WorldMap – A Geospatial Framework for Collaborative Research

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The Center for Geographic Analysis, Harvard University
Presentation Topics

• What is WorldMap?
• Origins, goals, objectives
• Architecture
• Functionality
• Current status, future plans
• Conclusions, acknowledgements
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What is WorldMap? – web based open source software

• Interactive mapping system
• Geographic data portal
• Spatial investigation tool
• Dynamic publication platform
• Collaboration framework

http://worldmap.harvard.edu/alpha
What is WorldMap? – the initial interface

Get started by Viewing a Map or Creating a Map.

WorldMap ALPHA is an experimental platform designed for viewing and interpreting maps collaboratively. Today maps come from many sources and take many forms, from paper atlases to digital satellite images to census files. WorldMap aims to pull these and other hard-to-find maps together and make them available to researchers to explore, share, annotate, and remix.

WorldMap combines modeling capabilities of Geographic Information Systems (GIS) with current web technologies, and is made available as Open Source software. Use the hosted version of WorldMap here or download and run the application on your own server. WorldMap stands on the shoulders of other Open Source projects including AfricaMap, GeoNode, OpenLayers, PostGIS, and GEOS. WorldMap is licensed under Version 3 of the GNU General Public License (GPL).

Source Code

All the code for WorldMap is open source and freely available at github.

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Department of African and African American Studies (AfricaMap)
Department of Earth and Planetary Sciences (Vermont Geology Map)
Fairbank Center for Chinese Studies (ChinaMap)
FAS Academic Technology Group (ParisMap)
Folger Fund (ChinaMap)
Harvard Forest (Harvard Forest Map)
Harvard-MIT Data Center
Institute for Quantitative Social Science
Milton Fund (AfricaMap)
Provost Fund
Radcliffe Institute for Advanced Study (BostonMap)
Rappaport Institute for Greater Boston (BostonMap)
Weatherhead Center for International Affairs (ChinaMap)

Software Development Contributions
What is WorldMap? – interactive mapping system
What is WorldMap? – geographic data portal
What is WorldMap? – a spatial investigation tool
Save custom maps - lets you save the state of your map. Anyone opening the map will see the view that you saved.

Links - support conversations about a map but don’t change the state of the map. Links can be emailed.

Embed code - allows you to add a live map to your blog or web page by copying and pasting.
What is WorldMap? – collaboration framework
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WorldMap origins – from AfricaMap

**AfricaMap:**
- Led by Harvard Professors Suzanne Blier and Peter Bol
- Beta release in Nov. 2008
- Was cloned for other regions.

**WorldMap:**
- Built on the foundation of AfricaMap
- Collaborative tools added
- Alpha release Dec. 2010
WorldMap goal - facilitate geospatial information sharing

- Memory institutions
- Universities, schools
- Businesses
- Government agencies
WorldMap objective – to fill an internet mapping system niche

Serving the “middle ground” user
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## WorldMap architecture – key element matrix

<table>
<thead>
<tr>
<th>Component</th>
<th>Primary Open Source Project</th>
<th>Language</th>
<th>Interoperability standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Map viewer client which is used within a browser such as IE or Firefox</td>
<td>OpenLayers</td>
<td>JavaScript</td>
<td>HTTP, WMS, WFS, GeoRSS</td>
</tr>
<tr>
<td>Map rendering and symbolization which allows the user to control the appearance of a map.</td>
<td>GeoServer</td>
<td>Java</td>
<td>WMS, WFS, SLD</td>
</tr>
<tr>
<td>Data export to provide data in various useful formats</td>
<td>GeoServer</td>
<td>Java</td>
<td>GML, KML, GeoJSON, CSV, PDF, JPEG, PNG</td>
</tr>
<tr>
<td>Authentication to allow users to control access to materials they contribute</td>
<td>Django</td>
<td>Python</td>
<td></td>
</tr>
<tr>
<td>Metadata catalog to store information about data layers to support search and documentation</td>
<td>GeoNetwork</td>
<td>Java</td>
<td>CSW</td>
</tr>
<tr>
<td>Spatial RDBMS to support a wide variety of spatial data storage, manipulation, and query operations</td>
<td>PostGIS</td>
<td>C++</td>
<td>Spatial SQL</td>
</tr>
<tr>
<td>Map caching to allow the GeoServer rendering engine to handle much greater loads by eliminating need to render any map twice</td>
<td>GeoWebCache</td>
<td>Java</td>
<td>WMS-C</td>
</tr>
</tbody>
</table>
WorldMap architecture – version 1.1 design diagram
WorldMap architecture – built from open source software
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WorldMap functionality – an abbreviated list

- Create a custom map
- Select existing data layers
- Upload local data sets
- Set map symbology and transparency
- Control access to map and data
- Save a derivative copy of a map
- Query by location and by attributes
- Jump to the same location on other mapping systems
- Bring in multi-media information such as Picasa and YouTube
- Download data sets for local analysis
- Export map to a PDF file
- Save the URL to a map
- Embed dynamic map in HTML files for web publishing
WorldMap functionality – create your own map

- Registration is required to create a custom map
- Define a map extent, add and symbolize layers, set permissions, save the map.
WorldMap functionality – add existing layers to your map
WorldMap functionality – add existing layers to your map
WorldMap functionality – load external data via the web (WMS, WFS protocols)
WorldMap functionality – load your own data

Shapefile and Geotiff formats supported
## WorldMap functionality – set map and layer permissions

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<tr>
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</thead>
<tbody>
<tr>
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<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Edit</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Manage</td>
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<td>Yes</td>
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WorldMap functionality – Picassa and YouTube
WorldMap functionality – symbology
WorldMap functionality – feature query
WorldMap functionality – KML interoperability
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Index of /chinamap

<table>
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<tr>
<th>Name</th>
<th>Last modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChinaMap_Data_Notes.pdf</td>
<td>07-Mar-2011 18:32</td>
</tr>
<tr>
<td>China_HSRail_25apr11.kmz</td>
<td>25-Apr-2011 13:01</td>
</tr>
</tbody>
</table>

Opening China_HSRail_25apr11.kmz

You have chosen to open

China_HSRail_25apr11.kmz
which is a Google Earth KMZ file
from: http://chgis.hmdc.harvard.edu

What should Firefox do with this file?

- Open with Google Earth (default)
- Save File
- Do this automatically for files like this from now on.

Settings can be changed using the Applications tab in Firefox's Options.

OK Cancel
WorldMap functionality – KML interoperability
WorldMap functionality – connecting to other systems
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Currently in alpha, release 1.0 planned for July, 2011

Latest source code available:

https://github.com/cga-harvard/cga-worldmap
• online georeferencing
• time enabled search and display
• Google street view integration
• integration with Zeega (zeega.org)
• map annotation
• gazetteer searches
• mobile device support
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Lots of maps created by many users, and the system is designed to handle many more. Try it out!

- AfricaMap
- Boston Research Portal
- Vermont Geology Map
- Harvard Forest Data Map
- ParisMap
- East Asia Map (China Map)
- Philadelphia City Owned Properties
- U.S. Railroads

.......plus 88 others and counting......
WorldMap – acknowledgements

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Weatherhead Center for International Affairs, Harvard University

FAIRBANK CENTER FOR CHINESE STUDIES, Harvard University

Department of Earth & Planetary Sciences, Harvard University

Academic Technology Group

Milton Fund

RADCLIFFE INSTITUTE FOR ADVANCED STUDY, Harvard University

HARVARD Kennedy School RAPPAPORT INSTITUTE for Greater Boston

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Lex Berman, Project Manager, China Historic GIS Project, CGA

All of the staff at CGA!