

Industry Watch



Co-Chairs

Raj Jain

Co-founder and CTO

Nayna Networks, Inc.

S. Srinidhi

CEO

Prometheus Consulting

Our Speakers



- ❑ 12 Distinguished Industry Leaders
- ❑ By invitation only
- ❑ 7 Carriers, 1 technology strategist, 4 Equipment Vendors
- ❑ Wide variety of topics: Access, Metro, Content, Wireless/Wireline, Wi-Fi/DSL, Business/Regulatory issues

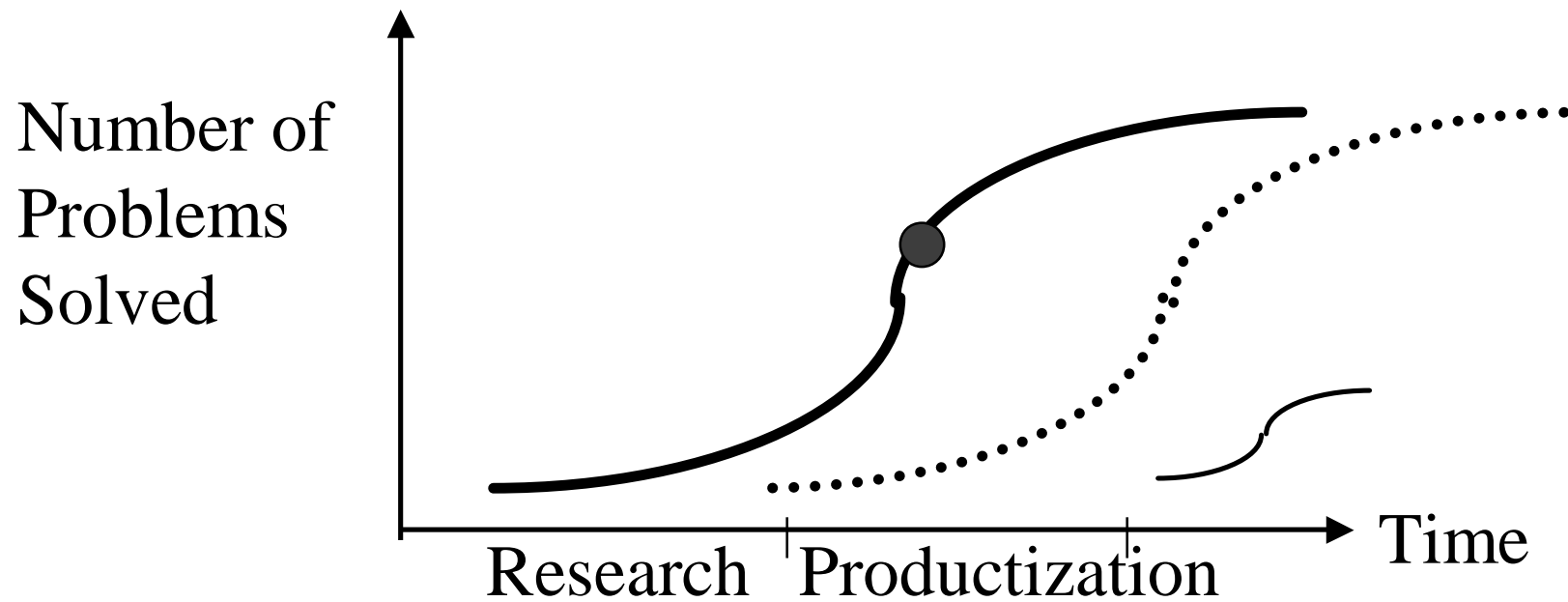
Topics Addressed

- ❑ What is the state of the broadband?
- ❑ What are the subscriber and traffic growth rates?
- ❑ How regulation can help the industry
- ❑ Which upcoming technologies have potential for success? MPLS, RPR, 3G, Wi-Fi
- ❑ Where new investments are being made?

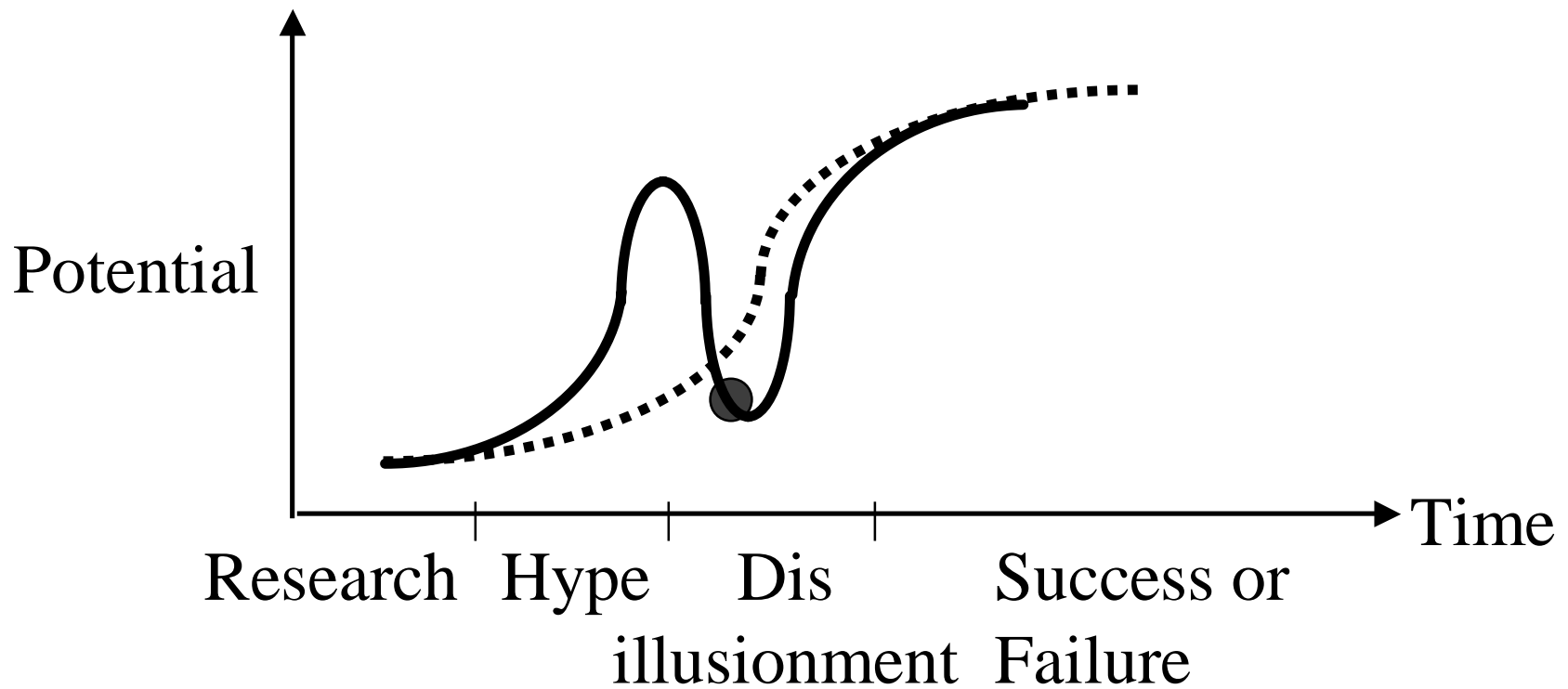


1. Technology life cycle
2. Traffic Growth
3. LAN/WAN Convergence

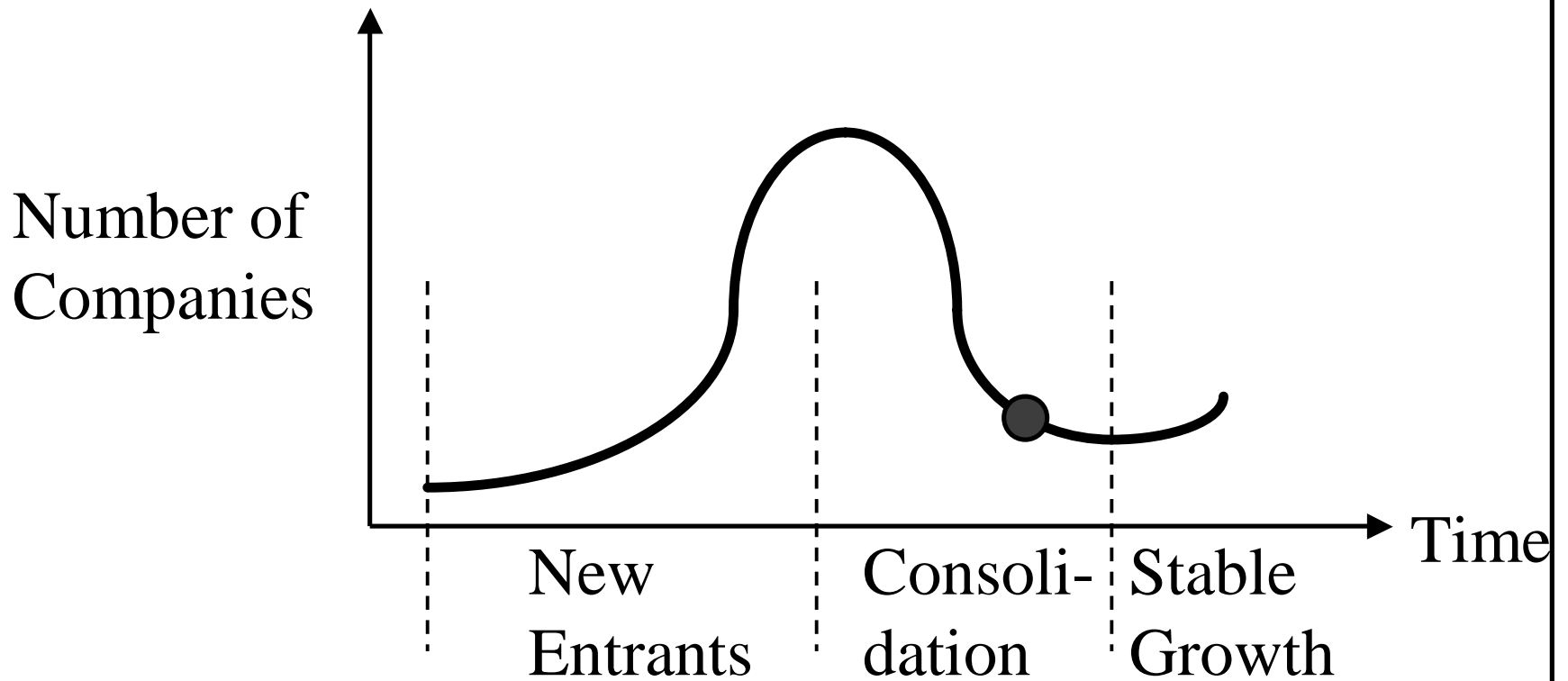
Life Cycles of Technologies



Hype Cycles of Technologies



Industry Growth



Trend: Evolution vs Revolution

1. CLECs to ILECs

ILEC: Slow, steady, predictable.

CLEC: Aggressive, Need to build up fast

New networks with newest technology

No legacy issues

2. Back to Voice

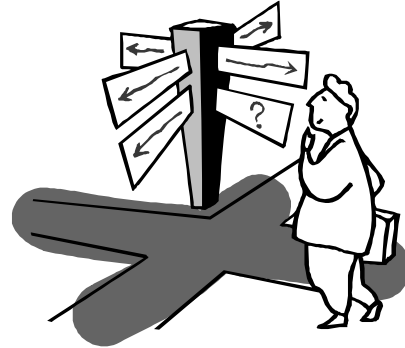
CLECs want to *start* with data

ILECs want to *migrate* to data

⇒ Equipment that support voice circuits but allow packet based (hybrids) are more important than those that allow only packet based

⇒ Evolution

Traffic vs Capacity Growth



Expensive Bandwidth

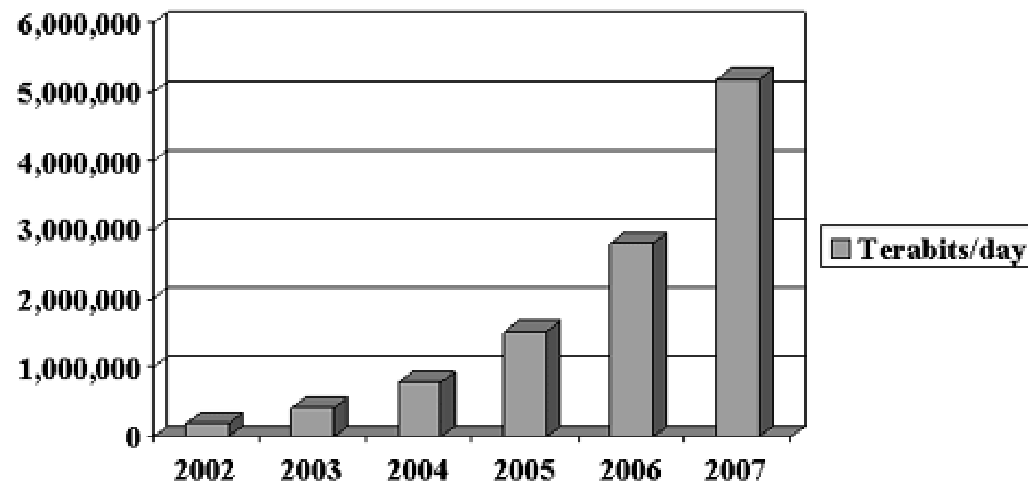
- Sharing
- Multicast
- Virtual Private Networks
- Need QoS
- Likely in WANs, L3

Cheap Bandwidth

- No sharing
- Unicast
- Private Networks
- QoS less of an issue
- Possible in LANs, L1/L2

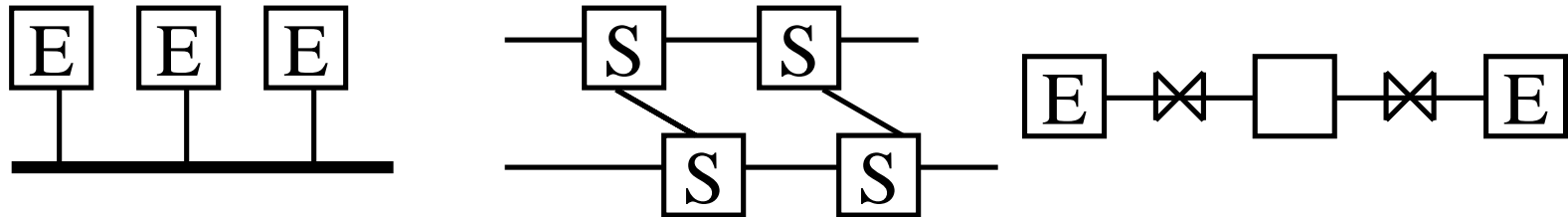
Traffic Growth

Worldwide Internet Bandwidth End-Use Demand, 2002-2007 (Terabits/day)



- ❑ Internet traffic to nearly double every year for the next five years
- ❑ IDC Report, “Broadband Drives Internet Growth,” February 27, 2003.

Trend: LAN - WAN Convergence



- ❑ Past: Ethernet in LAN (enterprise).
SONET in WAN (Carrier)
- ❑ Ethernet was distance limited due to media sharing
- ❑ Gigabit Ethernet \Rightarrow No hubs \Rightarrow No more media sharing,
- ❑ Point-to-Point Ethernet
 - No distance limitations due to MAC. Only Phy.
 - Datalink protocols limited to frame formats
- ❑ 10 GbE over 40 km \Rightarrow Ethernet End-to-end.

Networking: Failures vs Successes

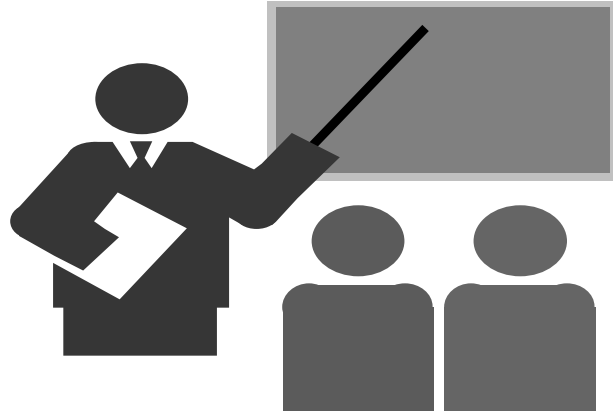
- ❑ 1980: Broadband (vs baseband)
- ❑ 1984: ISDN (vs Modems)
- ❑ 1986: MAP/TOP (vs Ethernet)
- ❑ 1988: OSI (vs TCP/IP)
- ❑ 1991: DQDB
- ❑ 1994: CMIP (vs SNMP)
- ❑ 1995: FDDI (vs Ethernet)
- ❑ 1996: 100BASE-VG or AnyLan (vs Ethernet)
- ❑ 1997: ATM to Desktop (vs Ethernet)
- ❑ 1998: Integrated Services (vs MPLS)
- ❑ 1999: Token Rings (vs Ethernet)

Requirements for Success

- ❑ Low Cost: Low startup cost \Rightarrow Evolution
- ❑ High Performance
- ❑ Killer Applications
- ❑ Timely completion
- ❑ Manageability
- ❑ Interoperability
- ❑ Coexistence with legacy LANs
Existing infrastructure is more important than new technology



Summary



- ❑ Bottom of the hype cycle \Rightarrow Better days are ahead
- ❑ ILEC vs CLECs \Rightarrow Evolution vs Revolution
- ❑ Ethernet and IP in telecom \Rightarrow Need reliability, security and access controls

Acknowledgements

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