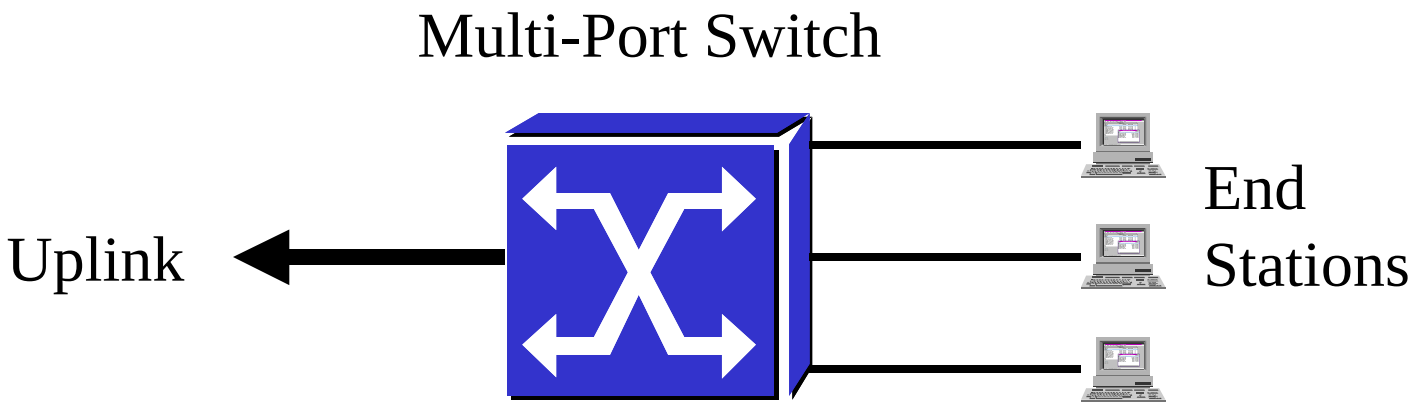
Ethernet in the First Mile (EFM) Tutorial – Point to Point over Fiber

Outline

- What is Point to Point (P2P) over Fiber?
- Why do we need P2P over Fiber?
- GbE vs. P2P over Fiber
- P2P Transceiver Options
- P2P Transceiver Considerations
- Summary

What is P2P over Fiber?

- Point-to-point is the topology Ethernet has used successfully for over a decade



- Study Group Objective:

  1000BASE-X >=10km over single SM fiber

What is P2P over Fiber?

- Reuse 802.3z 1000BASE-LX specifications

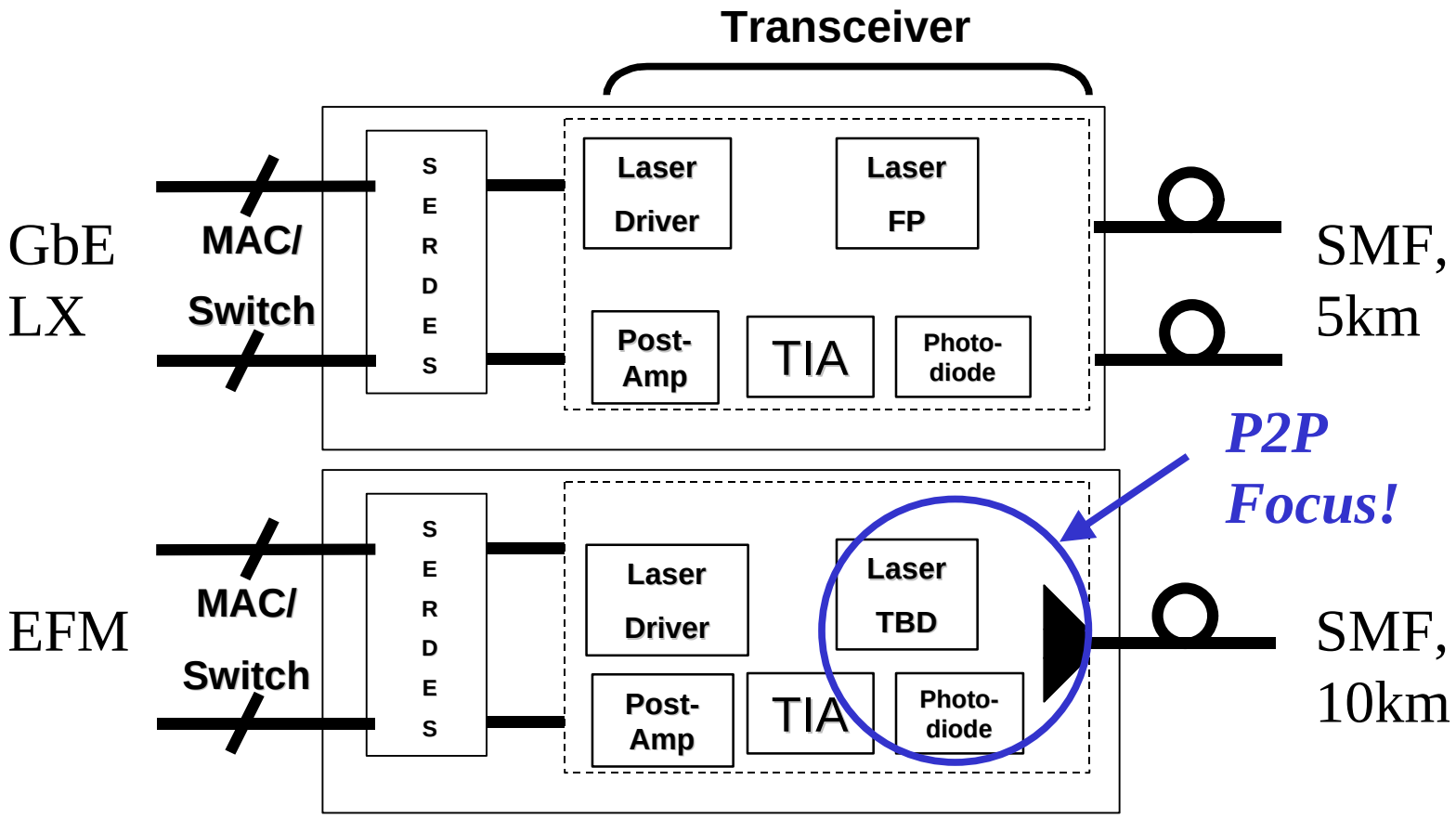
  But…

- Single Single-Mode Fiber (SMF)
- ≥10km vs. 5km
- Extended Temperature

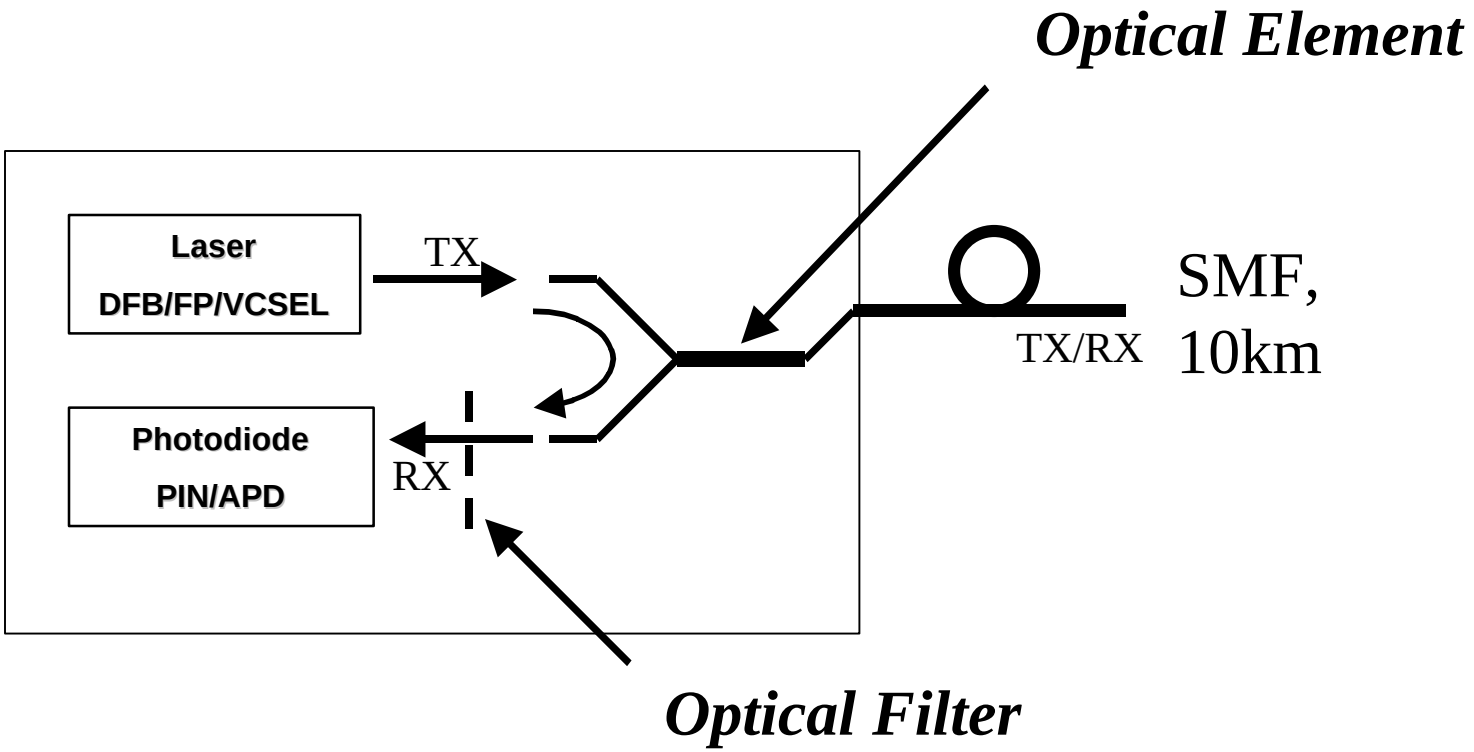
Why P2P over Fiber?

- P2P over Fiber is Gigabit Ethernet optimized for the subscriber access market
- Each transceiver connects to one and only one transceiver
- Each link is symmetrical and capable of using the full transceiver bandwidth

GbE LX vs. Single Fiber P2P



P2P Focus


Optical Element
Laser
DFB/FP/VCSEL
TX
Photodiode
PIN/APD
RX
TX/RX
SMF,
10km
Optical Filter

Transceiver Candidates

Option	Upstream	Downstream
1	13x0nm	
2	13x0nm+Δ	13x0nm- Δ
3	13x0nm	15x0nm
4	15x0nm	
5	15x0nm+ Δ	15x0nm- Δ

Transceiver Considerations

- Different up/down-stream wavelengths lead to different transceivers at each end of the link
  - Requires mechanism to manage differences
- Single wavelength solutions are not straightforward
  - Ability to bring cost effective solutions to market
- Cost/volume manufacturability of each wavelength plan

Summary

- P2P over single SM Fiber :
  - Is similar to 1000BASE-LX
    - Slight modifications to address the subscriber access market
  - Meets the 5-criteria with multiple transceiver options available
    - http://grouper.ieee.org/groups/802/3/efm/public/may01/kelly_1_0501.pdf
  - Is an important technology for subscriber access networks