Geospatial Web Services
Web GIS Server

The Web GIS server is the most important component in a Web GIS. Its functionality, ability to be customized, scalability, and performance are critical to the success of the Web GIS application. The capability and the quality of a Web GIS application is largely dependent by the Web GIS server it uses.

Leading Web GIS Servers

• **esri ArcGIS Server** — esri Propritary Software

• **Geoserver** — Originally Developed by volunteers and some paid programmers by the Open Planning Project. Now part of the OpenGeo Suite.

• **Mapserver** — Developed by University of Minnesota
Web Services

In contrast with Web pages, which are usually isolated and closed to external software systems, Web services are considered open, in that they are programming interfaces that can be accessed by other applications over the Web.
Web Services

A **Web service** is a program that runs on a Web server and exposes programming interfaces to other programs on the Web.

Example of a Web Service:

http://www.w3schools.com/webservices/ws_example.asp
Web Services

Advantages of Web Services:

– Open to other software systems over the Web

– Independent of programming language and OS

– Web services and their clients are not tightly bound to one another

– One-for-all release and update
Geospatial Web Services

Geospatial Web services can be categorized by the functions they provide:

• Map Services
• Data Services
• Analytical Services
• Metadata Catalog Services
**Geospatial Web Services**

**Map Services**: Map services allow clients to request maps of a specific geographic extent, and the maps are returned in an image format.

Beyond viewing, map services may also support: attribute query, spatial identify and dynamic reprojection functions.
Geospatial Web Services

Map Services

There are two types of Map Services:

• Cached/Tiled Map Service
• Dynamic Map Service
Cached/Tiled Map service

A map service that fulfills requests with pre-created tiles from a cache is called a cached/tiled map service.

A cached map service:

- Highly resource intensive on the server side
- can significantly improve performance time in delivering maps
- Is typically used to serve maps where the content is relatively static.
- Eg. Imagery, basemaps, contour maps etc..
Geospatial Web Services
Map Services

Dynamic Map service

A Dynamic map service requires the server to render the map each time a request comes in.

A Dynamic map service:

- Not very resource intensive on the server side
- can be significantly slow depending on the size of the data and server capabilities
- Is typically used to serve maps whose data is constantly changing
- Eg. weather, population, gps data etc...
Data services allow you to query, edit and synchronize data over the Web. Some data services are also map services, which let you see the map display as well have access to the raw data.

There are 4 types of Data Services:

- Feature Editing Services
- Search Services
- Image Services
- Geodata synchronization Services
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Data Services

Example:

- Feature Editing Service: [http://servicesbeta.esri.com/ArcGIS/rest/services/Fire/IncidentAssessment/FeatureServer](http://servicesbeta.esri.com/ArcGIS/rest/services/Fire/IncidentAssessment/FeatureServer)


- Image Service: [http://imagery.arcgisonline.com/arCGIS/rest/services/LandsatGLS](http://imagery.arcgisonline.com/arCGIS/rest/services/LandsatGLS)
Analytical geospatial Web services perform a variety of GIS analysis functions, from commonly used geocoding and road network analysis to geometry transformation and geoprocessing services.

There are 4 types of Analytical Services:

• Geocoding Services
• Network Analysis Services
• Geometry Services
• Geoprocessing Services
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Analytical Services

Example:

- Geocoding Service:
  http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Locators

- Network Analysis Service:
  http://sampleserver3.arcgisonline.com/ArcGIS/rest/services/Network

- Geometry Service:

- Geoprocessing Services:
  http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Demographics/ESRI_Population_World/GPServer
Metadata can describe GIS data and services. A metadata catalog service allows publishing and searching metadata. It facilitates sharing geospatial information and services.
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Web Service Communications

There are two types of communication models for Web Services:

• **SOAP(Simple Object Access Protocol) Based Web Services** use HTTP Post to send requests. The requests and responses are in SOAP encapsulated XMLs

http://www.w3schools.com/webservices/ws_example.asp
Geospatial Web Services

Web Service Communications

REST (Representational State Transfer) style Web Services are Web services that transmit data over HTTP without additional messaging layer such as SOAP. In most common RESTful Web service architecture, the client sends all parameters in the request URL.
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Web Service Communications

“With REST everything is a URL”


http://rpc.geocoder.us/service/csv?address=1600+Pennsylvania+Ave,+Washington+DC
The main standards bodies related to geospatial Web services are:

– OGC: Open Geospatial Consortium

– ISO/TC 211: International Organization for Standardization, Technical Committee 211

– W3C: World Wide Web Consortium