Proposal of 100G-EPON to Support Backward Compatibility with 10G-EPON

Mike Emmendorfer
January 12, 2016

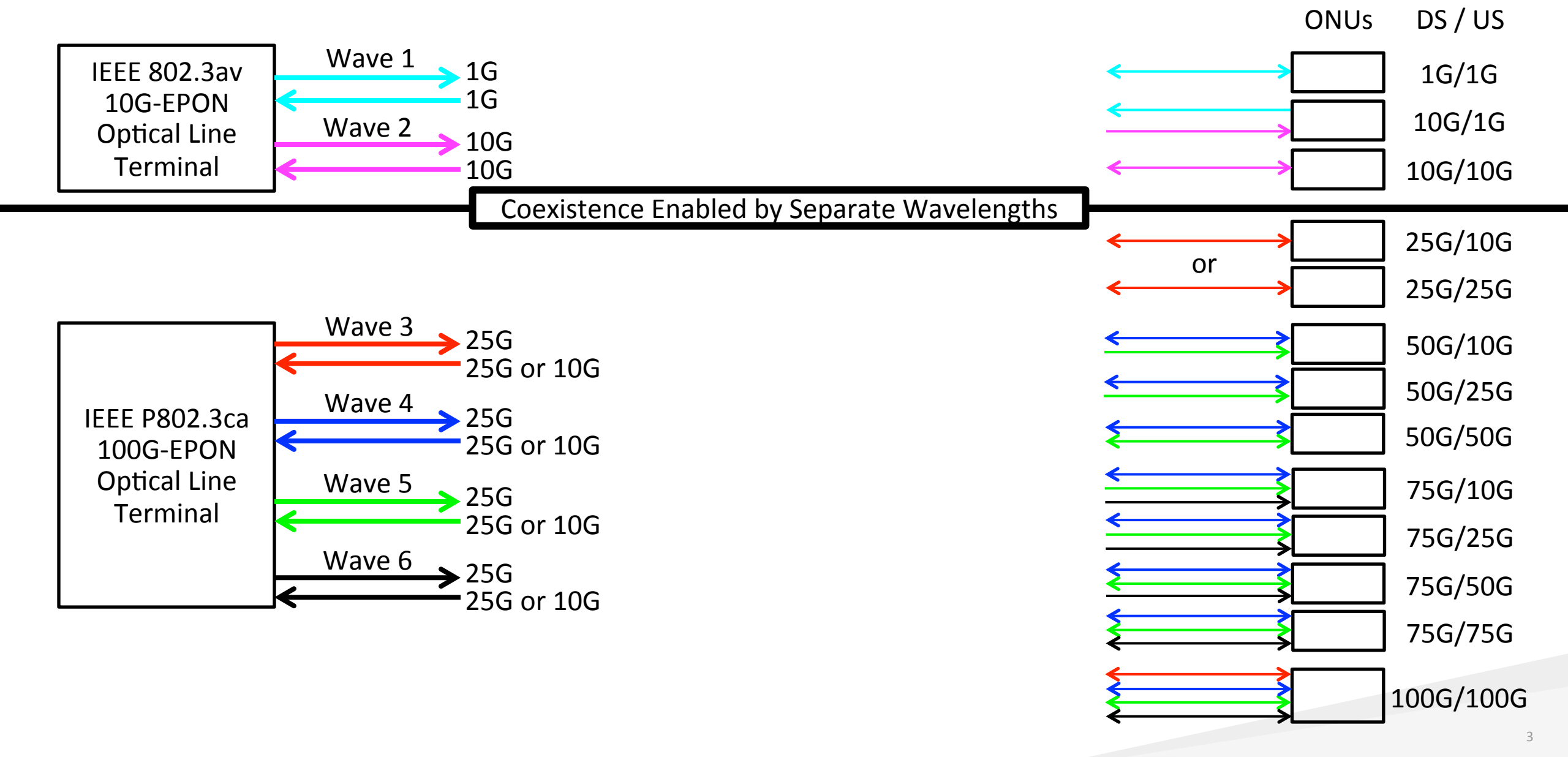
100G EPON Objectives

Objectives

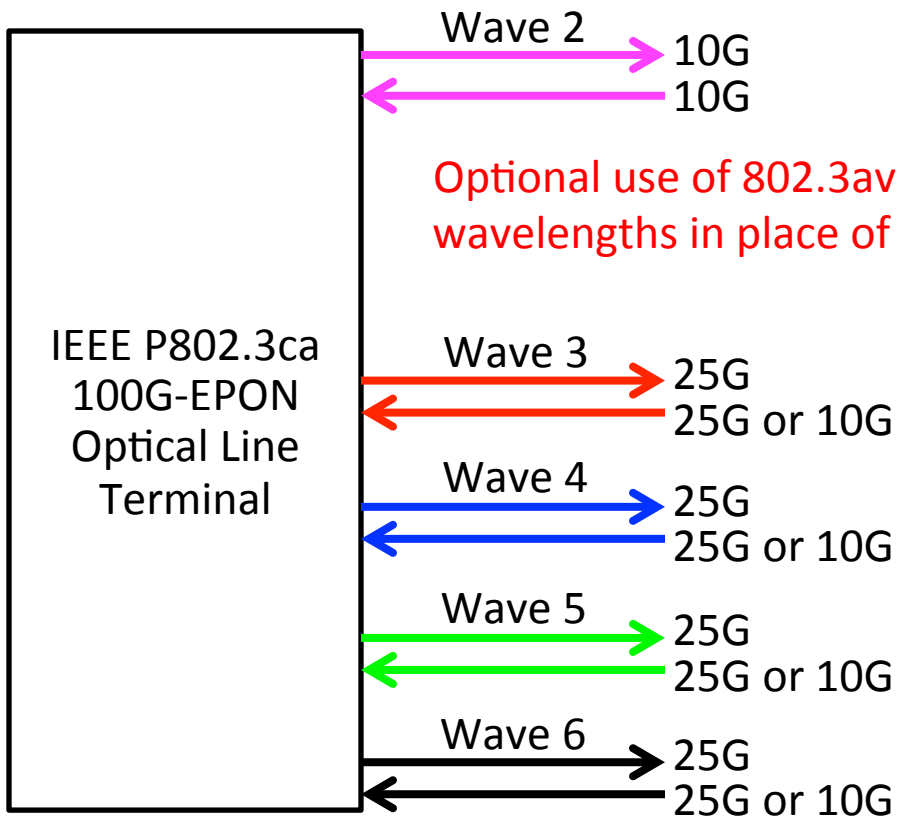
- Support subscriber access networks using point to multipoint topologies on optical fiber
- Provide specifications for physical layers operating over a single SMF strand and supporting symmetric and/or asymmetric the MAC data rates of:
  - 25 Gb/s in downstream and less than or equal to 25 Gb/s in upstream
  - 50 Gb/s in downstream and less than or equal to 50 Gb/s in upstream
  - 100 Gb/s in downstream and less than or equal to 100 Gb/s in upstream
- PHY(s) to have a BER better than or equal to 10-12 at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Support coexistence with 10G-EPON
  - Optical power budgets to accommodate channel insertion losses equivalent to those supported by the 10G-EPON standard
  - Wavelength allocation allowing concurrent operation with 10G-EPON PHYs

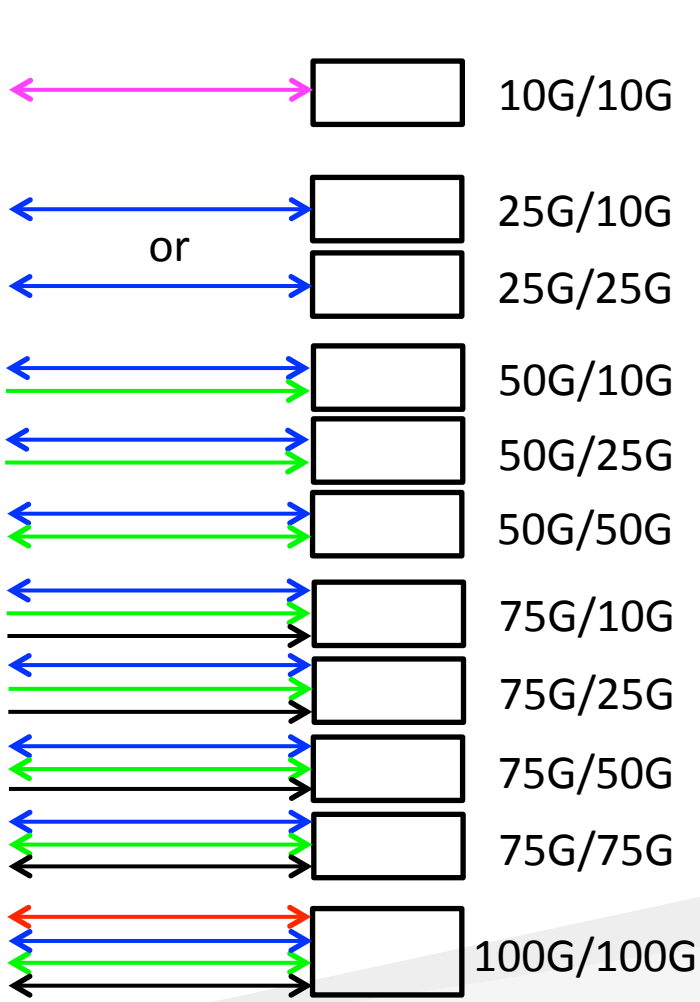
2

Coexistence 10G-EPON and 100G-EPON



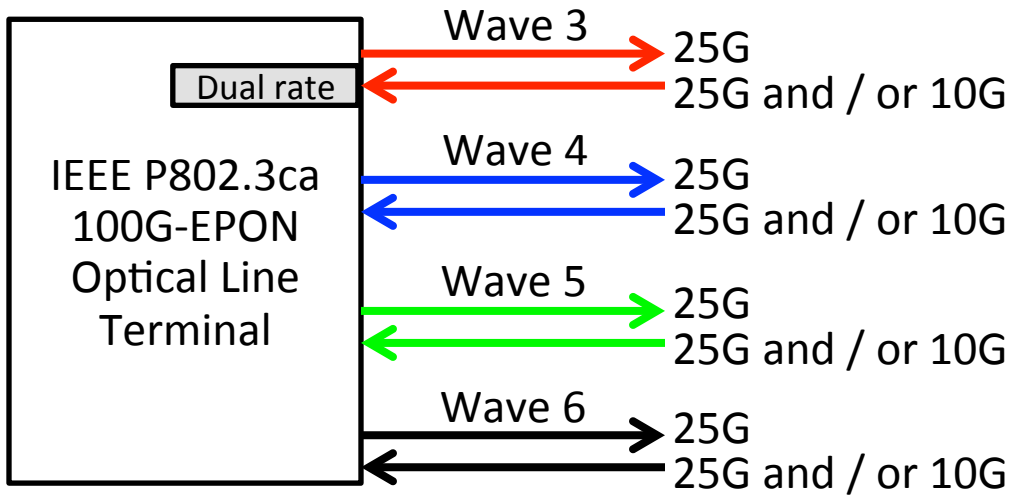
Proposal 1: Define Optional Support for Backward Compatibility Between 10G-EPON and 100G-EPON

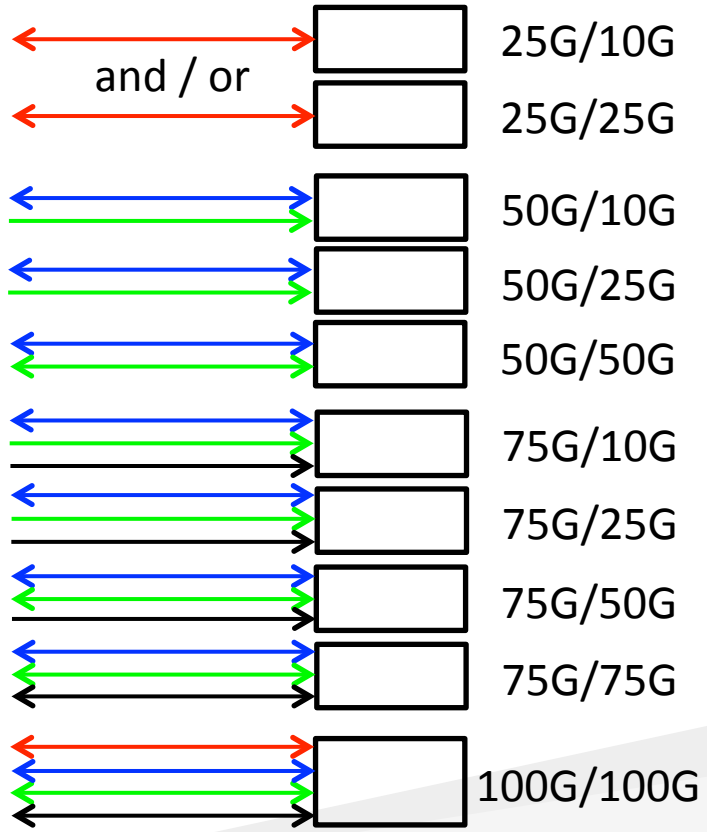




When 100G is needed change remaining 802.3av ONUs to 802.3ca ONUs operate wave 3 at 25 Gbps symmetrical to achieve 100G

Proposal 2:
Define Dual Rate 10G and 25G Upstream





Support for Backward Compatibility

- Operators can elect to swap out 802.3av 10G-EPON OLTs with 802.3ca 100G-EPON OLTs if backward compatibility is implemented this will change the following
  - **Facility Requirements**
    - Some operators have space/power/conditioning constraints at facilities backward compatibility reduces these factors compared with coexistence that requires separate line cards or likely chassis and line cards.
  - **Number of Operational Elements**
    - Backwards compatibility can reduce the number of aggregation layer devices because both legacy and next generation end-user devices can be served by a single device.
  - **Optimized Performance**
    - Over time as the legacy end-user devices (802.3av ONUs) are replaced with next generation (802.3ca ONUs) all wavelengths may operate at intended data rates.

Use and Adoptions of Backward Compatibility

- IEEE 802.3 100M Ethernet
- IEEE 802.3 1000M Ethernet
- IEEE 802.3av
- IEEE 802.11 (WiFi)
- Fibre Channel
- G.fast
- DOCSIS

- **Enterprise Markets**
  - Upgrading Ethernet Switches in Wiring Closets reduces space, power, conditioning, and number of elements while creating flexibility to support legacy and future end user devices.
  - Fibre Channel switches typically support at least 2 pervious versions this reduces capability issues and enables the customer to invest in the future when products are available
- **Carrier Markets**
  - When Access Technologies are backward compatible this allows the operator to make investments at the aggregation layer elements located in facility, node, or cabinet “before” CPE devices are purchased.
  - Carriers can migrate the legacy customers to the updated and extensible aggregation layer customers and remove the older systems (reducing space, power, conditioning, and number of elements)

Questions or Interest in Proposals

- **Proposal 1:** Define Optional Support for Backward Compatibility Between 10G-EPON and 100G-EPON

- **Proposal 2:** Define Dual Rate 10G and 25G Upstream

Thank You