



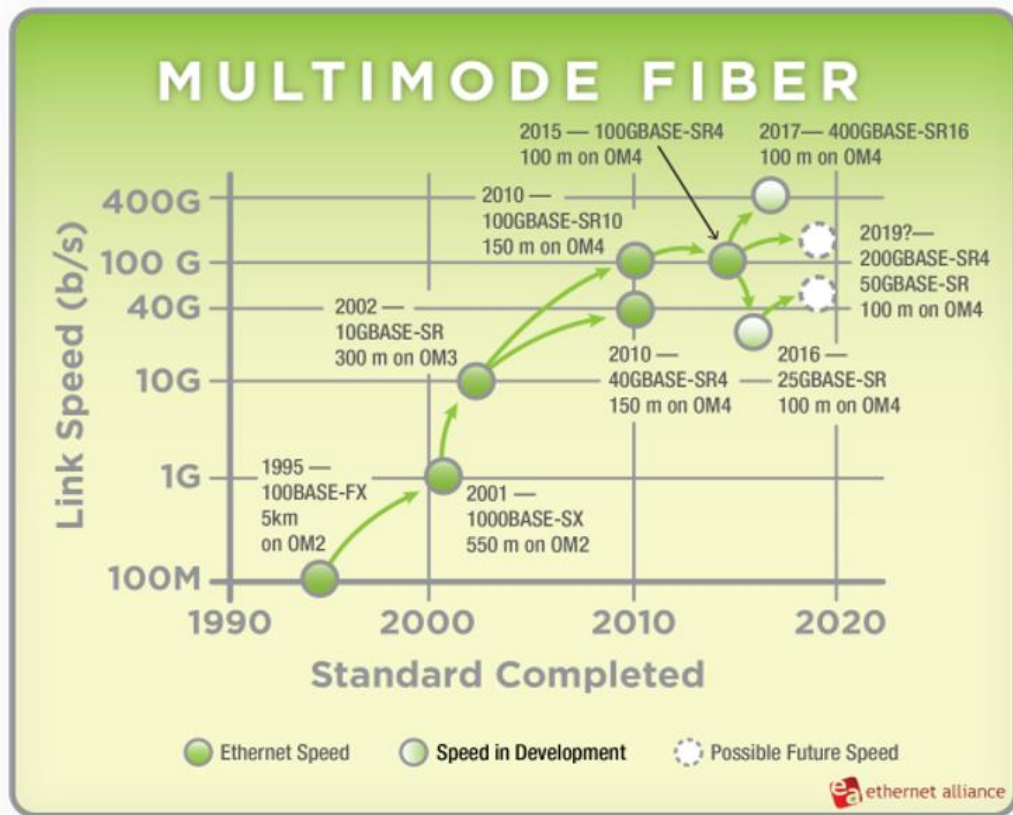
# Future of Multimode Optics

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Sep 29, 2016

Vipul Bhatt

# Rapid Progress in Ethernet Rates



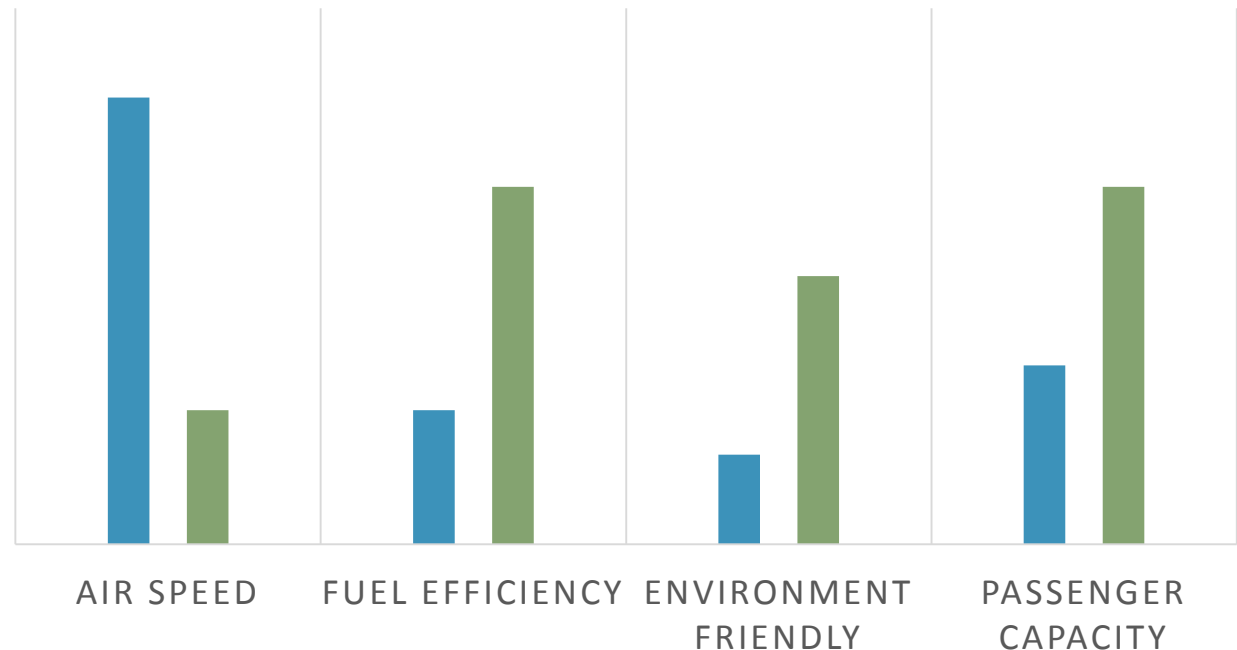
- ◆ We often hear: “At higher speeds, does multimode optics have a future?”
- ◆ A better framing of the question is:
- ◆ “Can multimode optics continue to meet the needs of its target short-reach segment in the foreseeable future?”
- ◆ The answer is a resounding Yes.

Source: Ethernet Alliance

# Every Market Segment Requires Design Tradeoffs

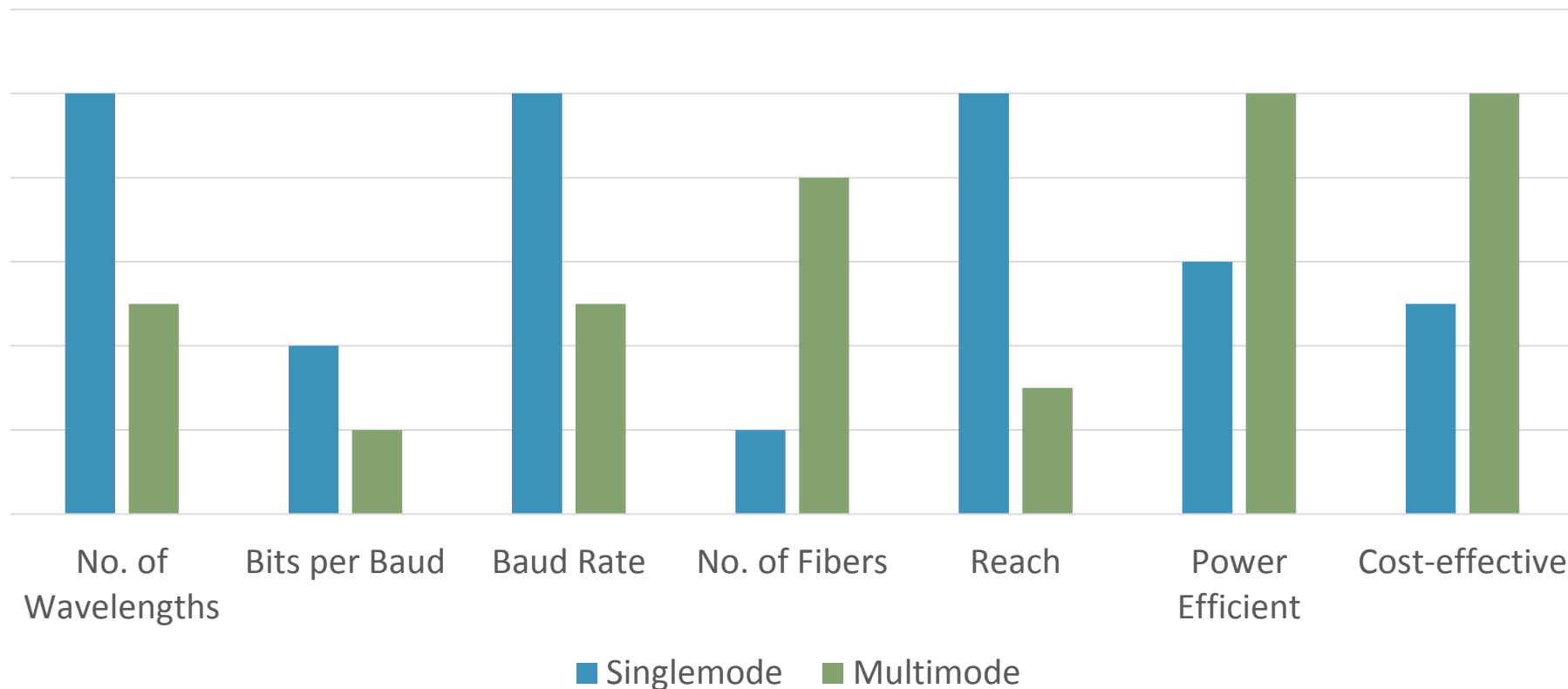
## AIR TRAVEL: FAST VS. AFFORDABLE

■ Fast Travel   ■ Affordable Travel

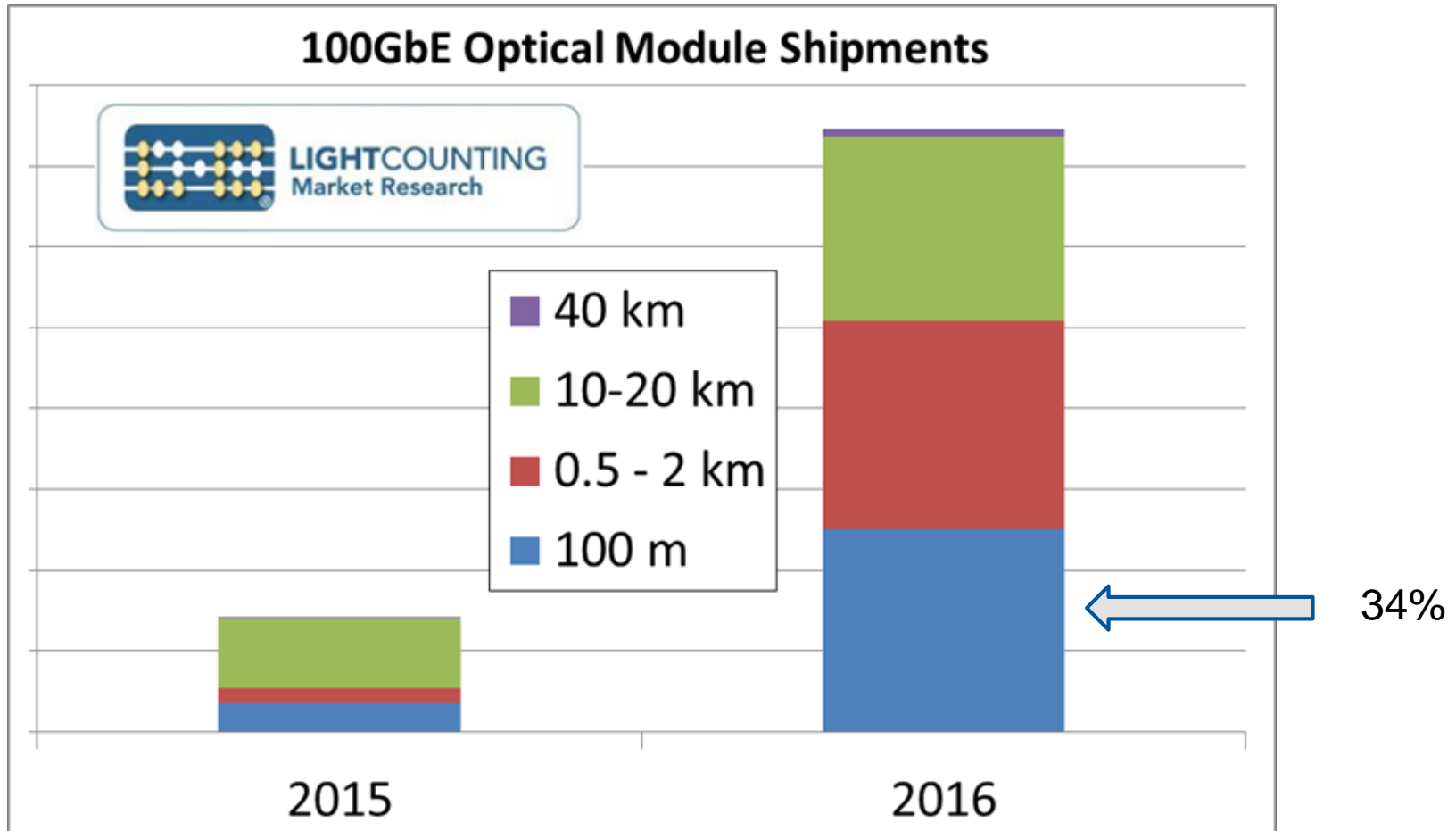


# Multimode Optics Strikes the Right Tradeoff for Short Reach

Singlemode vs. Multimode



# 100G Multimode Module Shipments Maintain a Healthy Share



Courtesy: LightCounting

# Looking Ahead

- ◆ For the foreseeable future, multimode optics will compete favorably against alternatives like singlemode / silicon-photonics in short reach applications
  - VCSEL advantages haven't changed: low cost, small size, on-chip testing, efficient coupling, easy packaging, low threshold current.
  - Multimode fiber innovations in transmission and wider spectrum
  - VCSEL development will continue to make progress
    - PAM modulation, higher signaling rates, multiple wavelengths
    - Will keep multimode a significant force at 200G and 400G
  - Additional potentially favorable market forces: Higher speed server interconnects; ToR giving way to architectures that need longer interconnects for servers