

# Mobile Adventure

## Session Mobility - Seamless Services across Devices

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## Session Mobility

- Service Discovery
  - Split Session
  - Real-time and messaging
  - Transcoding
  - Security & Privacy
  - Performance
  - Accounting
- 

- Internet-based customized services become available on most devices
- Providing personalized services to satisfy user needs at anytime and any places
- Supporting of seamless service configuration and usage are therefore of increasing significance

- Mobile devices continue to be limited in bandwidth, power and display capability. They can greatly benefit from the capabilities of other devices.
- Goal: A mobile user should be able to discover nearby devices, then **easily** and **seamlessly** include them in his ongoing multimedia session, with the use of only standard internet protocols
- Focus: **real-time videoconferencing session**
- Elements:
  - Location-based Device Discovery
  - SIP signaling for session transfer

# Location-based Splitting Session Transfer Example



Called Party



**Session Transfer Mode**

1. Mobile Node Control
2. Session Handoff

**Devices in Conf. Room**

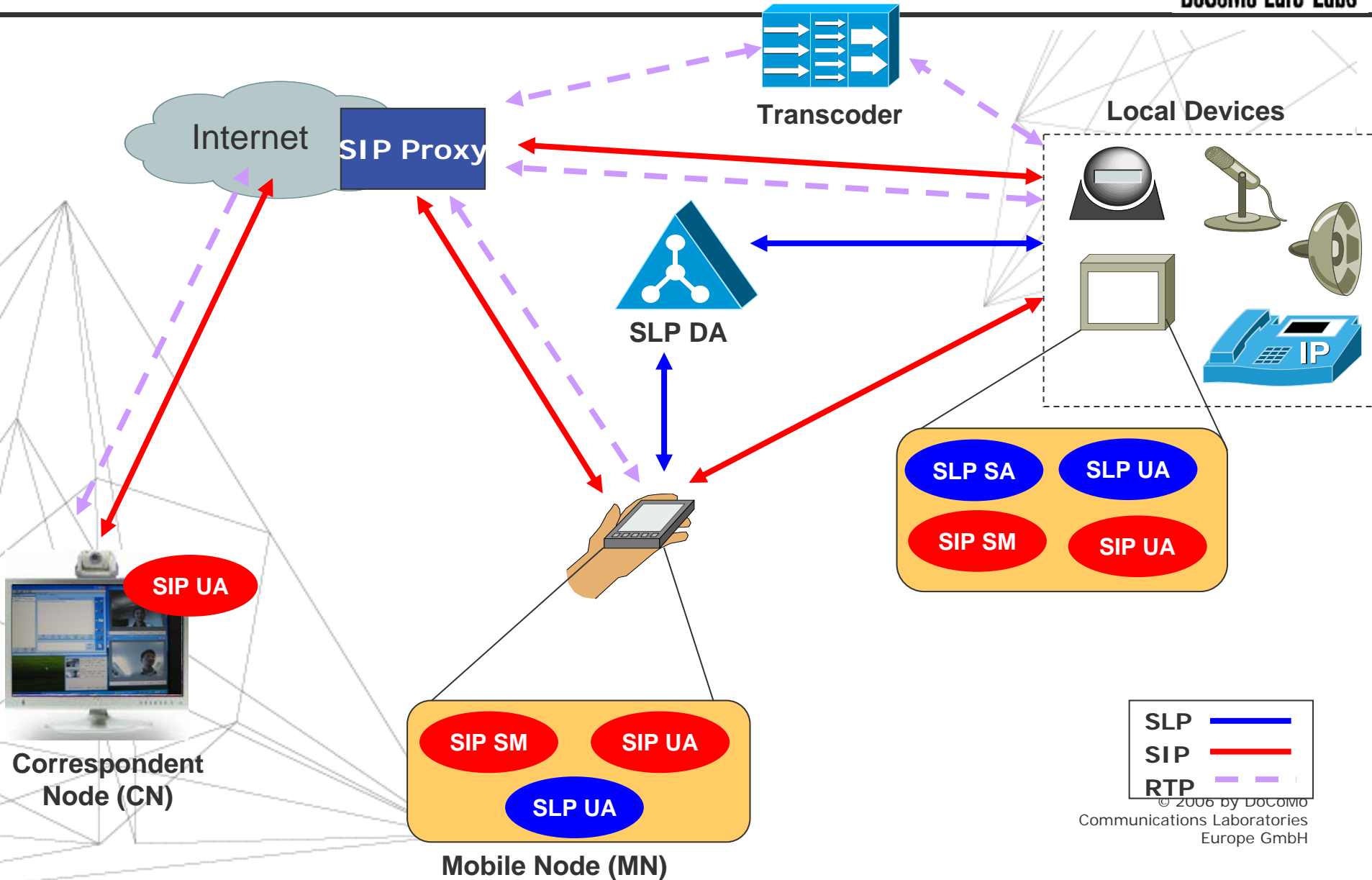
1. Device A (audio)
2. Device B (video)
3. SIP Phone.....



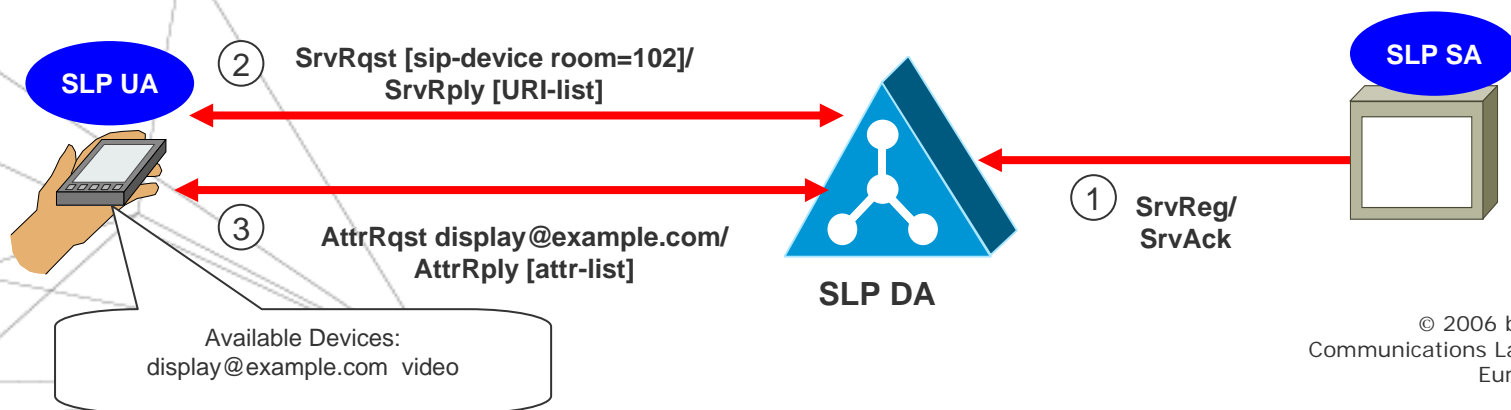
**Conference Room**



# Mobile Adventure Architectural Overview



- Low-power wireless protocols find close devices without knowing location
- We use Service Location Protocol (SLP)
- Location discovered in a variety of ways
  - **Direct:** Through Bluetooth, DHCP, GPS or other means, the device receives its own location
  - Device subscribes to user **presence**, presence updated when user walks into a room with his swipe card, the device receives location update



# Session Transfer—Options

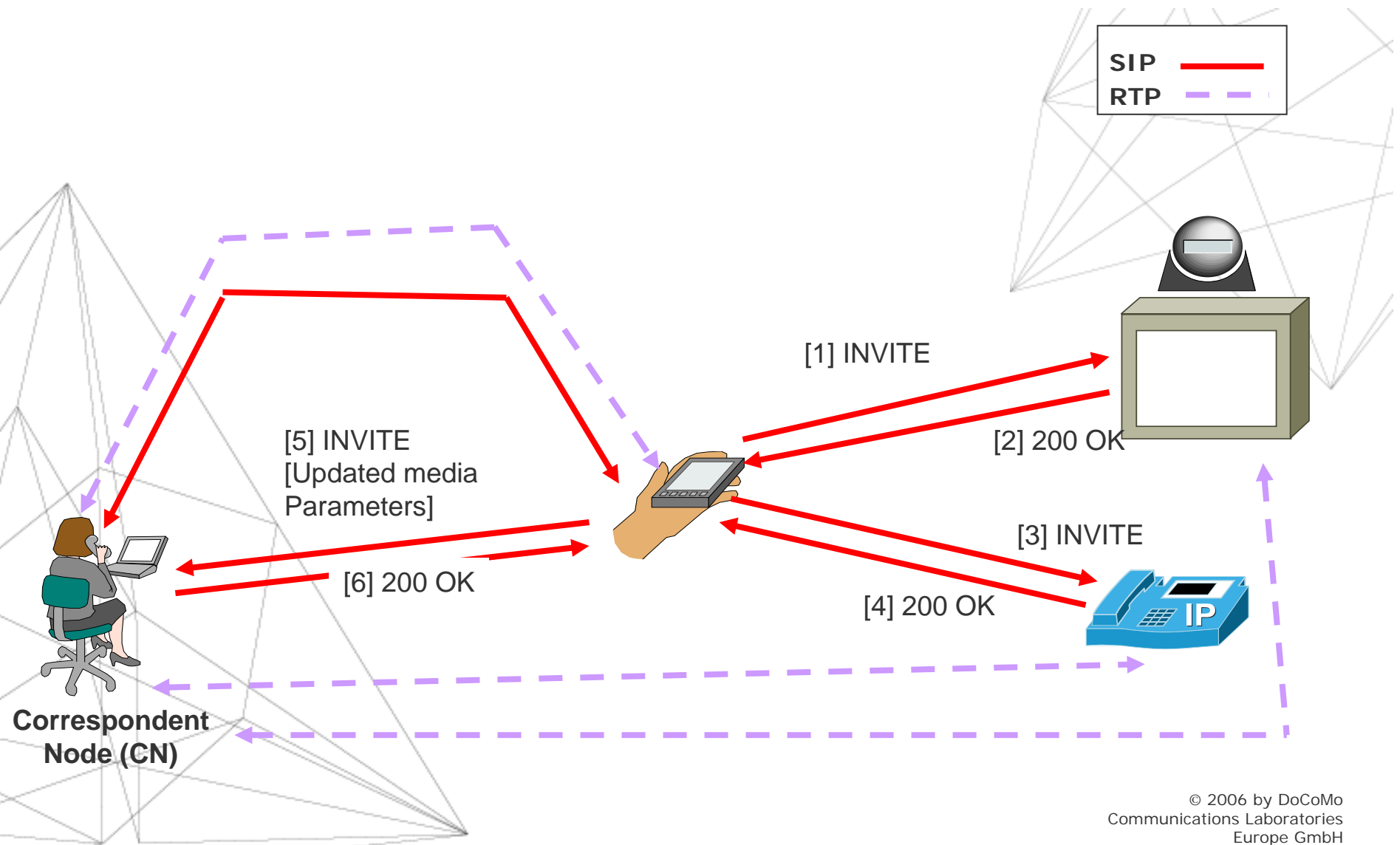
- Media that may be transferred
  - Real-time media (eg. audio, video)
  - Text messaging
- Transfer modes
  - Mobile Node Control Mode (MNC)
  - Session Handoff Mode (SH)
- Whole or Split Session Transfer
- Transfer in mid-session or on incoming call
- Security and Privacy mechanisms

# Mobile Node Control Mode (MNC)

- SIP Third-party call-control used
  - mobile node establishes a separate session each local device while retaining session with CN, setting up session media to be transmitted directly between them
- Useful for retaining part of session media (eg. audio) on mobile device, while adding or transferring another media (eg. video)
- Easy to support existing devices
  - they must only support INVITE request



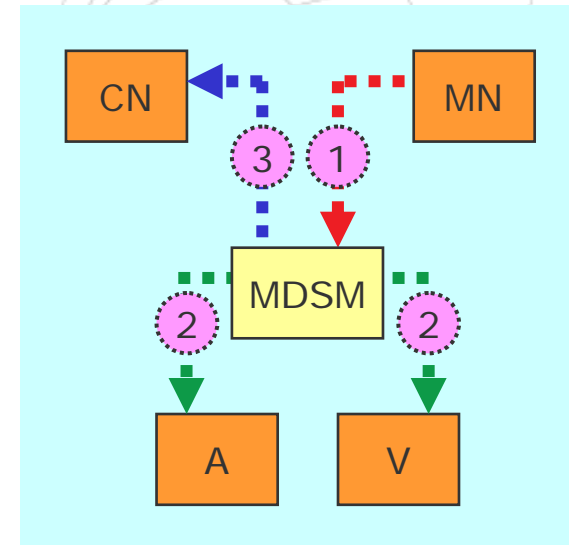
# Example—MNC transfer to two devices



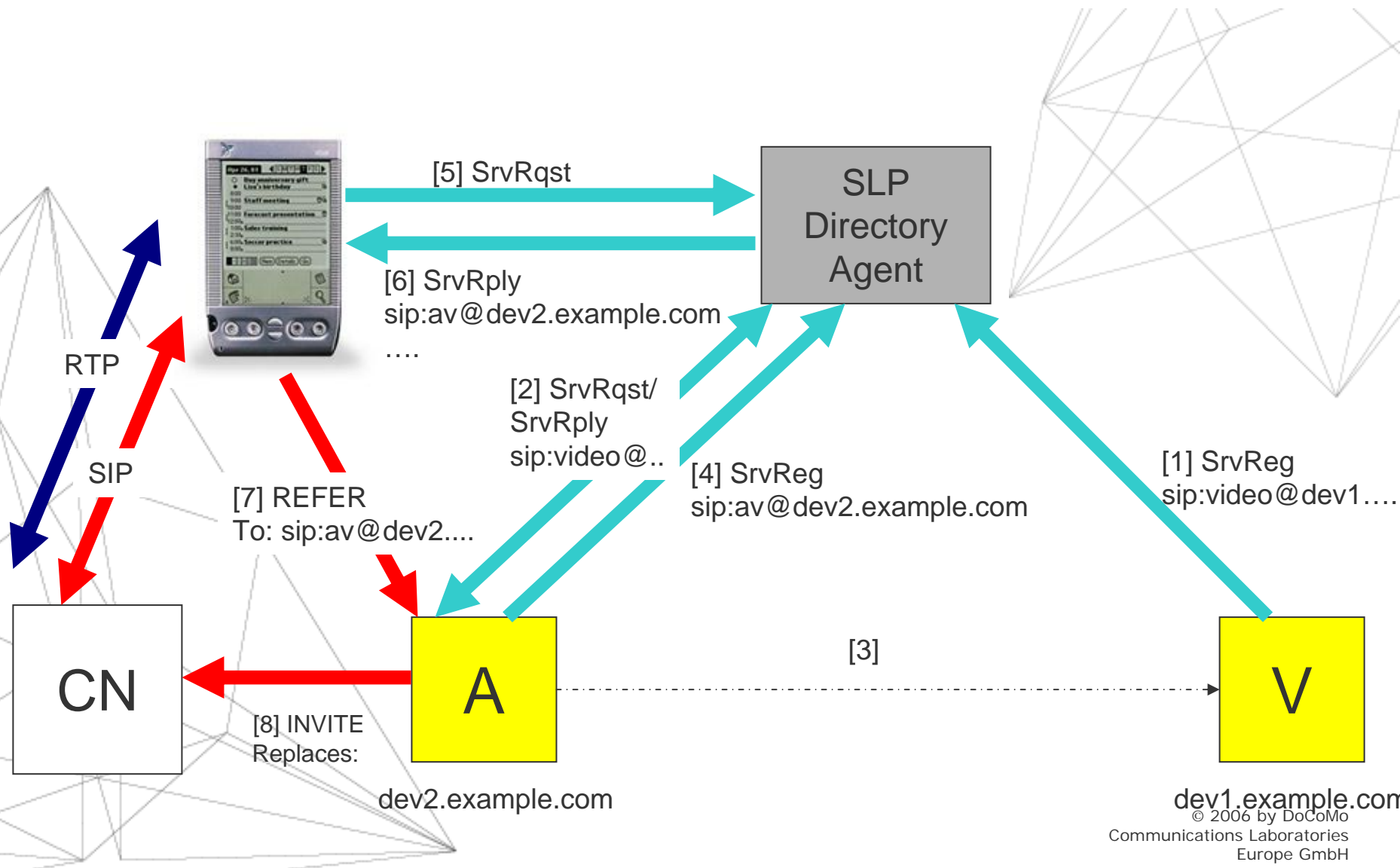
# Session Handoff (SH) Mode: Splitting Session Transfer

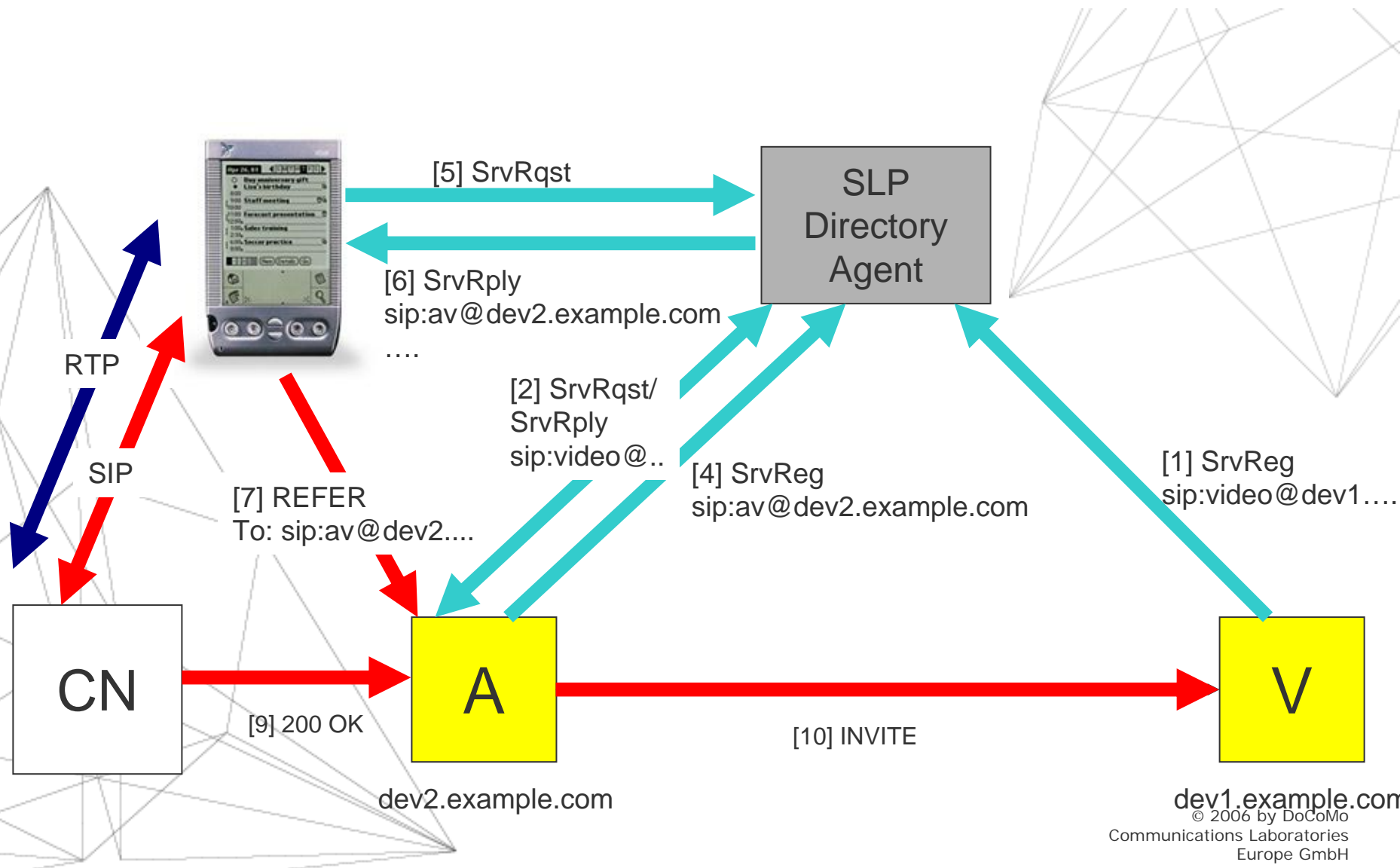
- Relinquish session control to transferred target device(s)
- Use SIP REFER method asking a referee to initiate a new session between itself and the referred target

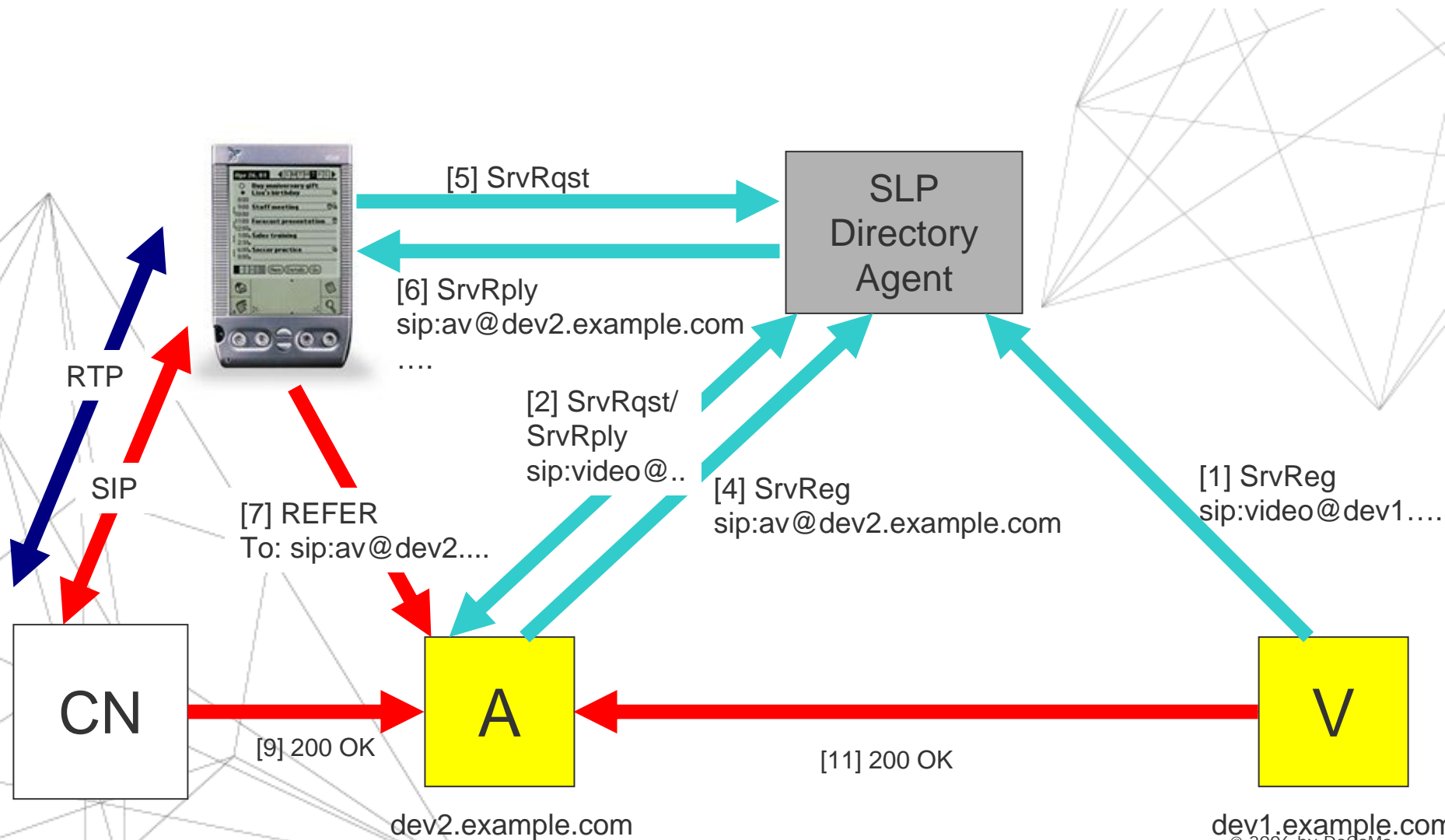
**No current standard way  
to associate multiple  
sessions with a single call  
in SIP  
(between CN and local  
devices)**

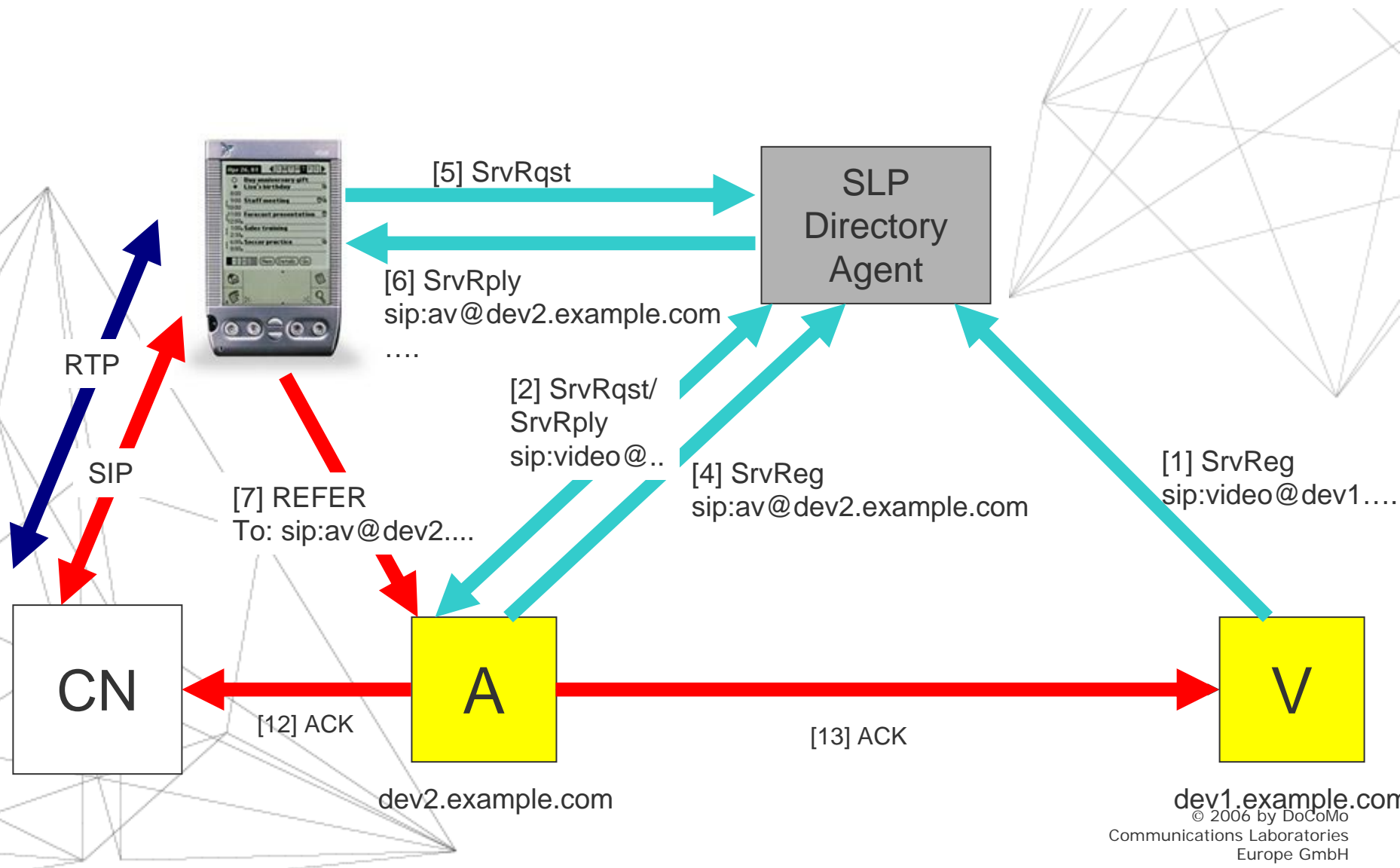


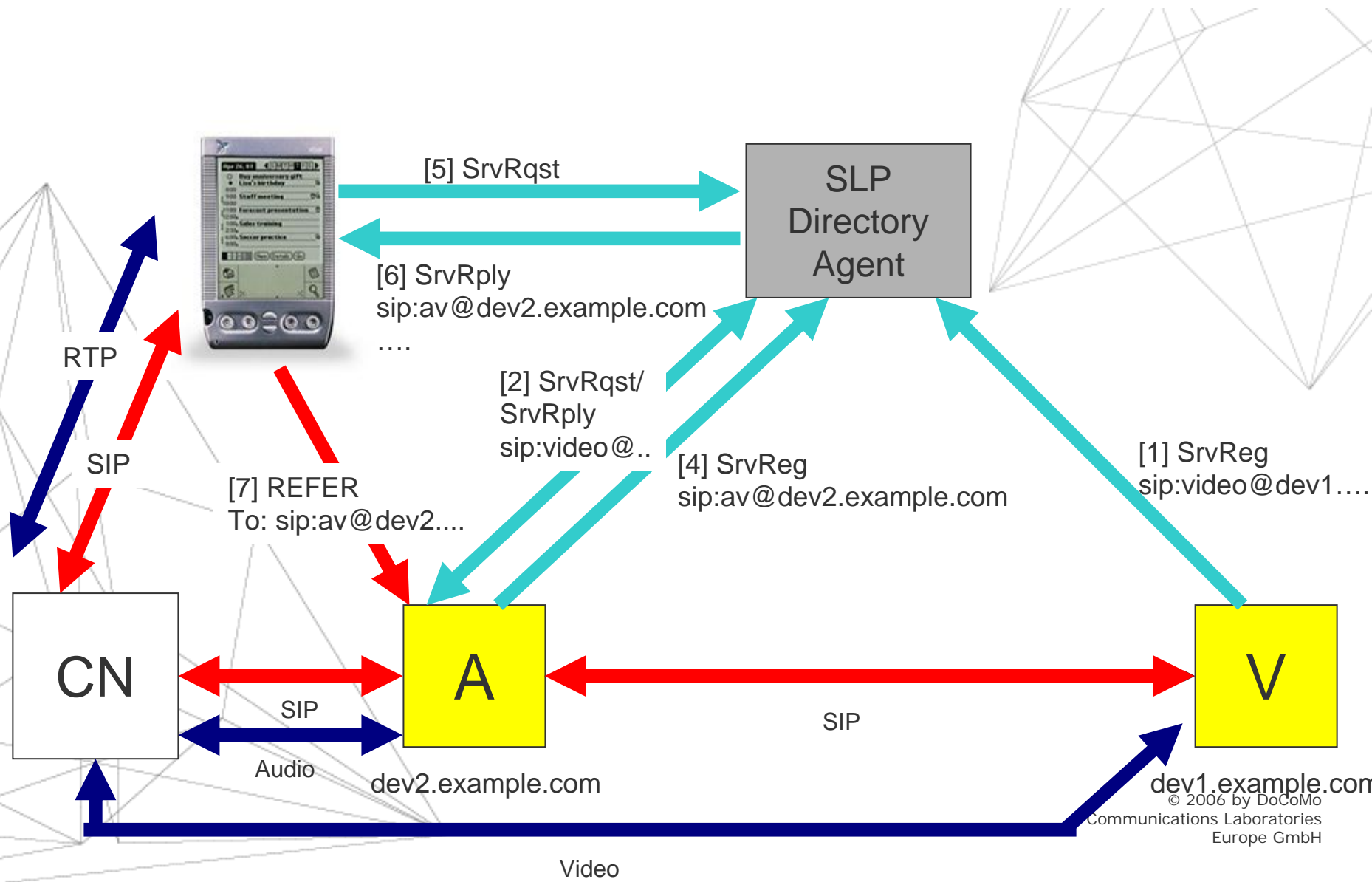
- Require a Multi-Devices System Manager (MDSM) to logically forming local devices and represent them as a single system to the CN.







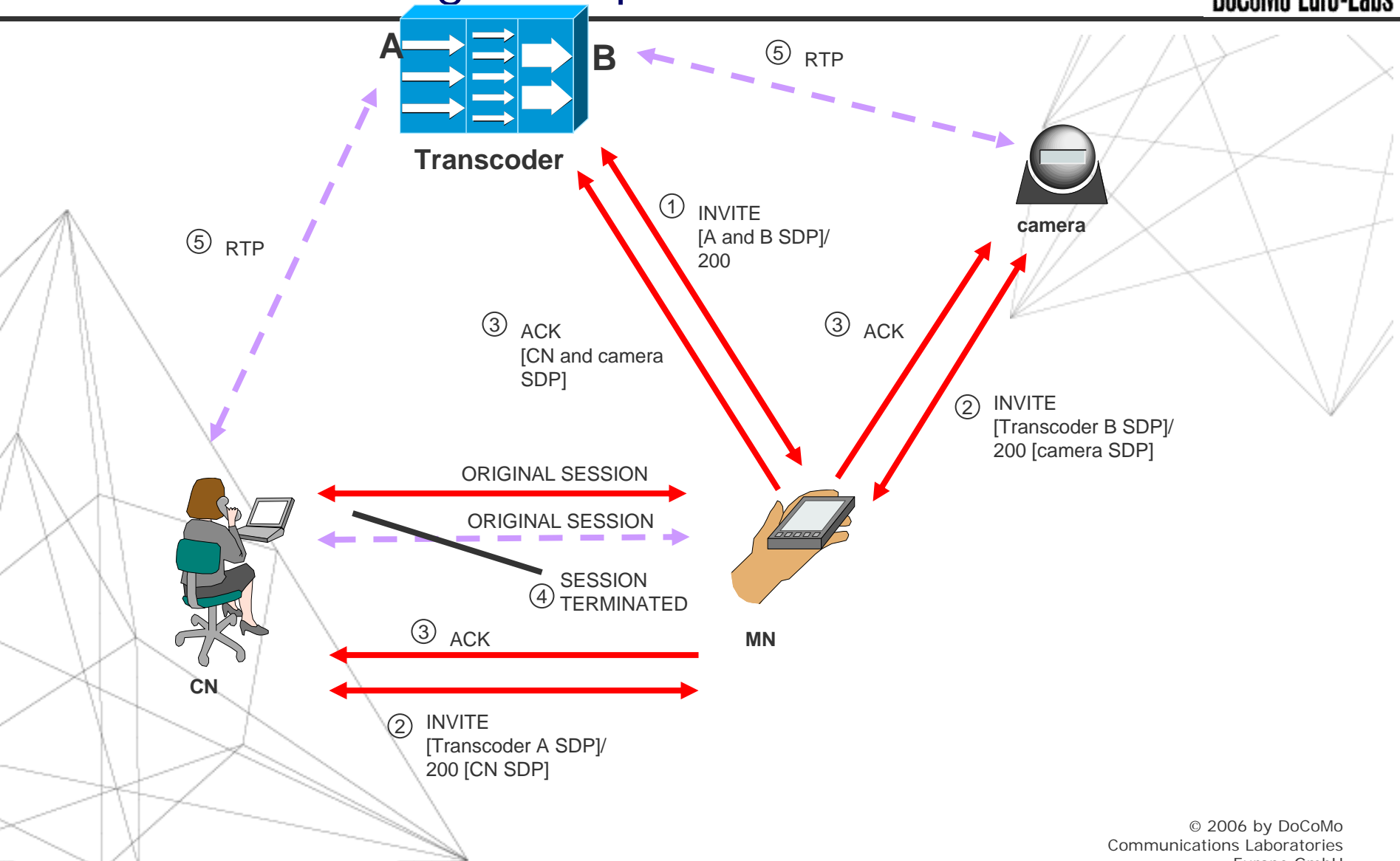




- When the local device and CN have no common codecs, session transfer must go through a transcoder (may be located through SLP)
- MN maintains sessions with transcoder, CN, and local device, using 3pcc to create media sessions between them
- Transcoder translates between CN and local device media
- Other capabilities, such as bandwidth and display resolution, may be negotiated in SDP, using existing specifications for H.263+

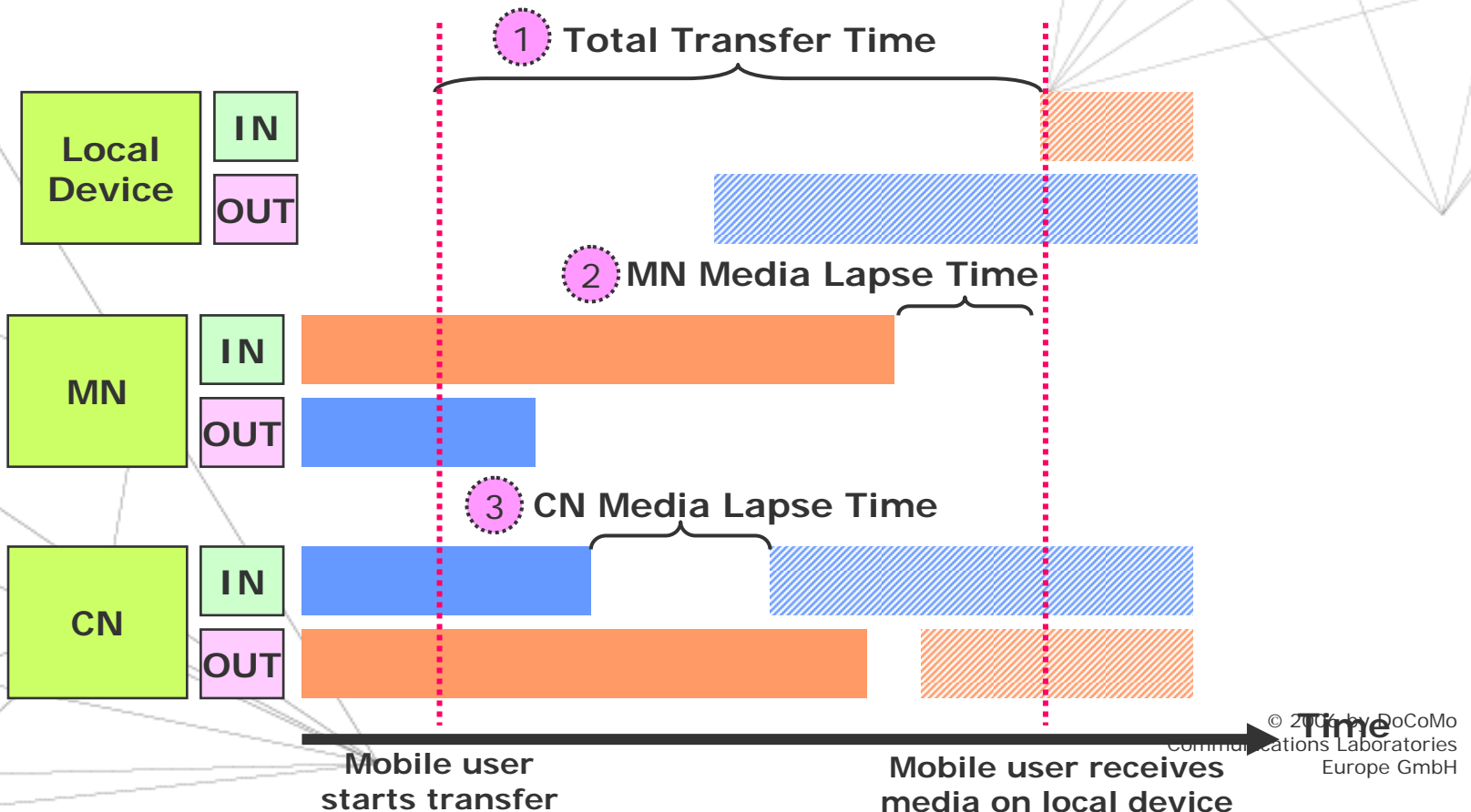


## Transcoding Example



## Performance Measurement

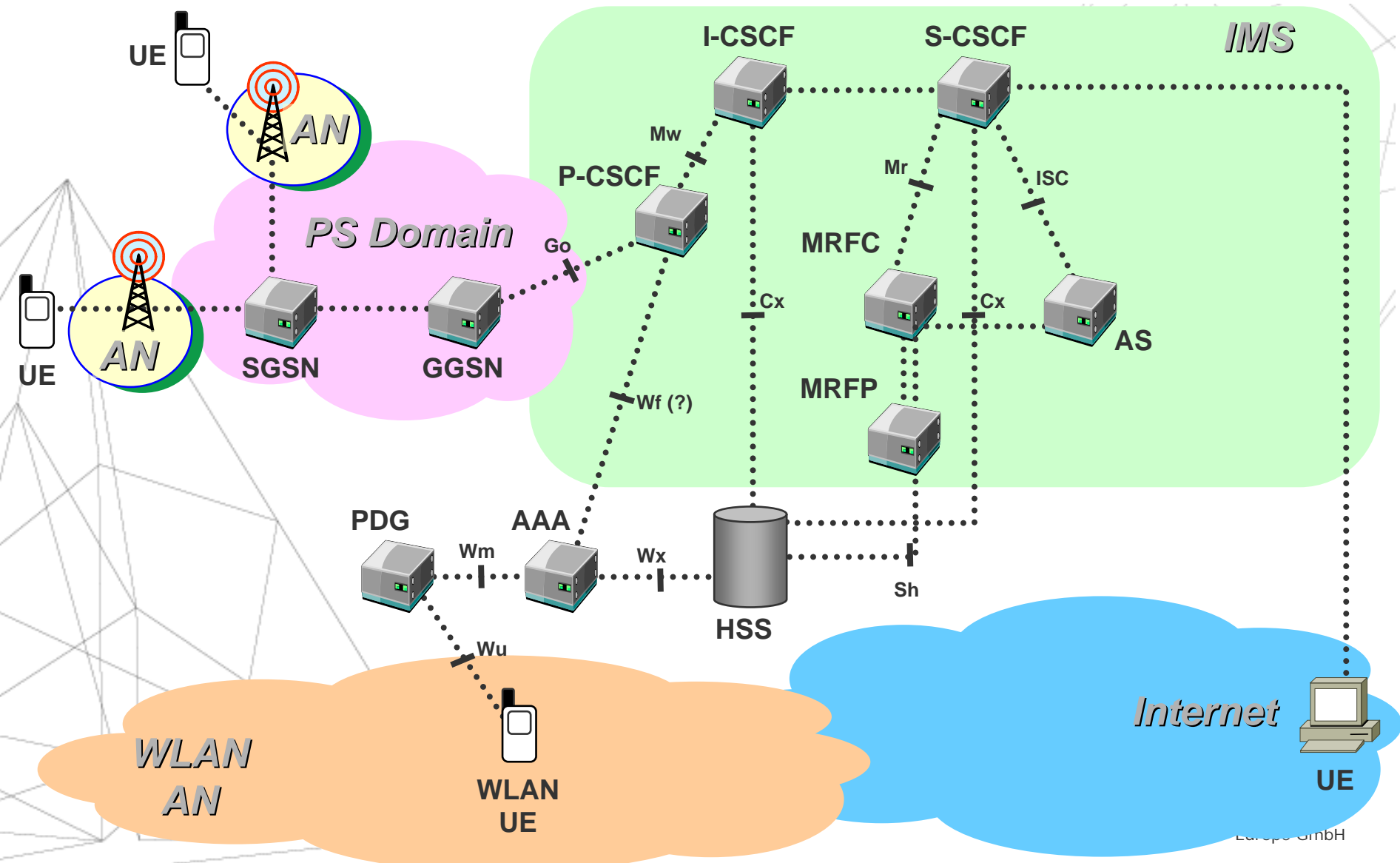
- Measurements are carried out by setting up a **trans-Atlantic** audio and video call between two SIP UAs, and then transfer the call to one or more local devices using both modes.
- To evaluate performance of our system, we do measure three criterias as shown below:



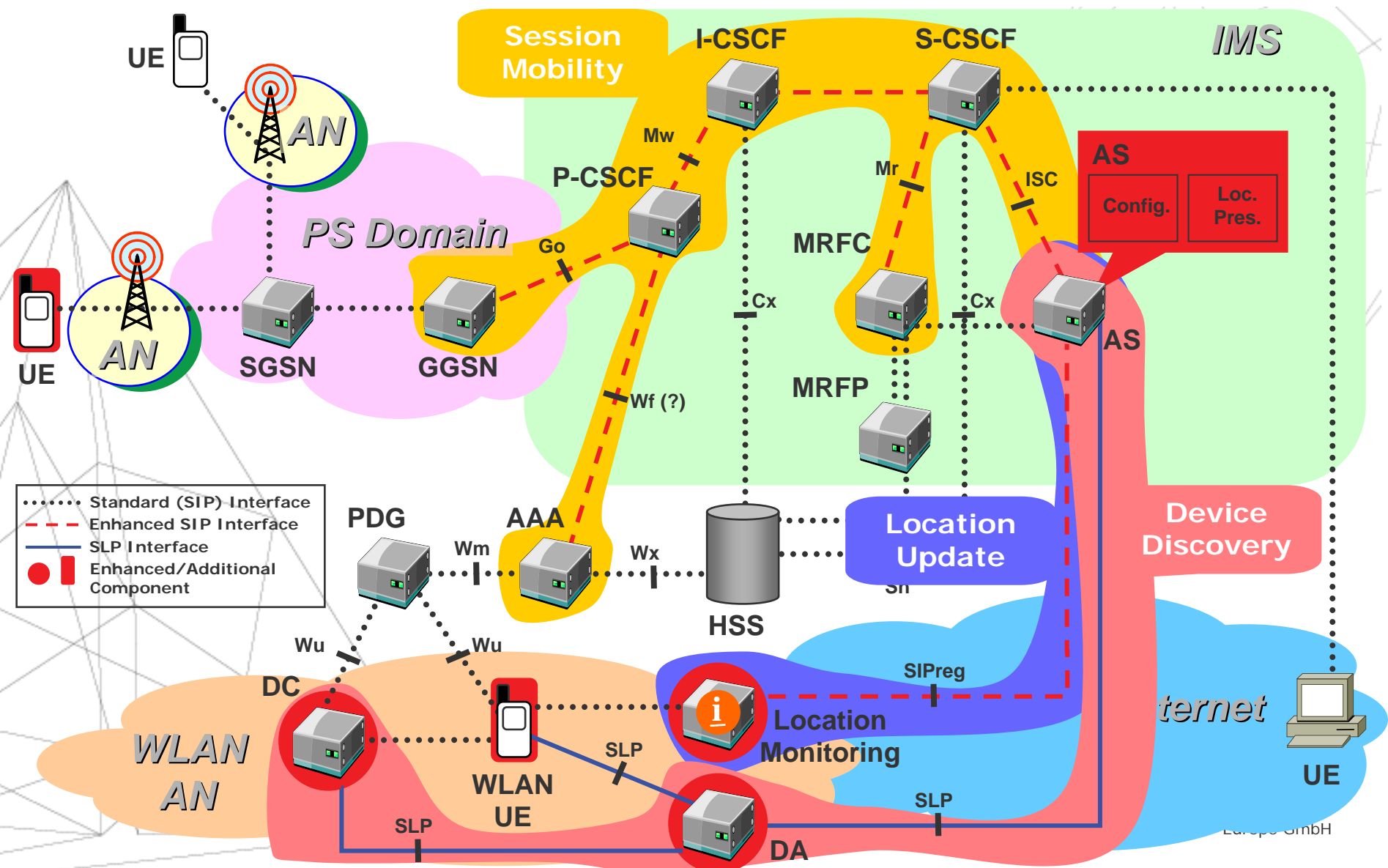
	CST (only audio)		SST (video call)			
	MNC	SH	MNC Audio	MNC Video	SH Audio	SH Video
TTT (ms)	815	420	397	400 (2361)	906	900 (2967)
MNLT (ms)	81	238	99	100 (2098)	461	500 (2523)
CNLT (ms)	0	154	0	0 (1155)	193	600 (1756)

- Correspondent Node (CNLT):
  - no disruption in MNC
  - small disruption for video
  - NOTE: measured 1-2s video delay (given in "()") due to start/restarting of our video application (not due to signaling!)
  - NOTE: video delay in SSH is cause by MDS system (implemented on audio node)
- Mobile Node (MNLT):
  - minimal audio disruption (in MNC mode)
  - < 500 milliseconds in SH mode: checking authorization for session replacement
- Total Delay (TTT): not annoying (< 1 second)

# Mapping to IMS: 3GPP Architecture V6



# Mapping to IMS



- Session Mobility = seamless transfer of media of an ongoing communication session from one device to another
- System architecture and methods for providing this service as part of the Session Initiation Protocol (SIP)
- Basic steps
  - service discovery to locate devices to use as transfer targets (SLP)
  - session transfer
  - reconciliation of device capability differences
- Described as Internet Draft `draft-shacham-sipping-session-mobility-02`, currently under AD review
- Discussed for standardization in ETSI TISPAN and 3GPP

- *An Architecture for Location-Based Service Mobility Using the SIP Event Model*, Mobisys 2004 Workshop on Context Awareness, Boston, MA.
- *The Virtual Device: Expanding Wireless Communication Services through Service Discovery and Session Mobility*, WiMob '05, Montreal, CA.
- *Ubiquitous Device Personalization: The Next Generation of IP Telephony*. Accepted for ACM Transactions on Multimedia Computing, Communications, and Applications (TOMCCAP).
- Two current IETF Internet Drafts
  - draft-shacham-sipping-session-mobility-02
  - draft-shacham-sip-media-privacy-01