities

Flexible wireless network access to educational content and information systems

- Integrated powering of wireless equipment and VoIP telephones via Power-over-Ethernet
- Usable with all important security protocols (authentication in accordance with IEEE 802.1X, RADIUS)



 Future-proof thanks to IPv6 support





FTTO Installations

Dubai International Airport
World's busiest international
airport

Concourse A and D





FTTO Installations

DNU - Det Nye
Universitetshospital

Denmark's fiber-based
hospital of the future





FTTO Installations

College de l'oise, France



Ministry of Justice, Kiel/Germany





FTTO Installations

Leipzig Medical University, Germany



Cannes Hospital, France





FTTO Installations

Munich University, Germany



Copernicus Airport, Wroclaw, Poland





FTTO Installations

E.ON Ruhrgas AG
Essen/Germany

The Territorial Hospital Centre (CHT) of New Caledonia, a French territory in the South Pacific





FTTO Installations

Four Star Hotel Complex
Bora Bora, French Polynesia



Władysław Biegański Regional Specialist
Hospital, Grudziądz, Poland





FTTO Newest Project

Bahrain Airport



Bahrain awards \$1.1bn contracts for new airport terminal

By Neil Halligan Sunday, 24 January 2016 4:40 PM

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Bahrain has awarded a contract worth \$1.1 billion to construct a brand new terminal at Bahrain International Airport to a joint venture of between the UAE's Arabtec and TAV Construction from Turkey.

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Companies



Summary

- Fiber based structured cabling is more beneficial in many ways
- FTTO is a future proofed and profitable network concept
- CAPEX and OPEX are lower than conventional copper based structured cabling
- Fiber based SCN is green and sustainable
- Increasing number of projects with FTTO



QUESTIONS?



Thank you for listening



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