Big Data – Managing Location in a Smart City

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Location Information in Smart Cities

Everyone uses and shares Location Data

Where is ... How do I get to ...

Find me the nearest ... When is the bus coming?

I have checked in at ... on Foursquare.

Today I'm at GWF 2014

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Characteristics of Incoming Data

Specific to location information

- Continuous streams of sensor data
 - Large number of sensors, massive amounts of data
 - Location transmitted explicitly GPS, phone network, ...
- Implicit location information
 - Address: Needs to be interpreted
 - Unstructured information: Requires semantic analysis
- Needs to be analyzed for proximity, spatial interaction
- Needs to be evaluated in context
 - Environment, Road network, Public transport routes

Manage incoming location data

Cascading architecture: devices \rightarrow gateways \rightarrow servers





Using Location Data in Context

Smart City needs to provide Geospatial information

- Conventionally using location data on a map
- Two-dimensional data usually not sufficient, need 3D
 - Location within buildings shopping malls, airports, ...
 - Lots of use cases for city modelling (see next slide)
- Value-add through integration with other data
 - spatial or non-spatial information combined in open platform
 - use of standards (ISO, OGC) is prerequisite
- 3D data acquisition is Big Data topic in itself
 - but well-understood and routinely possible



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Example: City of Berlin – 3D City Model Implemented by TU Berlin

berlin

- 550000 buildings, reconstructed from 2D cadastre and LIDAR data
- Textures extracted from oblique aerial photography
- Combined with various data sets
- Based on CityGML standard



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Smart Cities need a Spatial Data Infrastructure Requirements Database functionality such as



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SDIs are ideal for a Cloud Infrastructure



SDI is fundamental part of Smart City Platform City Citizen **Service Empowerment** Collaboration **Social Media** City **Business** Operation **Productivity** Harmonization Entrepreneurs City **Sustainable** Infrastructure City Modernization Sensors ORACLE

SDI is fundamental part of Smart City Platform



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