

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

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>