

# Development of Distributed MetBroker toward Information Grid

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# Agenda

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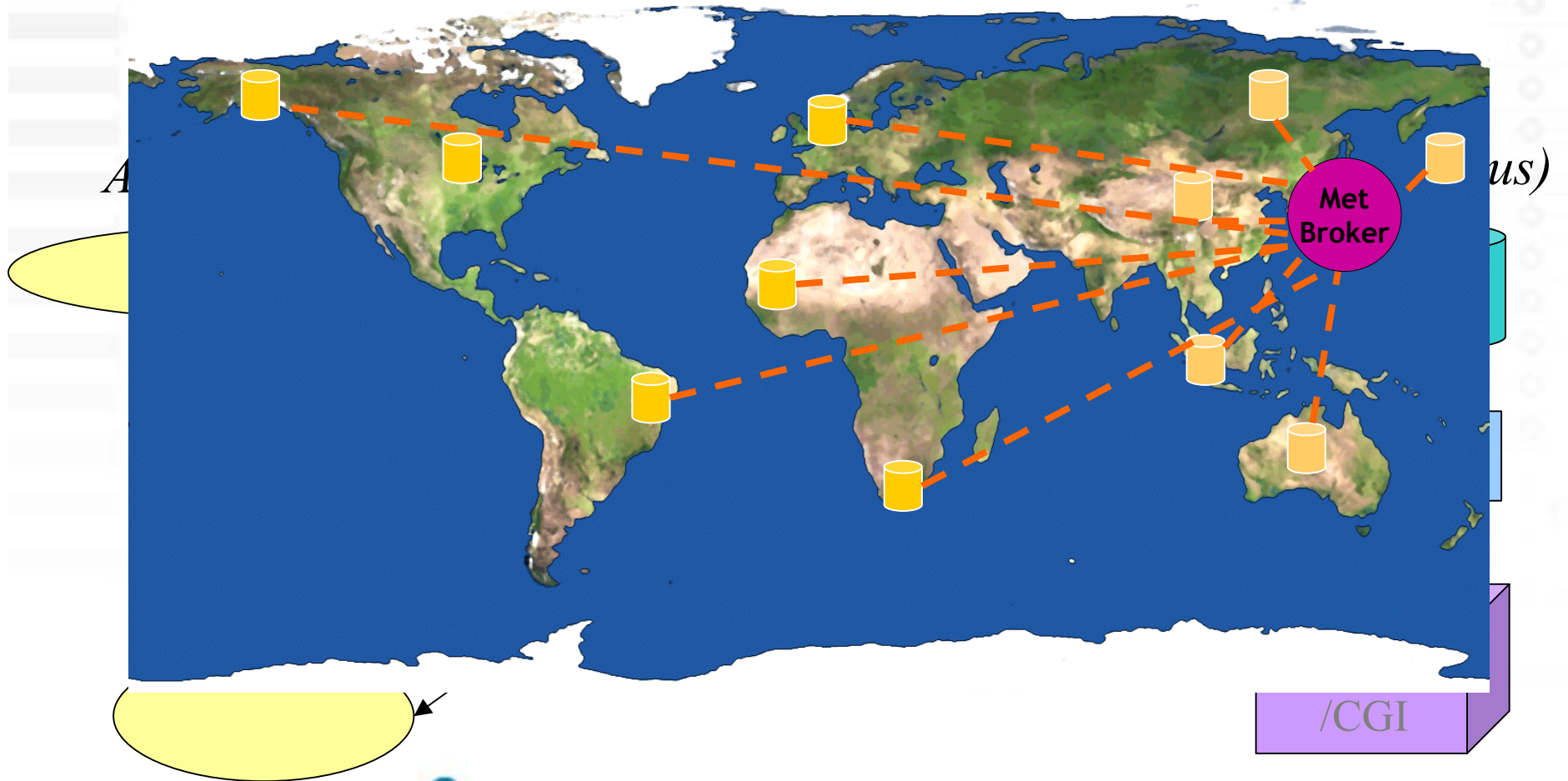
- **Objective**
- **Distributed MetBroker**
- **Progress of Distributed MetBroker**
- **Information Grid**

# Objective

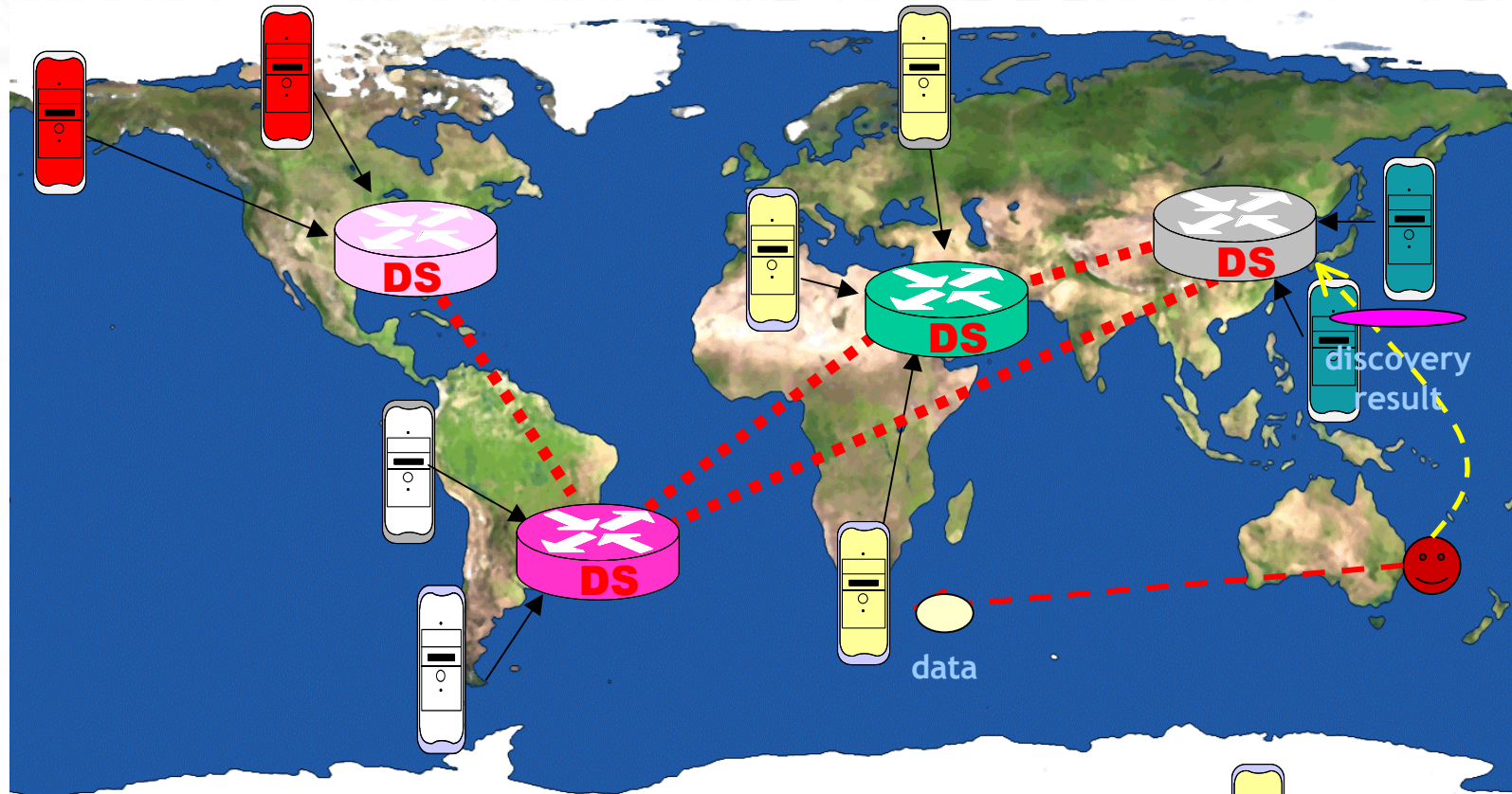
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- Collaborative work between NECTEC, HAI (Thailand) and NARC (Japan)
- Extend NARC's Centralize MetBroker to distributed System
- Based on **Web Services** and **Grid Technology**
- Consist of 2 main components
  - MetBroker
  - Discovery Service
- Applies for other project (Multiple Broker, Info. Grid)

# MetBroker



# Distributed MetBrokers Scenario



→ MetBroker

DS → Discovery Service

# Discovery Service

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- **Discover MetBroker**
  - analyze user's data request
  - return suitable MetBroker
  - **Smart Discovery Service**
- **Registry**
  - MetBroker registry services
- **Monitor MetBroker**
  - status (running, shutdown)

# Discovery Services

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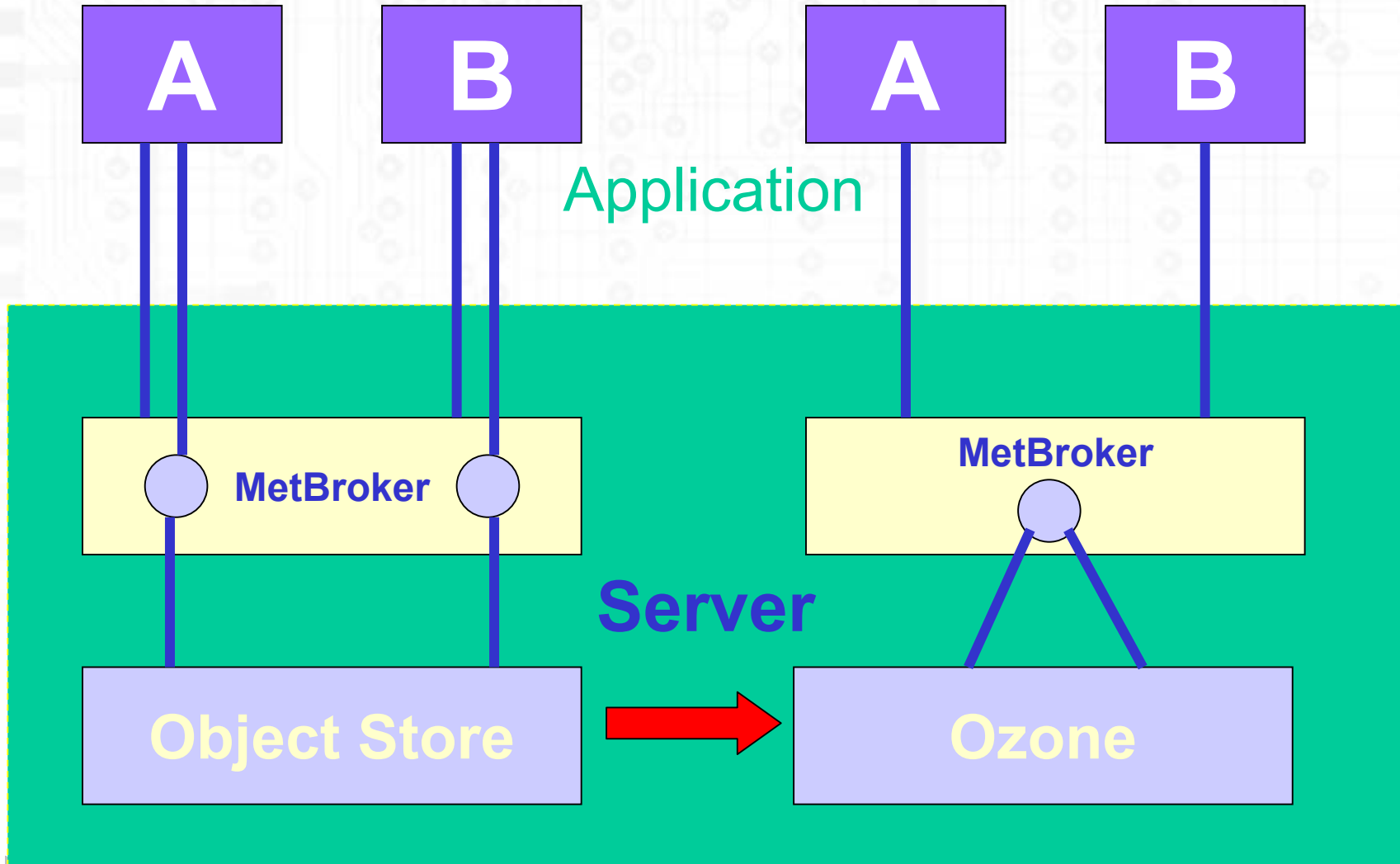
- **Components**
  - NR Marker
  - Smart Discovery Services
  - Single Sign-on service

# Progress of Distributed MetBroker

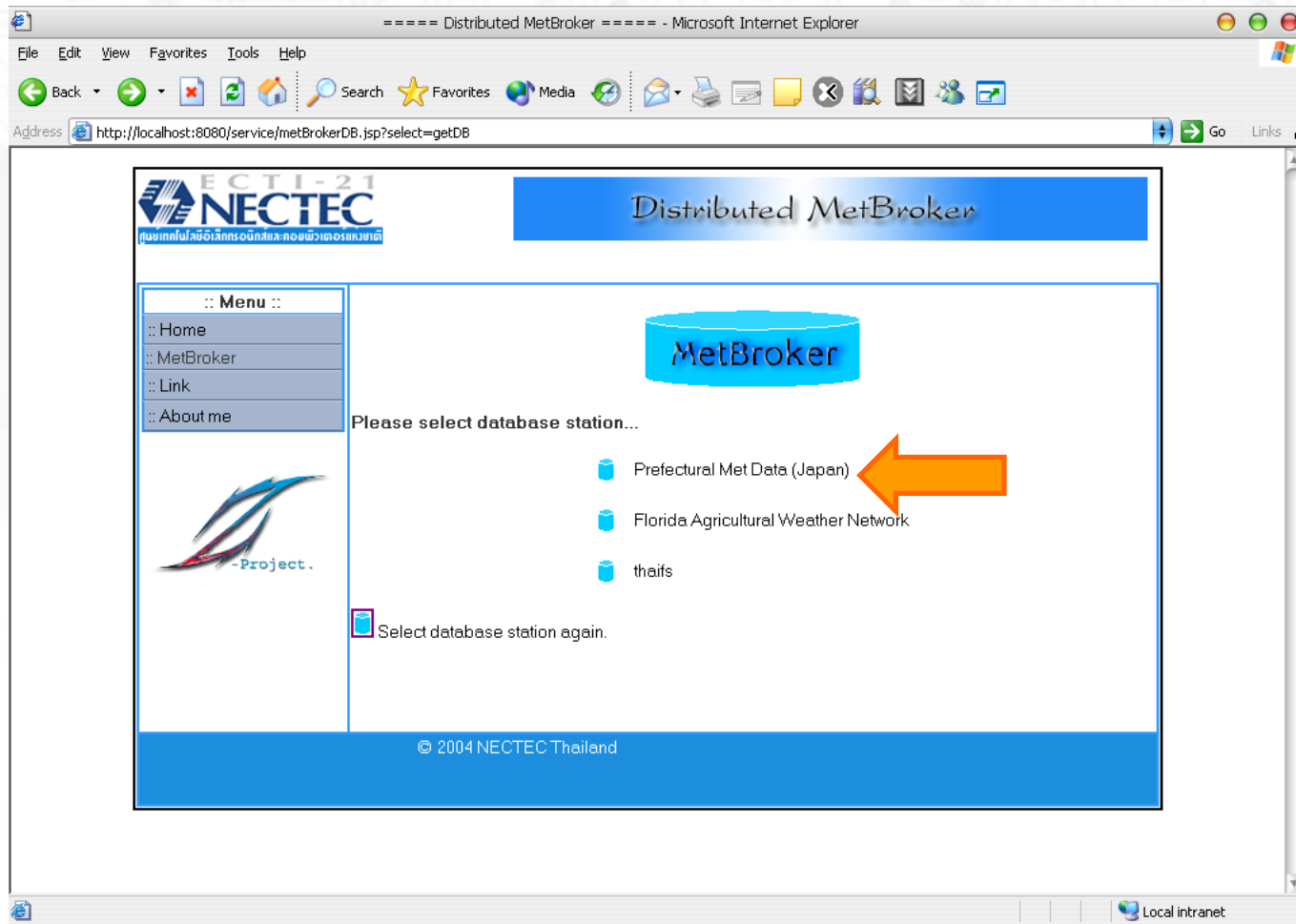
- **Replace Object Stored Database with Ozone Database**
- **MetBroker Web Services version**
- **MetBroker's system resources sharing on grid environment**



# Replace with Open source database



# MetBroker Web Services



# MetBroker Web Services

==== Distributed MetBroker ==== - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address <http://localhost:8080/service/metBrokerDB.jsp?dbID=prefmetdb> Go Links

**ECTI-21 NECTEC**  
ศูนย์เทคโนโลยีอิเล็กทรอนิกส์และคอมพิวเตอร์แห่งชาติ

**Distributed MetBroker**

**MetBroker**

**Menu**

- Home
- MetBroker
- Link
- About me

**This Database Station has no region.**

Please select WeatherStations to see detail of station

- Tottori Exp.Stn., THES
- Chiba Campbell, 3
- Chardonnay, NYSAES, 2
- Chiba Res.Cnt., 1

Select database station again.

© 2004 NECTEC Thailand

<http://localhost:8080/service/index.jsp> Local intranet

# MetBroker Web Services

==== Distributed MetBroker ==== - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address http://localhost:8080/service/metBrokerDB.jsp?dbID=prefmetdb&stationID=2

Go Links

Menu

- Home
- MetBroker
- Link
- About me

Project.

MetBroker

You choose ...

- Prefectural Met Data (Japan)
- Chardonnay, NYSAES, 2

This station has period 30 มิถุนายน 2540, 13:00:00 - 16 สิงหาคม 2540, 18:00:00

Please fill period in the blank and select duration, element.

Start : 10 06 2540

End : 10 07 2540

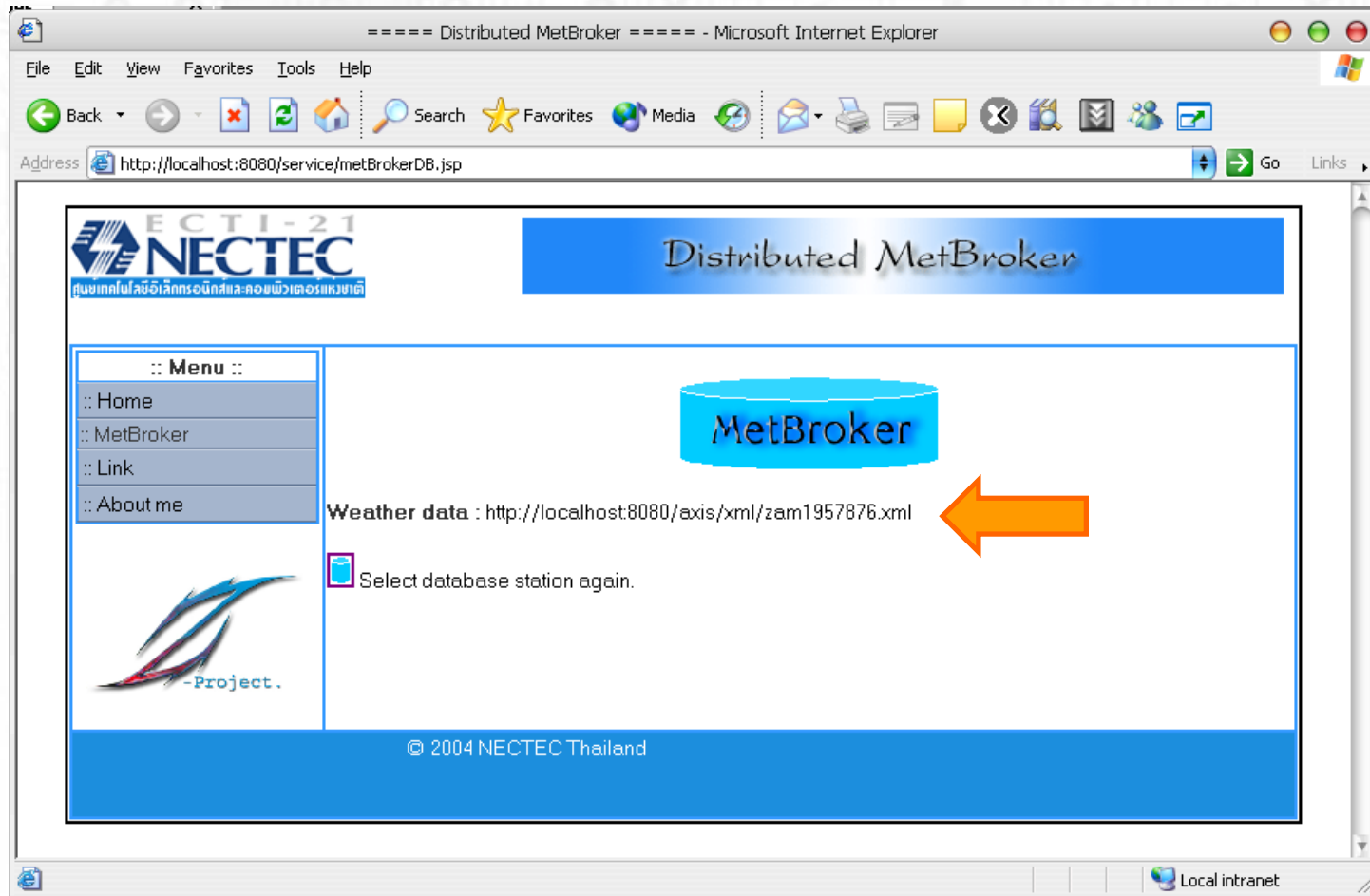
Hourly

- อุณหภูมิอากาศ
- ฝน
- ลม
- Radiation
- ความชื้น
- Bright Sunlight

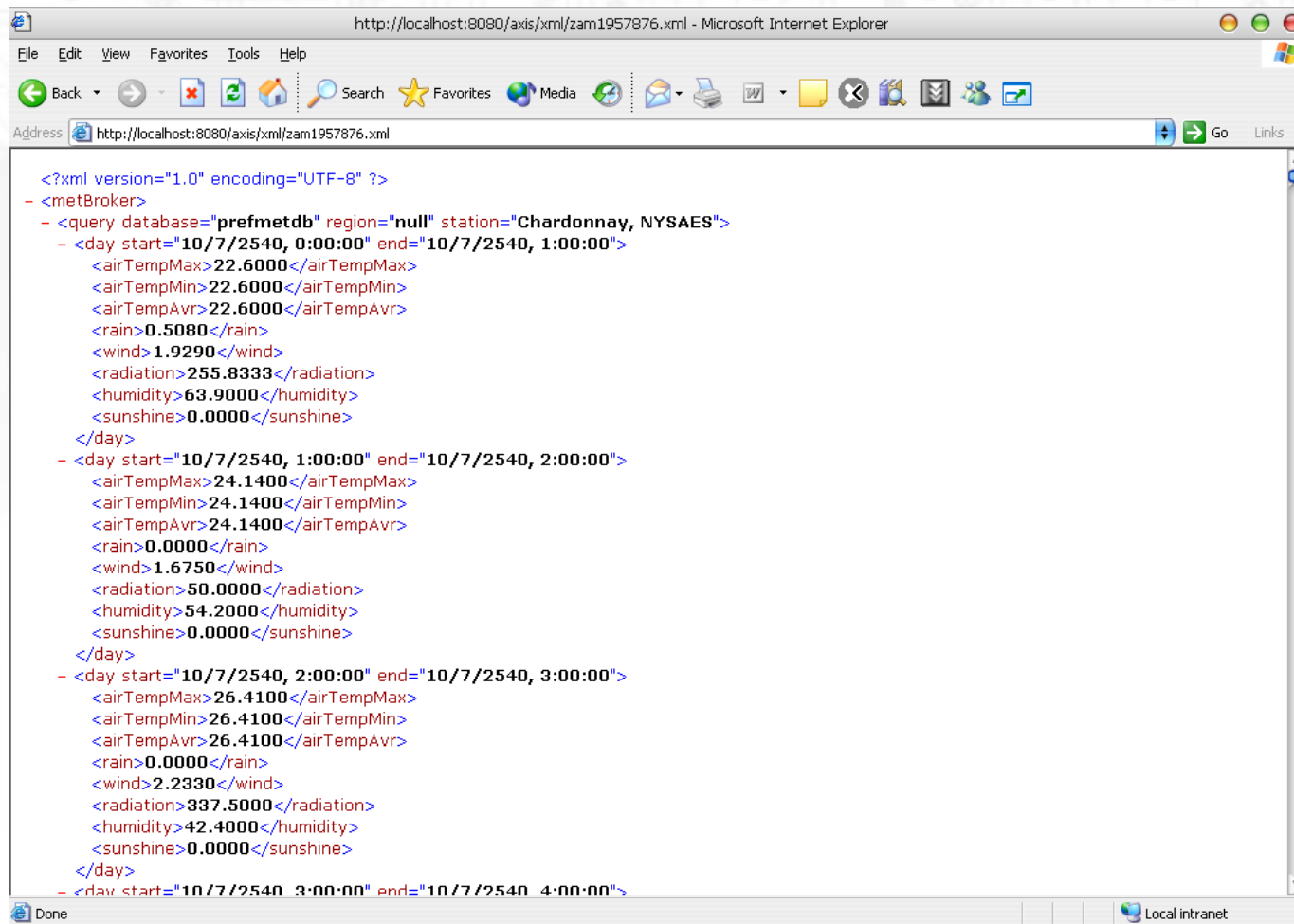
Submit

Done Local intranet

# MetBroker Web Services

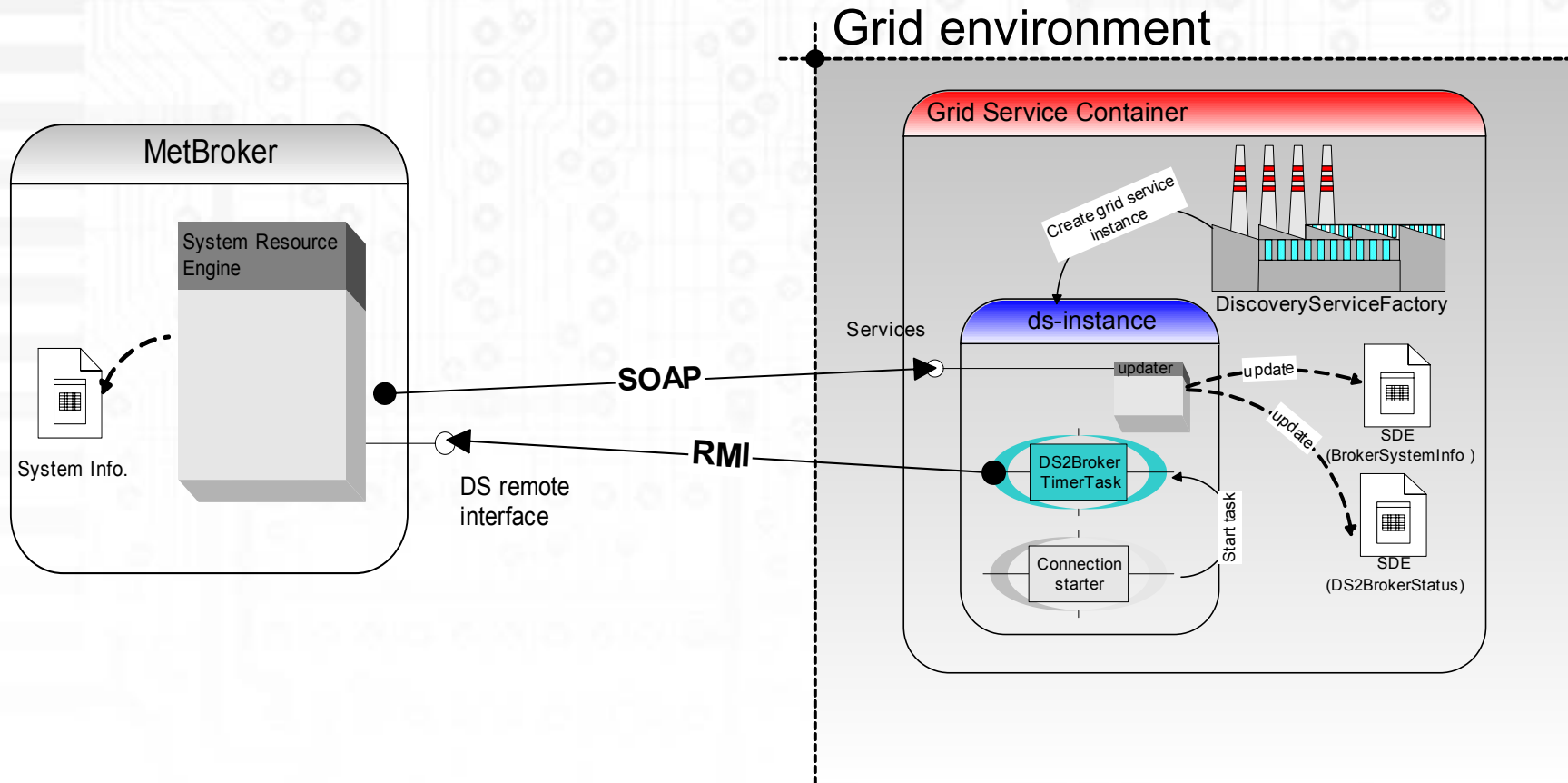


# MetBroker Web Services

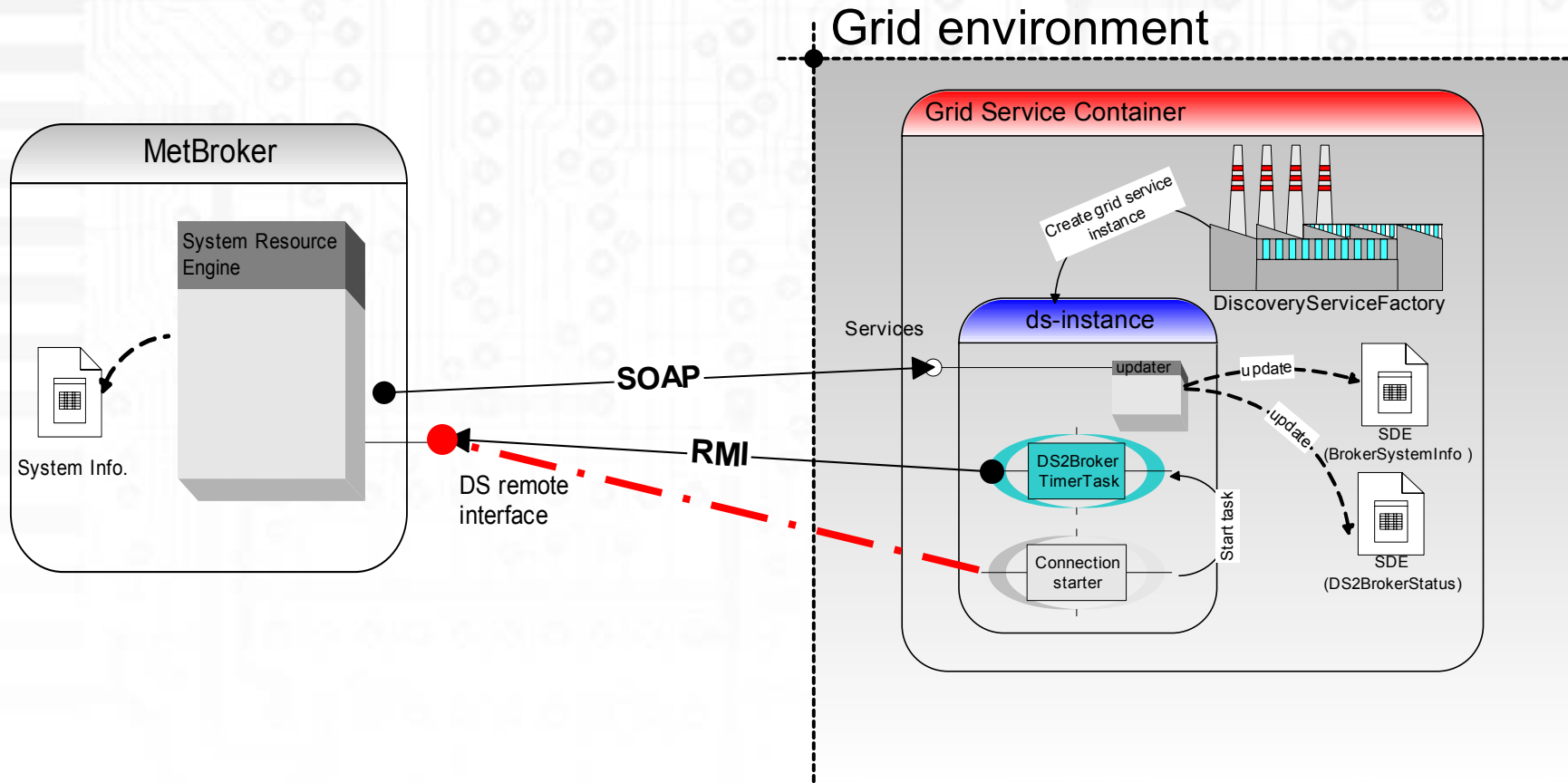


```
<?xml version="1.0" encoding="UTF-8" ?>
- <metBroker>
- <query database="prefmetdb" region="null" station="Chardonnay, NYSAES">
- <day start="10/7/2540, 0:00:00" end="10/7/2540, 1:00:00">
  <airTempMax>22.6000</airTempMax>
  <airTempMin>22.6000</airTempMin>
  <airTempAvr>22.6000</airTempAvr>
  <rain>0.5080</rain>
  <wind>1.9290</wind>
  <radiation>255.8333</radiation>
  <humidity>63.9000</humidity>
  <sunshine>0.0000</sunshine>
</day>
- <day start="10/7/2540, 1:00:00" end="10/7/2540, 2:00:00">
  <airTempMax>24.1400</airTempMax>
  <airTempMin>24.1400</airTempMin>
  <airTempAvr>24.1400</airTempAvr>
  <rain>0.0000</rain>
  <wind>1.6750</wind>
  <radiation>50.0000</radiation>
  <humidity>54.2000</humidity>
  <sunshine>0.0000</sunshine>
</day>
- <day start="10/7/2540, 2:00:00" end="10/7/2540, 3:00:00">
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  <airTempMin>26.4100</airTempMin>
  <airTempAvr>26.4100</airTempAvr>
  <rain>0.0000</rain>
  <wind>2.2330</wind>
  <radiation>337.5000</radiation>
  <humidity>42.4000</humidity>
  <sunshine>0.0000</sunshine>
</day>
- <day start="10/7/2540, 3:00:00" end="10/7/2540, 4:00:00">
```

# Sharing system resource information



# How does it work?





# Information Grid

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- **Objective**

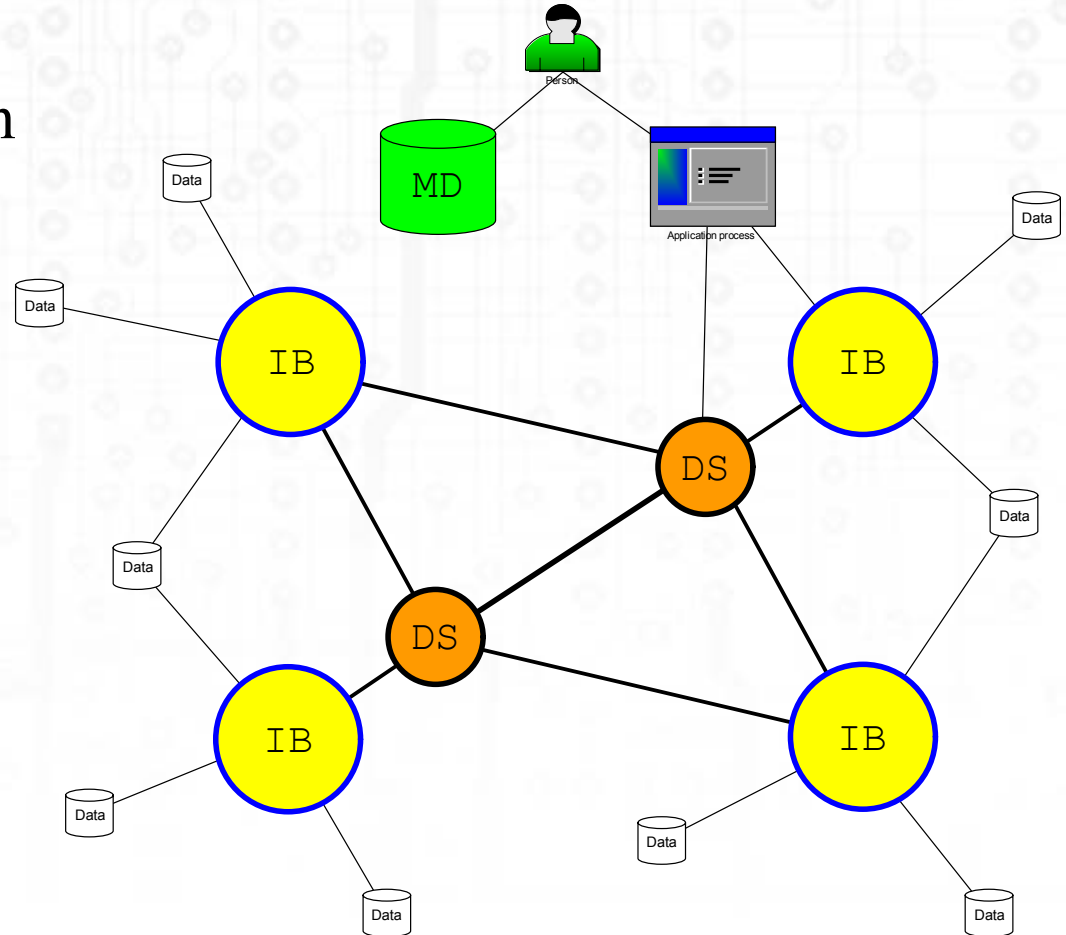
- build frame work and infrastructure for integrating public information sources to support a problem solving environment

- **Homogeneous information sources**

- Other products like IBM's DB2II, Avaki

# Scenario

- **Marker Directory**
  - Marker Definition Language
- **Information Broker**
- **Discovery Service**



# Information Grid

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- **Implements**
  - Marker Directory
  - Information Broker
  - Discovery Service
  - Application
- **Standard**
  - Information Grid Framework
  - Marker Definition Language

# Conclusion

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- **Distributed MetBroker solve single-point of failure and bottle neck**
- **Broker scalability**
- **Each broker can manipulate all data by themselves**
- **Data discovery feature**
- **Important key for Information Grid**

**Thank you**

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# Discovery Service

- **The best MetBroker**
- **Used for Multiple Broker project**

$$S_{MB}^i = \alpha_{MB}^i \times \alpha_{Rsrc}^i \times \frac{(W_{region}^i + W_{users}^i + W_{net}^i + W_{CPU}^i + \dots)}{n}$$

$$S_{best} = \text{Max} (S_{MB}^1, S_{MB}^2, \dots, S_{MB}^N)$$

J.G. Wang (NARC)

# Technologies related

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- **Grid**
  - globus 4.0
  - grid services
- **Web Services**
- **Semantic web**
  - Resource Description frame work (RDF)
  - Ontology
- **Distributed MetBrokers**