BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

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Department of Electronics and Telecommunication Engineering

Optical Communication

Presentation

on

"OPTICAL NETWORK DEPLOYMENT: LONG HAUL AND MAN NETWORKS"

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Optical Network Deployment

Optical network deployment is the process of setting up a communication infrastructure using optical fibers to transmit data through light signals.
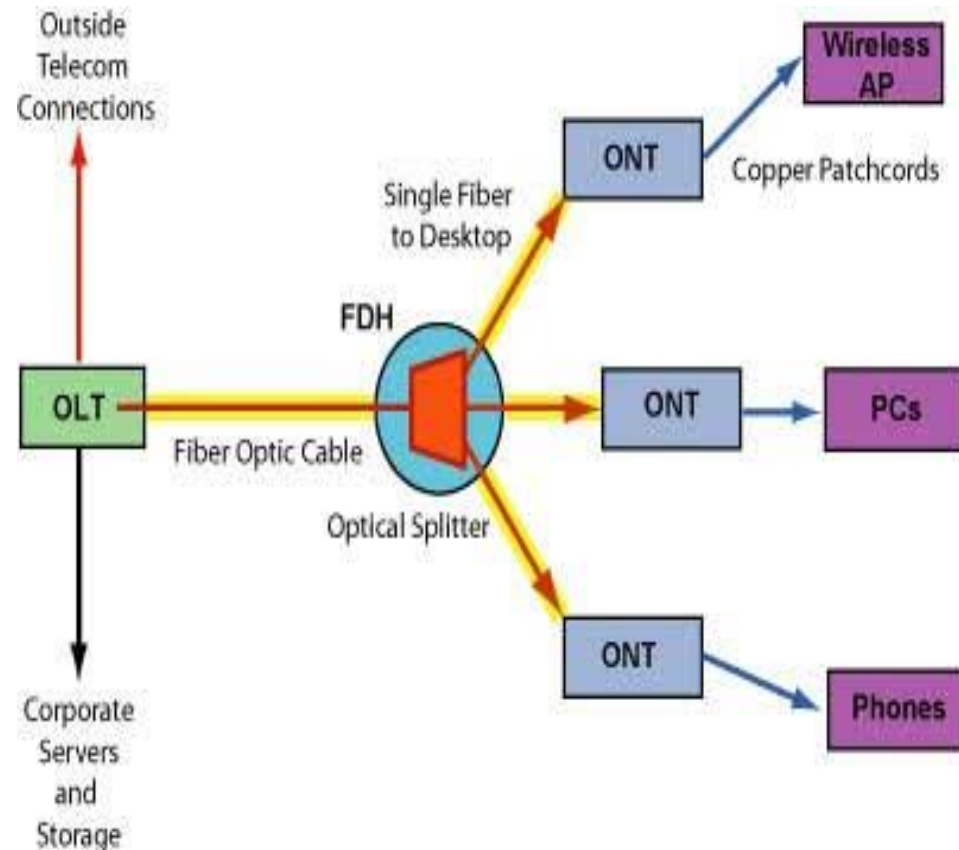
Survey of deployment sites to identify potential challenges or opportunities.

Fiber optic cable installation along the planned router, either underground or on utility poles.

Install optical networking equipment, including transmitters, receivers, and amplifiers, at appropriate locations

Outside Telecom Connections

Wireless AP

ONT

Single Fiber to Desktop

Copper Patchcords

FDH

OLT

Fiber Optic Cable

ONT

PCs

Optical Splitter

Corporate Servers and Storage

ONT

Phones

Optical networking technologies in telecommunication

- Fiber optic technology is used in communications since its delivery of bandwidth satisfies the demands of big businesses, cloud operators, and internet content providers.

- They increase network capacity, effectiveness, and flexibility, enabling on-demand service deployment and configuration.

- The telecom sector can provide services up to Gbps and more for each user end because of its ability to deliver greater wavelength capacity and wavelengths per fiber in fiber optic technology.

Long Haul Networks

- A long-haul network as the name implies is a network connecting several regional or national networks together.
- These networks are also referred to as core or backbone networks and they also interconnect other long-haul networks to extend global interconnectivity between national domains.
- A current long-haul optical network typically comprises point-to-point DWDM links with optical regenerators at end points and with erbium-doped fiber amplifiers (EDFAs) placed between the end terminals as shown:
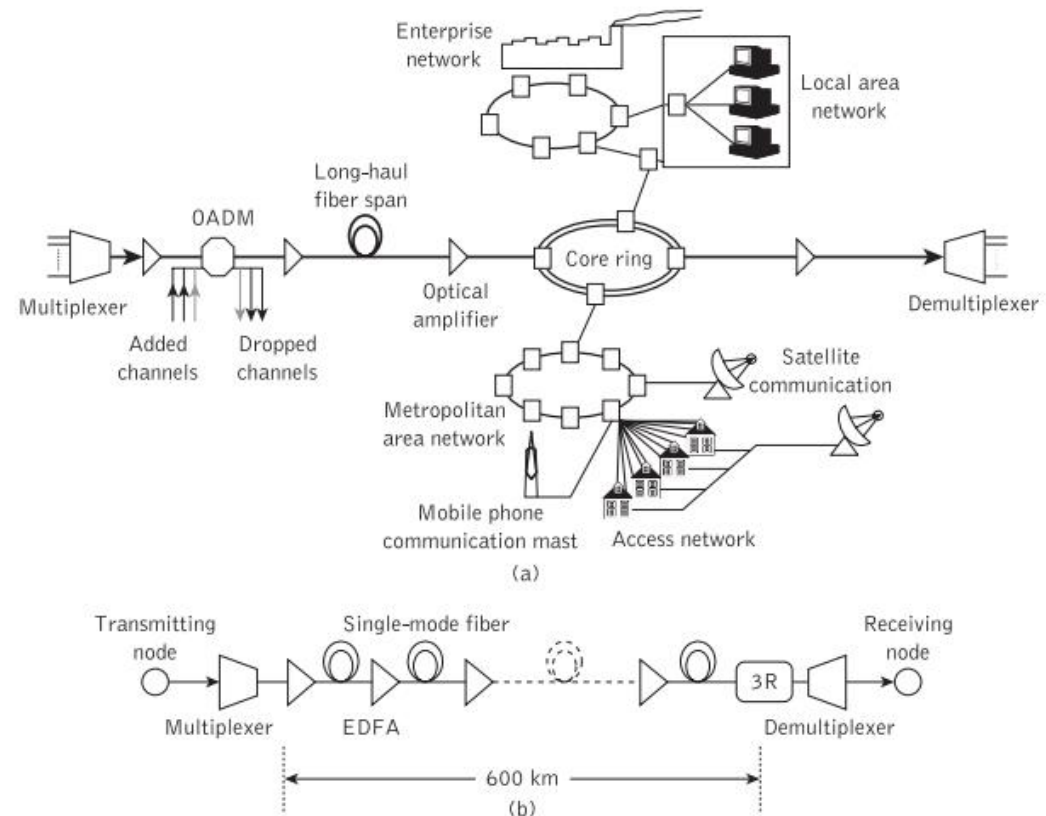
Optical network: (a) a modern, complex dense wavelength division multiplexed (DWDM) backbone network with add/drop channels, also interconnecting metropolitan, access, local area and enterprise networks; (b) structure of a point-to point DWDM link for the long-haul network

Long Haul Networks

Long-haul optical fiber networks are now classified in relation to their maximum achievable distance without optical signal regeneration by designations of long-haul, extended long-haul (ELH) and ultra long-haul (ULH). The ranges of the transmission distances for these designations are:

- Long-haul optical fiber networks from 600 to 1000 km
- Extended long-haul (ELH) from 1000 to 2000 km
- Ultra long-haul (ULH) from 2000 to 4000 km

Metropolitan Area Networks

- Provide regional interface interconnecting the access network end users with long-haul networks.
- Requires the networks to be fast, scalable, modular and reconfigurable.
- Must be cost effective in terms of both operation and maintenance.
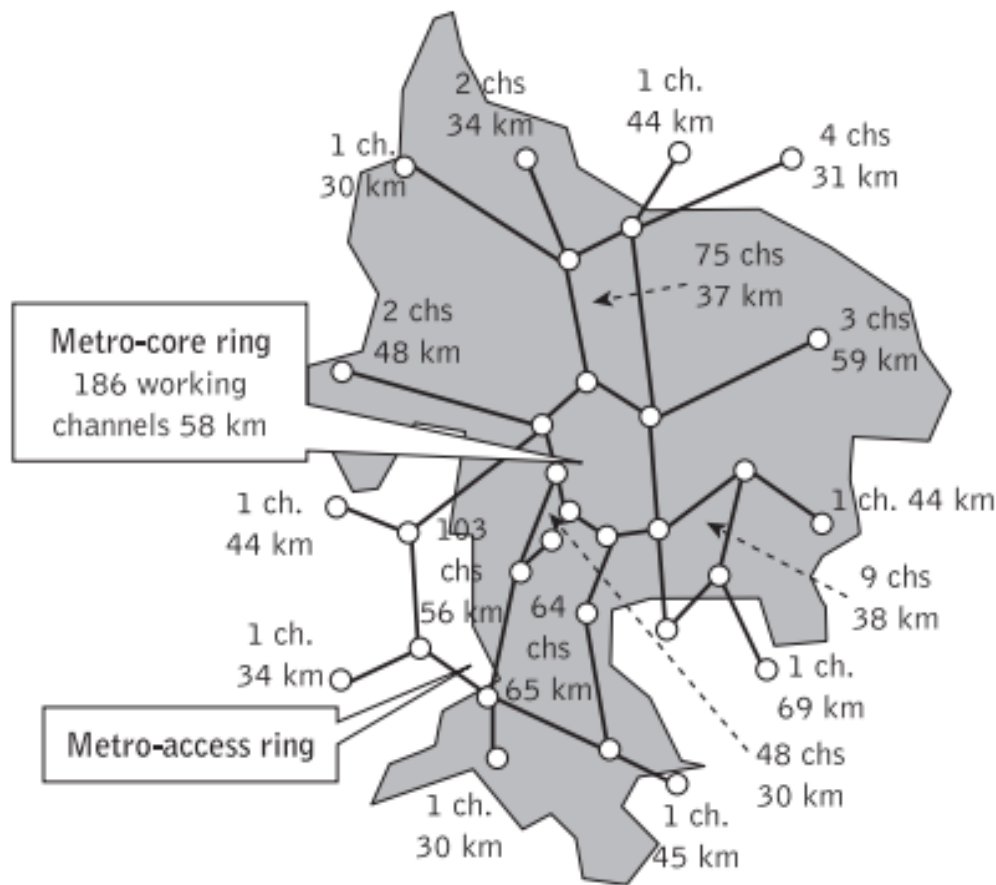- **RING TOPOLOGIES**
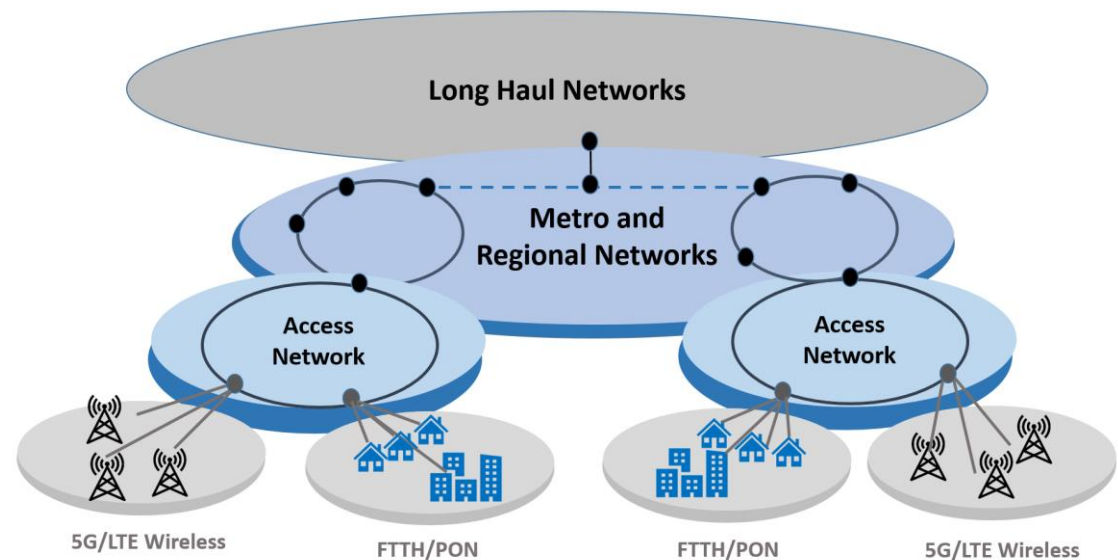
Metropolitan Area Networks

- Digital Cross Connect (DXC) or Points-of-Presence (POP):
  - Interconnects two metro ring networks
  - Acts as a hub node between the two networks
- MANs tend to be divided into two segments:
  1. metro core or core ring
  2. metro access or collector rings

Technologies used:
1. SDH/SONET
2. DWDM
3. MPLS
4. Ethernet
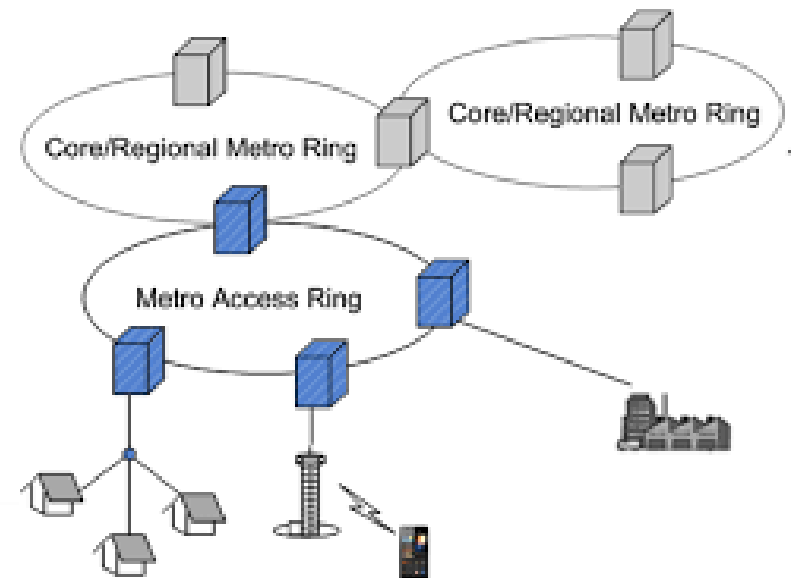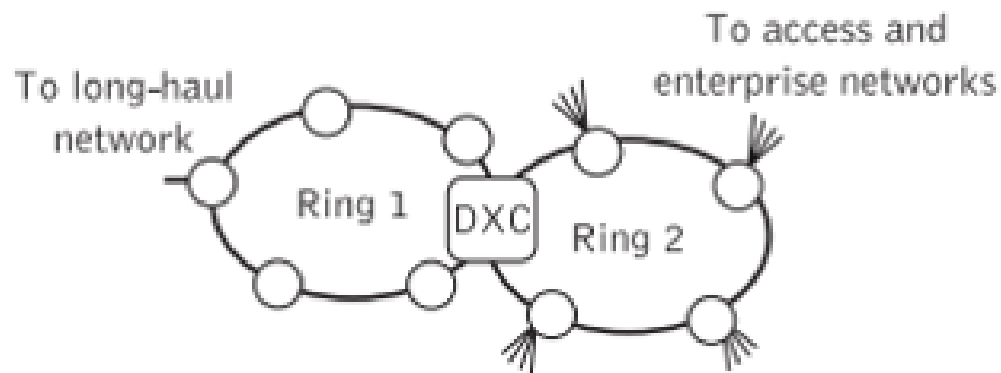
Metropolitan Area Networks

Network of a Typical Large city includes:

- Central metro-core ring
- Five metro-access rings connected to twelve dedicated links from the premises
- Core ring interconnected to the access/collector rings though a DXC
- Long-haul interconnection provided by either DXC or OXC depending upon the traffic type being carried

THANK YOU! :)