

## Issues to Resolve

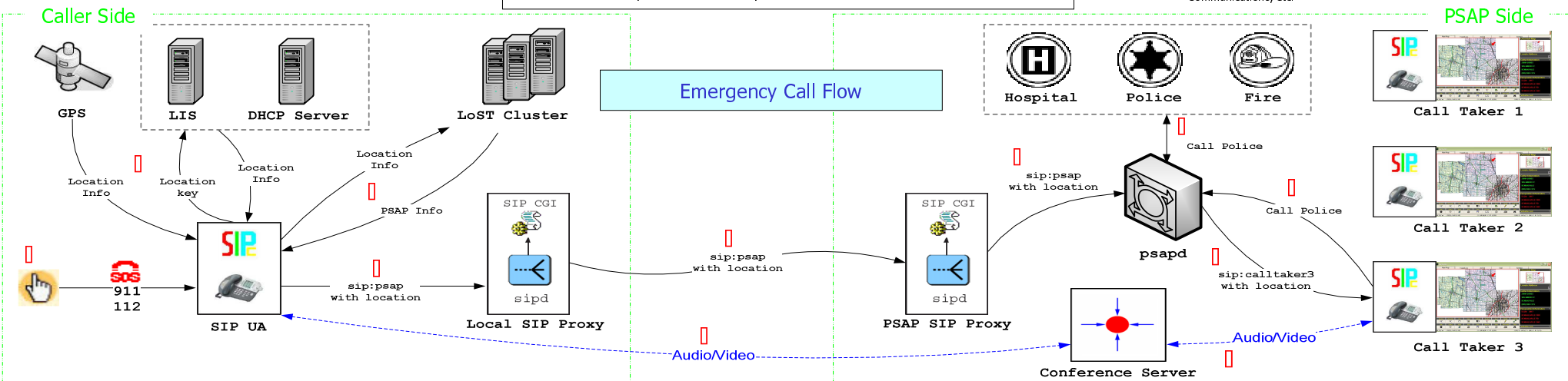
- Where on earth is the caller?
  - VoIP service can be used anywhere as long as there is Internet connectivity
  - Solutions to two problems below depend on caller location
- How can the phone identify an emergency call?
  - Let phone remember 9-1-1. But if you're in Europe?
  - Use a global standard service identifier such as, *urn:service:sos* or *urn:service:police*
- To which PSAP should the call go?

## Project Objectives

- Develop a prototype system that routes emergency calls over SIP based VoIP networks.
- Use embedded location information delivered via the SIP protocol to make routing decisions.
- Implement various ways of determining caller location
- Implement features of IP based Public Safety Access Point (PSAP)
- Provide opportunities to enhance 9-1-1 system:
  - More robust
  - Additional media like video and text.
  - Better integration with first responders and public safety
  - Cheaper to build and operate.

## A Collaborative Effort

- Funding
  - National Telecommunications and Information Administration (NTIA)
- Requirements
  - National Emergency Number Association (NENA)
- Software Development
  - Columbia University
  - Texas A&M University
- Deployment and Testing
  - PSAPs at Brazos County, Texas and College Station, Texas
  - University of Virginia and PSAP at Albemarle County, Virginia
- Standardization
  - Internet Engineering Task Force ECRT, GEOPRIV Working Group
- Contributions
  - States of Texas and Virginia 911 offices
  - Corporations like Cisco, Nortel, MapInfo, FirstHand Technologies, Emergent Communications, etc.

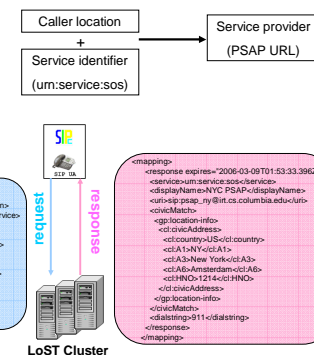


## Determining Caller Location

- Endpoint is responsible for its own location.
  - Multiple methods tested
    - DHCP server is able to return both civic address and geographic coordinates
    - Network switches will be able to broadcast location information through LLDP-MED protocol
    - Skyhook Wireless uses signal strength of access points to calculate location
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## Determining PSAP using LoST Protocol

- Which PSAP should the call go to?
  - Depends on location and required service
- LoST (Location-to-Service Translation)
  - Translates a service identifier and location to PSAP URL and emergency string
  - Supports both civic and geo location
- An example of a query and a response



## Features of the IP based PSAP

- Implemented
  - Audio, video, and text messaging
  - Caller location on Google Maps
  - Language-based call distribution
  - Fully mute / partially mute
  - Recording and logging of calls
  - Call queuing
  - Automatic call overflow to a backup PSAP
- Future Work
  - CPR-howto
  - Automatic answering based on time and location of call