
Technology Trends and the IETF

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Outline

- ◆ technology directions
- ◆ service integration
- ◆ industry directions
- ◆ impact on need for standards
- ◆ VC & pundit impacts
- ◆ government impact
- ◆ impact on IETF

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Overview

- ◆ interrupt with ?s
- ◆ my opinion is of unknown worth
- ◆ if you agree with everything I say
 - you don't understand what I said
 - you don't understand the problems
 - Gartner Group would like your name

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technology directions

- ◆ away from assumptions of single answers
 - e.g. ATM
- ◆ towards assumptions of single answers
 - e.g. IP
- ◆ changing understanding of data patterns
 - non-poisson distribution
 - <ftp://thumper.bellcore.com/pub/dvw/sigcom.93>
 - "full" pipes mean added latency

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LAN Technology

- ◆ Ethernet is near future
 - replace ATM in planning
 - 155Mb ATM \approx 100 Mb Ethernet
 - Gb Ethernet cheaper than 155 Mb ATM
- ◆ QoS a confusion
 - more later

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LAN Switches

- ◆ active-flow control 802.3x
- ◆ VLANs
- ◆ buffering
- ◆ cut-through
 - more under routing
 - importance of latency

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Latency

- ◆ latency only from the user's point of view
 - service latency
- ◆ client + network + server latency
- ◆ network transit latency - small
 - unless satellite
- ◆ data transfer
 - TCP not effected much by consistent network latency
- ◆ big issues:
 - server latency
 - buffering in network devices

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Routers & Routing

- ◆ interconnect "networks"
 - IGPs & EGPs
 - note ATM needs routing
- ◆ as fast as needed
- ◆ "level 3 switches"
- ◆ two types of routing
 - datagram
 - flow (a.k.a. cut-through)

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HS WAN Technology

- ◆ ATM
 - telco's current plans
- ◆ frame over SONET
 - ISP's current want
- ◆ frame over WDM?
 - lowest cost future?

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HS WAN Future

- ◆ depends on tariffs not technology
- ◆ limited future for private WAN nets
 - move to general public data service
- ◆ WDM deployment may be limited by regulations

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LS WAN Future

- ◆ "residential gateway"
 - if "router" can be an enabler
 - if "PC" can be a limiter
- ◆ "Internet" is the future
 - whatever the Internet is
- ◆ xDSL, cable modem etc.
 - depends on tariffs not technology
 - ISDN is example of what not to do

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QoS

- ◆ needed where there are constrained resources
 - lines, interconnect devices, servers
- ◆ types
 - predictive, flow-based, non flow-based

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Predictive QoS

- ◆ QoS in most current datagram networks
- ◆ “just” make network “big” enough
- ◆ reasonable on a LAN or campus network
- ◆ hard to do for WAN
- ◆ tends to provide cycles of quality
 - over build for need
 - need catches up and passes capacity
 - over build for new need

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Flow-Based QoS

- ◆ per flow state kept in the network
 - e.g. ATM & RSVP
- ◆ assumed to be right answer
- ◆ scaling issues
- ◆ authentication issues
- ◆ accounting issues

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Non Flow-Based QoS

- ◆ new work
- ◆ packets are "marked" at edge of net
 - e.g. precedence bits
- ◆ 2 or more levels
- ◆ multiple mechanisms proposed
 - drop priority, queue selector

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Service Integration

- ◆ voice, video & data integration is goal
 - why?
 - \$ assumed, may not be real
 - at what level?
 - ATM, SONET, WDM, or glass
- ◆ campus may integrate before WAN
 - lots of bandwidth - little/no QoS needed
- ◆ WAN: voice over current infrastructure
 - or SONET/ATM
- ◆ WAN: data over SONET/photons

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Industry Directions

- ◆ telcom - bigger is better
- ◆ technology - bigger & smaller is better
- ◆ complexity

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Telcom Vendor Directions

- ◆ merge!
Worldcom/MCI etc.
- ◆ investment to make infrastructure is very large
- ◆ WDM may change some of this

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Technology Vendor Directions

- ◆ Cisco, 3Com & Bay develop technology by buying much 2nd system syndrome in in-house development
- ◆ new technology comes first from small companies
Gb Ethernet, level-3 switches etc.

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Complexity

- ◆ can not seem to hide complexity
- ◆ e.g. network management stations
- ◆ selling ISDN is a strategic error
why should customer care?

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Impact on Need for Standards

- ◆ usefulness of standards to market leaders always a question
- ◆ open standards not a benefit to "old" IBM
how about to new Cisco? Microsoft?
- ◆ some governments see standards as control points
EU on GII standards for example
- ◆ usefulness to customers not in question

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VC & Pundit Impacts

- ◆ too many assumptions on future
disconnect with actual technology development
- ◆ "big six" consulting firms have a bad track record
- ◆ e.g.
SNA, APPN, ATM, NII to replace Internet,
Internet telephony?
- ◆ can get VC \$ only if meet vision
even if actual technology not there
thus "wrong" technology can get pushed

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Government Impact

- ◆ non-respecting of borders Internet a real problem
- ◆ what is a community? what is a culture?
- ◆ set rules that can not be implemented
e.g. CDA
- ◆ how work out Internet governance?
could we create the telco settlements policy today?

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Impact on the IETF

- ◆ currently "the" venue for "network" technology
ITU trying
pressure for more WGs on more topics
- ◆ some vendors ask for "blessing" of proprietary technology
- ◆ fewer confrontations that expected
but some
- ◆ IETF scale (WGs & attendees) an issue

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IETF contd.

- ◆ IPR an issue
 - rather many patents these days
 - IPR shows up after standardization
 - use standards process to help evaluate licenses (some)
- ◆ dismissal of other standards organizations an issue
 - willful ignorance in some cases
 - “leaders chosen for technical expertise”

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IETF Future

- ◆ volunteer organization
- ◆ much depends on nomcom selections
 - non-responsive or clueless AD can kill efforts
- ◆ good prospects "if"

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