Smart City applications of growing importance

- Experiences from SmartSantander and FI PPP OUTSMART

Benchmark frameworks for IoT deployments in Smarter Cities

- Ongoing work of the PROBE-IT project
On the quest for the Smart City killer app

Top 50 IoT applications for a smarter world

1. Smart parking
2. Structural health
3. Noise urban maps
4. Traffic congestion
5. Smart lightening
6. Waste management
7. Intelligent transportation

Source: http://www.libelium.com/top_50_iot_sensor_applications_ranking
SmartSantander

- **FIRE research facility for IoT technologies and services in the context of a smart city**
  - Outdoor deployments in city and moving vehicles and indoor deployments in buildings

- **Services**
  - Smart parking
  - Smart irrigation
  - Participatory sensing
  - Smart tourism (PoI information with AR)
  - Smart fleet and transport management
  - Smart environmental monitoring (noise, pollution)
  - Smart metering
OUTSMART

Birmingham
TravelSmarter - incentive-based multi-modal travel planner for sustainable travel

Berlin
Intelligent Public Waste Basket
Intelligent Subsurface Container

Santander
City Light Map
Automatic Adaptability of Street Light Intensity

Aarhus
Open Data: Education and Operators
Open Data: Utility Work Sites

Trento
Active Leak Detection Service for Water Distribution

U&E Domain
Outsmart pilots

Open Data: Education, Operators, Utility Work Sites

- Sewage and rain data for educational purposes system
- Water utilities to use data to run diagnostics on equipment
- Utility work that will affect traffic patterns will be mapped in real-time to help avoid transportation delays.

Active Leak Detection Service

- Night monitoring of water supply for improved leak detection ability.
- Small rollout in Povo, IT
- Data integration and sensing automation
- Automated report generation to water utilities.

TravelSmarter

- Focus on Pershore Road corridor in Birmingham
- Users will be given mobile phones with OUTSMART app installed.
- PoC will focus on walking, cycling, bus and metro. Integrated calorie and CO₂ calculators
Intelligent Public Waste and Subsurface Container Monitoring

• Fill level detection and communication with passing refuse collection vehicles will be showcased
• Real-time mapping of bins and efficient route planning will be used
• Defective wastebaskets can be immediately identified and deficiencies can be repaired automatically

City Light Map and Automatic Adaptability of Street Light Intensity

• Light level sensors deployed all over the city of Santander and will show the current status of city illumination.
• Can detect lighting failures or over-lit/under-lit areas.
• Automatic adaptability of street light depending on density of traffic and on environmental conditions.
DEVELOPING A BENCHMARKING FRAMEWORK FOR IOT DEPLOYMENTS
Benchmarking framework

- A decision making tool based on comparison
  - To produce a judgment (black-box) (normative)
  - To identify the good practices, related to the implementation (instrumental)
  - To learn from the other deployments (cognitive)
  - To stimulate positive competition and co-operation (motivational)
Existing ICT benchmarking frameworks

- **ITU - Measuring the information society**
  - ICT development index (IDI)
  - ICT price basket

- **i2010 benchmarking framework for the developments in the information society**
  - Indicators for ICT sector
  - Broadband and connectivity
  - ICT usage by households and individuals
  - ICT usage by enterprises
  - E-public services
Who is interested in benchmarking IoT deployments?

- **Policy makers**
  - Comparison to one another in terms of impacts?
  - Appreciation by citizen/users?
  - Comparison in terms of governance?
  - Data privacy and security?

- **Technology developers / Service business / operators**
  - Comparison in terms of interoperability?
  - Scalability?
  - Ease of deployment?
  - Best options to deploy new services (efficient use of available data)?
  - Comparison regarding maintenance and operation efforts?

- **Deployment drivers / sponsors**
  - Comparison to achieve given functionalities / Fill the ToR?
  - Comparison in terms of RoI?
  - Comparison regarding business models?
  - Best options for future proof deployments?

- **Users**
  - Comparison in terms of data privacy and security protection?
  - Available services in other places?
  - Comparison in terms of effectiveness regarding service?
## Benchmarking dimensions

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<tr>
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<th>Policy makers</th>
<th>Deployment Drivers/sponsors</th>
<th>Technology developers</th>
<th>Users</th>
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<tbody>
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<td><strong>Economy and finance</strong></td>
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<td><strong>Data protection</strong></td>
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6/12/2012
Initial roadmap

Define set of indicators and tools to capture information for IoT deployment benchmark

- Analysing existing benchmark frameworks
- Capture/derive a set of useful indicators through interview and analysis of selected stakeholders
- Validate initial indicator set with a broader set of stakeholders
- Survey and ad-hoc studies for capturing qualitative information to capture best practices

Test initial benchmarking framework

- Apply initial framework to 10 cities
Getting involved

✓ Benchmarking IoT deployments session
✓ June 20\textsuperscript{th} - 16.00-19.00
✓ IoT week @ Venice, Italy
✓ www.probe-it.eu