VoCCN: Voice over Content-Centric Networks

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Everybody knows that …

- Content-based networking is great for content dissemination …
- … but can’t handle conversational or real-time traffic.

‘Everybody’ is half right.
Content networking is more general than IP

It does anything that IP can.

To demonstrate this we implemented VoCCN, a VoIP-functional-equivalent based on CCN.

(The way we map the IP conversation model isn’t CCN-specific and should work for other Pub/Sub systems.)
VoCCN – why bother?

- VoIP works badly for multi-point, multi-interface and mobility.
- VoIP security is poor.
- VoIP setup is complex.
IP builds conversations using two patterns:

- Service to instance
- Uni- to bi-directional

These are just ‘name’ manipulations that should map to any (topic-based) pub-sub system with hierarchical or algorithmic names.
VoCCCN has only a few moving parts

- Resulting system is simple, secure and scalable.
- Robust support for mobility and multi-point.
- Supports secure, stateless, VoIP inter-operation.
Performance

Packet Interarrival Times

CDF: Proportion of Packets

Stock LinPhone
CCN LinPhone (encrypted)

Packet Interarrival Time (ms)

Rate (pkts/sec)

Link A traffic
Link B traffic

Time (sec) from Start of Call

link A disconnected
link B disconnected
link A disconnected
Availability

- Our (open-source, GPL’d) CCN stack is available at www.ccnx.org.
- The VoCCN linphone code should be there by the end of this week.

Questions?
Message exchanges

**Caller (Alice)**

- Interest:
  `/domain/sip/bob/invite/E_{pkB}(sk)/E_{sk}(SIP INVITE message)`

- Data:
  - Name: `/domain/sip/bob/invite/E_{pkB}(sk)/E_{sk}(SIP INVITE message)`
  - Signature Info: `<metadata>, <signature>`
  - Content: `E_{sk}(SIP response message)`

**Callee (Bob)**

- Interest:
  `/domain/bob/call-id/rtp/seq-no`

- Data:
  - Name: `/domain/bob/call-id/rtp/seq-no`
  - Signature Info: `<metadata>, <signature>`
  - Content: `SRTP packet (encrypted audio)`

**Media Path**

- Interest:
  `/domain/alice/call-id/rtp/seq-no`

- Data:
  - Name: `/domain/alice/call-id/rtp/seq-no`
  - Signature Info: `<metadata>, <signature>`
  - Content: `SRTP packet (encrypted audio)`