

Web Mapping? Why? How?

Isn't Google enough?

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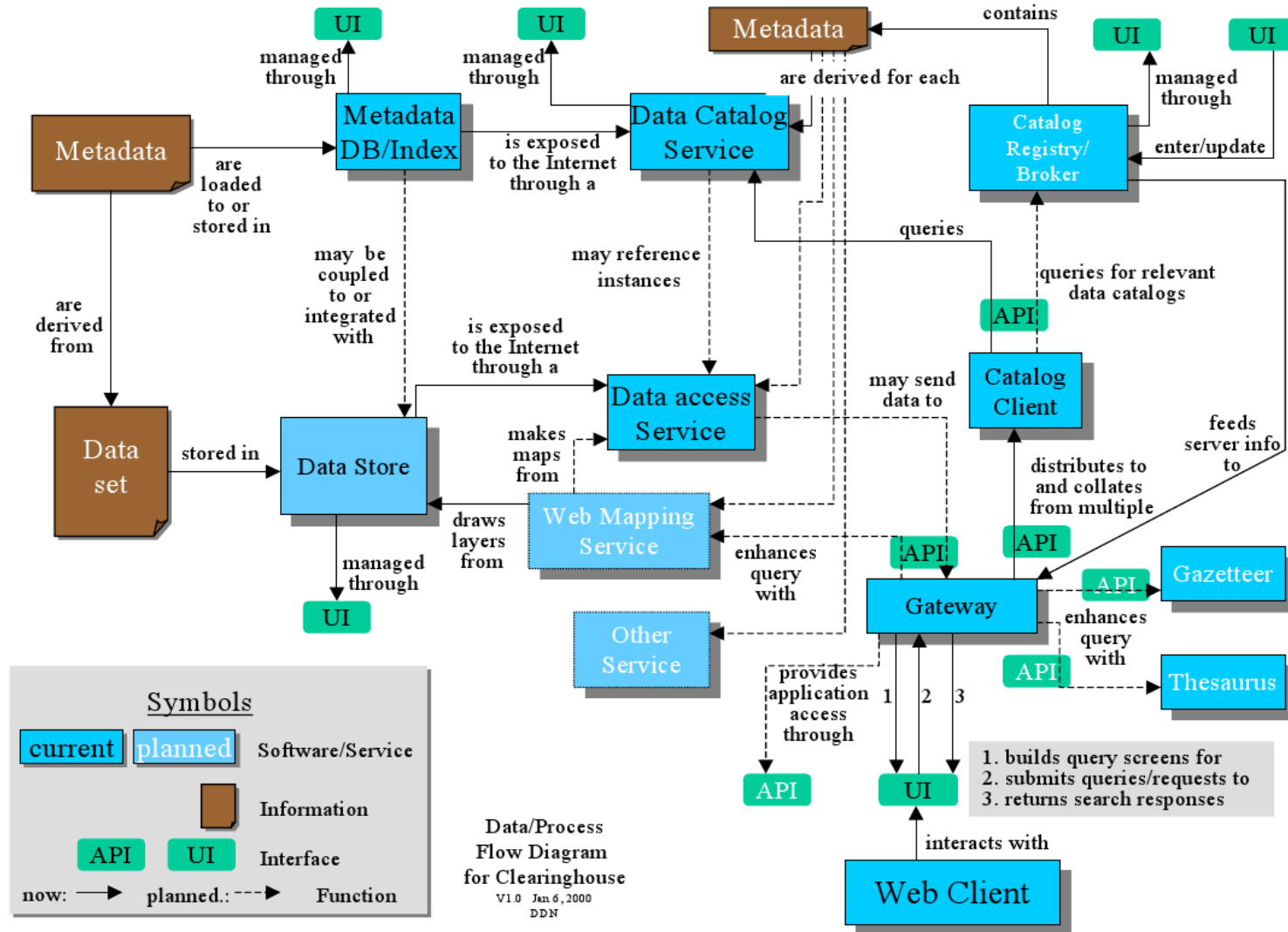
Oxford Archaeology/OADigital

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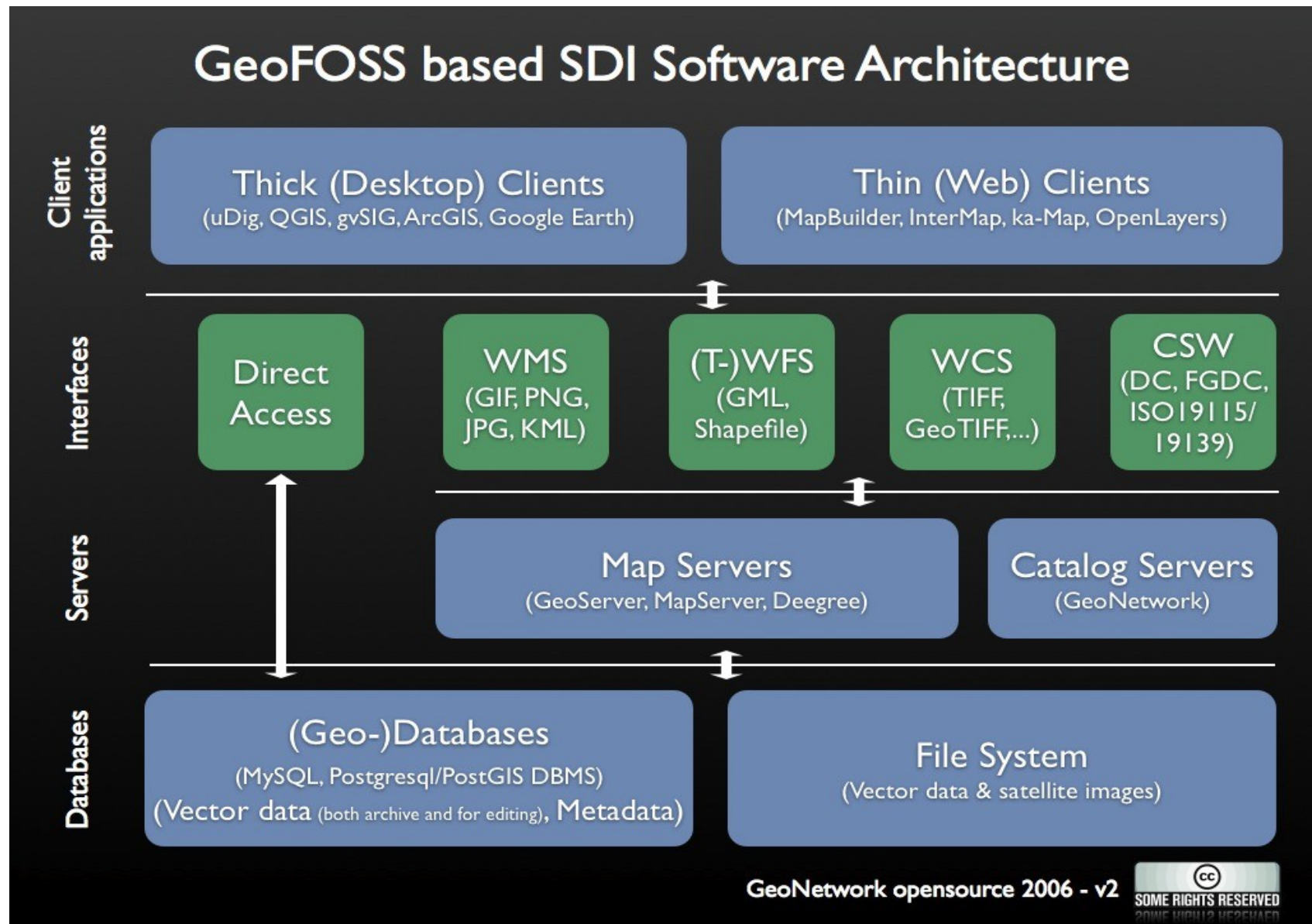
+44 (0)1524 880212

The Geospatial Stack

(Diagram from Hell)



The Real Geospatial Stack



Your Data

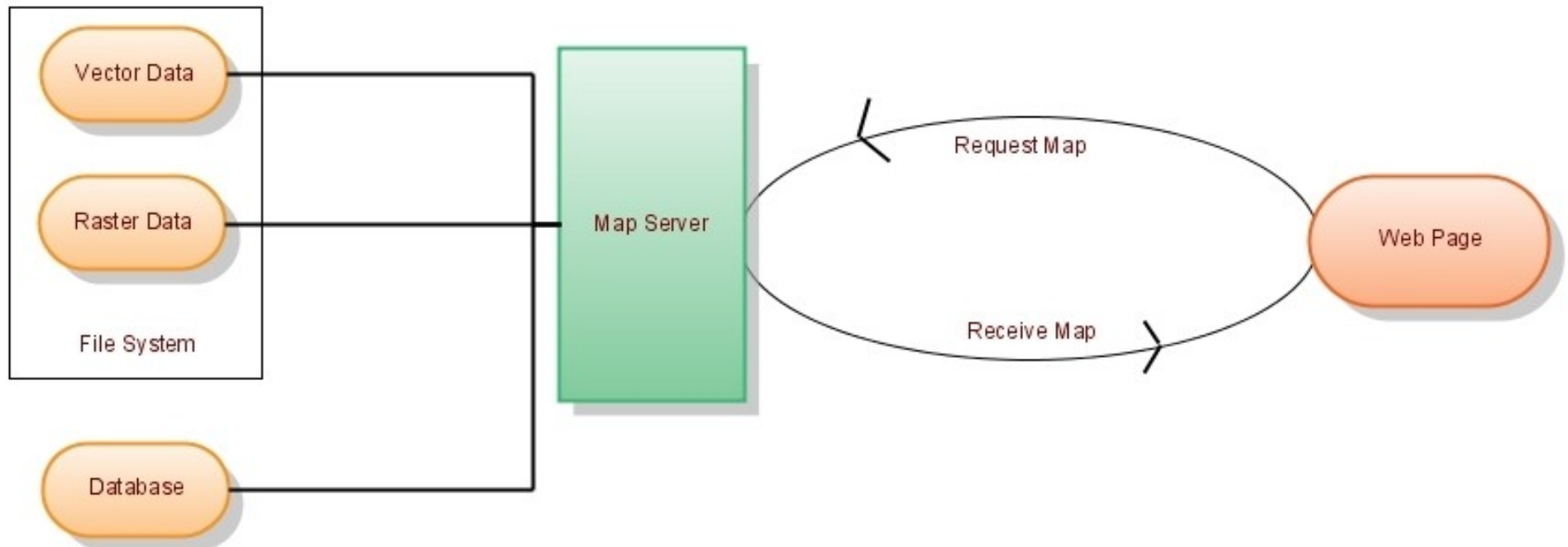
Must be:

Accessible

Readable

Clean

Map Servers



Converting your data into web-accessible formats

Minnesota Mapserver

Download windows binaries from:

<http://maptools.org/ms4w/>

and everything else from:

<http://mapserver.gis.umn.edu/download/current/>

Minnesota Mapserver

Check it's working by entering the following URL in
firefox:

<http://www.maths.lancs.ac.uk/cgi-bin/mapserv?>

Simple Map File (test.map):

MAP

NAME "My first map"

UNITS dd

EXTENT -10908931.354601 -2813375.945688 8689298.182275 11986946.775106

PROJECTION

'init=epsg:4326'

END

IMAGETYPE PNG

SIZE 400 300

SHAPEPATH "/web/home/cookj1/data/vmap0_shapefiles"

IMAGECOLOR 255 255 255

LAYER

NAME alaska

DATA alaska

STATUS OFF

TYPE POLYGON

PROJECTION

'init=epsg:4326'

END

CLASS

NAME "Alaska"

STYLE

COLOR 232 232 232

OUTLINECOLOR 32 32 32

END

END

END

END

Testing your map

Test your map at the web prompt:

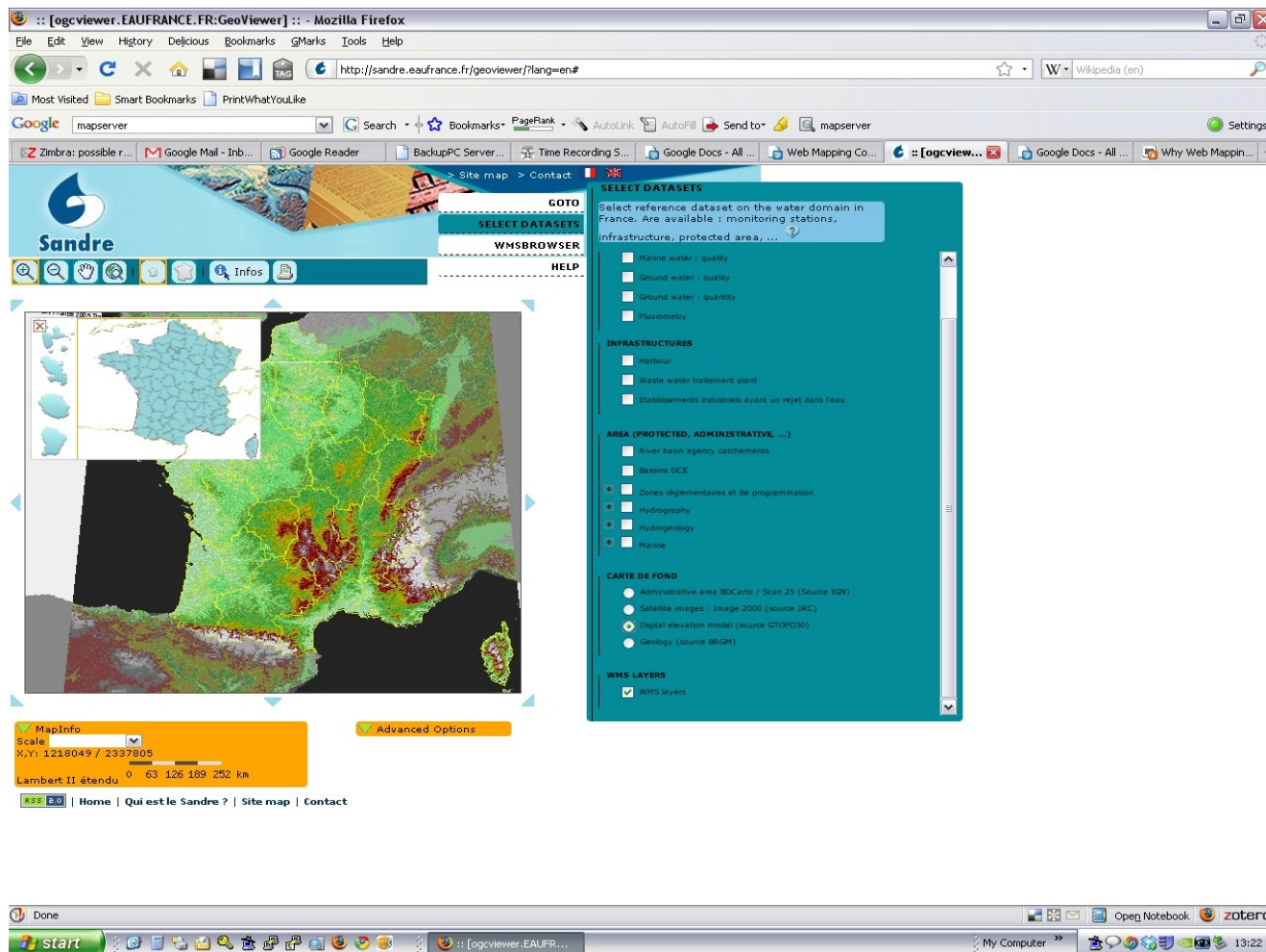
```
http://www.maths.lancs.ac.uk/cgi-bin/mapserv?  
map=/web/home/cookj1/test.map&mode=map
```

Or from the command line:

```
shp2img -m test.map -o testmap.png
```

Mapserver in the wild

<http://mapserver.gis.umn.edu/gallery>



Geoserver

<http://geoserver.org/>



Mapserver Demos

Try the demos here:

<http://www.maths.lancs.ac.uk/~rowlings/MapServer/workshop-5.0/>

Web Mapping Services

The Power-House of your setup

WMS

A GetCapabilities request:

<http://wms.jpl.nasa.gov/wms.cgi?request=GetCapabilities>

```
<?xml version='1.0' encoding="UTF-8" standalone="no" ?>
<!DOCTYPE WMT_MS_Capabilities SYSTEM "http://wms.jpl.nasa.gov/WMS_MS_Capabilities.dtd" [ <!
ELEMENT VendorSpecificCapabilities EMPTY> ]>
<WMT_MS_Capabilities version="1.1.1">
<Service>
  <Name>OGC:WMS</Name>
  <Title>JPL Global Imagery Service</Title>
  <Abstract>WMS Server maintained by JPL, worldwide satellite imagery.</Abstract>
```

...

WMS

A GetMap request:

<http://wms.jpl.nasa.gov/wms.cgi?>

request=GetMap

&service=wms

&version=1.1.1

&srs=EPSG:4326

&format=image/jpeg

&styles=

&bbox=-180, -60, 180, 84

&width=600

&height=300

&layers=global_mosaic

Additions to the map object (test_wms.map)

```
MAP
...
  WEB
  ...
  METADATA
    "wms_title" "My first wms server"
    "wms_srs" "EPSG:4326"
    "wms_onlineresource" "http://www.maths.lancs.ac.uk/cgi-
bin/mapserv?map=/web/home/cookj1/test_wms.map"
  END
END
...
END
```


Additions to the layer object

LAYER

...

STATUS

MINSCALE 1000

MAXSCALE 10000000

METADATA

"wms_title" "My first wms layer"

"wms_srs" "EPSG:4326"

END

END

Testing your server

GetCapabilities:

*[http://www.maths.lancs.ac.uk/cgi-bin/mapserv?
map=/web/home/cookj1/test_wms.map&service=wms&reque
st=GetCapabilities](http://www.maths.lancs.ac.uk/cgi-bin/mapserv?map=/web/home/cookj1/test_wms.map&service=wms&request=GetCapabilities)*

Add it as a WMS layer in Quantum GIS

WFS

A GetCapabilities Request:

http://map.ns.ec.gc.ca/envdat/map.aspx?

service=WFS&version=1.0.0&request=GetCapabilities

A GetFeature Request:

http://map.ns.ec.gc.ca/envdat/map.aspx?

service=WFS

&version=1.0.0

&request=GetFeature

&typename=envirodat

Additions to map and layer (test_wfs.map):

```
MAP
...
  WEB
    ...
    METADATA
      ...
      "wfs_title" "My first wfs server"
      "wfs_srs" "EPSG:4326"
      "wfs_onlineresource" "http://www.maths.lancs.ac.uk/cgi-
bin/mapserv?map=/web/home/cookj1/test_wfs.map
    END
  END
  LAYER
    ...
    DUMP TRUE
    METADATA
      "wfs_title" "My first wfs layer"
      "gml_featureid" "cat"
      "gml_include_items" "all"
    END
  ...
```

Testing your server:

A GetCapabilities Request:

*[http://www.maths.lancs.ac.uk/cgi-bin/mapserv?
map=/web/home/cookj1/test_wfs.map&service=wfs&request=getcapabilities&version=1.0.0](http://www.maths.lancs.ac.uk/cgi-bin/mapserv?map=/web/home/cookj1/test_wfs.map&service=wfs&request=getcapabilities&version=1.0.0)*

A GetFeature Request:

*[http://www.maths.lancs.ac.uk/cgi-bin/mapserv?
map=/web/home/cookj1/test_wfs.map&service=wfs&version=1.0.0&request=getfeature&typename=alaska](http://www.maths.lancs.ac.uk/cgi-bin/mapserv?map=/web/home/cookj1/test_wfs.map&service=wfs&version=1.0.0&request=getfeature&typename=alaska)*

Maps on web pages

(Finally)

An OpenLayers map file (oltest1.html)

```
<html>
  <head>
    <script src="http://www.maths.lancs.ac.uk/ol/lib/OpenLayers.js"></script>
    <script type="text/javascript">
      var map;
      function init() {
        map = new OpenLayers.Map('map');
        var wms = new OpenLayers.Layer.WMS(
          "OpenLayers WMS",
          "http://labs.metacarta.com/wms/vmap0?",
          {layers: 'basic'}
        );
        map.addLayers([wms]);
        map.zoomToMaxExtent();
      }
    </script>
  </head>
  <body onload="init()">
    <div id="map" style="width: 600px; height: 300px"></div>
  </body>
</html>
```

WMS Layers in detail

name	{String}	A name for the layer
url	{String}	Base url for the WMS
params	{Object}	An object with key/value pairs representing the GetMap query string parameters and parameter values.
options	{Object}	Hashtable of extra options to tag onto the layer

```
var wms = new OpenLayers.Layer.WMS("Alaska",  
    "http://www.maths.lancs.ac.uk/cgi-bin/mapserv?  
    map=/web/home/cookj1/test_wms.map",  
    {layers: "alaska"}, {isBaseLayer: false});
```


Commercial Layers (oltest2.html)

You need an API key in the script section (for google, sign up at <http://code.google.com/apis/maps/signup.html>):

```
<script src='http://maps.google.com/maps?
file=api&v=2&key=ABQIAAAAJpkAC9ePGem0llq5XcMiuhr_wWLPFku8lx9i
2SXYRVK3e45q1BQUd_beF8dtzKET_EteAjPdGDwqpQ'></script>
```

Then additions to the html file:

```
var satellite = new OpenLayers.Layer.Google(
    "Google Satellite" ,
    {type: G_SATELLITE_MAP}
);

map.addLayers([satellite]);
```

Google/WMS Layers (oltest_wms.html)

```
var map;
var options = {
    projection: new OpenLayers.Projection("EPSG:4326"),
    maxExtent: new OpenLayers.Bounds(-179.722, 33.6053, 179.679, 84.7857)
};

function init() {
    map = new OpenLayers.Map('map', options);
    map.addControl(new OpenLayers.Control.LayerSwitcher());

    var gsat = new OpenLayers.Layer.Google(
        "Google Satellite",
        {type: G_SATELLITE_MAP}
    );

    var wms = new OpenLayers.Layer.WMS(
        "Alaska",
        "http://www.maths.lancs.ac.uk/cgi-bin/mapserv?map=/web/home/cookj1/test_wms.map",
        {'layers': 'alaska', 'transparent': true}, {reproject: true}
    );

    map.addLayers([gsat, wms]);

    map.setCenter(new OpenLayers.LonLat(-152, 67), 3);
}
```

WFS Layers

Require extra configuration of the server to accept external wfs requests (see <http://trac.openlayers.org/wiki/FrequentlyAskedQuestions#ProxyHost>):

In general, uses the same set of parameters as WMS, eg:

```
var wfs = new OpenLayers.Layer.WFS(  
    "Alaska",  
    "http://www.maths.lancs.ac.uk/cgi-bin/mapserv?  
        map=/web/home/cookj1/test_wfs.map",  
    {typename: "alaska"}  
);
```

BUT:
WFS layers need reprojecting to overlay correctly on commercial map layers (you may need to edit the projection file that mapserver uses- see http://crschmidt.net/~crschmidt/spherical_mercator.html)

OpenLayers Examples

Try them out at:

<http://www.maths.lancs.ac.uk/ol/examples>

Other Mapping APIs

Mapguide OpenSource: <http://mapguide.osgeo.org>

Viewer Sample Application - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://localhost:8008/mapguide/phpviewersample/ajaxtiledviewersample.php

AJAX (Tiled) Viewer Sample Application

Zoom

Layers

- ✓ Tiled Layers
 - Roads
 - Parcels
 - Zone: AGR
 - Zone: EXM
 - Zone: MER
 - Zone: MFG
 - Zone: RES
 - Zone: S&W
 - Zone: WTC
 - Zone: Other
 - Islands
 - Hydrography
 - CityLimits

Properties

Name	Value
Acreage	0.37
Billing	906 S. 17TH ST.
Address	906 S. 17TH ST.
Description1	ORIGINAL PLAT
Description2	THE N 1/3 OF LOTS 1,2,3
Description3	BLK 223 ALSO THAT F OF VAC
Description4	MARYLAND AVE ADJ THE
Lot	90X180
Dimensions	

Parcel
Name: GLAUBIG TRUST 7-21-9
Address: 906 S. 17TH ST.

Overview

Welcome to the Sample Application. This sample demonstrates how to construct a PHP Viewer application using the Web Extensions APIs. The application is based on a subset of the Sheboygan data set and shows how to:

- Connect to a Site and create a session.
- Query feature data and work with geometry.
- Change the view of a map from server-side script.
- Read and manipulate XML based resources.
- Store temporary resources within a session.
- Plot a map as an EPlot DWF.

Server Platform: Apache/2.0.55 (Win32) mod_fastcgi/2.4.2 mod_jk/1.2.15

X: -87.728347, Y: 43.745220 (Degree) | 1 feature selected | 1: 7,196 | 4 x 7 (mi) | Powered by MapGuide

Cataloguing

(Or what to do with all this fancy web-data now you've got it)

Geonetwork

Java-based geospatial cataloguing system

Download at: <http://geonetwork-opensource.org/>

Geonetwork in the wild

<http://www.geoportal.org>

The screenshot shows a Mozilla Firefox browser window displaying the GEOportal website. The browser's address bar shows the URL http://www.geoportal.org/web/guest/geo_home. The website features a navigation menu with links for HOME, ABOUT GEOPORTAL, CONTACTS, NEWS, MAP VIEWER, ADVANCED SEARCH, and ABOUT GEO. A central globe map is the focal point, with a text overlay that reads "Click to activate the Globe". The map displays several orange location markers in the northern hemisphere and red exclamation mark icons in the southern hemisphere. A text box on the map provides a news alert: "Floods and landslides in Kenya. Severe flooding and landslides - affecting an estimated 300,000 people - are being reported from several parts of the country. The floods started in Sudalangi district, Western Province on 10 November. Read the full story". To the left of the globe is a vertical sidebar with a "Provide Feedback to GEO" button and a list of resource categories: DISASTERS, HEALTH, ENERGY, CLIMATE, WATER, WEATHER, ECOSYSTEMS, AGRICULTURE, and BIODIVERSITY. Below these are sections for "GEOSS CLEARINGHOUSE" and "GEOSS REGISTRY". To the right of the globe, a "BREAKING NEWS" section repeats the headline about floods and landslides in Kenya, accompanied by a small world map icon. Below this is a "WELCOME TO GEOPORTAL" section with a brief description of the portal's services. At the bottom of the map area, there are controls for "Zoom", "Change Surface Texture", "Find a place", and "Key". The browser's status bar at the bottom left shows the JavaScript error "javascript:getFlash()".

References

Web Mapping Illustrated (O'Reilly) by Tyler Mitchell ISBN 0-596-00865-1

Mapserver main website: <http://mapserver.gis.umn.edu/>

Mapserver 5 tutorial: <http://biometry.gis.umn.edu/tutorial/>

Geoserver website: <http://geoserver.org/>

Openlayers website: <http://openlayers.org/>

Introduction to Openlayers (Workshop, FOSS4G 2008):

<http://workshops.opengeo.org/openlayers/intro/doc/>

OGC Standards (for WMS/WFS etc): <http://www.opengeospatial.org/standards>

Geonetwork website: <http://geonetwork-opensource.org/>

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