Internet Telephony

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Overview

- Internet telephony – overview and motivation
- Internet – a quick review
- network layer: resource reservation (RSVP)
- transport layer: RTP
- application layer: signaling (SIP, H.323, MGCP)
- programming Internet telephony

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Outline

Motivation for Internet telephony:

- transmission efficiency
- OAM integration
- services

Short summary of the existing PSTN (SS7):

- digital transmission and switching
- SS7 architecture: SSP, SCP, …
- SS7 protocol stack: MTP, ISUP, TCAP

Signaling: H.323, SIP:

- role of signaling
• SIP architecture: user agents, proxies and redirect servers
• SIP forking, security, mobility, …
• interaction of signaling and resource reservation
• H.323 architecture
• comparison of H.323 and SIP

Internet telephony services:
• SIP services
• cgi-bin
• Call Processing Language (CPL)

Internet telephony device control:
• motivation and architecture
• MGCP
Interoperation with the PSTN:

- architectures: bridging or tunneling
- SIP-to-ISUP translation
- E.164 address mapping
- Gateway location

Billing and operational issues:

- Billing for what and where?
- Emergency services
- Operator services
- Intercepts

Audio and video codings:

- audio coding techniques: sample vs. frame
• impairments for packet audio
• uncompressed digital video formats: YUV, CIF, …
• JPEG
• MPEG

Quality-of-service constraints and impairments:
• packet loss
• packet delay: causes and requirements
• delay jitter
• QOS compensation mechanisms

Packet scheduling and resource reservation:
• traffic policing: GCRA and token buckets
• packet scheduling: priority and WFQ
- receiver-oriented resource reservation: RSVP
- sender-oriented resource reservation: YESSIR
- Diff-Serv
Outline

RTP:

- motivation
- packet formats for data
- RTCP for QOS feedback and audience size estimation
- media synchronization
More information

Internet and telecom statistics:  
http://www.cs.columbia.edu/~hgs/internet

Papers:  http://www.cs.columbia.edu/IRT

RTP:  http://www.cs.columbia.edu/~hgs/rtp

RTSP:  http://www.cs.columbia.edu/~hgs/rtsp

SIP:  http://www.cs.columbia.edu/sip