

Advice to Link & Subnet Designers

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Document Overview

- Authors observe significant two-way “disconnect” between subnet/link designers and the Internet protocol community
- Intended to give basic advice to the designers of links and subnetworks intended to carry IP
- Also intended to get Internet people to think about what they really want/need

Internet Architecture Overview

- End-to-end principle
- Minimal functionality needed to carry IP
- Subnet errors of commission (I.e., gratuitous complexity) more common than errors of omission
- Some subnet hooks still needed to support multicast & QOS

MTUs & Fragmentation

- IPv4 fragmentation is best avoided (and IPv6 router fragmentation doesn't exist) so subnets should support a “reasonable” MTU

Connection-oriented Subnets

- Often used but add considerable complexity for state management; difficult to pick good idle timeouts
- PPP generally usable except at very high speeds, where subnet should provide hardware framing

Bandwidth-on-Demand (Falk)

- Similar to connection-oriented subnets, more general case
- Similar problems in predicting demand, avoiding idle channels

Reliability & Error Control

- Internet end-to-end emphasis
- Link/subnet error control still important for performance
- Ongoing discussion on allowable subnet error rate; 1 packet/RTT too high
- Better approach may be “as low as possible subject to TBD delay limit”
 - delay can be both ARQ & FEC

Bandwidth Asymmetry

- Already experienced on cable modems
 - Motorola CyberSURFR: 27 Mb/s down, 768kb/s up (35:1) far more asymmetric than “A”DSL
- *Some* asymmetry easily tolerated
- Problems occur with TCP ack congestion
 - larger packets
 - ack filtering

Multicasting (Touch)

- Efficient multicasting needs link layer support, particularly on broadcast media

Sections to be written

- QoS, Fairness vs performance, congestion signalling
- Delay characteristics
- Buffering, flow & congestion control
- Compression
 - best done at higher layers

More Sections to be written

- Mobility
 - best done at higher layers
 - subnet mobility OK over limited geographic areas,
I.e., as long as cost & delay isn't too high
- Broadcasting & Discovery
- Routing
- Security