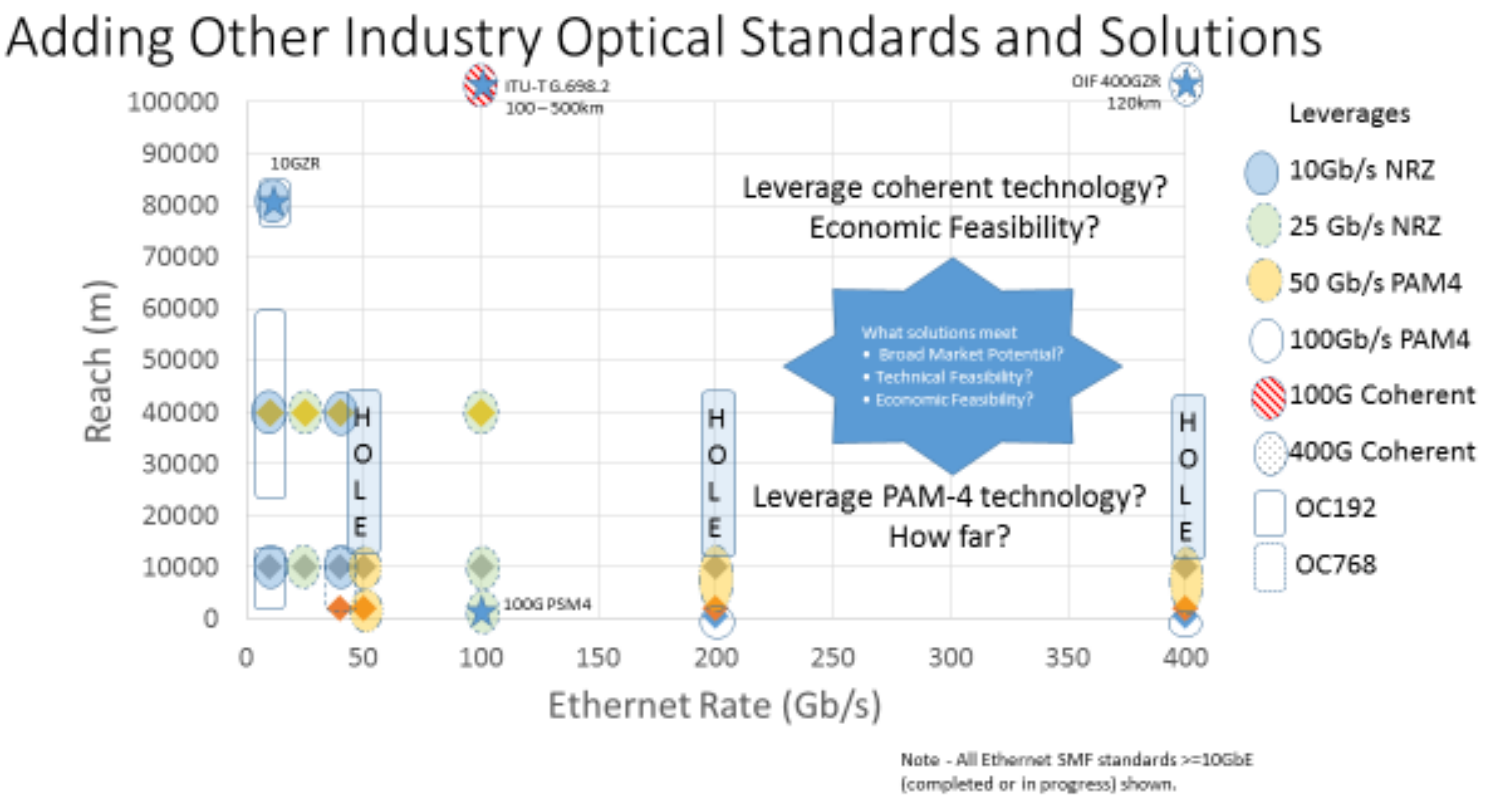
Pluggable Coherent 400G

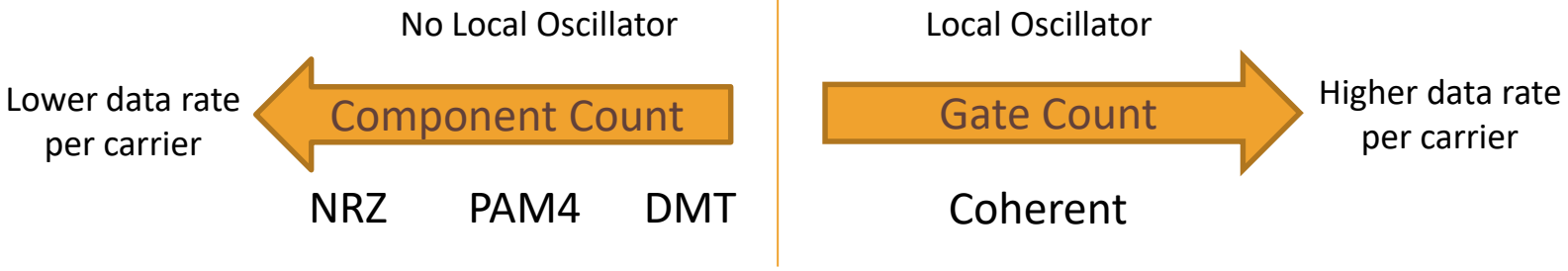
Tom Williams

Keith Conroy

Beyond 10km Landscape



Coherent…..It's Just a Local Oscillator!



- Even in direct detect, various modulation formats exist to trade-off component count for gate count
  - Coherent is just an extension of this continuum with extra receiver gain by adding a local oscillator
    - In most applications, the same laser is shared between transmitter and receiver
  - The penalty for added gate count is reduced over time at the pace of Moore's Law
- Coherent design and architectures were initially focused on optimization for long haul and metro DWDM applications
- Coherent offers the benefit of higher data rate per carrier

Pluggable Coherent 400G

- Coherent power/bit has reduced at ~40%/year
  - Smaller CMOS technology nodes
  - Increased bits/symbol
  - Optimization for shorter reach interfaces
    - LH → Metro → DCI
- OIF project defining 400G coherent interoperable modes
  - Modulation Format, Framing, FEC encoding, etc.
  - Two target applications
    - DWDM – 120 km
    - Single λ – TBD km
      - ~40km seems reasonable (no external amplification or DCM)
  - <15W power target based on 7nm process
    - OSFP, QSFP-DD, or COBO form factors
    - Single λ application may be lower
      - Fixed Laser
      - Reduce CD compensation

Evolution in Power, Cost and Density per 100G