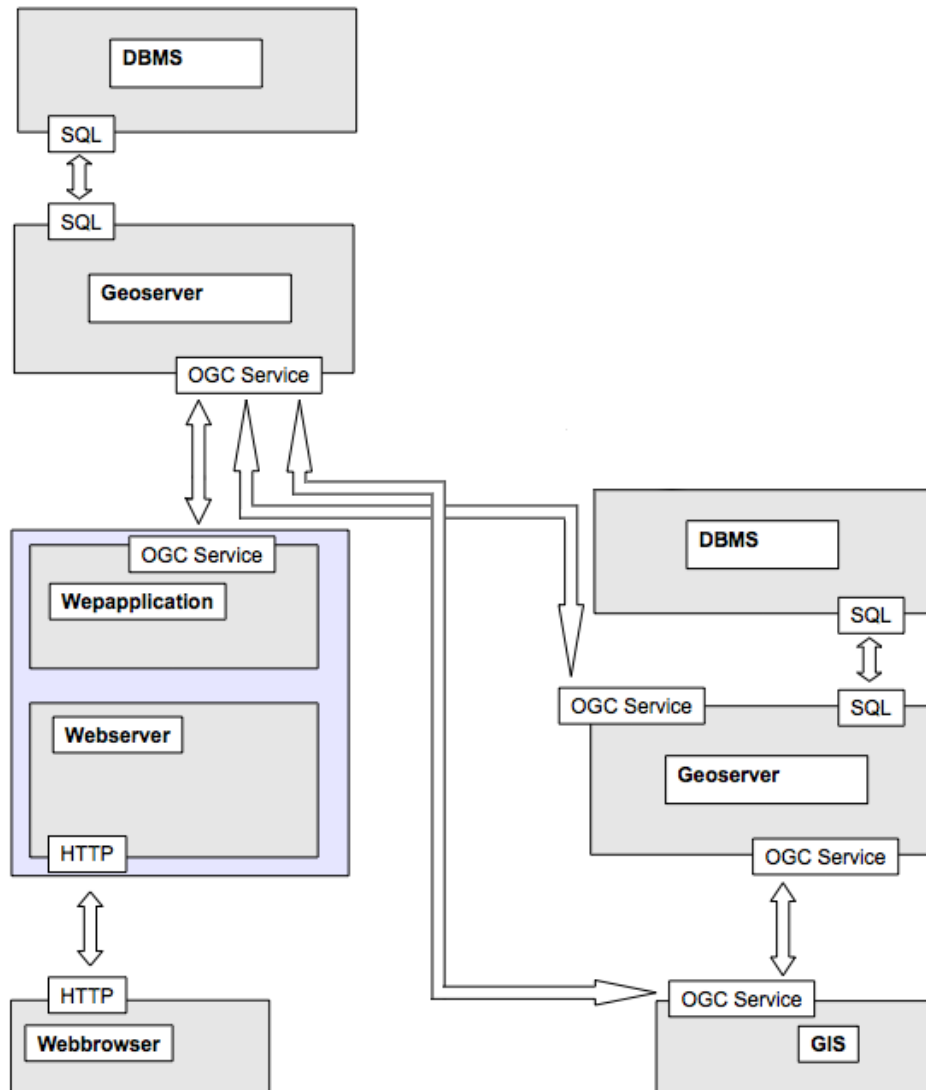


Introduction to Geo-Data-Infrastructures



by Till Kirchner (June 2009)

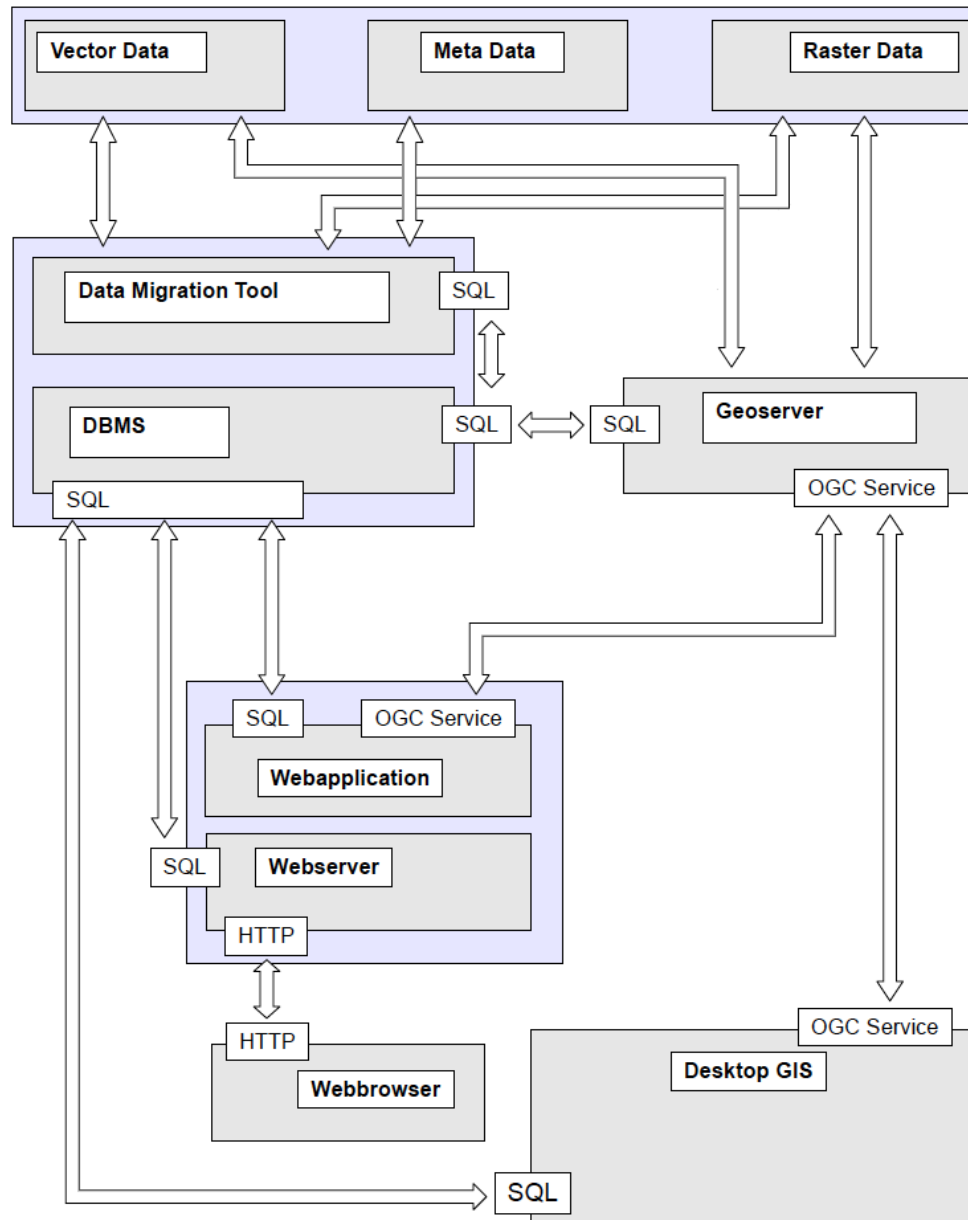
What is a Geo-Data-Infrastructure (GDI) ?

- an open computer network
- based on the Service Oriented Architecture (SOA) approach
- to share and process geospatial data

General Components of a GDI:

- Data Pool
- Tools to access data in a standardized way
- Tools to visualize and process the data
- Tools to search for available data

Components of a GDI



SAO approach in a GDI:

- The Open Geospatial Consortium (OGC) has specified several services to offer geospatial data in a GDI
- The services differ in the data format used to publish the geospatial data and the possible client server interactions

Advantages of using OGC Services in a GDI

- Services can be used platform independent
- Standardized unique access to several different data sources (databases, file systems, other geo servers)
- Data processing is often realized on the server site
- Amount of transferred data through the network is quite low
- Requested data is always up to date

Example of a Client Server Communication using a Web Mapping Service (WMS)

The client sends a http request to a known server address:

<http://localhost:8080/geoserver/wms?SERVICE=WMS&REQUEST=GetCapabilities>

This request specifies the service (WMS) and the operation (GetCapabilities).

All the client needs to know is the correct URL under which the WMS is available.

Example of a Client Server Communication using a WMS

As an answer to the GetCapabilities Request sent by the client the Geo Server sends back a XML file.

This XML file send by the Server includes all information needed from the client to request a map.

Like:

- offered layers
- available styles
- supported Spatial Reference Systems
- ...

Example of a Client Server Communication using a WMS

A GetMap Request from the client could e.g. look as follows:

```
http://localhost:8080/geoserver/wms?  
request=GetMap  
&version=1.1.1  
&srs=EPSG:325833  
&layers=wvk:biospherereserves  
&Format=image/png  
&styles=biosphere  
&bbox=2916625.0625,5215127.375,3509991.1875,6171415.125  
&width=500  
&height=700
```

Link: [GetMap](#)

Result of the GetMap Request:



Map showing the biospherereserves of
Germany

Example of a Client Server Communication using a WMS

Instead of a rasterfile the server also allows to request maps in form of kmz files which can be visualized in an earth viewer like Google Earth

[http://localhost:8080/geoserver/wms/kml?layers=wvk:biosphere reserves](http://localhost:8080/geoserver/wms/kml?layers=wvk:biosphere%20reserves)

Link: GetKML

picture showing the biospherereserve
“Schorfheide Corin” requested via
WMS in Google Earth



Summary of the WMS Dialog:

The whole communication process is platform independent.

We don't know which OS is used on the Server site nor had to specify the client ones.

The client do not even know which Geo Server is used for the WMS.

The map sent by the server was in form of a bmp image (21.5KB).

Question:

Where did the data used to produce our map come from?

Which data source has been used by the Geo Server to produce the requested map is unknown to the client as well.

In our case the data shown in the map came from a Spatial Database Server.

Disadvantages of OGC Services:

- at the moment no user administration is implemented
 - if several users have to use data with different rights a spatial database system (SDBS) should be accessed directly
- there are more sophisticated possibilities to process data on the sever site by using a SDBS directly

Another important Question: How to find published Geo Data?

That data can be used, it is not enough to publish it in a standardized way.

The interested user also need the chance to find data of interest.

The OGC therefor defined the “Catalogue Service”.

Standardized Data Description:

Only if data is described with meta data in a standardized way there is a good chance to build up Services which allow to find data sets to a certain topic or area.

At the moment such a geo data search catalogue is build up for Germany which will be part of a European “geo data search engine” in the future.

Will there be the global GDI in future?

At the moment each federal state in Germany builds up a GDI.

Those GDI will in nearer future be part of the nation wide GDI DE.

The GDI DE itself will be integrated into the European GDI.

Small networks or portals which has been called a GDI 2 years ago are meanwhile already called “GDI Crosspoints” (GDI Knotenpunkte).

And the “GLOBAL SPATIAL DATA INFRASTRUCTURE (GSDI) ASSOCIATION” already exists.

Literature / Resources:

- Geoservices Kurzdokumentation von OGC basierten Geoservices (Michael Dreesmann)
- Praxishandbuch WebGIS mit Freier Software (CCGIS GbR / terrestris GbR)
- Web Mapping mit Open Source-GIS-Tools (Tyler Mitchell)
- <http://www.geoserver.org/>
- <http://postgis.refrations.net/>
- <http://udig.refrations.net/>
- <http://www.opengeospatial.org/>
- <http://www.gsdi.org/>
- <http://www.portalu.de/>