Defining Scope and Objectives:

Point to Point on Fiber/Copper and Point to Multi-Point on Fiber

Bruce Tolley

Enterprise Line of Business, Cisco Systems

EFM Study Group,IEEE 802.3 Interim

9 Jan. 2001

Version 2.1

btolley@cisco.com

408-526-4534

Why Ethernet for the First Mile?

- Lowest-cost, highest-volume network technology
- Installed base of 300M+ Ethernet ports today
- Supports all services: data, voice and video
- Works over all kinds of copper and fiber
- Eliminates unnecessary protocol conversions
- Faster, simpler, and cheaper than alternatives

Customer Issues

- Who is the customer?
  - Telcos, IXCs, PTTs
  - ILECs, CLECs
  - BLECs, OSPs
  - Ethernet “Carriers”, power companies
  - Real estate development firms, commercial building owners
- Where is the final end user?
  - Single family residences
  - MXU, MTU, MDU, etc.
  - Europe, Asia, not just USA, Canada
- This is not the Ethernet market of 1985 or 1995 or 1999

Speeds and Feeds

- GTTH
  - Leveraging 1000BASE-X cost curves
  - Subscriber bandwidth: 100 to 1000 Mbps
- Point to multi-point
  - Leveraging point to multi-point topologies
  - Subscriber bandwidth: 30 to 100 Mbps
- Copper
  - Leveraging installed copper
  - Subscriber bandwidth: up to 30 Mbps
- Some customers will build networks with all three

Optical Ethernet: Economics of Deployment

- To achieve wide consumer acceptance, connectivity should be very cheap. Think AOL model
- To enable profitable network operation, equipment cost should be low
- Fiber plant has long life (30 years +) and can be amortized over long term
- Services will drive revenue model

This is NOT a LAN market. It is a SP/LEC market

Why Point to Multi-Point?

- There are competing technologies:
  - FSAN ATM Passive Optical Networks
- Industry interest in IP/Ethernet PONs
  - IEEE 802.3 should do this work
- Customer interest in IP/Ethernet PONs
  - RBOCs, CLECs
- Fits customer business model
  - Low cost of equipment and connectivity = Max. service revenue per dollar invested
- Fits customer service model
  - Ethernet will support any service IP supports: voice, video, data

Why Not Ethernet Point to Multi-Point?

- Not the “lowest” cost Ethernet solution
  - Costs are low enough to merit inclusion in SG goals
- Shared media is a step backwards
  - Last mile is point to multipoint problem
  - Residences and MXUs are not communicating with each other
  - Technical solution should fit customer problem
- Requires a new MAC
  - Maybe yes. We can decide at end of SG if EPON effort requires its own 802.3 PAR or own WG
- Will slow down EFM standards effort
  - Premature to decide this

Non-objectives and Questions

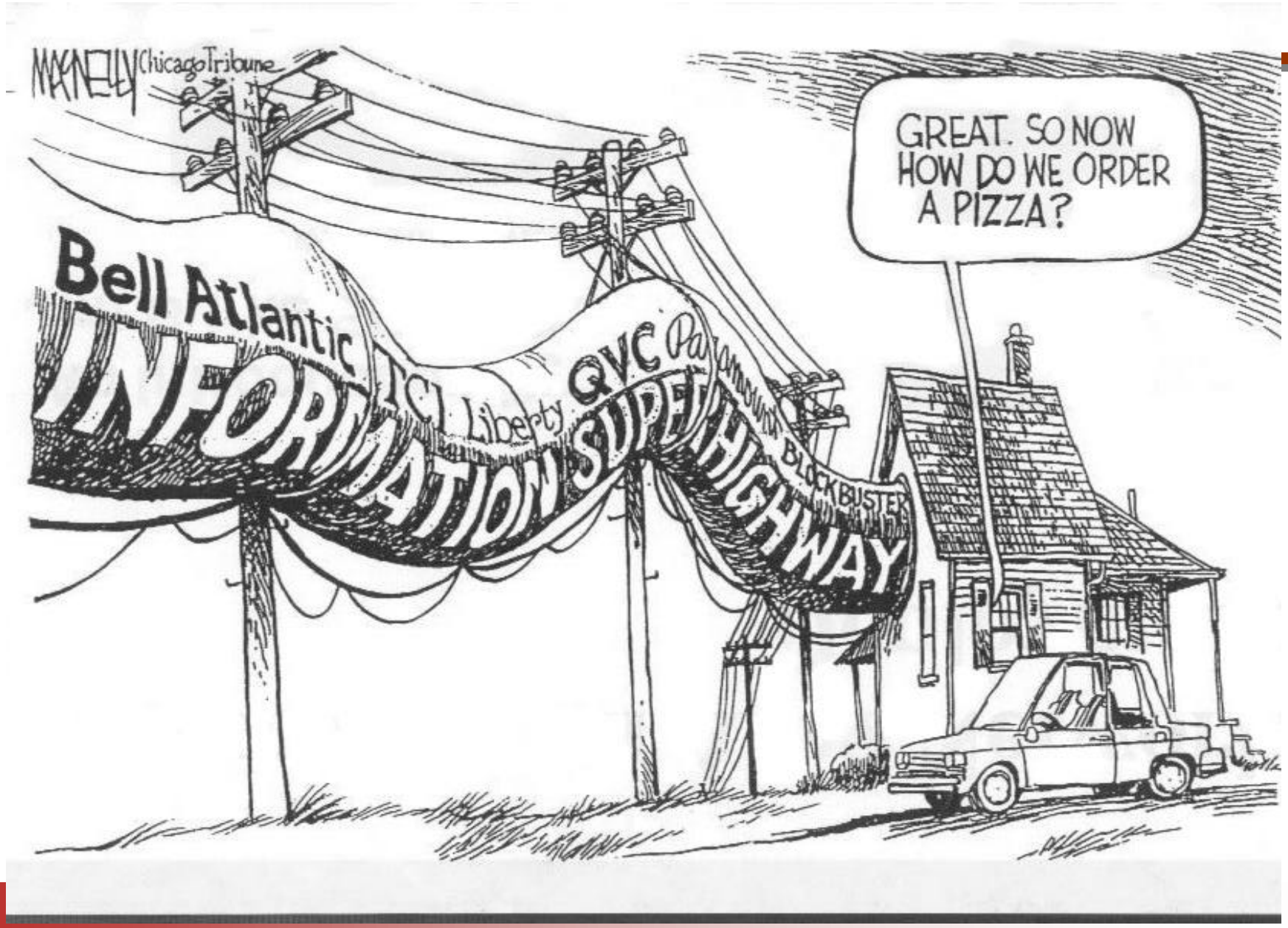
- Full Service Ethernet access networks?
  - Most likely NOT an objective
- QoS?
  - Support for POTs
  - Support for VOIP
  - Support for video (analog and other)
- Traffic management?
- OAM functions?
- Home networks: outside the scope
- Layer 3 or 802.1: outside the scope

Some Objectives for SG

- Support 802.3 Ethernet over Copper from CO to residences and MxUs
  - at distance of up to 2 km
  - at data rate of up to 30 Mbps
  - dirty wire
- Support 802.3 Ethernet over SM fiber from CO to residences and MxUs
  - at distances of at least 10 km
  - at data rate of 1000 Mbps
- Support star-wired, structured cabling, and shared fiber topologies
- Support point to point and point to multipoint networks

Conclusions

- **Market is highly segmented**
- **Customers are very sophisticated**
- **Customers will self-select different solutions based on THEIR business models (not our models)**
- **Options**
  - **GTTH: 100 to 1000 Mbps on fiber**
  - **Point to multipoint: 30 to 100 Mbps on fiber**
  - **Copper 5 to 30 Mbps on installed copper**
- **Goals for EFM effort should include support for both copper and fiber, point to point and point to multipoint topologies**


MACNELLY Chicago Tribune
Bell Atlantic
TCI
Liberty
QVC
Paramount
BLOCKBUSTER
INFORMATION SUPERHIGHWAY
GREAT. SO NOW HOW DO WE ORDER A PIZZA?