FORCE10™

Ethernet-
The Next Generation

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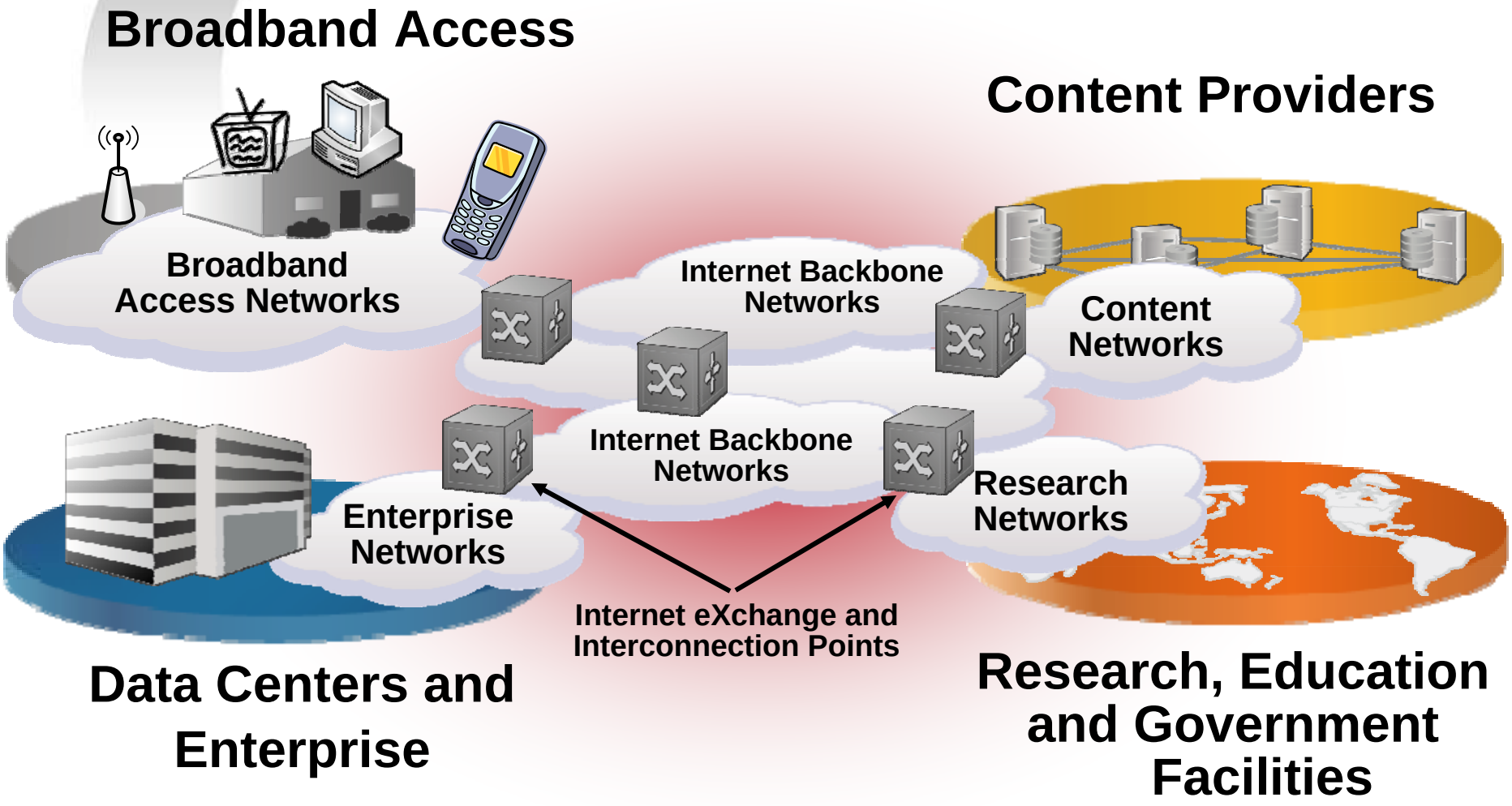
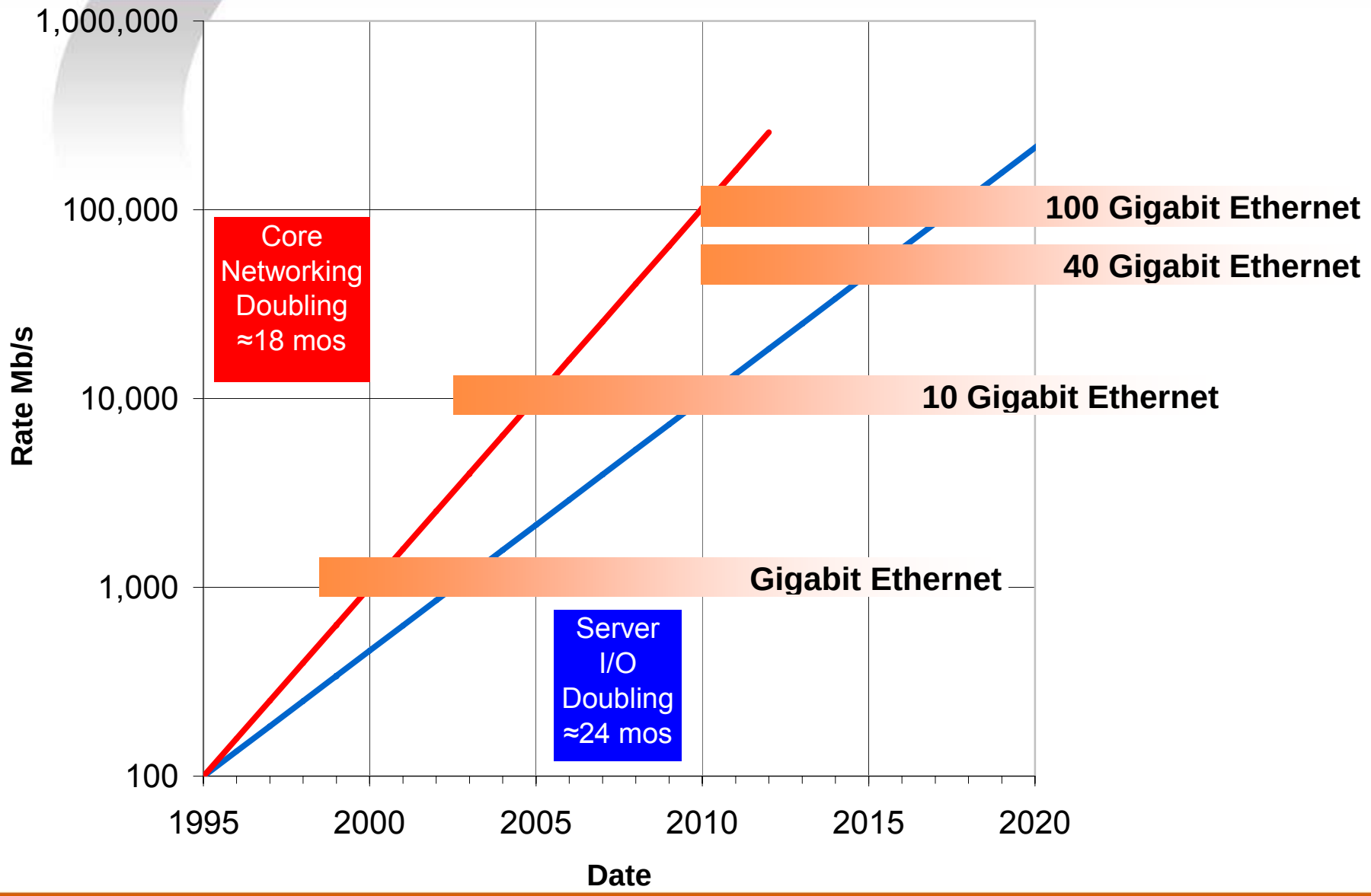
The Ethernet Ecosystem



Reasons Cited for 100 Gb Ethernet

- LAG is becoming too unwieldy
- Use of lots of cheap GE Servers
- Migrating GE servers to 10GE servers
- 10G port density demand
- Blade Servers
- Plans to use virtualization
- My core needs to support more 10GE access
- My carrier isn't taking on new 10GE services
- Video – On Demand / High Definition
- Multicast Traffic – Financial Applications
- Broadband Access and Content Consumption

Timing of Application Needs



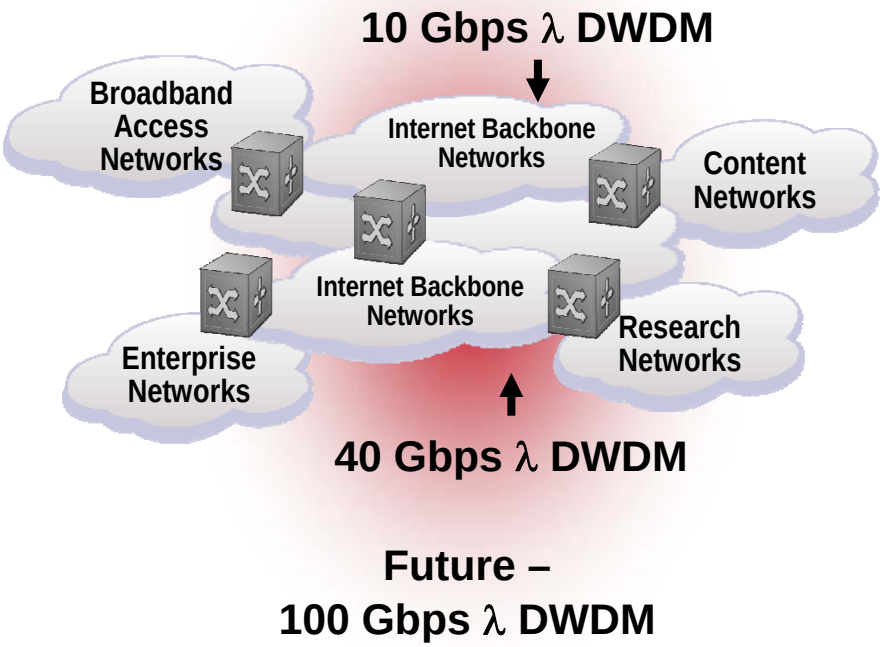
HSSG Objectives

- Support full-duplex operation only
- Preserve the 802.3 / Ethernet frame format utilizing the 802.3 MAC
- Preserve minimum and maximum FrameSize of current 802.3 standard
- Support a BER better than or equal to 10^{-12} at the MAC/PLS service interface
- Provide appropriate support for OTN
- Support a MAC data rate of 40 Gb/s
- Provide Physical Layer specifications which support 40 Gb/s operation over:
  - at least 100m on OM3 MMF
  - at least 10m over a copper cable assembly
  - at least 1m over a backplane
- Support a MAC data rate of 100 Gb/s
- Provide Physical Layer specifications which support 100 Gb/s operation over:
  - at least 40km on SMF
  - at least 10km on SMF
  - at least 100m on OM3 MMF
  - at least 10m over a copper cable assembly

Adopted by HSSG and approved by 802.3 at July 2007 Plenary

Providing Support for OTN

Ethernet Ecosystem



Future –
100 Gbps λ DWDM

- OTN Networks
  - 10 Gbps λ DWDM
  - 40 Gbps λ DWDM
  - **No existing 100G transport network**
- Problems for Next Gen Ethernet
  - 40GE: line rate > Payload of ODU3 products
  - 100GE: Existing / Greenfield networks
- Solution Discussion
  - Transcoding (could be defined by ITU)
    - requires IEEE 802.3 to forbid use of undefined 64B/66B code words
  - ITU-T SG15 - define ODU4 to provide transparent backhauling of 100 GbE on single λ
  - 100 GbE may also be carried over current OTN networks using virtual concatenation:
    - ODU3-3v, 3 bonded wavelengths of 40Gbit/s
    - ODU2-11v, 11 bonded wavelengths of 10Gbit/s

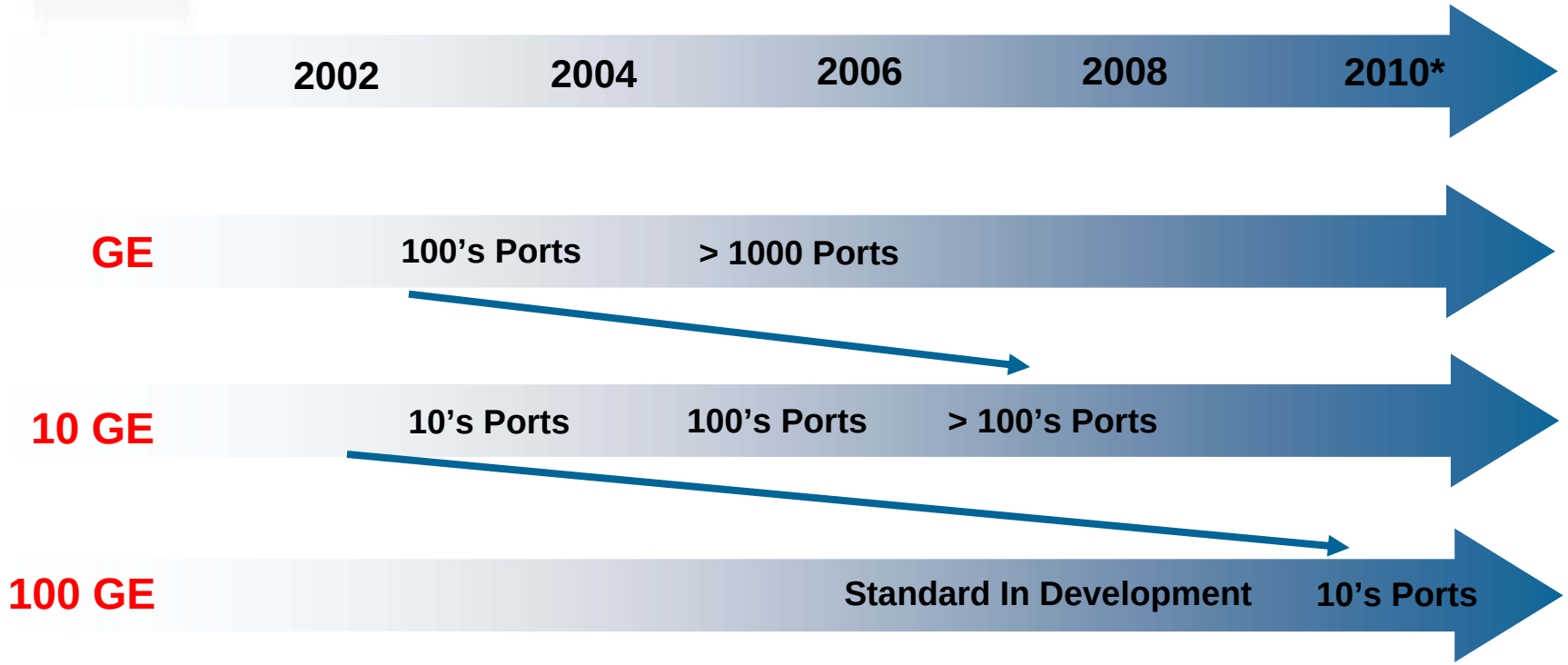
Physical Layer Specifications

	40G	100G
At least 1m backplane	√	
At least 10m cu cable	√	√
At least 100m OM3 MMF	√	√
At least 10km SMF		√
At least 40km SMF		√

Higher Speeds Drive Density – Everyone Benefits!

- You may not need 100G Ethernet, but the Eco-System does….
- Even if you don't need higher speed Ethernet, you still benefit
- New technology will drive 10 GbE port density up and cost down
  - Just as 10 GbE did for GbE
- Assuming switch/routers have the switching capacity, these line-rate combinations on a single line card are possible for 100 GbE
  - 1 x 100 GbE port
  - 10 x 10 GbE ports
  - 100 x 1 GbE ports
  - And even more oversubscribed port density…

Industry System Port Count Cycle



The Next Generation of Ethernet

- The Higher Speed Study Group will become the IEEE 802.3ba Task Force
- This effort will produce 1 amendment to the IEEE 802.3 specification.
- 40 GbE and 100 GbE will be delivered together