

SIP for Mobile Applications

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

VON Developer's Conference Summer 2000 (Boston)

July 18, 2000 – *The Road Ahead*

Overview

- mobility – more than just wireless terminals
- SIP for mobility
- SIP bake-off

Mobility in an IP environment

Terminal mobility: terminal moves between subnets

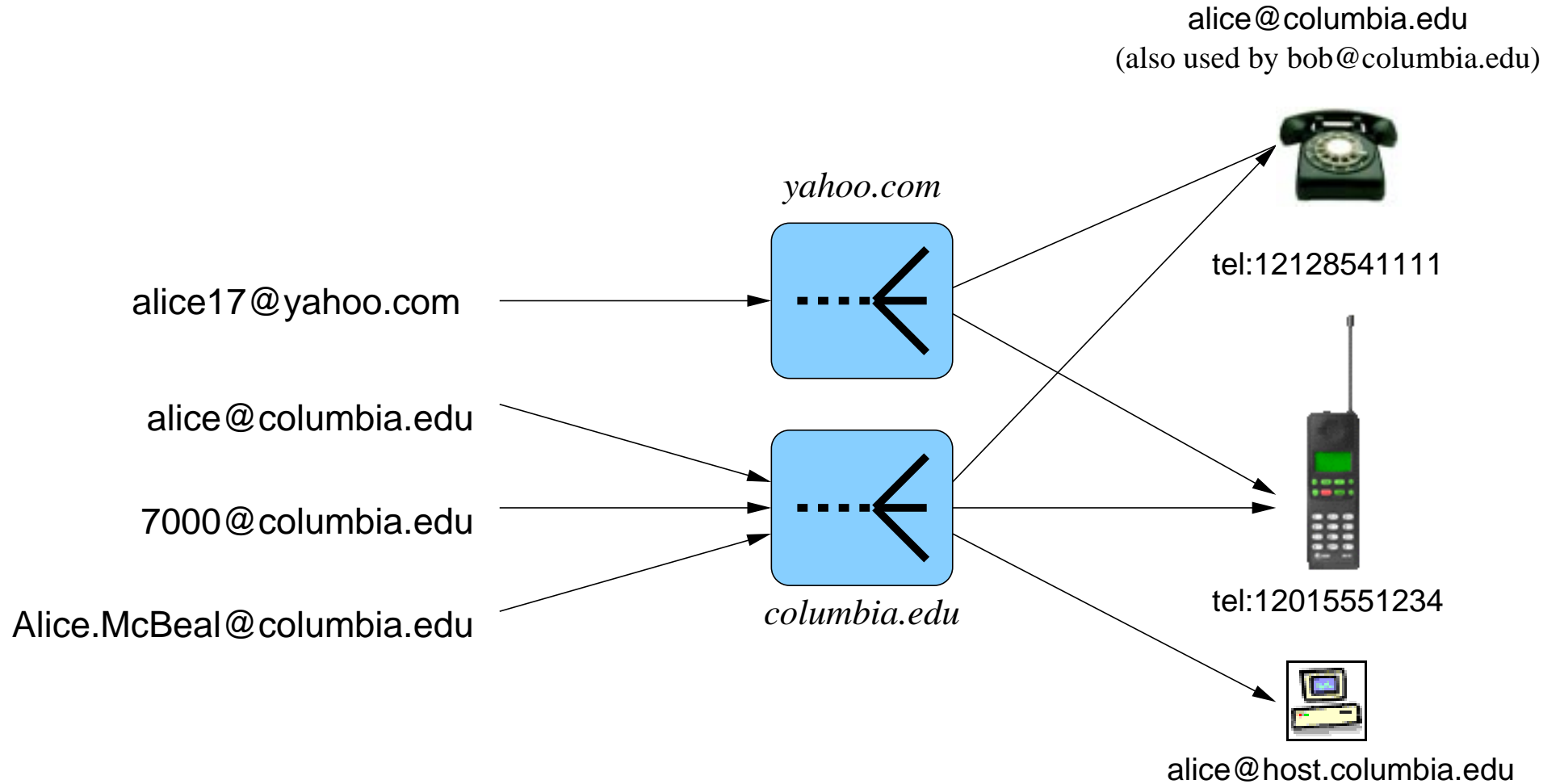
Personal mobility: different terminals, same address

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



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, ...

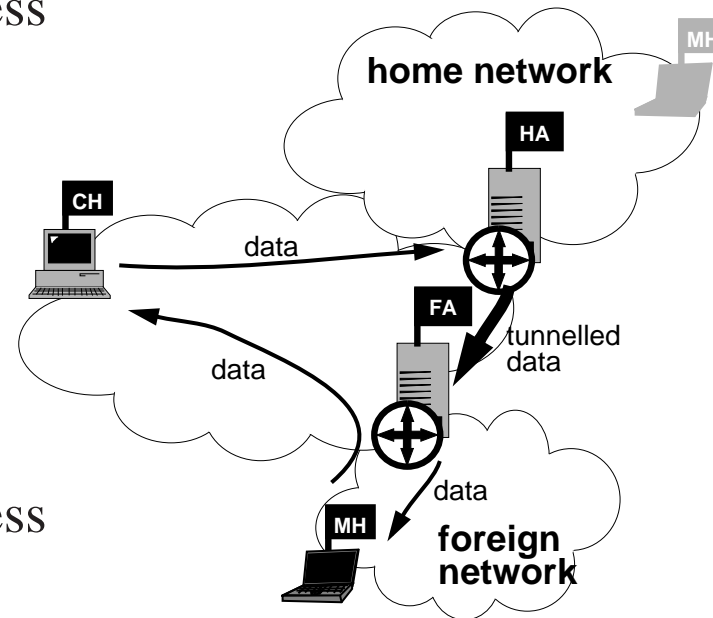
One device, but changing set of owners!

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 \Rightarrow IP address changes (DHCP)
- mobile IP hides address changes
- but: little deployment
- encapsulation overhead
- dog-legged routing
- may not work with IP address filtering



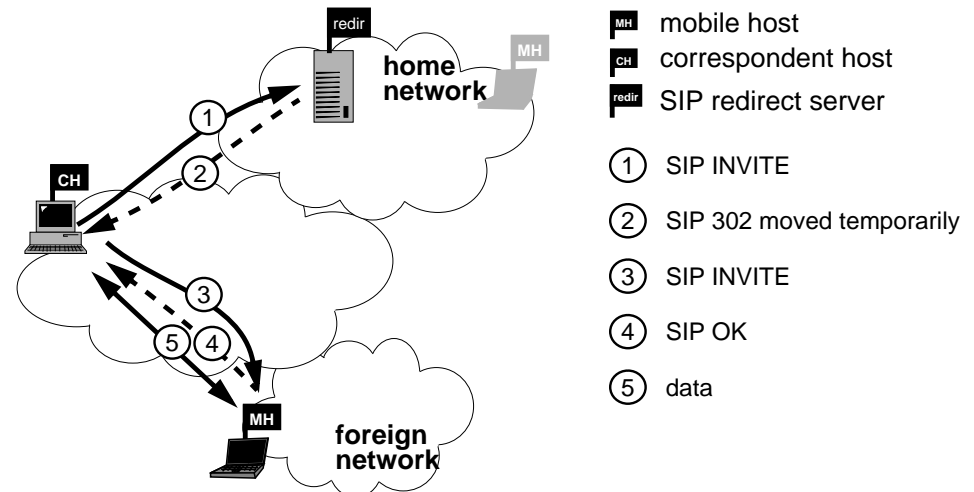
- MH** mobile host
- CH** correspondent host
- HA** router with home agent functionality
- FA** router with foreign agent functionality

SIP terminal mobility overview

- pre-call mobility \Rightarrow SIP proxy, redirect
- mid-call mobility \Rightarrow SIP re-INVITE, RTP
- recovery from disconnection

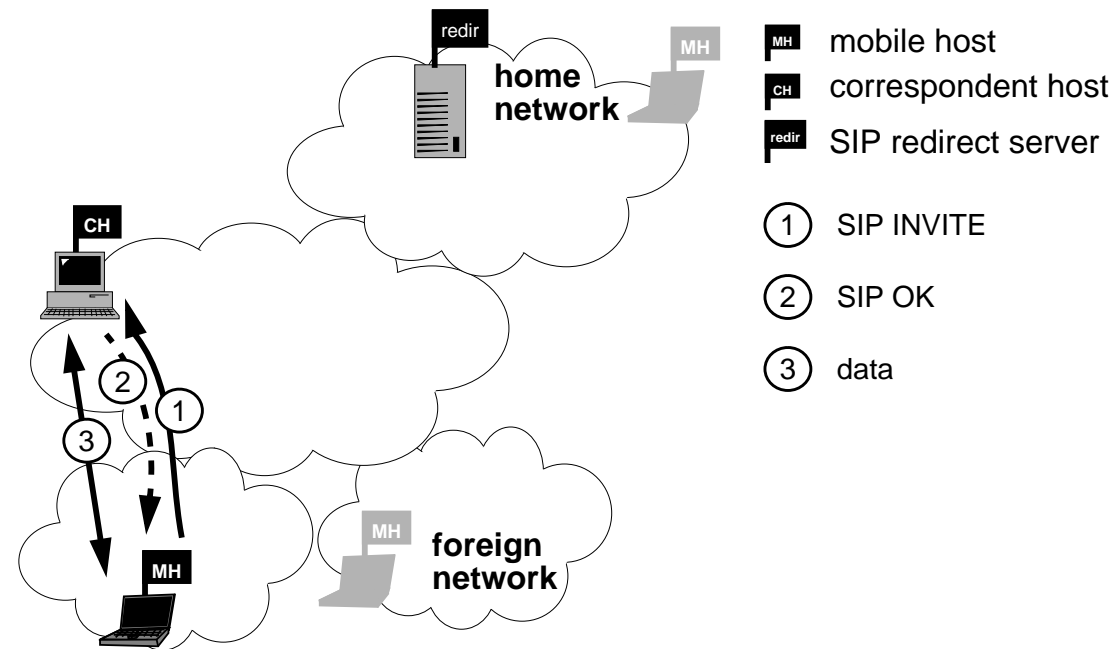
SIP terminal mobility: pre-call

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



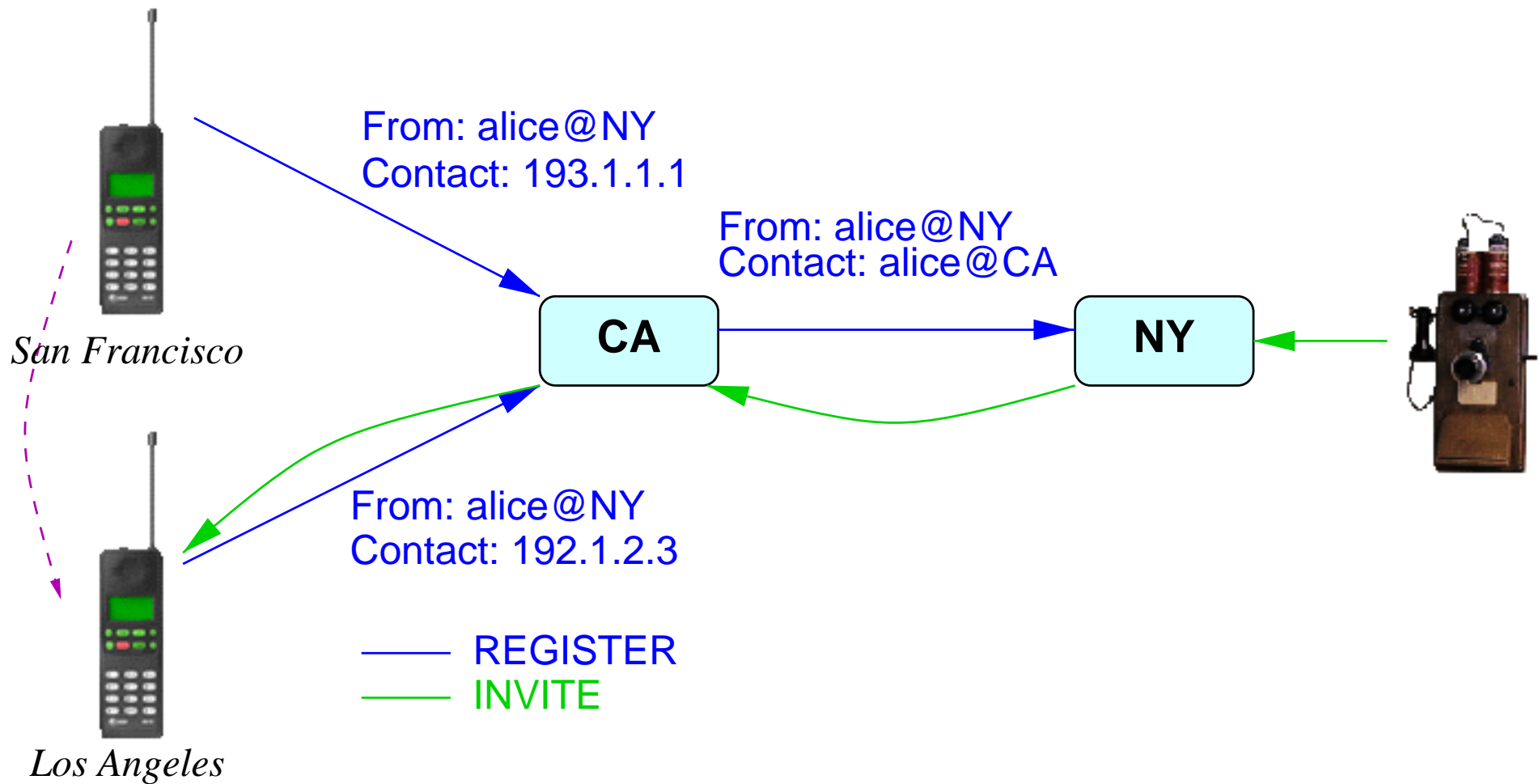
SIP terminal mobility: mid-call

- 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



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>