

Getting Started with MapServer, Part 1

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Outline

MapServer Background

- Brief History
- Features/Capabilities

MapServer Demo Application

- Compilation/Downloading
- Installation
- Demo Application

Third Party Client/Management Tools

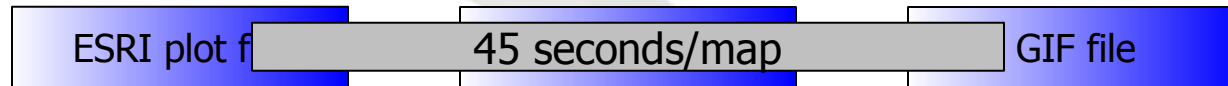
- Overview of Third Party Client/Management Tools

Background

A Brief History of MapServer
(or MapServer's Brief History)

MapServer: The Past

- 1994 - C Program Creates ArcPlot AMLs



- 1994 - NASA-sponsored ForNet Project
- 1997 - *Shapelib* Library (LGPL or “MIT-type”)
- 1997 - NASA-sponsored TerraSIP Project
- 1998 - MapServer 3.2 Released as Open Source
- 2001 - MapServer 3.4
- 2003 - MapServer 4.0
- 2004 - MapServer 4.2

MapServer: The Present

- Version 4.8.3 Released 30 March, 2006
- 10+ Active Developers Around The World
- 2,100+ Subscribers to MapServer-Users List
- 40,000+ Global Applications Deployed
- 3rd MapServer User Meeting Held in Minneapolis, June 2005

MapServer: The Future

- Open Source Community
- Open Source Geospatial Foundation
 - <https://www.osgeo.org/>
- OGC Compliant
- FOSS4G2006
 - <http://www.foss4g2006.org/>

Background

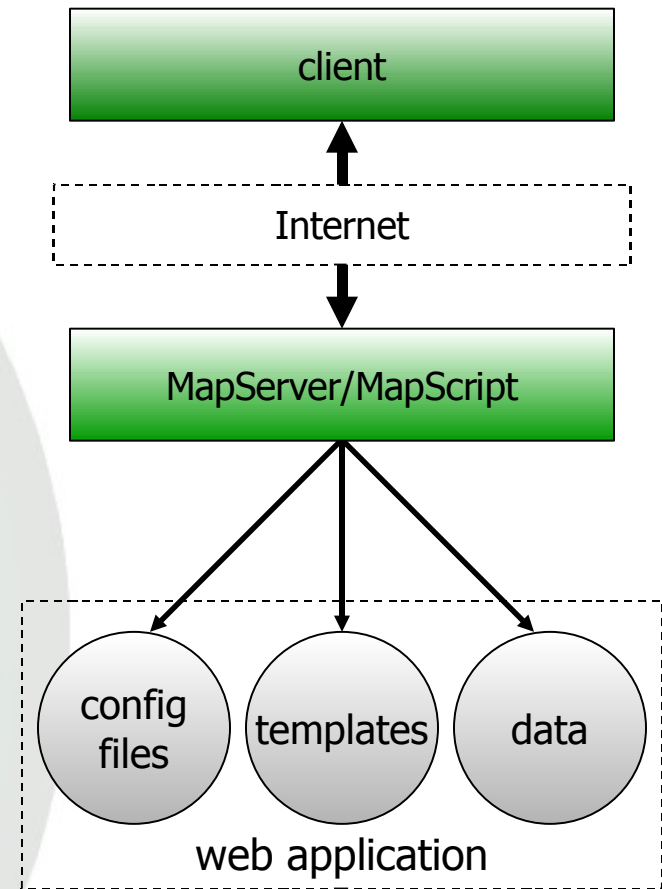
MapServer Features and Capabilities

What isn't MapServer

- A Desktop GIS!
- A Ready-To-Use Application (e.g. parcel mapping)
- Client-Based (e.g. isn't installed in your computer)
- Easy-To-Use, “Wizard” Configurable
- Expensive!

What is MapServer?

- Application Development System for Web-Based Mapping
- Server-Based
- Open Source
- Supports OGC Web Services Specifications
- *Fast*
- Extremely Configurable
- Easy-To-Use



Creating A MapServer Application

The Way to Web Mapping Nirvana

Required and Optional Software

Any HTTP server that supports the CGI protocol

- Apache, IIS, Tomcat, etc.

MapServer CGI program and utilities

- shp2img, shptree, sortshp, etc.

Other geospatial programs/utilities

- GDAL/OGR utilities (gdalinfo, ogrinfo, ogr2ogr, etc.)
- Proj.4 utilities (proj, cs2cs)
- GRASS, QGIS, etc.

Downloading and Compiling

Download the Source Code

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

Compile the Source Code

- See http://mapserver.gis.umn.edu/docs/howto/compiling_on_unix
- See http://mapserver.gis.umn.edu/docs/howto/win32_compiling

Download Pre-compiled Binary Packages

- If compiling isn't an option
- [MS4W](#) for Windows, [FGS](#) for Linux, [FWTools](#) for either
- [Mac OS X](#)
- Debian and other Linux Distributions

Installing MapServer (Packages)

For MS4W (windows):

- Make sure you have no web server installed/running
- Unzip the MS4W archive to the C: drive (or any drive)
- Using Windows Explorer (not Internet Explorer), navigate to [C:\ms4w](#) and double-click on [README_INSTALL.html](#)
- If you are averse to reading READMEs (bad!), double-click on `apache_install.bat` (at your own risk)

For stand-alone binaries on Windows:

- Unzip archive in a temporary directory
- Copy `mapserv.exe` to web server's CGI-BIN directory
- Copy DLL's to system directory or to CGI-BIN directory
- Copy Proj.4 directory to [C:\](#)

Installing MapServer (Packages)

For FGS (Linux):

- See <http://www.maptools.org/fgs/index.phtml?page=install.html> and <http://www.maptools.org/fgs/index.phtml?page=readme.html>

For FWTools:

- Follow directions at <http://fwtools.maptools.org/windows-main.html> or at <http://fwtools.maptools.org/linux-main.html>

For more platform specific instructions:

- Go to <http://mapserver.gis.umn.edu/docs/howto> and look for documents under the “Compiling” section

Testing Your MapServer Installation

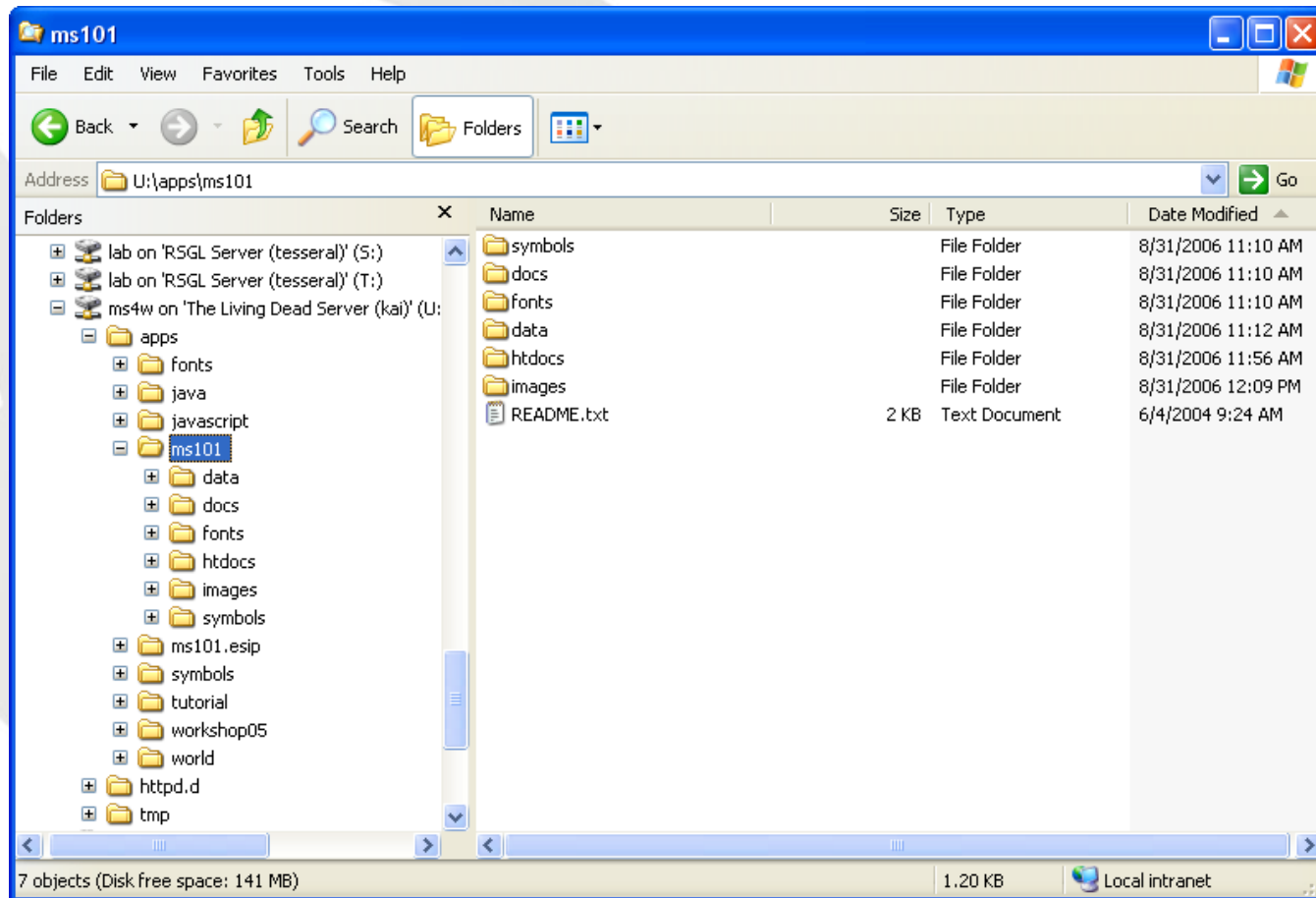
- Open a web browser window and type:
<http://localhost/cgi-bin/mapserv> (Linux/Unix/Mac) or
<http://localhost/cgi-bin/mapserv.exe> (Windows)
- This should return the following message:
`No query information to decode. QUERY_STRING is set, but empty.`
- If you didn't get the message above, check your installation and make sure that:
 - The web server has been restarted
 - All the required libraries are installed either in the system directory (e.g. C:\Windows\system32) or in the CGI-BIN directory (e.g. C:\Apache\cgi-bin)
 - The MapServer CGI program (mapserv or mapserv.exe) is in the CGI-BIN directory

Application Files and Directories

- Application Directory: `/data/www/ms101`
 - Map and HTML template file are located here
 - Demo Application template file: `ms101final.html`
 - Demo Application map file: `ms101.map`
- Web Root Directory: `/data/www/ms101/htdocs`
 - HTML files (`index.html`) and web-readable images
 - Web Root Alias (Virtual Directory): `/ms101`
 - Application URL: `http://localhost/ms101/index.html`
- Temporary Files Directory: `/ms4w/tmp/ms_tmp`
 - Files created by MapServer goes here
 - Alias: `/ms_tmp`
- MapServer CGI Program: `/cgi-bin/mapserv(.exe)`

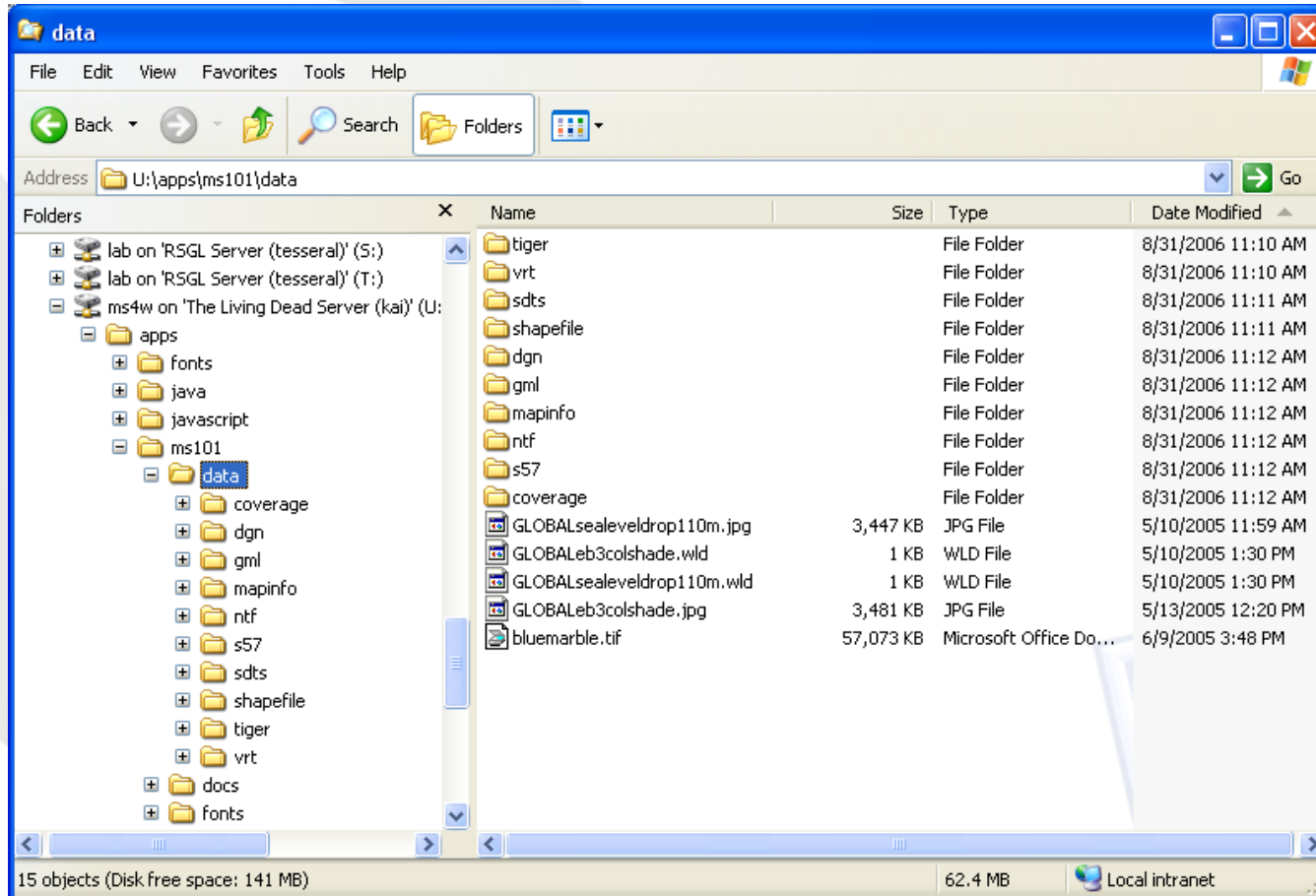
Creating a Demo Application

Demo application directory structure



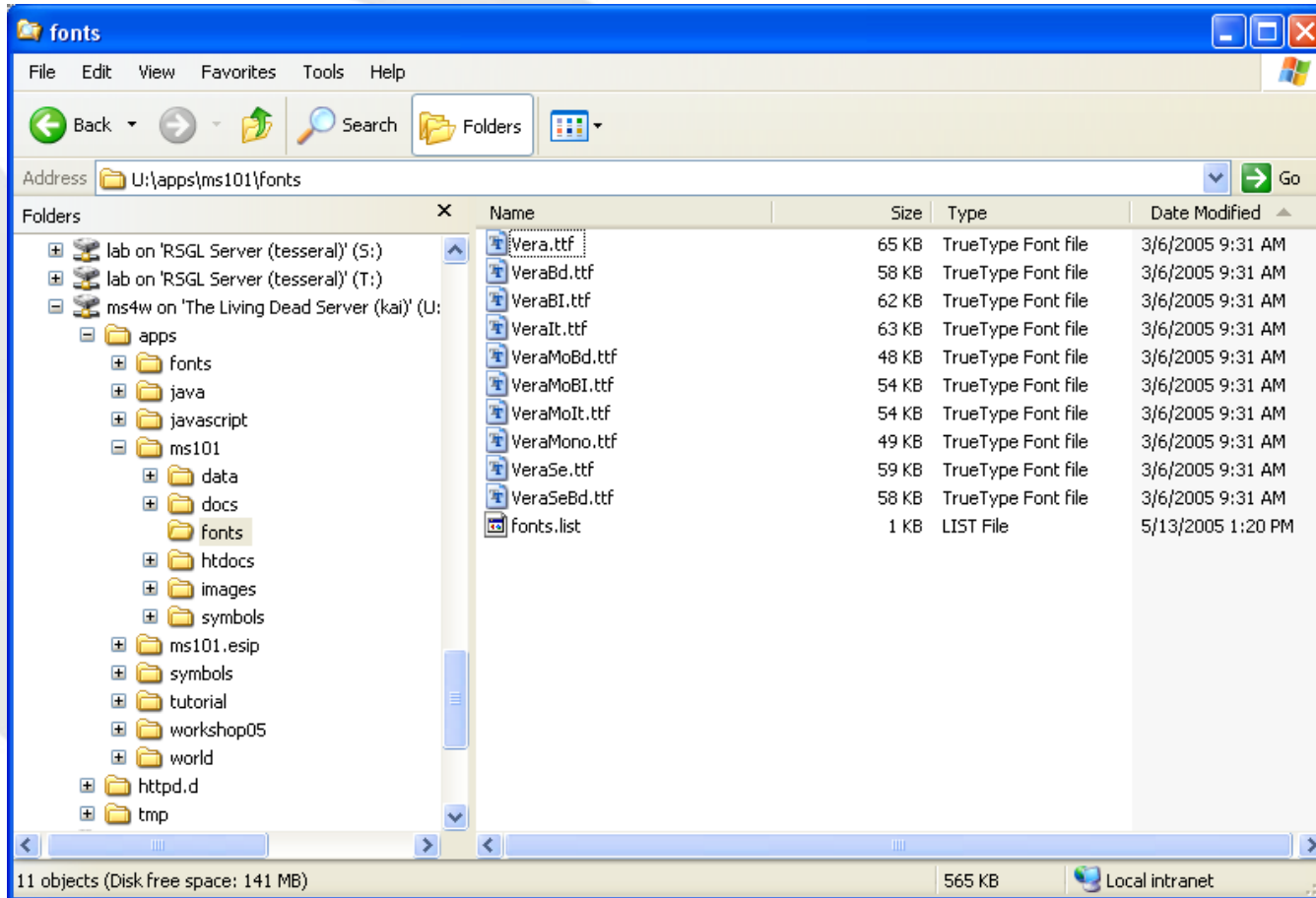
Creating a Demo Application

- All data are in “data” subdirectory



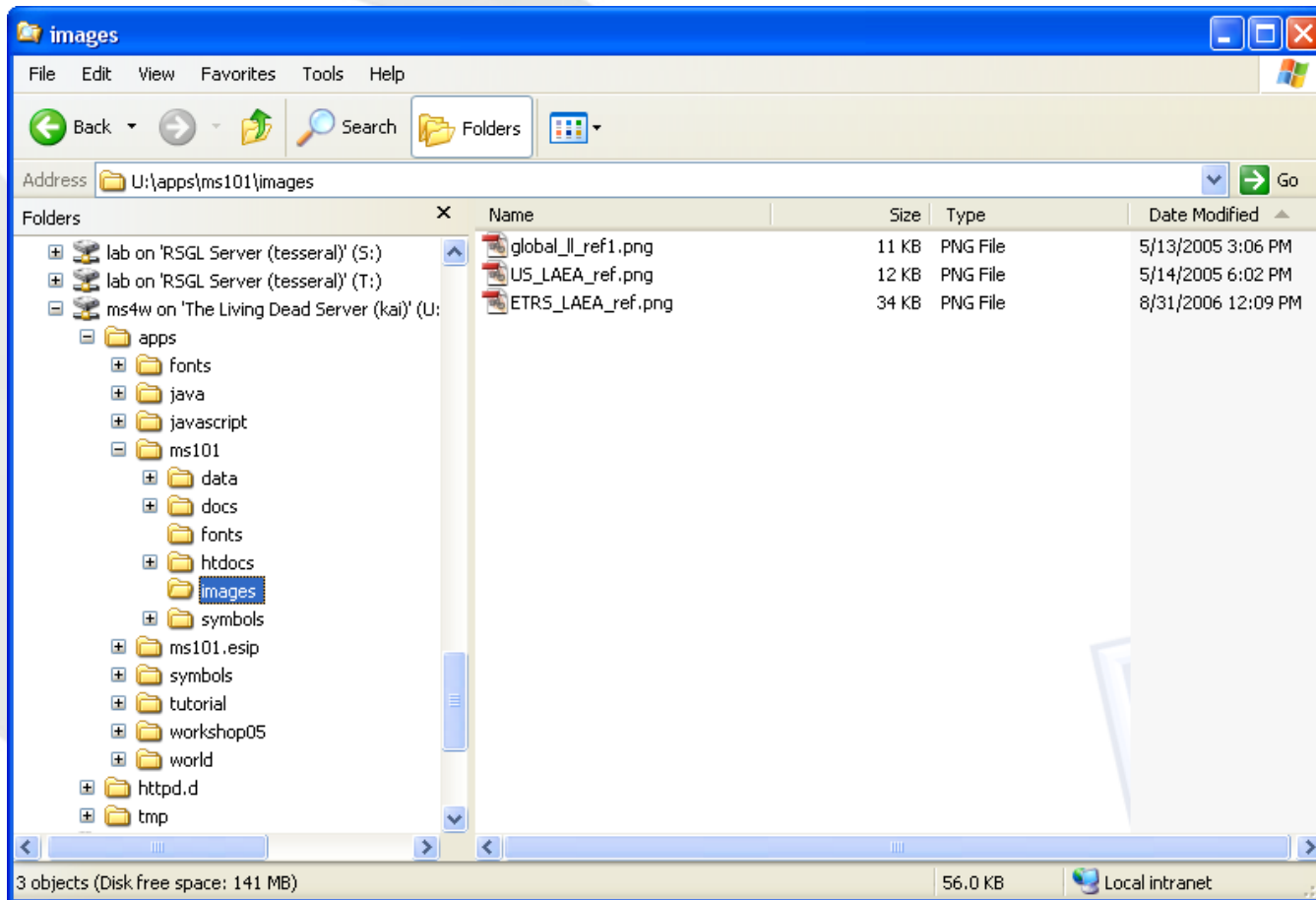
Creating a Demo Application

- TrueType fonts are in “fonts” subdirectory



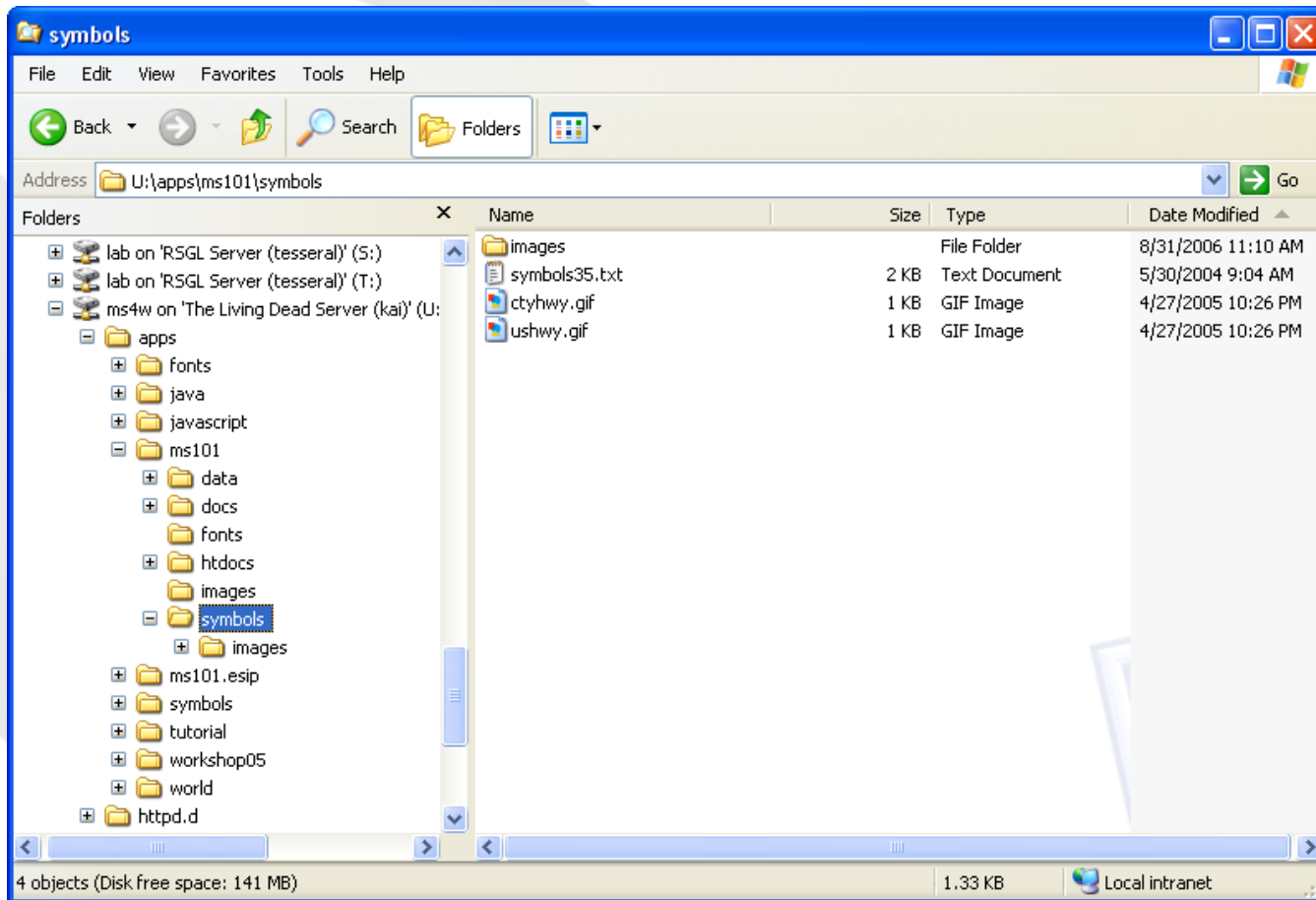
Creating a Demo Application

- Template images are under the “images” subdirectory



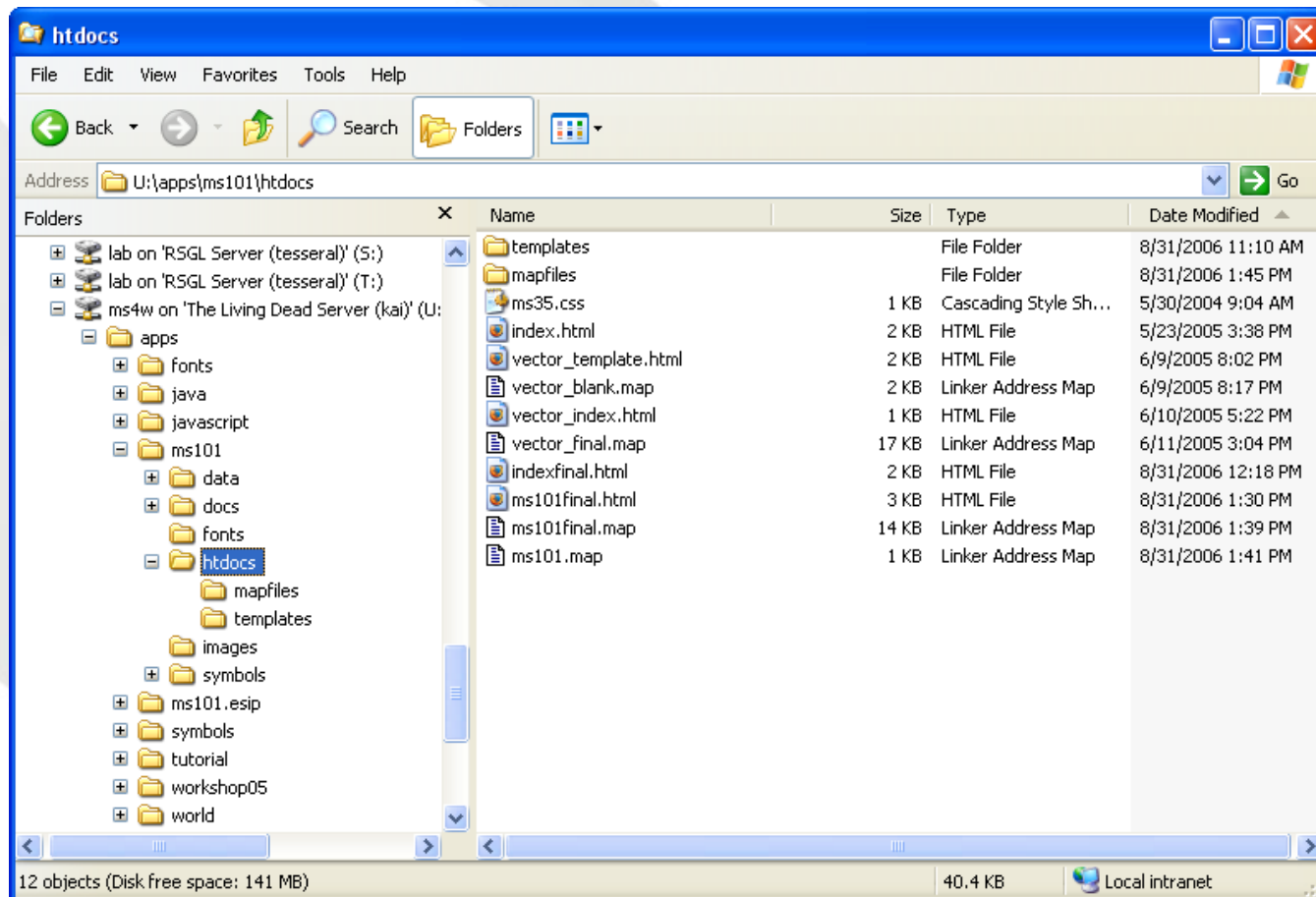
Creating a Demo Application

- Symbol files are under the “symbols” subdirectory



Creating a Demo Application

- Map files, template files, and other web-readable files are in the “htdocs” subdirectory



Creating a Demo Application

- Define a web “alias” (virtual directory) in your web server
- The demo's alias looks like this in Apache

```
Alias /ms101 "/ms4w/apps/ms101/htdocs"
```

```
<Directory "/ms4w/apps/ms101/htdocs">  
    AllowOverride None  
    Options Indexes MultiViews  
    Order allow,deny  
    Allow from all  
</Directory>
```

- This definition needs to go into Apache's httpd.conf
 - You can also save it as a file and “Include” it in httpd.conf – see </ms4w/Apache/conf/httpd.conf>
- This Alias tells the web server where the url <http://localhost/ms101> is located.

Example 1: The Map Object

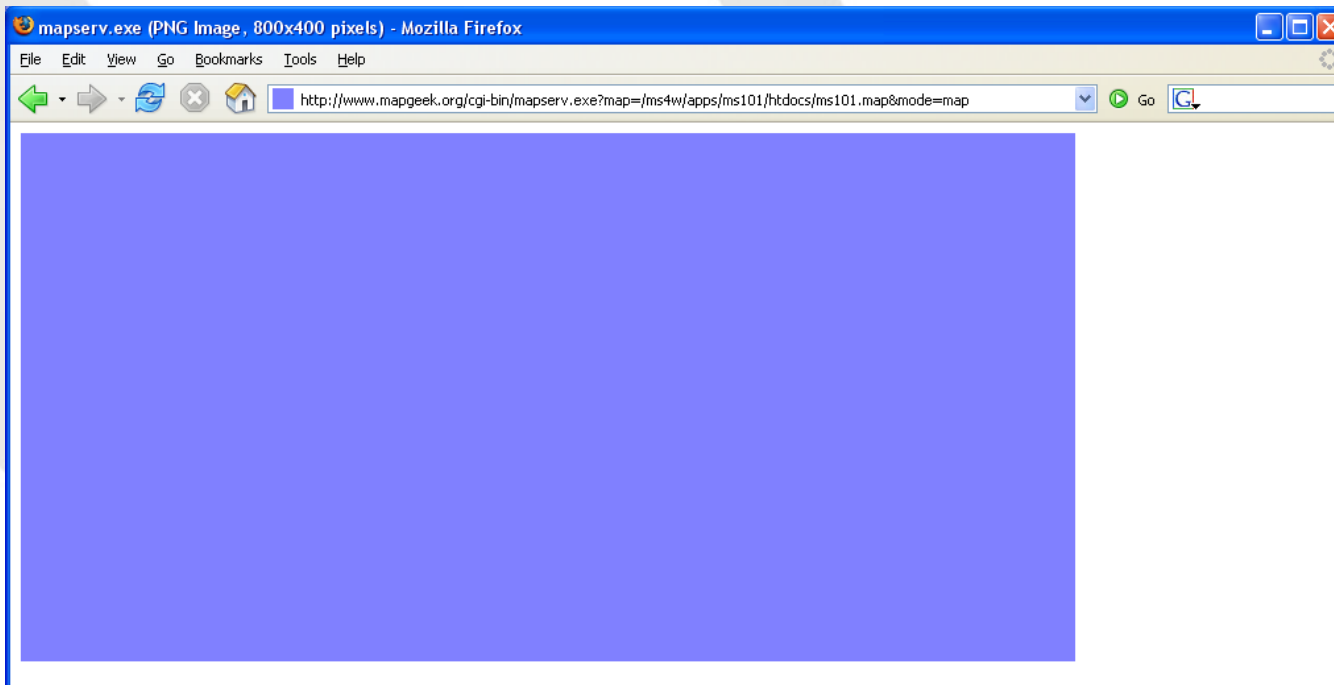
- Open “/ms4w/apps/ms101/htdocs/ms101.map

```
MAP
NAME          MS101_
EXTENT        -180 -90 180 90 # Geographic
SIZE          800 400
IMAGECOLOR    128 128 255
END
```

-
- “EXTENT” is the output extent in output units
 - SIZE is the width and height of the web map in pixels
 - IMAGECOLOR is the default image background color
 - The entire MAP FILE REFERENCE is available at:
http://mapserver.gis.umn.edu/docs/mapfile_reference
 - To see the example map, open the URL:
<http://localhost/cgi-bin/mapserv?map=/path/to/mapfile.map&mode=map>

Example 1: The MapServer Request

- The request protocol:
<http://localhost/cgi-bin/mapserv.exe?map=/path/to/ms101.map&mode=map>
- So, what's up with the output?
 - Remember the map file?
 - SIZE 800 400
 - IMAGECOLOR 128 128 255



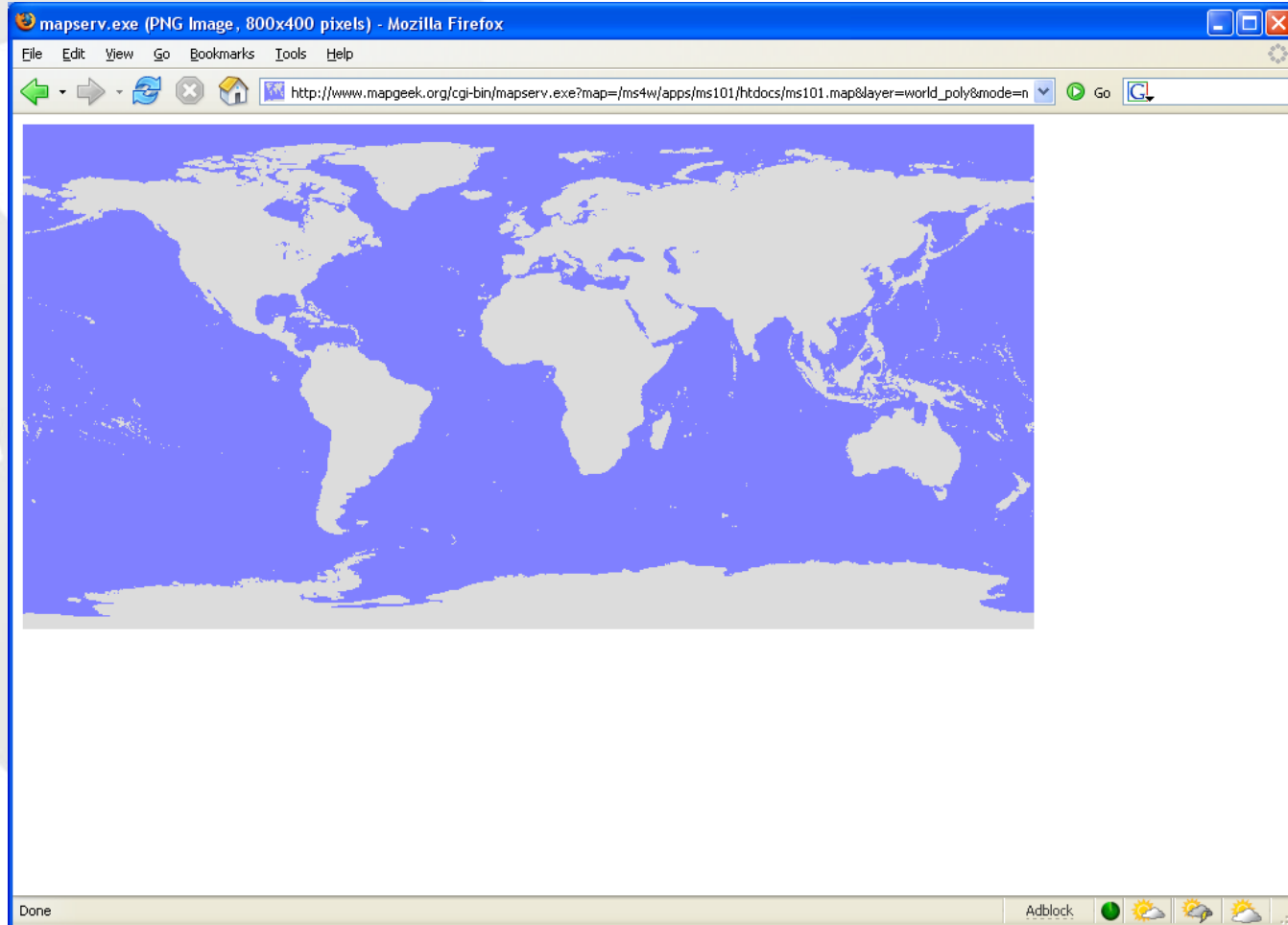
Example 2: Adding a Polygon Layer

```
LAYER # World polygon layer begins here
  NAME      world_poly
  GROUP     world
  DATA     'shapefile/Countries_area.shp'
  STATUS    ON
  TYPE      POLYGON

  CLASS
    NAME     'The World'
    STYLE
      COLOR  220 220 220
    END
  END
END # World polygon layer ends here
```

-
- Open “mapfiles/world_poly_layer.map” and append its contents to “ms101.map”
 - View the resulting map with the following request:
http://.../cgi-bin/mapserv.exe?map=/.../ms101.map&layer=world_poly&mode=map

Example 2 Output



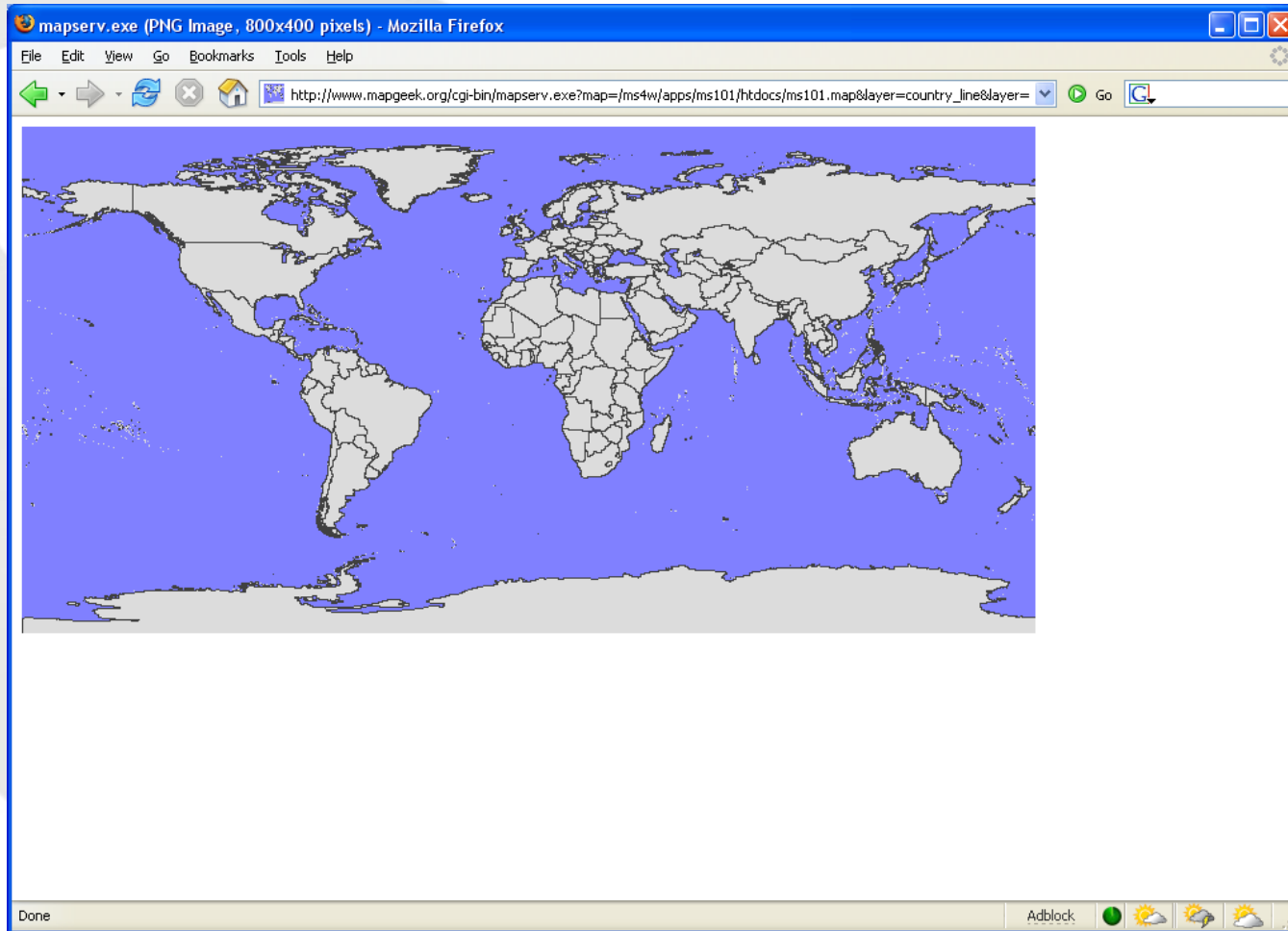
Example 3: Adding a Line Layer

```
NAME          country_line
GROUP         world
DATA          'shapefile/Countries_area'
STATUS        ON
TYPE          LINE

CLASS
  NAME        'Country Boundary'
  STYLE
    COLOR     64 64 64
  END
END
```

-
- Open “mapfiles/world_line_layer.map” and append its content to “ms101.map”
 - Again, [view the map](#) by typing in the MapServer request

Example 3 Output



Example 4: Defining Layer Classes

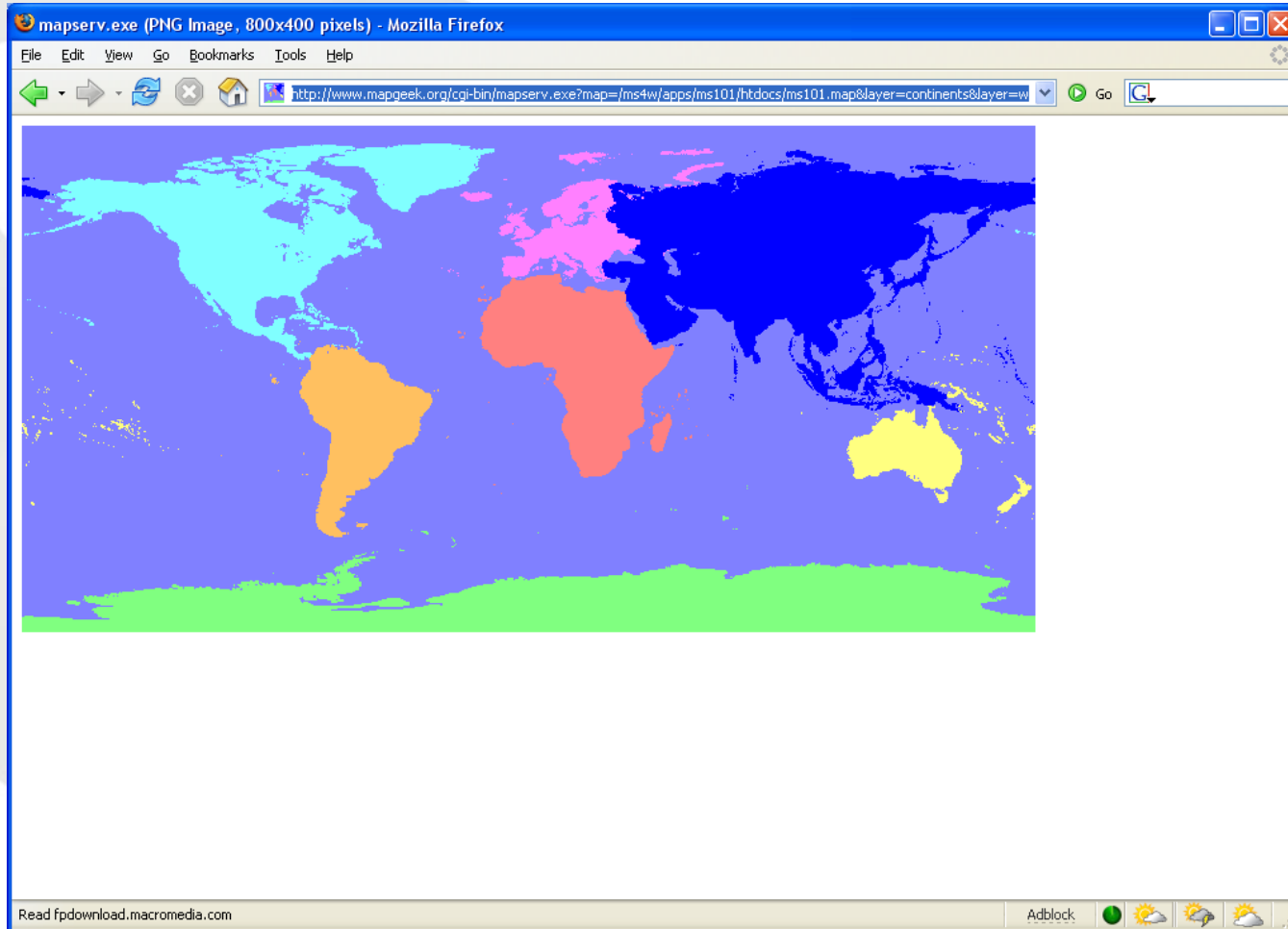
- Open the file “mapfiles/continents_layer.map”
- Here's a snippet of the file:

```
LAYER # World polygon classified by continents begins here
  NAME          continents
  DATA         'shapefile/Countries_area'
  STATUS        ON
  TYPE          POLYGON

  CLASSITEM     'NA3DESC'
  CLASS
    NAME        'Africa'
    EXPRESSION  'Africa'
    STYLE
      COLOR     255 128 128
    END
  END
END
...
```

- Add it to “ms101.map”, just below the first layer.
- Make another request to [view the map](#).

Example 4 Output



Example 5: Labeling

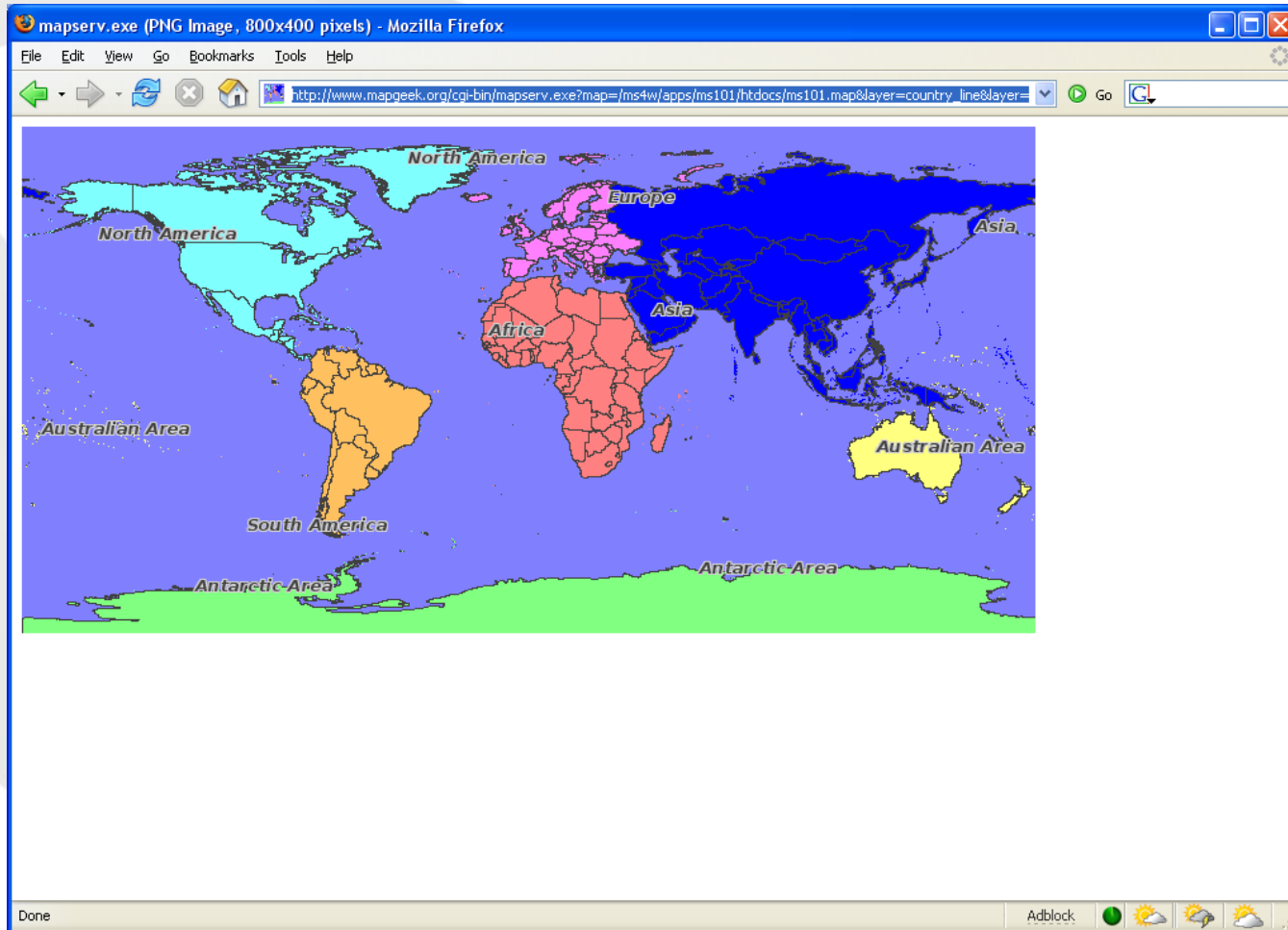
- Open the file “mapfiles/continents_label_layer.map”
- Here's a part of the file:

```
LAYER # World polygon classified by continents begins here
```

```
...
  LABEL
    COLOR      64 64 64
    OUTLINECOLOR 212 212 212
    TYPE       TRUETYPE
    FONT       vera_sans-bold-italic
    SIZE       10
    ANTIALIAS  TRUE
    POSITION     CC
    PARTIALS   FALSE
    MINDISTANCE 250
    BUFFER     4
  END
...
```

- Replace the continents layer in “ms101.map” with this file.
- Make another request to [view the map](#).

Example 5 Output



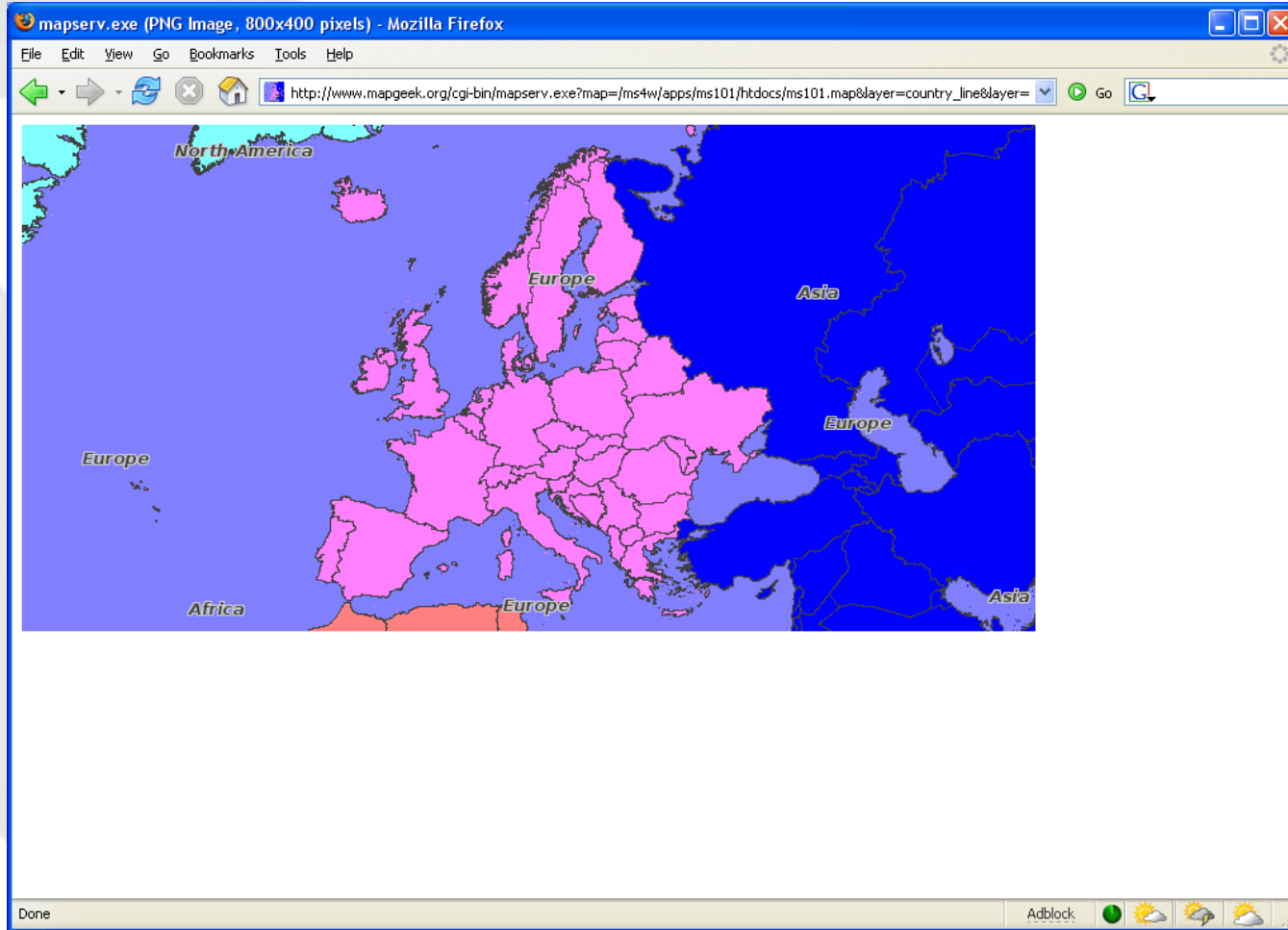
Example 6: Reprojection

- Open the file “mapfiles/output_projection_block.map”
- Here's a part of the file:

```
...  
PROJECTION  
    ...  
    "init=epsg:3035"  
    ...  
END  
...
```

- Append the contents of this file to “ms101.map”, just before the first layer definition.
- Open the file “mapfiles/layer_projection_block.map” and copy its content to each of the layers defined in ms101.
- Replace the map EXTENT with the content of “mapfile/etrs_laea_extent.map”
- Make another request to [view the map](#).

Example 6 Output



Example 7: Adding Raster Data

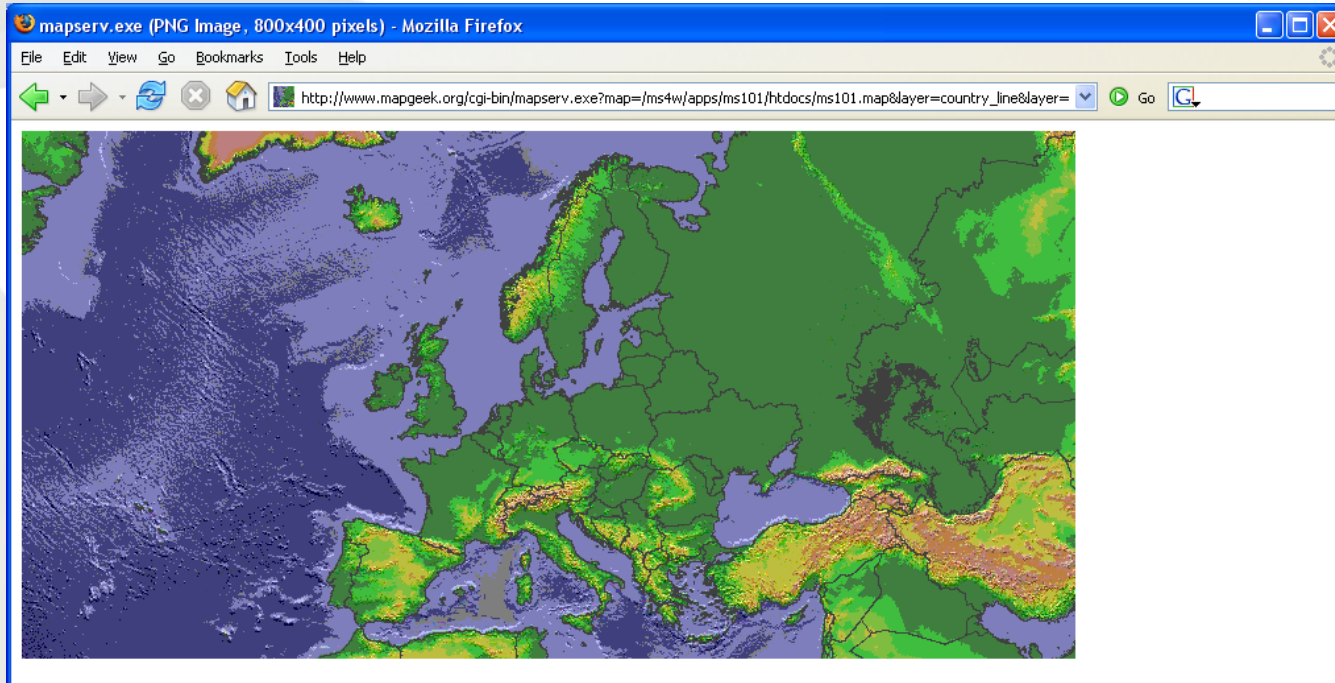
- Open “mapfiles/shadedrelief_raster_layer.map”

```
LAYER # Shaded relief raster layer ends here
NAME      'shadedrelief'
STATUS    ON
TYPE      RASTER
DATA      'GLOBALeb3colshade.jpg'

PROJECTION
  "init=epsg:4326"
END
END # Shaded relief raster layer ends here
```

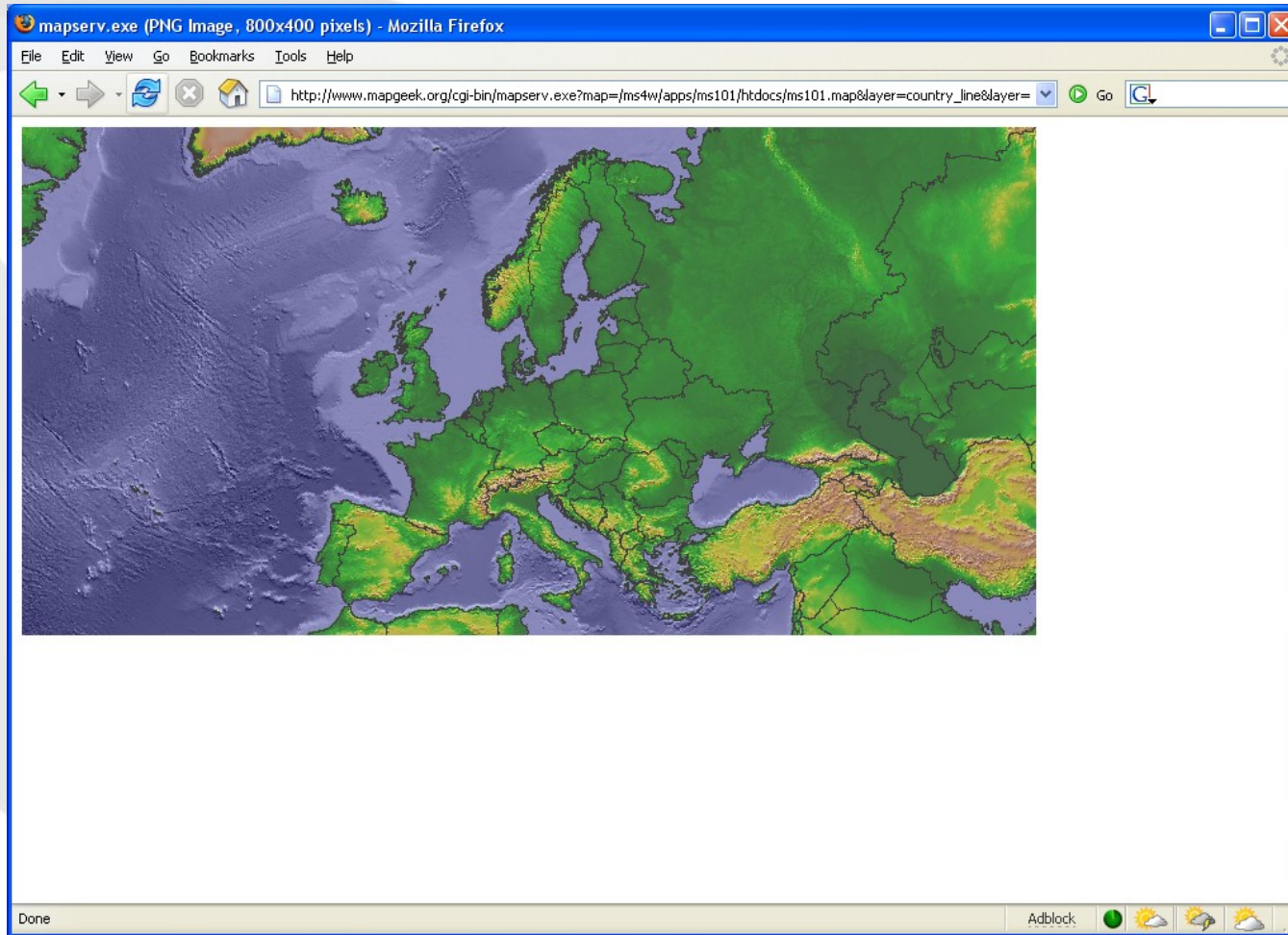
- Append the contents of this file to “ms101.map”, after the two polygon layers—world_poly and continents
- [View The Map](#)
- [Raster Data Access](#) for more information

Example 7 Output



- Ugly?
- Change value of IMAGETYPE in “ms101.map” from PNG to PNG24
- Refresh the browser

Example 7 Output, Reloaded



Example 8: Adding OGC WMS Layer

- Open “mapfiles/wms_client_modis_layer.map”

```
LAYER # MODIS WMS map from JPL
```

```
...
```

```
CONNECTIONTYPE WMS
```

```
CONNECTION "http://wms.jpl.nasa.gov/wms.cgi?"
```

```
METADATA
```

```
"wms_srs" "EPSG:4326"
```

```
"wms_name" "BMNG"
```

```
"wms_server_version" "1.1.1"
```

```
"wms_format" "image/jpeg"
```

```
"wms_style" "Aug"
```

```
END
```

```
...
```

```
END # Modis WMS image ends here
```

- Append the contents of this file to “ms101.map”, after the “shadedrelief” layer

Example 8: Adding OGC WMS Layer

- Open “mapfiles/web_object_block.map”

```
WEB
```

```
...
```

```
IMAGEPATH      '/ms4w/tmp/ms_tmp/'
```

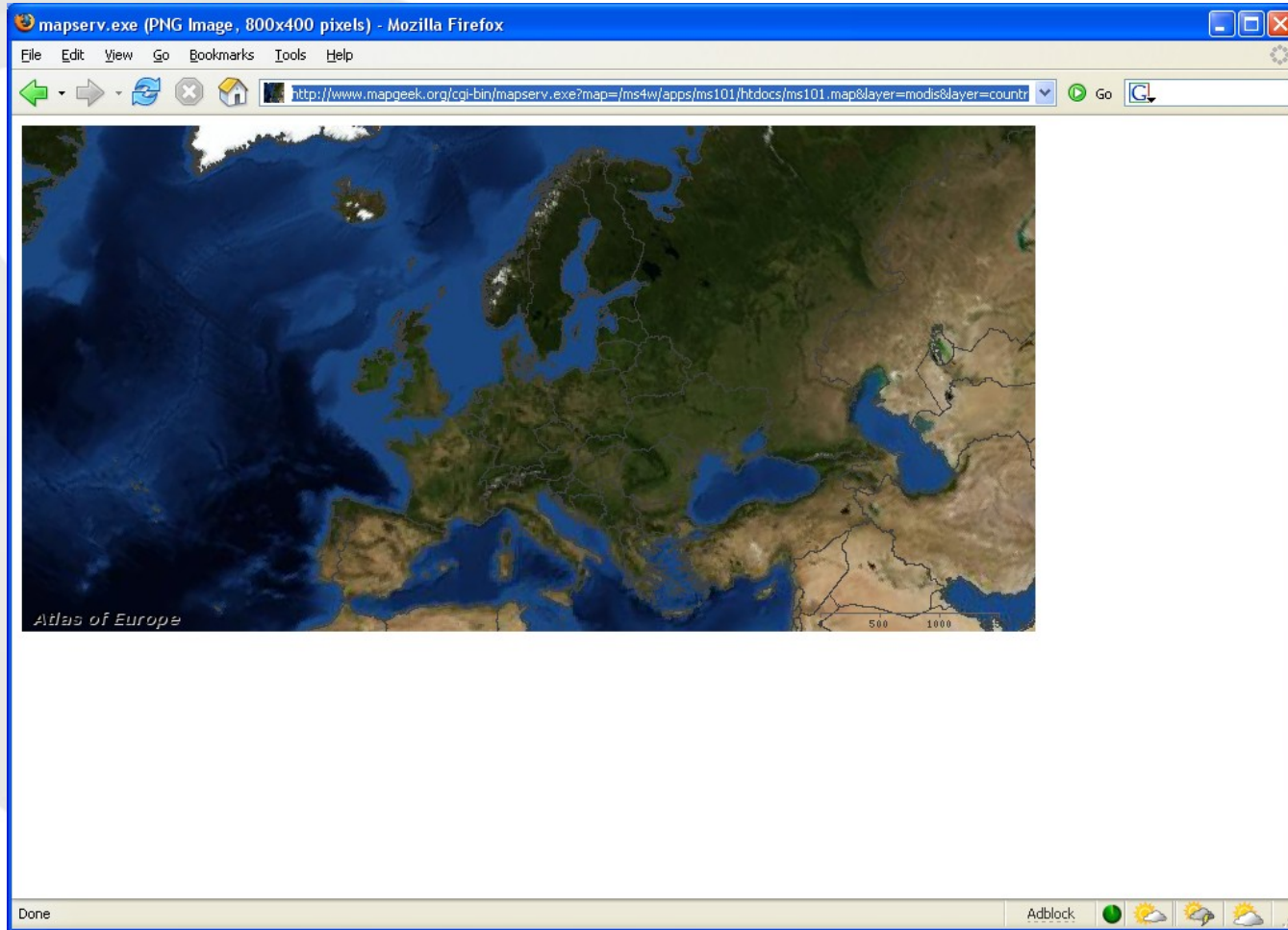
```
IMAGEURL       '/ms_tmp/'
```

```
...
```

```
END
```

- Append the contents of this file to “ms101.map”, before the output projection block
- [View The Map](#)

Example 8 Output



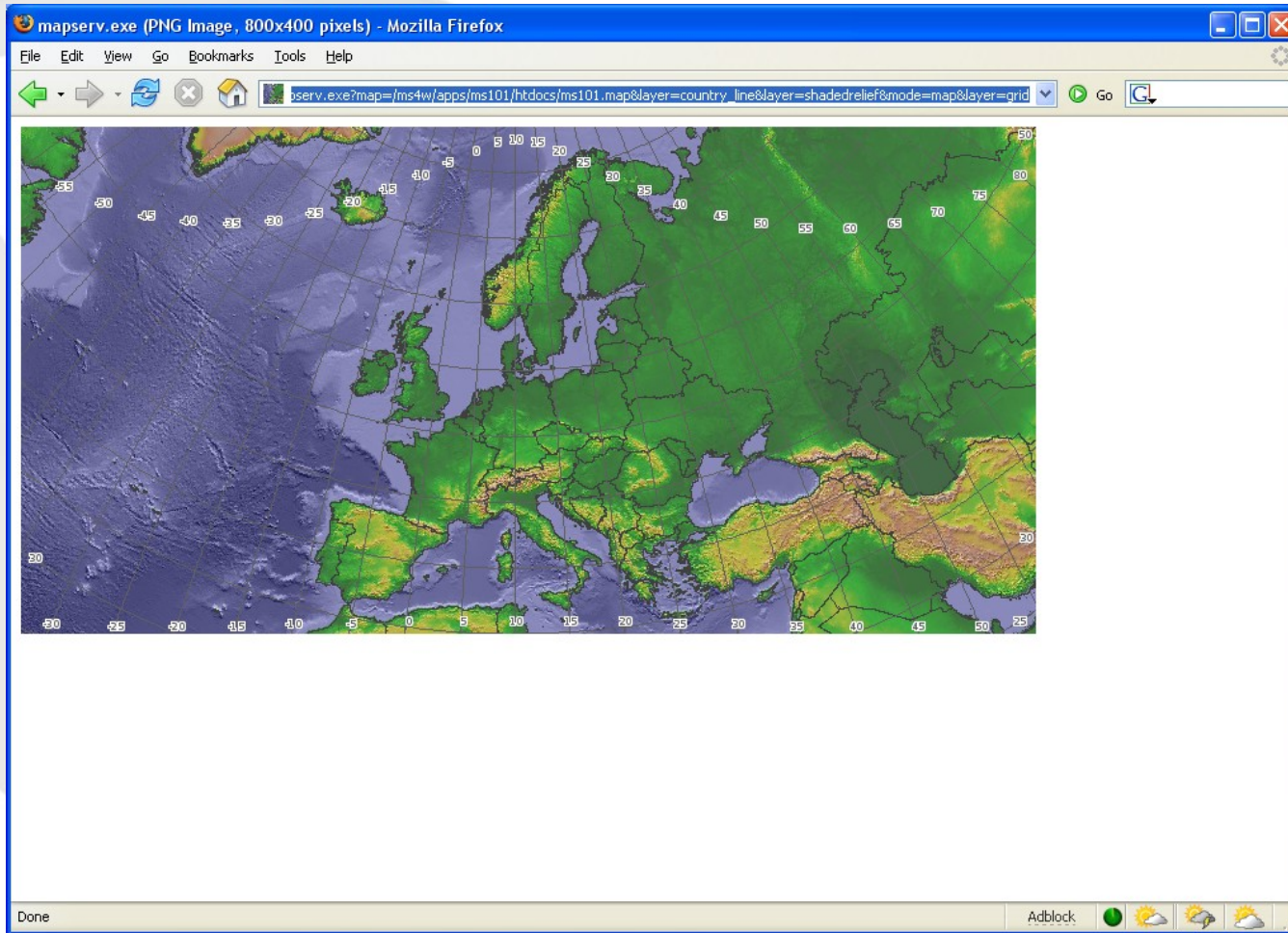
Example 9: Adding a GRID Layer

- Open “mapfiles/grid_layer.map”

```
...  
GRID  
  LABELFORMAT DD  
  MAXARCS 5  
  MAXINTERVAL 5  
  MAXSUBDIVIDE 128  
END  
...
```

- Append the contents of this file to “ms101.map”, after the last layer
- **View The Map**

Example 9 Output



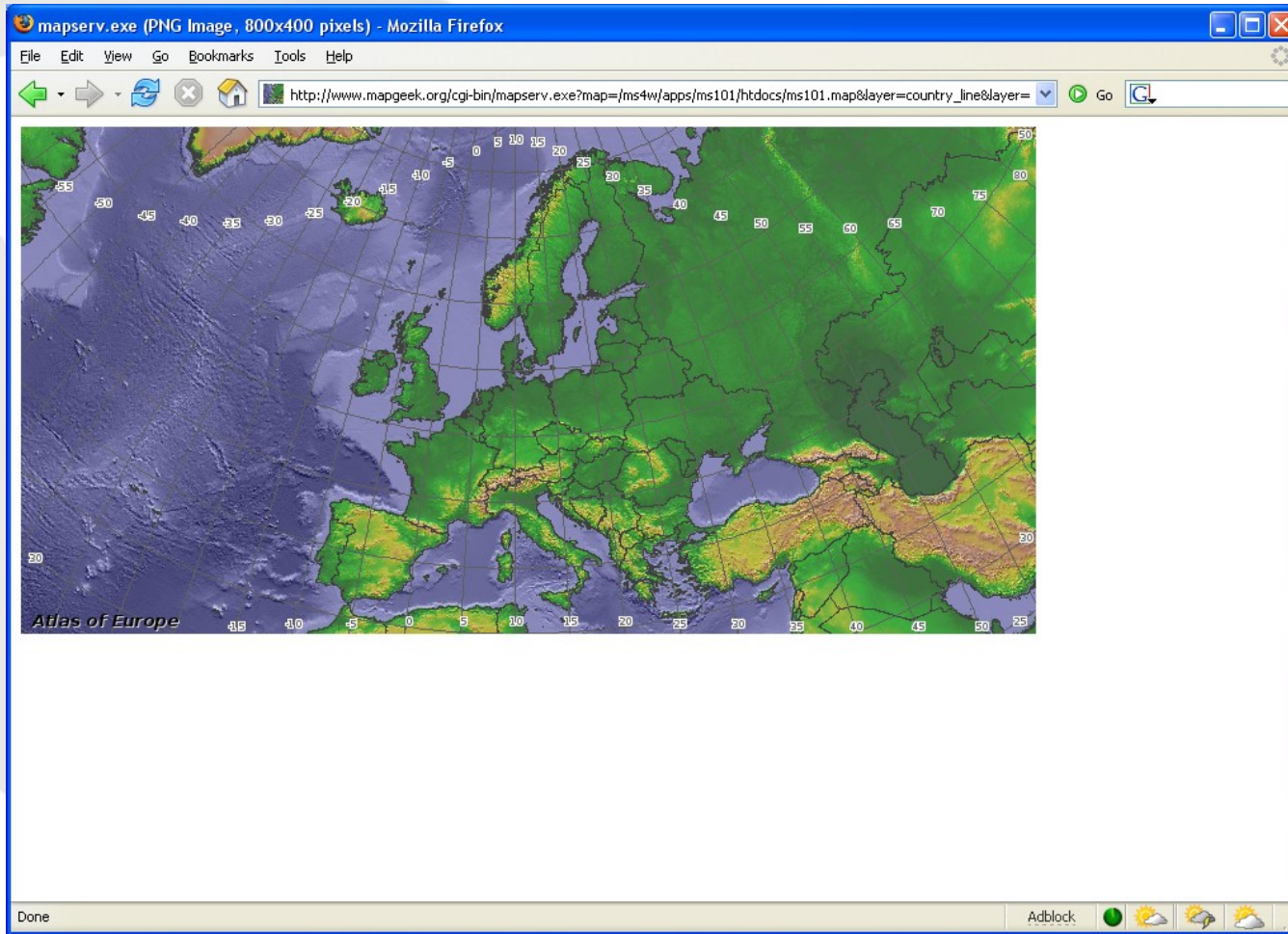
Example 10: Adding Inline Feature

- Open “mapfiles/inline_feature_layer.map”

```
...  
FEATURE  
  POINTS  
    5 390  
  END  
  TEXT 'Atlas of Europe'  
END  
...
```

- Append the contents of this file to “ms101.map”, after the last layer
- **View The Map**

Example 10 Output



Example 11: SCALEBAR

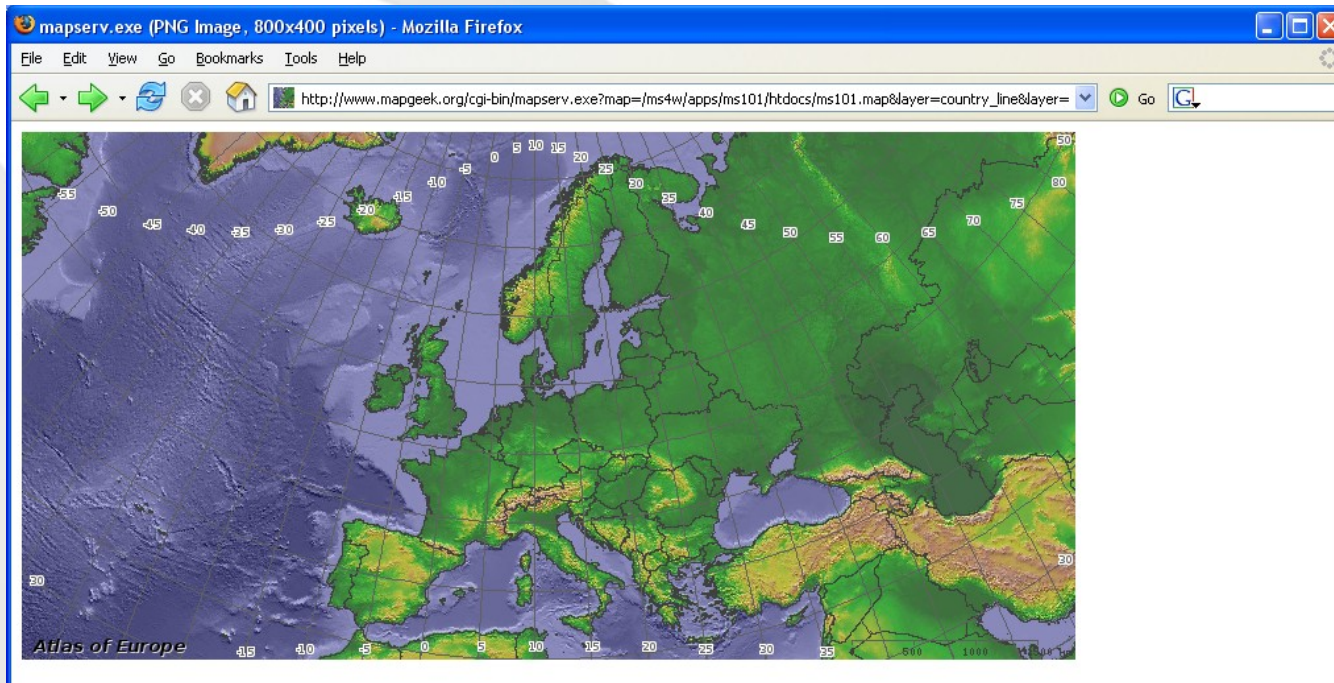
- Open “mapfiles/scalebar_object_block.map”

```
SCALEBAR
  IMAGECOLOR 255 255 255
  LABEL
    COLOR 64 64 64
    SIZE TINY
  END
  STYLE 1
  SIZE 108 3
  COLOR 64 64 64
  UNITS KILOMETERS
  INTERVALS 3
  TRANSPARENT TRUE
  STATUS EMBED
  POSITION LR
END
```

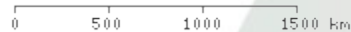
- Append the contents of this file to “ms101.map”, after the output projection block
- View The Map** or just the **scalebar itself**

Example 11 Output

- Embedded Scalebar



- The Scalebar image via “mode=scalebar”



Example 12: LEGEND

- Open “mapfiles/legend_object_block.map”

```
LEGEND
STATUS      ON
LABEL
TYPE        TRUETYPE
FONT        vera_sans
COLOR       0 0 0
SIZE        8
ANTIALIAS   TRUE
END
END
```

- Append the contents of this file to “ms101.map”, after the scalebar block
- [View The Legend](#)

Example 12 Output

- The Legend graphic:

- 
- Graticule
 - Country Boundary
 - Africa
 - Antarctica
 - Asia
 - Oceania
 - Europe
 - North America
 - South America
 - The World

Example 13: REFERENCE

- Open “mapfiles/reference_object_block.map”

```
REFERENCE
```

```
STATUS ON
```

```
IMAGE '../images/ETRS_LAEA_ref.png'
```

```
SIZE 180 90
```

```
EXTENT 171100 1322745 8701540 5587965 # ETRS_LAEA
```

```
COLOR -1 -1 -1
```

```
OUTLINECOLOR 255 0 0
```

```
END
```

- Append the contents of this file to “ms101.map”, after the legend block
- View The Legend:**



Example 14: HTML Template

- Open “templates/ms101.html”

```
<html>
...
<body bgcolor="#FFFFFF" text="#000000">
  <h1 align="center">Getting Started with MapServer</h1>
  <div align="center">
    
  </div>
</body>
</html>
```

- Create a table within this file and add image tags for legend and reference:
 - Reference tag is [\[ref\]](#)
 - Legend tag is [\[legend\]](#)
- [View The Map](#)

Example 15: QUERY

- Open “mapfiles/world_query_layer.map”

```
LAYER # World query layer begins here
```

```
...
```

```
STATUS      ON  
TYPE        QUERY
```

```
...
```

```
HEADER      'templates/countries_header.html'  
FOOTER      'templates/countries_footer.html'
```

```
TOLERANCE   2
```

```
CLASS
```

```
  TEMPLATE  'templates/countries_query.html'
```

```
...
```

```
END
```

```
END # World query layer ends here
```

- Append this file to “ms101.map”
- In “ms101.map”, replace web object template keyword to: `TEMPLATE 'ms101final.html'`
- [View the map](#), select a “query” mode, click on a country

Example 15: QUERY, Continued

- Open “templates/header.html”

```
<html>
  <head>
    <title>MapServer Demo Interface</title>
    <link type="text/css" rel="stylesheet"
href="/ms101/ms35.css" />
  </head>
  <body bgcolor=#FFFFFF>
    <h1 align="center">MapServer Query Interface</h1>
```

- Open “templates/footer.html”

```
</body>
</html>
```

Example 15: QUERY, Continued

- Open “templates/countries_header.html”

```
<h4>
  <b>Layer: Countries</b>
</h4>
<table cellpadding=5 cellspacing=2 border=0>
  <tr bgcolor=#CCCCCC>
    <th>COUNTRY NAME</th>
    <th>CODE</th>
    <th>CONTINENT</th>
  </tr>
```

- Open “templates/countries_footer.html

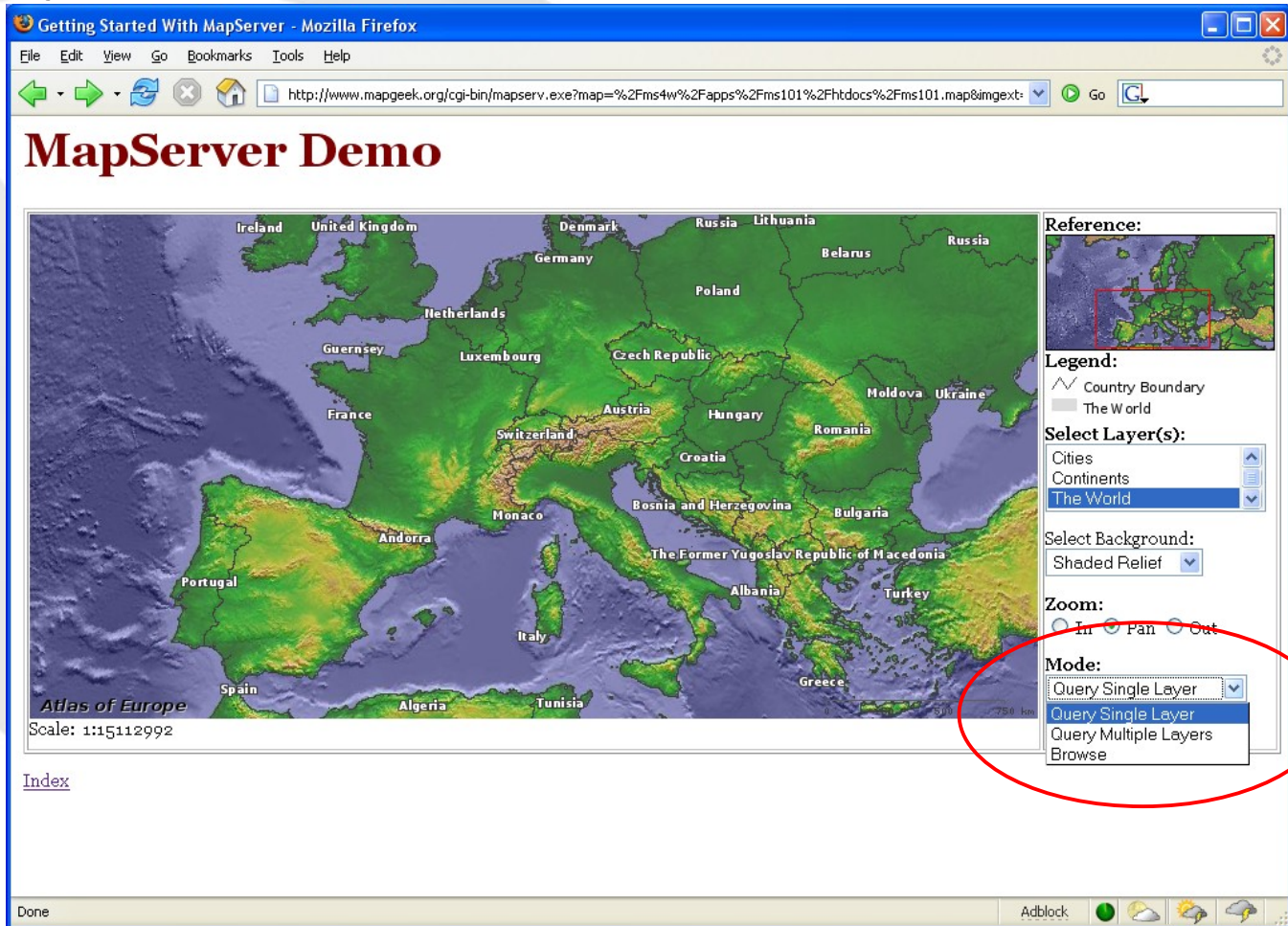
```
</table>
<p>&nbsp;</p>
```

- Finally, open “templates/countries_query.html

```
<tr>
  <td>[NA2DESC]</td>
  <td>[NA2]</td>
  <td>[NA3DESC]</td>
</tr>
```

Example 15 Output

- Query Mode Selection:



Example 15 Output

- Query Result:

MapServer Demo Interface - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.mapgeek.org/cgi-bin/mapserv.exe?map=%2Fms4w%2Fapps%2Fms101%2Fhtdocs%2Fms101.map&imgext=. Go

MapServer Query Interface

Layer: Countries

COUNTRY NAME	CODE	CONTINENT
Switzerland	SZ	Europe

Done Adblock

The Finished Demo Application

- The final mapfile is at </ms4w/apps/ms101/htdocs/ms101final.map>
- The final HTML template is at </ms4w/apps/ms101/htdocs/ms101final.html>
- Open a web browser and enter the following url:
<http://localhost/ms101/indexfinal.html>

MapScript

Exposing the MapServer API to
Scripting Languages

MapScript Overview

- Extends MapServer capabilities
- Seamless Integration with Other Applications
- Uses SWIG (except PHP)
- Support for Several Languages:
 - PHP
 - Python
 - Perl
 - Ruby
 - Java
 - C#
 - TCL/Tk
- See the [MapScript API Reference](#) for more information
- Demo: [Tcl/Tk MapScript](#)
- Demo: [PHP/MapScript](#)

Third Party Tools and Support

Client and Management Tools for
MapServer Applications

Third Party Tools/Support

- Open Source Client Tools

- MapLab
- Chameleon
- ka-Map! – Demo
- CartoWeb – Demo
- MapServer Workbench
- MapBender
- MapBuilder
- OpenLayers
- PMapper – Demo
- PrimaGIS – Demo
- Others

- Proprietary Client Tools

- Neapoljs

Support and Other Resources

- Support Available via Mailing Lists
 - [MapServer-Users](#)
 - [MapServer-Dev](#)
- Additional Support via Consulting/Services Companies
- MapServer Website: <http://mapserver.gis.umn.edu>
- MapTools: <http://www.maptools.org>
- GDAL/OGR: <http://www.gdal.org>
- PROJ.4: <http://proj.maptools.org>
- OSGeo: <https://www.osgeo.org>,
- OSGeo Wiki: <http://wiki.osgeo.org>

Questions?



OSGeo.org
The Open Source
Geospatial Foundation