JGN2plus Workshop on P2P Overlay Platform PIAX and Live E! \sim APNG 10th Camp in Bangkok \sim





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Another infrastructure for Sensor Network



Today's Contents

- 1. Overview of PIAX
 - idea, structure etc.
- 2. Install & Setting
- 3. Practical work
 - How to join in P2P network and get sensor data
- 4. Introduction of some application

PIAX: A P2P Agent Platform

http://piax.org/en

• Integrates multiple P2P-based discovery functions and mobile agent features



Why P2P Overlay Network?

- Load balancing
- Robustness
- Ad-hocness
- Asynchronusness
 - …and so on.

Overlay

Network

Physical

Network

5

Overlay Networks Implemented on PIAX

- Skip Graphs
 - Range queries
- LL-Net
 - Geographical queries
- DOLR
 - Attribute based queries (ALM)
- DHT
 - Key-value based storages
- Flooding
 - Arbitrary queries

PIAX Architecture as a middleware



Discovery RPC API



PIAX Overlay Test-bed on JGN2plus



Live E! Distributed sensor data archive on PIAX



Practical Work

By Hirokazu Tanaka and Yoshimasa Ishi

Please note...

- Local File Server URL: http://203.159.26.64/PIAX/
- For PIAX peer, Windows XP or Vista is recommended

Preparation

- Check and configure your computer environment
 - 1. Please write down your IP address.

```
>ipconfig
```

Turn off firewall, or set up the firewall to accept inbound packets to port 80 and 12367

- Install JRE 5 (Java Runtime Environment 5.0)
 - 1. Download JRE5 from the archive server(http:// 203.159.26.64/PIAX/).
 - 2. Install JRE5.

Install the Application Package

- 1. Download a zip package of the application from the archive server(http://203.159.26.64/PIAX/).
- Unzip the archive to "C:\LiveE_PIAX" (any directory name is OK.)

C:\LiveE_PIAX
+ additional
+ agclasses
+ images
+ lib
+ ui
classpath.bat
classpath.sh
live-edh nron

directory structure

Install PIAX package

- 1. Download PIAX from the archive server(http://203.159.26.64/PIAX/).
- 2. Unzip the zip archive to "C:\PIAX".
- 3. Copy "C:\PIAX\piax-2.0.0-all.jar" package to "C:\LiveE_PIAX\lib".

Run the Application on Single Peer

- Starting up the single peer
 - 1. Open a command prompt. Then, type following

> C: > CD C:\LiveE_PIAX

- Run classpath.bat to set Java classpath.
 classpath.bat
- 3. To Run the application, type following command.

> java org.piax.live_e.LiveE localhost [loc_x] [loc_y] [sensorID]

Set longitude of AIT, 100.61 to *[loc_x]*. Set latitude of AIT, 14.08 to *[loc_y]*. Set your **[sensorID]**,like hongo.wide.ad.jp/WXT510/test/.

Run the Application on Single Peer

• Open http://localhost/ on your web browser.

You can see following map view.



Modify WL500g Communication Host configuration

• To upload sensor data to the agent, you need to modify the ASUS router's cron configuration. Modify cron configuration to change upload host to your PC.

> crontab –e

*/1 * * * * /rom/livee/get_csv.sh /rom/livee/owwnogui > /tmp/data.csv */1 * * * * sleep 52; killall owwnogui; /rom/livee/csv_to_temperature.sh /tmp/data.csv >> /tmp/temperature; /rom/livee/csv_to_windspeed.sh /tmp/data.csv >> /tmp/winddir; /rom/livee/csv_to_windspeed.sh /tmp/data.csv >> /tmp/windspeed; rm /tmp/data.csv; /rom/livee/upload_data [IP address] services/DataUpload200703 [Your Sensor ID] MDAwMDAwMDA= /tmp /rom/livee 5 * * * ntpclient -h mail.hongo.wide.ad.jp -s

Set your PC's hostname or IP Address to *[IP Address]*. Set your sensor ID to *[Your Sensor ID]*.

Data Upload Confirmation

• Wait a few minutes until the router uploads sensor data to your computer. By browsing http://localhost/ on your PC, you can see a Temperature icon on the



• Click an icon on the map, then a balloon window is opened.

Agent configuration

- 1. If you click 'configure' link in the balloon, the view moves to agent configuration view
- 2. In this view, you can move and set peer location by clicking somewhere (your country!) on the map.
- 3. After you decide new location, click 'OK' button under the map.



Run the Application on 20 peers

 Let's challenge to share the sensor date over PIAX Peer-to-Peer network

Type following command

> java org.piax.live_e.LiveE 203.159.26.107

Before this you have to quite the single peer by typing 'q'+<enter> on command prompt.

Run the Application on 20 peers

 After start up, open "http://localhost/" on your browser.
 You can see two types of icon. Sensor is running on your Computer. If no yellow oval is displayed, the sensors is running on the other peer.



LiveE! Distributed Sensor Archive on PIAX



End of Presentation

See also http://www.piax.org/en

Skip Graphs

Forward query for key range of [1:3] from peer '110'



LL-Net implementation on Skip Graphs (1/2)

Definition of Location-ID



LL-Net implementation on Skip Graphs (2/2)

