

Topology Options for the Physical Access Network

ITU-T SG15 Q7

Han Chao - Editor, Question 7 of ITU-T SG15

ITU-T SG15 has comprehensive set of standards (recommendations) for the Physical Network

- L.100 series: Optical fibre cables
- L.200 series: Optical infrastructures
- L.400 series: Passive optical devices
- L.300 series: Maintenance and operation

Total of
82 Recommendations

Of these Recommendations:

L.250 defines the topologies of the access network and describes references of all the related ITU-T Recommendations

ITU-T L.250 “Topologies for optical access network”

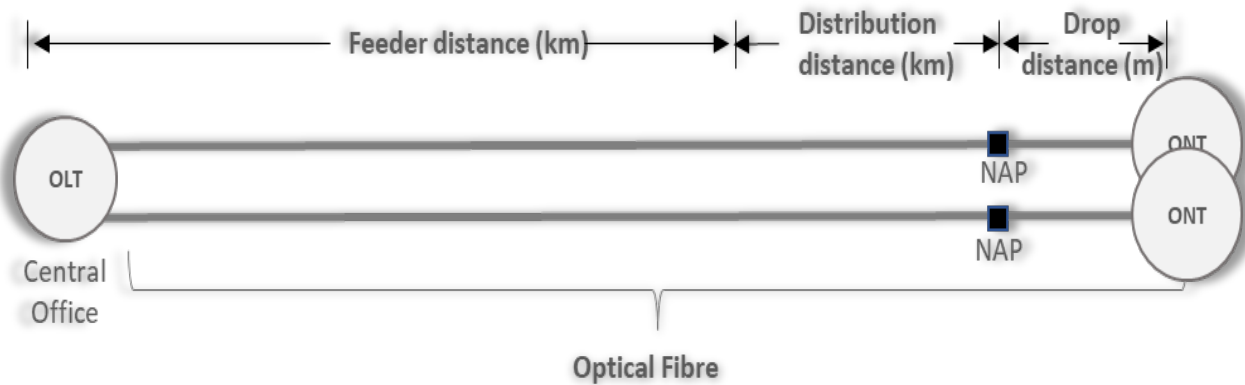
(Revision ongoing, to be consented at Nov 2023 ITU-T SG15 Plenary)

references applicable component recommendations as well as describes many topology options considering:

- **scalability** (cable fibre count, spare fibre, split ratio, etc.)
- **survivability** (physical redundancy, security, supervisory system, etc.)
- **functionality** (bit rate, transmission distance, etc.)
- **cost** (construction and maintenance costs)
- **upgrades** (increased transmission capacity & transmission length, increased number of customers, connected things)

ITU-T L.250 - Access network architecture design choices

Optical Fibre Point to Point

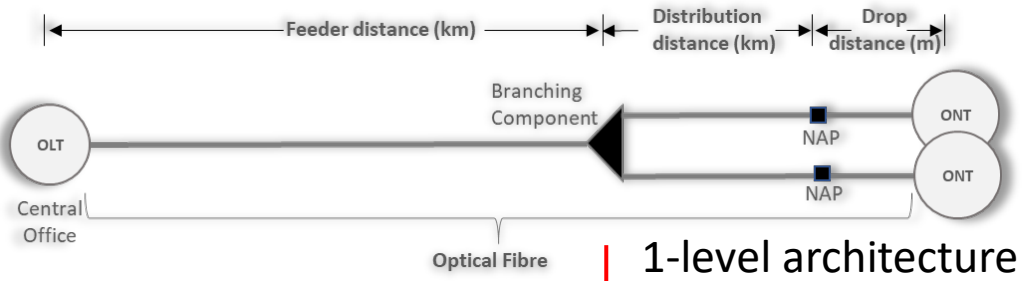


Features

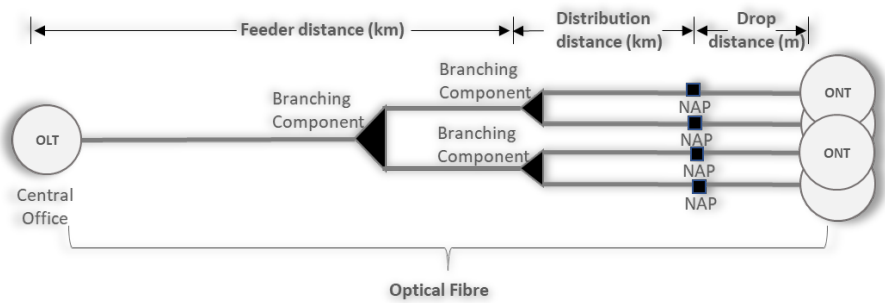
- ✓ Low optical loss, providing maximum transmission distance between CO and end user;
- ✓ High bandwidth capability and provides an easy upgrade path.
- × A dedicated fibre for every user means high fibre count demands and high construction cost.

ITU-T L.250 - Access network architecture design choices

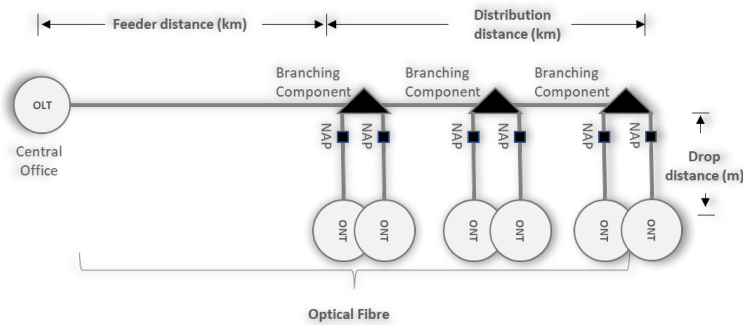
Optical fibre Point-to-multipoint



1-level architecture



2-level architecture



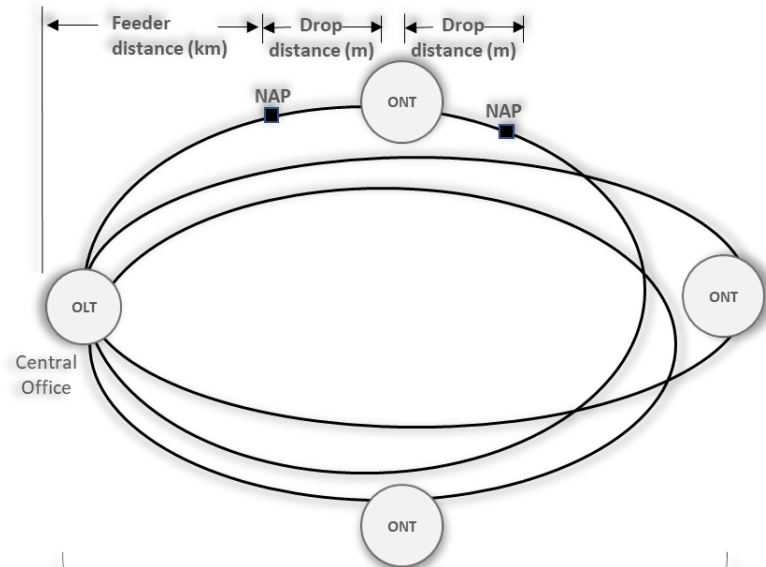
Tap architecture

Features

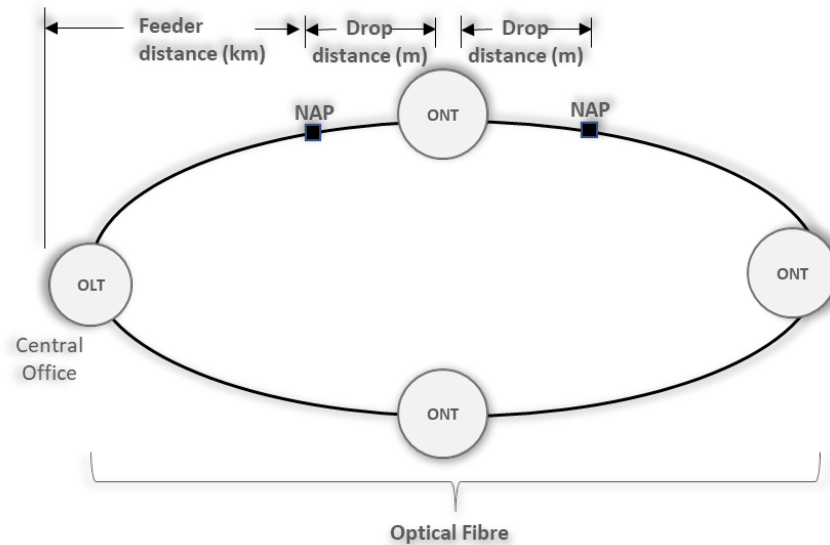
- ✓ Reduce demands for number of fibres, leading to decrease of construction cost
- ✗ Optical loss increase, limiting the transmission distance between CO and end users
- ✗ Increase complexity of network management

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Ring



Optical fibre point-to-point type



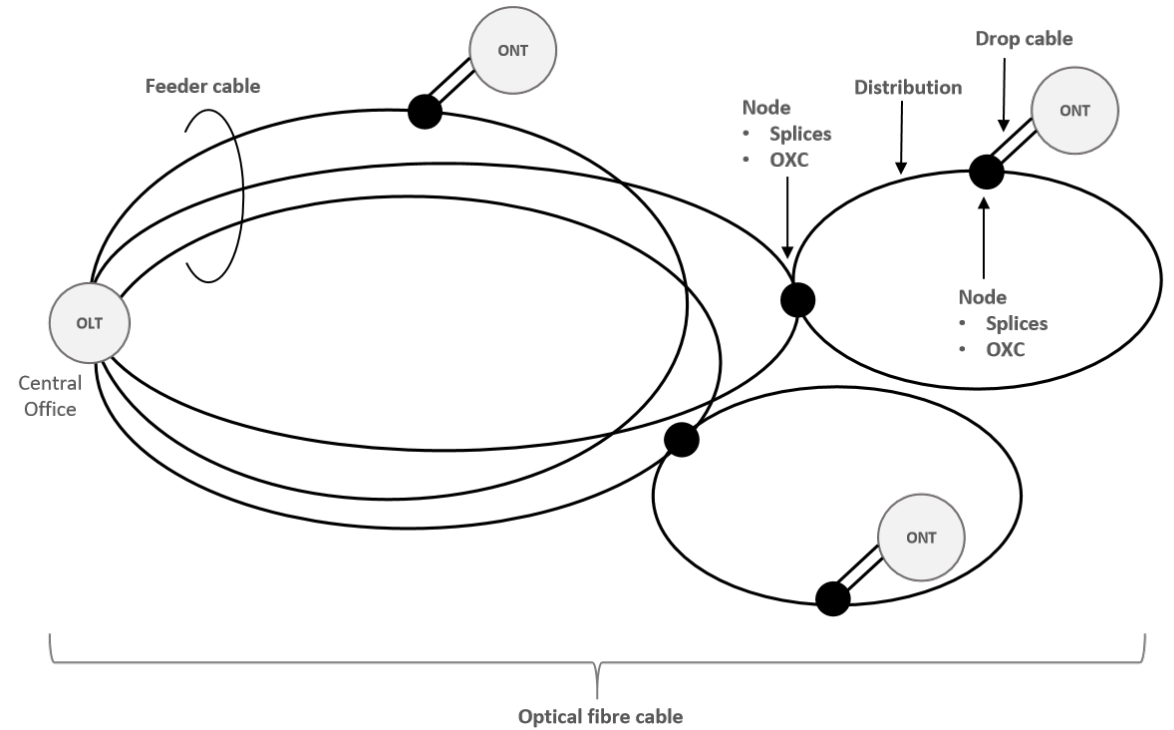
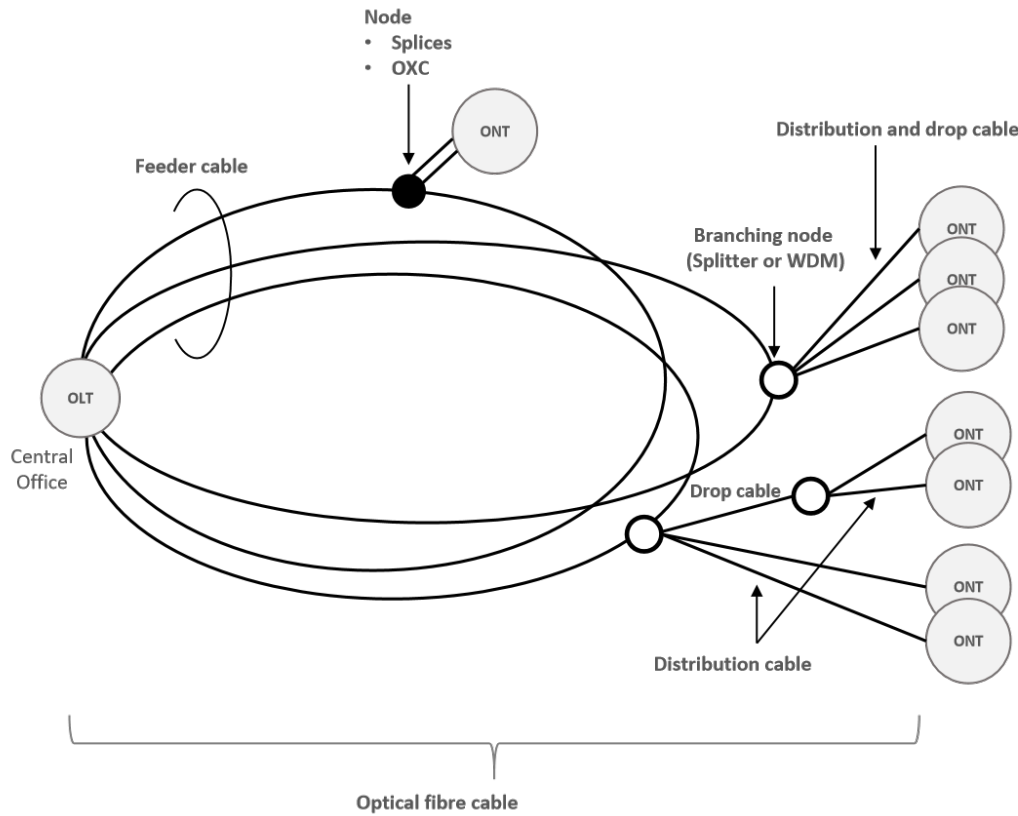
Multiple type

Features

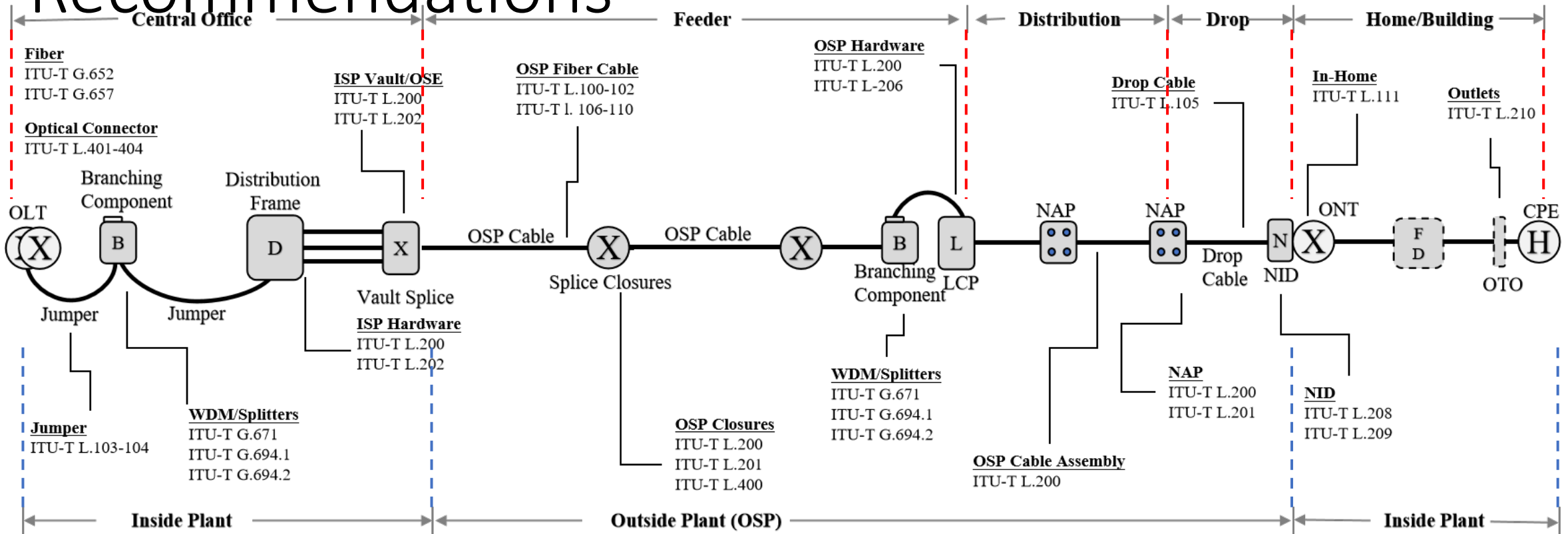
- ✓ Offers high reliability with redundancy
- ✓ ease of maintenance for alternative routing

ITU-T L.250 - Access network architecture design choices

Convergence



ITU-T Access network components Recommendations



Other upcoming work items in ITU-T SG 15 Q7

- Questionnaire on optical infrastructure sharing
- Pre-connectorised cabling components for FTTx infrastructures
 - ITU-T L.pcc will describe requirements of pre-connectorised cabling components defined as housings, closures, cable assemblies and terminals, which are factory terminated with connectors.
- L.Suppl.fttx "National Experiences for FTTx Network Architectures"

