Joint IEEE 802 and ITU-T Study Group 15 workshop "Building Tomorrow's Networks"
Geneva, Switzerland, 27 January, 2018

Next Generation PON
100G-EPON

(IEEE 802.3ca)

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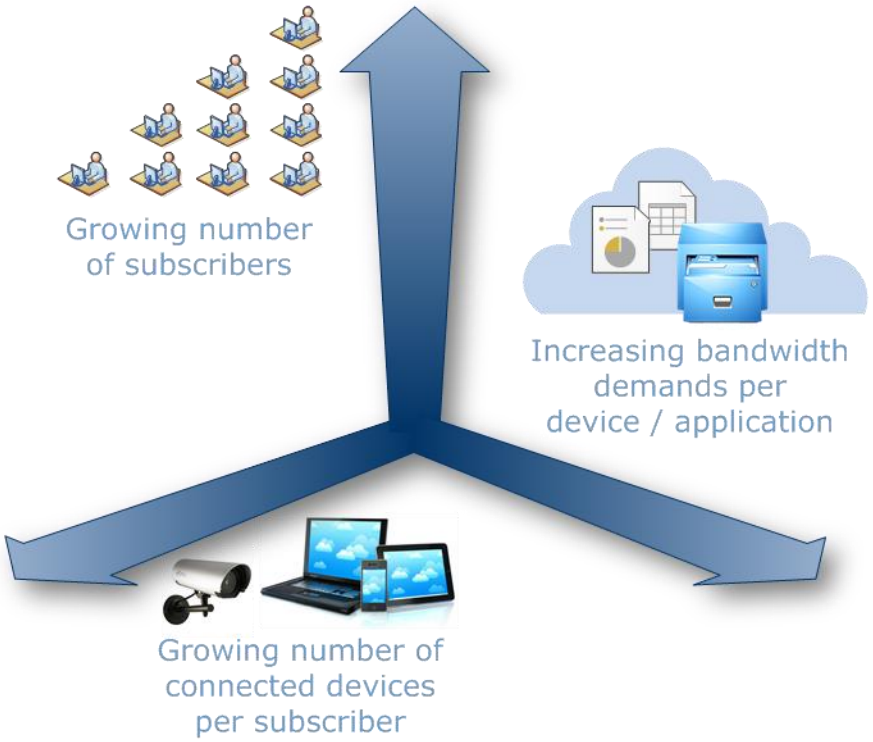
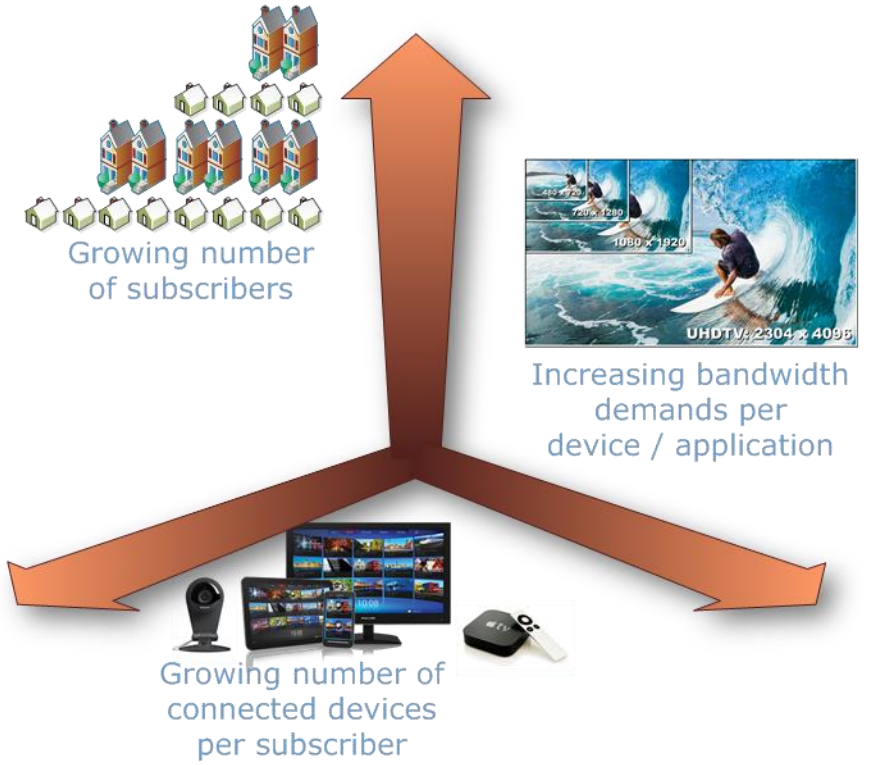
In The Beginning…

Business Access Networks



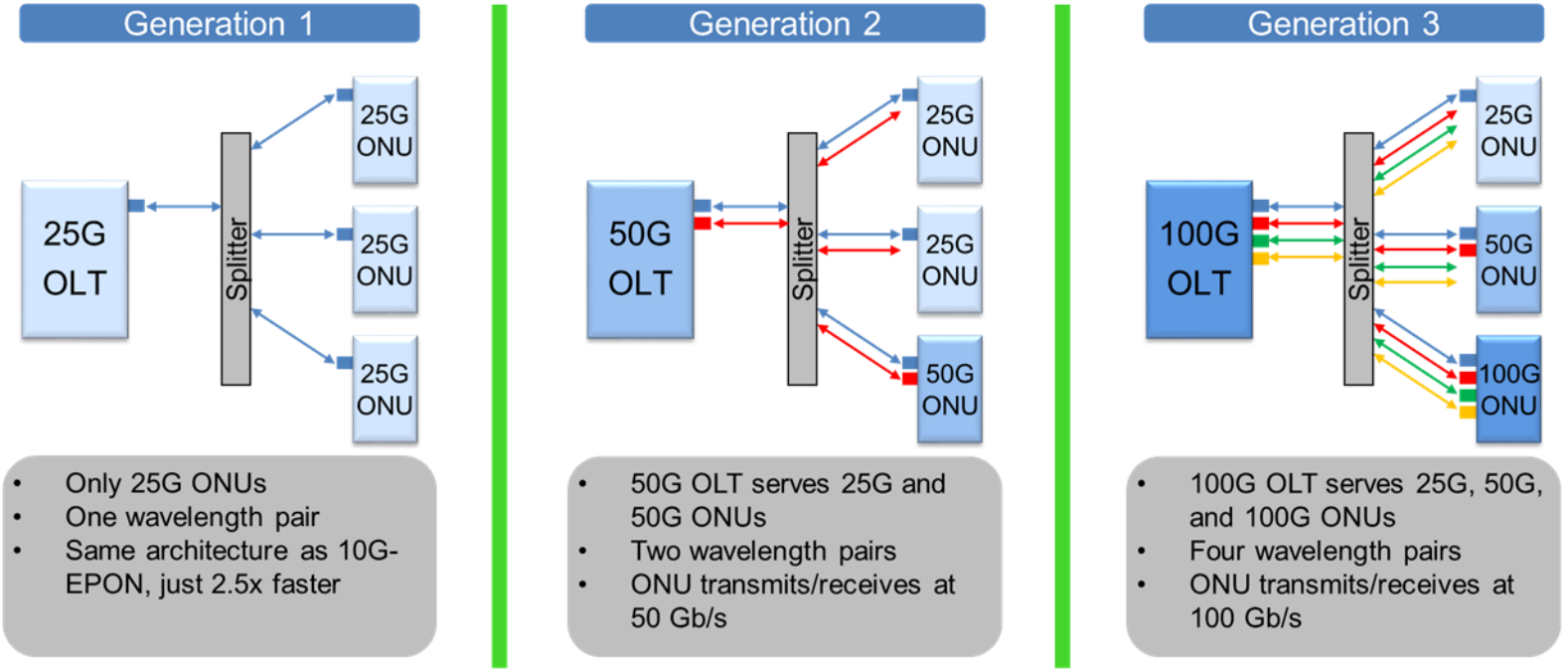
Residential Access Networks



↑ Users
↑ Devices/User
↑ Bandwidth/Device

→ Lots and lots of bandwidth, growing continuously

So We Decided…



- Only 25G ONUs
- One wavelength pair
- Same architecture as 10G-EPON, just 2.5x faster

- 50G OLT serves 25G and 50G ONUs
- Two wavelength pairs
- ONU transmits/receives at 50 Gb/s

- 100G OLT serves 25G, 50G, and 100G ONUs
- Four wavelength pairs
- ONU transmits/receives at 100 Gb/s

Key differentiators: Generational approach, 25 Gb/s per-wavelength, 100 Gb/s total capacity, no tunability, channel bonding

Create an IEEE standard capable of…
…growing with market needs
…defining generations of technology (25/50/100)
… based on 25Gbps per wavelength

Primary 802.3ca Objectives

- Provide specifications for physical layers operating over a single SMF strand and supporting symmetric and/or asymmetric 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

- Support coexistence with 10G-EPON (and XGS-PON) (Wavelengths for concurrent operation, same optical distribution networks)

There Have Been Challenges…

- Provide specifications for physical layers operating over a single SMF strand and supporting symmetric and/or asymmetric 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~~

Why was this objective removed?

- Technically challenging to meet ODN power budget with 4 wavelengths (delaying task force progress)
- Challenging to find 4 upstream and 4 downstream wavelengths while maintaining economic feasibility
- 100Gbps not needed for ~10 years
- Better technical solutions available in future (i.e., 50 Gbps wavelengths)

What About PON Convergence?

- Is it a goal? YES!
- Decisions to foster PON convergence:
  - Adopted another objective:

> Wavelength allocation allowing concurrent operation of 25G-EPON and G-PON reduced wavelength set (1290nm-1330nm) PHYs

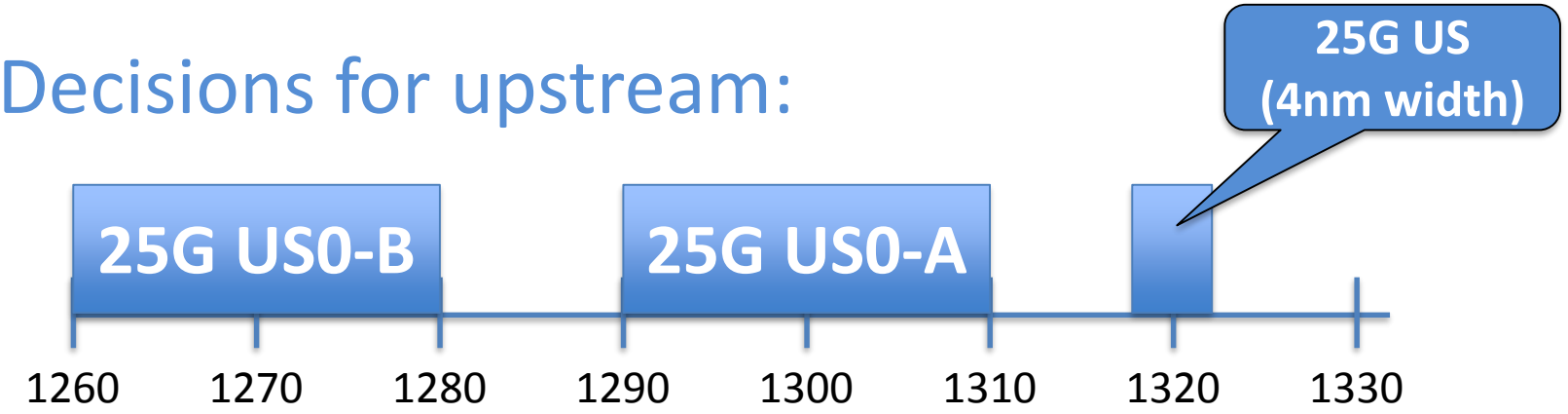
  - Decoupling connectivity from media access
  - Improved REPORT/GATE efficiency
  - Frame fragmentation

IEEE 802

ITU

Speaking Of Wavelengths…

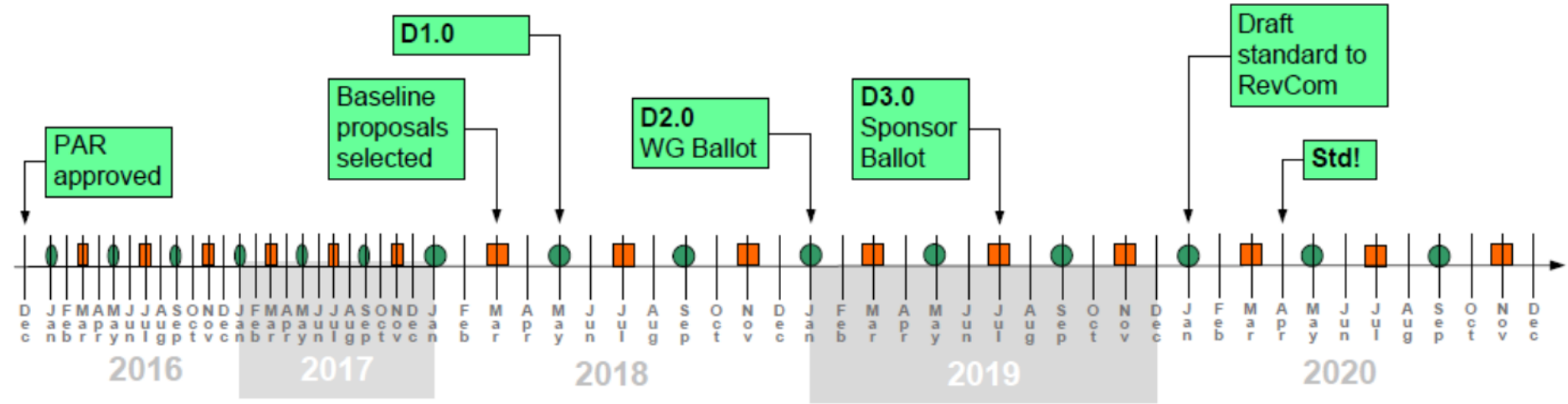
- Decisions for upstream:



  - US0-A → 25Gbps PON WDM coexistent with 10G-EPON/XGS-PON
  - US0-B → 25Gbps PON WDM coexistent with G-PON

802.3ca Timeline

IEEE P802.3ca Timeline



- 802.3 Interim Meeting
- 802.3 Plenary Meeting

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Thank you!

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