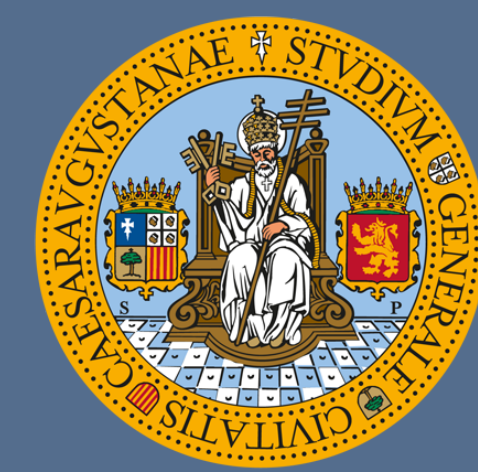


# Mobile Endpoints:



## Accessing Dynamic Information from Mobile Devices



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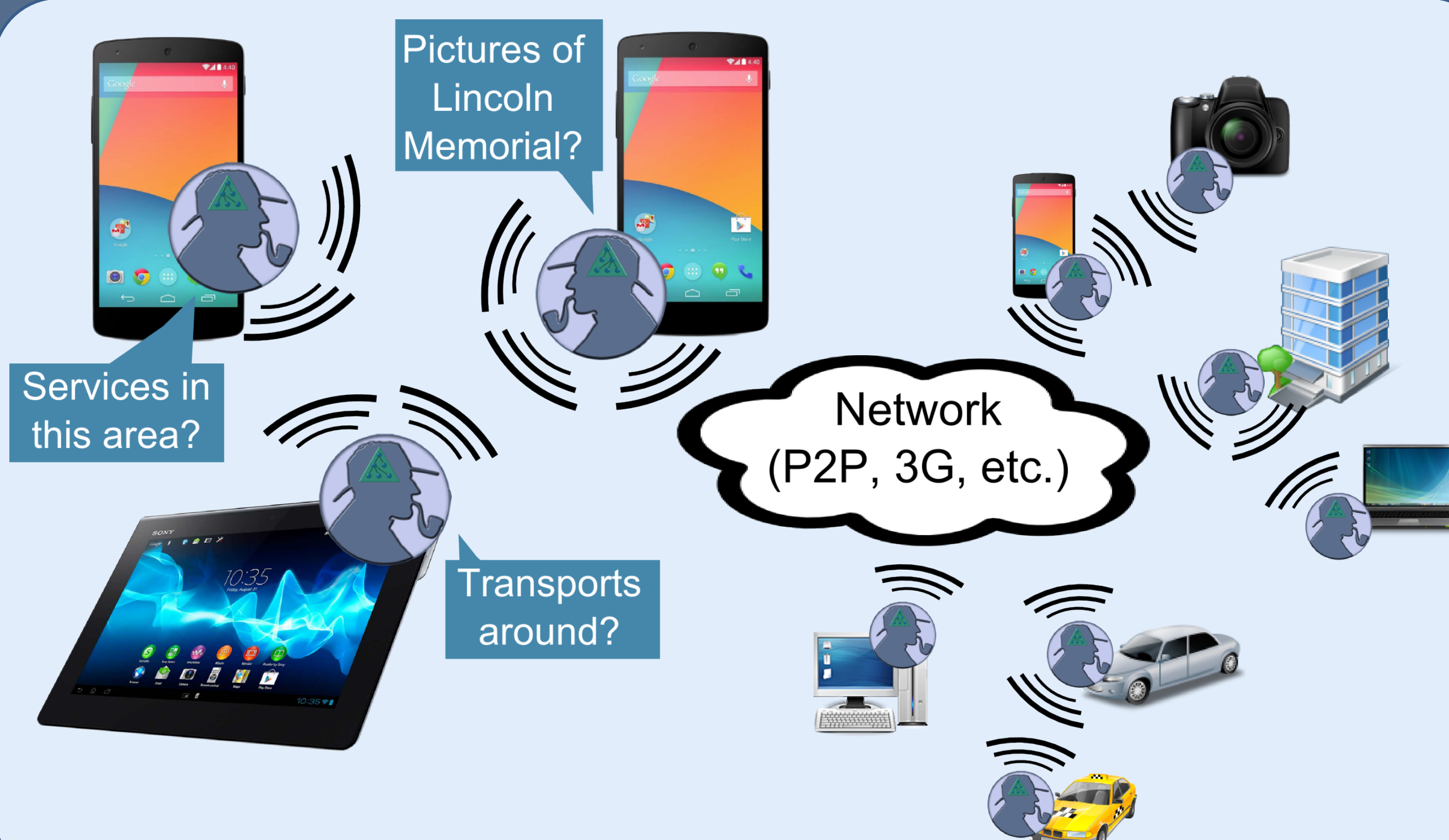
### SHERLOCK

System for Heterogeneous  
mobile Requests Leveraging  
Ontological and Contextual  
Knowledge

Mobile computing + Semantic Web  
P2P ad hoc communications  
Knowledge representation and  
reasoning



### Inter-device Cooperation



### Motivation

- Mobile devices equipped with multiple sensors and communication mechanisms:
  - Consumers and producers of information!
- A centralized KB with information from sensors is not feasible.
  - Millions of devices.
  - Privacy implications.

### Query Language

- Based on SPARQL
  - GeoSPARQL**: geospatial tagged information is frequent in mobile scenarios.
  - SPARQL-DL**: OWL expressivity and use of reasoner for inferences.
- Benefits
  - Decouples SHERLOCK from a specific scenario.
  - Easily translation into SPARQL to query external endpoints.
  - Other software modules are able to pose queries to SHERLOCK devices directly.

### Sample Query

"...Pictures of the header of the parade at Washington D.C. and the fireworks at the Lincoln Memorial..."

```

SELECT ?photo, ?timestamp
WHERE {
  LID{
    Type(?parade, sherlock:ParadeHeader),
    FILTER(geof:within(?photo, geof:buffer(?parade, 200, 'm'))),
  } TOD{
    Type(?photo, sherlock:Photo),
    PropertyValue(?photo, sherlock:target, ?parade)
    ...}
} OR WHERE {
  LID{
    FILTER(geof:within(?photo, geof:buffer(38.88, -77.05, 200, 'm'))),
  } TOD{
    Type(?photo, sherlock:Photo),
    PropertyValue(?photo, sherlock:target, sherlock:Fireworks),
    PropertyValue(?photo, sherlock:target, dbpedia:Lincoln_Memorial)
    ...}
}

```

Location of Interest Definition

Target Objects Definition

### Query Processing

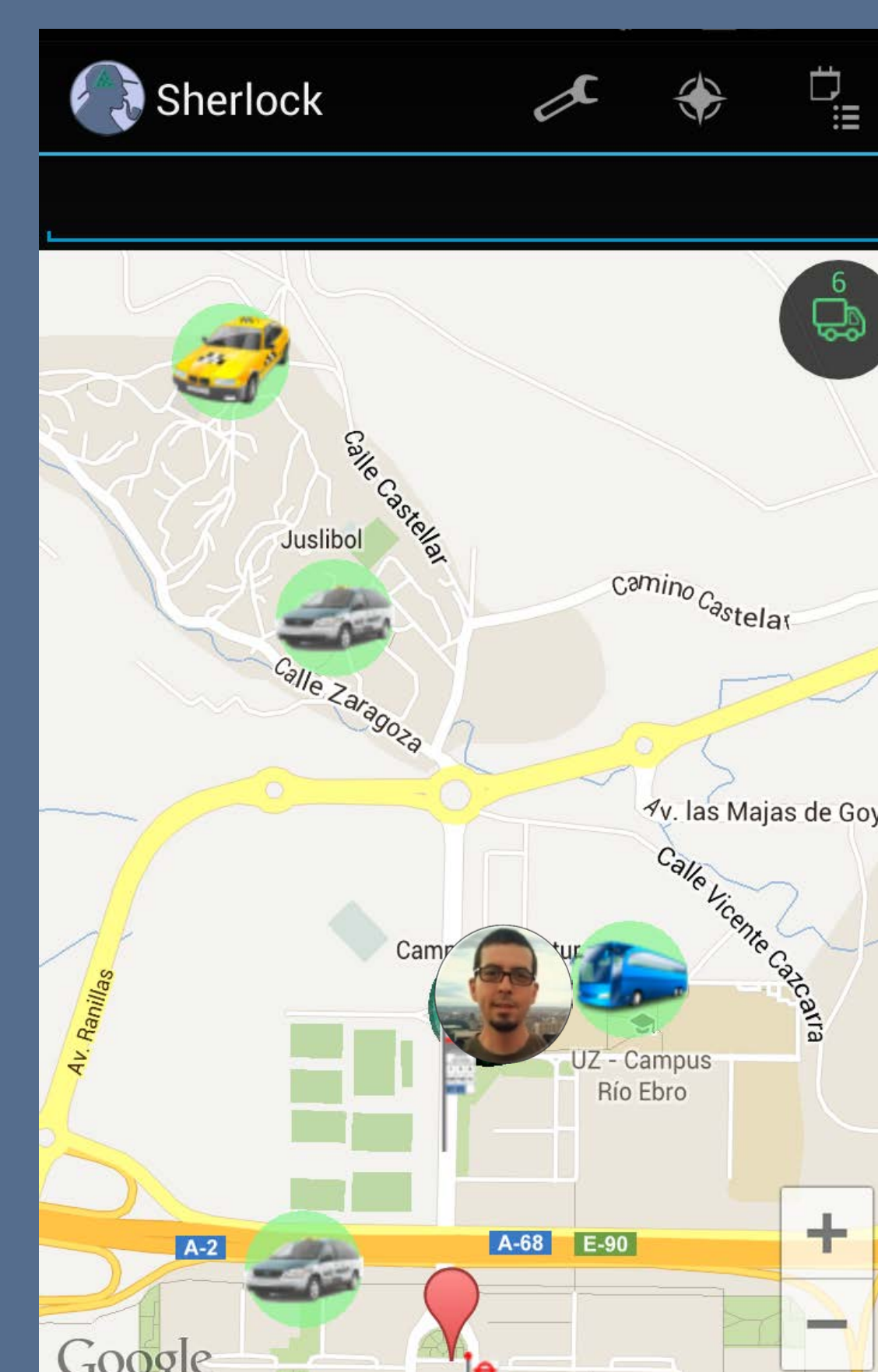
- Execute query against local KB.
  - The information could be already on the device!
- Execute query against third party KBs.
  - Translation into SPARQL.
- Execute query against KBs on other devices.
- Split query based on LIDs and send agents.
- Execute query against KBs.
- Interaction with user if needed.
- Return and correlate results.

### Agent Network



### Prototype

- Technologies:
  - OWL API
  - Hermit reasoner
  - Partial GeoSPARQL implementation



Android Goes  
Semantic

