Ethernet in the First Mile - Direction

IEEE Plenary meeting

Hilton Head, March 2001

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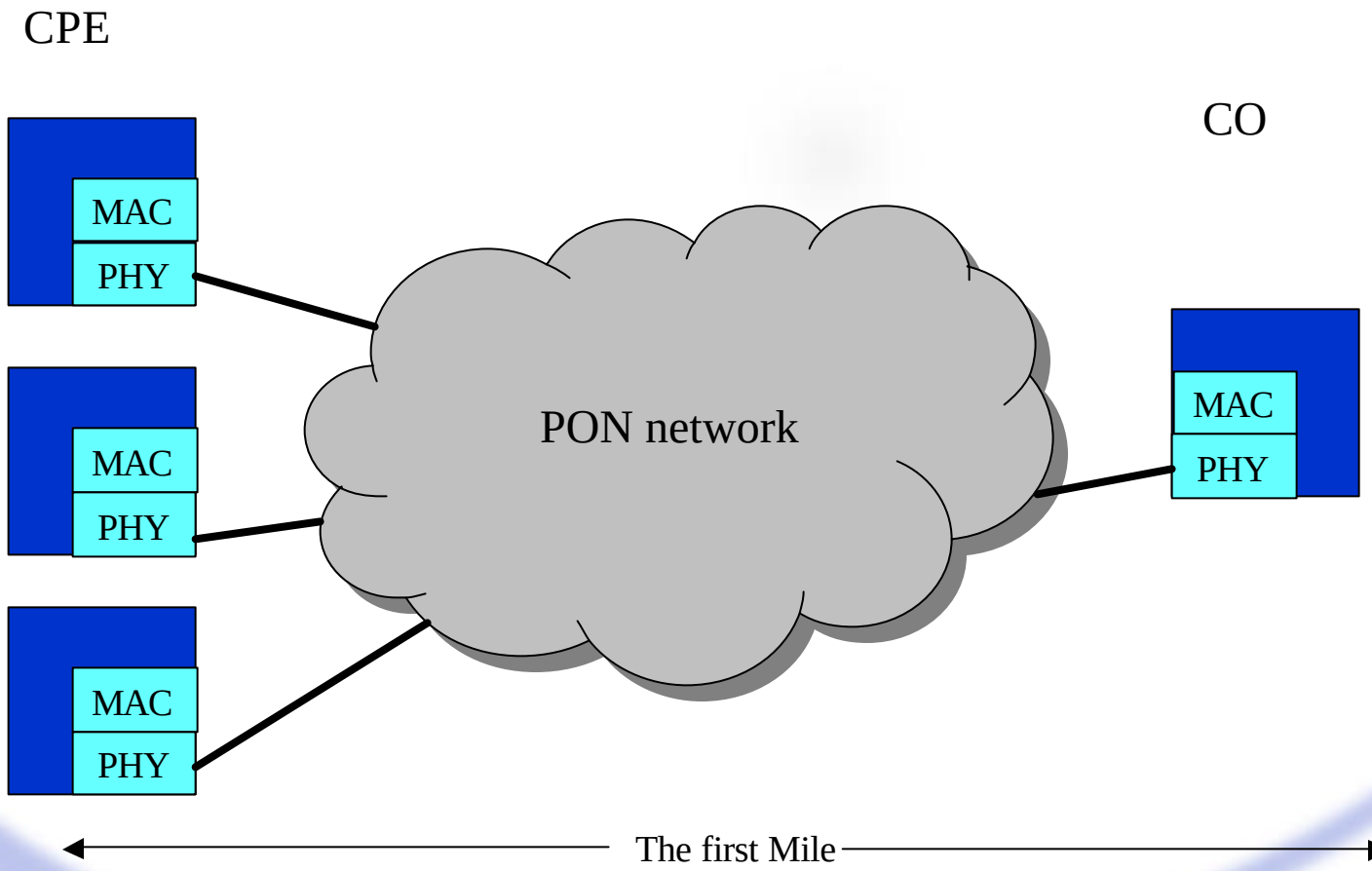
Ethernet in the First Mile –

- There's more to it than distance!
- It is addressing a new customer – the Service Provider

Typical EPON Application

High Number of end-users, low BW portion per end-user

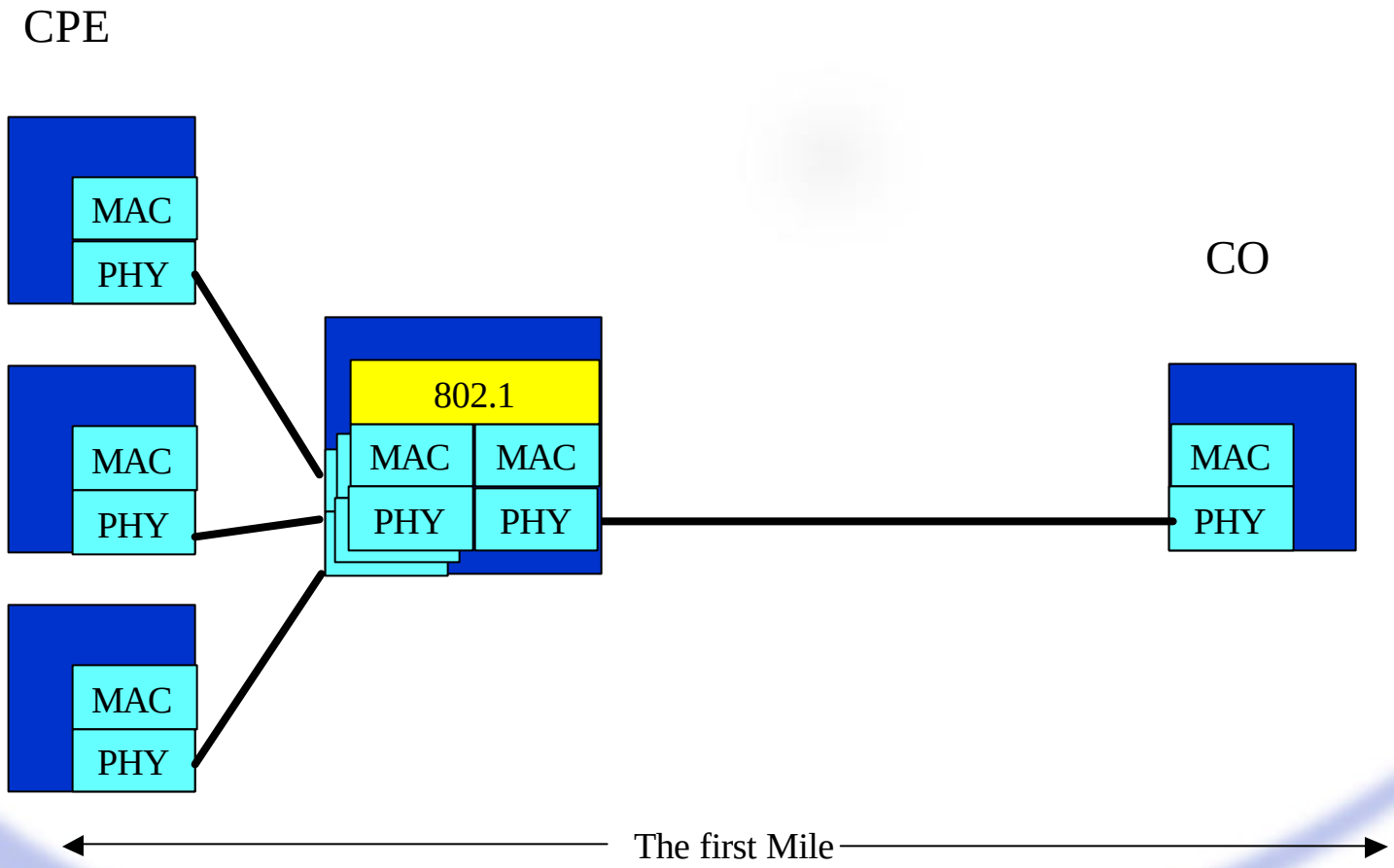


Requirements from EFM in the EPON application

- Physical Layer
  - Distance
  - Speed
  - Environmental
- Serviceability
  - OAM&P in the Eth link level
- Availability
  - Protection? – Probably not in the EFM scope

Typical Switched Eth in the First Mile Application

Low Number of end-users, High BW portion per end-user



Main Applications

- Industrial parks
- Building LECs

Requirements from EFM in the Switched Eth application

- All of the previous ones plus…
- Multiple Users
  - User Segregation using VLANs
- Multiple Services
  - Different SLAs:
    - BW – dealt with in higher layers(queuing, scheduling…)
    - Delay & Jitter – in higher layers(queuing, scheduling…)
    - SLA Measurement
- Serviceability – OAM&P also in the VLAN level
- Availability – Protection!

- Red marked requirements – Need to go up to the 802.1 level

Serviceability

- OAM&P in the link level
  - Loopback
  - BER measurements
  - Fault Indication
  - Statistics
- OAM&P in the VLAN level
  - Loopback
  - Fault detection/indication
  - Statistics
  - SLA measurements
    - Delay
    - Jitter (delay variation)

Availability

- Need to provide the 99.999% -> Protection
  - Automatic
  - Link based / other (connection)
  - Should not conflict with Link Aggregation aspects
  - Based on a system/network view
  - Probably not in the scope of EFM

Multiple Customers

- Customers are identified and segregated by VLANs
- Current issues:
  - Need to support more than 4K “connections”
  - Need to separate user VLAN tags from SP segregation mechanisms
  - Need to separate user control plane from SP control plane (STP, other L2 control protocols)

Multiple Customers - Solutions

- Use stacking of VLAN tags + map user VLANs to network VLAN tags in two hierarchies – Solves first two problems
- Translate destination MAC of known MC into reserved BC MAC inside the SP network, and back – Solves third problem

- EFM might wish to request these changes from 802.1

Summary

- Need to be addressed by EFM
  - Physical
  - OAM&P in the link level
- Need to be addressed by 802.1 (EFM might request as a body)
  - VLAN extension + longer frame (+4 bytes)
  - User & SP control plane separation
  - OAM&P in VLAN level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