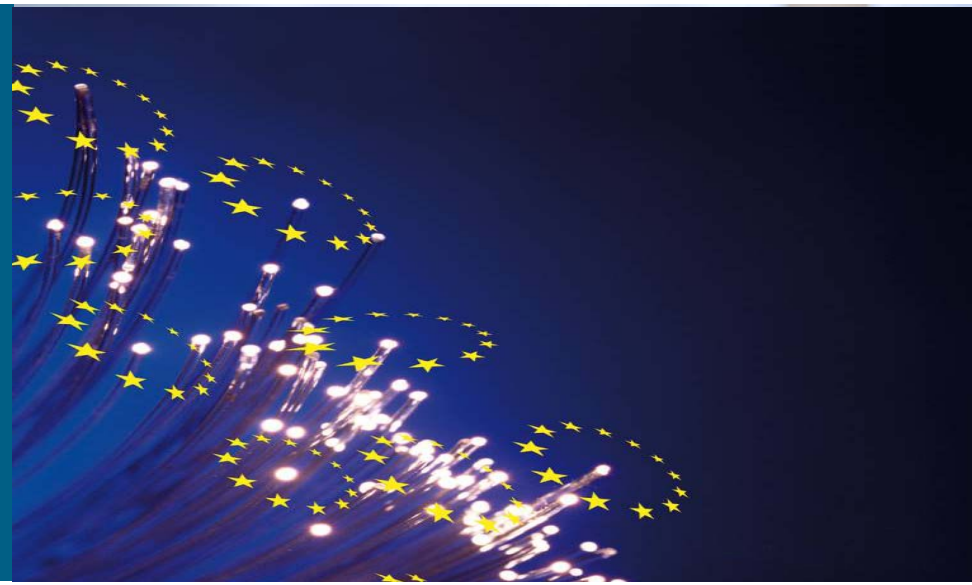
# Ethernet FTTH and Open Access – The Key to a Future-Proof Next Generation Access Network



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# Requirements for a future-proof FTTH solution

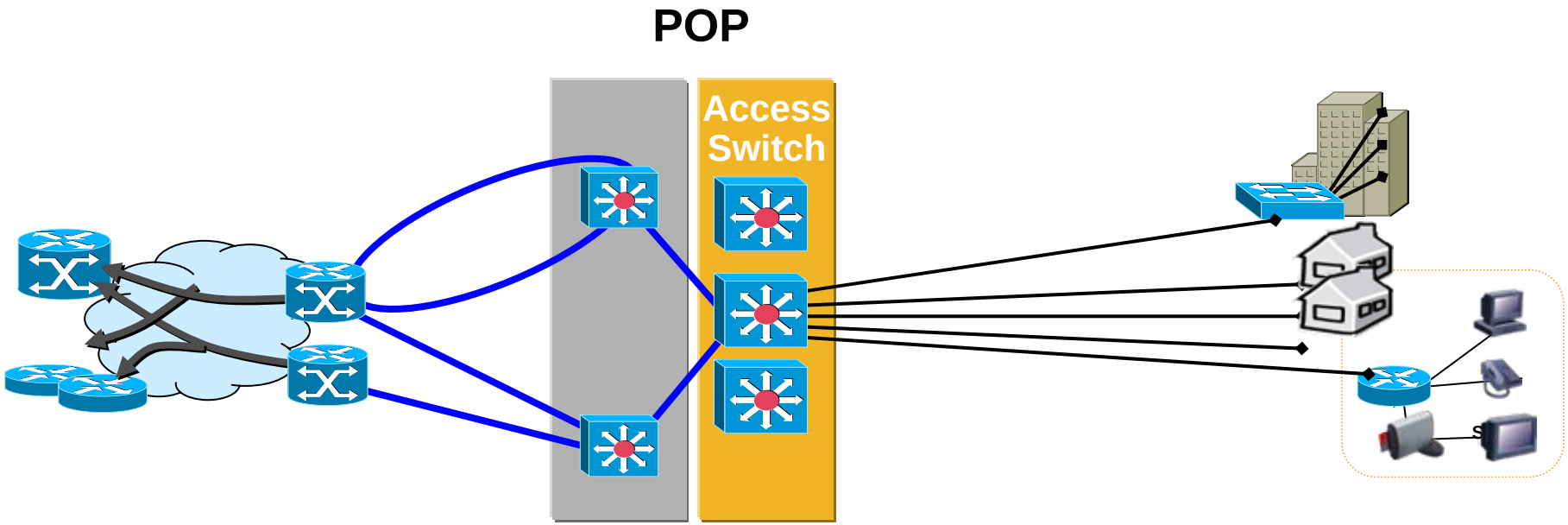
- Support for
  - growing bitrate requirements ... *50% YoY*
  - over the lifetime of the fiber plant ... *>40 years*
  - without any major modification of the passive infrastructure ... *no introduction of additional components in the fiber plant*
  - easy upgrade of transmission speeds ... *on a per-customer basis*
- Easy management
  - no bottle-necks in the passive infrastructure
  - simple trouble-shooting
  - no need for encryption
- Open access

# Open Access

- Access to infrastructure on equal terms for Service Providers
- Customer choice of services and speeds
- Prevents monopolies
- Infrastructure sharing is possible on multiple layers

| | |
|---|---|
| Ducts - | ultimate facilities-based competition potential |
| | technically and economically feasible? |
| Fibers - | similar to LLU |
| | enables competition on technology / speed |
| | common cost-optimized passive infrastructure build |
| Bitstream - | quick time to market and rapid innovation for non-facilities-based SPs |
| | no competition on technology / speed |
| | first step on “ladder of investment” |

# What is Ethernet Point-to-Point?

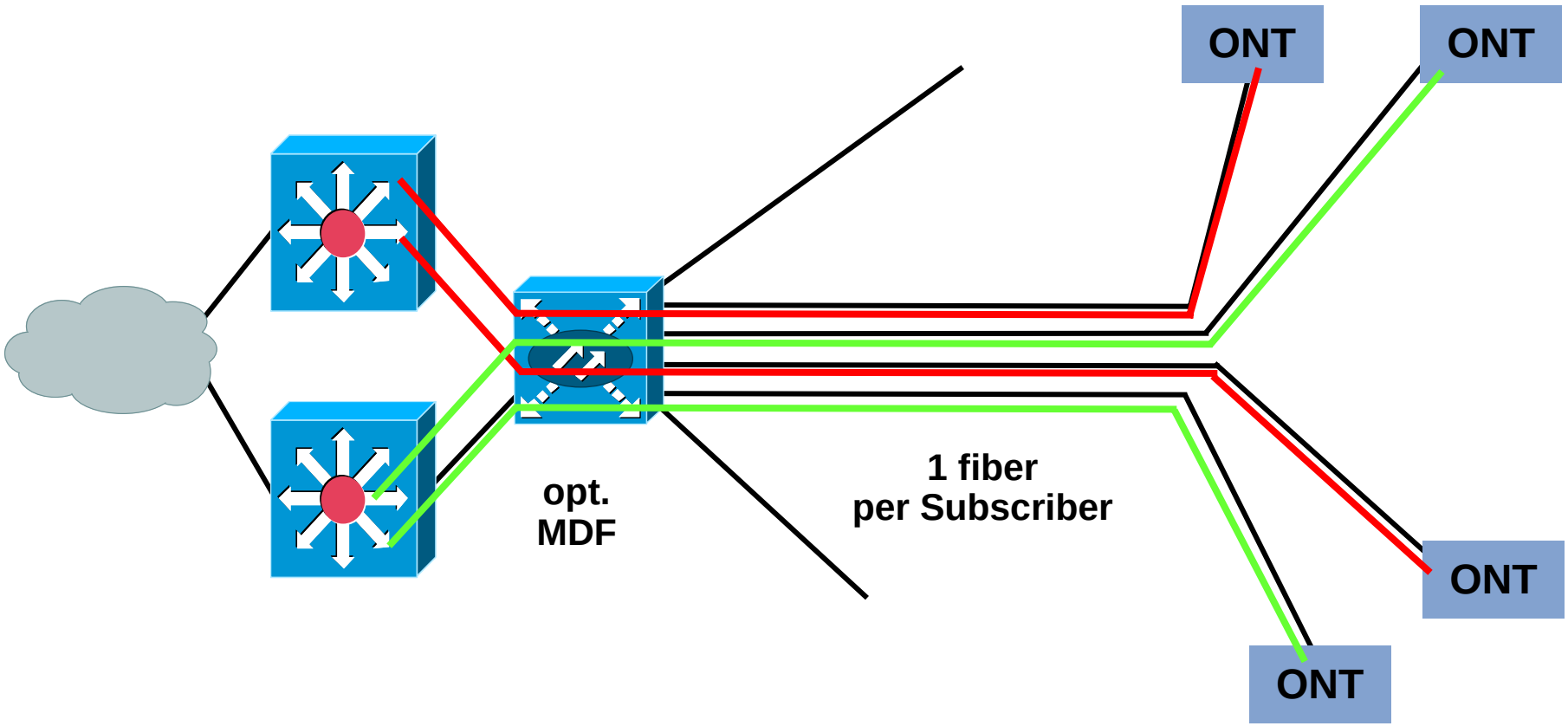



- Direct star connectivity between POP and subscriber

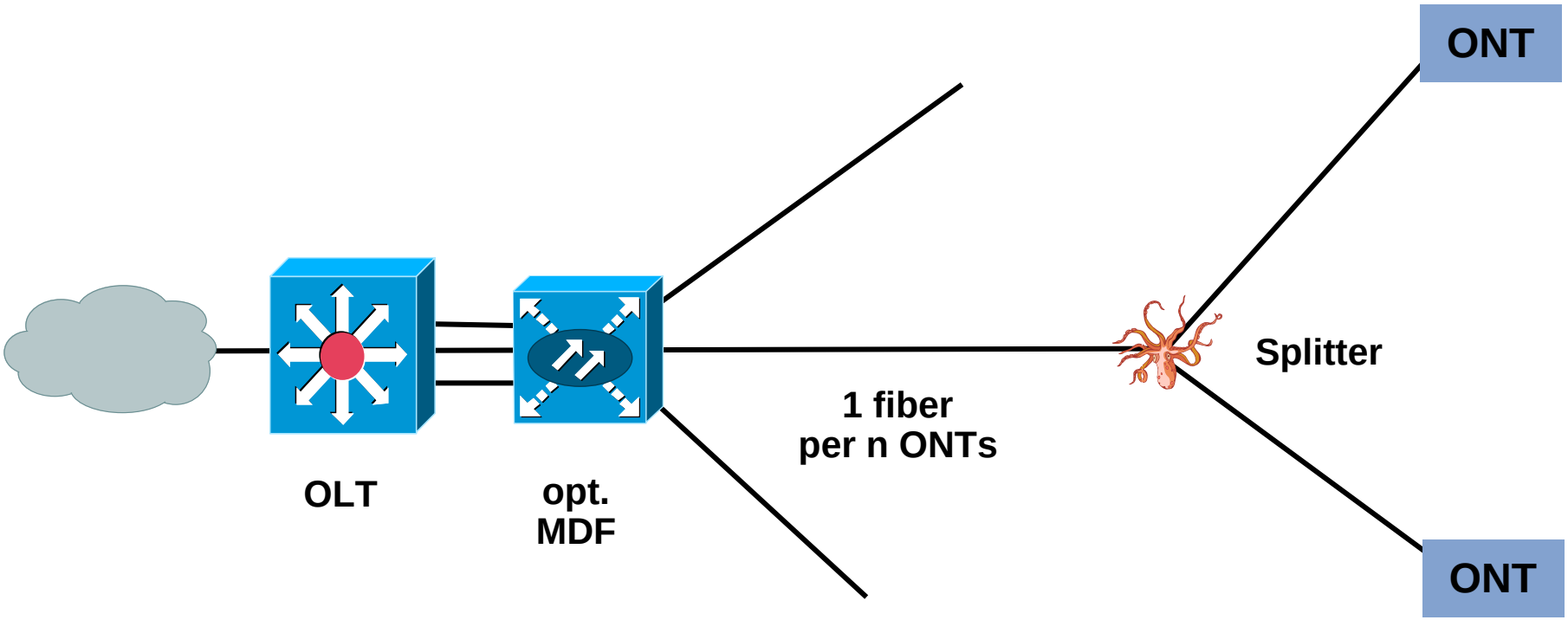
  topology similar to today's telephone access network

- Using standard Ethernet technology (FE, GE, ...) over single strand of single-mode fiber

# Open fiber access is straightforward



# Compare PON – no open fiber access feasible



# Benefits of Ethernet point-to-point

- Simplicity
- Virtually unlimited bitrate per subscriber
- Fiber is neutral with respect to transmission technology
- Migration to higher speeds or new technologies on a per-customer basis
- Pay as you grow
- Open Access to fiber inherently embedded in the architecture

⇨Flexible, Future Proof

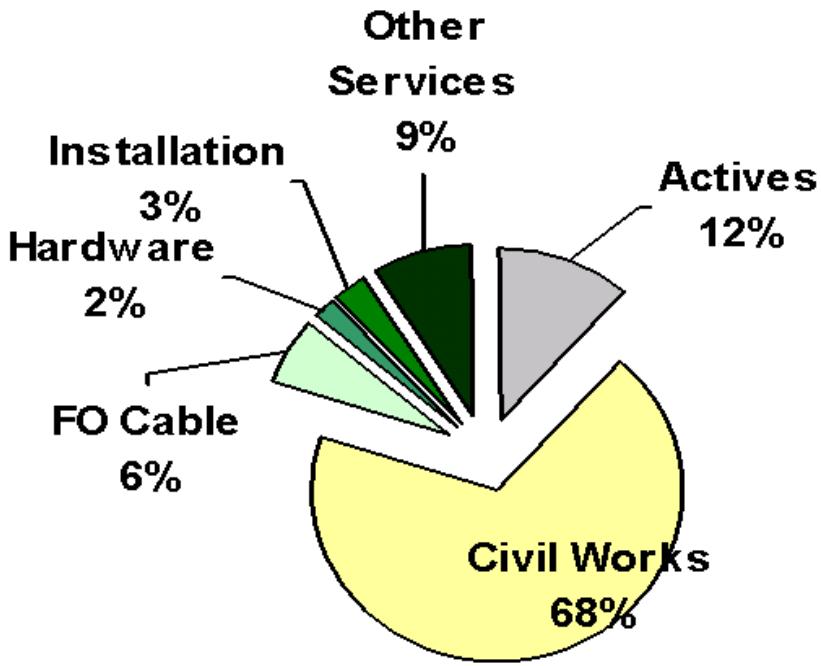
# Challenges for Ethernet point-to-point deployments

- Slightly more duct space required compared to PON due to higher number of fibers required
  - not relevant in greenfield deployments
  - double-check available space in ducts – surprises are almost guaranteed
- Slightly more POP space required for fiber management and active equipment
  - small price to pay for the flexibility achieved

# Cost considerations

- Ethernet technology is very cost-effective due to high volume manufacturing
- Modern Ethernet switches provide high port density
- Fiber is cheap
- Very dense fiber management solutions reduce space requirements
- Only ports for paying subscribers need to be installed

  => take rate!
- Cost difference only significant where existing ducts are “just big enough” for PON => civil works for p2p




Source: Corning & FTTH Council Europe

# Options for fiber infrastructure deployments

- By vertically integrated Service Provider
  - different investment cycles for passive and active infrastructure
  - high upfront cost
  - selective coverage typical
  - can be facilitated by various rights-of-way solutions:
    e.g., ducts, sewers, tunnels, ...
  - *example: Free*
- By Physical Infrastructure Provider
  - e.g. consortium based on public-private partnership
  - *example: Amsterdam CityNet*
  - coverage not only defined by revenue expectations
  - different investment cycles handled by different organizations

# Conclusion

- Point-to-point fiber deployments are
  - future-proof
  - simple
  - secure
- A point-to-point fiber access network
  - maintains its value over the lifetime of the fibers
  - allows open access to fiber to maintain competition in next-generation access networks
  - $\Rightarrow$ is the default choice for most European FTTH deployments
- Open fiber access is a typical requirement for FTTH networks involving any kind of public engagement (e.g., PPP)