Web Mapping? Why? How?

Isn't Google enough?

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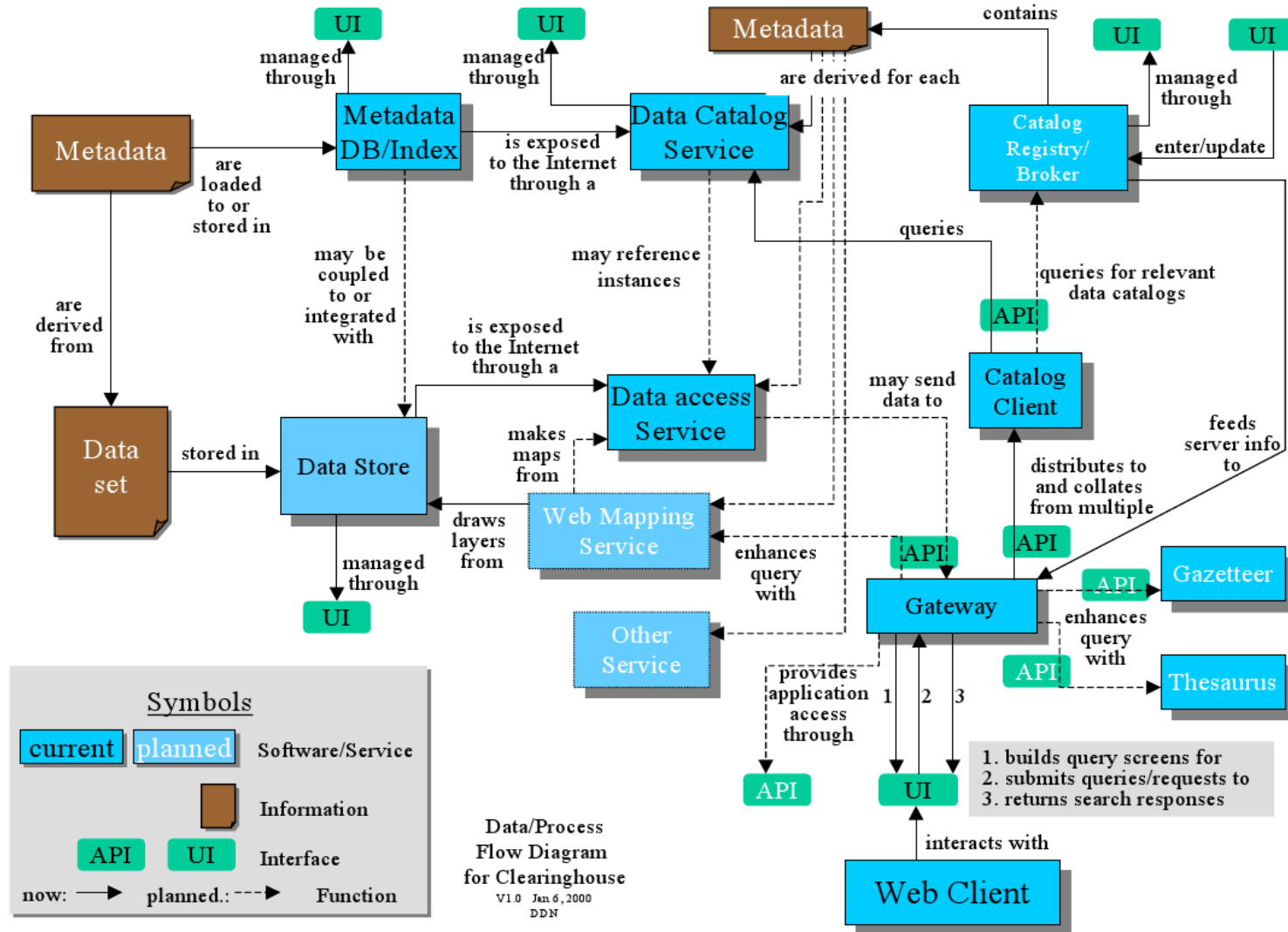Oxford Archaeology/OADigital
j.cook@thehumanjourney.net
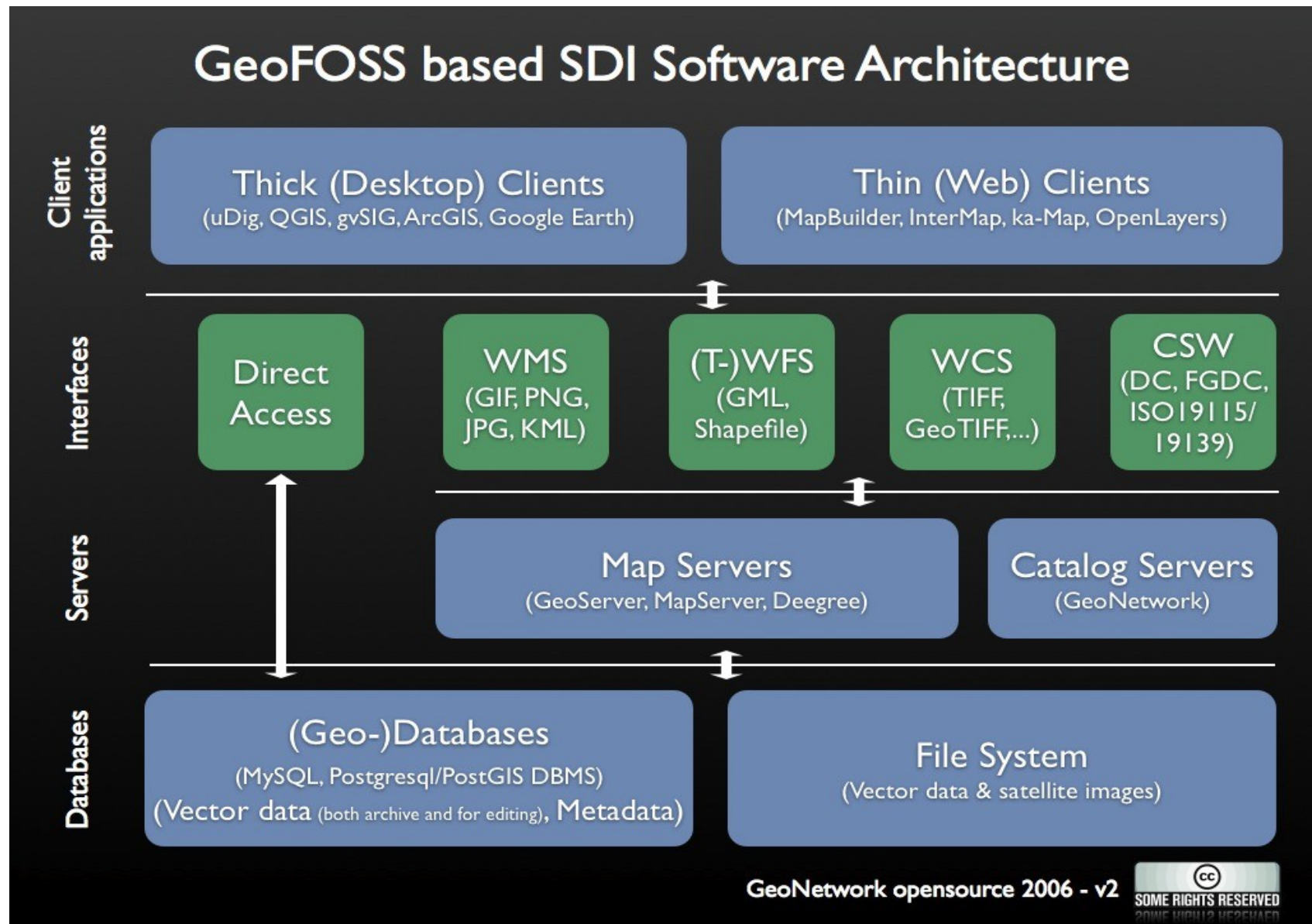+44 (0)1524 880212

The Geospatial Stack
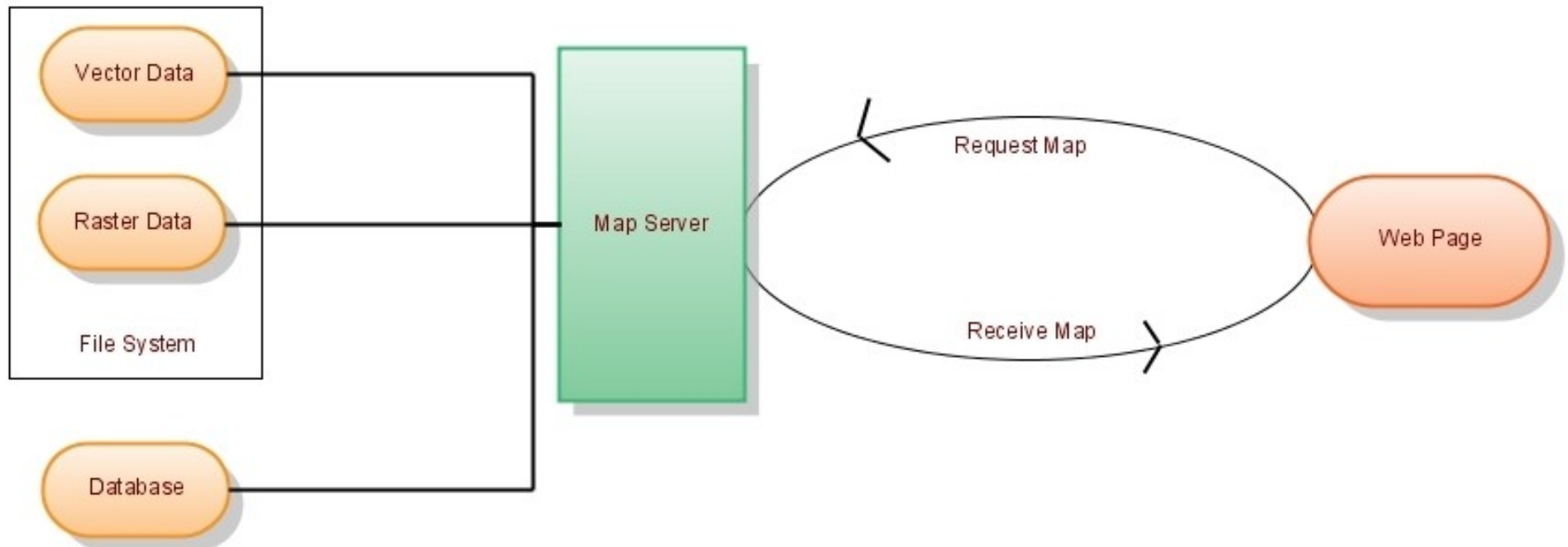
(Diagram from Hell)

The Real Geospatial Stack

GeoFOSS based SDI Software Architecture

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
```
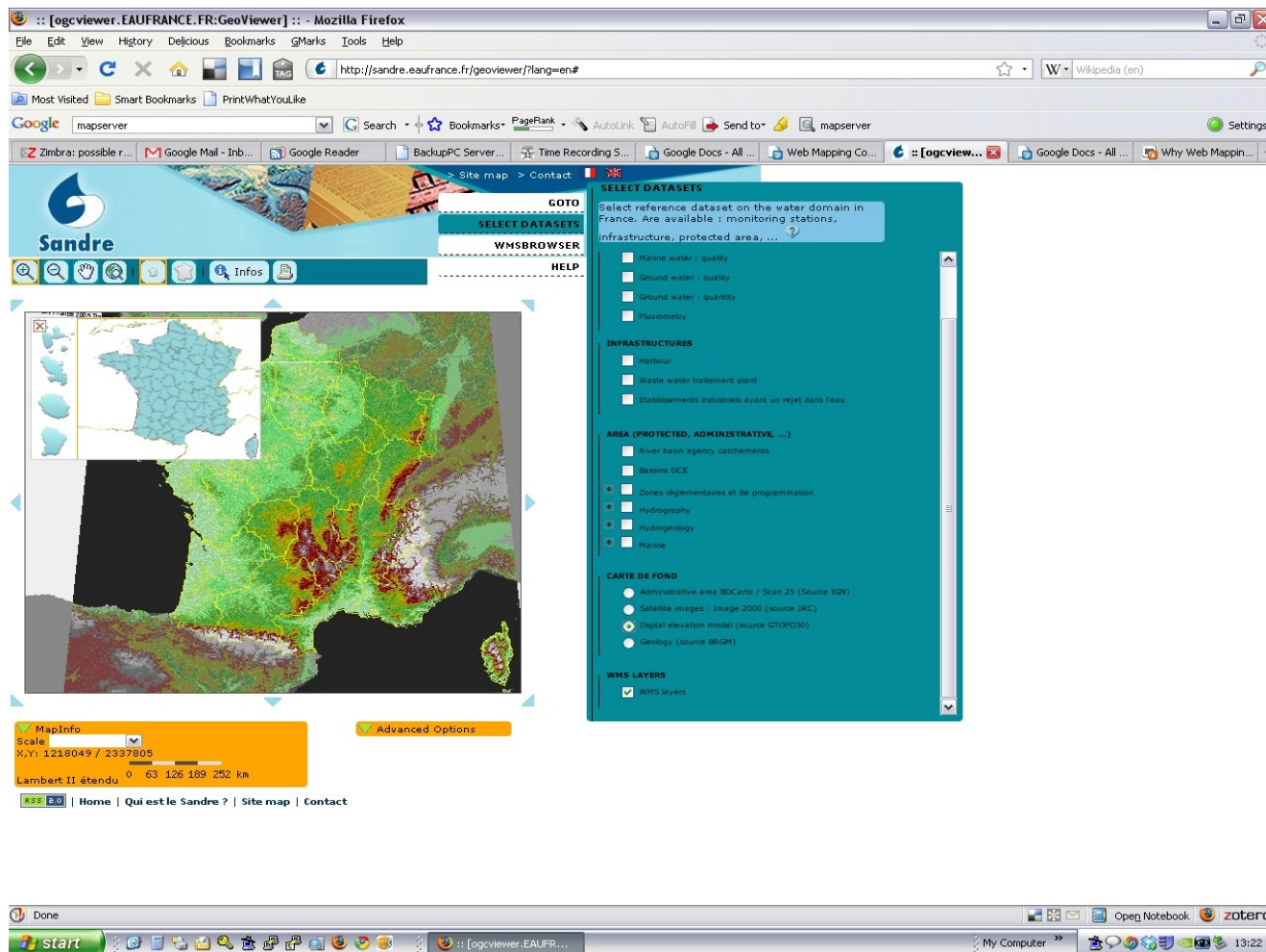
Testing your map

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&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

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

Maps on web pages

(Finally)

An OpenLayers map file (oltest1.html)

```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&amp;v=2&amp;key=ABQIAAAAjpkAC9ePGem0lIq5XcMiuhR_wWLPFku8Ix9i
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

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

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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