



Third High Level Forum on UN Global Geospatial Information Management  
**联合国第三次全球地理信息管理高层论坛**



Sustainable Development with Geospatial Information  
**地理信息支撑可持续发展**

**Session 4 Science, Technology, and Innovation to Measure and Monitor Progress**  
**-- Leverage the Technology Revolution**

# **For Time-Critical Geospatial Decision Making**

## **Real-time GIS and More .....**



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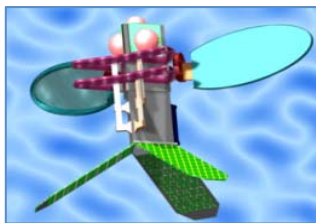


**武汉大学**  
WUHAN UNIVERSITY

# A World of Real-time Streaming Data



**7,000 Billion Sensors!**



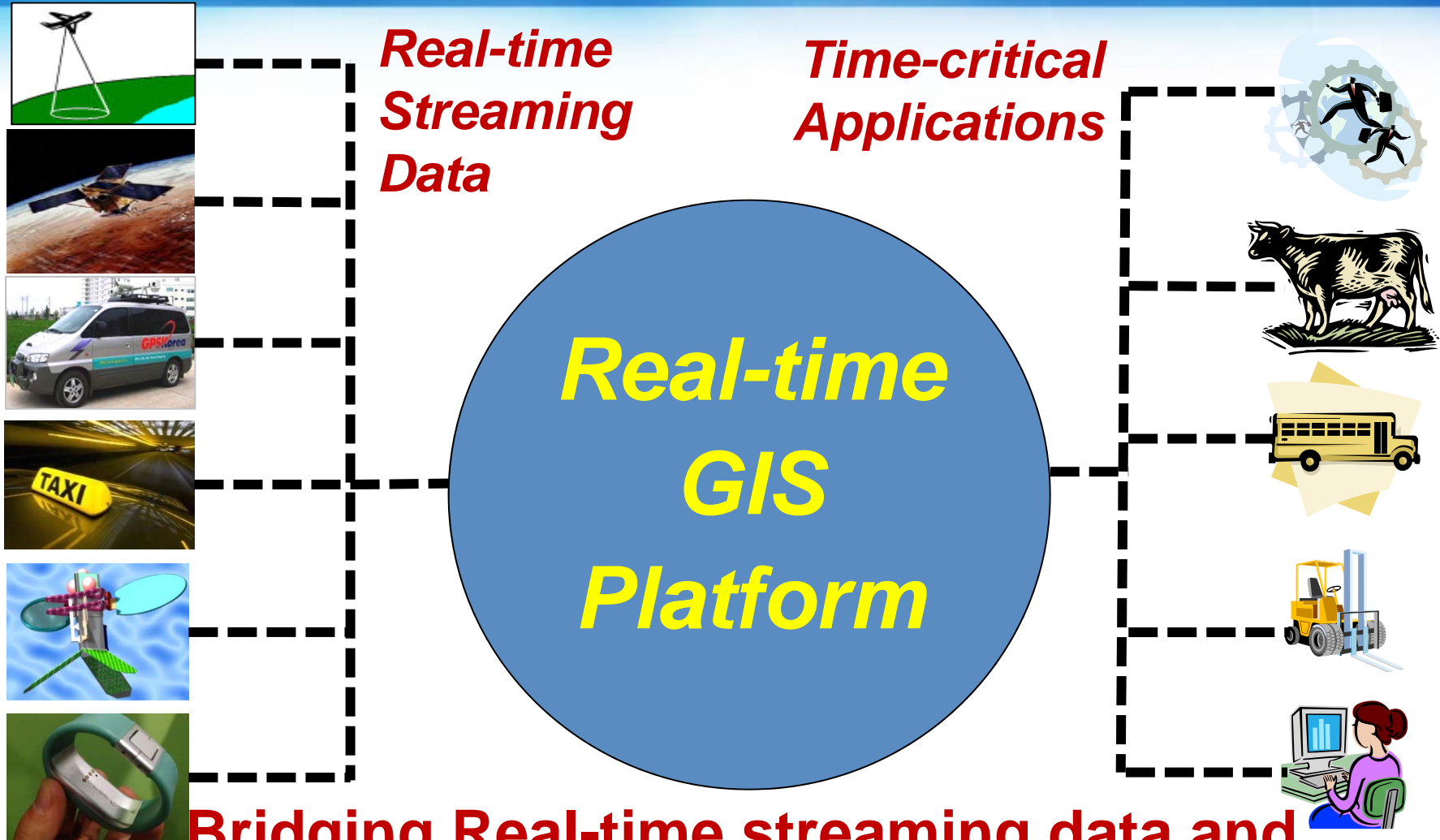
# Call for Time-critical Applications



## Time-critical Applications!



# New Platform



**Bridging Real-time streaming data and Time-critical geospatial applications**

# Real-time GIS

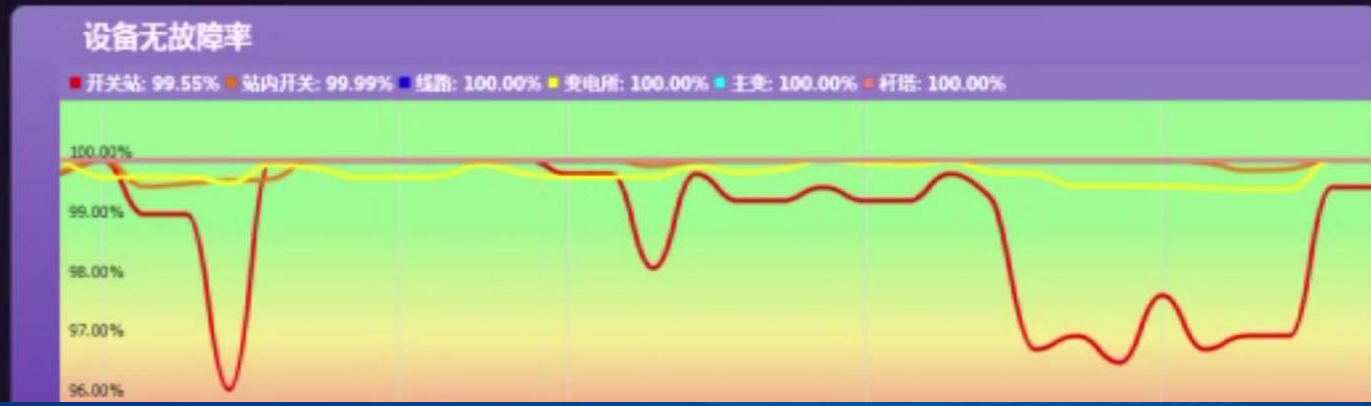
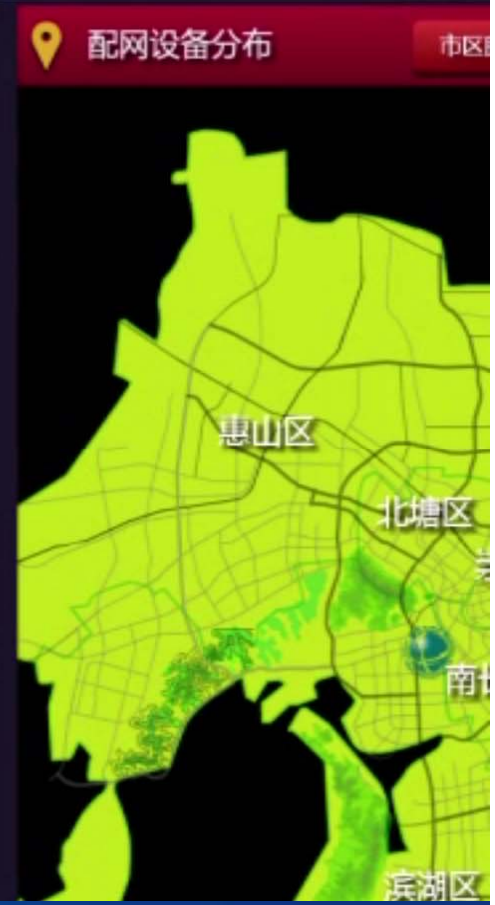
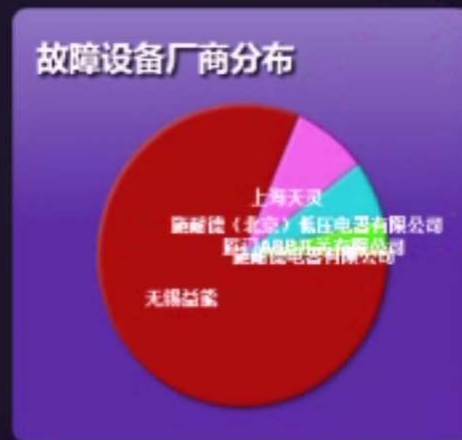
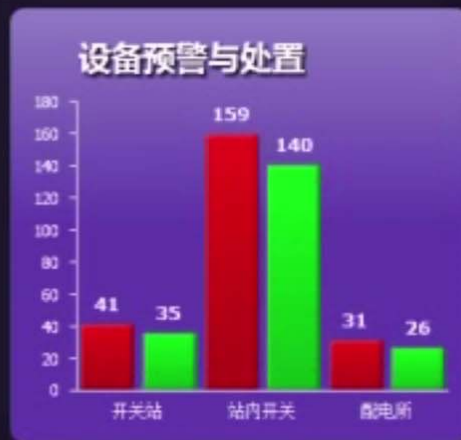
	Real-time GIS	Spatiotemporal GIS	Traditional GIS
<b>Data Source</b>	Streaming data besides static data	Offline spatiotemporal data	Static data only
<b>Data Loading</b>	data import + streaming in	data import	data input + import
<b>Data model</b>	spatiotemporal	spatiotemporal	static spatial
<b>Data Storage and Index</b>	increasing storage and growing index	stable storage and spatiotemporal index	stable storage and spatial index
<b>Data Processing</b>	streaming spatiotemporal	static spatiotemporal	static spatial
<b>spatiotemporal Process Model</b>	dynamic persistency	Static persistency	no process concept
<b>Historical data</b>	Integrated management	periodical archiving	periodical archiving

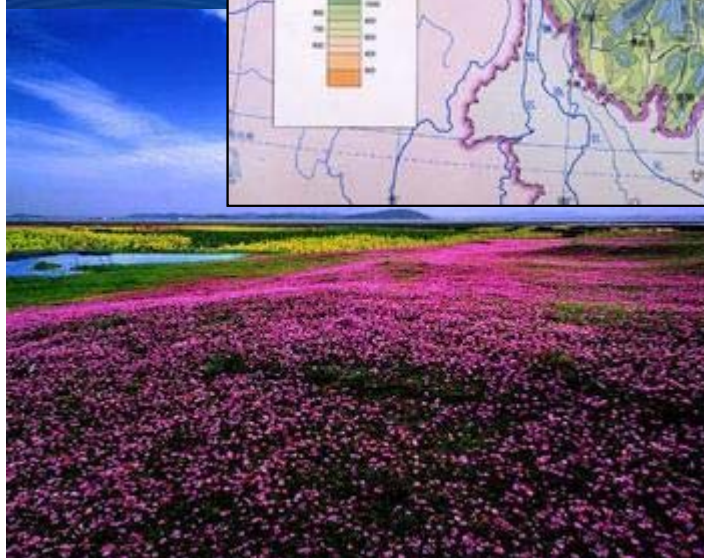
# Technical Challenges

- How to manage persistently streaming-in data from huge number of sensors?
- How to promptly update spatiotemporal index of ever growing real-time data?
- How to process data fast enough for time-critical applications?
- How to find just-enough number of sensors to support a time-critical applications?
- How can applications, sensors talk with each other universally ? Standards, specifications ..... ?



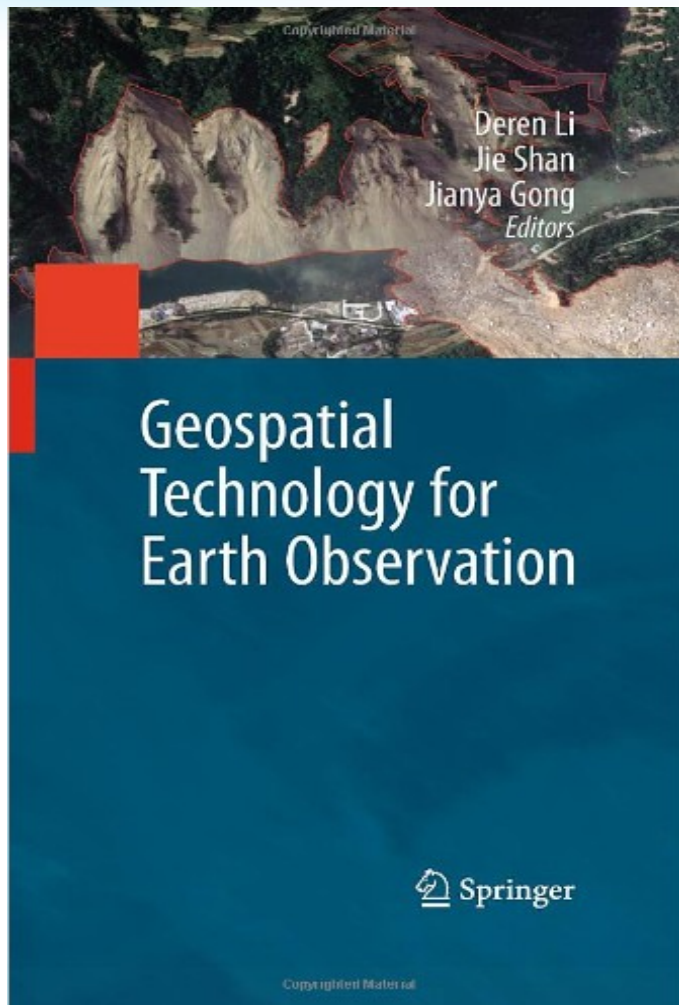
# We already have initial applications .....







# Vision: Geospatial Service Web (GSW)



## Chapter 13

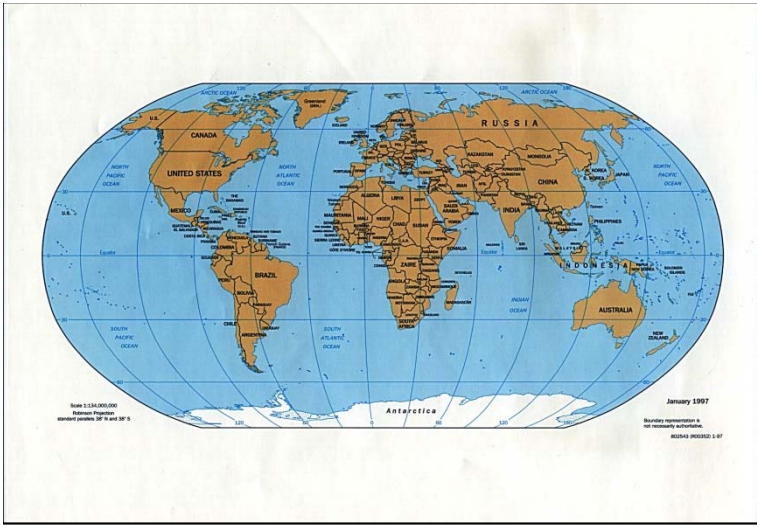
### GEOSPATIAL SERVICE WEB

Jianya Gong, Huayi Wu, Wenxiu Gao, Peng Yue, Xinyan Zhu

#### 13.1 Introduction

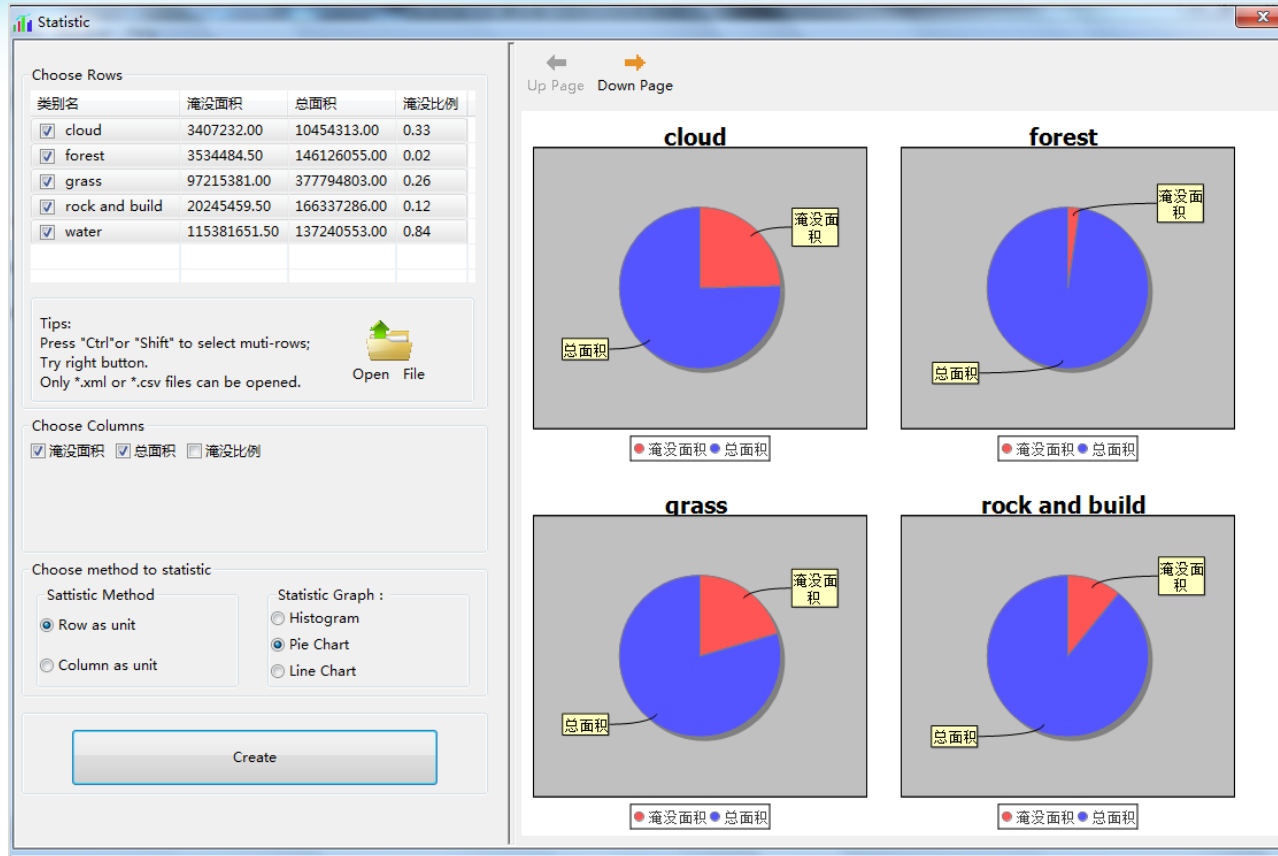
##### *13.1.1 Web and Services*

The Web has become a platform where data, information and knowledge can be published, discovered and retrieved. The growth of the Web has resulted in the Web-based sharing of distributed resources. The trend to enhance the collaboration, creativity and rich user experiences has led the evolution of Web to the so-called Web 2.0, which is represented by a set of typical applications including blog, wiki, social networking (O'Reilly 2005). Another trend to increase the intelligence of the Web is the effort to move the Web to a universal medium for data, information and knowledge exchange, i.e. the Semantic Web, in which the semantics of information on the Web are defined, making it possible for the Web to understand (Berners et al. 2001). Grid computing, a blueprint for the computing in-



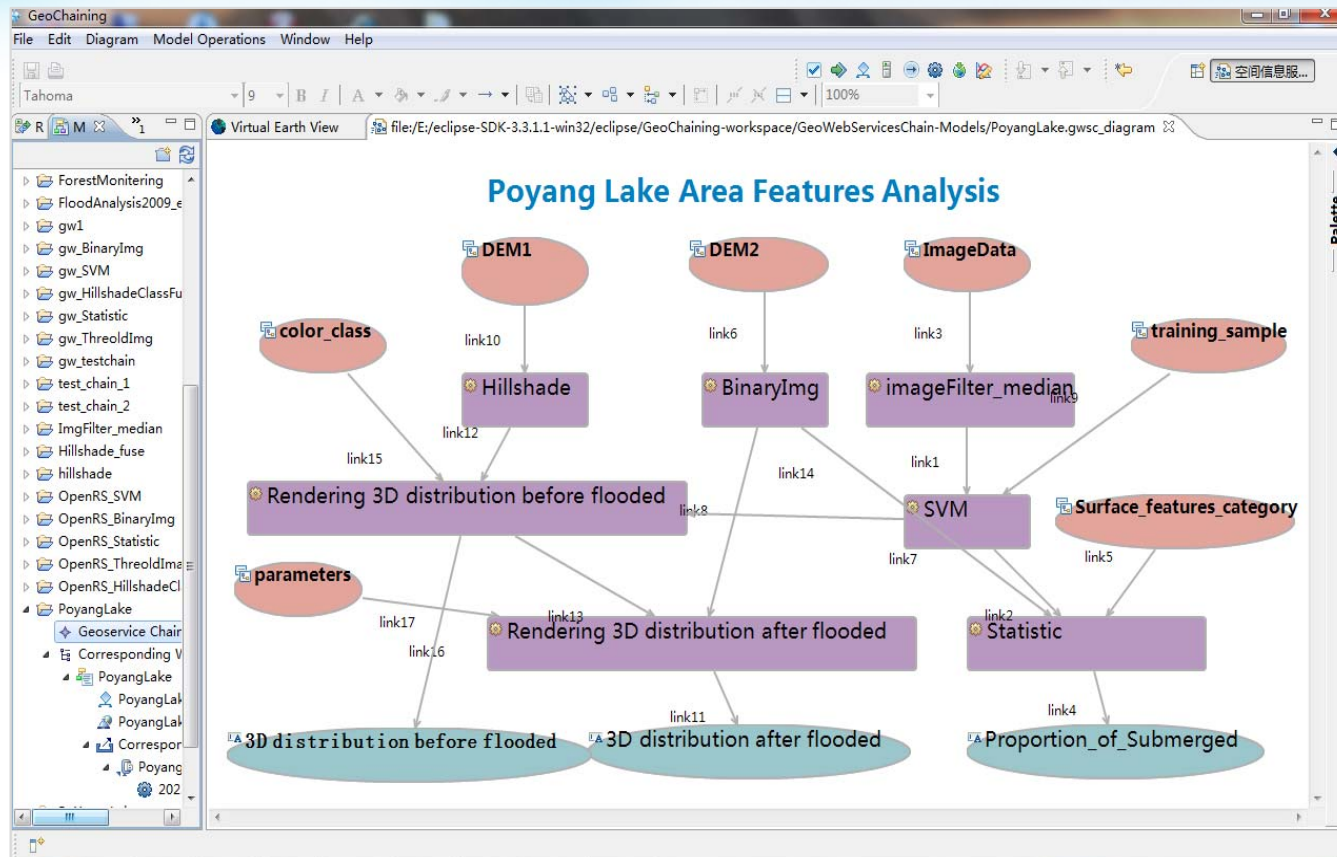
# Share static data to streaming data



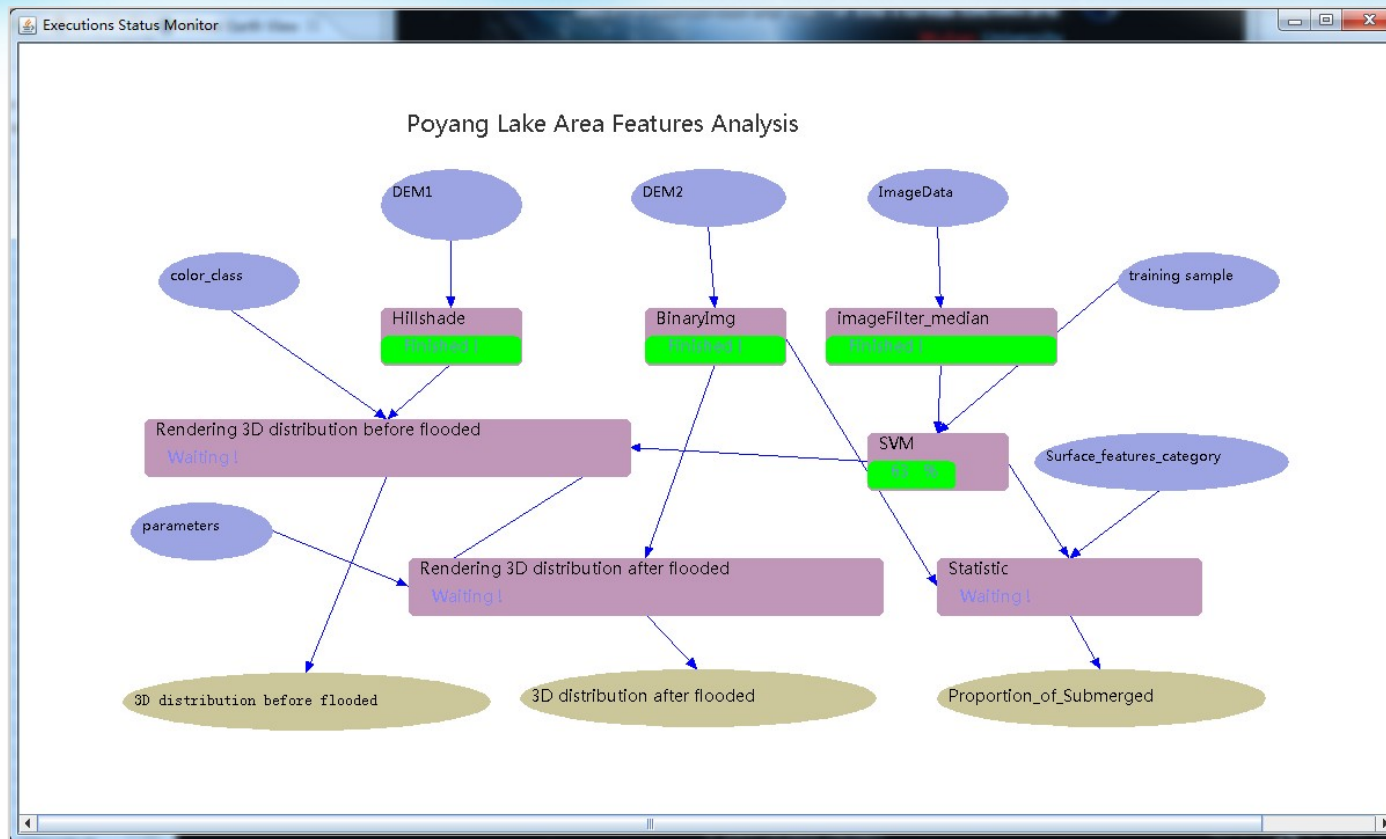


Share processing services .....

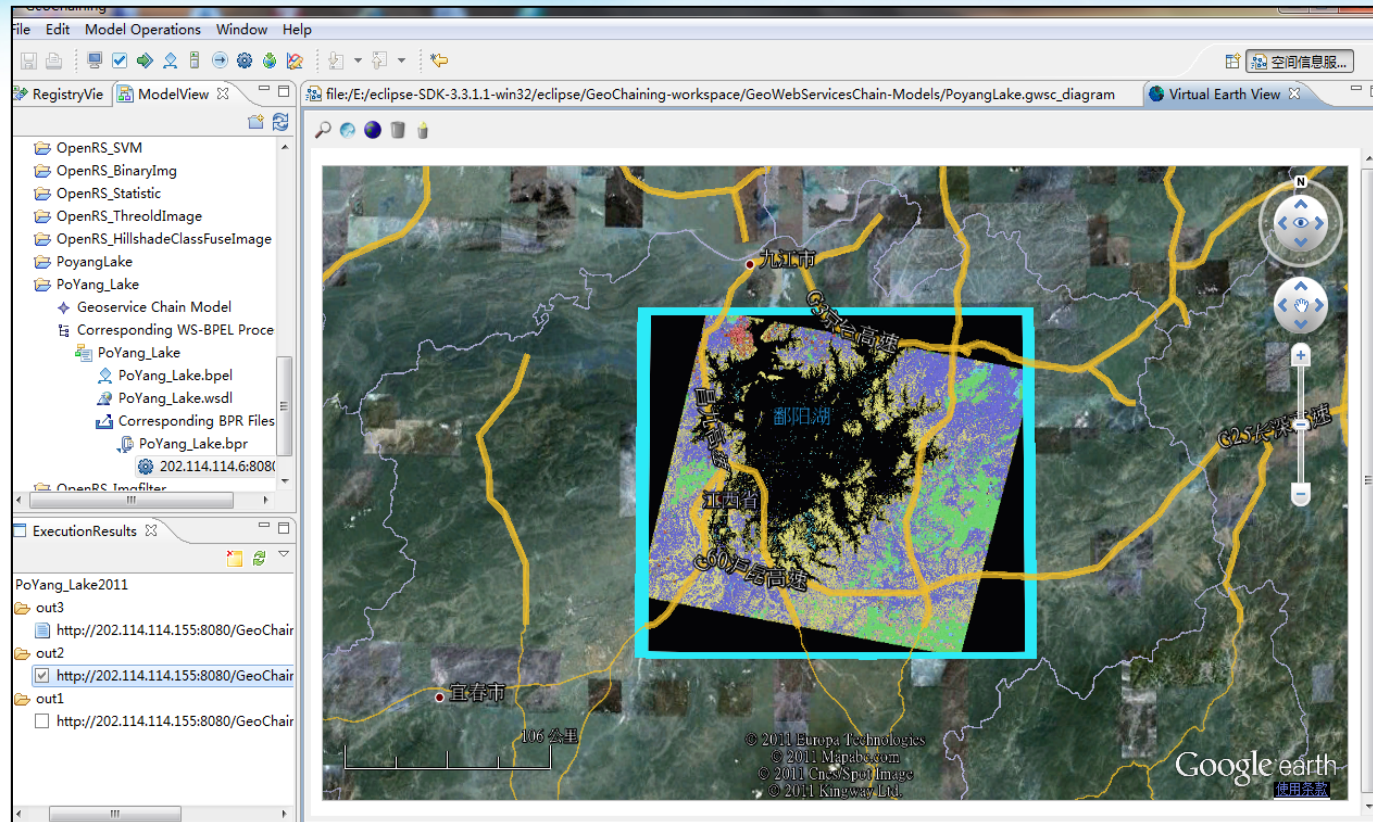




Share knowledge of processing models .....

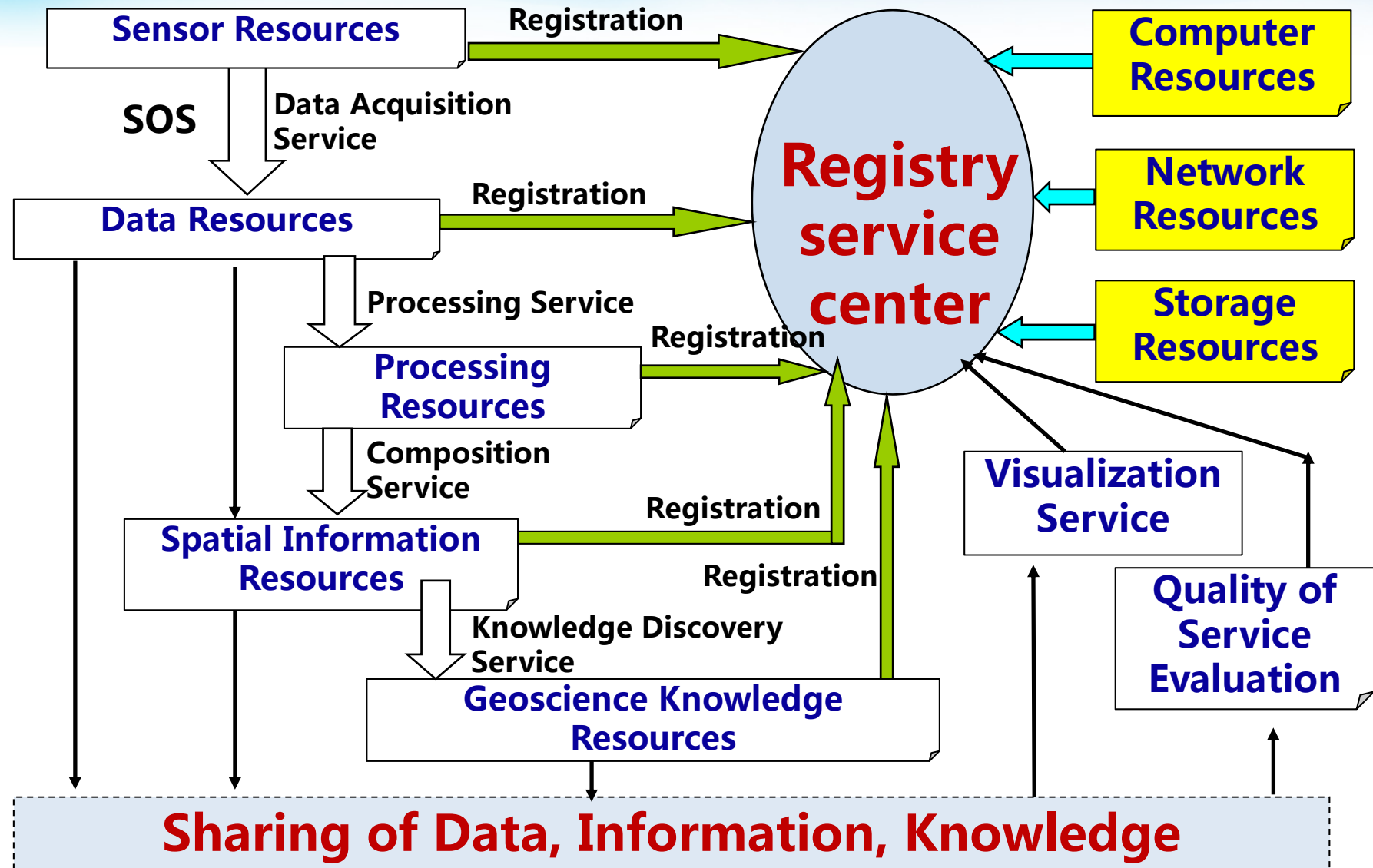


Share model processing services.....



Share model processing results.....

# Vision – Geospatial Service Web



# Brief Conclusions

- ***Real-time GIS is an emerging technology, that***
  - *Super abundant sensors will provide persistently streaming data*
  - *Time-critical is essential for monitoring sustainable development*
- ***The vision is a web - Geospatial Service Web, that shares***
  - *Sensor information and sensor observation data*
  - *Metadata and data*
  - *Algorithm and online processing services*
  - *Knowledge of processing model and composition processing services*
  - *.....*



# Thank you!

测绘遥感信息工程国家重点实验室（武汉大学）

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