Next generation urban data infrastructures

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From Urban Data Infrastructures...

- Urban Data Management has been a topic of research and practice for over 40 years.
- Much progress with the diffusion of GIS in the 1990s and then of Spatial data Infrastructures in the 2000s.
- Most of the emphasis on sharing data across public administration siloes.

....to Smart Cities and Regions

- But as cities become more complex we need to move beyond sharing data to sharing understanding of the problems, trade-offs, and choices i.e. a new model of governance.
- Smart Cities encompass this notion of ICT-enabled interactions between physical, social, and knowledge capital
- They address issues of optimizing limited resources to improve efficiency of key urban infrastructures: water, sanitation, transport, energy, ICT.

Using the metaphor of car….

From understanding there is a problem when the steams comes out of the radiator..

The first "indicators" built directly in the part of interest

More complex indicators but not interoperable

Modern indicators: just the essential + alerts

Today's cars more and more as sensor platforms

Back

Tags +

Related content

· Insurance Telematics Europe 2013

· From the orchard to the table with M2M

Sensor platforms at 300 kilometers per hour

Thursday, 14 March 2013

Today's F1 cars

- 18000 data channels
- 2 Gb per lap
- 8000 simulations, updated every 2 seconds
- Reverse-engineering of communications in other teams to understand the status of the competitors' cars

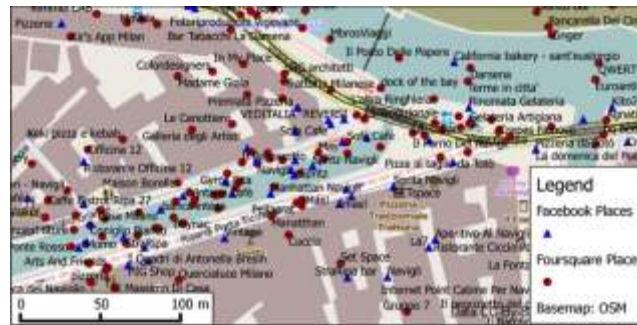**The Urban Data Infrastructures of the future ....**
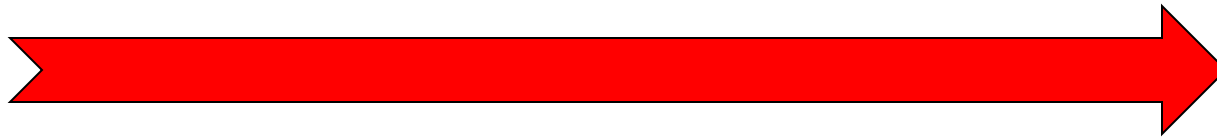
+ data + sensors + analytics + more participation and open innovation
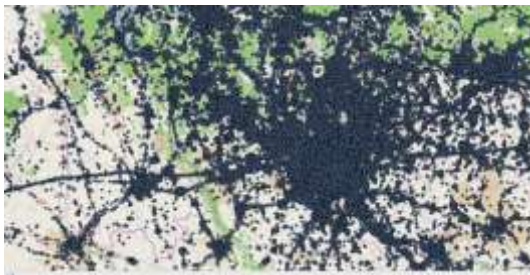
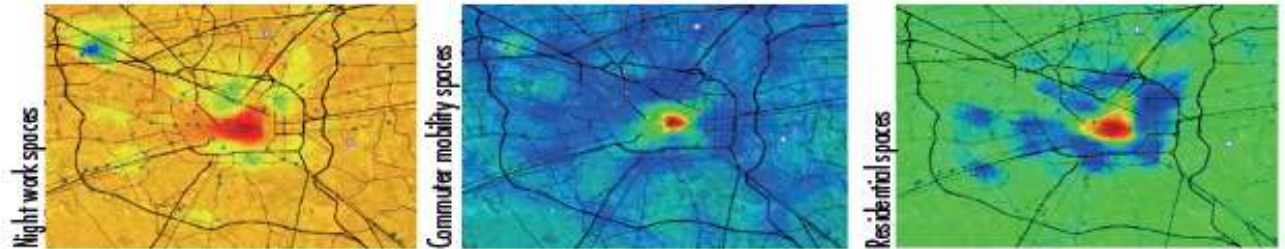# Integrating data sources

Milan by Copernicus
Source: ESA

Milan by FourSquare & Facebook
Source: S. Spyratos, 2015

Turin air quality
Source: EveryAware

Milan by Twitter
Source: Capineri & Romano, 2015

Milan by Mobile Phone
Source: Paola Pucci 2014

Urban Dashboards

http://citydashboard.org/london/

http://www.dublindashboard.ie

Key issue 1: interoperability

- Interoperability as a key "smartifier" to connect networks
- European Directive 2007/2/EC establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) is a key asset to increase interoperability of public administrations in Europe and foster Digital Single Market
- Copernicus data to follow INSPIRE. Now working on specs for in-situ/mobile sensors.
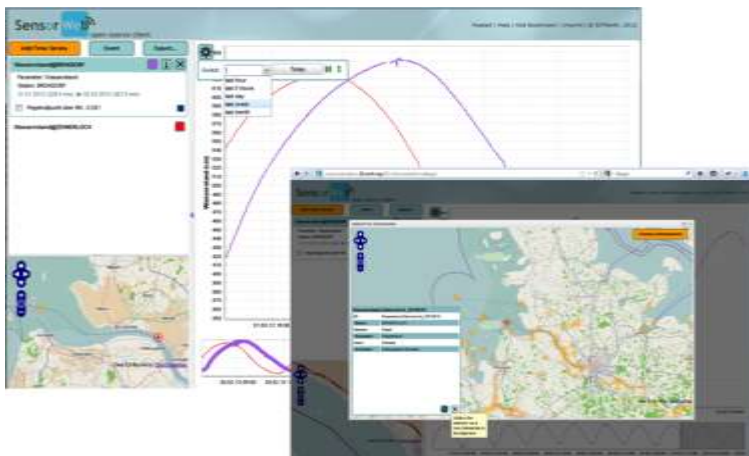
Annex I
1. Coordinate reference systems
2. Geographical grid systems
3. Geographical names
4. Administrative units
5. Addresses
6. Cadastral parcels
7. Transport networks
8. Hydrography
9. Protected sites

Annex II
1. Elevation
2. Land cover
3. Ortho-imagery
4. Geology

Annex III
1. Statistical units
2. Buildings
3. Soil
4. Land use
5. Human health and safety
6. Utility and governmental services
7. Environmental monitoring facilities
8. Production and industrial facilities
9. Agricultural and aquaculture facilities
10. Population distribution – demography
11. Area management/restriction/regulation zones & reporting units
12. Natural risk zones
13. Atmospheric conditions
14. Meteorological geographical features
15. Oceanographic geographical features
16. Sea regions
17. Bio-geographical regions
18. Habitats and biotopes
19. Species distribution
20. Energy Resources
21. Mineral resources

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Key issue 2: cyber-security

- Limited hardware complexity of IoT sensors inhibits security by design.
- One track is to secure clouds of sensors (e.g. http://openinterconnect.org/)
- Cooperation with industry needed to develop agreed standards.
- EC initiated Alliance for IoT Innovation (AIOTI) in 2015 to promote such dialogue
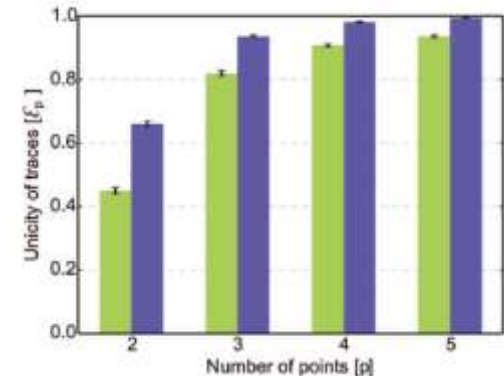

Source: http://www.theinternetofthings.eu

Key issue 3: the loss of privacy

12 data points to uniquely identify a fingerprint

- Only 4 data points needed to uniquely identify an individual 90-95% of the times using mobile phone or credit card data
- Need to rethink concepts of privacy and how to empower control of digital rights by users


unicity

$$\mathcal{E} \sim (v * h)^{-p/100}$$

Number of points

Spatial resolution

Temporal resolution

Source: de Montjoye, Y. A., Hidalgo, C. A., Verleysen, M., & Blondel, V. D. (2013). Unique in the Crowd: The privacy bounds of human mobility. Nature SRep, 3.
de Montjoye Y.-A., Radaelli L., Singh V. K., Pentland A. S., Unique in the shopping mall: On the reidentifiability of credit card metadata. Science (2015).

Key issue 4: data democracy

- Serious debate needed about privacy as human right or just consumer preference
- Increasing shift in data collecting and knowledge about society from public to private sector
- Need to engage private sector in a transparent dialogue on how to have open access to non-confidential data useful for public policy (e.g. population distribution)
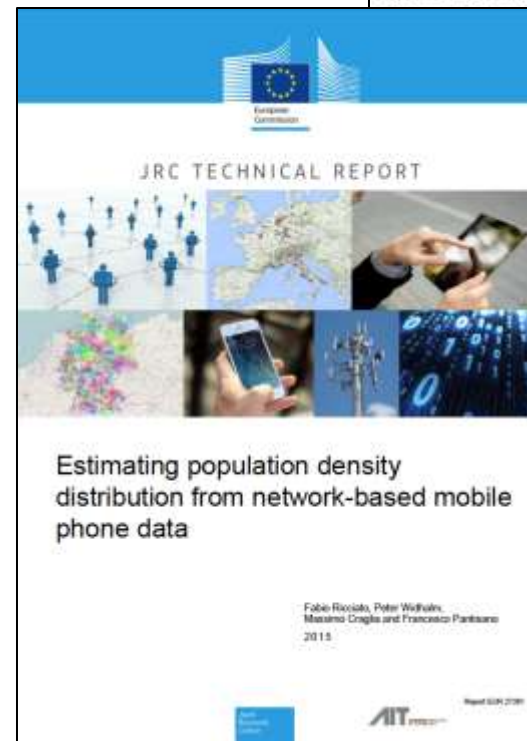
Key issue 5: institutional capacity and governance

- IoT, mobile apps, ubiquitous Internet access provide major opportunities for efficient and accountable urban management and more participatory approaches
- The pace of technological development is far outpacing the capacity of institutions at all levels to adapt and meet the expectations. Risk of technology lock-in.
- Cultural and organizational challenges and new skills needed to make the most of the opportunities and limit the risks.
- City governments as Open Innovation laboratories.

Source: Telecentre.org Foundation

Thank you for your kind attention

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