



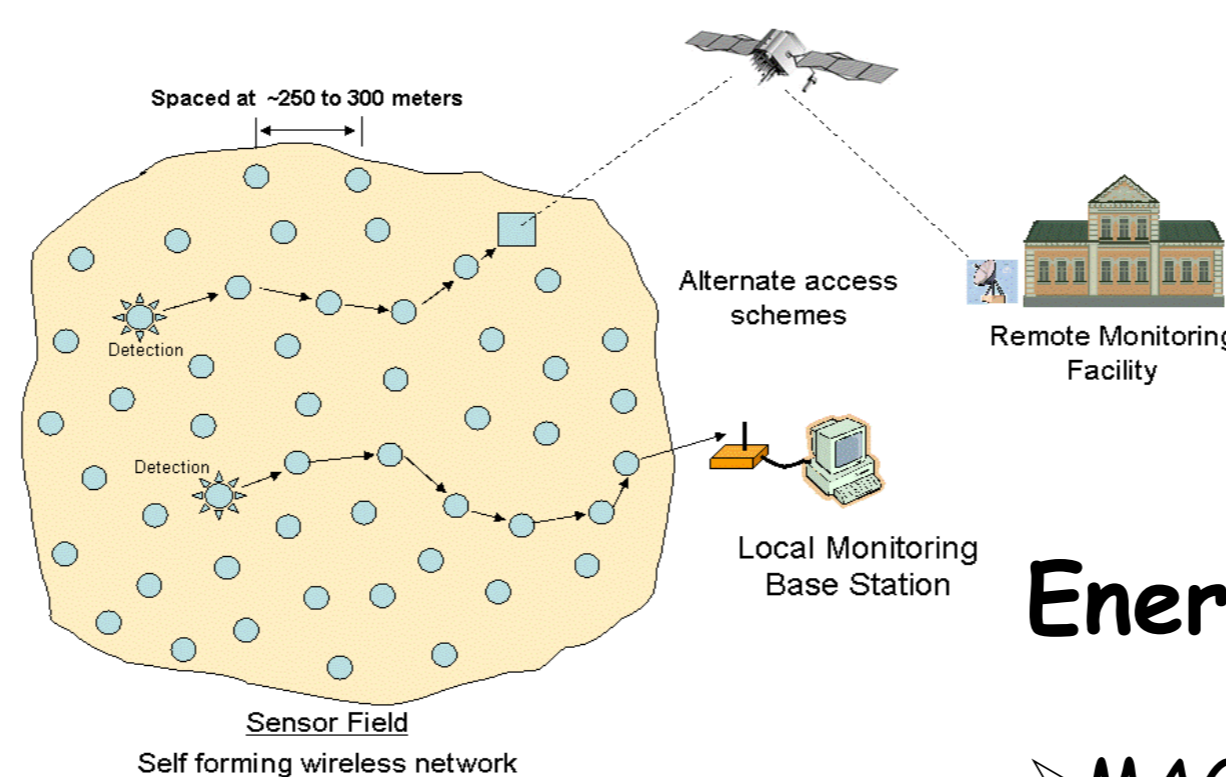
REDUCING POWER CONSUMPTION IN A NETWORK OF IMOTE2/TINYOS SENSOR NODES

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WSNs features and constraints

- Low energy
- Low cost
- Low data rate
- Short transmission range
- Limited hardware resources
- Interferences
- Heterogeneity
- Scalability



Applications

- Home automation
- Personal health care
- Measurements and control
- Telecommunication applications
- Advanced metering infrastructure
- Process monitor and automation

Energy efficiency

- MAC protocols
- Network (routing) protocols
- Physical layer transmission
- Algorithms

Hardware

Imote2 Radio Processor Board (IPR2400)

- Intel XScale processor - PXA271
- 802.15.4 radio with an on-board antenna
- Wireless MMX coprocessor
- Multi-color status indicator LED
- Basic and advanced expansion connectors supporting: 3xUART, I2C, 2xSPI, SDIO, I2S, AC97, USB host, Camera I/F, GPIO, mini-USB port for direct PC connection



Imote2 Basic Sensor Board (ITS400)

- 3d accelerometer
- Temperature sensor
- Humidity sensor
- Light sensor
- 4-channel A/D



Interface Board (IIB2400)

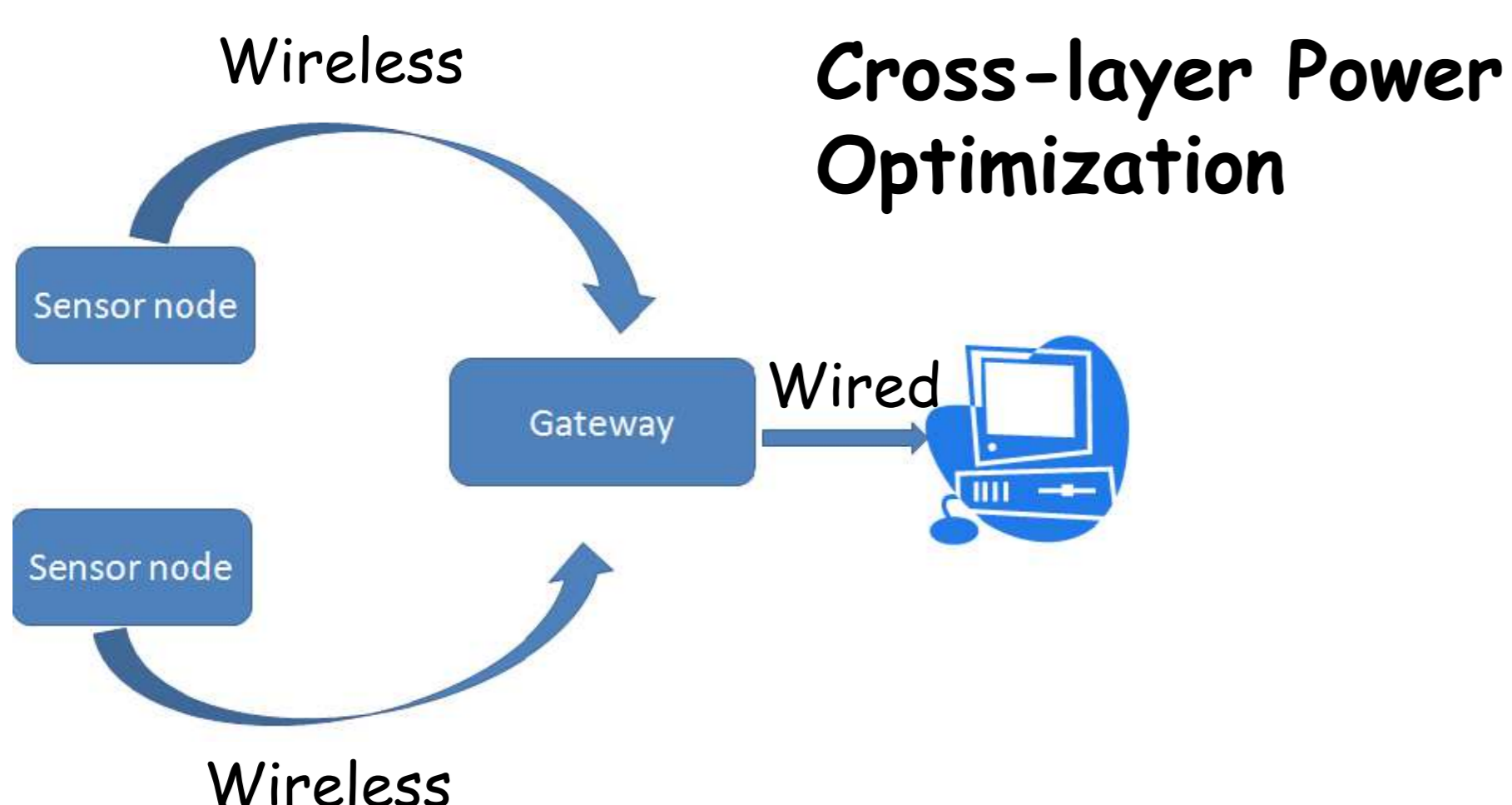
- code loading and debugging through JTAG interface



Software

- TinyOS and nesC
- .NET MICRO Framework
- Visual Studio 2005
- SQL Server database

Functionalities



Message=header (data about network, node and message type) + payload (sensor data)

Sensor node

- Periodically measures the environment
- Sends only when the variation is big enough
- **Minimize communication process**
- Enters **deep sleep state**

Gateway

- Receives the message from the sensor node
- Converts it to the correct format
- Sends it to the PC

PC side

- Reads messages from the USB interface
- Identifies and extracts the fields from the message
- Computes sensor data values
- Stores data into database