SIP for Mobile Applications

Henning Schulzrinne
Dept. of Computer Science
Columbia University
New York, New York
schulzrinne@cs.columbia.edu

VON Europe Spring 2000 (Stockholm)

June 20, 2000 – SIP and the Future of VON Protocols
Overview

- mobility – more than just wireless terminals
- SIP for mobility
- SIP bake-off
Mobility in an IP environment

**Terminal mobility:** terminal moves between subnets

**Personal mobility:** different terminals, same address

**Service mobility:** keep same services while mobile
Terminal mobility

- domain of IEEE 802.11, 3GPP, mobile IP, …
- main problems:
  - handover performance
  - handover failure due to lack of resources in new network
  - authentication of redirection
Personal mobility

alice@host.columbia.edu
telephone: 12128541111
(also used by bob@columbia.edu)

mobile phone
PC

alice17@yahoo.com
alice@columbia.edu
7000@columbia.edu
Alice.McBeal@columbia.edu

yahoo.com
columbia.edu

alice@columbia.edu
(also used by bob@columbia.edu)

black phone
mobile phone
PC
Personal mobility

- switch between PDA, cell phone, PC, Ethernet phone, Internet appliance, ...
- several “generic” addresses, one person/function, many terminals
- e.g., tel:2129397042, hgs@cs.columbia.edu, schulzrinne@yahoo.com or support@acme.com
- SIP is designed for that – proxying and redirection does translation
- but: need mapping mechanisms to recognize registrations as belonging to the same person
- some possible solutions:
  - dip into LDAP personnel database or /etc/passwd to match phone number and variations of name (J.Doe, John.Doe, Doe)
  - need dialing plan to recognize 7042@cs.columbia.edu and tel:2129397042 as same
Service mobility

Examples:

- speed dial & address book
- media preferences
- special feature buttons (voice mail, do-not-disturb)
- incoming call handling instructions
- buddy lists

— independent of terminal (including pay phone!), across providers
Service mobility

- **REGISTER** can retrieve configuration information (e.g., speed dial settings, distinctive ringing or voice mail settings)
- but needs to be device-independent
- most such services (e.g., voicemail forwarding, call filtering) should remain on server(s)

Separate issue: how does the payphone (or colleague’s phone) recognize you?

- PDA (IR)
- i-button
- fingerprint
- speech recognition, ...

One device, but changing set of owners!
Service mobility – call handling

- need uniform basic service description model → Call Processing Language (CPL)
- CPL = XML-based flow graph for inbound & outbound calls
- CPL for local call handling
- update CPL from terminal: add telemarketer to block list
- harder: synchronize CPL changes across multiple providers
- one possibility: REGISTER updates information, but device needs to know that it has multiple identities
- merging of call logs
Terminal mobility – details

- move to new network → IP address changes (DHCP)
- mobile IP hides address changes
- but: little deployment
- encapsulation overhead
- dog-legged routing
- may not work with IP address filtering
SIP terminal mobility overview

- pre-call mobility ➔ SIP proxy, redirect
- mid-call mobility ➔ SIP re-INVITE, RTP
- recovery from disconnection
SIP terminal mobility: pre-call

- MH acquires IP address via DHCP
- optional: MH finds SIP server via multicast REGISTER
- MH updates home SIP server
- optimization: hierarchical LR (later)
SIP terminal mobility: mid-call

- MH→CH: new INVITE, with Contact and updated SDP
- re-registers with home registrar
SIP terminal mobility: multi-stage registration

Don’t want to bother home registrar with each move

From: alice@NY Contact: 193.1.1.1
From: alice@NY Contact: alice@CA
From: alice@NY Contact: 192.1.2.3
SIP and mobility: issues

- doesn’t work for TCP applications – solutions:
  - punt: “don’t walk while telnet’ing”
  - application-layer awareness: restart web, email, ftp transfer – need for deep fade anyway…
  - NAT-style boxes controlled by SIP (see Telcordia ITSUMO project)

- but: works nicely for “vertical handoff” between different technologies - e.g., transfer call from mobile handset to office videophone when arriving at work
Conclusion

- mobility is more than just wireless handsets
- terminal, personal and service mobility
- SIP enables all three, but likely to be hybrid solutions
For more information...

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

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

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