

# Location-based Information Delivery Using Stream Processing Engine StreamSpinner

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## Introduction

Network and sensor device technologies are advancing  
We can easily obtain real-world information as data streams

Example of data streams:

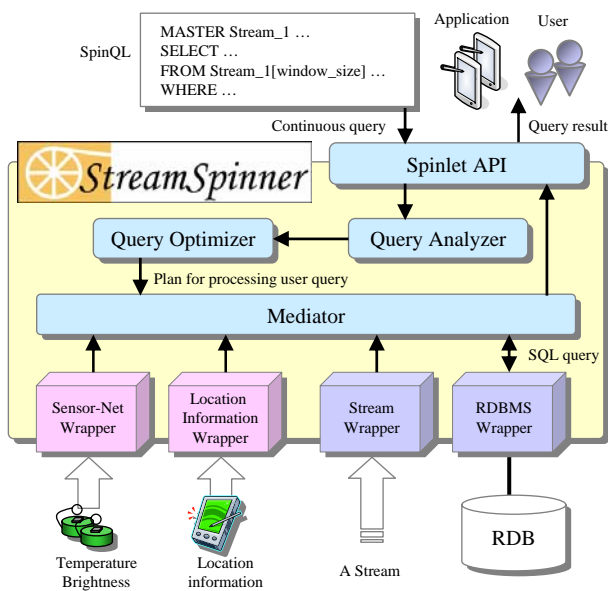
- Location information of moving objects
- Temperature and brightness monitored by sensor devices

**StreamSpinner** is a stream processing engine we are developing

Features of StreamSpinner:

- Query processing over data streams
- Integration of data streams and databases
- Event driven continuous query execution
- Novel multiple query optimization technique
- Java API for application development

## StreamSpinner Architecture



### Stream Wrapper

- Detects arrivals of new data units and transforms them into tuples
- Notifies Mediator of arrival events

### Mediator

- Evaluates continuous queries associated with the event from wrappers

## SpinQL

Data streams are modeled as unbounded relations

SpinQL is our event driven continuous query language

```
MASTER Sensor
SELECT Sensor.Light, Seat.X, Seat.Y
FROM Sensor[1msec], Seat
WHERE Seat.NodeId = Sensor.NodeId
```

**MASTER clause** gives master information sources

Data arrivals from master information sources trigger activation of the query

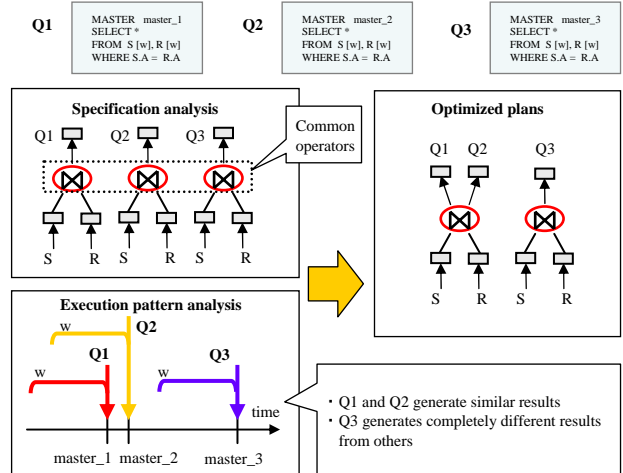
**FROM clause** can define a window for each data stream

Tuples arriving within the windows are used to generate the results

## Multiple Query Optimization

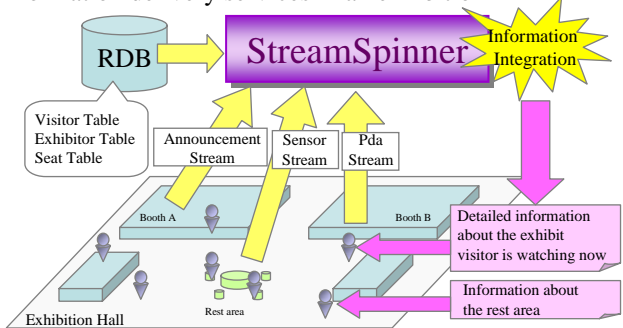
Optimizer derives query plans sharing common operators

Our method takes execution timings of queries into account  
to optimize multiple event driven continuous queries



## Demonstration System

Using StreamSpinner, we have developed location-based information delivery services in an exhibition

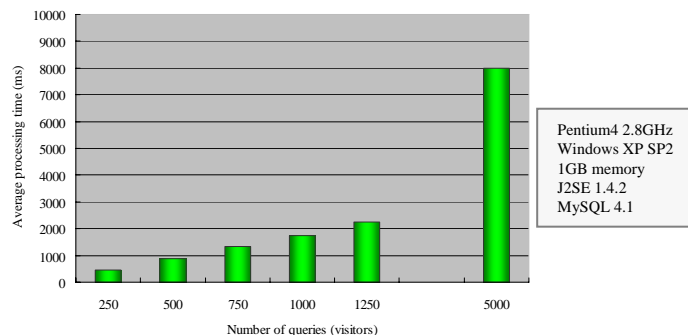


Visitors move around in the hall with a portable terminal  
The terminal displays the information delivered from the system

## Experimental Evaluation

The virtual exhibition hall has 500 seats in rest areas.

Each sensor sends brightness of the seat at 10-second intervals



### Related work

[1] Y. Watanabe and H. Kitagawa.

A Multiple Continuous Query Optimization Method Based on Query Execution Pattern Analysis. *Proc. DASFAA*, pages 443–456, 2004.

[2] Y. Watanabe and H. Kitagawa.

Adaptive Query Optimization Method for Multiple Continuous Queries. *Proc. SWOD*, pages 92–95, 2005.