

# Web Map Servers

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**UNESCO-IHE**  
Institute for Water Education



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# Learning Objectives

After this lecture you will be able to understand web map servers as used in Web-GIS applications

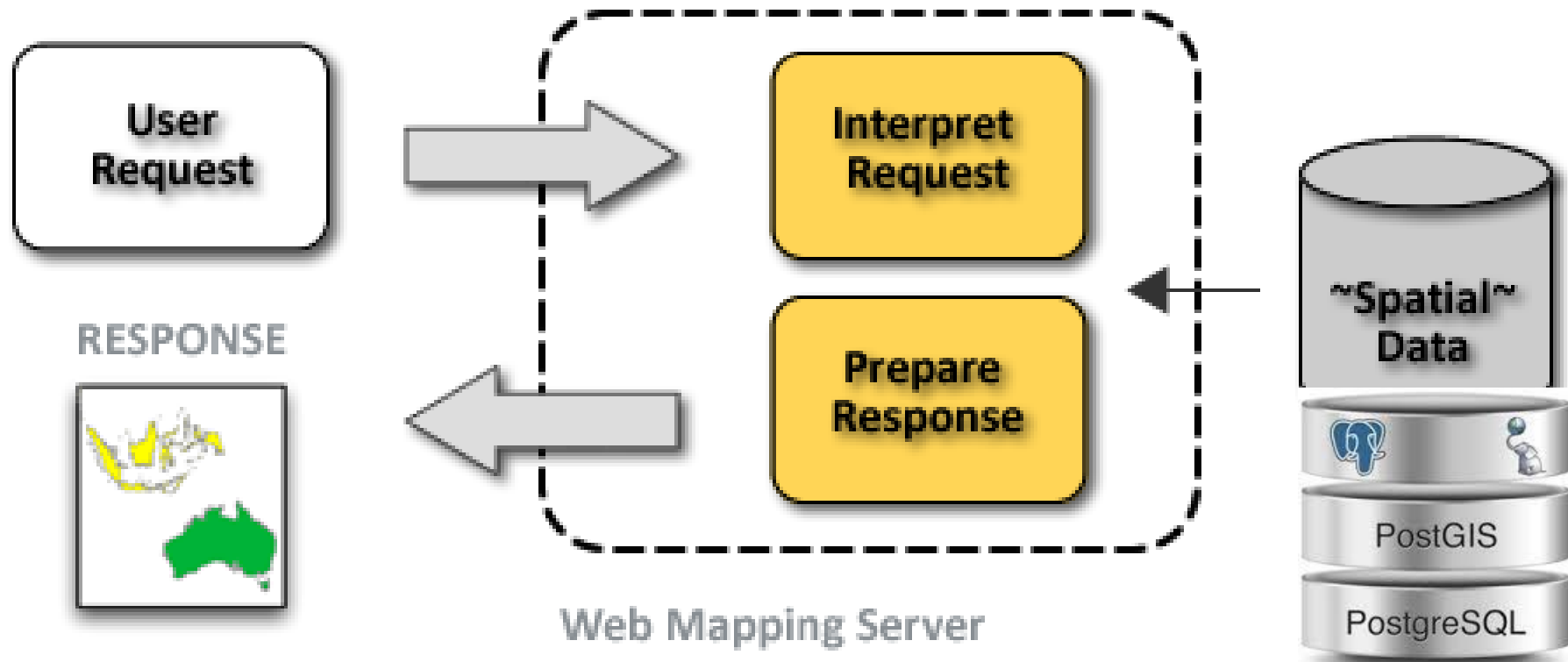
# Introduction

A Web Map Server is a computer program that produces maps of spatially referenced data dynamically from geographic information.

It is a simple interface for web based mapping applications.

The various protocols involve a query syntax for posting a request for the desired layers and zoom window to the server, which returns a map as a standard picture (GIF, PNG or other format) or as a vector format (e.g. KML, GML)

# Workflow diagram



# Types of Web map servers (Web)

1. Open source server software that provide web map services capability include:
  - GeoServer
  - Mapnik
  - MapServer
  - MapGuide Open Source
  - World Wind Server
  - QGIS Server
  - GeoWebCache

# Types of Web map servers(Web)

2. Proprietary server software that provide web map services capability include:

- ArcGIS server
- ArcIMS
- GeoMedia
- Oracle MapViewer
- GeoWebPublisher
- Autodesk's Infrastructure Map Server

# Types of web map servers(Desktop)

1. Open source standalone (client side) software that allow viewing web map services include:

- Geozilla
- QGIS Browser
- osgEarth
- Marble

# Types of web map servers(Desktop)

2. Proprietary standalone (client side) softwares that allow viewing web map services include:

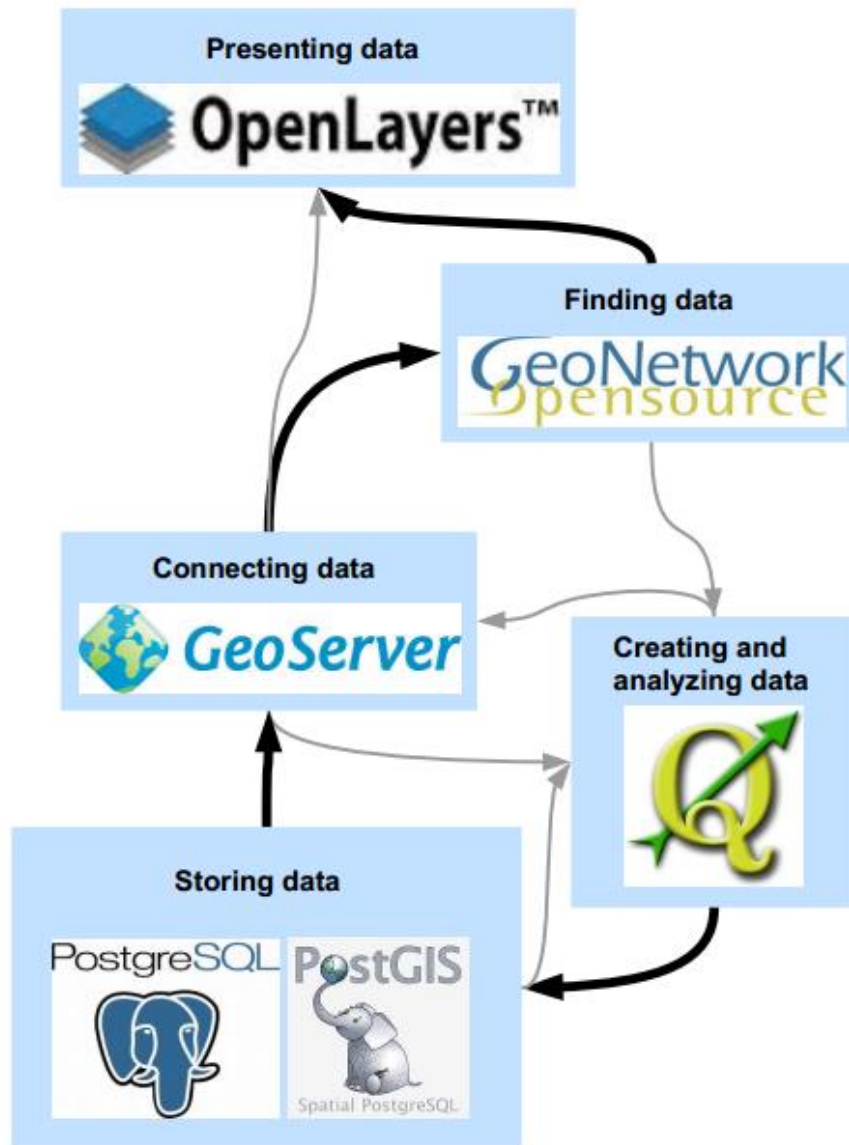
- Esri ArcGIS & ArcGIS Explorer
- Google Earth
- Global Mapper
- Geoweb3d Desktop



# Geoserver

GeoServer is a specific implementation of a web-mapping server, offering access to data in a known set of formats and sources (files and databases), using specific protocols. GeoServer can read from many different data sources, from files on the local disk to databases.

# Geoserver



- PostGIS/PostgreSQL for **storing data**
- **GeoServer** for **publishing data**
- OpenLayers for **visualisation of data**
- GeoNetwork for storing and searching **metadata**

# Geodata formats

The following is a list of the most common data formats supported by GeoServer.

## 1. Files

- Shapefile
- JPEG2000
- GeoTIFF
- ArcGrid
- GDAL formats(ESRI .hdr Labelled,ERMapper(.ers),ILWIS Raster Map(.mpr,.mpl)

## 2. Databases

- PostgreSQL-PostGIS
- DB2
- ArcSDE
- SQL Server
- Oracle Spatial

# Geodata Services

The structure protocols that are used in making request for geographic data from web mapping server include:

1. Web Map Service (WMS)
2. Web Feature Service (WFS)
3. Web Coverage Service (WCS)
4. Web Processing Service (WPS)

# Geodata Services

Data

Metadata

Processing

Web  
Mapping  
Services  
(WMS)

Web  
Feature  
Services  
(WFS)

Web  
Coverage  
Service  
(WCS)

Catalogue  
Services  
for the  
Web  
(CSW)

Web  
Processing  
Service  
(WPS)



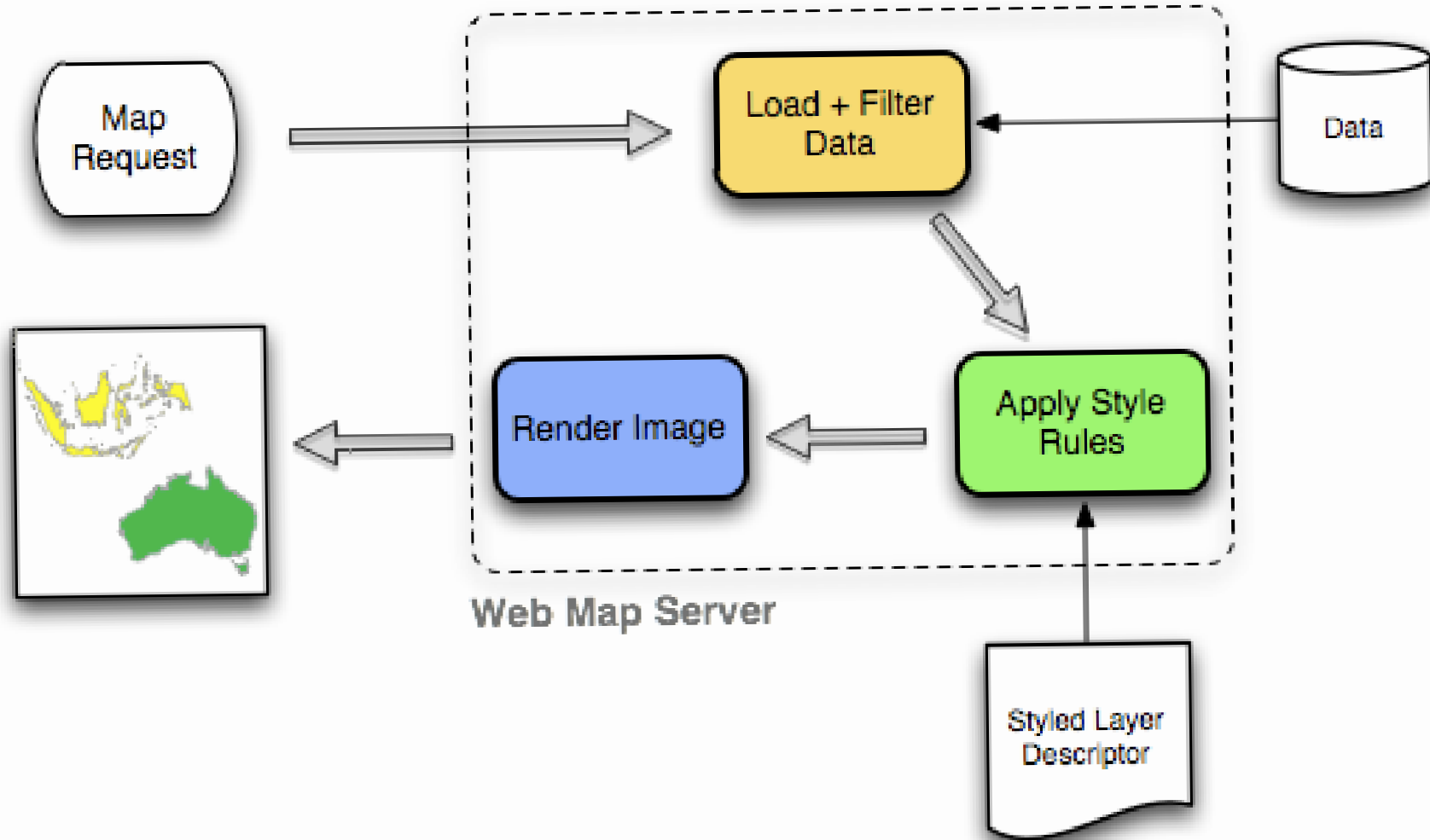
# Web Map Service (WMS)

The Web Map Service (WMS) is a standard protocol for serving geo-referenced map images generated by a map server.

The client sends a request to a map server, then the map server generates an image based on parameters passed to the server in the request and finally returns an image.

The WMS generates an image from whatever source material is requested, which could be vector data, raster data, or a combination of the two.

# A diagram showing how a WMS turns data into a map image

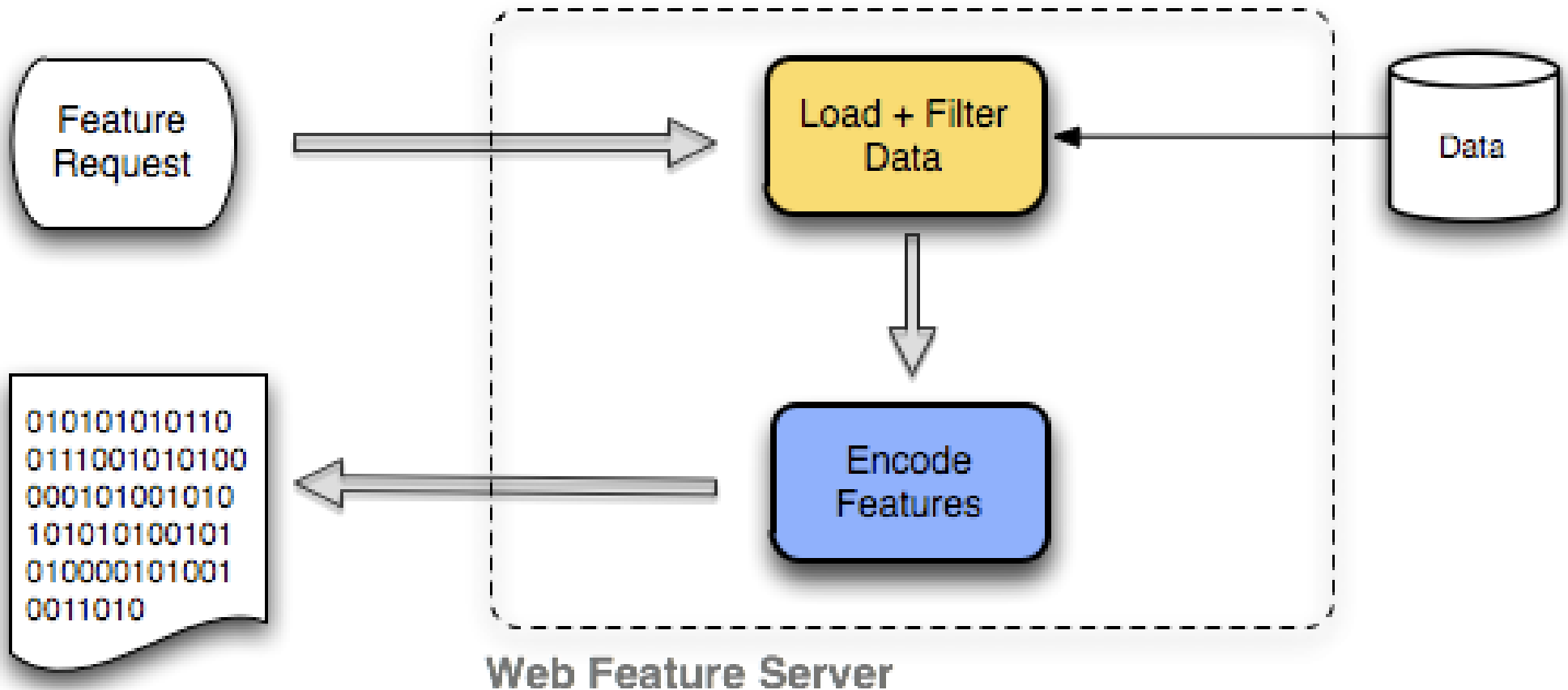


# Web Feature Service (WFS)

This protocol is used to return geographic feature data. This allows users to create their own maps and applications from the data, to convert data between certain formats, and be able to do raw geographic manipulations of served data.



# A diagram showing how a WFS turns a request into a response

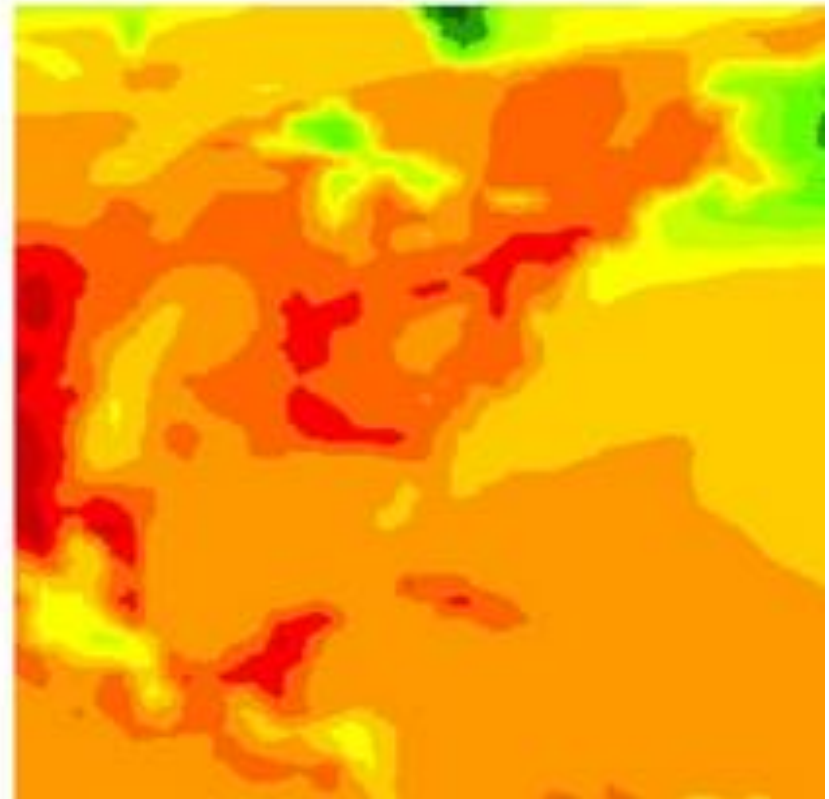


# Web Coverage Service (WCS)

A Web Coverage Service is a standard that allows the visualization and provision of geospatial data from a web server. Data can be defined by temporal and spatial characteristics and can be delivered in multiple raster based data formats (e.g. GeoTiffs, .img, ENVI (.hdr) file types). WCS returns a server's available data with its original properties in tact, which can be interpreted, processed and extrapolated.

# An output of Web Coverage Service (WCS)

- Scope: Retrieval of gridded, swath, TIN or other "coverage" data in binary or other formats (HDF, GeoTIFF, NITF, NetCDF, etc.)
  - Elevation, Orthoimagery
- Operations:
  - GetCapabilities
  - GetCoverage



# Catalogue Services for the Web (CSW)

Catalogue services support the ability to publish and search collections of descriptive information (metadata) for data, services, and related information objects.

The following standard CSW operations are currently supported by Geoserver

- GetCapabilities
- DescribeRecord
- GetRecords
- GetRecordById
- GetDomain

# Why GeoNode/Geoserver?

GeoNode/Geoserver came into being due to the premise that the original way of sharing spatial data is broken. Thus provide the following benefits:

- GeoNode's data management tools allow for integrated creation of data, metadata, and map visualizations.
- Each dataset in the system can be shared publicly or restricted to allow access to only specific users.
- GeoServer is designed for interoperability, it publishes data from any major spatial data source using open standards.
- It brings together mature and stable open-source software projects under a consistent and easy-to-use interface allowing users, with little training, to quickly and easily share data and create interactive maps.

# References

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<http://docs.geoserver.org/2.7.4/user/webadmin/>

<http://www.slideshare.net/antscott/web-mapping-servers-which-horse-for-which-course-1>

<http://www.slideshare.net/SebastianBenthall/spatial-data-infrastructure-best-practices-with-geonode>

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