

# Towards a Global Spatial Data Infrastructure Using Web Services

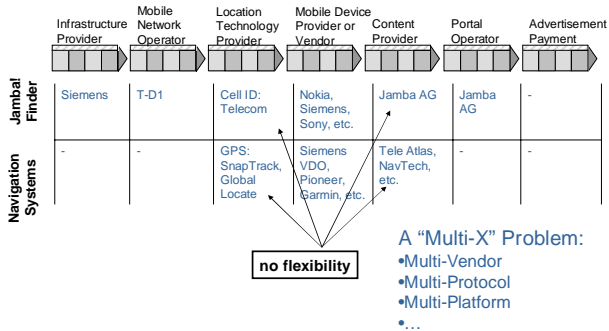
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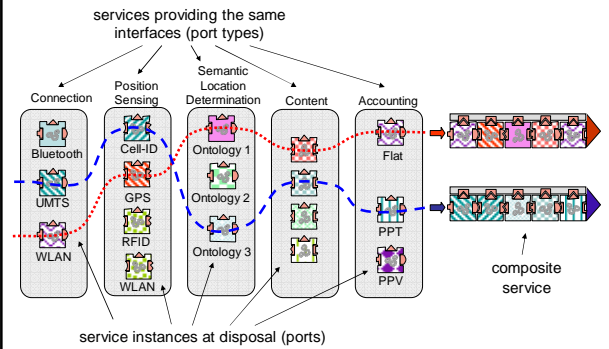
## Content

- **Location-Based Services (Today)**
  - current LBS value chains and their problems
- **Adaptive Location-Based Services (Tomorrow)**
  - Web Services and adaptive service composition
- **Berlin Adlershof – A Case Study**
  - a distributed spatial information system
- **SEMALON – The Semantic Location Network**
  - approaching global scalability and interoperability
- **Conclusions**

## LBS Value Chain



## Adaptive Location-Based Services



## Berlin-Adlershof A Case Study



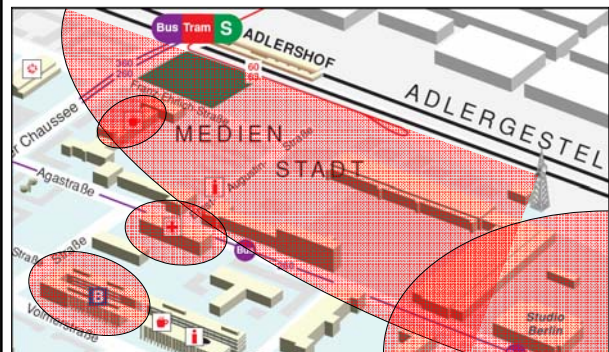
- Location-Based Services for Berlin Adlershof Science and Technology Park (WISTA)
- Cooperation with the Geographic Institute, Humboldt University Berlin and WISTA Management

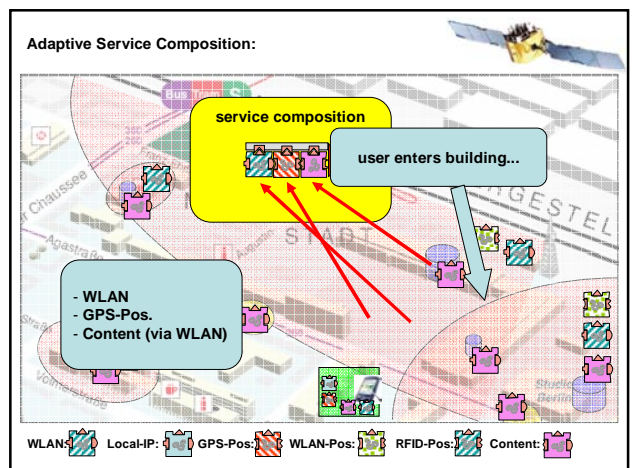
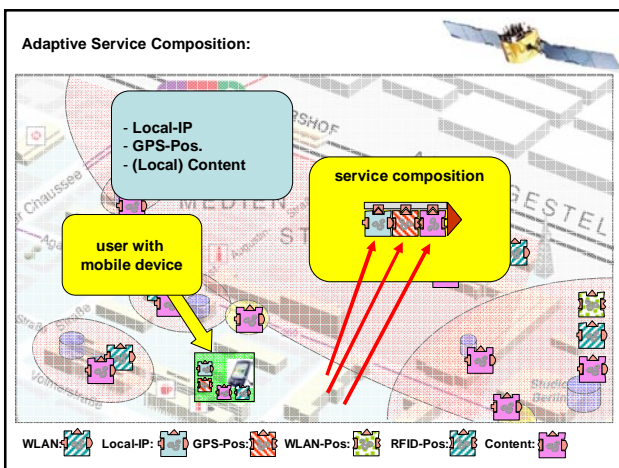
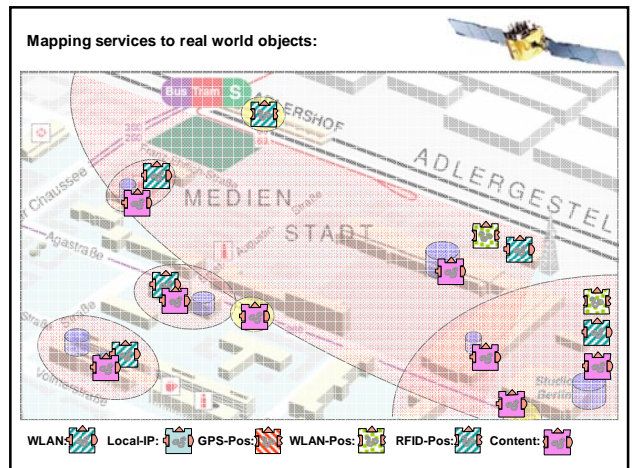
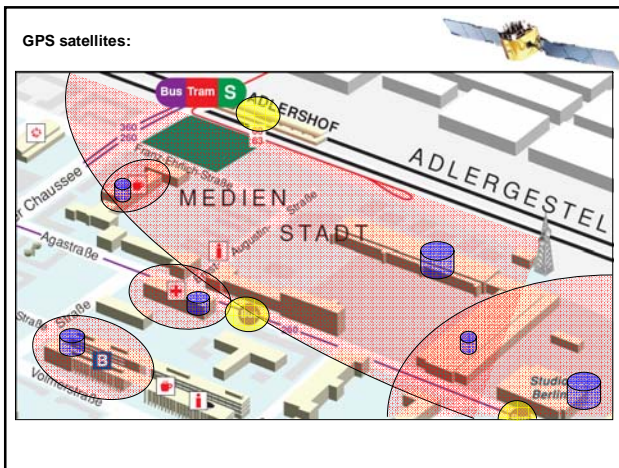
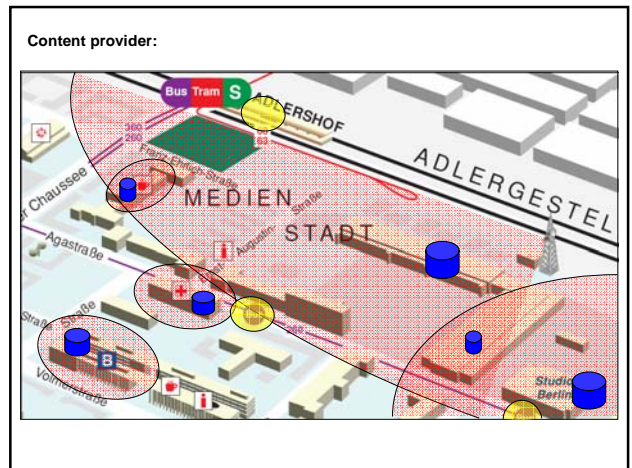
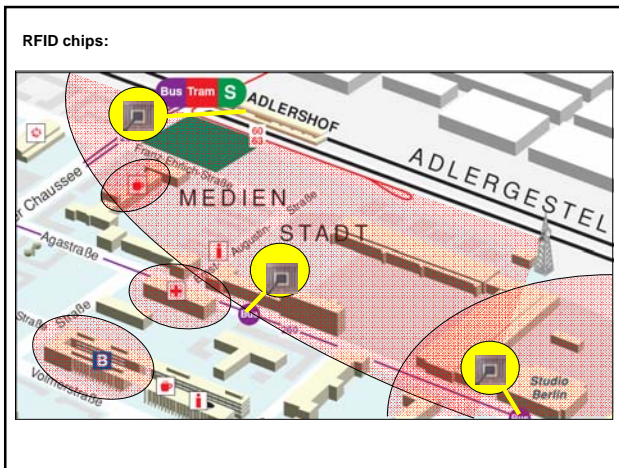


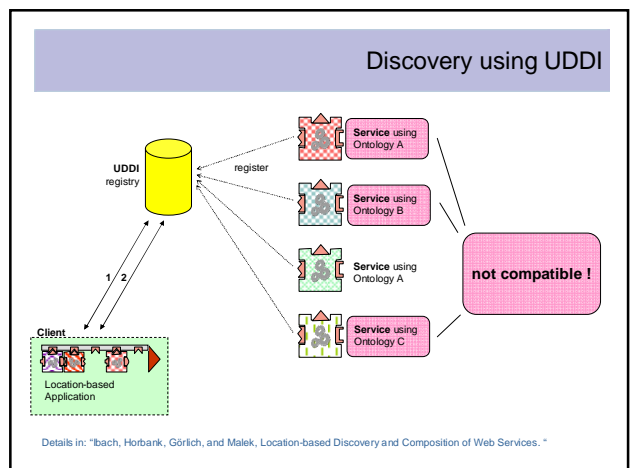
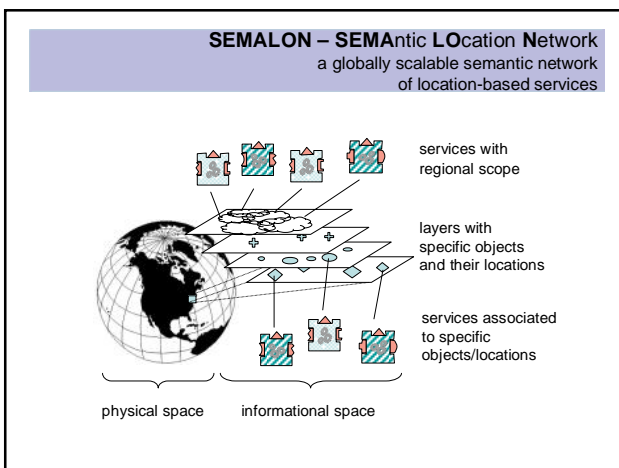
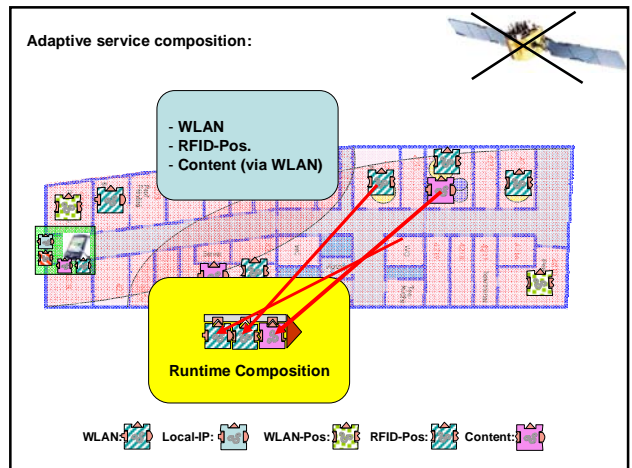
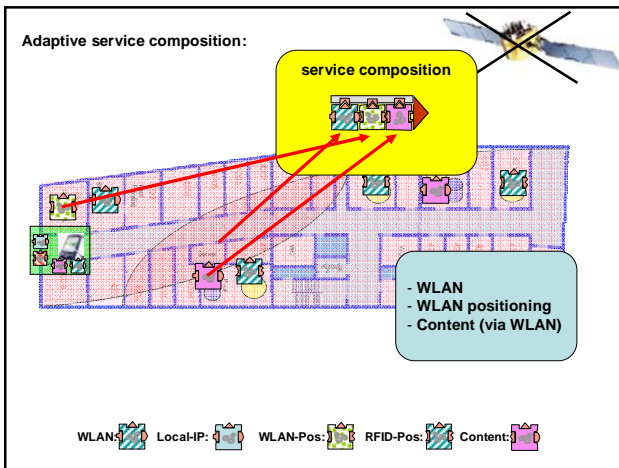
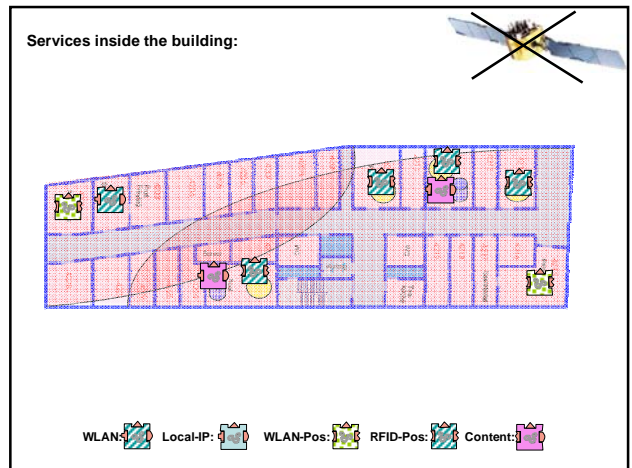
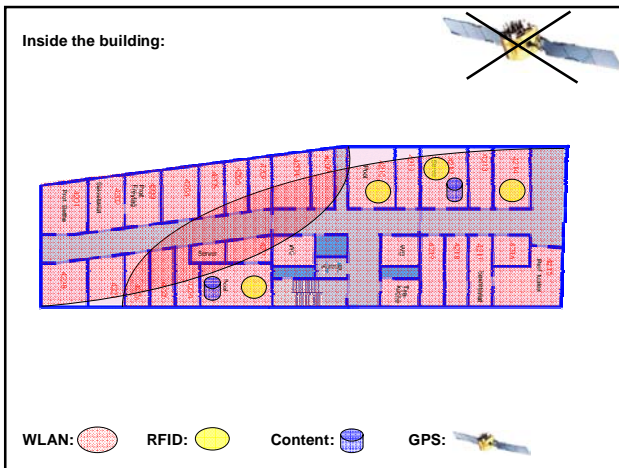
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## Campus Berlin-Adlershof – A Case Study

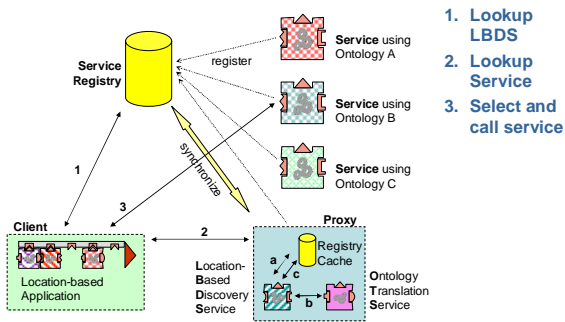
Wireless networks:







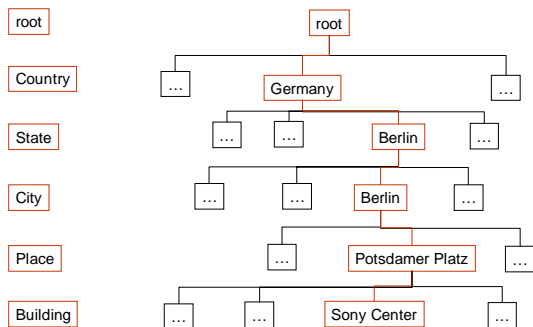
## Discovery using a Dedicated Service



## UDDI Queries

- descriptive annotations can be attached to any service type or service instance and registered in the repository
- search for values that describe the entry according to a categorization scheme
- category levels can be combined using Boolean operators
- e.g., lookup services where  $\langle \text{City} \rangle$  is  $\langle \text{Berlin} \rangle$  and  $\langle \text{Building} \rangle$  is  $\langle \text{Sony Center} \rangle$
- to interpret these attachments semantically, **shared ontologies**, i.e., standardized, commonly available, and machine-interpretable categorization schemes, must be provided

## Spatial Ontologies - Example



## Location Semantics

### Geographic position:

N52°32.39' E13°24.64'

### Semantic Position:

```
<rdf:Description
  about="urn://prater.theatres.berlin.de">
<rdf:type
  resource="urn://myontology.myID.de/Schema/theatre"/>
<rdf:type
  resource="urn://myontology.myID.de/Schema/places/ambient"
  />
<t:Name>Prater</t:Name>
</rdf:Description>
```

## Translation Example



Value: Geo-coordinates ⇔ Theater ⇔ Silent Space ⇔ Mute

Ontology: WGS84      Places      Places/Theater      CellPhone Profiles

## Conclusions and Outlook

### Conclusions

- To arrive at a GSDI we have to overcome the "Multi-X" problem
- Web Services are a promising way to do so
- Our SEMALON-approach adds location-based service discovery and semantic interoperability

### Outlook

- Performance and Availability
- Reputation systems
- Legal issues