

Developing the Oregon Spatial Data Library

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Abstract: *The Oregon Spatial Data Library (<http://spatialdata.oregonexplorer.info/>) provides easy and convenient ways to find, access, and share geospatial data. Developed in partnership with the Oregon Department of Administrative Services (DAS), the Oregon Spatial Data Library provides access to spatial data including "framework" data for the State of Oregon. Framework datasets serve as "base data" for a variety of GIS applications that support important research, business, and public services. Administrative boundaries, transportation, land use, ownership, water, hazards, and wetlands are examples of framework data.*

Introduction

At the Western Association of Map Libraries (WAML) Spring 2010 conference, OSU Libraries shared how to use the Oregon Spatial Data Library, a powerful new data access tool for Oregon researchers, students, public agency staff, private industry, and citizens.

The Oregon Spatial Data Library (OSDL) is part of the Oregon Explorer natural resources digital library which consists of a statewide site (www.oregonexplorer.info) and associated basin, topic, and data portals. The Oregon Imagery Explorer, which serves .5 meter color orthoimagery, was the first data portal to be created for the Oregon Explorer. Building on the success of the Oregon Imagery portal, a second Oregon Explorer data portal, the Oregon Explorer Spatial Data Library was developed. The Institute for Natural Resources (INR) and the Oregon State University Libraries (OSU Libraries) launched the Oregon Spatial Data Library on National GIS Day – November 18, 2009.

Purpose and Vision

Geospatial data use is now a part of routine operations for Oregon government agencies. As a result, agencies receive many requests from organizations throughout the state for geospatial data. Maintaining that geographic data in an efficient and coherent manner is critical to today's complex and

demanding service environment. A Web-based Internet portal application providing access to and distribution of public domain, statewide Framework data would meet the majority of users' needs.

The Department of Administrative Services (DAS) and Oregon State University are collaborating to develop web sites to allow for the distribution of spatial data for the State of Oregon. The near-term objective of this project was to develop an Oregon Spatial Data Library that serves statewide Framework data and other spatial data. This Web site is integrated into the Oregon Explorer Natural Resources Digital Library and the State of Oregon's navigatOR initiative.

The targeted primary users for the Oregon Spatial Data Library are staff of agencies participating in the Oregon Geographic Information Council (OGIC), including Federal, State, and local governments and tribes. Secondary users include the general public. The intent is that the portal enables spatial data access (searching, viewing and downloading) by anyone from anywhere.

The screenshot shows the Oregon Spatial Data Library website. At the top, there is a dark blue header with the title "Oregon Spatial Data Library" on the left and navigation links "Login Register Help About Feedback" on the right. Below the header is a light blue navigation bar with "HOME SEARCH DOWNLOAD" and a "LAUNCH MAP VIEWER" button. The main content area has a "Home" heading and a sub-heading: "The Oregon Spatial Data Library provides easy and convenient ways to find, access and share geospatial data." There are two main content boxes. The left box, titled "Find Data", contains a search bar with the text "AdminBoundariesFramework" and a "Search" button. Below the search bar is a section titled "Oregon Framework Data" with a list of categories: Admin Boundaries, Bioscience, Cadastral, Climate, Elevation*, Geodetic Control*, Geoscience, Hazards, Hydrography, Imagery, Land Use/Land Cover, Transportation, Utilities*, and Reference. A note below the list says "* No framework data and/or a standard available yet." and there is a link "GEO Spatial Data Library Alphabet" and "What is Framework Data?". The right box, titled "Featured Data", is for "Oregon Hazards Data". It has two columns: "DATA" and "RESOURCES". The "DATA" column lists: Hazards data includes: Climate, Coastal Erosion, Earthquake, Floods, Geologic Floodplain, Landslides, Naturally Occurring Hazardous Materials, Tsunami, Volcanic Hazards, and Wildfire. The "RESOURCES" column lists: Hazard/Preparedness Framework Implementation Team, geodata.gov, The National Atlas, and Hazards Explorer. Below the resources is a "TOOLS" section with a "Hazards Reporter" link and a small map icon. At the bottom of the page, a dark blue footer contains the text: "This is a GIS Portal Toolkit Computer System. Please read the Disclaimer and Privacy or Contact Us."

Oregon Spatial Data Library Development Process

When we developed the Oregon Spatial Data Library, we used a process that engaged users from the beginning. The portal development team included researchers, programmers, librarians, and the Oregon Spatial Data Library planning team. The planning team members included Framework Implementation Team leads, State agency staff, Federal agency staff, and University representatives from Oregon State University and the University of Oregon. Additional input was obtained from the Oregon Geographic Information Council (OGIC) which sets policy and direction for Geospatial activities in Oregon. OGIC

provided input on the initial functional requirements and characteristic of the Oregon Spatial Data Portal.

The Oregon Spatial Data Library project was intended to occur in multiple phases. Phase 1 was the project scoping, which included an assessment of how well ESRI's GIS Portal Toolkit (GPT 9.3) met the required and desired needs of the portal and the beginning development and implementation of the Oregon Spatial Data Library. Future phases of the Oregon Spatial Data Library will include such deliverables as serving additional spatial data beyond framework data, enhancing features for viewing, and accessing or editing data.

Phase 1

Phase 1 scoping included articulation of the required and desired functionality relative to software that currently is available to serve as the foundation for the Web site, satisfying as many of the needs of DAS and other State agency partners and Oregon users as possible.

We drafted the initial functional requirements and characteristics of the Oregon Spatial Data Library, based on workshop findings, input from the planning team, and the online survey results.

Initial Functional Requirements

1. The application will be integrated into the Oregon Explorer and the navigatOR initiative and provide access to framework spatial data.
2. The spatial data portal architecture will be designed to support future geospatial data access and distribution, beyond framework spatial data.
3. The application will allow a user to select an area of interest (AOI), clip that area from the database, compress those images for efficient transfer, and electronically ship them to the user. Once received, users will have the option to uncompress the data. Metadata will accompany all shipments.
4. The application will support multiple projections and datums.
5. The application will adhere to Federal Geographic Data Committee (FGDC) and Open Geospatial Consortium (OGC) standards.
6. The application will provide 24-hour/7-day-a-week operational accessibility.

Initial Major Characteristics

Browsing. The application will have a simple viewing mode where users can browse datasets alphabetically or by category, similar to what is available now at the Geospatial Enterprise Office (GEO) Spatial Data Library.

Searching. The search feature will support several methods of defining an area of interest (AOI), including by interactive map and by database query.

Processing. The application will be able to clip data to the AOI


Output. The application will be able to generate:

1. Custom datasets generated from a user-defined AOI
2. Output in multiple projections (including Oregon Lambert), compressed and combined with metadata

Search

WHERE

Anywhere
 Intersecting
 Fully within



[» Additional Options](#)

FRAMEWORK DATA

[Admin Boundaries](#) | [Bioscience](#) | [Cadastral](#) | [Climate](#) | [Elevation](#) | [Geodetic Control](#) | [Geoscience](#) | [Hazards](#) | [Hydrography](#) | [Imagery](#) | [Land Use/Land Cover](#) | [Transportation](#) | [Utilities](#) | [Reference](#)

Results 1-10 of 10 record(s)

Expand results [Zoom To Results](#) [Zoom To Searched Area](#)

State of Oregon Administrative Boundaries WMS


This WMS represents a collection of administrative boundary layers for the State of Oregon. Information pertaining to individual layers is available on the Oregon Geospatial Enterprise Office website (<http://www.oregon.gov/DAS/EISPD/GEO/alphalist.shtml>).

[Website](#) [Add To Map](#) [Details](#) [Metadata](#) [Zoom To](#)

Oregon State Boundaries - 2001

This theme shows the jurisdictional and cartographic state perimeters for Oregon in the Oregon Lambert Projection.


[Website](#) [Download](#) [Details](#) [Metadata](#) [Zoom To](#)



Oregon School Districts

The school district theme was created in various stages from 1997-2000. The theme was originally derived from 1:100,000 scale census data.


[Website](#) [Download](#) [Details](#) [Metadata](#) [Zoom To](#)



Oregon Legislative Districts Senate - 2000

The Oregon Senate Districts theme was created by merging blocks from the census 2000 redistricting blocks theme using the Autobound Redistricting extension. The polygons formed by the merged blocks represent the boundaries of the Oregon House districts. ...

[Website](#) [Download](#) [Details](#) [Metadata](#) [Zoom To](#)



Recommendations from April 29, 2008 Planning Team Meeting

During the April 29, 2008 Spatial Data Planning Team meeting, we asked for specific recommendations concerning required or desired functionality, including functionality related to searching, map viewing, and downloading. The planning team feedback is summarized in the project completion report².

Assessment of ESRI's GIS Portal Toolkit 9.3 relative to user needs

The process used to assess the functionality and fit of the ESRI GIS Portal Toolkit 9.3 against the required and desired functionality involved numerous steps:

- scoping the necessary hardware required for installation,
- purchasing additional hardware (one server),
- configuring a database,
- installing the software,
- installation of ArcGIS Server (JAVA),
- creation of map services,
- establishing an ArcSDE data connection to GEO,
- loading metadata,
- configuring the data download functionality, and
- final user interface customizations.

The supporting documentation for GPT 9.3 recommends having minimally two servers to support the toolkit. Based on this recommendation, a new server was purchased and an existing map server at OSU Library was configured to support the GPT 9.3 application.

GPT 9.3 stores harvested metadata in ArcSDE tables. Working with ESRI support, it was determined that the best solution was to use an existing OSU Library ArcSDE database and add a specific user to access the GPT metadata tables created in the existing ArcSDE instance at the OSU Library.

Installation of the software included a metadata service, a harvesting service and web applications. Each of these services and applications required individual installation and configuration of their respective files as there was no single installation utility for all of the pieces. For the ability to logon to the site as different users with various roles, Lightweight Directory Access Protocol (LDAP) authentication was setup to grant the appropriate permissions.

ESRI documentation specified that ArcGIS Server 9.3 (JAVA edition) be installed to support the map services in the portal application. After installation of ArcGIS Server 9.3 JAVA, the supporting map and geo-processing services were also created. Data used to support these map services required being accessible to the ArcGIS Server user accounts.

In order to test the feasibility of creating a distributed framework for data access, an ArcSDE data connection was opened up between GEO and OSU Library. This connection required the involvement of system administration staff at both locations to open up the necessary firewall permissions.

To load metadata into the GPT 9.3 several options are available. One is to setup a metadata service or a WebDAV directory on a publishing entities server which is harvested from the GPT 9.3. Another option is to grant publishers permission to connect to the GPT 9.3 metadata service and selectively publish content via ArcCatalog utilities. The final option is to have publishers manually import metadata via the web application and upload one metadata record at a time. For the testing of this first phase of this project, the approach taken was to open up the ArcSDE connection and import metadata from GEO and on the OSU side manipulate the metadata to add required fields to ensure proper functioning (see Metadata Configurations below). For future phases, it is recommended that publishers conform to the requirements of publishing to the portal.

To enable the clip, zip and ship functionality of the GPT 9.3 two ArcGIS Server services were required along with the licensing of the Data Interoperability Extension for ArcGIS Server.

The final step was to customize and make the web application contextually relevant to Oregon.

Improvements

ESRI released the ArcGIS Server Geoportals extension 9.3.1 after the conclusion of Phase I of this project. Improvements in 9.3.1 that may influence future phases of this project include:

- a. Base architecture shift away from using ArcIMS metadata service to a direct database model. The implication is that a re-import of the metadata in the beta site will need to occur though the understanding is that this can occur through a harvest of the current site.
- b. Increased usability changes most notably to the advanced searching options.
- c. Ability to launch a unique map viewer. Current version requires the JAVA map viewer to launch.
- d. Quick preview of live services through a lightweight javascript map viewer.
- e. Federated searching of other portals. This will allow for easy searching of GOS or user defined portals to be returned in search results.

Summary

Completion of Phase I of this project involved the scoping, installation and implementation of a customized beta version of the ESRI Geoportal Toolkit 9.3. Modifications that were made to get the beta version of the site running included customizing the metadata and metadata configuration files, extensive troubleshooting with ESRI to enable the data download with support for shapefiles and customizing the web application interface to improve some baseline usability. The next version of the portal toolkit (now an extension for ArcGIS Server) will provide some useful enhancements over the beta version implemented including a shift to a lighter-weight database model, usability enhancements and federated searching. For future phases of this project, some initial recommended next steps are:

- a. Migrate the beta site to 9.3.1.
- b. Scope feasibility of creating a one-tool solution that integrates raster and vector data using the underlying architecture of GPT 9.x and the ER Mapper Imagery Explorer for data extraction but that has a unified user interface.
- c. Create a publishing document for new contributors to use in adding their metadata/data to the portal.
- d. Market to prospective publishers for data inclusion on the site.
- e. Perform usability testing and evaluation with the beta site to inform future OSDL development phases

Future Collaboration

University of Oregon Libraries (UO Libraries) is collaborating with Oregon Explorer to contribute additional geospatial data sets to the Oregon Spatial Data Library. UO Libraries plans to add 100 more datasets to be accessed and downloaded.

Anyone may provide geographic data by publishing map services and images, geographic datasets, geoservices, spatial solutions, geographic and land reference material, and geographic activities or events to share with others through submission of on-line provider forms within the OSDL portal. Publishing is performed via an online form or an upload utility.

Acknowledgements

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