A distributed reasoning platform is presented to reduce the energy consumption of Wireless Sensor Networks (WSNs) offering geospatial services by minimizing the amount of wireless communication. It combines local, rule-based reasoning on the sensors and gateways with global, ontology-based reasoning on the back-end servers.

**Reasoning architecture**

- **Sensor gateway**
- **Router**
- **Back-end server**
- **User requests**
- **MySQL Database**

**Local reasoning**
- Rule-based data pre-processing
- Transmit less data
- Complexity reasoning adapted to capabilities device
- Optimize & monitor energy consumption of the device

**Global reasoning**
- Ontology-based back-end reasoning
- Optimize overall energy consumption of the WSN

**A SSN Ontology extension modeling energy usage**

**Code generation workflow**

- XML-based description
- Par ser
- Virtual application model
- C Code

**Prototype: PPA**

- Local reasoning: Sensors: Detect occupation of parking spot
- Gateway: Cache measurements & request up-to-date ones
- Balance data freshness and amount of RF communication by adapting cache strategy

**Prototype: GBTM**

- Local reasoning: Detect open/close of the lid
- Accumulate sensor readings during configurable time interval
- Send in bulk

**Global reasoning**

- Optimize wake-up scheme of the sensors