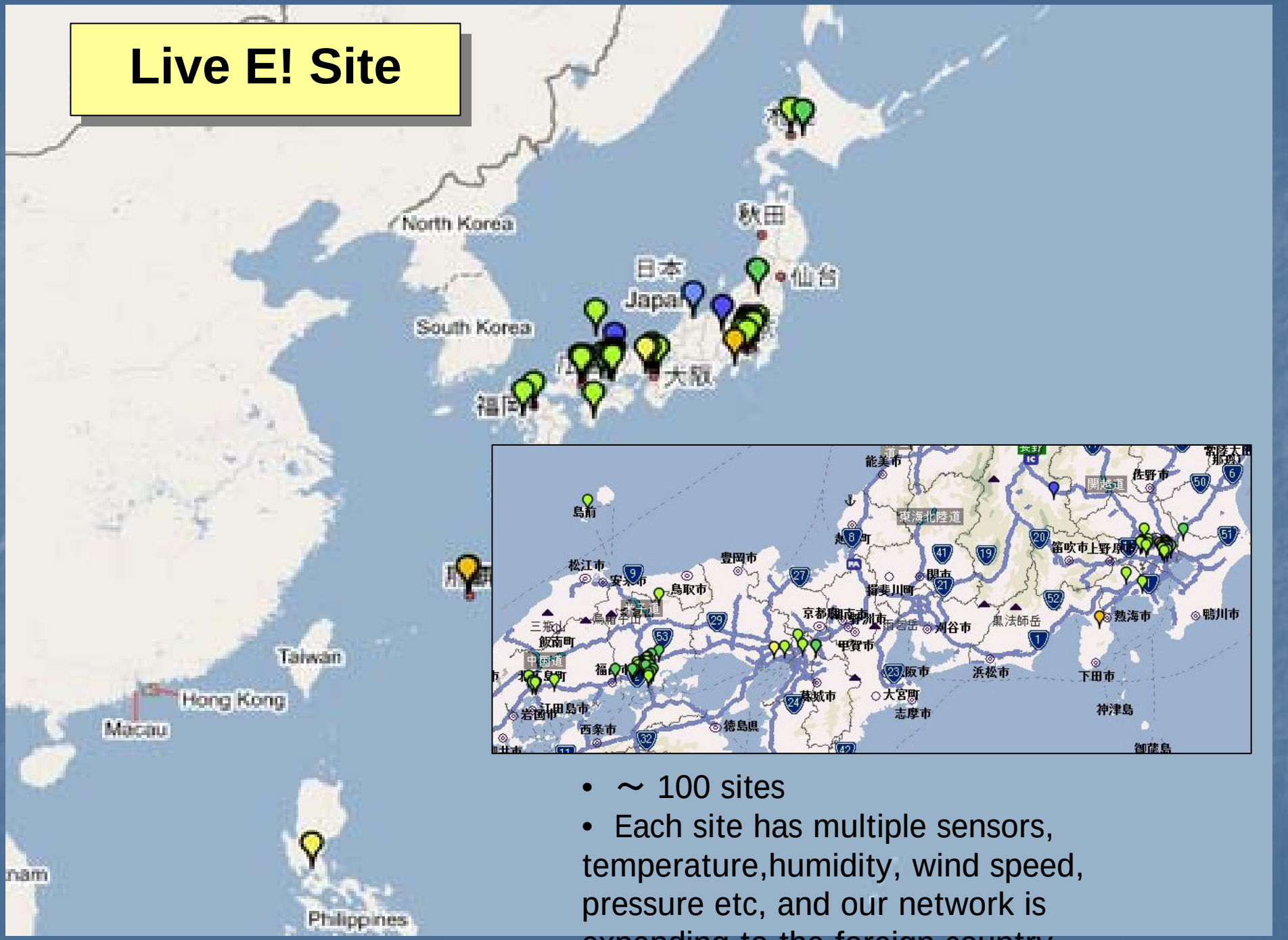
A Weather Sensor Network in Japan and the Application

Seiichi X. Kato (Hyogo College of Medicine)
Hirokazu Tanaka (Osaka University)
Shinji Shimojo (Osaka University)

Live E! Project

- Founded by WIDE project in Japan (2005)
  - WIDE project is a research consortium on the internet technology among industry and academia
- We establish the platform to share all the digital information and devices by individuals and organizations in order to recognize the environment of the Earth.
- Everybody can join in this projects

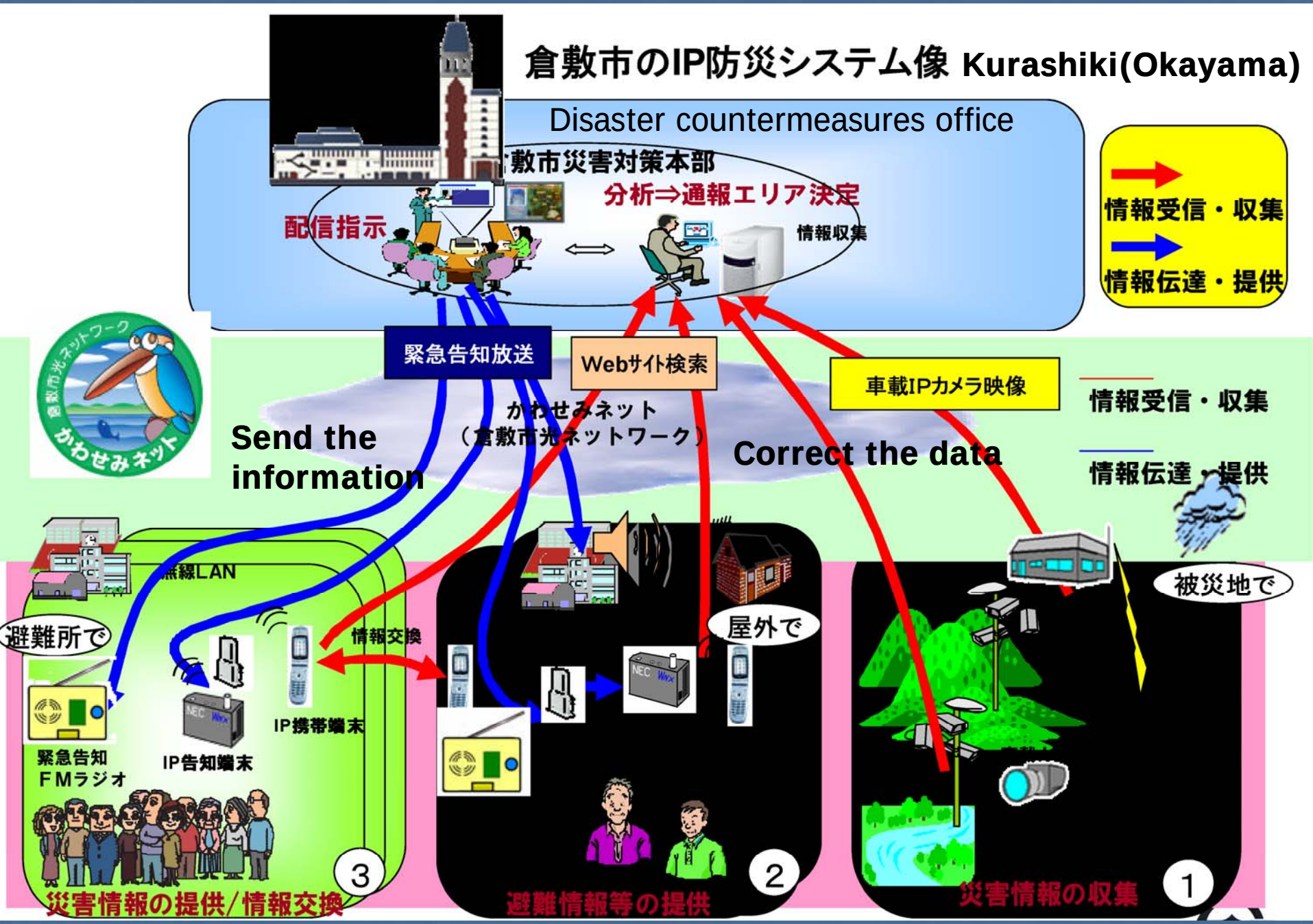
Live E! Site



- ～ 100 sites
- Each site has multiple sensors, temperature,humidity, wind speed, pressure etc, and our network is expanding to the foreign country.

Application

- Basic information for the environment
  - Temperature, Wind speed, air pressure etc.
- Education
- Public services
  - Disaster information (e.g., Typhoon)
- Business application


倉敷市のIP防災システム像 Kurashiki(Okayama)
Disaster countermeasures office
敷市災害対策本部
分析⇒通報エリア決定
配信指示
情報収集
情報受信・収集
情報伝達・提供
緊急告知放送
Webサイト検索
車載IPカメラ映像
かわせみネット
（倉敷市光ネットワーク）
Send the information
Correct the data
情報受信・収集
情報伝達・提供
無線LAN
避難所で
情報交換
IP携帯端末
IP告知端末
緊急告知
FMラジオ
屋外で
被災地で
3
災害情報の提供/情報交換
2
避難情報等の提供
1
災害情報の収集

倉敷市　光ネットワーク　”かわせみネット”　を活用した
Live E! プロジェクト環境観測センサー設置予定図

Problem of this system

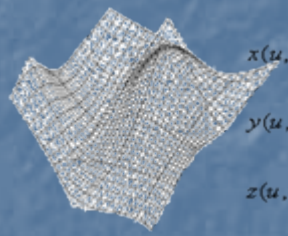
- We cannot get the weather information of any place.
  - We have not yet have enough sensors.
  - We cannot cover all area.

↓

- Distribution map by the interpolation

Interpolation services for the weather information

Weather data XML
<Sensor>
....
</Sensor>



$$x(u,v) = \sum_{i=0}^{n}\sum_{j=0}^{m} x_{ij} N_{i,k}(u) N_{j,k}(v)$$
$$y(u,v) = \sum_{i=0}^{n}\sum_{j=0}^{m} y_{ij} N_{i,k}(u) N_{j,k}(v)$$
$$z(u,v) = \sum_{i=0}^{n}\sum_{j=0}^{m} z_{ij} N_{i,k}(u) N_{j,k}(v)$$

Contour Data XML

Get the weather data

Script&data

interpolation

ContourData

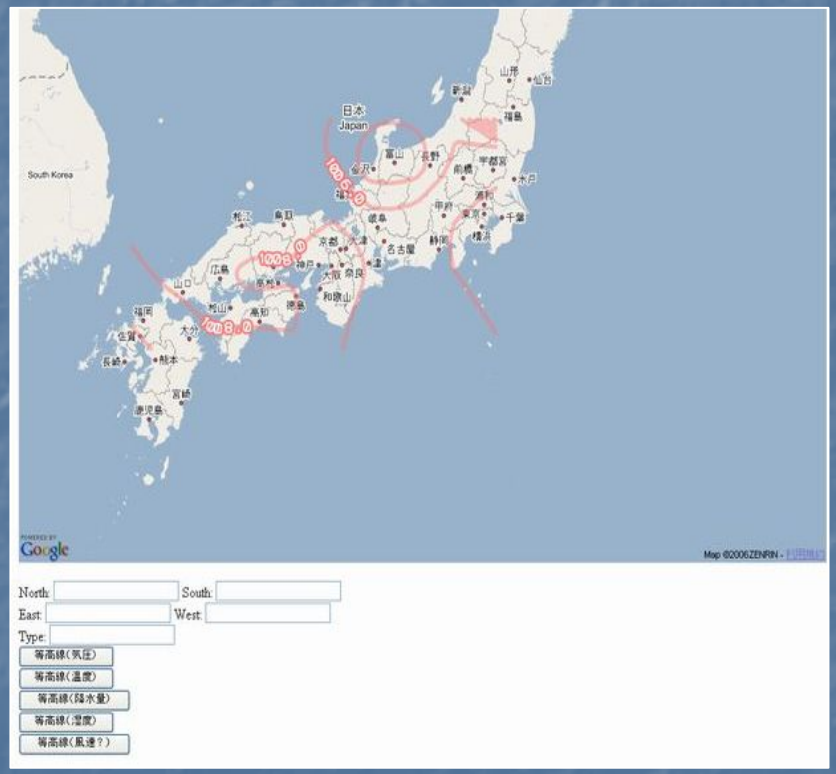
Weather Information

Draw contour services

Search

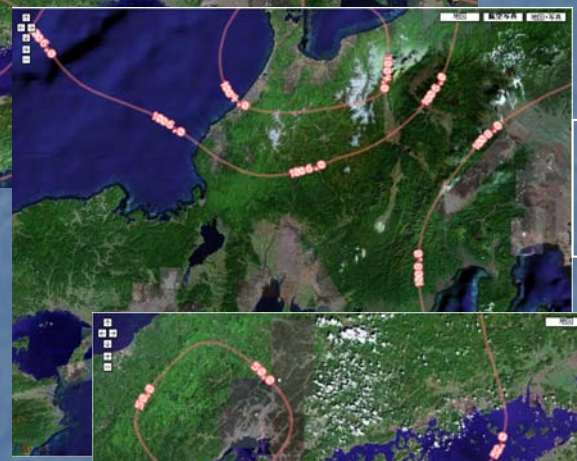
User

Test application: contour map

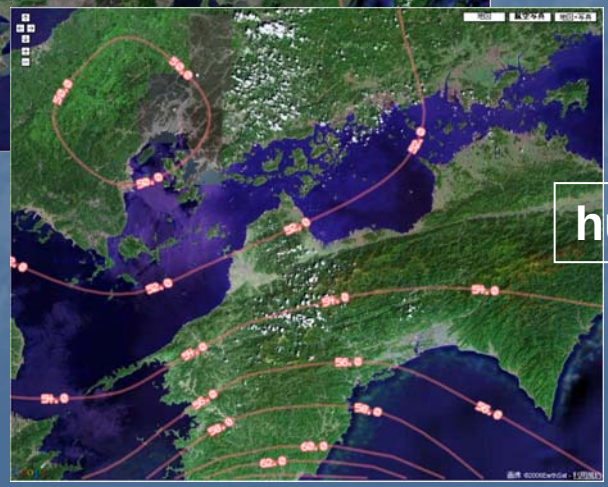


Contour map on Google Map

Temperature



Barometric pressure



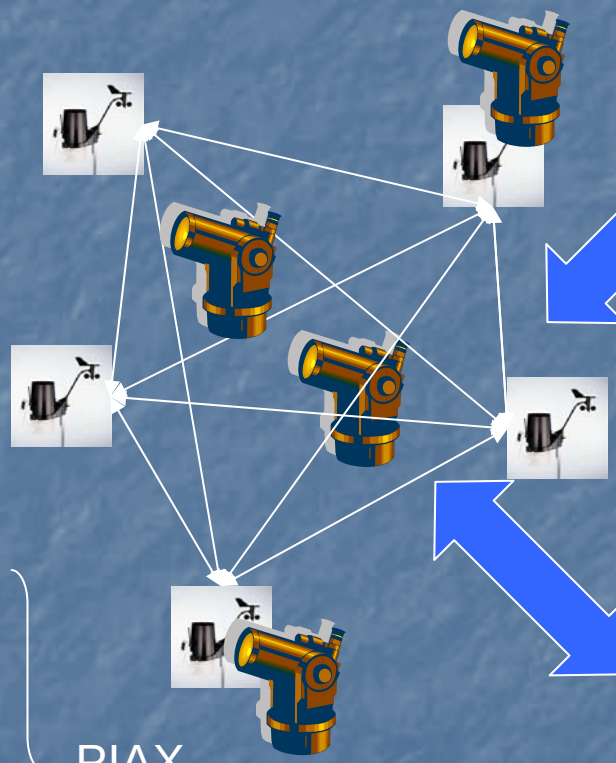
humidity

Future work: P2P, Grid, Web Services

PIAX
A P2P AGENT PLATFORM

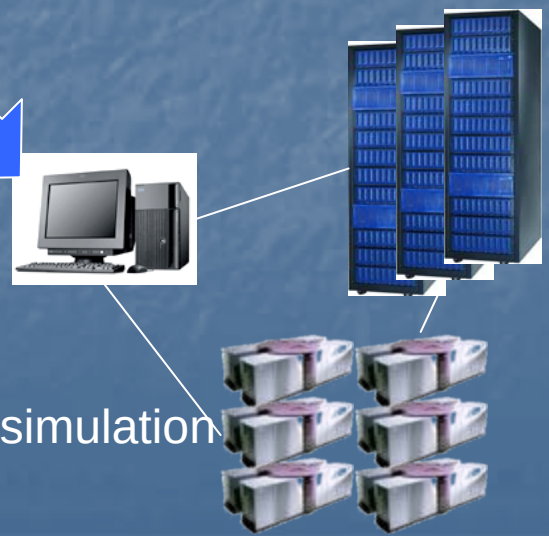
- P2P platform developed by CMC.
- Based on Java
- LL-Net, DHT
- Web Services

P2P network by PIAX



Weather Data
Web services

Grid Resource



Prediction by
Hydrodynamic simulation