Reorganizing Around Web Services

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July 2010
• **Mission:**
  – “Encouraging and facilitating the effective use of geospatial information and technology for Utah”

• **Activities:**
  – State Geographic Information Database (SGID)
  – Geospatial Infrastructure for:
    • Data and Imagery Acquisition, Sharing, Distribution
    • Internet–enabled web and mapping services
    • Map-based web applications
    • GPS base station network
  – Coordination of local government, state & federal agencies geospatial activities and resources for optimal ROI

• **Hybrid Business Model**
  – Cost Recovery & Appropriation
Web & Map Services

• Definition:
  – **Web Service**: "a software system designed to support interoperable machine-to-machine interaction over a network.” (WC3)
  – **Usually**: Client – Server (Request – Response)
  – **Good terms to know**:
    • **WSDL** – protocol describing how to use WS
    • **UDDI** – Registry/Catalog of WS
    • Formats: SOAP, JSON, WMS, REST, etc

• **WS/MS Intended Audience** – App developers
  • **Web services run in the background of applications**
  • Thin (browser) and Thick clients (ArcMap, etc)
    – GIS and Non-Spatial Audience
  • .NET, java, php, python, ruby, etc
Web & Map Services

- Example: Elevation lookup
  - Request: SGID Dataset Name, x, y
  - Response: Elevation

```xml
<?xml version="1.0" encoding="utf-8" ?>
<string xmlns="http://mapserv.utah.gov/WSUTSGID_RasterValues">
1454|meters</string>
```
Utah Map and Web Services:

- **From Exploration:** ArcIMS 2000-2007 (~15 services, ArcAXL)

- **To Business Solutions:** ArcGIS Server, 2008 →
Utah Geospatial Infrastructure

• 2008 Strategic Plan Addresses Geospatial Services
  – Goal 4.2: “Services Are Effective, Accessible and Reliable”.
  – Objectives:
    • Create a common infrastructure for delivering geospatial services
    • Create exemplary services
    • Develop services for data integration.
    • Adopt management and control processes
Utah SGID Data Reorganization

- **State Geographic Information Database**
  - SDE: 450+ Vector Layers
  - ImageServer: 20+ Raster Layers

- **Services Focus and Geospatial Archiving Needs Drive Reorganization**
  - ISO Topic Categories
  - Easy of update/maintenance
  - Attributes for map & web services
    - Ease of use
    - Cartography
  - Performance
AGRC Office Reorganization

- **Organizational**
  - Preexisting Model
    - Horizontal
    - Project Focus
    - 1 Supervisor
  - New Model
    - Operational Groups, 4 Section Managers
      - Administration
      - SGID Data
      - Cadastral
      - Tech/App Development (Web/Map Services)

- **Physical**
  - Designed for collaboration:
    - by group
    - shared spaces
    - low walls
Core Web Services:
• Address Location
  – Address/Zip
  – Address/Placename
  – Milepost/Route
• Features At/Near Point
• Get Feature Attributes
• Elevation Lookup
• Keyword lists
  – Cities, placenames, GNIS
• Base Map Services

About:
• mapserv.utah.gov
• SOAP, JSON, Map services info
• User accounts
  – Track usage
  – Communicate with users
Componentizing Strategy:

- 1st Gen: Design web service to specific use
  - District Lookup
    - Address → legislators, tax districts, etc.
    - Easy for application developers
Componentizing Strategy:

• 2nd Gen: Design services as building blocks
  – District Lookup
  – Address Locator + Feature At Point
    • Application develops have to chain services 😞
      – First find address location
      – Then find districts at address location
    • Faster, easier to maintain, more flexible 😊
Web Service Advantages

- Get more from investment, reach wider audience
- Application Developers don’t need to maintain own geospatial infrastructure, licenses, & data
- Contract with end user defined by request and response definitions
  - Frontend Input/Output parameters must stay the same
  - Backend methodology & data can be changed without breaking contract
- Custom handling of tasks
- Example: Address Locator
Ex. Address Locator Web Service

• Seamless updates: no files, data, parameters, software to be managed by application developers

• Customized Location Methods:
  – Backend is all zipcode-based geocoding
  – But place name input is also allowed
    • Place name to zipcode alias table
  – Three levels of street name aliasing
  – Milepost/Route handled by same service
  – Next? NENA DB direct GC
Ex. Solar Energy Web Service

• Input: Polygon (list of coordinate pairs)
• Returns Monthly Averages
  – Solar Energy (watts)
  – Sunlit Hours
• 400 million points each w/ 24 preprocessed attributes derived from LIDAR data w/ ESRI solar tools & custom scripts
  – 1 meter resolution, extent = Salt Lake City
  – Custom python, VBA scripts:
    • Tiled solar tools processing
    • Aggregating tiles & layers
Core Statewide Map Services:

- Publish once, integrate into applications
  - WMS base map services
    - Imagery (via Image Server)
    - Imagery/Streets Hybrid (tile cache)
  - ImageServer
    - Aerial Photography, CIR, (vintages available)
    - Scanned Maps
      - USGS topo series
      - Geology base maps
  - Hillshades
Integrating Web & Map Services

- Tile Map Service
- Address Locator
- City List
- GNIS Placename
- Get Feature Geometry

This is the interface template for most of our simple interactive maps.
Environmental Quality Public Information Site

Basic Display/Query

- Wizard or GIS style interface
- Search/view cleanup sites and related data
- Make FOIA request and/or link to document management system

Uses web services for: base map, geocoding, city/placename lists
DNR Watershed Restoration Initiative: Web-Based Feature Editing
DNR Watershed Restoration Initiative: Document Management

Utah’s Watershed Restoration Initiative

Projects

Project ID: 19  Project Title: Park Ridge Bullfrog (return to project portal)

Images & Attachments

Images

<table>
<thead>
<tr>
<th>Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>Bullfrog area, taken 8-24-97</td>
</tr>
<tr>
<td>During</td>
<td>Bullfrog in action</td>
</tr>
</tbody>
</table>

Attachments

Attach supporting documents, except for the following:

- Document
- Seed Documents
- NEPA Documents
- Monitoring reports

No comments have been added.
DNR Watershed Restoration Initiative: Budget Mgmt Interface
New technical requirements:

- Enterprise apps require skill sets, specializations, database design, use cases, flow diagramming
- CS/IT skill set can quickly become more important than geospatial
What’s next:

• Refine management processes for web/map services
• More core web & map services
• Outreach to developers
• App Dev Projects
  – Agriculture - salinity
  – Oil & Gas
  – Biotics - T & E species
  – Regional 3 fish DB
  – Health info integration (IBIS, flu)
Summary: SSDI Geospatial Web Services

• Extend benefits of geospatial investment
• Takes commitment, forethought, resources
• Important focus areas
  – Geography → CS, IT
  – Industry standards
  – Performance orientation, focus can't be on the size of the data pile
  – Reaching non-GIS audiences with GIS data and maps
Comments/Questions

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• mapserv.utah.gov
Where have we been?

We have all been building databases
Geospatial Database are primarily used by Geospatial folks
You must have certain software/hardware to interact with the data
We needed to develop core services/components so we could build once and use many times
Rely on existing data already developed and stored in a database
AGRC needed to look at its personnel structure and decide what the focus should be
Refer to strategic plan.......does this fit
The Problem

You need to have good data, bad data really shows up bad!

The value of a data set is a direct proportion to the amount of use it gets

Deq screen shots

WRI Screen Shots (3 Slides)

Or 5 or six slides with functionality