Architecture for Sharing the Condition of Networked Smart Objects Based on Wireless Sensor Networks and RFID Integration

Motivation

Increasing demand for product condition monitoring

Radio Frequency Identification (RFID)

- De-facto technology for automatic object identification
- Improves product visibility, traceability & life-cycle management
- *Identity is insufficient for condition monitoring*

Wireless Sensor Networks (WSN)

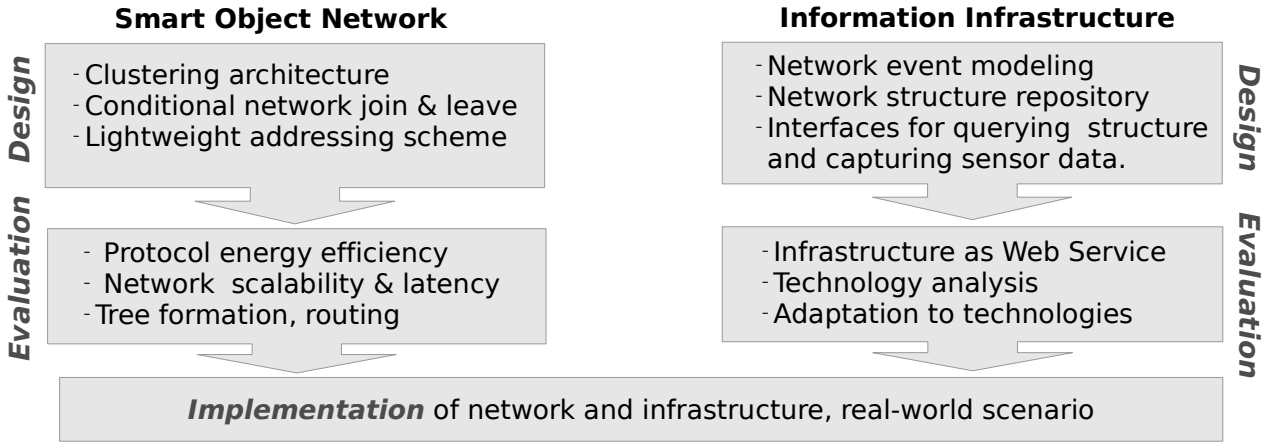
- Popular technology for sensing environment condition
- Provides costless deployments and immediate results
- *Lack of infrastructure and standard ID makes it inappropriate for supply-chain environments*

WSN and RFID Integration

- Compatible technologies that can easily complement each other
- Forecast technology merge by the most important RFID standard organization
- *Can it provide a solution for monitoring the condition of uniquely identified objects?*

Design of a solution for the integration of Wireless Sensor Networks and RFID

1. Active networking of Smart Objects: attach embedded wireless devices to objects and develop protocols for multi-hop, dynamic wireless networking. Devices are also able to sense their condition.
2. Structured data: Smart Object interactions are reported to an Information Infrastructure. A centralized repository stores the real-time structure of every network.
3.Information Sharing: the repository is made accessible globally. Clients can query the structure and subscribe to sensor data that is pushed in real-time from the Smart Object networks.



Conclusion & Contributions

- Integrating WSN and RFID can effectively provide a solution for monitoring the condition of products
- This thesis provides a complete solution by using active networking and sharing the condition globally. *Its most important characteristics are*:

1. Dynamic protocols with mobility as core functionality
2. Efficient in terms of energy consumption, scalability, latency and network architecture
3. Flexible infrastructure adapting to any technology. Demonstrated implementation with WSN and XML-based Web Services. Real-world supply-chain scenario.
4. Use RFID standards for legacy services