GEOProcessing 2010 Panel

Digital Society Trends: Geospatial Processing Challenges

Moderator: Bernd Resch, MIT and Research Studios Austria, USA/Austria

Panelists:

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Research Challanges

A “never ending quest” :

- Knowledge from data
  - A lot of data
  - Bad data
  - “Drowned in data, Starving for knowledge”
  - We need better (true) geospatial datamining

Research Challanges

A challange that we should have achieved:

- 4D GIS for the masses:
  - Efficient visualization & interaction
  - True 4D analysis tools

4D: An old concept

- Torsten Hägerstrand, 1969
  - Time Geography, time-space paths
- 4D GIS proposals have been around since the beginning of the 90'
  - Database technologies are "ok".
  - Visualization techniques are available…
    - Not quite "ok"…
    - 2.5D is the norm. Others are clumsy…
    - Any true and usable 4D ?
  - Analysis techniques are available…
    - Not quite "ok" …or are they ?
    - Time and space should NOT be treated as other variables: they have their own particular characteristics

The need exists

- Automobile GPS systems
  - Why 4D ? (or at least time-space)
    - Traffic jams, circulation restrictions, energy consumption concerns, etc
- Maritime navigation systems
  - Meteorological and oceanographic data (tides, storms, shallow channels, etc,,)

That's all
Folks !

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4D GIS – Pervasive Sensing – Linked Data

Future Challenges in GIS

Bernd Resch

14 February 2010

rsa iSPACE

senseable city lab:.::

4D GIS

- How can 4D be brought to the user?
- What are different ways of representing the time dimension instead of time itself?
- New paradigms (approaches, methods, algorithms) necessary in spatio-temporal analysis

Pervasive Sensing

- Bottom-up vs. top-down approach in policy-making
- Central criterion for user adoption: usefulness
- Privacy protection: opt-in/opt-out possibilities

➔ but: adapt our perception to new technologies instead of preventing innovation!

Linked Data

- Why are geo-data often not linked and how can this problem be solved?
- Are dedicated linkages between geo-data sources even necessary or is the implicit location link sufficient?
- Why are other domains obviously far ahead?

Model Web and Linked Data

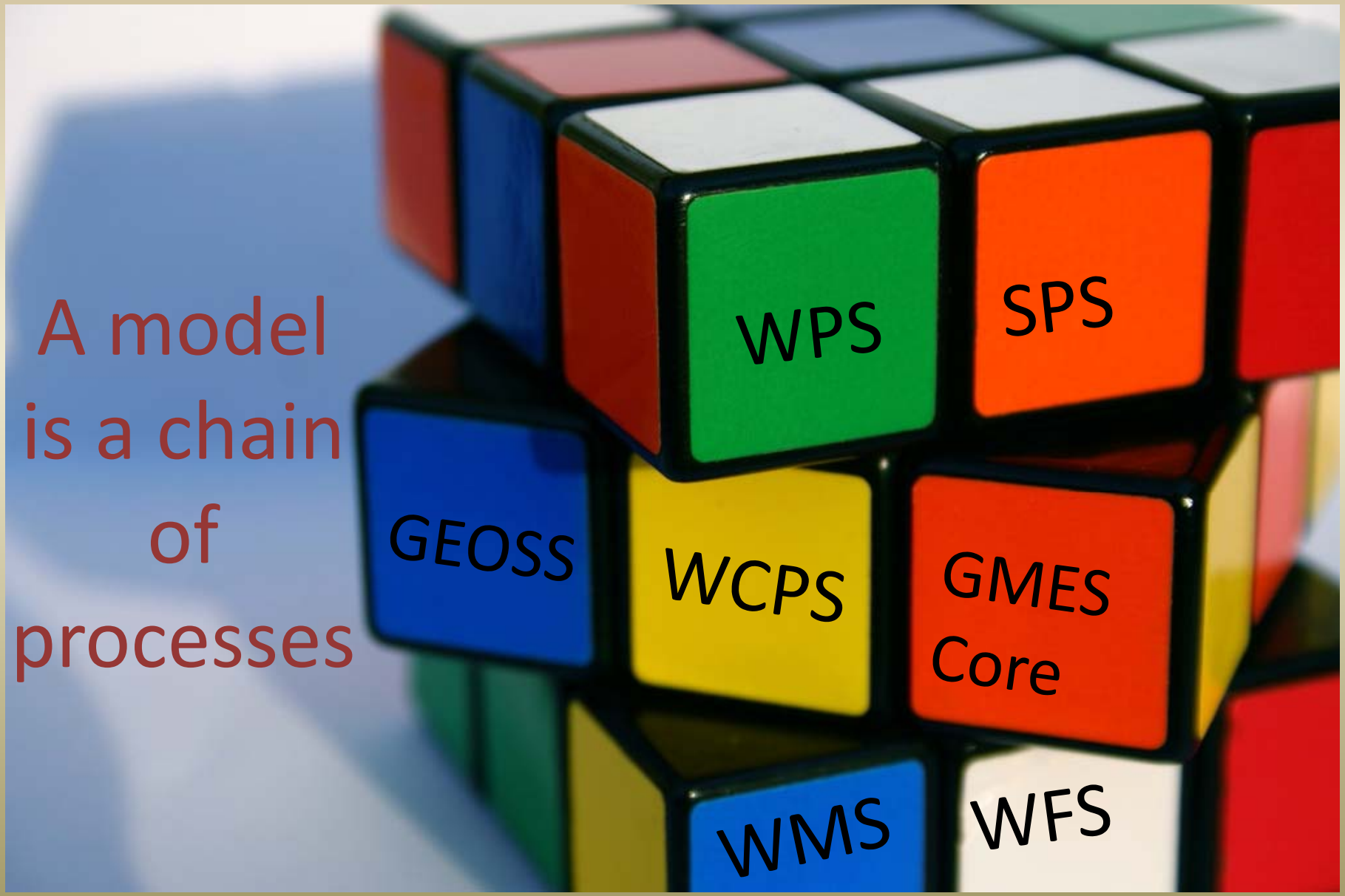
Carlos Granell, UJI, Spain

Panel on Geoprocessing challenges
GEOProcessing 2010 Conference, Feb 2010

Models everywhere

http://www.flickr.com/photos/snowblink/3106049394/

A model is a chain of processes



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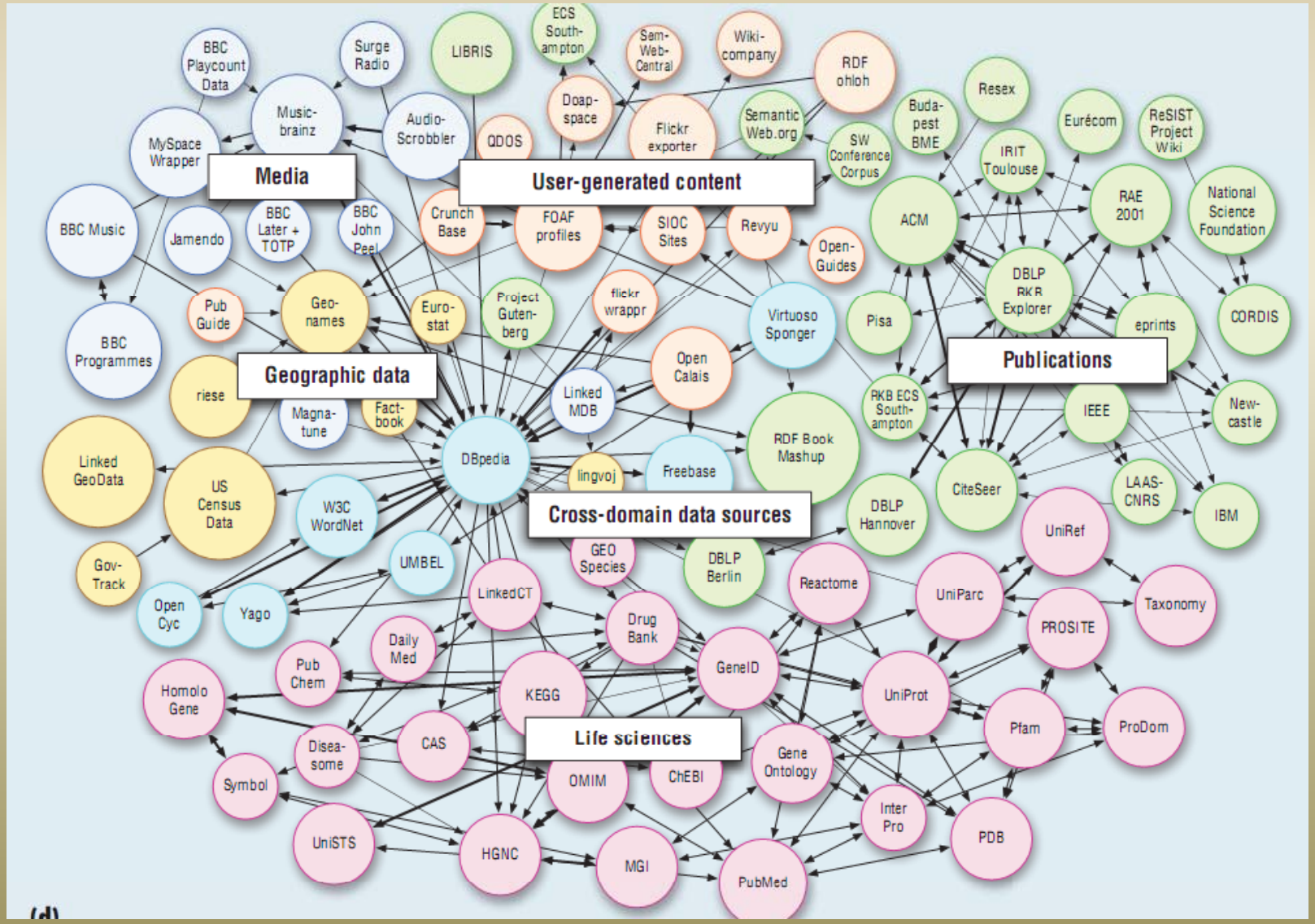
Reduce complexity in Model Web, reusable (common) building blocks?

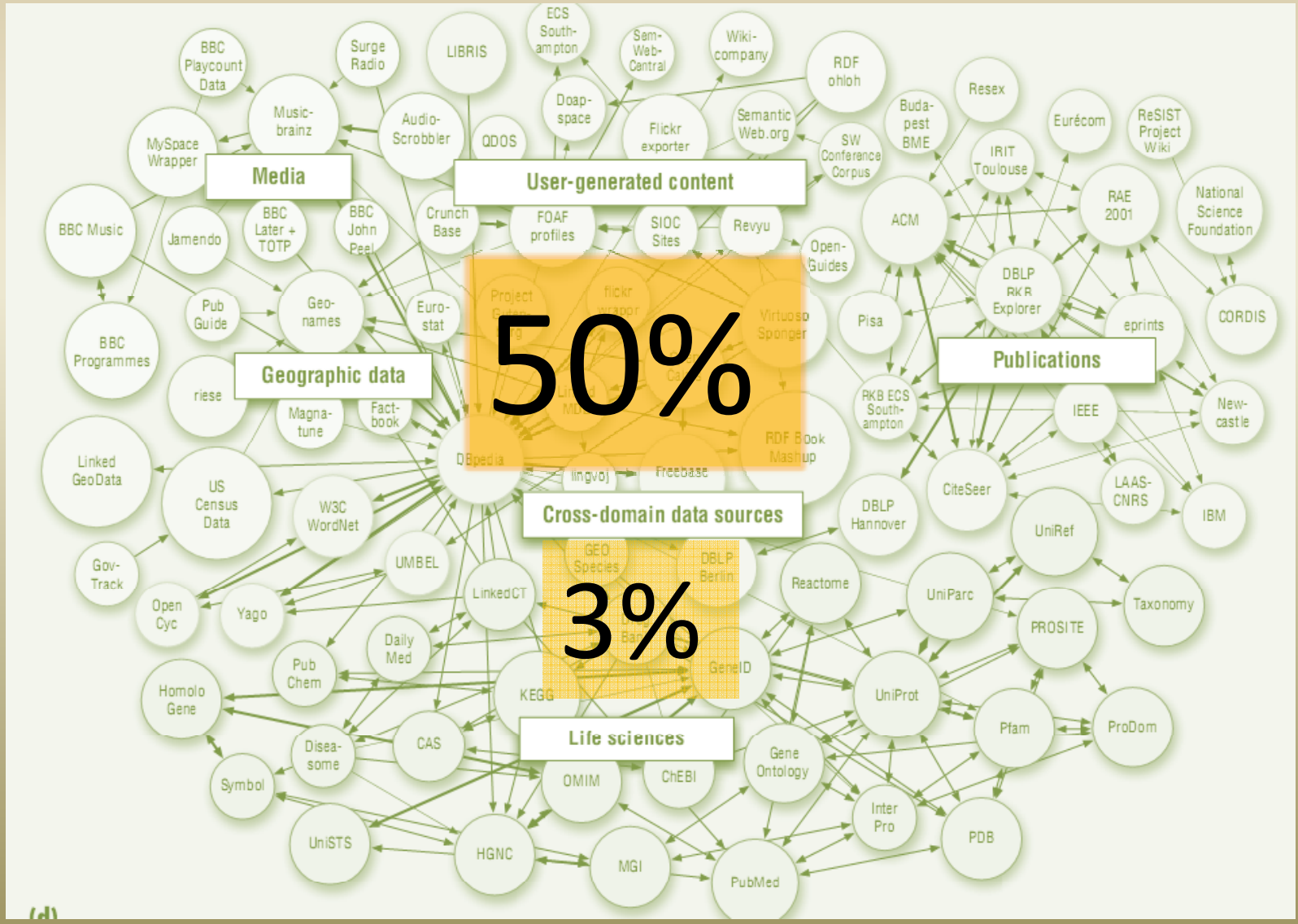
Model Web in Virtual Globes?

Cloud of linked data sources

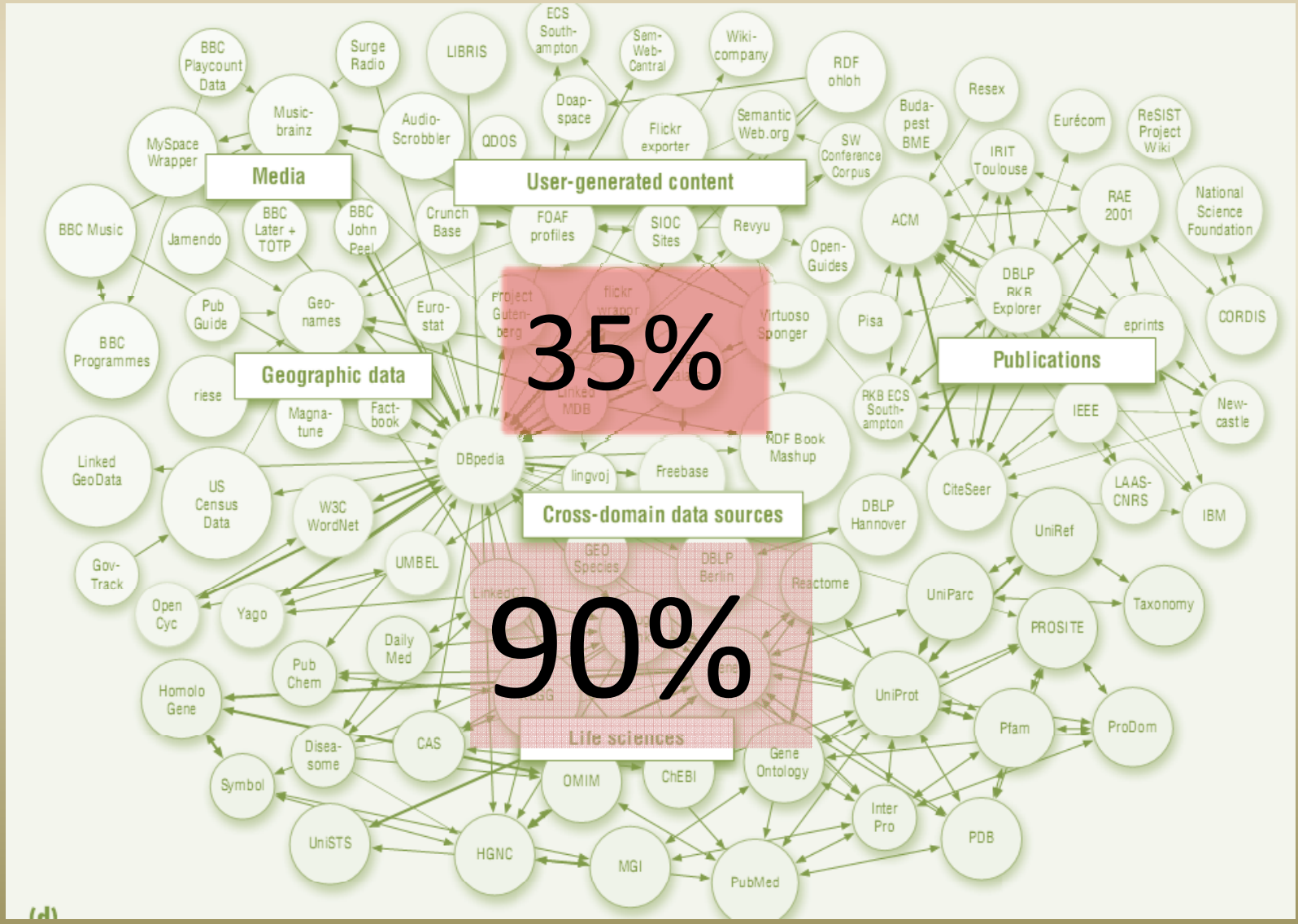


Source: Bizer, C. (2009) The Emerging Web of Linked Data. *IEEE Intelligent Systems* ,24(5): 87-92

Cloud of linked data sources



Cloud of linked data sources



Geoprocessing over

linked data sources?

Geoprocessing over

linked data & SDI sources?

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Pervasive Sensing

A Multi-dimensional Challenge in the Stress Field Technology – Innovation – Society

Bernd Resch

14 February 2010

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senseable city lab:.::

Pervasive Sensing ::: Vision

- "In the next century, **planet earth will don an electronic skin**. It will use the Internet as a scaffold to support and transmit its sensations. [...] It consists of millions of **embedded electronic measuring devices**: thermostats, pressure gauges, pollution detectors, cameras, microphones, glucose sensors, EKGs, electroencephalographs. These will probe and **monitor cities** and endangered species, the atmosphere, our ships, highways and fleets of trucks, our conversations, our bodies – even our dreams."

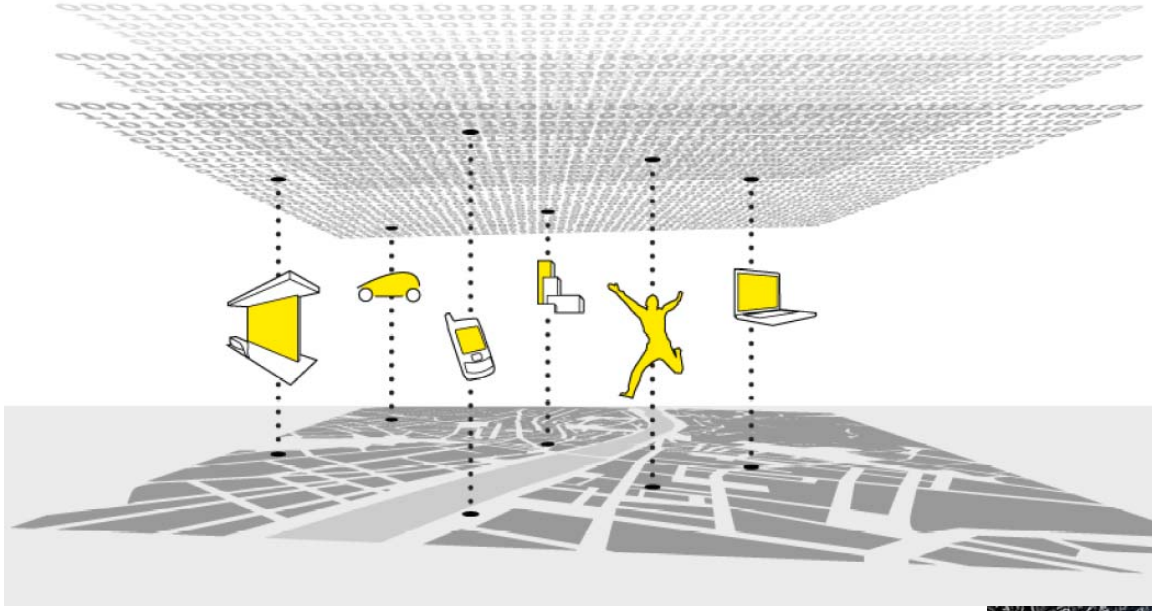
(Neil Gross, 1999)

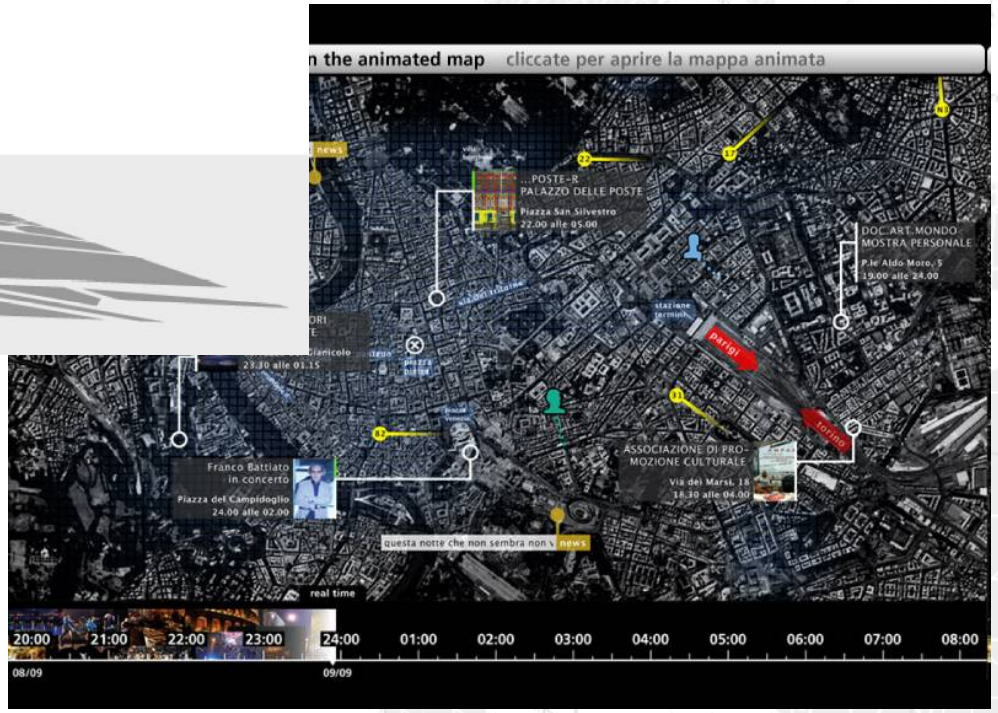
Pervasive Sensing ::: Motivation

- Ubiquitous monitoring is a critical process:
  - Ensure public safety
  - Set up continuous information services
  - Provide input for spatial decision support systems

➔ Shift development away from proprietary single-purpose implementations towards interoperable analysis systems

Pervasive Sensing ::: Motivation



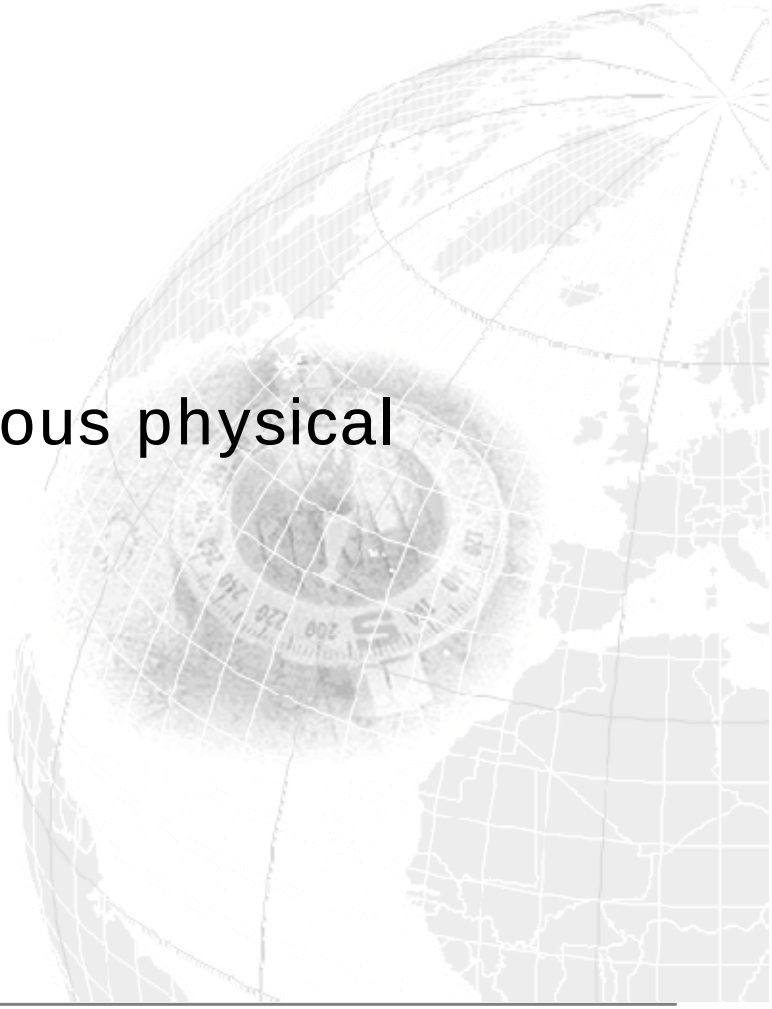


Pervasive Sensing ::: Essential Questions

- What are particular challenges of pervasive sensing and monitoring?
- Which implications does “pervasive urban monitoring” contain for the individual?
- What societal, technological and perceptual impacts do pervasive monitoring infrastructures have our environment?

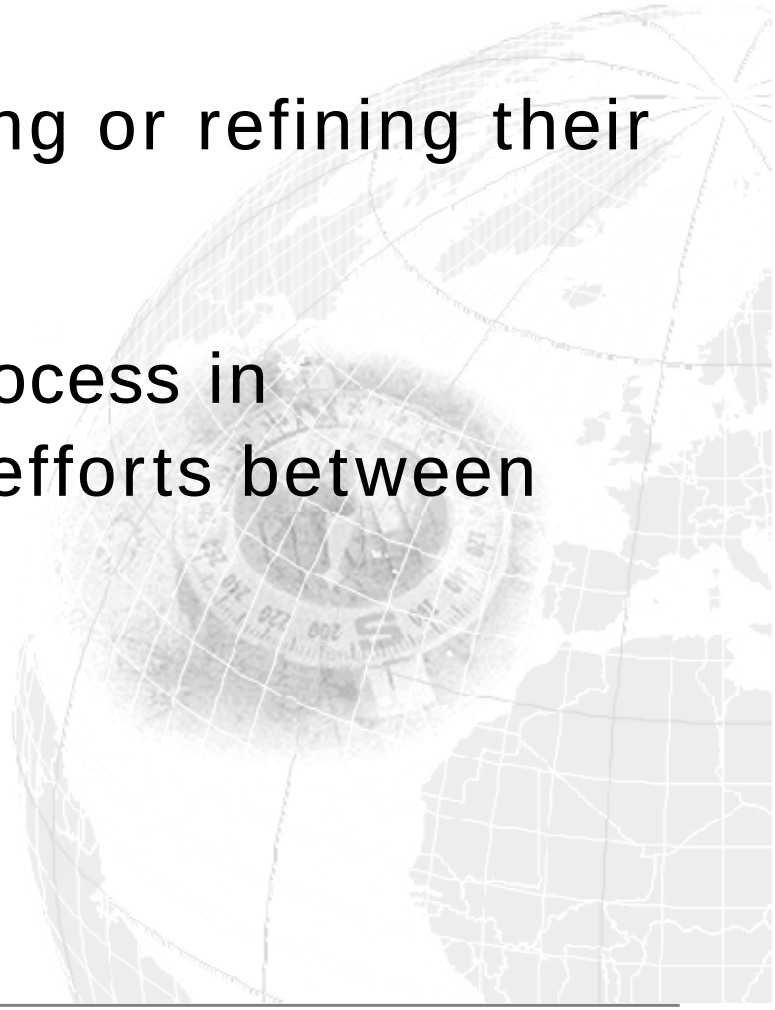
Particular Challenges of Pervasive Sensing

- Conceptual
  - Various stakeholders
  - Large variations within continuous physical phenomena
  - Direct impact on people
- Technical



Effects on the Social/Urban Environment

- Support professionals in building or refining their models of urban dynamics
- Trigger profound rethinking process in collaboration and cooperation efforts between different authorities



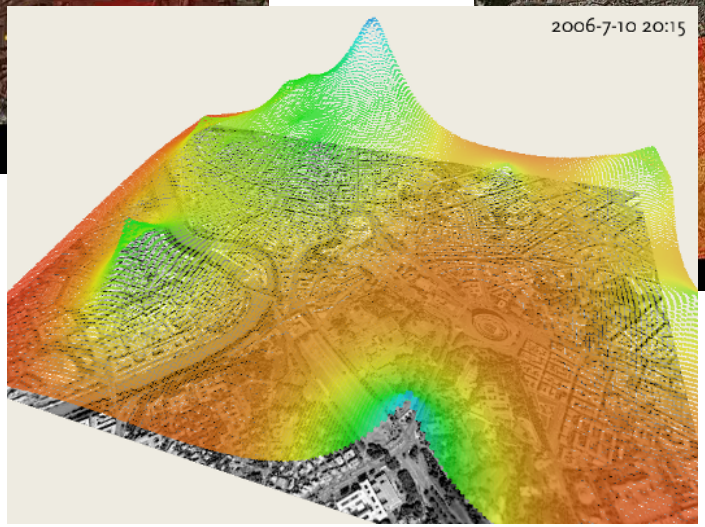
Effects on the Social/Urban Environment

- Feed back “sensed” data can change people’s behaviour
- Empower everyday citizens to monitor the environment with sensor-enabled mobile devices
- People-centric view of measuring, sharing, and discussing urban environments might increase agencies’ and decision makers’ understanding of a community’s claims

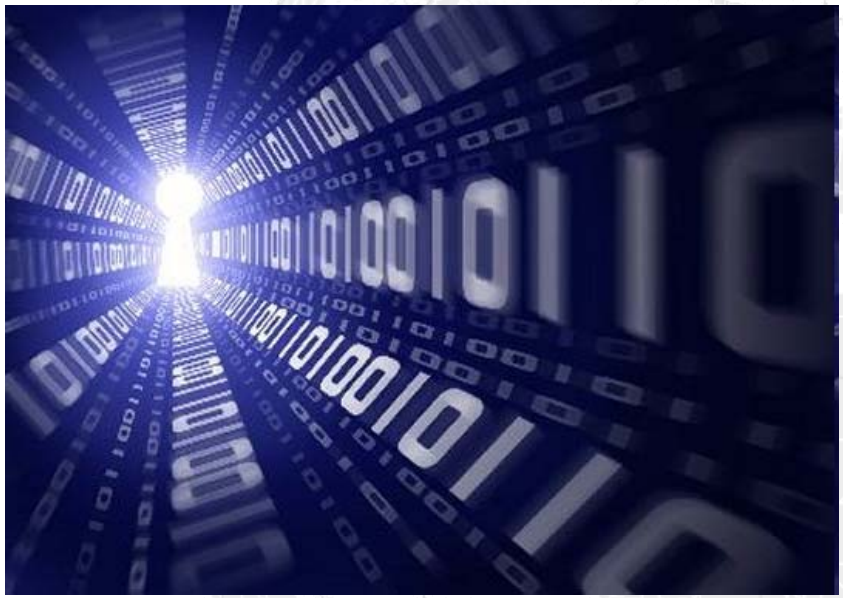
Effects on the Social/Urban Environment

- Issues:
  - Sensor data are just surrogates for other, more direct impacts on humans
  - Privacy, data ownership, accessibility and integrity
  - Sampling density, standardisation, quality control, power control, officiality of data, and update frequency

Effects on the Social/Urban Environment



Conclusion

- Address the discussion in a constructive way and bring the technology to the people!
- Promote the user appropriation of the information through awareness of limitations

➔ **usefulness is the key**