

Towards a Global Spatial Data Infrastructure Using Web Services

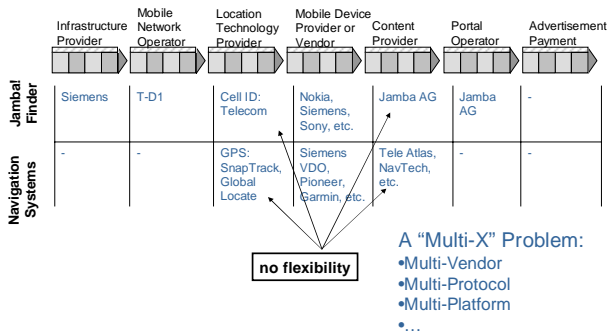
Peter Ibach and Matthias Horbank
Humboldt University Berlin, Germany
Computer Science Department



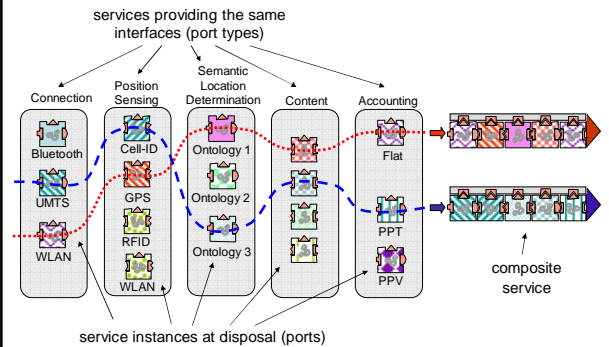
Content

- **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



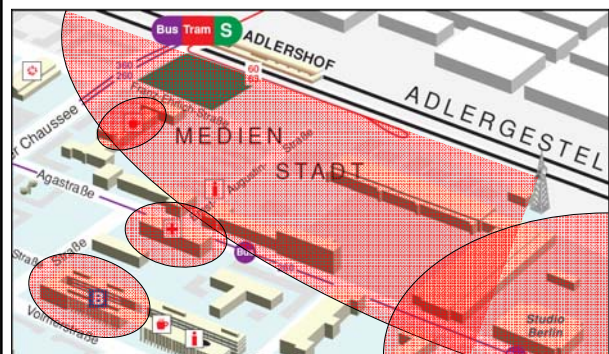
- Location-Based Services for Berlin Adlershof Science and Technology Park (WISTA)
- Cooperation with the Geographic Institute, Humboldt University Berlin and WISTA Management

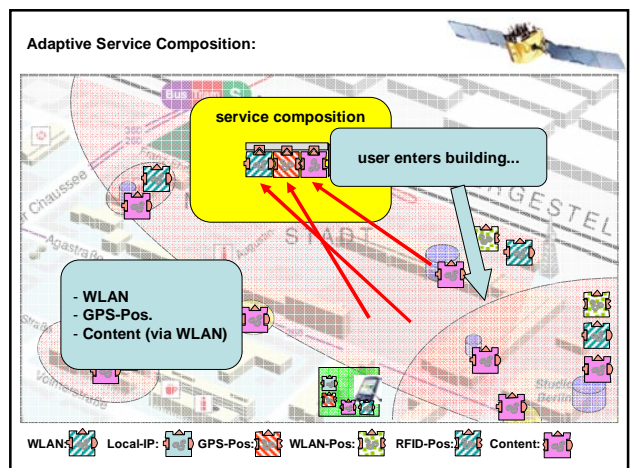
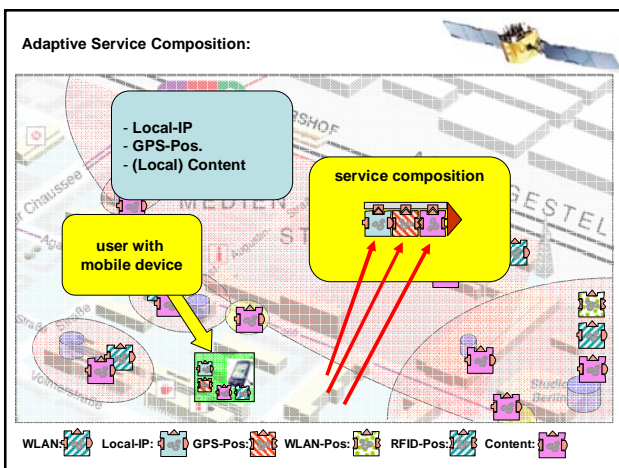
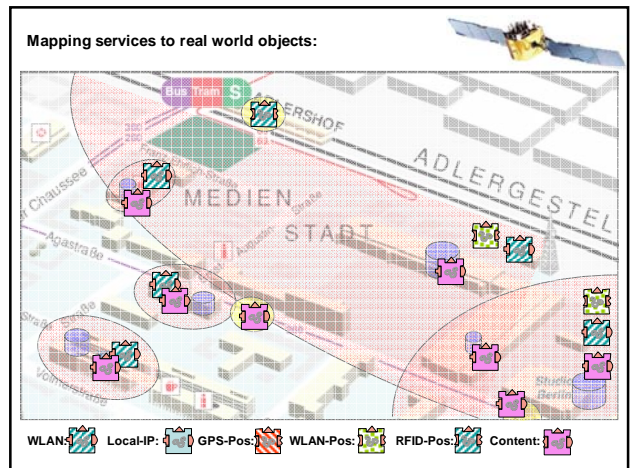
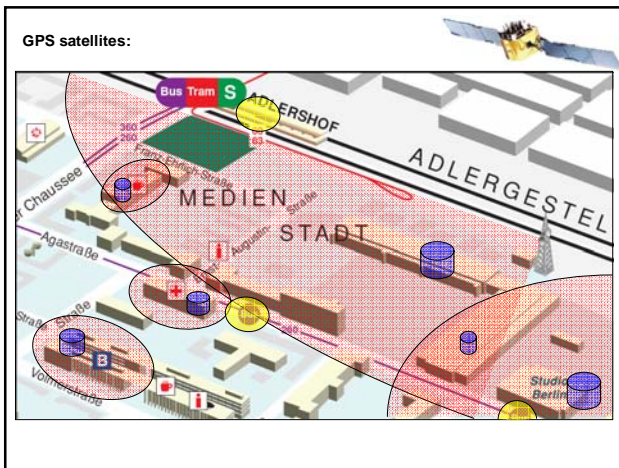
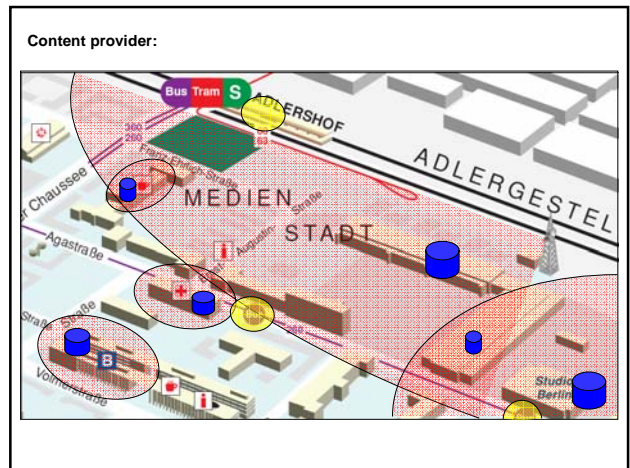
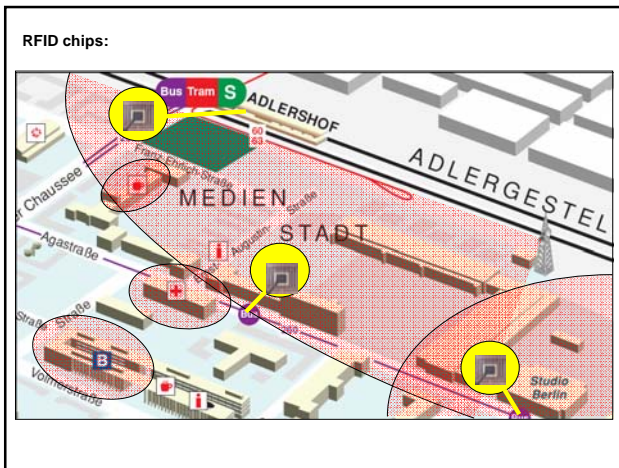


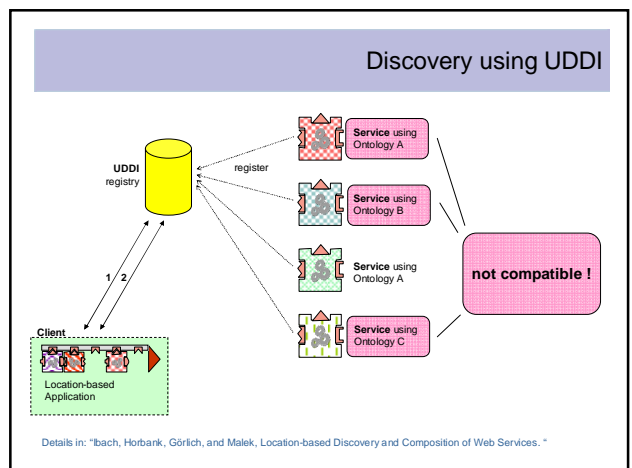
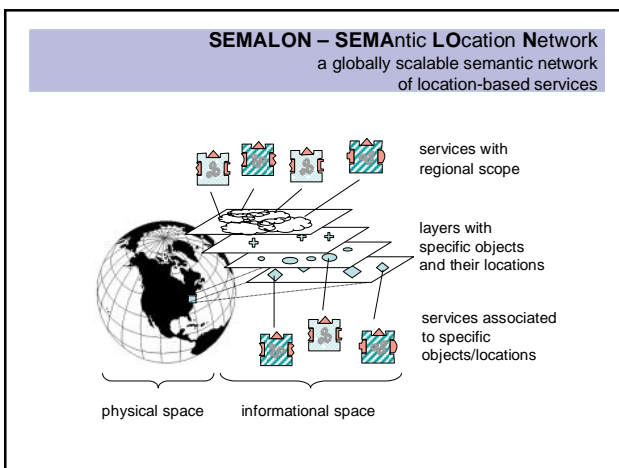
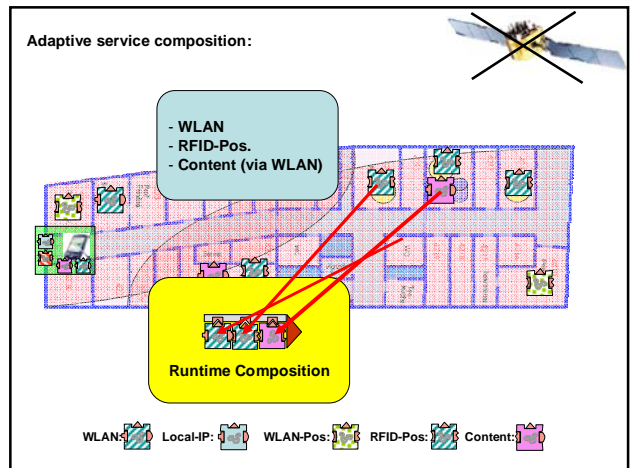
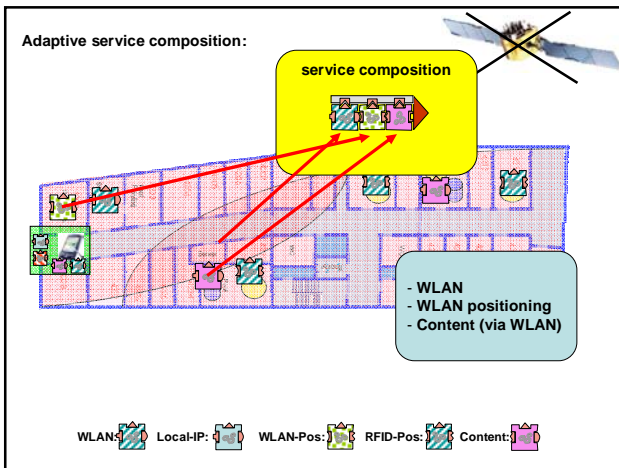
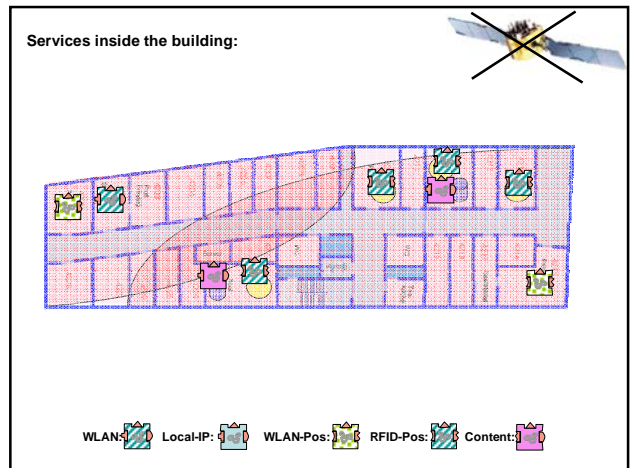
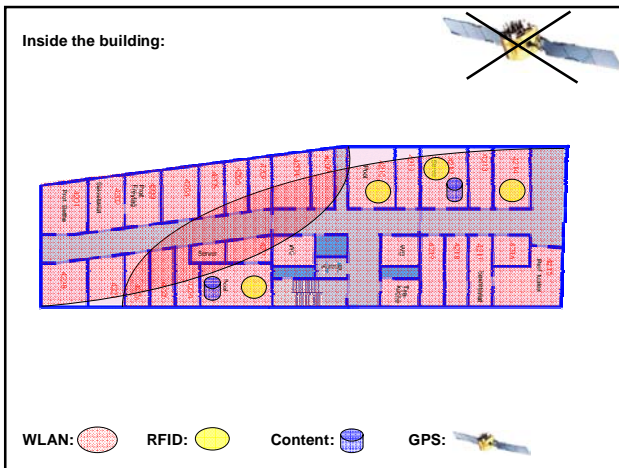
Printer service in room IV.212

Campus Berlin-Adlershof – A Case Study

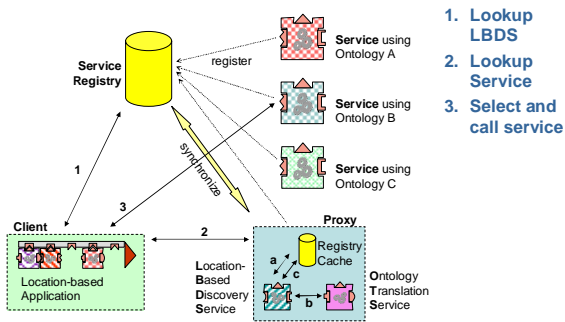
Wireless networks:







Discovery using a Dedicated Service

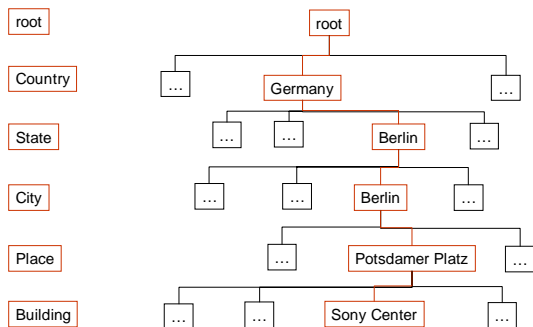


1. **Lookup LBDS**
2. **Lookup Service**
3. **Select and call service**

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 \Rightarrow Theater \Rightarrow Silent Space \Rightarrow 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