Applying integrated sensor networks in public distribution systems

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Introduction

• Experiences from the EU FP7 Project ProSense:
  – ProSense Common Gateway
    • Integration of various WSN
    • Collecting of sensor data
    • Searching sensor data using temporal, spatial, and semantic queries
    • Providing subscribing and alerting services on sensor data
    • Visualization of sensor locations using web technologies
The ProSense Common Gateway - Interface

- Web Interface – GWT (Google Web Technology) is used
- Could be accessed from small devices (mobile phones, handheld) remotely
The ProSense Common Gateway – General Principle

• Sensor measurement on sensor node
• Notifying the PCG server with observed data
• Applying some processing or calculations on received data
• Checking for alerts, or subscription of sensor data
• Sending notifications to users
The Application: Monitoring and control of the public distribution system

• Creating the tool for enabling an easy monitoring and control to operators of the public distribution systems

• Visualization of sensor locations using popular maps (GoogleMaps or custom maps), real-time monitoring of measured data, alerts, interoperability with sensor data (using open standards)

• Access to the system not only from the control room

• Examples of the public distribution systems:
  – District heating systems
  – Water distribution systems
The District heating systems: Available Software Systems

- Termis by 7-Technologies, Denmark
- Termis by EL-TEC, Slovenia
- Web enabled solutions (typical SCADA solutions)
  - DAQ Connect
  - WebSCADA
  - BroadWin WebAccess
  - SCADA Node
The district heating systems: Our approach

• Market target: Inexpensive solution for small to medium distribution systems
• Solution based on open standards and software
  – JBoss application server, PostgreSQL or any other SQL-enabled database
• Web enabled
  – GWT is used for web interface
  – Comet technology is used for real-time user notifications
  – Thin clients are enabled by Android platform
• Scripting languages (Ruby, Groovy) are used for specialized functions
Main software functionalities

- Modeling of network topology using custom maps or Google Map
- Real-time operator & expert working mode
- Technician working mode using thin client
- Control of the system is enabled only from intranet, monitoring is enabled remotely because of security
- Management of alerts (definition and notifications)
- Interoperability with sensor data
- Advanced functions:
  - Analyzing of measured data using data mining algorithms
The pilot project: The district heating system of Lazarevac town

- Currently serves 4000 habitants
- Optical network is used for communication
Other applications

- Monitoring and control system for building energy management, heating and cooling systems for hospitals, buildings…
- Utilizing external information for efficient energy management (intervals of cheaper electricity, weather forecast…) 
- Enabling remote monitoring of the system by maintaining service company
Questions? Comments?

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