Title
Integrating Wireless Sensor Networks

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- Multiple execution plans can satisfy the same end user’s need.
- Tradeoffs exist among different execution plans.
  - Power consumption
  - Message latency
  - Accuracy
- Some operational environments are better suited to specific execution plans.

Problem Description: How to Efficiently Express Users’ Need?

How to provide intuitive abstraction?
- Describe what the user interests are, but not how to achieve them.
  - Difficult task for end users to find all possible execution plans and exploit tradeoffs
  - Abstractions must be easy to map to execution plans!
- Enable sharing of abstractions.
  - Portable format and extensible language are the key!

How to map abstraction into execution plans?
- Export well-known performance metrics from database.
  - Energy, latency, accuracy, etc.
  - Metrics description is a must!
- Promote reuse of existing software primitives through performance metrics.
  - Common database for storing software primitives and service abstractions is needed.

Proposed Solution: SensorMod: Sensor Modeled Object Description

Intuitive core objects
- Region:
  - Describe dynamic set of nodes executing task during runtime.
  - E.g. nodes qualifying constraints of set of attributes.
- Aggregation:
  - Describe aggregation functions.
  - E.g. spatial maximum, temporal minimum, window average, etc
- Condition:
  - Describe set of event condition of user interest.
  - E.g. spatial maximum greater than 100.
- Actuation:
  - Describe set of actions upon event detection.
  - E.g. real-time streaming, triggering, logging, etc.

Portable and extensible language
- XML Object Description for sharing
  - XML parser is freely available.
  - Well-structured and portable!

Encourage subclassing
- Extensible through specialization!
- Enable expressing data through typing.

Easy-to-use data transformation graph

Example
- Monitor for regions where average radiation level > 10, upon detection send event to user and track every 30 seconds

Sensor* Architecture Position