WorldMap Help

Center for Geographic Analysis, Harvard

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1.0 Overview

Alpha Related Issues

WorldMap is still in Alpha so we are working things out in several areas including: interface design, functionality, bug fixing, and handling high load conditions.

WorldMap has been tested more thoroughly on Firefox and Chrome than on Internet Explorer. There are known problems with Internet Explorer 6.

There are areas of functionality that require you leave the map page. When that happens, you will be asked whether you want to navigate away from the page. Click cancel, then save your map, then proceed.

When you are away from the map page you have saved you can use the back button to get back to it.

Help

worldmap@harvard.edu

Open System Access

The system is currently open to anyone in the world to use and is hosted by Harvard on the Amazon cloud. We are allowing anyone to upload pretty large files to the system (up to 100 meg). The combination of these factors means that the system could be slow at times.

Open Source

The platform is Open Source and can be deployed on Linux or Windows environments. WorldMap is currently being developed and deployed on Ubuntu Linux.

Because it is Open Source, all code in the system can be examined and improved on by others. Source code for WorldMap is available at: https://github.com/cga-harvard/cga-worldmap if you would like to install it on your own server.

2.0 Help

2.1 Terminology

Layers

In WorldMap you can upload map data (currently Shapefiles or GeoTIFFs) to the WorldMap system. Each map data file you upload is called a “Layer” in WorldMap. You can control access to your layers by setting permissions.

Maps

WorldMap allows you to organize your Layers and other people’s Layers together into collections, which you can configure in various ways and save. These collections are called “Maps” in WorldMap. You can control permissions in WorldMap at both the Layer and the Map level.

2.2 Registering

To register click "Sign In" on the front page, then click "Register". Fill out your username, email address, password, and if you are Harvard check that. If so you will be sent to a page to verify your Harvard ID. (There is no difference in functionality between Harvard and non-Harvard. We are starting to allow access control by group and Harvard is the first group we have enabled.) You will then receive an email with a validation link that you must click to be registered. Now you have an account and a profile and you can log in on the front page.

NOTE: Unregistered users can view all public content on the system and can make temporary changes to Maps created by others. Registered users can create their own Maps, upload materials, change symbolization, and save changes. In addition registered users can control access to layers they own and can access any private content that has been made accessible to them by others.

2.3 Filling in Your Profile

Profiles allow people to find out about other users of the system. A user's profile name is associated with any layer or map they create. Once you are logged in you can go into your profile and add information about yourself. As you add materials to WorldMap, those materials will be listed here.

NOTE: The user profile contains at a minimum the user's name and email address. Other optional items include organization, position, phone, fax, address, city, state, zip, country.

2.4 Map Permissions

Once you have created and saved a map, you can control who else in the world can see it. Click on "Share Map" link at the upper right and you can make your map private or share with just a couple people or open it to the world. If you want, you can choose to only allow certain people to make changes to your map. Currently the only group authentication control is for Harvard and uses Pin authentication via an Isites page.

NOTE: You can also control permissions on *layers* in your Map (see below). If you want, you can create a map which is public and includes some public and some private layers.

Once you have created a map or loaded new data to WorldMap, a link to that material shows up in your profile where others can see what you have created. If a map or layer is not public for viewing, the name of it will still show up here.

2.5 Layer Permissions

Users can control whether others can see and/or modify the layers they load to their map. Layer permissions are added using email addresses, as with a Google Doc. Layer permissions can be set at the time of upload and can be modified as needed later. Currently the only group authentication control is for Harvard and uses Pin authentication via an Isites page.

WARNING: Currently any uploaded layer which can be viewed by the public is also technically downloadable even though it may appear not to be. There do exist some custom layers in WorldMap which reside on a separate server and can be viewed but not downloaded, but

the ability to make layers viewable but not downloadable is not yet enabled in the WorldMap interface.

2.6 Viewing a Map

To search existing maps, click "Viewing a Map" on the front page. Here you will see a list of maps others have created, listed in the order in which they were created. Use the search box to find things you want.

Next to the name is the name of the person who created it so you can contact them. WorldMap is about encouraging collaborations between people with common interests.

2.7 Choice of Basemaps

A number of preset basemap layers are available, including Google Satellite, Hybrid, Roads, Physical, and Open Street Maps. Other commercial and non commercial base maps will be added.

2.8 Ways to Zoom

There are several ways you can zoom (change scales) in WorldMap:

- Map navigation tools include the standard zoom bar and map drag.
- Roll your mouse wheel.
- Choose a scale from the scale bar readout.
- Zoom and pan simultaneously by defining a box on the map (shift-drag box) which upon release zooms you to the area you defined with the box.
- You can right-click on a layer name and select "Zoom to Layer Extent" to zoom to that layer.

2.9 Legend, Scale Bar

WorldMap generates legends automatically based on the SLD (Styled Layer Descriptor) symbolization. Legends for any vector layers being displayed are in the Legend tab next to the Data tab at the upper left. The scale bar changes with zoom level and the exact scale ratio is displayed.

2.10 Layer on/off, Layer Order, Transparency

You can turn layers on and off, move them around to control what is displaying on top of what in the map. You can also change transparency of any layer by right clicking and going to Layer Properties.

2.11 Layer Renaming, Category renaming

You can rename layers by right-clicking a layer, selecting "Layer Properties", then "About". You can rename a category by right-clicking it and selecting "Rename Category".

2.12 Map Click for Details

WorldMap will return attributes for as many (vector) layers as you have turned on. The layers will be listed at the upper right and the individual records will be listed in the panel below. You can select records grouped by layer in the upper panel and see the record highlighted on the map and attributes displayed in the panel below.

2.13 Add a Layer from WorldMap

Without permissions you will be able to add layers from WorldMap as well as add remote web services just for the session, but you will not be able to save your additions.

If you click "Add Layers" notice there are three tabs for adding a layer: "WorldMap Data" (for Layers which are already in WorldMap), "External Data" (for Layers which can be accessed via a web service URL), and "Upload Layer" (for Layers you would like to upload from your own hard drive).

2.14 Layer Order

Layers which are above others in the layer panel, display on the map on top of those which are below in the panel. Display order can be changed by dragging and dropping layers up or down, and the names of folders and layers can be changed.

NOTE: We are still working on the layer drag capability. Be careful not to drop your layer outside a folder. If you place it between folders your layers will disappear. The same thing will happen if you drop the layer at the end of a list of layers within a folder. We recommend that before you change layer order you save your map so you can just click refresh button to get back to where you were.

The category, a required part of the metadata, provides the default category for a layer added to a map.

2.15 Create a Map

Click "Creating a Map" link at the top of the page. A blank map template displaying the Google Terrain base map appears. Zoom to some part of the world and start to build your map.

2.16 Saving your Map

When you want to save your map (which you should do regularly) click "save" and there are several items you can define:

- **Name -** This is the name as it will show up in the map search tool. The name is also displayed on the header at the top of the page.
- **URL** – You decide what is displayed at the end of the URL. Example: http://ec2-184-73-229-41.compute-1.amazonaws.com/maps/my_test

  Here is a more user friendly form of the URL above: http://worldmap.harvard.edu/alpha/maps/my_test

  Once the system is out of Alpha, the WorldMap URL will be the only one you see.

- **Abstract** – A short description of the Map. This and the title are used by map search.
- **Keywords** – Words that are used to filter feeds Picasa, YouTube, and HGL. Separate keywords with a space. A space acts as an "or" operator to make your filter more general.

- **Splash page** – Formatted text which appears in an introduction box when the site is first opened by a user. This content also appears when you click on the "About" link at the upper left.
- **Banner** (coming soon) - Soon it will be possible to upload a banner to further customize your Map. Until then email us with your banner attached and the site you want it added to and we will add it.

2.17 Changing Styles

NOTE: Users can modify the way a vector (point, line, or area) map is displayed, and control the color of lines or area fills as well as labels. Users can also use rules to support complex symbolization schemes based on database and scale conditions. WorldMap uses an open format for symbolization called SLD (Styled Layer Descriptor). SLDs created can be uploaded to WordMap and used to symbolize a given layer.

In addition to controlled data sharing, one of the key benefits of WorldMap is cartographic expressiveness. The Style tool allows you to create SLDs or Styled Layer Descriptors which are XML documents that define the way a layer looks.

It is possible to edit map styles and create new styles in WorldMap. In addition you can use desktop tools such as ArcGIS to more easily create complex styles, and this is discussed later. Styles are created using one or more rules. Each rule can have several parts, including a label, coloring, scale dependency, and one or more database conditions.

At the top of the tool you can choose between existing styles for a given layer, copy an existing style, or edit an existing style, or create a new style from scratch.

Let's start by editing a rule from the currently chosen style. Select the rule and click Edit. There are three tabs containing options for defining the rule you are editing. Aspects of a rule that you set in the various tabs are cumulative for a rule so for example you create a rule by setting the color in the Basic tab and then a database condition to control when that color is displayed in the Advanced tab.

In the Basic tab it is possible to:

- change the name of the style
- change its fill and outline color (if it is a polygon)
- control opacity of line or fill
- control line width and line style

In the Labels tab it is possible to:

- Select a field to use as content for your labels
- Choose a font type and size and style for the Label
- Choose the color for the Label as well as the opacity
- Choose a halo (background color) for the Label, including its color, size, and opacity

In the Advanced tab it is possible to:

- Limit the display of whatever you have defined in Basic and Label tabs in terms of maximum display scale and minimum display scale.
- Limit the display of whatever you have defined in Basic and Label in terms of one or more database conditions. It is also possible to set multiple groups of conditions.

2.18 Creating Styles with Desktop Software

You can create styles using desktop tools such as AtlasStyler: http://en.geopublishing.org/AtlasStyler. This application is currently somewhat limited but you may find it does what you need. Any SLD file you generate with it you will need to modify as described below.

There is also a tool which runs in ArcGIS 9.3 called ArcMap2SLD: http://wald.intevation.org/projects/arcmap2sld/. This approach allows you to take advantage of much of the symbolization power of ArcGIS and apply it to WorldMap. We are currently working on adapting this tool to run in ArcGIS 10.

We will not use AtlasStyler or ArcMap2SLD now but an optional challenge exercise for this is included at the end.

2.19 Uploading a Shapefile with an Associated Style

Click "Add Layer" and select "Upload Layer". Now give the layer a name. Name it using a convention <geography>_<subject>_<date of data>_<optional version>_<temp if for testing purposes>

Choose the required parts of the shapefile starting with the ".shp" part and continuing with .dbf, .shx, and .prj parts. One can optionally include an SLD for styling. One can also optionally define the text encoding if you know what it is, though for this layer the default is appropriate, Latin 1. If you knew you had Chinese or Arabic characters in your file, you might choose UTF8.

When you come to the "Upload Layer" page you will see these areas (***** items are required):

***Title:** Give your layer a title.

***Data:** Choose a Shapefile (.shp part) or zip compressed shapefile or GeoTIFF as your data to load. If you use a zip compressed shapefile, be sure the zip file contains the .shp, dbf, shx, and prj parts of the shapefile.

HINT: You will increase your chances of a successful upload by having your shapefile or GeoTIFF file be in the "plain vanilla" projection space, Geographic WGS 84, also known as EPSG:4326. To know whether your shapefile is in this space, the contents of your .prj file will look like this in a text editor:

```
GEOGCS["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID["WGS_1984",6378137.0,298.25722
3563]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]]
```

You may not have a .prj file for your GeoTIFF as it is not needed since the projection information for a GeoTIFF is stored in the header of the GeoTIFF.

If your .prj file does not look like this, the upload may still work fine. If it doesn't, the most likely culprit is the projection space. The best way to fix that is to use an application like ArcGIS or QGIS and reproject your file to Geographic WGS 84. This can be done for shapefiles or GeoTIFF files. Check with us on how to do a reprojection if you need help.

SLD: Optionally provide an SLD. This is an XML document that you would have created using the AtlasStyler or the ArcMap2SLD tool.

***Abstract:** Provide a description of your data. More information is better. At the very least when you add real data, please include a brief description of the data, who created it, for what purpose, and when. Please also include source materials used to create the data layer. This information is important both for you to remember what the data is about, and to allow someone else a chance to benefit from your work (assuming you want to make the data available for others to use at some point).

Permissions: Default permissions are set such that the world can view it but only you can change it. Add individual users to define who can edit (modify the style), or manage (delete layer, change permission settings).

If you select a GeoTIFF file for the **Data** item above, the view will remain the same. If you choose a shapefile, (the part of the shapefile with the ".shp" ending), the view will change to handle the additional parts of the shapefile as shown below as well as an optional encoding selection:

***Data:** Choose the .shp portion of the shapefile
***DBF:** Choose the .dbf portion of the shapefile
***SHX:** Choose the .shx portion of the shapefile
***PRJ:** Choose the .prj portion of the shapefile
Encoding: Choose an optional encoding. The default is Latin1.

NOTE: A number of character encodings are supported including UTF8/Unicode, GBK, and Latin1/ISO-8859-1 to Latin15/ISO-8859-15, and in addition various Windows encodings. Specific encodings can be set when a layer is being uploaded. The default encoding is Latin1.

Click "Upload" and once uploaded you will be presented with a metadata form (see below).

2.20 Metadata

NOTE: Users uploading new layers are prompted to fill in optional and required descriptive information about the layer. Required items include: Title, Abstract, Keyword, thematic category (ISO 19115 format). Eventually Author, Source, and Date will be included as options in the metadata editor.

Once the file has been uploaded, the only additional required items are Keyword and Category, though there are useful metadata fields here which we strongly encourage you to make use of. Starred items are required.

***Title** Provide a title for your dataset. We recommend using the following naming convention:

<geography - continent, country, state, or city>_<what it is>_<date data represents>_<optional version>_<optional temp if it is for testing purposes and can be removed after a week>

Example:
africa_ethnographic_1959_2_temp

Date This date is filled in automatically with the date of upload, but can be changed.

Date Type (creation/publication/revision) Choose type of date you want to describe. The default type is "creation".

Edition Use this field to describe the edition.

Abstract Give an overview of the dataset. What does the data represent? Who created it and when? What sources were used?

Purpose Describe briefly how the data can be used.

Maintenance Frequency How often is the data updated?

***Keywords** Add keywords that will be useful handles others can use to find the dataset. Separate keywords with a space.

Keywords Region (under construction) Select a major region of the world. Other regions in addition to countries will be added.

Constraints Use What are the rules governing the use of this data? We encourage users to adopt an appropriate Creative Commons (http://creativecommons.org/) license to define the type of attribution they require, whether the data can be used commercially, and under what conditions modifications of the material can be redistributed.

For example if you would like to restrict use of your data to non-commercial uses and don't mind others using as long as they provide proper attribution and don't mind others modifying your work and redistributing modifications as long as this license is attached, we would suggest a non-commercial share alike license such as this one: http://creativecommons.org/licenses/by-nc-sa/3.0/. Or feel free to create your own license. If you do, include the URL to the license here.

Constraints Other Include any additional constraints.

Spatial Representation Type

- **grid** – raster dataset such as georeferenced satellite image or scanned georeferenced map in GeoTIFF format.
- **steroModel** – currently not supported unless stored in a GeoTIFF or Shapefile format
- **textTable** - currently not supported unless stored in a GeoTIFF or Shapefile format
- **tin** - currently not supported unless stored in a GeoTIFF or Shapefile format
- **vector** – point, line, or polygon dataset in ESRI Shapefile format.

Language Please choose the language closest to the language used in the attribute table if the dataset is a Shapefile and for the language used on the map if the dataset is a GeoTIFF.

Temporal Extent Start Date (Under construction) Use only a start date if a date range does not make sense for your data. This date should describe the "temporal footprint" of the data. What time period does it describe? This is generally not the date the data was published.

Temporal Extent End (Under construction) Use an end date if the data in your layer is best presented by a date range.

Geographic Bounding Box This describes the theoretical box necessary to enclose the data geographically and is automatically calculated by the system. It can also be modified here. The projection system used to define the bounding box is also defined here.

Supplemental Information Additional information about your data.

Distribution URL This URL is calculated by the system. This URL displays this data layer along with information about it and is a possible form of citation.

Distribution Description (Under construction)

Data Quality Statement Add any information you have describing data quality.

Point of Contact Person who should be contacted with questions about the data.

Metadata Author Name of the person who created the metadata.

***Category** These are ISO 19115 categories and help make it possible for queries from other system to return meaningful results.

Attributes For Shapefile datasets an attribute control table is automatically generated with the following columns:

- **Attribute** Lists the fields in the database.
- **Display Title** Is used to control how the fields are displayed when a user clicks on the layer on the map and returns attribute information in the panel to the right.
- **Display Order** This is the order in which the attribute information is listed when returned in the panel to the right after a click on a map. **NOTE**: The field which is displayed first is used in the summary table in the upper part of the panel to the right. It is best to designate a field to be first which provides meaningful information at the record level.

- **Searchable?** This toggle determines whether the field will be searchable from the text search box to the lower left of the map.

2.21 Troubleshooting Shapefile Uploading

If the layer does not upload there are several possible reasons why:

1) The projection is not being read properly. If the layer is not already in Geographic WGS 84 space, also known as EPSG 4326, project the shapefile to that space and try again.
2) The SLD file is not correct. Check and make sure that you have made the required changes to the file as defined above.
3) Check to see that the XML is valid: http://validator.w3.org/#validate_by_input
4) Check to see that the SLD file was created for this shapefile and not another shapefile. The fields described in the SLD should match the fields in the shapefile.

If all else fails, project your file to Geographic WGS 84 (we can help) and don't include any SLD.

2.22 Upload GeoTIFF

Raster files are images and can be satellite imagery or scanned maps which have been georeferenced. GeoTIFF files are rasters and have all the necessary information for display and georeferencing in one file.

Click "Add Layers" and "Upload Data". Now give it a title and choose the GeoTIFF to upload. Provide abstract information and click "Upload". Fill in a keyword and category. Notice that there are no fields for raster layers. This means there will not be information returned when the layer is clicked on, unlike shapefiles which contain attributes.

Raster (GeoTIFF) images do not have the same type of styling options as vector (shapefile) layers do.

2.23 Adding a Remote Web Service Layer

WorldMap supports the addition of a layer to a map via a "web map service" or WMS. Given a WMS URL to remote server X, WorldMap will then request a list of all the Layers on that remote server, and display the list in WorldMap to select from and add to the Map.

Here is an example of how a remote WMS layer can be added.

Copy the World Health Organization URL below:
http://Maps.who.int/tools/geoserver/wfs?request=GetCapabilities?SERVICE=WMS&REQUEST=GetCapabilities

Click "Add Layers and go to the "External Data" tab and click "Add WMS Server".

Paste the URL into the form and make sure there are no spaces at the end of the URL. Click "Add Server".

After a moment, WorldMap should display a list of Layers from the WHO server.

Click on Title list to sort. Click on "Global Health Facilities" and at the bottom click "Add Layers". Close the "Add Layers" window.
Save your map.

2.24 Bookmark and Embed Your Map in Another Web Page

In addition to being able to save changes to your map, it is also possible to save sub-views of your map using the "Link" button. These views can take the form of a bookmark URL or the form of an embeddable code snippet. The code snippet can be pasted into any web page to provide a live view of your map within a blog or any web page.

Create a view that you like and want to show to someone else. Then click the "Link" button at the upper left.

Now you have a bookmark URL for the view as well as an embed tag that you can paste into a blog or an HTML page.

Open a blog or page if you have one. If you don't have one and would like to try this, go to http://blogspot.com or any other blog provider and create a blog.

Open a blog entry then paste the snippet into the blog entry and save it. Now view it. See that panning and zooming is supported on the live map you created.

You can change the size of the embedded map by using the pulldown to change the height and width of the embedded map (measured in pixels), or by editing the height and width parameters in the code snippet manually.

2.25 Feeds

Find the little "More" box at the upper right.

These items are feeds which are a form of map service similar to the WMS map services you loaded earlier through the "Add Layers" button. These feeds need to be accompanied by a filter word which (currently) is stored in the form which appears when you click the "Save" button.

Example: click "Save" and type "Freetown" in the keywords section.

Now turn on Picasa. All of Picasa's photos which are georeferenced and which have the keyword "Freetown" are displayed on the map. You may need to zoom to the area of Sierra Leone in Africa.

This also works for YouTube for videos and for maps stored in the Harvard Geospatial Library.

For Picasa and YouTube, keep zooming in on an area of interest if you see some content there. Generally more and more content will appear as you get closer to the ground.

NOTE: This approach means if you have image or video content you want to have show up on WorldMap, you can load it to Picasa or YouTube, provide locations using the Picasa or YouTube location tools or, if you have it, key in an accurate lat/long. Then give your content one or more unique tags. Now when you user these keywords as your filter you will only bring in content you have uploaded.

2.26 Jump Tool

WorldMap supports "Jumping" to remote web sites using the geographic extent displayed in the current map view to define the view for the site being jumped to.

Current Jump sites include Bing Maps (useful for its oblique aerial photography in many major cities), Yelp (useful for detailed information on businesses and ratings), and Social Explorer (current and historic census mapping).

For example if one were looking at the Englewood neighborhood of Chicago in WorldMap and selected "Social Explorer" from the "Jump to" pulldown, a new tab will open displaying a Social Explorer interactive census map for the Englewood neighborhood. Social Explorer now also works for China.

From Sierra Leone, try Bing Map. Now let's zoom to Chicago and see how this works for Social Explorer in the US.

2.27 Downloads

Maps may be downloaded in a number of file formats including: ESRI Shapefile, Google Earth KML, Adobe PDF, Microsoft Excel, CSV (comma delimited text), GML (geographic markup language), PNG (image), JPEG (image).

2.28 View in Google Earth

Layers can be viewed in Google Earth. Google Earth versions are in the downloads section.

2.29 Printing

Select the "Open Street Map" base layer and click on the "Print" button at the upper left. Choose:

- Portrait type
- Resolution
- Whether you want a legend
- Pan your map in print view if necessary
- Provide a title for your printout.

Click "Print" and generate a PDF which you can save, email, or print.

NOTE: Printing is supported at up to 300dpi and creates an Adobe PDF view of your map at 8.5" x 11" (216mm x 279mm) and 8.5" x 11" (216mm x 356mm) sizes.

3.0 Appendices

3.1 Useful URLs

Web Map Services
AfricaMap:
http://worldmap.harvard.edu/africamap/tilecache/tiles.py/1.0.0/

WorldMap:
http://ec2-184-73-229-41.compute-1.amazonaws.com/geoserver-geonode-dev/wms/?version=1.1.1&request=GetCapabilities&tiled=true

MassGIS:
http://giswebservices.massgis.state.ma.us/geoserver/wms

World Health Organization:
http://apps.who.int/tools/geoserver/wfs?request=GetCapabilities?SERVICE=WMS&REQUEST=GetCapabilities

CubeWerx:
http://demo.cubewerx.com/demo/cubeserv/cubeserv.cgi?SERVICE=wms&VERSION=1.1.0&REQUEST=GetCapabilities

NEXRAD Real Time Weather:
http://mesonet.agron.iastate.edu/cgi-bin/wms/nexrad/n0r.cgi

Software
ArcMap2SLD
http://wald.intevation.org/projects/arcmap2sld/ works with 9.3

AtlasStyler
http://en.geopublishing.org/AtlasStyler

Applications
Mapwarper
https://github.com/timwaters/mapwarper

New York Public Library Map Rectifier
http://maps.nypl.org/warper/