



Design and Implementation of Grid-based Information Services

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Presentation of the framework

- **Sino-hungarian cooperation project**
- **Research and technology programme**





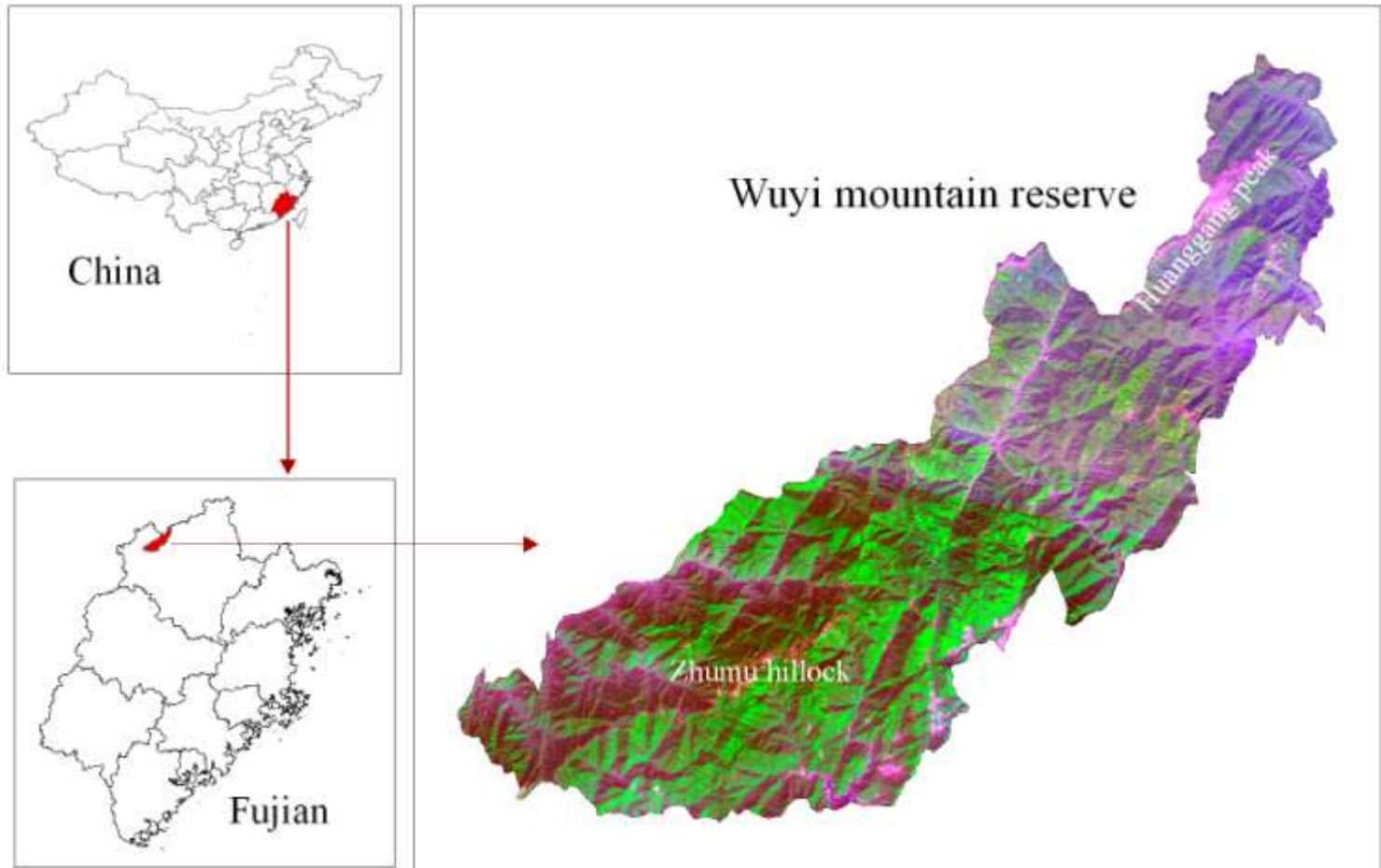
Objectives

- **This presentation addresses the following topics:**
 - How grid-base information services can be use for a better access and share of information and resources
 - This is illustrated by 2 examples linked to biodiversity protection
 - How grid-based information services and portlets were developed and deployed





Location of the Wuyi Mountain Natural reserve





Outlines

- **(1) Definitions**
 - Grid computing
 - Grid services
 - Globus toolkit
 - Portlets
- **(2) Description of the GeoKSGrid platform (content)**
- **(3) Demonstration**

- **(4) Prerequisite**
- **(5) Service and portlet development**
 - Deliver spatial information (WMS and WFS from GeoServer)
 - 3D tree models (VRML)
- **(6) Services and portlet deployment**





(1) definitions

Grid computing :

Grid computing (or the use of computational grids) is the combination of computer resources from multiple administrative domains applied to a common task, usually to a scientific, technical or business problem that requires a great number of computer processing cycles or the need to process large amounts of data.

CERN, one of the largest users of grid technology, talk of The Grid: "a service for sharing computer power and data storage capacity over the Internet"

**Some wellknown examples:
LHC Computing grid (LCG)
BOINC (2.7 petaFLOPS)**





(1) definitions

Grid based information technology:

Some of the problems to tackle:

- How do I manage execution?
- How do I Access and move data?
- How do I monitor and discover services?
- How do I control who can do what?

« Grid is a dynamic, complicated and distributed computing environment which integrates large numbers of heterogeneous resources »

Globus Toolkit has been developed to support the development of service-oriented distributed computing application and infrastructure.





(1) definitions

Globus toolkit:

The Globus Toolkit (developed and provided by the Globus Alliance), currently at version 5, is an open source toolkit for building computing grids.

Globus is one of the most famous grid middleware.

Grid middleware is a specific software product, which enables the sharing of heterogeneous resources, and Virtual Organizations. It is installed and integrated into the existing infrastructure of the involved company or companies, and provides a special layer placed among the heterogeneous infrastructure and the specific user applications.

Major grid middlewares are Globus Toolkit, gLite, and UNICORE.





(1) definitions

Globus toolkit:

The Globus Toolkit is an implementation of the following standards:

- **Open Grid Services Architecture (OGSA)**
- **Open Grid Services Infrastructure (OGSI)**
- **Web Services Resource Framework (WSRF)**
- **Job Submission Description Language (JSDL)**
- **Distributed Resource Management Application API (DRMAA)**
- **WS-Management**
- **WS-BaseNotification**
- **SOAP**
- **WSDL**
- **Grid Security Infrastructure (GSI)**





(1) definitions

Globus toolkit:

The Globus Toolkit has implementations of the OGF-defined protocols to provide:

- **Resource management: Grid Resource Allocation & Management Protocol (GRAM)**
- **Information Services: Monitoring and Discovery Service (MDS)**
- **Security Services: Grid Security Infrastructure (GSI)**
- **Data Movement and Management: Global Access to Secondary Storage (GASS) and GridFTP**





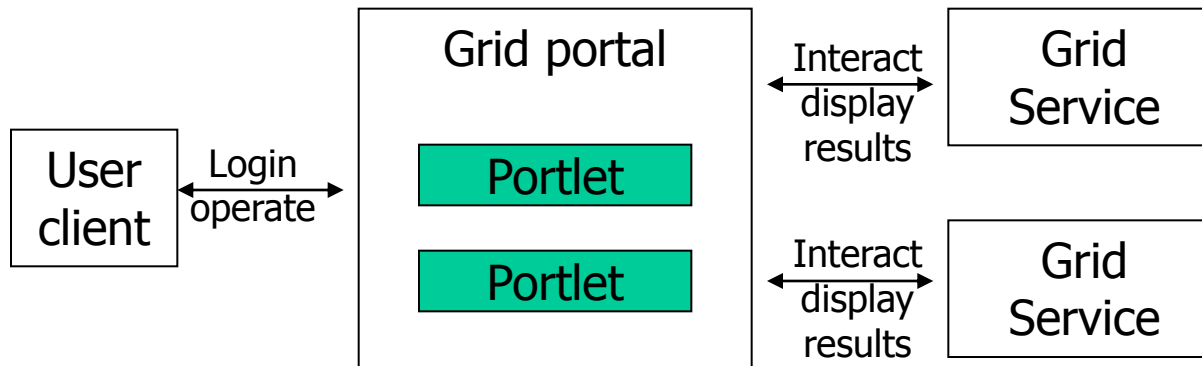
(1) definitions

Portlets:

Portlet is a web component that could be easily integrated into portal and acts as a bridge between users and grid service.

User logs in to portal and operates on portlet

Then portlet interacts with grid service and displays result in portlet.





(2) GeoKSGrid platform description

GeoKSGrid platform (Using GT4)

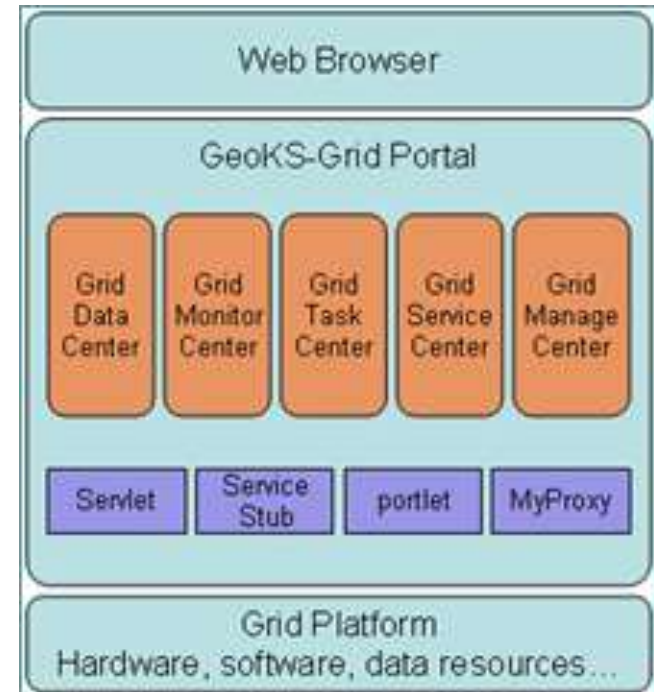
5 service centers:

- Data
- Monitoring
- Task
- Service
- Configuration



2 services:

- Landscape Classification of Nature Reserve Area in WuYi Mountain
- Virtual Plant Models for Rare Species in Wuyi Mountain





(3) Demonstration

- <http://grid.fzu.edu.cn/en>





• HOW?





(4) Prerequisite

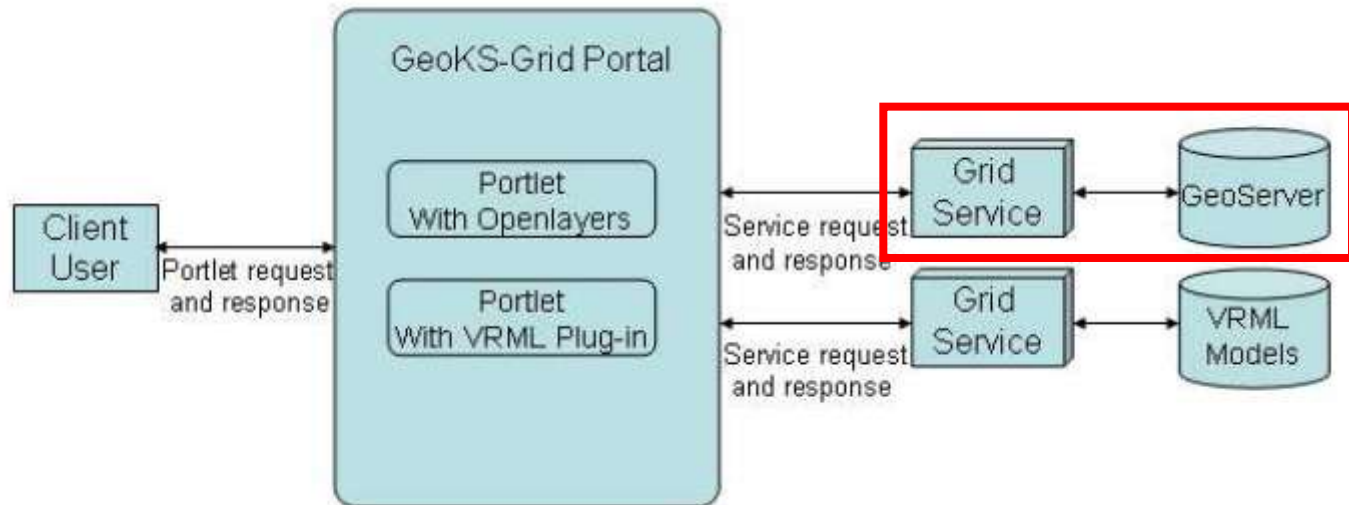
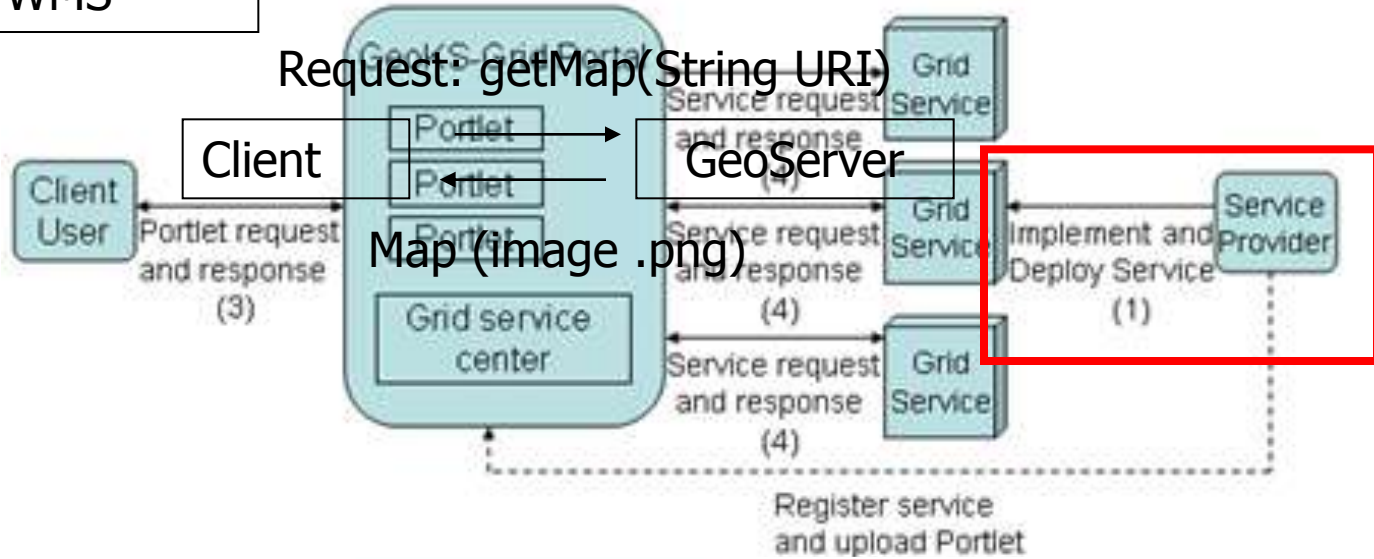
- **To have a system running with UNIX like operating system**
- **To install GT on the machine**
- **To become a Node on the grid by signing a host certification**





(5) Services and portlet design

WMS

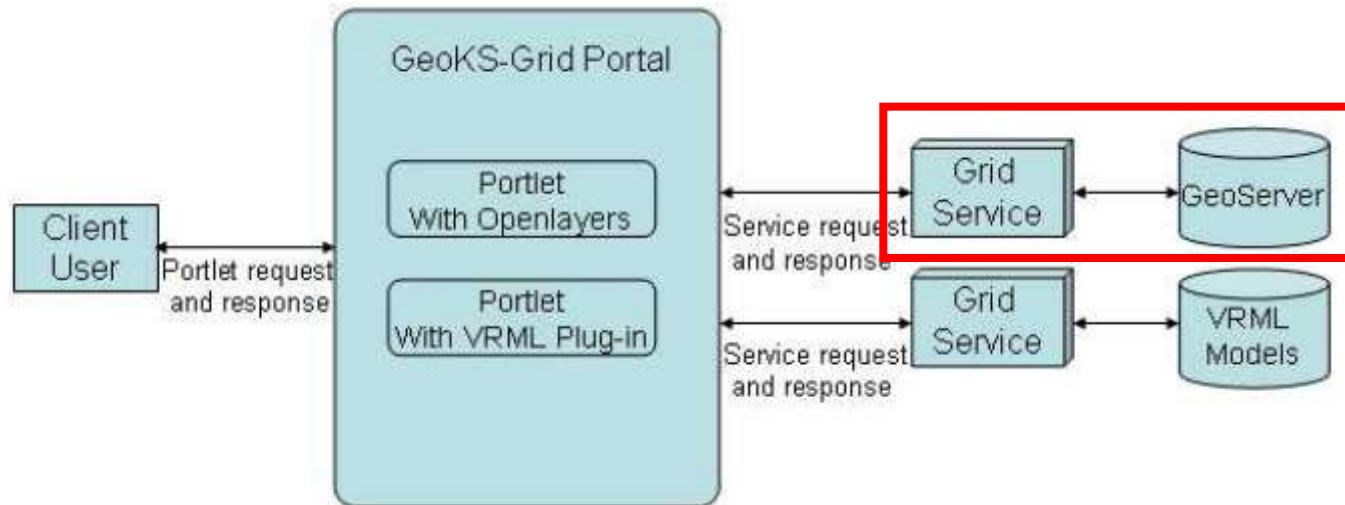
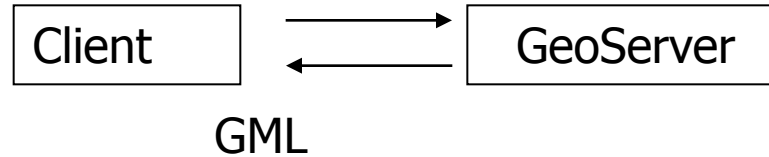




(5) Services and portlet design

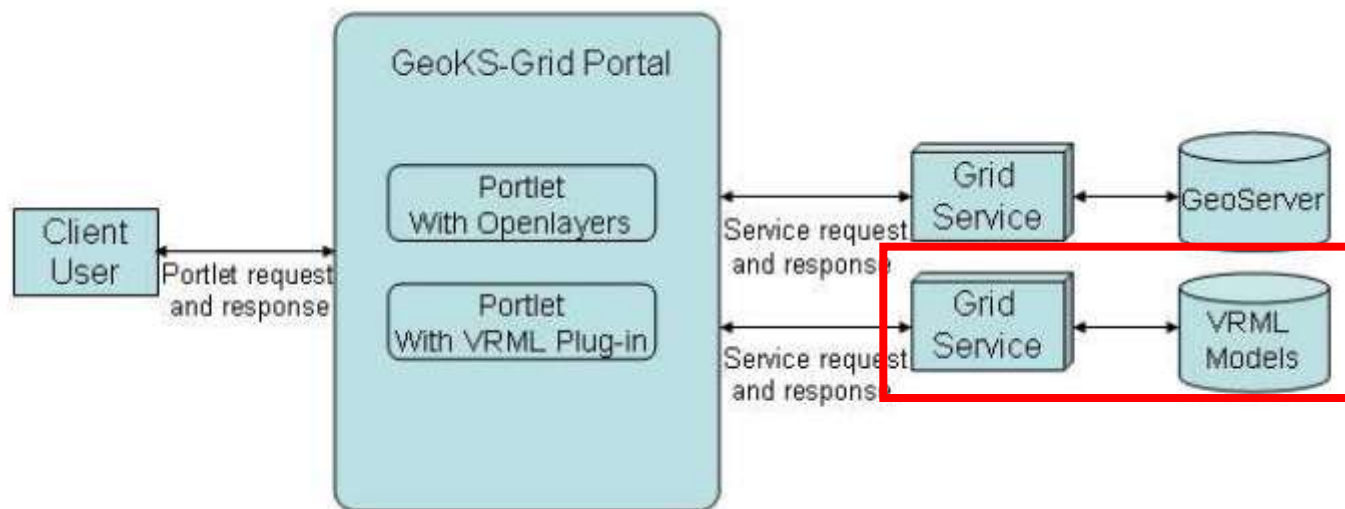
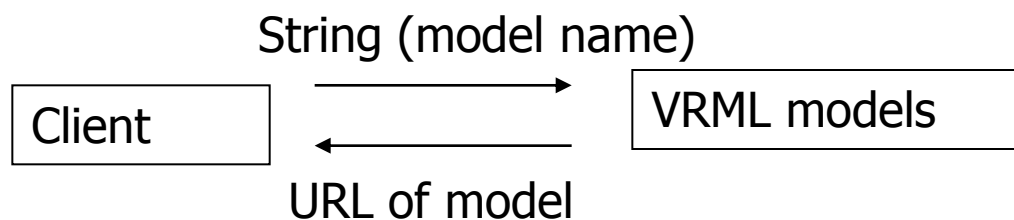
WFS

Request: getFeature



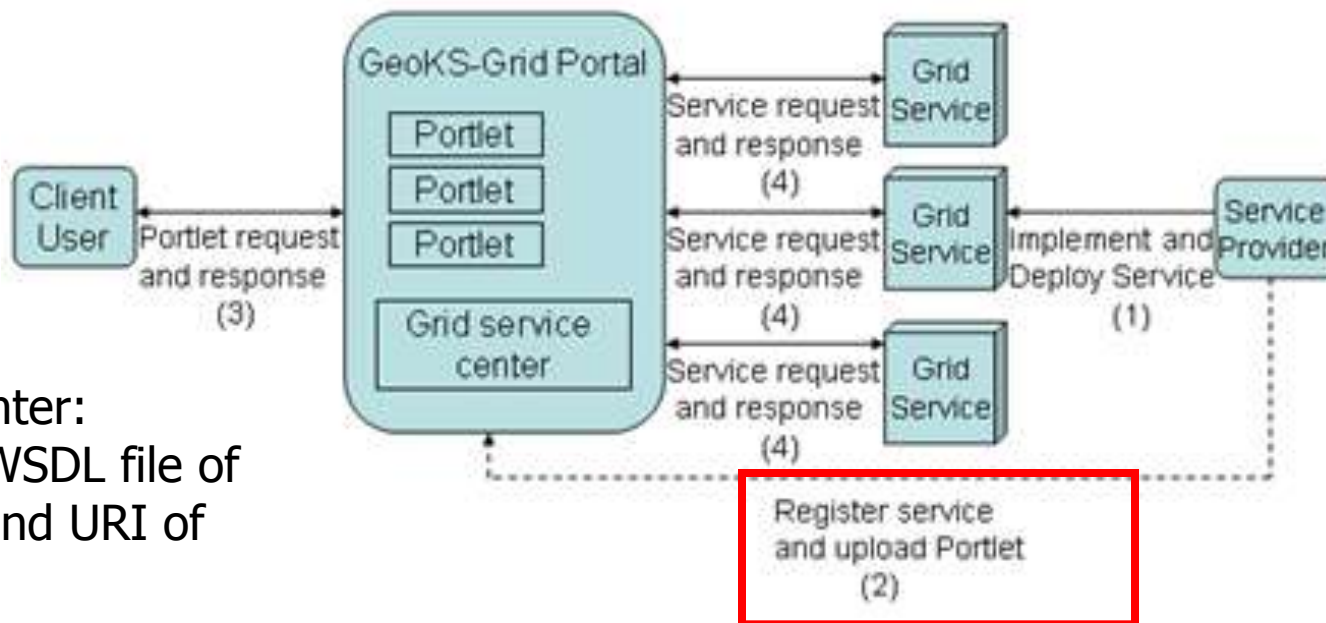


(5) Services and portlet design

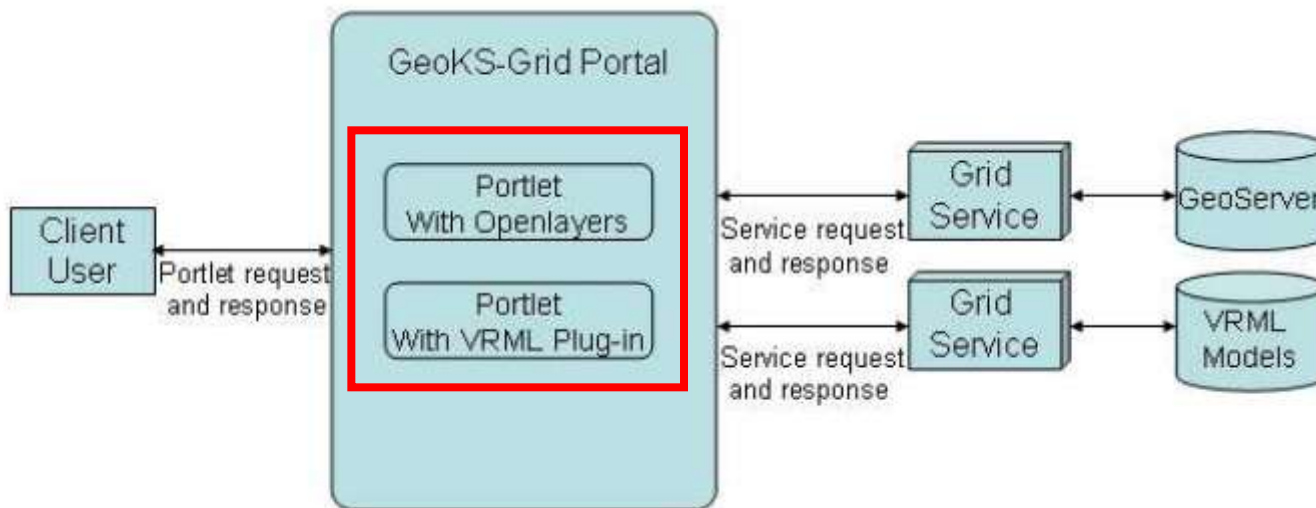




(5) Services and portlet design



In service center:
Name, URI, WSDL file of
grid service and URI of
portlet





Thank you for your attention

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List

- **VRML, Virtual Reality Modelling Language is a standard file format for representing 3-dimensional (3D) interactive vector graphics, designed particularly with the World Wide Web in mind**
- **WSDL The Web Services Description Language (WSDL, pronounced 'wiz-dəl' or spelled out, 'W-S-D-L') is an XML-based language that provides a model for describing Web services. The meaning of the acronym has changed from version 1.1 where the D stood for Definition.**
- **URI Uniform Resource Identifier**
- **WSRF web service resource framework**

