Internet based Emergency calls

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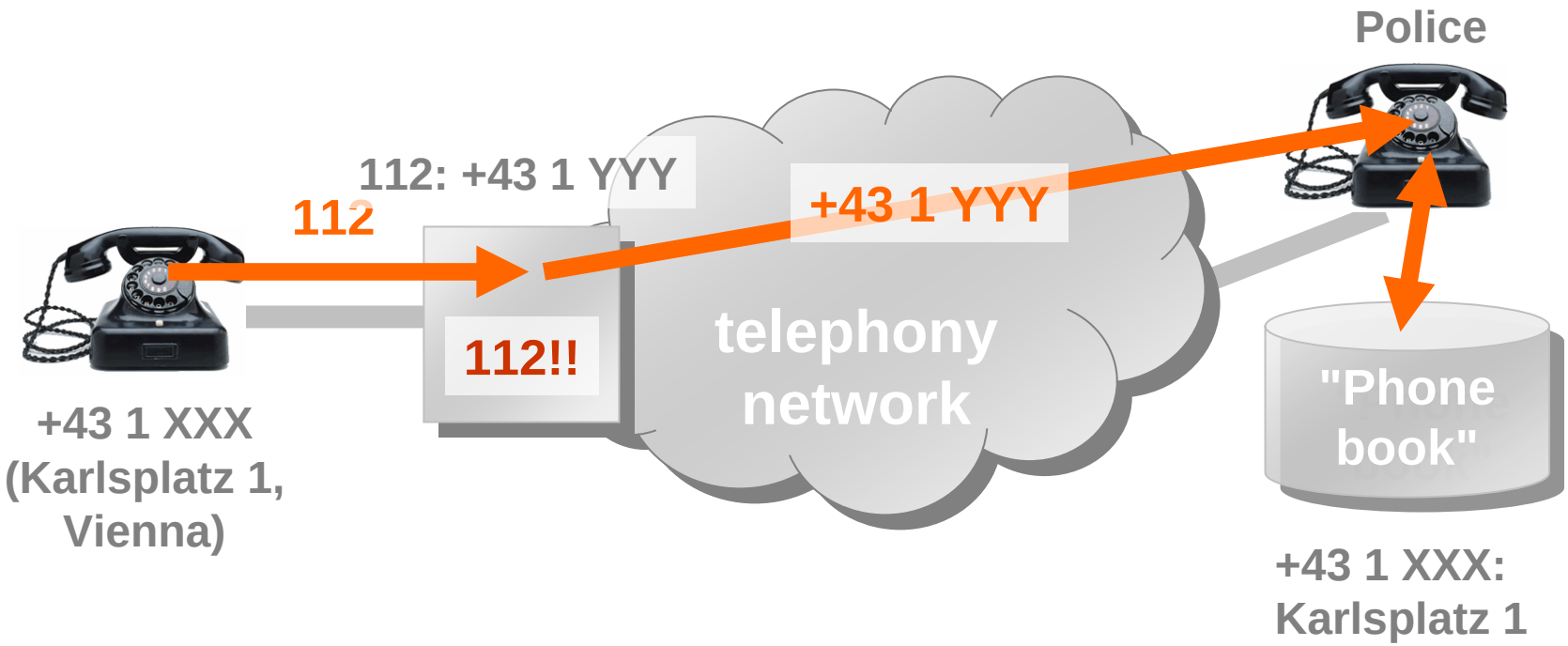
Agenda

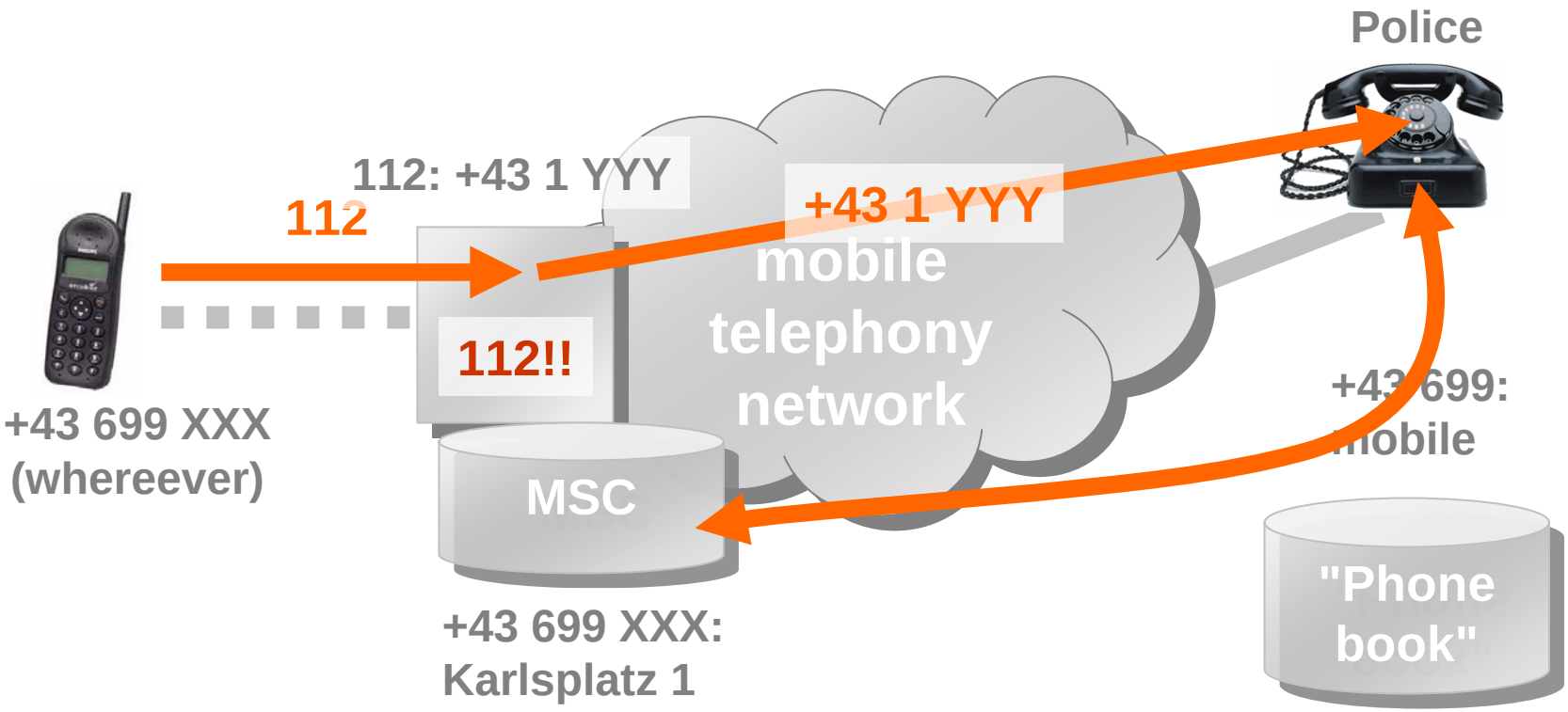
- How "legacy" Emergency Calling works
- Issues with IP-based emergency calls
- IETF architecture overview
- Who needs to do what?
- Regulation
- nic.at IP-based emergency calling projects

Emergency calls: "hello, world"



- Detect emergency call
- Route to "best" Public Service Access Point
- PSAP: Answer call, figure location, send help

Mobile: It gets trickier



- call destination depends on handset location
- handset location not in the "phone book": requires cooperation of PSAP and operator

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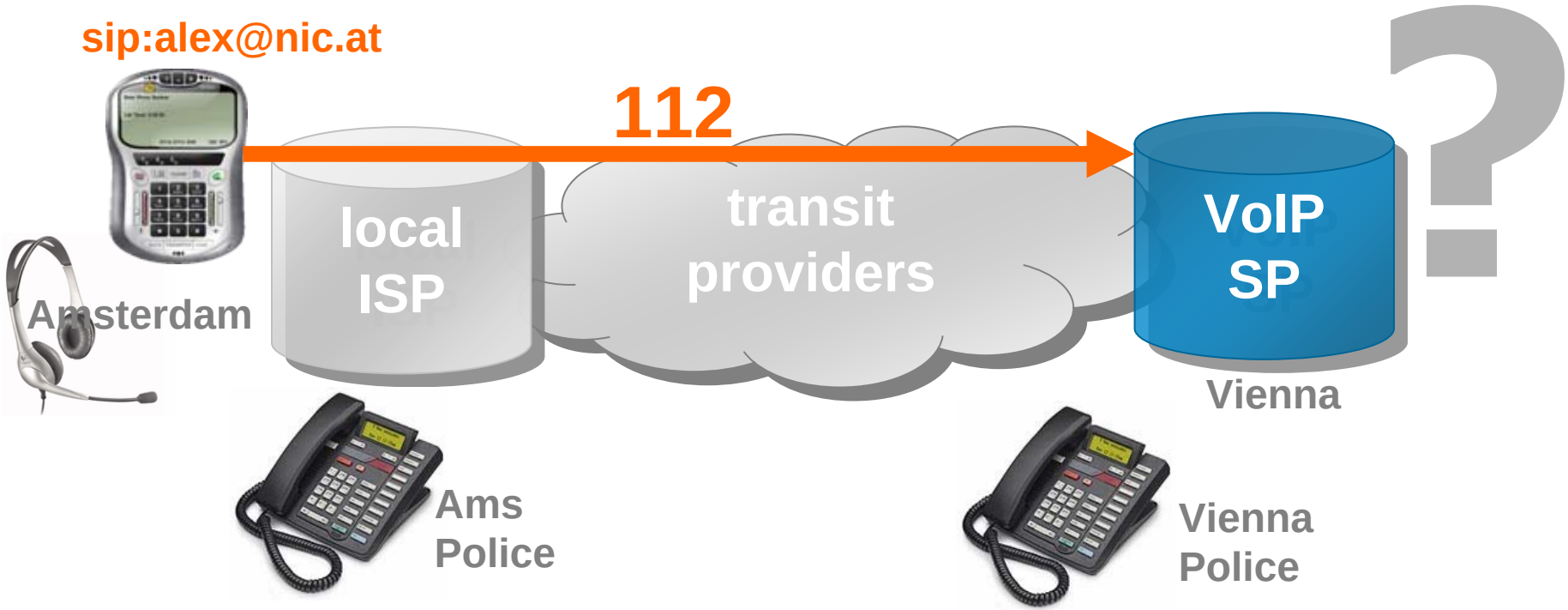
Like real estate: "It's all about location"

- caller location required to find correct (best/closest/non-busy) PSAP
- caller location needed to send help

- "Plain" telephony uses phone number / "phonebook" as key to location
- Mobile telephony uses access network element to access location info.
- (mobile) VoIP uses ?

VoIP & emergency calls: OMG!



- VoIP SP needs location to properly route the call, but doesn't know it
- Access ISP does not notice the call, but knows the user's location

Problem: Seperation of Service and Access

- Classical telephony is integrated
  - Service and Access from same provider
  - Easy to acquire location (even mobile)
- VoIP (usually) seperates roles
  - Access is completely independent from service
  - And they don't even know each other
  - They only have one thing in common: .... the user!

"Other" problems

- World wide mobility of (some) services
  - requires worldwide standards
- Services without phone numbers
  - number cannot be used as a lookup key
  - PSAP can't "call back" based on number
- It might be more than just voice
  - Instant Messaging, Video, email
  - PSAPs usually don't even handle SMS
  - "VoIP" is not always "VoIP" (think Skype)

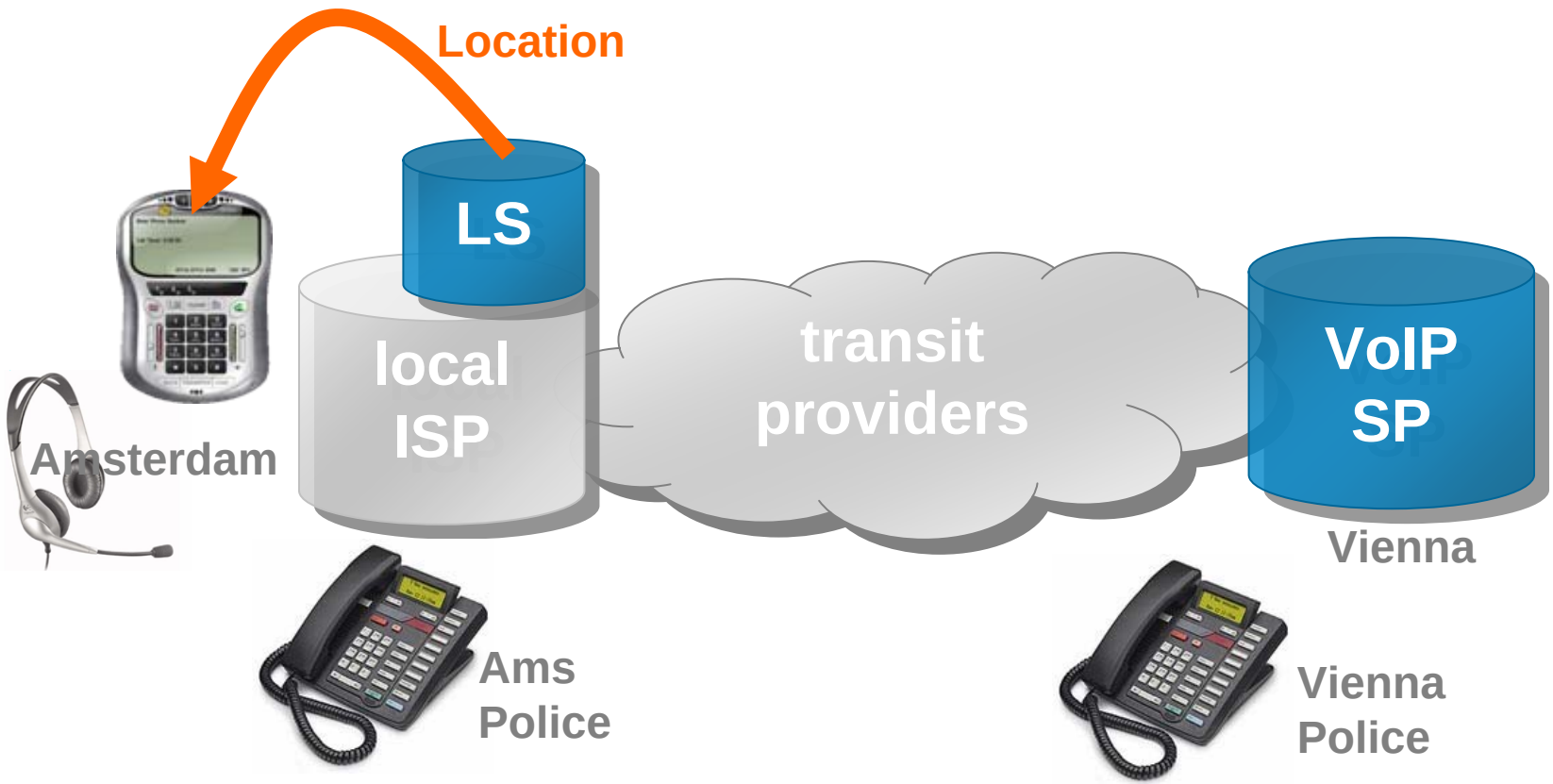
IETF emergency services work

- Working groups: ECRIT, GEOPRIV
- Location delivery (LCP)
- Service identification (service URN)
- Service discovery (LoST)
- Privacy, security (location by reference, location signing, location hiding)
- Introduction:
  - draft-ietf-ecrit-framework
  - draft-ietf-ecrit-phone-bcp

IETF architecture
(ECRIT, GEOPRIV)

- client acquires location from access net
  - DHCP
  - LLDP
  - HELD (HTTP Enabled Location Discovery)
- client (or service provider) uses LoST
  - "Location to Service Translation" – think of a pizza delivery service directory.
  - returns available services, PSAP contacts, dial strings
- emergency call contains location

Step 1: Location Discovery



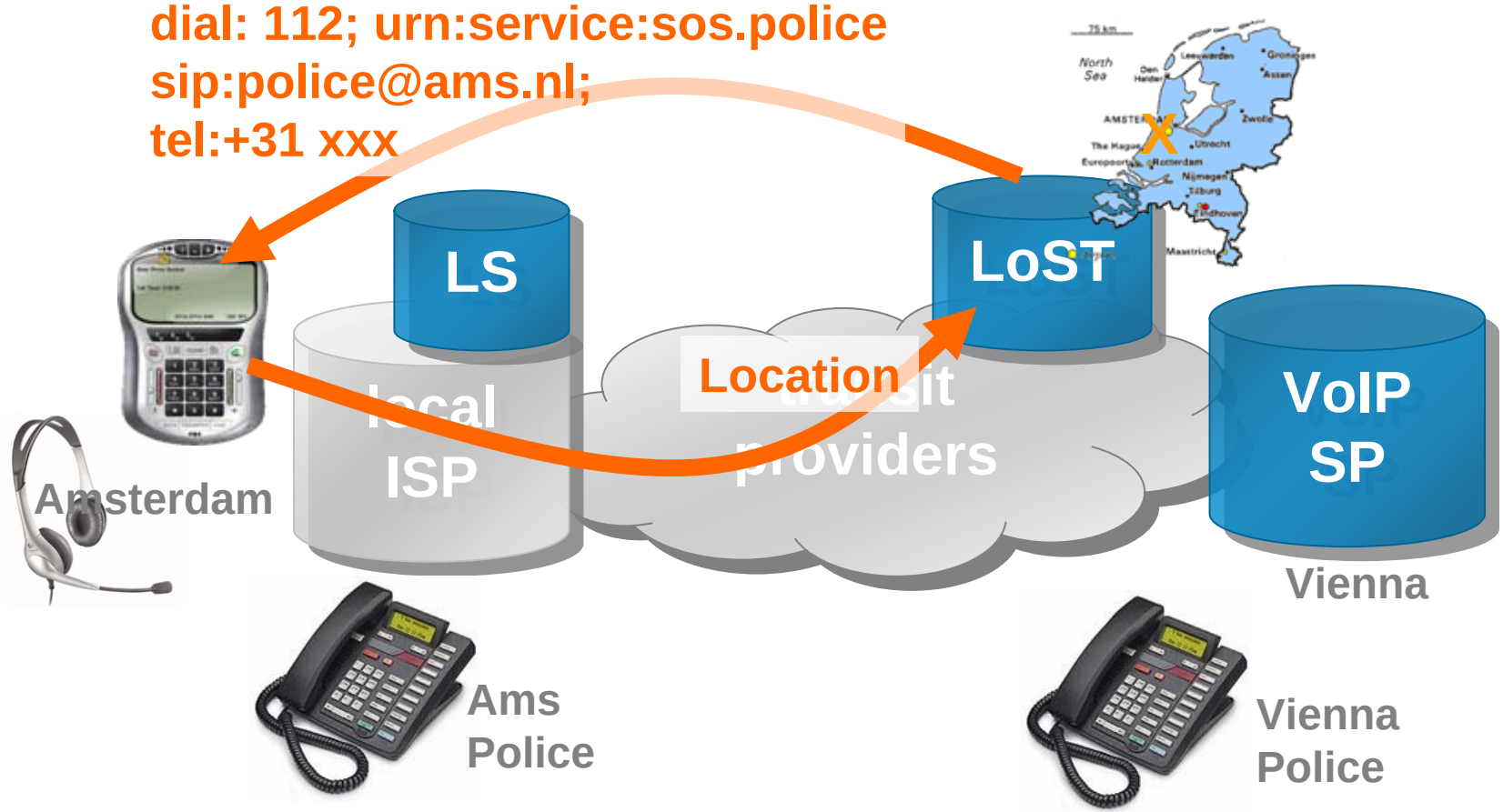
- Access network provides client with location

Step 1: Location Configuration

- Spatial / Civic
  - "Karlsplatz 1, Vienna" vs. "48°N 16°E"
- By value / by reference

- DHCP – (RFC3825, RFC4776)
- LLDP-MED – ANSI/TIA 1057
  - (LLDP: "CDP reloaded")
- HELD (HTTP Enabled Location Delivery)

Step 2: Service Discovery



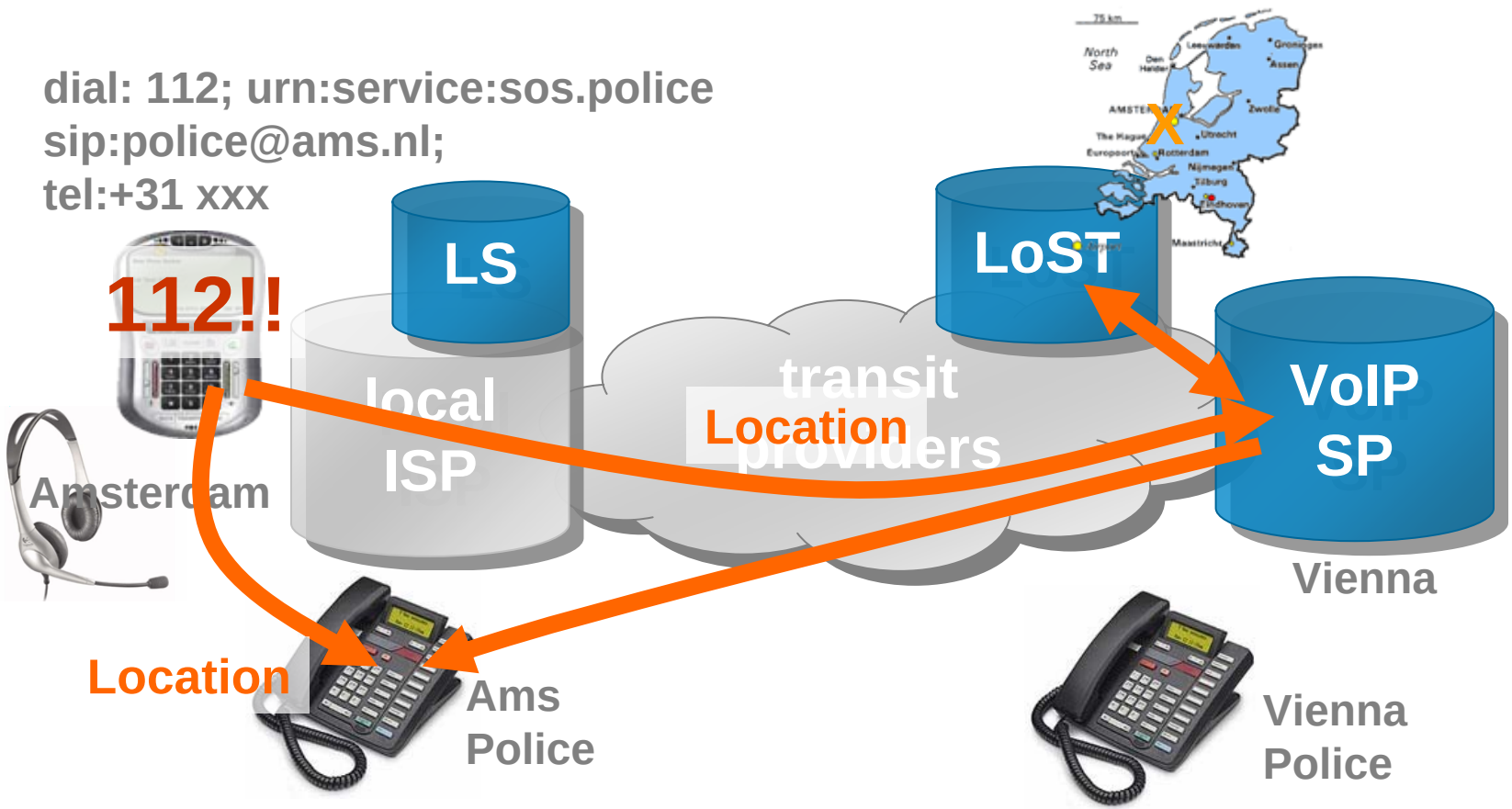
- Client uses LoST to discover dialstring, contact addresses

Step 2: Location to Service

- Input data: Location
- Output data:
  - available services (sos.police...)
  - contact URIs (sip, tel, ...)
  - service boundary (geographic object)

- XML/HTTP based, query/response
- expected to have similar query rate and importance as DNS
  - think of clients in cars, planes with frequent location updates

Step 3: Actual Emergency call



- Client can place emergency call to best PSAP (directly, or via VoIP SP)

Regulation & Motivation

- Most EU countries **require** emergency calling for telephony services
- Depends on **classification** of VoIP service (PSTN interopability)
- Weak execution, though. ("... in the best way technically feasable")
  - But – that might change (Sunday's news: "*4 kittens die because Internet emergency call fails*")
- Standardization is progressing rapidly – industry is barely watching
  - did someone mumble "IPv6" or "DNSSEC"?
  - changes cost money – government funding?

Who needs to do what?

- Access networks
  - location-enable their access lines
  - much effort, low incentive ($$$, privacy)
- VoIP SPs
  - Recognize, route, prioritize emergency calls
  - trust relations (location info, LoST server)
- Software Vendors
  - Add emergency support to VoIP client software
- PSAPs
  - publish their service coverage
  - expand service beyond PSTN-based telephony
- Someone (?)
  - run authoritative LoST servers for a region
  - define mapping of address elements to IETF standards
  - coordinate between PSAPs, government, access providers

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- Investigating practical application of standards
  - "location-enabled access network in a box" (OpenWRT extension)
  - mapping Austrian address data to PIDF-LO (upcoming internet draft)
  - VoIP-enabling PSAPs
- Consulting
  - PSAPs, ISPs, VoIP SPs

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- Participating in Austrian Emergency Services Forum
  - regulator, telcos, PSAPs, government – very few ISPs and VoIP SPs!
  - PSAP service area data collection
- LoST server prototype
  - similar to DNS in availability and performance reqs. – central function of local internet infrastructure
  - Funding?

conclusions

- Standards are progressing quickly
- Implementation means effort
- Regulators are looking away
  - how long? Until standards finished?

- Suggestion to ISPs: Watch closely, and prepare. Audit systems from the perspective of customer location provisioning.
- Suggestion to VoIP SPs: Expect nice letters from the regulator if you don't route emergency calls properly. Watch related consultations.

- Location information is a big business. There might be added value to monetize.

Thank you!

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