

10 Gigabit Ethernet

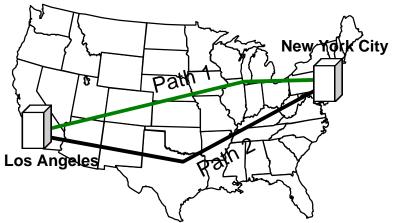
IEEE 802.3 Call For Interest March 9, 1999

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10 Gigabit Ethernet Backbones



Campus Backbones Access Networks Metropolitan Networks

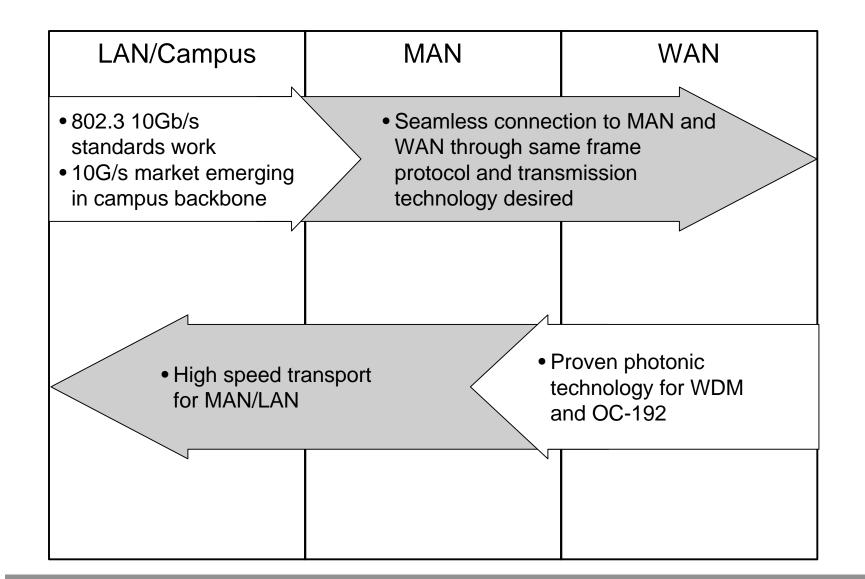


-Using Ethernet as the universal link layer for wide area networks provides a consistent end-to-end infrastructure

-10 GigE fills wavelengths of WDM photonic systems

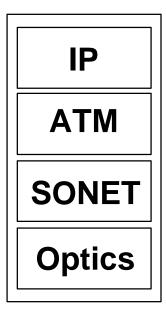
-10 GigE needs to be defined with wide area applications in mind





Today's Backbone

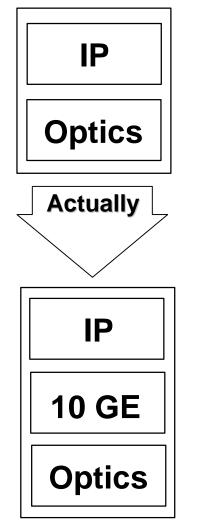




- L3: Packet Switching
- **L2: Cell Switching**
- L1: Circuit Switching
- **L0: Physical connectivity**

Each Extra Layer Adds Overhead and Cost ATM adds "Cell Tax" of 9.4% IP Packets don't fit exactly into ATM cells SONET Add/Drop performs no bandwidth sharing SONET framing adds 3.7% overhead





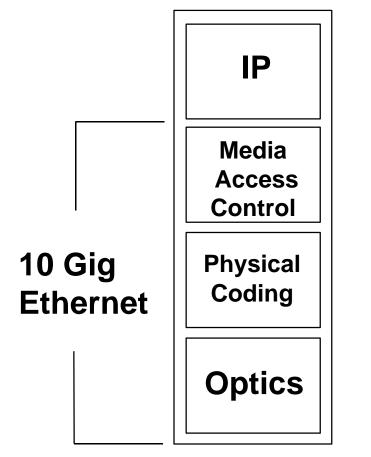
Seems obvious

Simpler, cheaper (assuming the vendor actually cares about your cost)When you don't have the intervening pieces it's easier to say they aren't necessary than to build the expertise

But it's not quite bolt-on

Some functions might actually be necessary! Layers 0 & 3 need to know a lot more about each other





L2: Frame forwarding, QoS, protection, multicast

L1: Header integrity, payload integrity, frame delineation, efficient line coding, signal trace, protection, FEC

L0: Physical connectivity



• SONET 3.7%

- Major loss from unshared circuit switch channels

• POS 3.7% + Byte Stuffing + PPP Headers

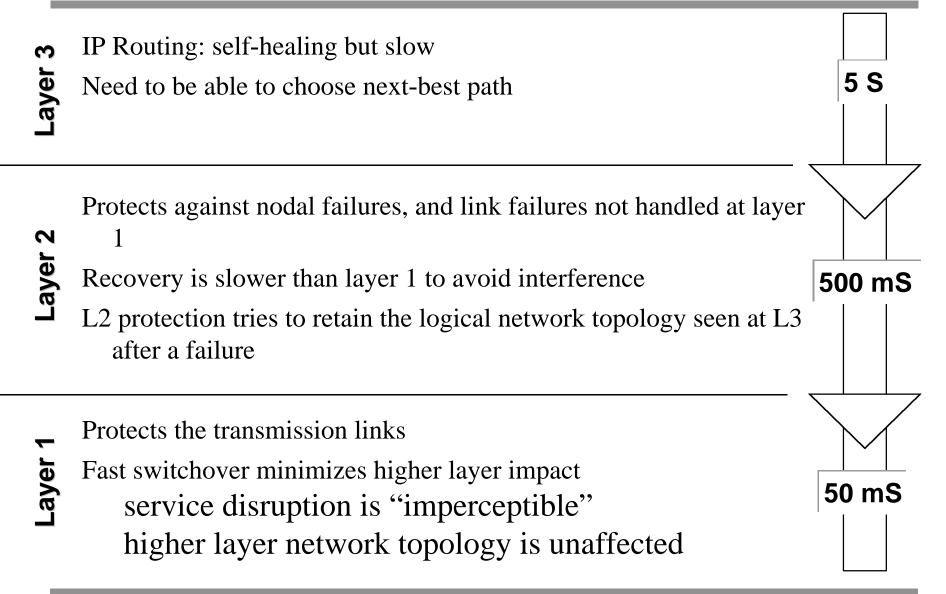
- Major loss from unshared circuit switch channels

- ATM 3.7% + 9.43% + Cell Packing Loss
 - Allows bandwidth sharing reclaiming loss from circuit switch
- 1G Ethernet 25% + Preamble + IFG + Headers
 - Major loss from 8/10 encode and gaps
 - Allows bandwidth sharing

Need Fast Failure Detection



How the world shares ideas.





• Phased project

- First phase for campus backbone networks
- Later phases for access and metropolitan

• Designed from the start considering wide area

- Infrastructure is not free
- Failure detection time around 10 msec
- Support duplex operation only
- High Encoding Efficiency
 - » Better than ATM's "cell tax" and packing overhead