Building Mashups Using the ArcGIS Web APIs

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Agenda

- **Overview: Web Maps**
- **Overview: ArcGIS API for REST**
- ArcGIS API for JavaScript
  - Google Maps Extension
  - Bing Maps Extension
- ArcGIS API for Flex
- ArcGIS API for Silverlight
- Questions
Evolution of maps on the Web

- Static Web Maps
  - Consumer maps
  - Spatial searches
  - Spatial exploration

- Searchable Web Maps
  - Elaborate tools
  - For GIS users

- GIS on the Web
  - Purpose-built maps
  - Reusable tasks
  - Accomplish specific tasks

- Web Maps 2.0
Web Maps

- Application accessed via a browser over a network
- Contains an interactive map component
- Consumes one or more Web services
- Solves specific business problems
Why Web maps are useful

• Use GIS without knowing GIS.
  – Simple applications access powerful functionality.
  – Gain spatial insight into business problems.
• Use GIS without installing GIS.
  – GIS functionality accessed in a Web browser.
  – GIS resources reside on multiple Web servers.
Mashups

- **Courtesy of Wikipedia**
  
  In Web development, a mashup is a Web application that combines data from more than one source into a single integrated tool.
Getting Started - Help/Resources

- **ArcGIS Resource Center**
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ArcGIS Server REST API

• Service Directory
  – A simple view of your ArcGIS Server (example)

• All GIS services are exposed as resources.
  – Service-level metadata

• Resources have operations.
  – Map Service (export, find, identify)
  – Map Service Layers (query)
  – Image Services (export)
  – Geocode Service (find address candidates, reverse geocode)
  – Geoprocessing (execute, submit job)
  – Geometry Service (project, simplify, buffer, and others* [where does this asterisk point to?])
  – Network Service (solve route)
ArcGIS Server Web APIs

- ArcGIS Services consumed via REST API
- Reusable services
- Development environment of your choice
ArcGIS Server Web APIs

- Mapping
  - Layers (tiled, dynamic, custom)
  - Graphics
  - Map navigation
- Tasks
  - Query Task (Map Server Layer)
  - Locator (Geocode Server)
  - Find Task (Map Server)
  - Identify Task (Map Server)
  - Geometry Service
  - Geoprocessor (GP Server)
  - Route Task (NA Server)
Creating Web maps

1. Author GIS resources.
2. Publish resources to ArcGIS Server.
4. Write code/referencing published service.
5. Run Web application.
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JavaScript API

What is the API?

- Collection of JavaScript classes
- Pure client development; runs in the browser
- All browsers know how to read it.
- Stable, well-developed language
- Built on the Dojo Toolkit (framework)
  - Open source
  - Out-of-the-box rich UI widgets
  - Eliminates most browser differences
- Two extensions
  - JavaScript Extension to the Google Maps API
  - JavaScript Extension to Bing Maps (formerly Virtual Earth)
ArcGIS API for JavaScript

*Development Environment*

- Markup language: HTML
- Scripting language: JavaScript
- API hosted by ArcGIS Online
  - Available for local hosting
- Develop applications in any text editor
  - Notepad
  - Aptana Studio
  - Visual Studio
- No downloads or plug-ins required
ArcGIS API for JavaScript Extensions

Google Maps, Bing Maps

- Alternate APIs that utilize Google and Bing Maps basemaps combined with ArcGIS Server content
- Same task functionality as the regular JavaScript API
- Use WGS 1984 Web Mercator projection (wkid 102113)
- Cached map services need to use Google/Bing tiling scheme

Google Maps
- Different default map navigation
- Requires Google API Key (free)

Bing Maps
- Requires Bing MapControl
- Only allows cached maps, no dynamic maps
ArcGIS API for JavaScript

Sample Application

• Included
  – Map
  – Extent
  – Tiled Layer
  – Dynamic Layer
JavaScript Tasks

*Find and Identify*

- **Find**
  - Find with Data Grid (sample)

- **Identify**
  - Identify Features (sample)
ArcGIS API for JavaScript

*Mashup Example*

- **Summit Map** (2009 ESRI Mashup Challenge winner)
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ArcGIS API for Flex

What is the API?

- What is Flex? A highly productive, free, and open source framework for building expressive Web applications
- Create rich Internet applications on top of ArcGIS Server
- Applications run in Flash Player plug-in through the browser or in Adobe AIR.
- Plug-in allows applications to look and act the same across browsers.
ArcGIS API for Flex

Development Environment

- Markup language: MXML
- Scripting language: ActionScript
- ArcGIS API for Flex: Download at the Flex Resource Center and add as a library to the application.
- Applications built in Flex Builder 3 stand-alone program or as an Eclipse plug-in
- Applications compile as a SWF file
ArcGIS API for Flex

Sample Application

- Included
  - Map
  - Extent
  - Tiled Layer
  - Dynamic Layer
Flex Tasks

Geoprocessing and Routing

- Geoprocessing
  - Drive Times (sample)

- Routing
  - Routing around Barriers (sample)
ArcGIS API for Flex

*Mashup Example*

- **DTSAgile Exec Mashup** (2010 ESRI Mashup Challenge winner)
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ArcGIS API for Silverlight

*What is the API?*

- Create rich Internet applications on top of ArcGIS Server.
- Integrates multimedia, graphics, animations, and interactivity into a single runtime environment.
- Based on the Microsoft Silverlight framework.
- Applications run in Silverlight Player plug-in.
- Plug-in allows applications to function and look the same in any browser.
ArcGIS API for Silverlight

*Development Environment*

- Markup language: XAML
- Scripting language: Visual Basic .NET/C#
- ArcGIS libraries downloaded from **Silverlight Resource Center**
- Microsoft Visual Studio 2008 SP1
- Microsoft Expression Blend
- Applications compile to XAP file
ArcGIS API for Silverlight

Sample Application

• Included
  – Map
  – Extent
  – Tiled Layer
  – Dynamic Layer
Silverlight Tasks

Query and Locator

• Query
  – Attribute Query (sample)

• Locator
  – Find an Address (sample)
ArcGIS API for Silverlight

Mashup Example

• Silverlight Showcase
Web API 2.0

*Some new key features*

- Client-side feature layer
- Editing
- Time-aware API
Wrapping it up

- Resource Center
  - Samples
  - API Reference
  - Conceptual topics
  - Code Gallery
  - Media Gallery
  - Forums
  - Sample Services

- ESRI users’ live sites
Wrapping it up

• What task(s) do I need to accomplish?
  – Business needs, etc.

• “Which API should I use?”

• Services are reusable.

• GIS is not just for geographers anymore.
Questions?