

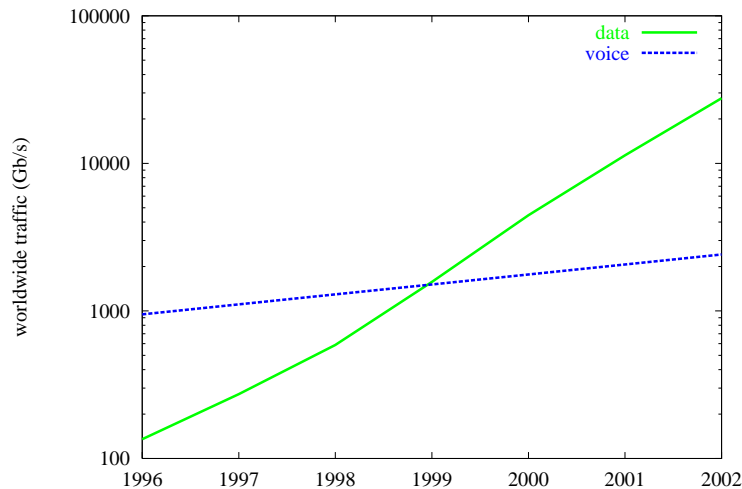
Engineering the Internet for Internet Telephony and Internet TV

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Internet Telephony



voice traffic \ll data traffic
→ design network based on
“data” traffic → IP as common
transport

- VoIP = signaling (SIP, H.323) + transport (RTP) + QoS (RSVP, YESSIR, Diffserv, ...)
- not just PCs, but Ethernet telephones
- SS7 “end of life” in about ten years?

Internet Telephony QOS Issues

- 99.999% reliability (5 min/year)
- lifeline powering
- automatic configuration: just plug in the phone
- 911 services
- denial-of-service attacks
- security
- user programmability
- packet QOS

System Reliability

- signaling servers (thousands, not 140)
- network: fiber, routers, DNS servers
- no good reporting and accountability mechanism
- what does IP reliability mean?

Lifeline Power

- mainly a residential issue
- need to power whole infrastructure: DSL/cable modems, phones, hubs, ...
- Ethernet phantom power?
- local battery may be sufficient

Automatic Configuration

- users can't be asked to “configure” their phone: plug'n'talk
- configure IP-layer
- user identities
- 911 information?

Master-Slave Denial-of-Service (MS-DOS) Attacks

- today, 50-100 compromised workstations send SYN, ICMP, ...
- often, spoofed source addresses
- hard to detect: looks like legitimate traffic
- imagine Melissa II: send one packet an hour to single destination
- DNS (root servers) and routing also vulnerable
- also: RTP flooding

Security

- can't assume that everyone has a public key certificate
- *negative identity*: email/VoIP addresses are cheap →
- no single trusted entity
- want role certification: “licensed stock broker”, “registered to solicit for charity”, “gas company employee”

Programmable Services

- instead of telco feature sets
- users, administrators can program phone behavior: time-of-day and other call routing, call blocking, voice mail, ...
- for example, Columbia/IETF **Call Processing Language** (CPL)
- *feature interaction*
- remedies: simulation, explicitness

Packet-Level QoS

scheduling state	admission state	
	flow	class
flow	IntServ	doesn't make sense
class	proposed	DiffServ

- DiffServ does not prevent overload
- no billing, charging, settlements
- need QoS reporting and feedback for SLA enforcement, fault detection (RTCP?)

Internet Television/Radio

- basically similar to Internet telephony
- difference: signaling (SAP instead of SIP), large-scale multicast
- large-scale multicast not likely to be deployed
- thus, AS-size multicast

Conclusion

- reliability expectations much higher: replace existing, mature services
- little measurement of e2e or component reliability
- packet QoS is probably the easier of the problem