

# NANOG 40 Panel: The Future of a Higher Speed Ethernet 40GbE, 100GbE, or Something Else?

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# Where do we stand today

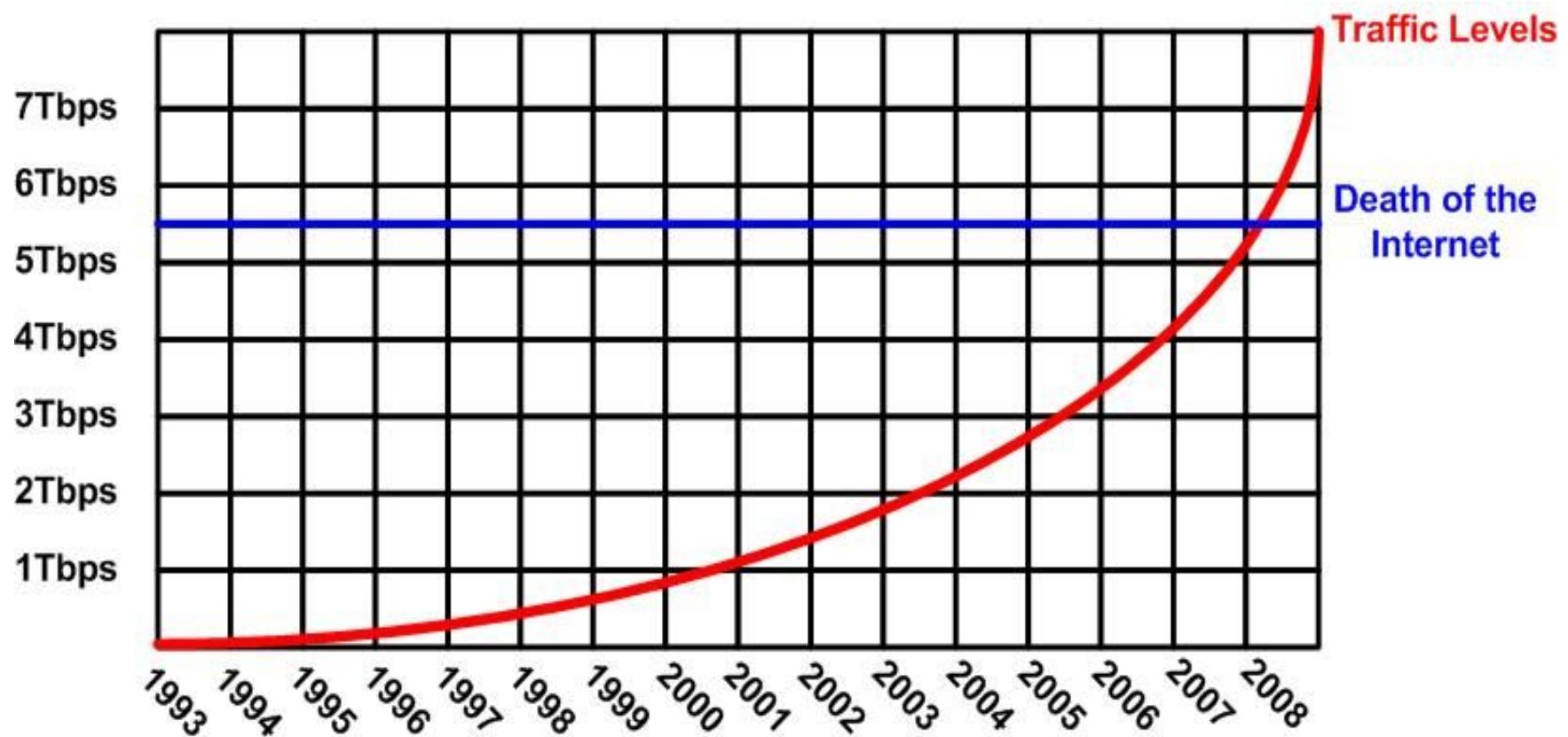
- Today's unit of measure is the 10Gbps Interface
  - OC-192 PoS has been available on routers for 7+ years
  - Most major long-haul and metro DWDM systems upgraded from 2.5G to native 10G signaling at around the same time.
  - Modern DWDM systems can deliver 25GHz 160x10Gbps
- 10GbE deployment rates are growing rapidly
  - WAN PHY allows transport over OC-192 infrastructure
  - 10GbE on very capable routers costs \$4,000-25,000/port
  - Availability of cheap DWDM 100GHz tuned XENPAK/XFPs
  - Availability of cheap long-reach optics (80km)
  - Many large networks are moving to 10GbE in the core

# So what's the problem?

- The “over-building” glut of the dot-com years has finally been completely exhausted by traffic growth.
- 10G has not only become the unit of measure for the core, it is the unit of measure for many customers.
- Large networks must use multiple 10G bundles
  - Many Tier 1's admit to needing 8x10G+ between US cities
  - IXs like LINX / AMS-IX are operating 8x10G rings today
    - And can't build in parallel due to their flat layer 2 architecture
    - Parallel paths and 8x10G bundles increases complexity
- Traffic levels continue to rise at an alarming rate

# Why do we need a faster Ethernet?

- Impending Doom – Too Much BitTorrent



# The Evolution of Optical Technology

- The last great migration was from 2.5G to 10G
  - Significant investment into 10G during the dot-com years
  - Leveraging that investment has lead to widespread commodity 10G components at low prices.
- The next leap forward is 40G optical technology
  - Optical challenges scale exponentially with the bit-rate
    - Chromatic Dispersion (CD), Polarization Mode Dispersion (PMD)
  - Spectrum is break even (4x25GHz 10G or 1x100GHz 40G)
  - But it actually exists today, and its shipping
    - OC-768c router interfaces available from Cisco and Juniper
    - Using standardized 40G 300-pin MSA optics with 2km reach
    - Still costs more than 4xOC192, but not outrageously more

# The 40GbE vs 100GbE Debate

- The 100GbE camp advocates skipping over 40GbE
  - Increased data rate could benefit end users
  - A 100G serial optical signal is not yet possible
    - So a 100GbE solution would involve parallel paths
    - 4x25G and 10x10G are the most common proposals
- The 40GbE camp advocates more obtainable goals
  - 40GbE could come to market significantly faster
  - 40GbE would be interoperable with 4x10G or 40G systems
    - Allows use of existing 10G infrastructure, or native 40G signaling
- Some camps advocate work on both technologies
  - While others feel this would only slow the adoption of both