



From Wireless Sensor Networks to Internet of Things and Future Internet

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What shall I talk about...

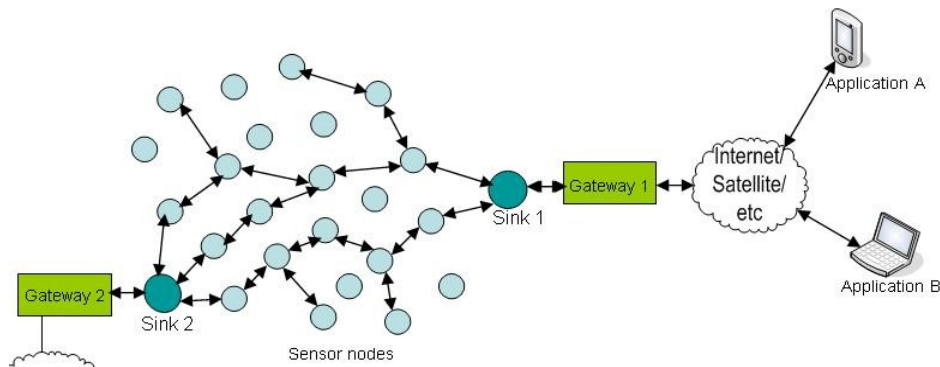
- › Wireless sensor networks
- › FP7 PROSENSE
- › Internet of Things and Future Internet



Wireless sensor networks

What are WSNs?

- › A number of small devices, each with
 - A micro controller
 - A wireless interface
 - One or more sensors and/or actuators
- › Collaboratively monitoring an area or executing a task
- › Interact with “others” via a gateway



How the researcher envisioned it

- › Hundreds or thousands of tiny nodes in a network
- › Self-organize, work for years
- › Execute one task for one user
- › Interact with the rest of the world via sink nodes/gateways
- › Network path between a sensor network and the end users considered as a data pipe

Typical WSN applications

- › Security and Military
 - Alarms, security, surveillance, biological and chemical attack detection, etc.
- › Environment
 - Forest fire detection, habitat monitoring, intelligent agriculture, air quality,...
 - Smart infrastructure (bridges, buildings)
- › Industrial Control and Monitoring
 - Process, plant, equipment monitoring, control of actuators
 - Asset tracking and management
- › Health and wellness
 - Home/elderly care, Ambient Assisted Living, chronic disorders
 - Personal health monitoring
 - Fitness companions and athletic performance
- › Home automation and consumer electronics

Typical research problems

- › Routing (energy efficient)
- › Clustering
- › Self-organization
- › Energy scavenging
- › Task definition and data aggregation



FP7 PROSENSE

PROSENSE

- › Support action project focused on Western Balkan area
- › March 2008 – August 2010
- › Budget 900kEUR
- › Partners
 - Ericsson Ireland
 - FEEIT Macedonia
 - INRIA France
 - Univ. of Birmingham
 - Warsaw University of Technology
 - ETF Serbia
 - Insitute Jozef Stefan Slovenia

Objectives

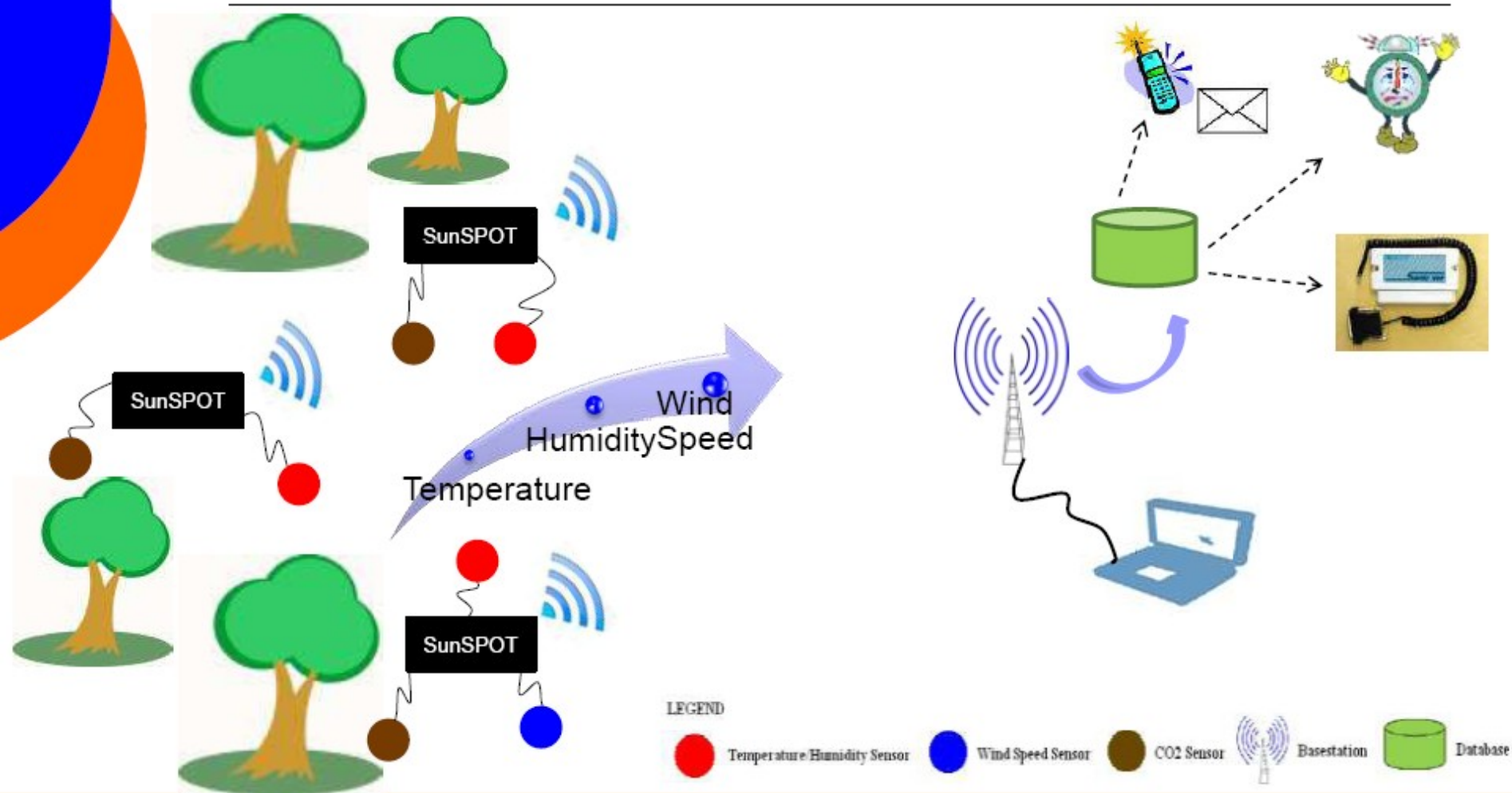
- › Set up WSN research labs in Skopje and Belgrade
- › Build up competence of researchers in WBC
- › Provide opportunities for mobility of researchers
- › Provide opportunities for networking with a wider research community
- › Raise public and research awareness in WBC regarding WSN

Some of the achievements

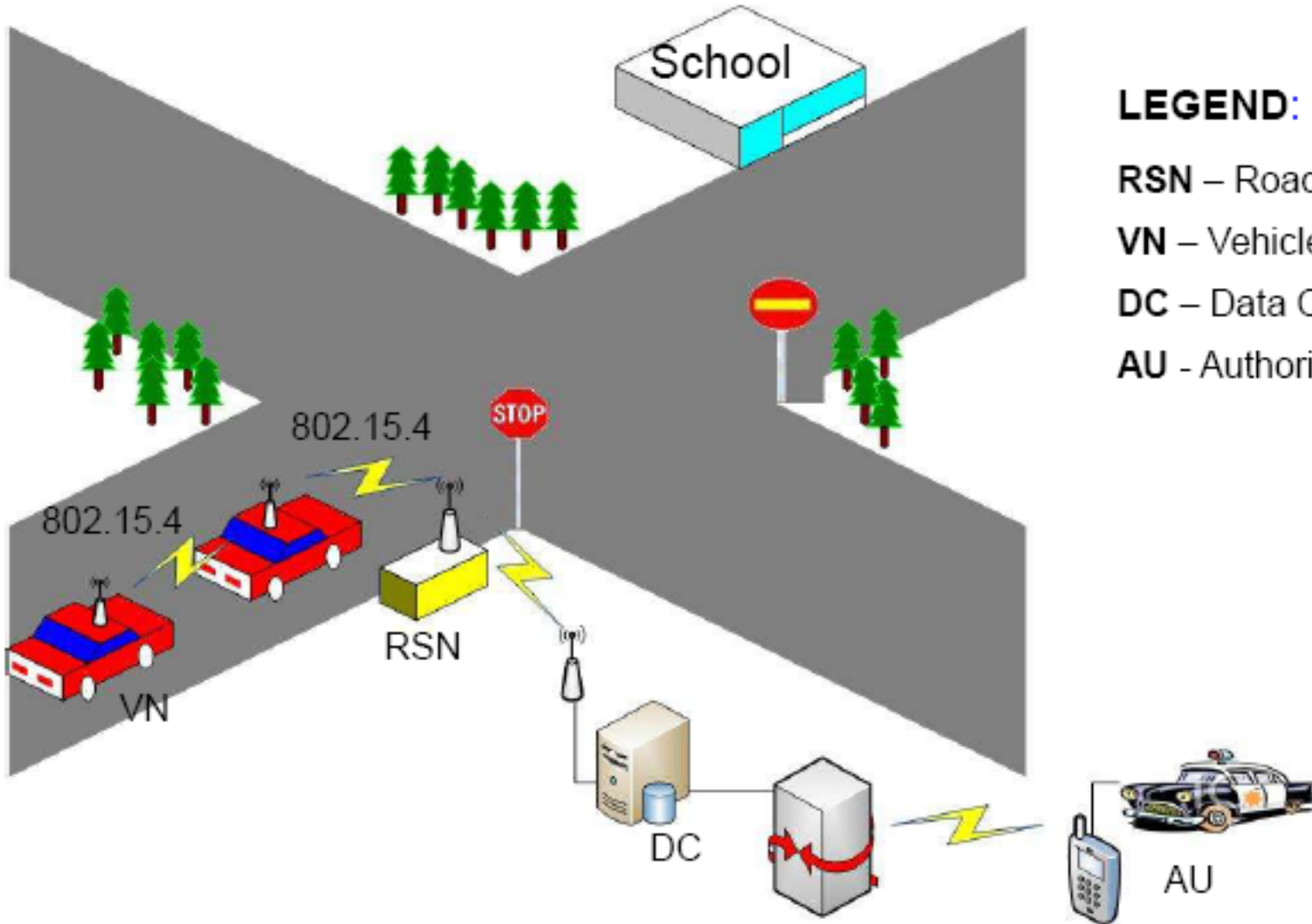
- › 4 workshops held (Dublin, Santorini, Belgrade, Ohrid)
- › 2 summer schools (Ljubljana, Ohrid)
- › 5 special sessions
 - DCOSS08 Greece, Telfor08 and 09 Serbia, KSTiT'09 Poland, WONS'10 Slovenia
- › 3 seminars
 - PhD seminar PhD-NOW at Ad HOC – NOW 08
 - 2 in Ljubljana
- › A book prepared and accepted for publishing by Springer
- › New research equipment



Description and scenario system structure



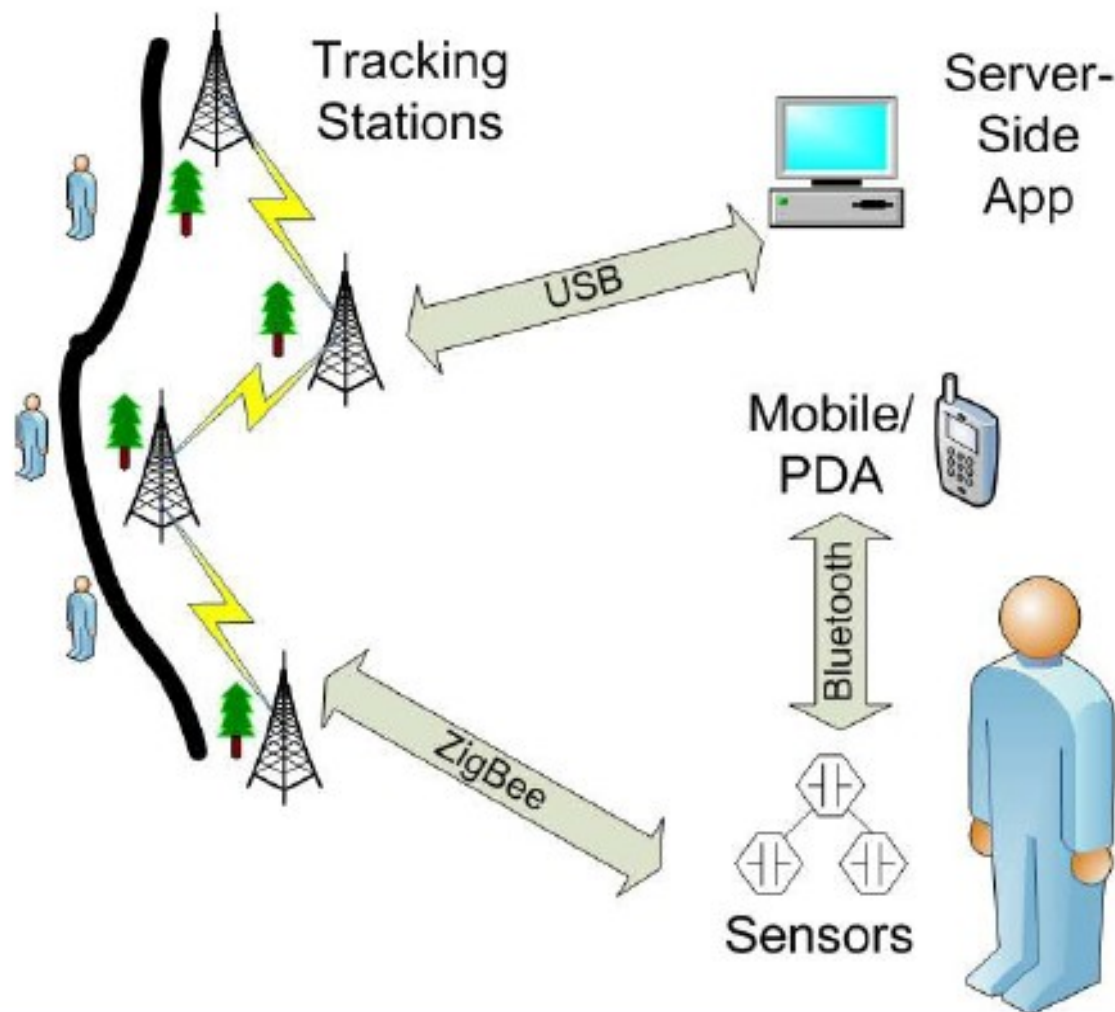
Smart Road Monitoring





Orig. SRT scenario - Block diag.

- Runners with sensors
- Tracking stations
- Mobile phones
- Supervisor comp.
- **Zigbee and Bluetooth**



Waste management





Towards Internet of Things

Vision: 50 billion connections by 2020

- **Approx. 10 machines surrounding each human being**
“Internet of Things — An action plan for Europe” (June 2009). *European Commission*
- **50b is the accumulated number of shipped microprocessors by 2020**
M2M internal analysis (June 2009). *BNET*
- **Approx. 100 connected devices in 500m families**
M2M internal analysis (June 2009). *BNET*

BMUM Jul 09

EVERYTHING WILL be connected

Drivers

- Entertainment, security, health
- Productivity, new revenues
- Sustainability, regulation

Connected consumer electronics



Intelligent transport, industry and society, smart utilities



INTELLIGENT
TRANSPORT
DRIVES
SUSTAINABLE
GROWTH

SECURE CHANNELS
CONNECTED
SOCIETY

SMART GRIDS
POWER
SMART CHOICES

PHONE LINES
LIFE LINES

END-TO-ENDLESS
TELEVISION

- Broadband ubiquity
- Declining cost of connectivity

Enablers

**1/4 of your customers
are willing to spend \$29 - \$46
to connect additional portable devices**

Source: Ericsson Consumer Lab, 2010

Connect my things



Internet of things

- › Everything on Internet
- › Everybody on Internet

- › Technology to
 - Blend and interconnect individual smart devices
 - Enable access to information about the real world
 - Interact and influence the real world

Smart city Scenario (www.sensei-project.eu)



Story

Technology

Society

Business



Multimodal Traveller

Worker in a Plant

Smart Places

Crisis Management

Scene : 1 2 3



They receive live information from the road authority about the state of the roads including traffic jams, accidents and weather. The car transmits information to the road authority regarding speed, distance travelled, use of windscreen wipers, etc.



Instead of conclusion



Internet of Things

One of the key drivers of FI

Plethora of potential applications

Opportunity for new business endeavors



Join us at our next events

RFID workshop

Summer school: www.senzations.net

August 28 – September 3, 2010 Rijeka



ERICSSON