A Sensor-Cloud Simulation Platform with Slow Intelligent System

Mao-Lin Li 2013/12/2
Outline

- Motivation
- System Architecture
- Application
- Demo
- Conclusion
Motivation

- Early Stage Verification
  - Simulate the behavior of sensor-cloud system
    - Fetching information

- Sensor-Cloud System
  - Computation V.S Communication

- Slow Intelligent System
  - Components V.S. Messages
    - Component-based design approach
    - Less modeling effort
System Architecture

Connect (Registration)

SIS Server

Cloud_infrastructure

Cluster_Head1

sensor1

s1Toc1

c1Tos1

c1Out

Cluster_Head2

sensor2

s2Toc1

c1Tos2

c2Out

sensor3

s3Toc2

c2Tos3

c2In

s1Toc1

c1Out
Application

- Temperature Observation
  - Shadyside
  - Lawrenceville
  - Squirrel Hill
  - Oakland

- Simulate the behavior of collecting data within sensor-cloud system.
Application Overview

PatternGenerator

- Name
- Status
- Temperature
- Humidity

Infrastructure

Central Lawrenceville
Upper Lawrenceville
Lower Lawrenceville
ShadySide1
ShadySide2
ShadySide3
North Oakland
Central Oakland
Lower Oakland
North Squirrel Hill
South Squirrel Hill
<table>
<thead>
<tr>
<th>Component</th>
<th>Input Message</th>
<th>Output Message</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensor</strong></td>
<td>1. Request (cluster head to sensor)</td>
<td>1. Data (sensor to cluster head)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Sensor_Name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Humidity</td>
</tr>
<tr>
<td><strong>Cluster Head</strong></td>
<td>1. Request (infrastructure to cluster head)</td>
<td>1. Request (cluster head to sensor)</td>
</tr>
<tr>
<td></td>
<td>2. Data (sensor to cluster head)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Sensor_Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Temperature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. Humidity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Data (cluster head to infrastructure)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. Cluster_Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Temperature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Humidity</td>
<td></td>
</tr>
<tr>
<td><strong>Infrastructure</strong></td>
<td>1. Data (cluster head to infrastructure)</td>
<td>1. Request (infrastructure to cluster head)</td>
</tr>
<tr>
<td></td>
<td>a. Cluster_Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Temperature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. Humidity</td>
<td></td>
</tr>
<tr>
<td><strong>Pattern Generator</strong></td>
<td></td>
<td>1. Request (PatternGen to infrastructure)</td>
</tr>
</tbody>
</table>
Demo

- Execute observation application
Conclusion

- Propose a simulation platform for sensor-cloud system
  - Component-based design approach in SIS

- Develop an application to simulate the behavior of sensor-cloud system.
Thank You!