# Benefits of optical fibres standardization

# FTTH Access networks and cooperation needs

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# 1) Benefits of optical fibres standardization

# Take away

**Interoperability, Vendor independence, Stability, Price are valuable benefits of standardization**

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***Motto: „If you cannot measure it, you cannot improve it“***
***( Lord Kelvin, IEC first president, 1906 )***

**Needs**

- New Services (high-speed data, VoIP, high definition TV, etc.)
- Better network stability
- Increasing data interchange

**Approach**

- Standards are part of each product or service:
  - E2E solutions (FTTH, core network, etc.)
  - Development of new components (optical frames, cables, connectors, devices, etc.)
  - Implementing of new technologies (WDM, LTE, etc.)

**Benefits**

- Products, services, solutions available on the free market → Price advantage
- Interoperability (custom & network side), Vendor independence, Easy deployment
- Own knowhow anytime available, good reaction time on customer needs

**Competition**

- Non-standardized solutions and products shall be avoided

# Standards reduce uncertainty and minimize the cost impact

## A continuous standardization work is a must

- Continuous standardization work leads to minimizing the uncertainty:
  - easy RFI/RFQ
  - same ‚language' with customers, suppliers
  - high level Knowhow internally
  - easy development of procedures
  - excellent reaction time, in benefit of customers

- The ‚always on' standardization work generates low costs:
  - Standards costs are low
  - no special activities needed
- ‚act reactively' will generate high costs:
  - Standards, Knowhow have to be updated
  - low reaction time → no customer satisfaction
  - high uncertainty

- Cost impact if ‚not follow' or ‚reactively' is high
  - no own Knowhow
  - dependence of suppliers
  - loss of business because uncertainty
  - no full control of own products

| | | Uncertainty | Costs (standardization) | Cost Impact |
|---|---|---|---|---|
| √ | **Standardization work 'always on'** | ○ | ◔ | ◔ |
| ✕ | do not follow | ● | ○ | ● |
| ✕ | later/ by request/ act reactively | ◕ | ◕ | ◕ |
| | ● = high ○ = low | | | |

# Overview national and international standardization bodies – a Swiss view

| Category | Standards | | |
|---|---|---|---|
| | General | Product oriented | Application oriented |
| **International** | ISO | IEC | ITU-T |
| **Europa** | CEN | CENELEC | ETSI |
| **Switzerland** | SNV | SEV, TK86 | ASUT |
| **USA** | ANSI | IEEE | TIA/ EIA |

**Legend:**

- ANSI = American National Standards Institute
- ASUT= Association Suisse des Telecommunications
- CEN = European Committee for Standardization
- CENELEC = European Committee for Electrotechnical Standardization
- EIA = Electronic Industries Alliance
- ETSI = European Telecommunications Standards Institute
- IEC = International Electrotechnical Commission
- IEEE = Institute of Electrical and Electronics Engineers
- ISO = International Organization for Standardization
- ITU-T = International Telecommunication Union- Telecommunication Sector
- SEV = Schweizerische Eisenbahn und Verkehrspersonal- Verband
- SNV = Schweizerische Normen Vereinigung
- TIA = Telecommunications Industry Association
- TK86= Technische Komitee CH passive optische Komponenten

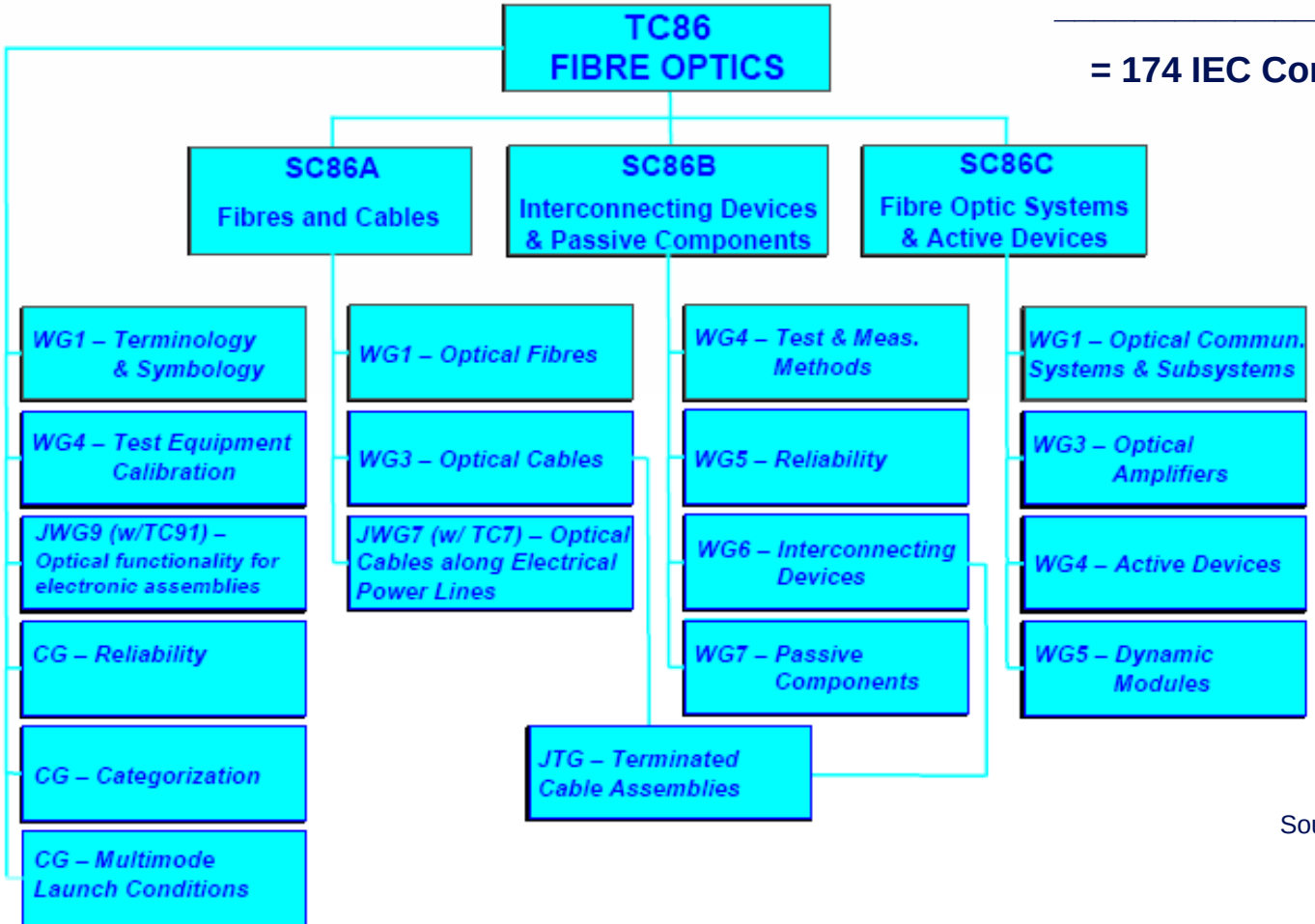
# Example: IEC TC86 committee structure

## TC86 Family

94 TCs (Technical Committees)

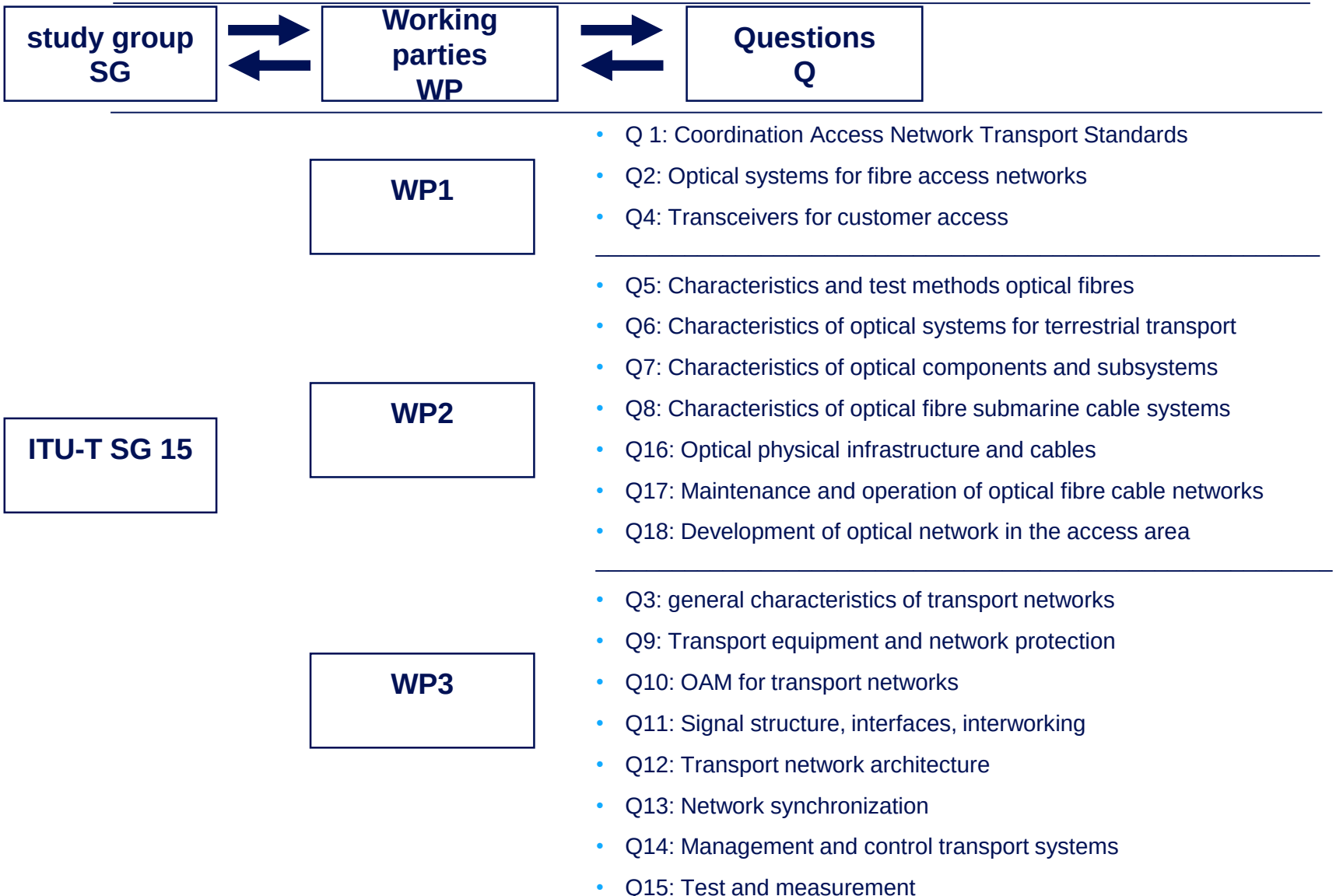
80 SCs (Subcommittees)

= 174 IEC Committees




Source: IEC website

# Example ITU-T Study Group 15 standardization structure



# Short update after the ITU-T SG15 meeting in Geneva, 15-26 Feb2016

- Fibre standardization discuss the introduction of ITU-T G.652E fibre category:
  - Technological reasons: ITU-T G.657A1 → ITU-T G.652E
  - Simplification of low-bend categories: only ITU-T G.657A2 (trench-based). Discussions regarding a new category ITU-T G.657A3 still ongoing

# 2) FTTH Access networks and cooperation needs

## One FTTH approach

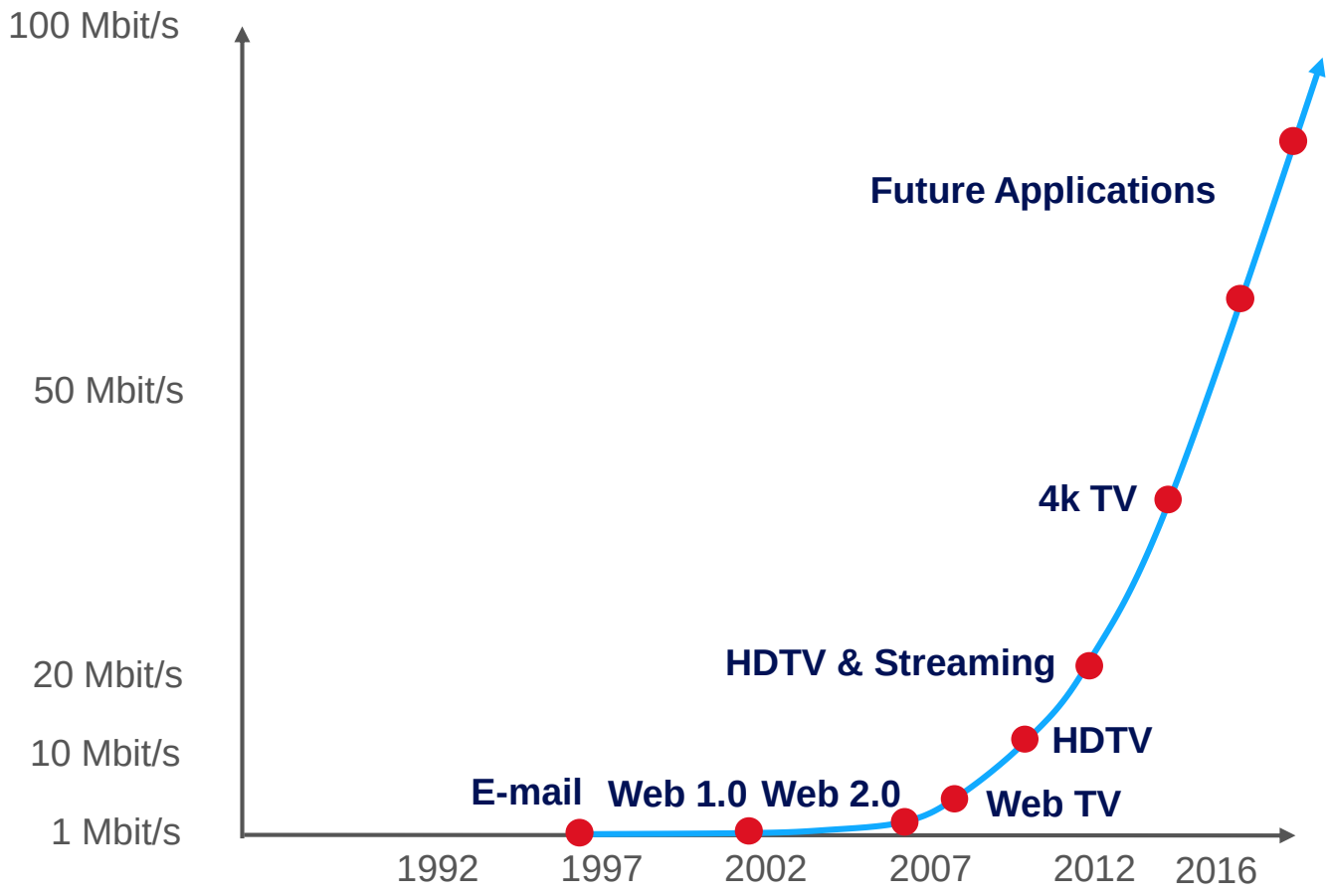
# Rapid development

## Bandwidth requirements are constantly increasing

- Telecom networks are becoming **the nerve systems of the information society**
- Traffic volume in the fixed network doubles **every 19 months** and **every seven months** in the mobile network
- New applications stimulate **demand for higher bandwidth**
- **Multi-device:** An increasing number of devices access a single connection

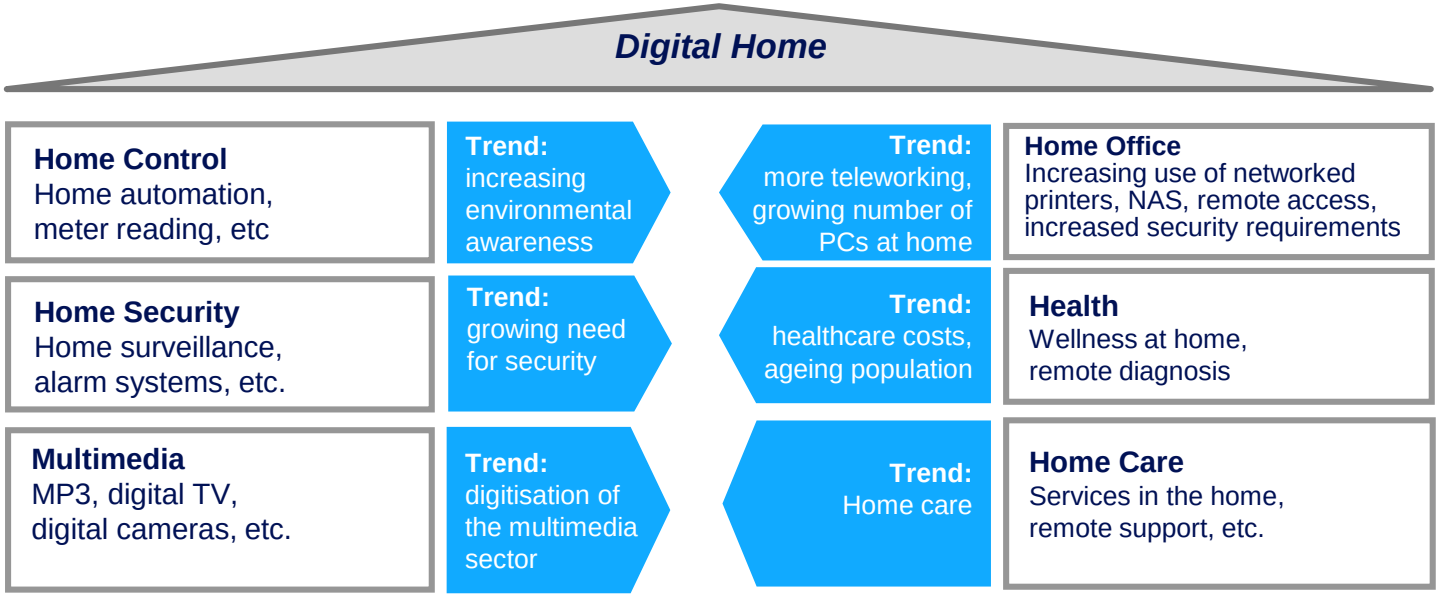
## Customer needs

# Increasing bandwidth enables new services to be developed

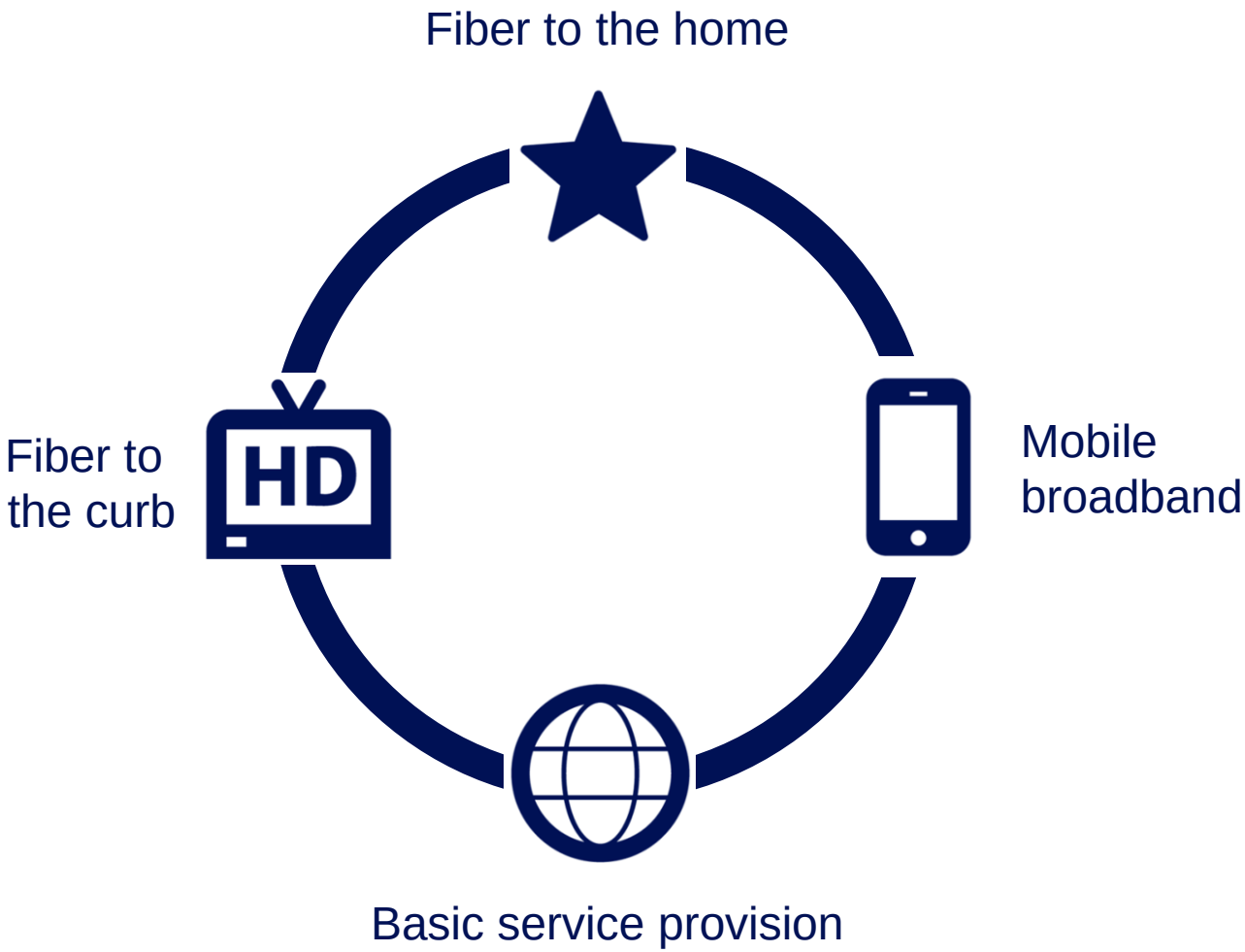


# Reasons to build FTTH Networks

## Tomorrow's Services as a mix of services



## Meeting the needs at all times with a mix of technologies



# Operators are focusing on Co-operation

## Cooperation Models

**Co-construction**
Partners with own duct infrastructure, such as electric utilities or cable network carriers

Enables co-construction

**Co-investment**
Partners without own duct infrastructure

Enables new network carriers to enter the market

**Leasing of single fibres**
Service providers with own technology but no network

Enables network infrastructure competition

**Leasing of fibre capacity**
Carriers without own network

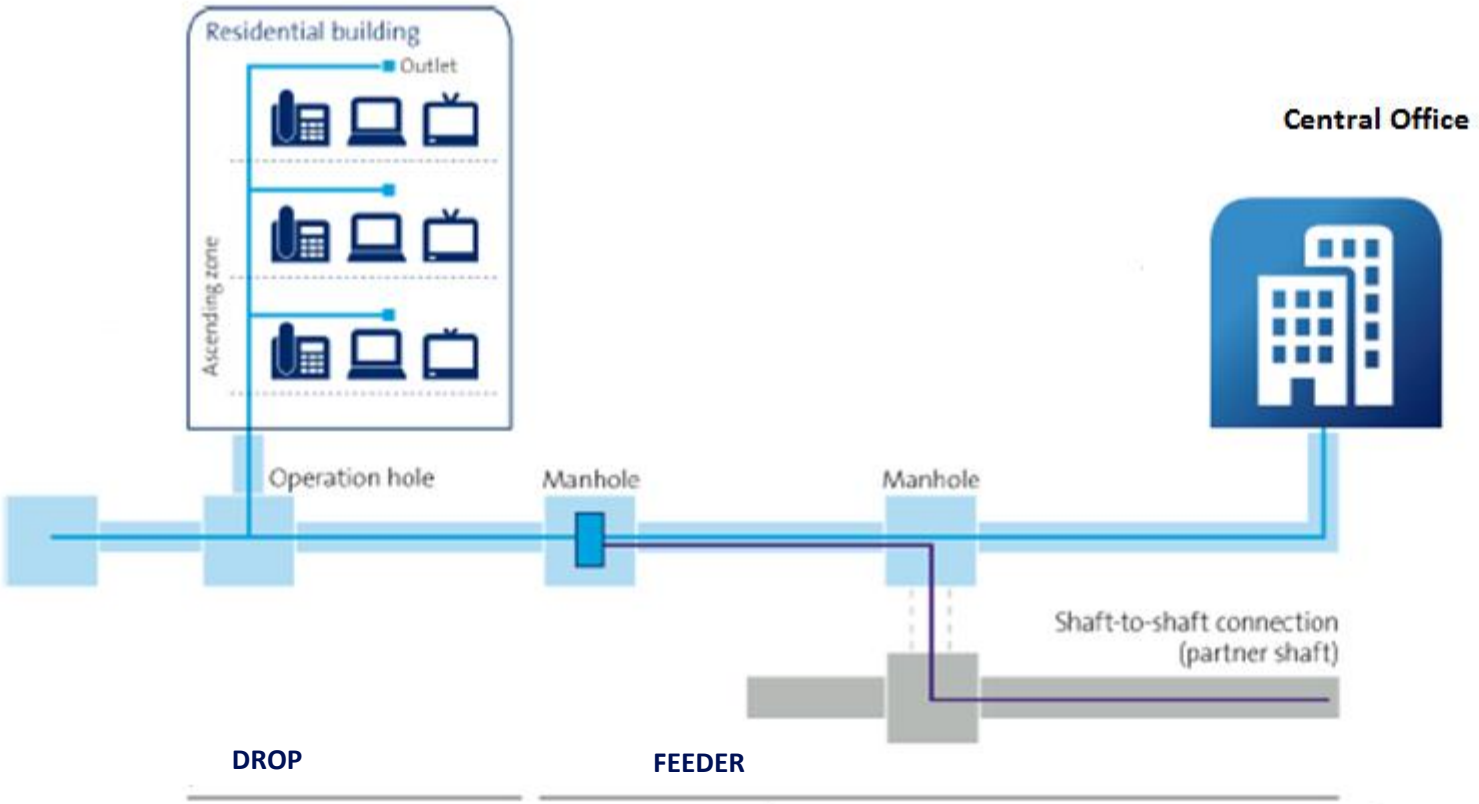
Enables competition between service providers

## One example of cooperation model (F, CH, etc.)

- Up to **four partners** can work together, thereby splitting the **investment risk**
- **Several fibres** are laid to the optical socket at the customer end
- Telecommunications providers who do not wish to invest gain **access to all network levels**
- Players have agreed on **common standards**
- These basic principles have been agreed among the market players after several **“round tables”** organized by the local regulators

# Cooperation between Service Providers and Municipalities boosts the rollout

## Point-to-Point FTTH



## Cooperation projects are an opportunity for each country

- **Infrastructure competition** is intensified by FTTH
- **Parallel networks are avoided** thanks to construction partnerships
- **Collaboration** allows faster and more cost-effective connection
- **Multi-fibre model** allows open access for telecommunications service providers
- End customers are therefore **free to choose** the telecom provider

# Success factors

## These points are essential for cooperation projects to succeed

**Uniform standards**

- Simplification for operators and customers

**Fair and balanced partnership**

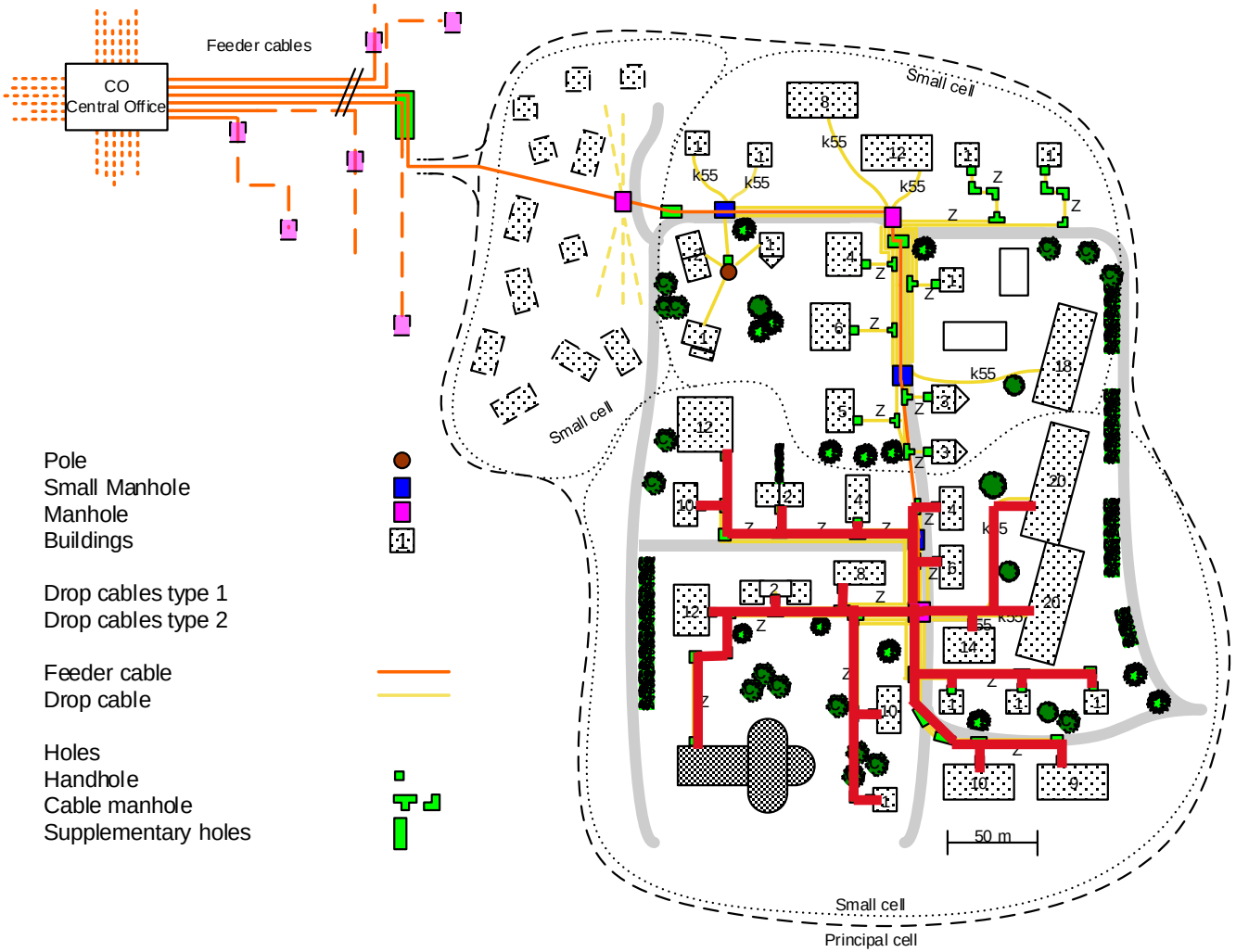
- Best practice and long-term mutual dependencies

**Investment security**

- No regulation and intervention at the present time which would endanger investments in next generation network

# Building FTTH Networks

## Drop (Distribution Network)
## Each building connected with one cable



Depending on the situation, the fibre cable is pulled in from the cable manhole or handhole.

The handholes are generally in
the footpath or on private land.

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# Examples of FTTH Standards

## National and International FTTH Standards are available

**ITU-T L.90:**

- Describes both P2P and PON technologies
- Defines the FTTH P2P and PON terminology
- Contains example of FTTH implementation from different countries
- Available on the ITU-T website

**Swiss Ofcom FTTH standard:**

- Defines the drop and home cabling to the customer wallsocket
- Defines the FTTH P2P terminology
- Full compliant to ITU-T L.90 and other international standards
- Free available on the Swiss Ofcom website

**It is highly recommended to contact an experienced consultant to correctly address FTTH projects**

# Conclusions

- Standardization allows the service providers
  - To define quality concepts that are easy measurable and reproducible
  - To have a common language to suppliers, technology integrators, partners
  - To buy optical components on the international market
  - To implement scalable technologies

- FTTH examples demonstrate
  - Projects already started
  - Standards already available
  - Cooperation need between several players


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Disclaimer

AFOR makes hereby no suggestions regarding the use of the mentioned and related standards, documents and/ or concepts.

# Questions and answers