

Chapter 2:

**Future Telecommunication Networks:
Traffic and Technologies**

by Johan Engström

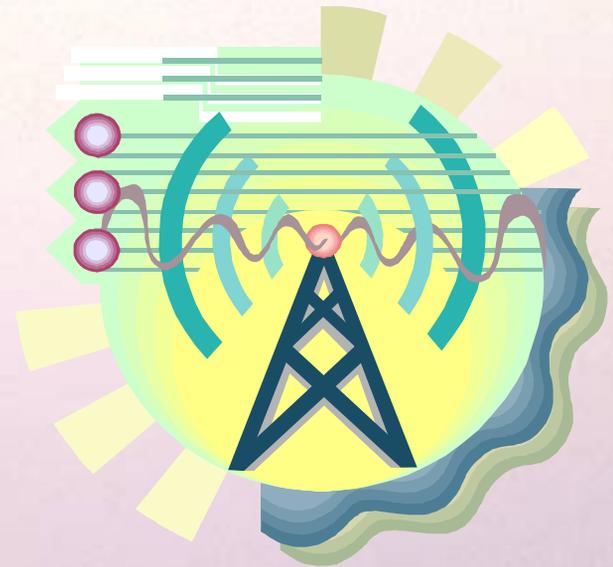
Presentation Contents

- Chapter 2 – A walkthrough
 - Introduction
 - Key technologies
 - Impact of competition
 - Four traffic hypotheses
 - Synergy: future projections
- Summary
- Questions – Discussion



Introduction

- Efficient transport of information is a key factor the today's information society
- The user's primary interest is in services
- Chapter 2: a view of the future, timescale 1997-2012 (10-15yrs)
- Technologies / Traffic types / Competition



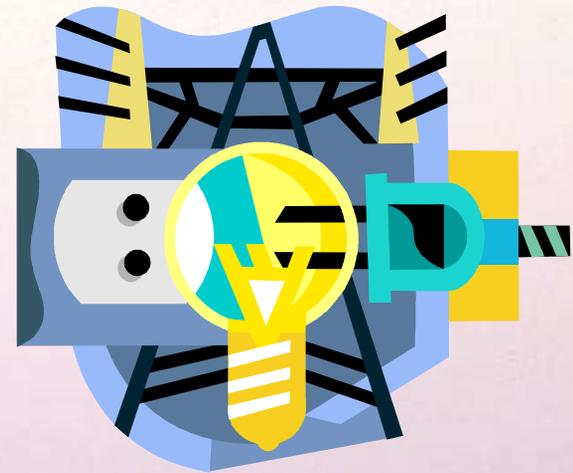
Key technologies

- What will be the technology that succeeds?
- Depends on the type of traffic that will become dominant
- Rough grouping of communication technologies
 - Electronic
 - Optical



Electronic technologies

- Synchronous Optical Network (SONET/SDH)
- Asynchronous Transfer Mode (ATM)
- Integrated Services Digital Network (ISDN/B-ISDN)
- Internet (TCP/IP)
- TV, Wireless



Optical technologies

- Wavelength Division Multiplexing (WDM)
 - point-to-point
 - static networking
 - dynamic
- Optical Time-Division Multiplexing (OTDM)
- Solitons



Technologies & traffic attributes

	Latency	Bit rate	Suitable for bursty traffic
SONET/SDH	Controlled	High	No
ATM	Variable, small	N/A	Yes
IP	Variable, large	N/A	Yes
ISDN	Low	Low	Yes
Optics	Lowest	Highest	No

Impact of competition

- Service convergence -> companies have to offer service bundles
 - Internet over voice network
 - Voice over Internet network
 - Video over Internet network
 - Video over wireless network
- Roughly two options
 - Heterogenous network
 - Integrated network



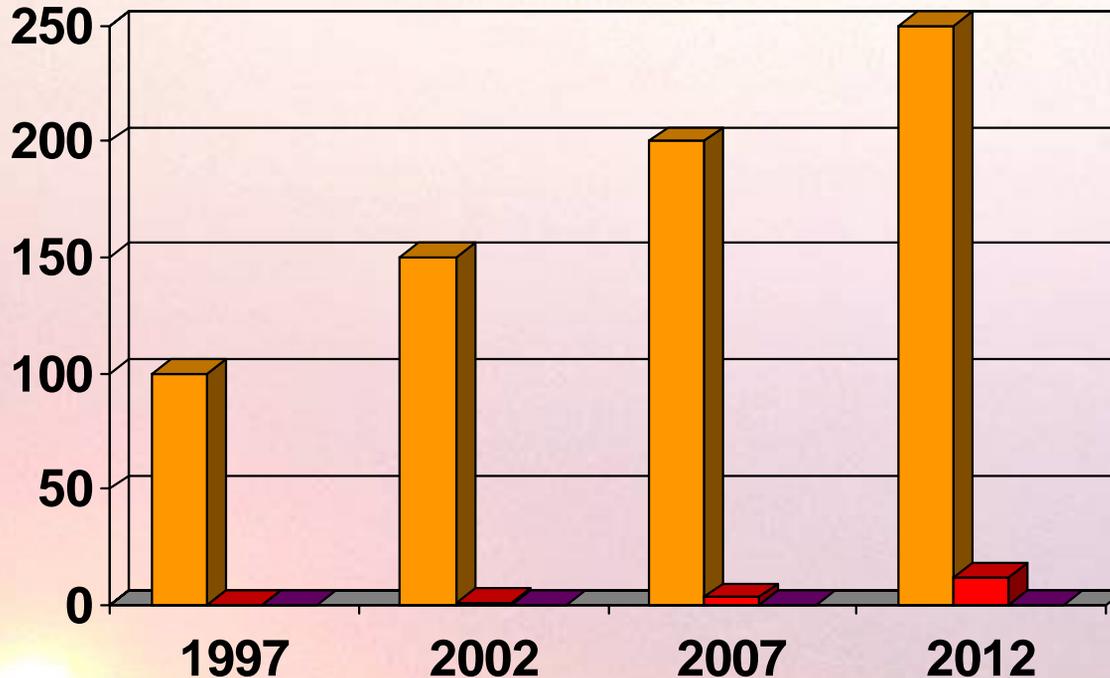
Four traffic hypotheses



- Hypothesis 1:
Conventional Growth
- Hypothesis 2:
The Internet Age
- Hypothesis 3 & 4:
The Digital Video Age

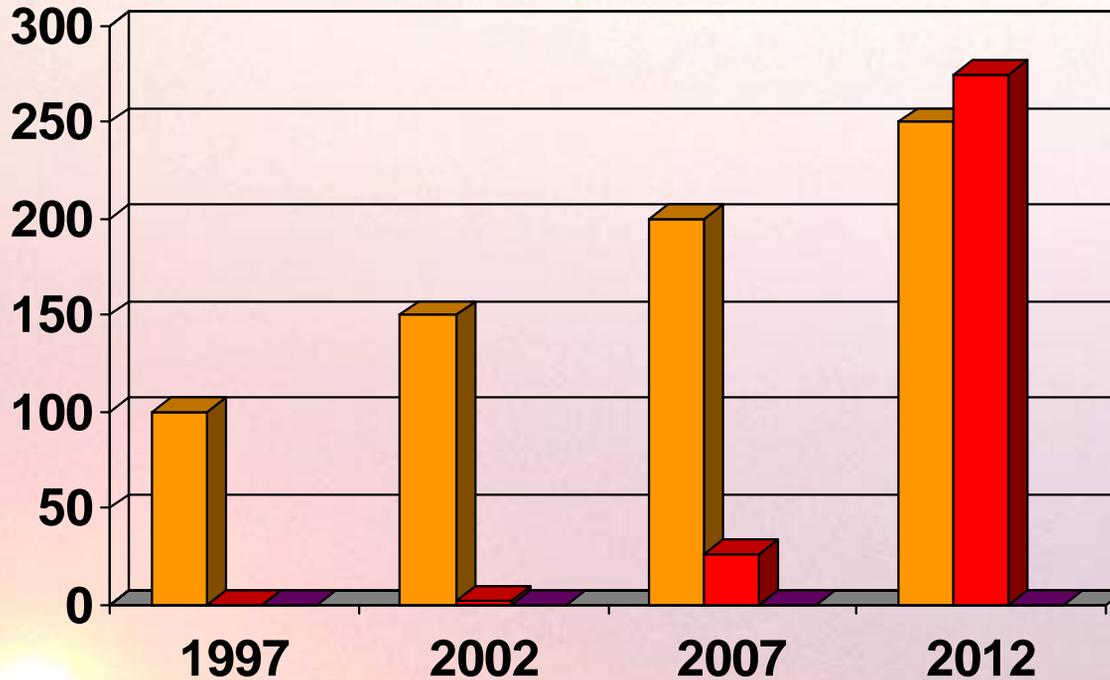
Hypothesis 1: Conventional growth

Growth: 10% telephone, 30% Internet



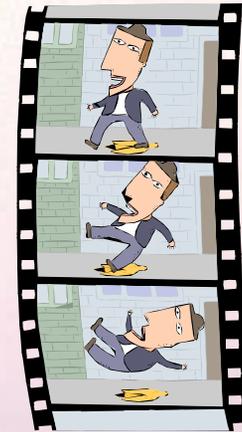
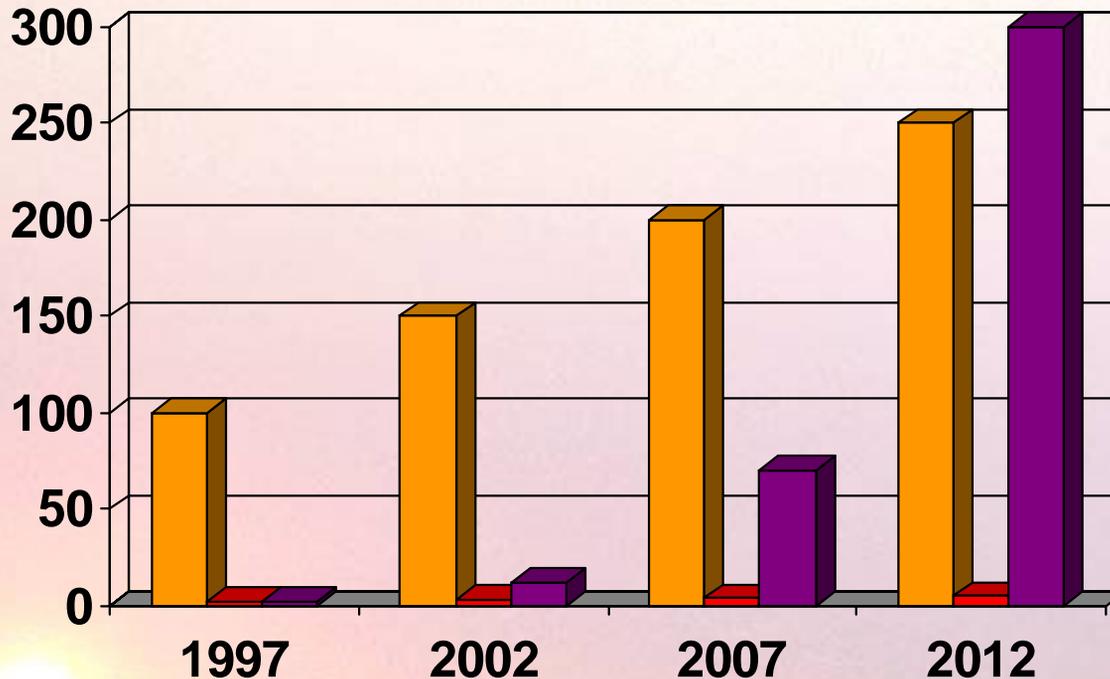
Hypothesis 2: The Internet age

Growth: 10% telephone, 60% Internet



Hypothesis 3: The digital video age

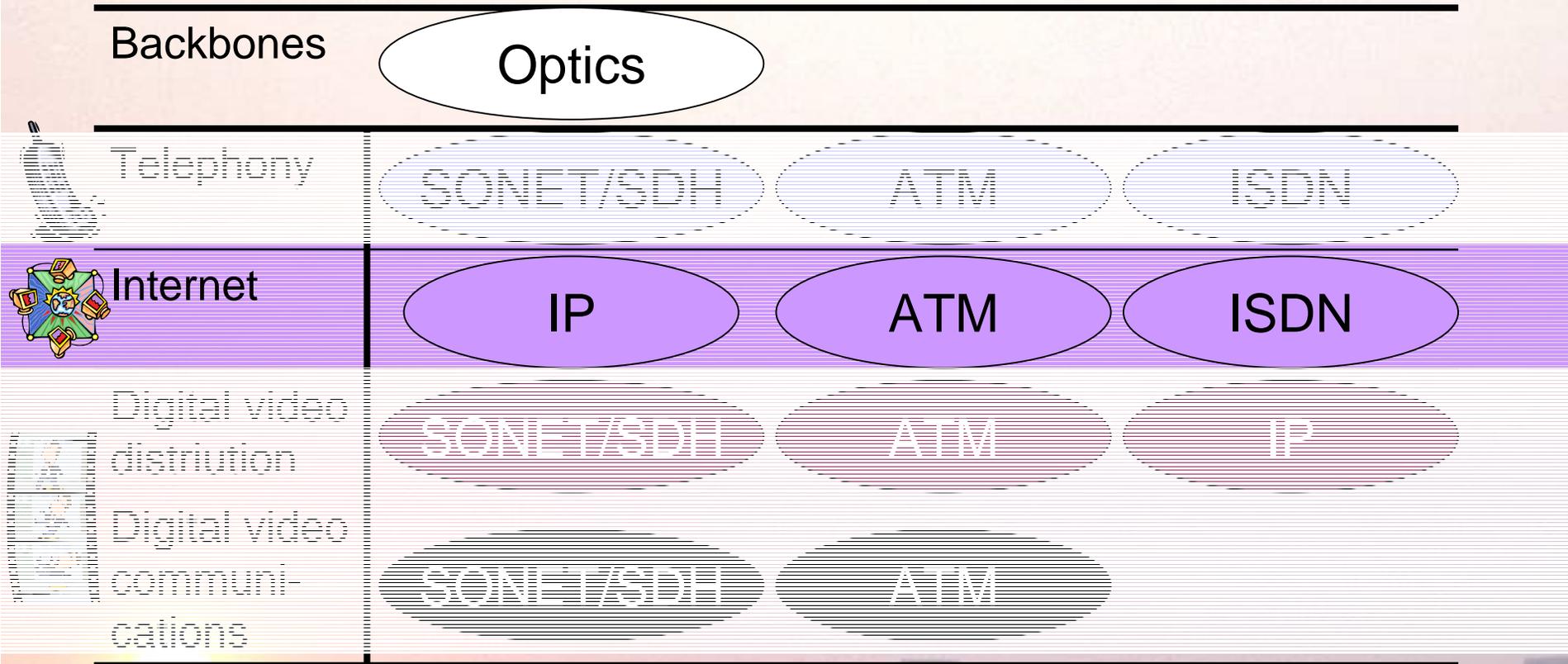
Growth: 10% telephone, 30% Internet



Hypotheses & traffic attributes

	Latency	Bit rate	Holding time	Burstiness	Directionality
 Telephony	Sensitive	64kb/s	Minutes-hours	Low	Bi-directional
 Internet	Not sensitive	> 56kb/s	One hour	High	Highly directional
 Digital video distribution	Not sensitive	Several Mb/s	Hours	Medium/high	Highly directional
Digital video communications	Sensitive	110kb/s – 1Mb/s	Minutes-hours	Medium/high	Bi-directional

Hypotheses mapped to technologies



Synergy: Future Projections

- Topologies
 - Backbones: rings
 - Distribution: stars / double-stars
- Optical & Wireless technologies are becoming more common and challenge copper-based technologies
- Direction of traffic developments dictates prevailing technologies 
- Link speeds will rise, 20-40Gb/s on trunk lines
- HDTV / Digi-TV

Summary

- To cope on the market companies have to offer service-bundles to the consumers
- Finding the suitable data transmission technology relies on identifying the characteristics of the traffic in the network
- Promising technologies for transmission are ATM, WDM and SDH and for the network-side IP and SDH.
- For client-side connections ISDN, B-ISDN (ATM), DTV, DSL and wireless technologies are to be considered.

Inconsistencies and quibbling

- "ATM may or may not be needed, but ISDN is not really necessary, although it might be used as well"
- Loose facts presented in an incoherent manner without proper justifications
- References to data tables mixed up & many typos
- Outdated and somewhat US-centered



Thank you for listening!

Questions / Discussion