# ISIS Extensions for Flex Ethernet (FlexE)
## draft-zcdc-isis-flexe-extention-01

**Authors**

Yongqing Zhu (zhuyq@gsta.com)

Huanan Chen (chenhuanan@gsta.com)

Zongpeng Du (duzongpeng@huawei.com)

Mach Chen (mach.chen@huawei.com)

# 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 correspond to any existing Ethernet PHY rate
- FlexE has three major features
  - Bonding, bond Nx100GbE interfaces into a single pipe to form a larger and faster 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 corresponding slots
  - Each slot has a 5G granularity for now, more granularities may be supported (e.g., 25G)
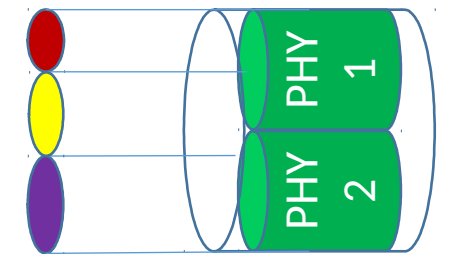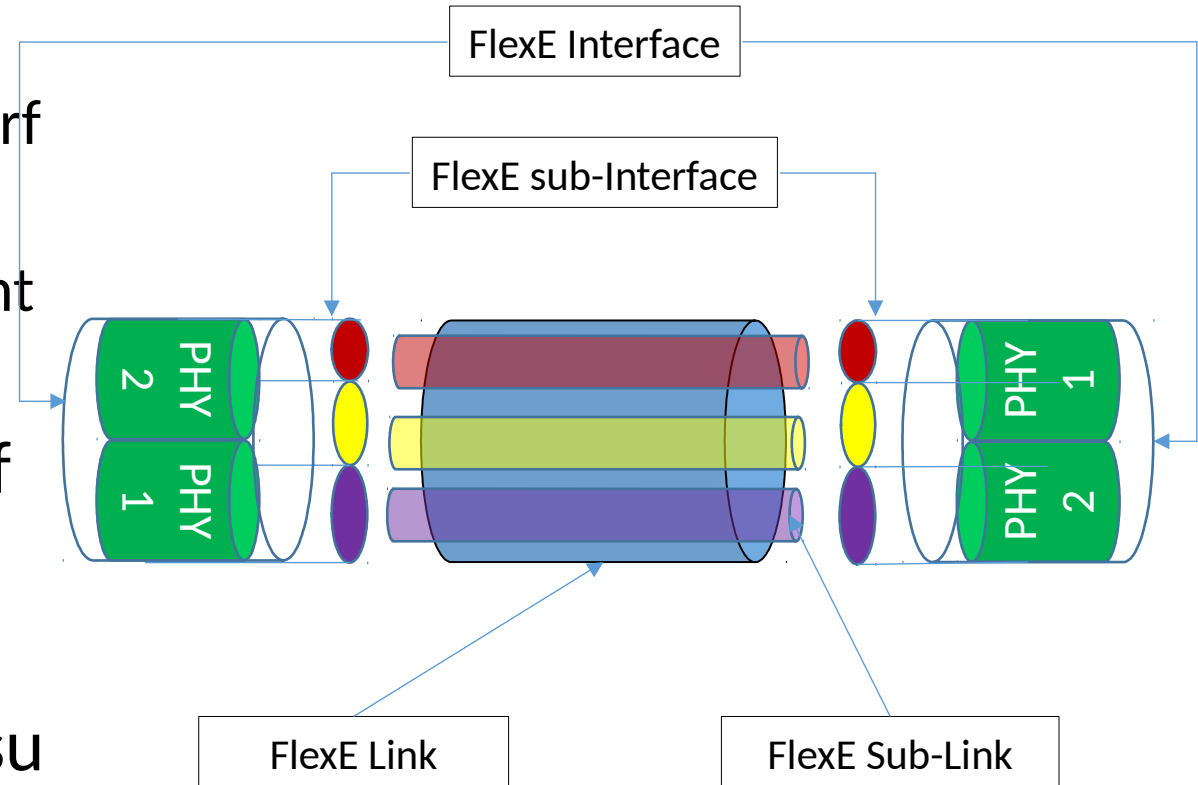
200G MAC
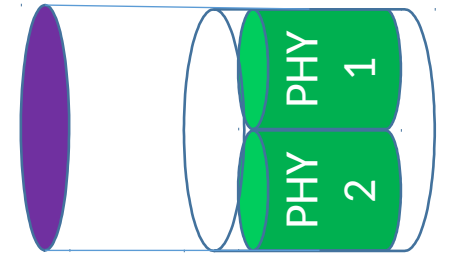
150G MAC
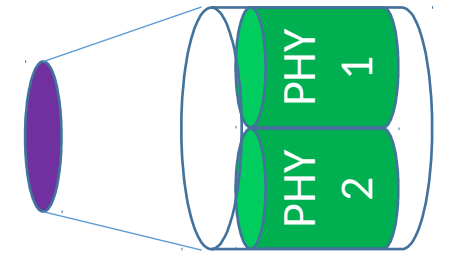
25G MAC

50G MAC

125G MAC

PHY 1

PHY 2

# FlexE Interface and Link

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

FlexE Interface

FlexE sub-Interface

PHY 2

PHY 1

PHY 1

PHY 2

FlexE Link

FlexE Sub-Link

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