



C A L Y n e t w o r k s

Ethernet in the First Mile: The Cost Effective Solution

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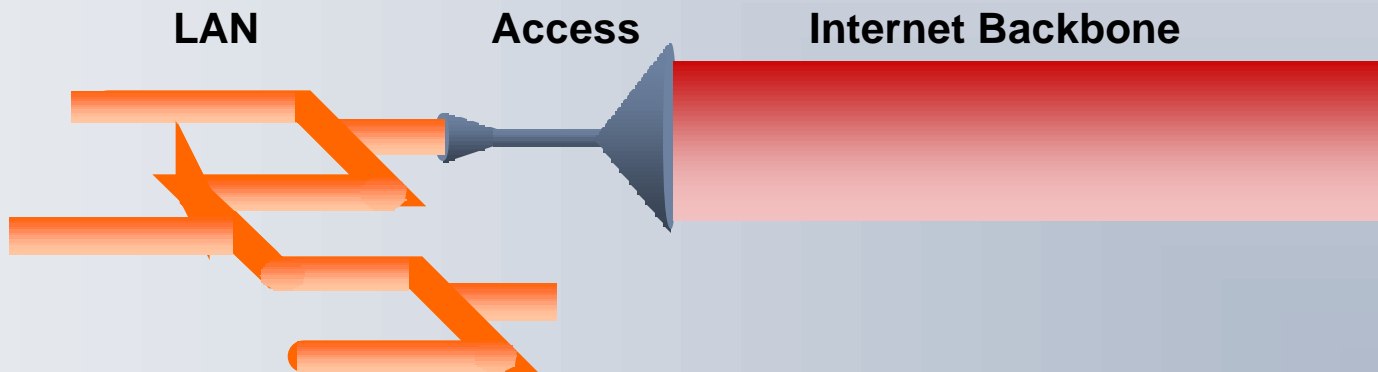
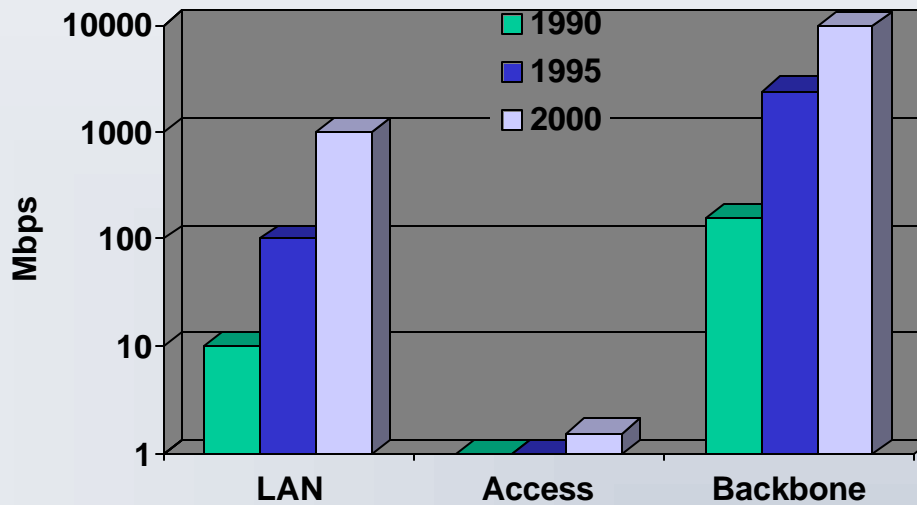


Prior to 2000

- Native Ethernet: Limited distance
- IP traffic over Ethernet is “best effort,”
 - No latency control
 - No jitter control
 - Inefficient bandwidth utilization
 - No restoration capabilities comparable to SONET
 - No SLA features
- ATM and SONET
 - Network survivability
 - Bandwidth efficient
 - Managed data traffic
 - High price tag



Bottleneck in Local Access





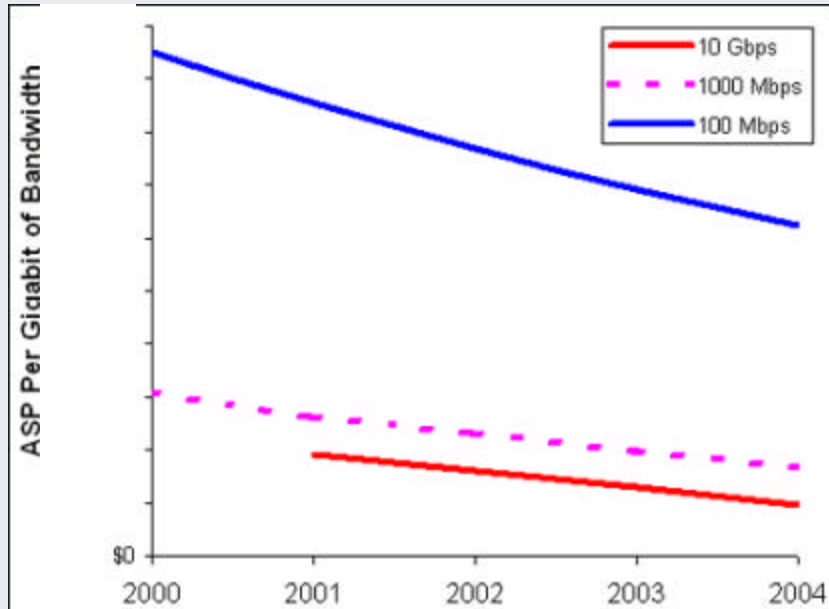
Market

- Enterprise (large business buildings)
- Small & Medium Business (SMB)
- Multi-Tenant Units (MTUs)
- Residential (single family)
- Multi-Dwelling Units (MDUs)

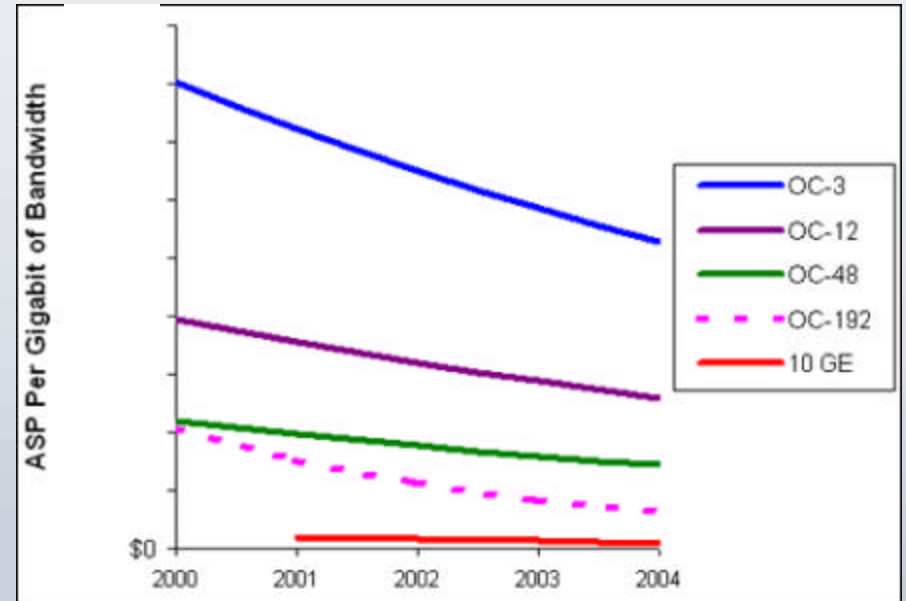


Industry Trend

Ethernet



SONET



(Source: Dell'Oro Group)

- **Dell'Oro Group survey of industry trends**
 - Average Selling Price (ASP)
 - Normalized to 1 Gbps service
- **Ethernet & IP-based services simplify delivery to user**



Ethernet LECs

Ethernet Local Exchange Carriers:

- Cogent Communications
- Telseon
- XO Communications
- Yipes Communications
- Fiberstreet
- UTFors
- Bredbandsbolaget



Wireless is Key to \$\$uccess

“ To reduce reliance on the physical connection for the short distance between our customers and our fiber optic networks,... we will deploy a high-bandwidth wireless connection ... to our fiber rings.”

“These fixed wireless connections ..., in most cases, will cost less than fiber to install.”

Source: XO (Nextlink) Communications, Inc., 1999 Annual Report, pages 14 & 15.



Service Provider Needs

- Reach
 - kilometers
- Low latency and jitter
 - milliseconds
- Survivability
- Management FCAPS
 - Faults, Config., Accounting, Performance, Security
- Standards
- Security

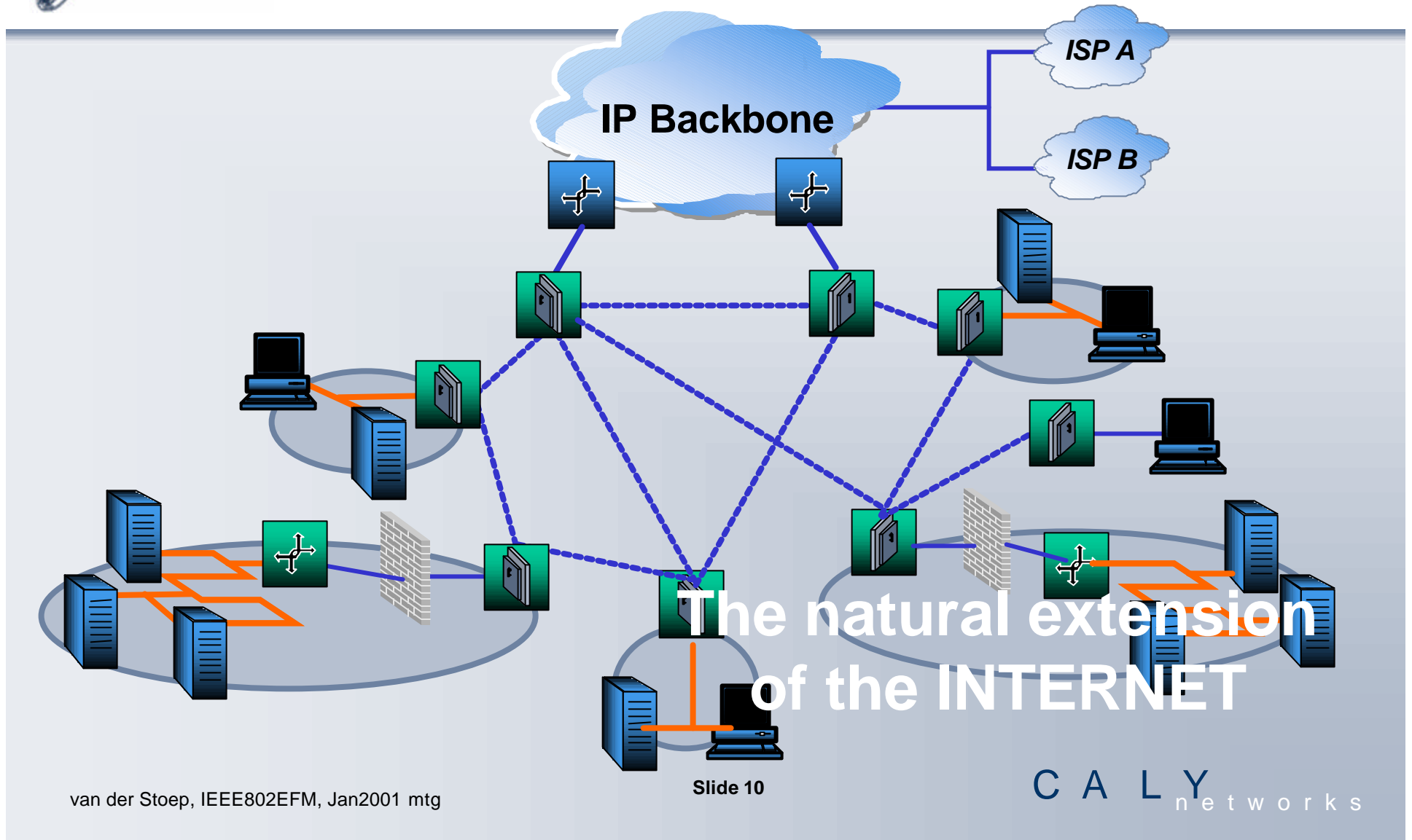


SP Needs (cont'd)

- Multi-Media
 - Dark fiber, dark λ , RF, laser
- Point of Demarcation = interface to user's LAN
 - Isolates Service Provider & User
 - Operational, safety, regulatory
 - Compatible with User's installed base
 - Devices, cabling, jacks, etc.
- High Speeds (100 Mbps++)
- Negotiate Performance
 - 100, 1000, ... Mbps?
 - Packet error rate: 1.e-6, 1.e-9, 1.e-12?



CALY Networks





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