ISIS Extensions for Flex Ethernet (FlexE)

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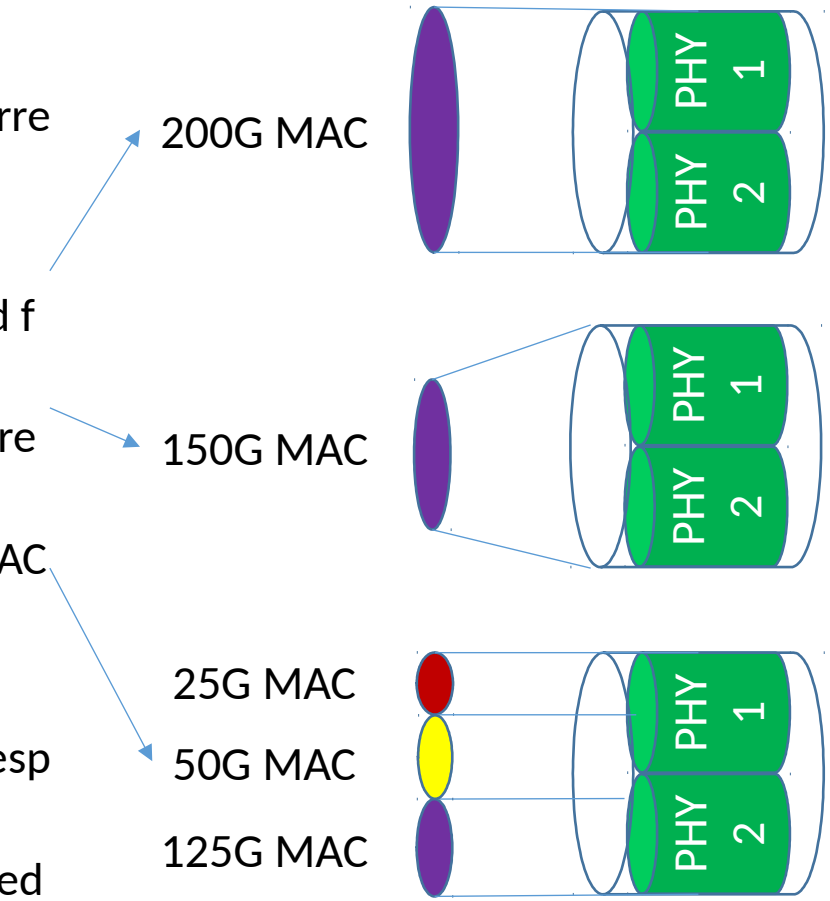
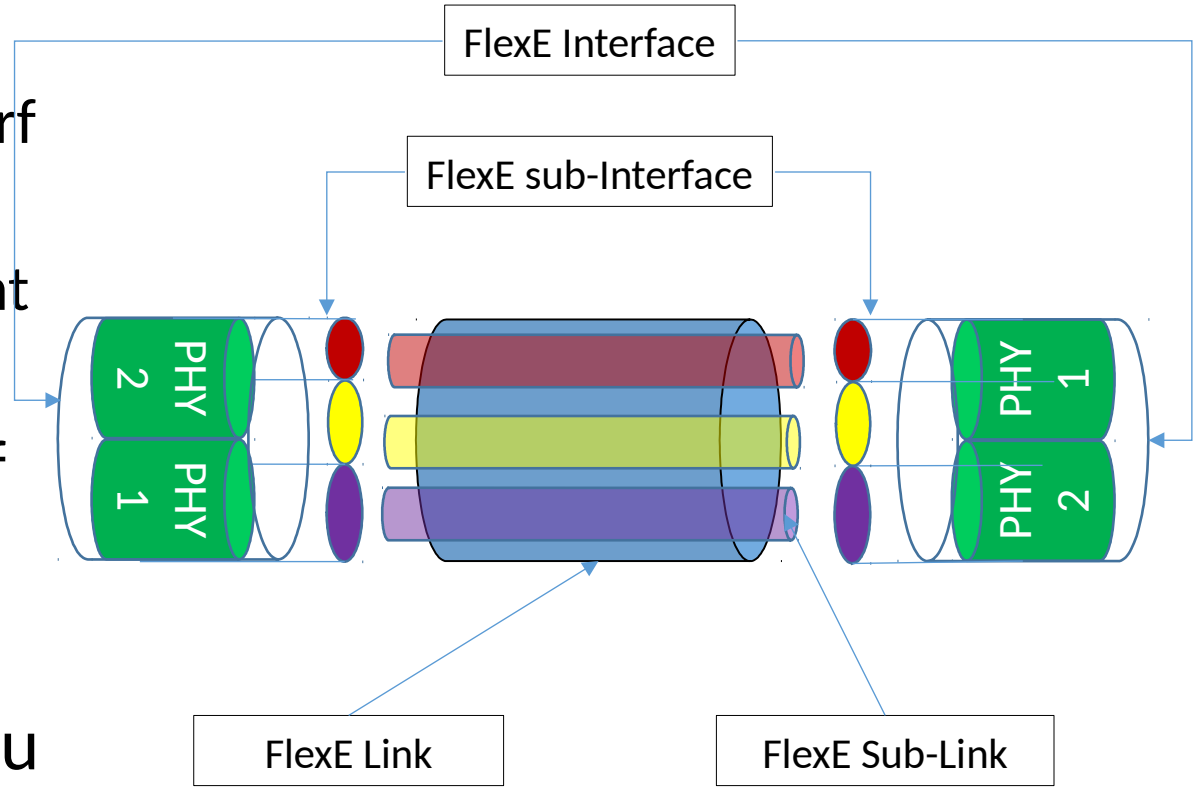
Flex Ethernet (FlexE) Overview

- By decoupling Ethernet MAC rate and PHY rate
  - FlexE can support a variety of Ethernet MAC rates that may or may not corre spond to any existing Ethernet PHY rate
- FlexE has three major features
  - Bonding, bond Nx100GbE interfaces into a single pipe to form a larger and f aster interface
  - Sub-rating, adapt Ethernet MAC rate to line rate, mainly for the case where the line rates in UNI and NNI are not matching
  - Channelization, within a PHY or a group of PHYs, e.g., supporting a 25G MAC , a 50G MAC and a 125G MAC to over two bonded 100GBASE PHYs
- FlexE introduces the “slot” concept
  - Based on a calendar, direct how to dispatch/map Ethernet flow onto corresp onding slots
  - Each slot has a 5G granularity for now, more granularities may be supported (e.g., 25G)



FlexE Interface and Link

- A FlexE interface
  - Is a Nx100GBASE bonded Ethernet interfaces
  - Can be channelized into multiple sub-interfaces
- A FlexE link connects two FlexE interfaces
  - The big pipe
- A FlexE sub-link connects two FlexE sub-interfaces
  - The small pipes



Reference: https://tools.ietf.org/html/draft-izh-ccamp-flexe-fwk-03

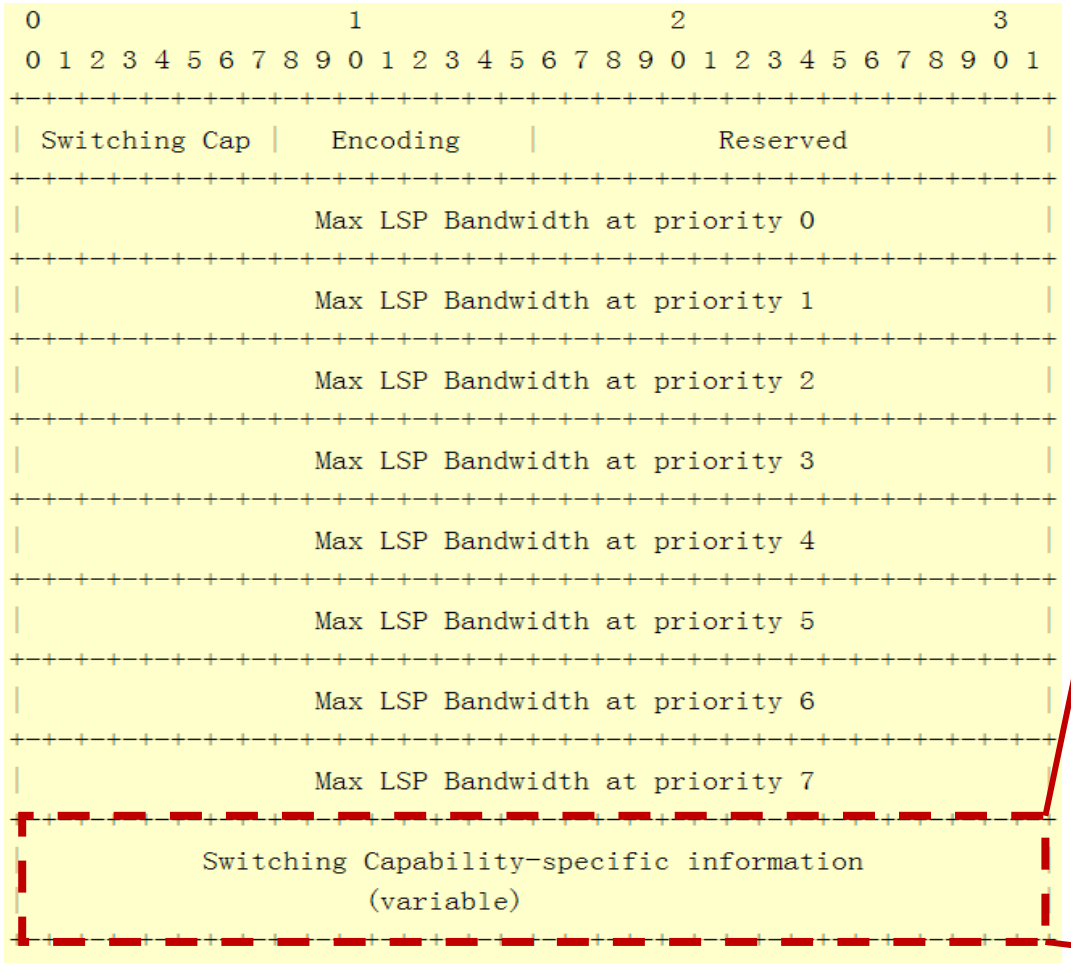
A Use Case of FlexE –Network Slicing

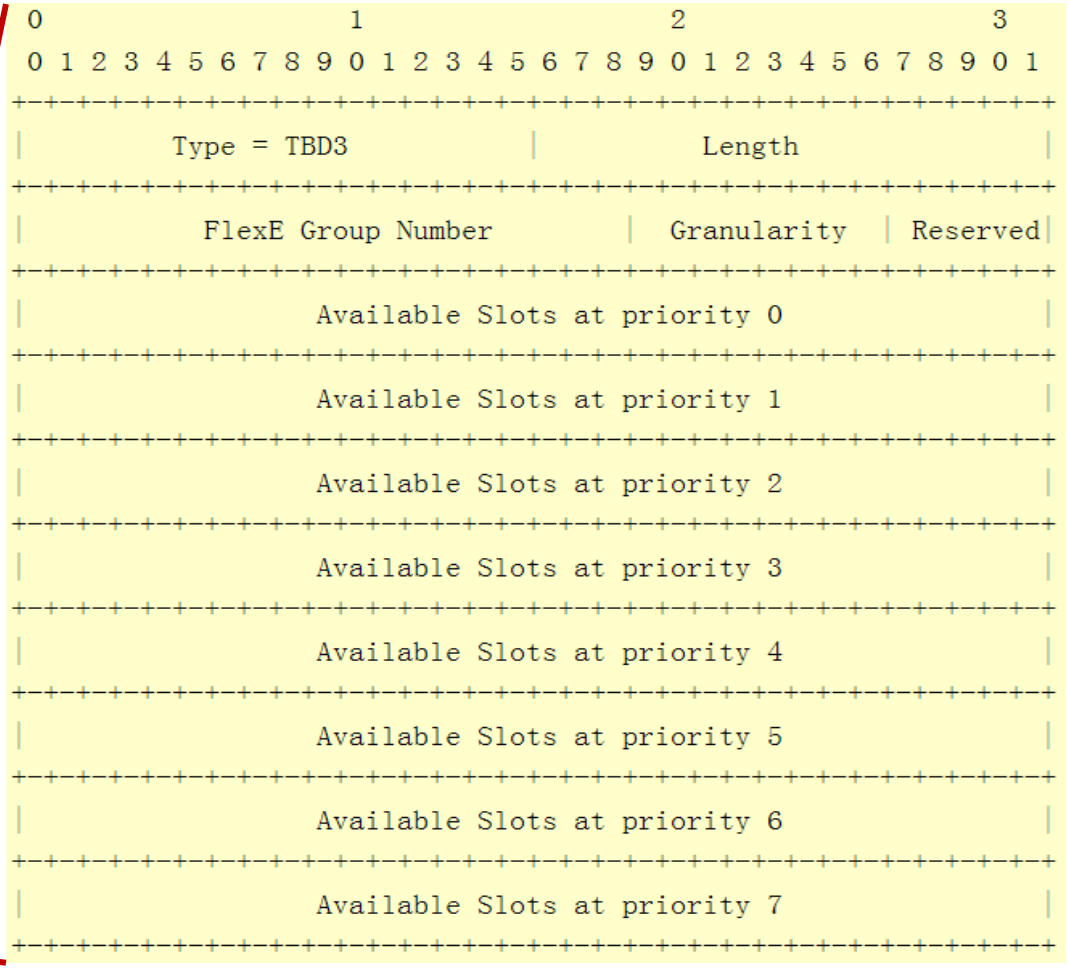
- A FlexE link sliced into multiple FlexE sub-links as demand
- A set of FlexE sub-links allocated to a user/service to form a “sliced network” that has dedicated resources
- LSPs of the user/service can be established over their own sub-links
  - ✓ RSVP-TE signaling, or
  - ✓ Segment Routing
- Provide interface/link level isolation

Advertisement of FlexE Link and Sub-link

- FlexE Link, following new information needed
  - ✓ Granularity (e.g., 5G per slot)
  - ✓ Available slots
- FlexE Sub-link, two options
  - ✓ Each sub-link advertised as an individual link, need to
    - Configure IP address at two ends of the link
    - Enable routing protocols (e.g., OSPF or ISIS) on each link
  - ✓ Sub-link advertised as a member of a “bundle”
    - No need to configure IP address and enable routing protocols for each link
    - More scalable

ISIS Extensions for FlexE Link Advertisement





Interface Switching Capability Descriptor (ISCD) sub-TLV

FlexE Interface sub-TLV

Next steps

- WG review and feedbacks
- FlexE sub-link advertisment optimization and enhancment
  - Suport Network slicing (interface/link based) and Segment Routing

Thanks