The What, Why, Who and How of Where:
Building a Portal for Geospatial Data

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Director, Scholars Portal
What?
- Scholars GeoPortal
  - Beta release
    - Fall 2011
  - Production release
    - March 2012
- OLITA Award for Technical Excellence
Search and Browse for Data Layers
Census Subdivision - Cartographic Boundary File (CSD-CBF), 2006 Census

Coordinate system: 4269 - "NAD83"

Abstract:
The Census Subdivision Boundary Files contain the boundaries of all 5,418 census subdivisions. A census subdivision is an administrative area which is a component of the Standard Geographical Classification. Census subdivision is the general term for municipalities, as determined by provincial and territorial legislation, or areas treated as municipal equivalents for statistical purposes, for example, Indian reserves, Indian settlements and unorganized territories.

CSDUID - Uniquely identifies a census subdivision (composed of 2-digit province/territory code, 2-digit census division code and 3-digit census subdivision code).

ISO-19139 Metadata:
- Metadata Information
- Resource Identification Information
- Spatial representation Information
- Reference System Information
- Data Quality Information
- Distribution Information

Scholars Portal Metadata:
Zoom through 15 levels of cached tiles
Select different base maps
View Legend for each Layer
Refine searches by facets

View abstract or full metadata record
View attributes of features in each layer
Download by pre-defined area or user-defined area

Choose output file format

Choose coordinate system
Download by area of interest

OR

Download entire datasets

OR

Select a pre-defined area

OR

Draw an area of interest

Choose a mode and draw your region on the map:

Choose an output file format (vector data only)

Shapefile - (.shp)

Choose an output coordinate system (vector data only)

WGS 1984

Select services to extract data from:

Canada/US Road Linkages (LNK)

Canada/US Road Linkages (LNK)

Canada/US Roads Linkages

Download
Create simple annotations
Print or save map as PDF
Content

• 80 TB of datasets include vector files and imagery
• large scale (city, region) and small scale (provincial, national)
• key providers:
  – DMTI Spatial (DMTI Spatial SMART Consortium)
  – Statistics Canada
  – Ontario Geospatial Data Exchange (program of the Ontario Ministry of Natural Resources)
Why?
A Portal for Geospatial Data

• situation in 2007
  – large shared collections of GIS data
  – access to these files varied from school to school
  – much time spent on handling files, distributing them
  – access for scholars limited to open hours
  – discovery was difficult; retrieval was time consuming
Why a consortial approach?

- Addressing the problem was beyond the means of most individual libraries (financially, technically, staff skills)
- Pockets of specialized skills existed across the libraries but no one had all the necessary skills
- A track record of successful project management and application development with Scholars Portal
- A funding opportunity
Who?
420,00 FTE

http://www.ocul.on.ca
Project Partners

OCUL Governance Teams

OCUL Executive

Ontario Buys

Scholars Portal
Project Management Group

• Ongoing coordination of working group activities
• Financial oversight
• Coordination of RFP, Usability Study, data license negotiations, External Advisory Committee
• Communications with stakeholders including OCUL libraries, Province, and the broader library community
Technical, Standards & Collections Working Group

- Metadata Best Practices Document
- Metadata Editing Toolkit
- Model Data License
- Functional Requirements (for RFP)
- Data Loading Priority List
- Ongoing testing and portal feedback
- Collections Policy
Teaching & Learning Working Group

• Teaching & Learning Strategy Document
• GeoPortal Help Guide
• OCUL Training session, Dec 2011
• “Getting Started” Handout
• Survey of community regarding need for specific learning modules
• Ongoing portal testing and feedback
Scholars Portal Operations Team

• Responsible for project management, software development, and systems support
• Project Manager (Data and GIS Librarian)
• Development Team
  – 4 programmers
  – GIS Analyst
  – Metadata Librarian
  – Web Designer
How?
Developing the Plan

• 2007
  – OCUL map librarians consulted with researchers at various campuses and prepared needs assessment

• 2008
  – OCUL prepared a funding proposal to the province for a 3-year project to establish shared platform
  – platform would support preview, multiple data layers, subsetting, extraction
  – monitor results and benefits for researchers, students, and libraries

• 2009
  – received funding for $1.2M for a three year project
Users and Uses

• Content selection driven by analysis of users and uses
• Research survey issued in Fall 2011 to identify key research interests
• 59 completed responses
  – breakdown by discipline
  – research interests
Survey Results: Research Interests

- 98% of our sample was currently conducting a research project
Survey Results:
Use of Geospatial Data

Percentage of Researchers using Data by Type

- Imagery: Research 59%, Teaching 41%
- Land use: Research 49%, Teaching 41%
- Environmental: Research 49%, Teaching 48%
- Elevation: Research 46%, Teaching 46%
- Land cover: Research 44%, Teaching 44%
- Census data: Research 34%, Teaching 34%
- Natural resources: Research 37%, Teaching 34%
- Census boundaries: Research 29%, Teaching 27%
- Political boundaries: Research 41%, Teaching 39%
- Transportation: Research 39%, Teaching 37%
- Demographics: Research 34%, Teaching 37%
- Hydrography: Research 27%, Teaching 27%
- Structures: Research 25%, Teaching 25%
- Health data: Research 25%, Teaching 25%
- Parcels: Research 22%, Teaching 12%
- Other: Research 17%, Teaching 15%
- Imagery: Research 10%, Teaching 10%
Survey Results:
Desired GeoPortal Features - Searching

Percentage of Researchers Interested in GeoPortal Features

- Search by keyword: 85%
- Search by geographic selection: 78%
- Search by place name: 71%
- Search by topic: 70%
- Search by date: 48%
- Search by scale: 36%
Survey Results:
Desired GeoPortal Features - Downloading

Percentage of Researchers interested in GeoPortal features

- Download by user-specified geographic area: 78%
- Download by specific attributes: 75%
- Download entire dataset: 59%
- Download many file formats: 53%
- Download range of projections: 44%
Survey Results:
Desired GeoPortal Features - Other

Percentage of Researchers interested in GeoPortal features:
- View detailed metadata: 54%
- Create online maps: 42%
- Save maps: 41%
- Print/Export maps: 37%
- Help with portal use: 29%
- Notifications: 29%
- Group space: 20%
- Analyze data online: 19%
- Help with GIS concepts: 19%
Early Decisions: Open Source or ESRI

• Advantages of integrated software stack
  – ArcGIS map services provide elements of both WMS and WFS OCG services
  – easy way to publish geoprocessing services (e.g. clipping and downloading, re-projections, and multiple output formats)

• Effective caching for enhanced performance

• Control over symbology to provide better user experience

• Familiarity with ESRI products in academic market

• Difficulties of incorporating open source solutions in competitive RFP process
Early Decisions: FGDC or ISO

• International standard; option to create national profiles
• North American Profile released in 2009 (InterNational Committee for Information Technology Standards (INCITS) and Canadian General Standards Board Committee on Geomatics)
• Adopted by the Canadian federal and Ontario provincial governments
• Hierarchical structure creates ‘packages’ of metadata that can be reused and combined
• Support for the documentation of new geospatial data topologies and technologies
Data Loading and Map Services

• Data is loaded into the geodatabase
• Map document is created from this data; symbology defined at different scales
• Map document is published as a map service
• All map services are cached to ensure acceptable performance
• Map services allow users to preview data at various scales, explore attributes, and select a geographic subset for downloading
## Scholars GeoPortal Data

### In Production

<table>
<thead>
<tr>
<th>DMTI</th>
<th>OGDE</th>
<th>DLI</th>
<th>Open Content</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>40</td>
<td>20</td>
<td>32</td>
<td>3</td>
<td>95</td>
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</table>

### In Development (produced, awaiting caching)

<table>
<thead>
<tr>
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<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>4</td>
<td>26</td>
<td>0</td>
<td>59</td>
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### Services include:
- Point, line, and polygon data (vector data)
- Image services (raster data)
- Attribute tables
- Bilingual data (French and English)
Evaluation & Assessment

• Surveys of Geospatial Library Services
  – Qualitative Background Survey (Feb 2010)
  – Quantitative Statistics Tracking Surveys (6 semesters, 2010-2011)

• Usability Study (March 2012)

• Usage Statistics (Beginning March 2012)
Survey Results:
Tasks performed in the geospatial library

Average number of hours spent per semester

- Infrastructure Support: 24%
- Developing Materials / Presentations: 15%
- Delivering Materials / Presentations: 9%
- Acquiring / Licensing Geospatial Data: 11%
- Web Page Creation/Maintenance: 8%
- Managing and Organizing Data: 3%
- Authoring and Editing Metadata: 6%
- Indexing and Contours: 5%
- Handling Mediated Requests: 19%
Survey Results:
Geospatial Library Instruction

Hours spent per semester on Instruction (blue) and Instruction Hours devoted to Spatial Literacy concepts (red)

Average number of students reached by library instruction per semester

<table>
<thead>
<tr>
<th></th>
<th>Large</th>
<th>Medium</th>
<th>Small</th>
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<tbody>
<tr>
<td>Hours</td>
<td>258</td>
<td>174</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
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</table>

Total students reached by library instruction per semester, expressed per thousand

<table>
<thead>
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<tbody>
<tr>
<td></td>
<td>6</td>
<td>5</td>
<td>3</td>
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</table>
What’s Next?
Sustainability

• Plan approved by OCUL Directors in Fall 2011 supports ongoing staffing at Scholars Portal to maintain and develop the GeoPortal

• Establishment of an Operations Group to provide ongoing input into future enhancements

• Establishment of task groups as needed, to address teaching & learning, collections, metadata, and other future directions
Ongoing Assessment

• Conduct follow-up librarians surveys (less frequently, over 2 year period)

• Conduct follow-up researcher survey (2013)

• Review and report on usage of the portal
Foundation for Innovation

- Sustainable funding
- Strong development team
- Engagement of librarians
- Connections with faculty and students
- Feature rich server software
- Infrastructure with room to grow
Data Visualization

• Exploring large data sets using visual metaphors
  – Geographic Visualizations
    • setting filters on attributes
    • changing symbology to represent values
    • adding time as a dimension
    • real-time data feeds
  – Numeric Data viewed geographically
    • link data from ODESI to geographic regions
    • support pre-defined and on the fly visualizations
Visualizing attribute data - spatially

Population density

Language distribution and perceived health
Visualizing attribute data – spatially, on the fly

1. Create indicators, indexes; to visualize statistics

2. Custom maps, symbology, and filtering

3. Canadian 2006 census tracts

All census tracts from the 2006 Canadian census. Open the complete description and stats in another window.
Growing the service

• More shared data sources
• Local library data collections
• Partners from across the country
Questions?

http://geo.scholarsportal.info