WELCOME!
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800-0900</td>
<td>Registration</td>
</tr>
<tr>
<td>0900-0915</td>
<td>Welcome and Introductions</td>
</tr>
<tr>
<td>0915-1000</td>
<td>Getting Started with ArcGIS Server</td>
</tr>
<tr>
<td>1000-1015</td>
<td>Break</td>
</tr>
<tr>
<td>1015-1200</td>
<td>Building Rich Internet Applications on the ArcGIS Platform</td>
</tr>
<tr>
<td>1200-1300</td>
<td>Lunch</td>
</tr>
<tr>
<td>1300-1500</td>
<td>What’s New at ArcGIS 10</td>
</tr>
<tr>
<td>1500-1600</td>
<td>Closing Remarks</td>
</tr>
<tr>
<td></td>
<td>Refreshments</td>
</tr>
<tr>
<td></td>
<td>Networking</td>
</tr>
</tbody>
</table>
Day 1: Training Agenda

• Getting Started with ArcGIS Server
  – Introduction to ArcGIS Server
  – ArcGIS Server Clients
  – Making Great Web Maps
    • Best Practices
      – Caching
      – Optimized Services
    • Resources
  – What is REST
• Building Rich Internet Applications on the ArcGIS Platform
  – Leveraging REST
  – JavaScript API
    • Samples
  – Flex API
    • Templates
  – Silverlight API
    • Developer Resources
• What’s New at ArcGIS 10
  – Desktop, Server, Imagery
Day 1: Training Agenda

• Getting Started with ArcGIS Server
  – Introduction to ArcGIS Server
  – ArcGIS Server Clients
  – Making Great Web Maps
    • Best Practices
      – Caching
      – Optimized Services
    • Resources
  – What is REST

• Building Rich Internet Applications on the ArcGIS Platform
  – Leveraging REST
  – JavaScript API
    • Samples
  – Flex API
    • Templates
  – Silverlight API
    • Developer Resources

• What’s New at ArcGIS 10
  – Desktop, Server, Imagery
A Geographic Information System (GIS)

A GIS is a system for the Management, Analysis, Visualization and Dissemination of Geographic Information...

...for effective, timely, and efficient collaboration, problem solving, and decision-making.
GIS Has Evolved to Support the Enterprise

- Integrating distributed data and applications
- Connecting communities and enabling collaboration
- Supporting real-time operations
- Powering the specialist—and reaching the generalist

... and delivering critical mission capabilities
ArcGIS
The System for Using and Managing Geographic Information

Web

Mobile

Desktop

Cloud

Enterprise

Local

Communicating Geographic Knowledge

Visualize
Create
Collaborate
Discover
Manage
Analyze
ArcGIS
System for Geographic Information

Desktop
- Professional GIS
- GeoBrowser

Server
- Services
- Applications

Mobile
- Knowledge Worker
- Field Data Collection

Online
- Platform
- Services
- Sharing

A Complete Integrated System

... For Using Geography Everywhere
What is ArcGIS Server?

- **Author** ArcGIS files in a familiar environment (ArcMap, ArcGlobe, ModelBuilder)
- **Serve** ArcGIS files (.mxd, 3dd, .tbx, etc.) as Geoservices
- **Use** in a wide variety of clients
  - Desktop
  - Web
  - Mobile
What types of services can ArcGIS Server offer?

Map
View or query a 2D map on the server

Globe
View or query a 3D globe on the server

Geocode
Perform address matching on the server

Geodata
Perform data replication, extraction, or query over the intranet or Internet

Geoprocessing
Run a tool or model on the server and get the results back

Image
Provide access to raster data through a Web service
What clients can I use with ArcGIS Server?

- **Web clients**
  - Server based: .NET, JAVA
  - browser based: JavaScript / Flex Silverlight via REST

- **Mobile clients**
  - ArcGIS Mobile application for Windows Mobile devices
  - .Net SDK for Mobile and Tablet platforms

- **Desktop clients**
  - ArcMap, ArcGIS Explorer, ArcReader, ArcGIS Engine application

- **OGC clients**
  - OpenLayers, Gaia, Google Earth…
Demonstration

• Authoring and Publishing Services with ArcGIS Server
  – Create a Map Service from an MXD
  – Use Services from ArcMap
## AGENDA

**March 23, Tuesday**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800-0900</td>
<td>Registration</td>
</tr>
<tr>
<td>0900-0915</td>
<td>Welcome and Introductions</td>
</tr>
<tr>
<td>0915-1000</td>
<td>Getting Started with ArcGIS Server</td>
</tr>
<tr>
<td>1000-1015</td>
<td>Break</td>
</tr>
<tr>
<td>1015-1200</td>
<td>Building Rich Internet Applications on the ArcGIS Platform</td>
</tr>
<tr>
<td>1200-1300</td>
<td>Lunch</td>
</tr>
<tr>
<td>1300-1500</td>
<td>What’s New at ArcGIS 10</td>
</tr>
<tr>
<td>1500-1600</td>
<td>Closing Remarks</td>
</tr>
<tr>
<td></td>
<td>Refreshments</td>
</tr>
<tr>
<td></td>
<td>Networking</td>
</tr>
</tbody>
</table>
Making Great Web Maps
Streamlining workflows and communicating with maps

Create Beautiful maps
Build Great User Experiences
Publish Fast Map Services

Compact Cache
Fast on-the-fly &Cached Map Services

Ready-to-use Templates & RIA technology
Desktop + OnLine
What makes a great web map?

- Great cartography
- Multi-scale
- Fast
- Informative
- Easy-to-use

GIS users view

- Contains my authoritative information
- Makes my information useable and useful
- Up-to-date
- Easy to deploy and maintain
Great Web Maps

Design implications

• A web map is a set of web map layers.

• Each layer is based on a web map service.

• A web map service in ArcGIS is published using a map document.

• You author your web map layers as map documents in ArcMap and publish them as map services.

• You combine a set of web map layers from multiple services in your web map application.

Configure using web scripting
Elements of a Great Web Map

1. Multi-Scale Base Maps
   - One or more maps that provide a framework or context for displaying operational information layers

2. Operational Layers
   - Working layers
   - Feeds, observations, sensor, incidents
   - Query results
   - Model results

3. Information Popups and Reports for Operational Layers
   - Map layers as interactive reports

4. Web Map Application
   - Configure vs. program
What kind of map services should I publish?

**Basemaps**
- Geographic frame of reference
- Contain static vector and raster data
- Reusable in multiple applications

**Operational Layers**
- Show a focused item of interest
- Support functionality of the application
- Displayed on top of base map
Basemaps
*Provide geographic reference*

- Use ArcGIS Online
- Use your own resources
  - Your authoritative data
Map Templates

- Designed to be attractive and functional
- Variety of templates
  - Street Map
  - Topographic Map
  - Hydrographic Map
  - Demographic Map
  - Geologic Map
  - Parcel Map
  - Soil Map
- You can contribute

http://resources.esri.com/maptemplates/
A Cached Map Service Uses Pre-Rendered Tiles

- **Tiles pre-rendered at fixed scales**
- **Rapid display of static base maps**
- **Richer symbols and more information**
Keep Cartography Quality and Map Performance with ArcGIS Server Map Caching

• 1.5 seconds

• 4 seconds
How to build a base map

Using ArcMap

1. Define map scales
2. Build a map for each map scale
3. Put the set of layers for each map scale in a group layer
4. Set scale-dependent drawing for each group layer
5. Generate a cached map service

*Pre-compute when you can!*
Operational Layers
The focused set of layers that users work with

• Editing and data access layers
• Observations, sensor feeds, incidents
• Query results
• Result layers that are derived from analytical models

Earthquakes

Inundation Areas & Affected Buildings

Incidents, Customer Calls, Work Orders
Operational Layers
The focused set of layers that users work with

• Like base maps, operational layers
  – Require strong cartography
  – Are scale-dependent
• They also know how to report themselves
  – Operational layers as interactive reports

• Examples

Earthquakes  Stream Flow  Work Orders
Demonstration

• Create Two Services
  – Basemap
    • Based on Map Template
    • Cached
  – Operational Layers

• Explore REST Endpoints
Day 1: Training Agenda

• **Getting Started with ArcGIS Server**
  – Introduction to ArcGIS Server
  – ArcGIS Server Clients
  – Making Great Web Maps
    • Best Practices
      – Caching
      – Optimized Services
    • Resources
  – What is REST

• **Building Rich Internet Applications on the ArcGIS Platform**
  – Leveraging REST
  – JavaScript API
    • Samples
  – Flex API
    • Templates
  – Silverlight API
    • Developer Resources

• **What’s New at ArcGIS 10**
  – Desktop, Server, Imagery
Making Great Web Maps

Streamlining workflows and communicating with maps

Create Beautiful maps

Desktop + Online

Build Great User Experiences

Fast on-the-fly & Cached Map Services

Publish Fast Map Services

Ready-to-use Templates & RIA technology
Multiple Web Development Environments

Rich Internet Applications

Web Mapping Application

Web ADF (.Net/Java)

ArcGIS Server

JavaScript

Flex

Silverlight

REST

Web 2.0

Fast, Flexible, and Agile
# Web Application Development Platforms

<table>
<thead>
<tr>
<th>App Execution</th>
<th>Development</th>
<th>Languages</th>
<th>ArcGIS Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server with AJAX in browser</td>
<td>Visual Studio or NetBean IDE</td>
<td>.Net (C#, VB), Java</td>
<td>SOAP endpoints and ArcObject</td>
</tr>
<tr>
<td>Browser</td>
<td>Notepad or other text editor</td>
<td>JavaScript</td>
<td>REST API</td>
</tr>
<tr>
<td>Browser with Flash Player</td>
<td>Flex Builder or text editor with Flex SDK compiler</td>
<td>MXML and ActionScript</td>
<td>REST API</td>
</tr>
<tr>
<td>Browser with Silverlight plug-in</td>
<td>Visual Studio or Expression Blend</td>
<td>.Net (C#, VB)</td>
<td>REST API</td>
</tr>
</tbody>
</table>

**ArcGIS WebADF**
- Server with AJAX in browser
- Visual Studio or NetBean IDE
- .Net (C#, VB), Java
- SOAP endpoints and ArcObject

**ArcGIS API for JavaScript**
- Browser
- Notepad or other text editor
- JavaScript
- REST API

**ArcGIS API for Flex**
- Browser with Flash Player
- Flex Builder or text editor with Flex SDK compiler
- MXML and ActionScript
- REST API

**ArcGIS API for Silverlight**
- Browser with Silverlight plug-in
- Visual Studio or Expression Blend
- .Net (C#, VB)
- REST API
REST – what is it and why should I care?

- **RE**presentational **State** **Transfer**
- No need to persist client state in server session
  - Held on client (scalable)
- Client state sent to server in URL parameters
- Allows unique URLs to be cached

- **ArcGIS Services Directory**
  - [http://localhost/ArcGIS/rest/services](http://localhost/ArcGIS/rest/services)

- **Admin page to clear REST cache after changes to services**
  - [http://localhost/ArcGIS/rest/admin](http://localhost/ArcGIS/rest/admin)
ArcGIS Server REST API

- Simple view of ArcGIS Server

- All GIS Services are exposed as resources
  - Service level metadata

- Some resources have operations
  - Map Service (export, find, identify)
  - Map Service Layers (query)
  - Image Services (export)
  - Geocode Service (findAddressCandidates, Reverse Geocode)
  - Geoprocessing (execute, submit job)
  - Geometry Service (project, simplify, and others*)
ArcGIS JavaScript APIs – Why JavaScript?

- JavaScript is one of the most used languages in the world.
- Pure client development
- JS Frameworks abstract away the browser complexity
- Stability
- Accessible programming language
ArcGIS JavaScript API

- Embed maps and tasks from any ArcGIS Server into your website

- Use content provided by ESRI or use your own content as a basemap

  - **Map** can be in any supported projection
    - This is a big advantage...

- Built on top of Dojo JavaScript toolkit.
What is Dojo?

- Robust JavaScript Toolkit
- Active Community
- Dojo Dijits
  - Strong Widgeting system
  - Grids, charts, toolbars, trees, and many more
- Powerful eventing model
- Rich client side Graphics

- [http://dojotoolkit.org](http://dojotoolkit.org)
- [http://dojocampus.org](http://dojocampus.org)
Integrating Dojo Dijits into your application
What is in the JavaScript API?

- **Map Layers**
  - Cached map services
    - ArcGISTiledMapServiceLayer
  - Dynamic map services
    - ArcGISDynamicMapServiceLayer

- **Graphics**
- **InfoWindow**
- **Tasks**
  - QueryTask
  - Locator
  - FindTask
  - IdentifyTask
  - Geoprocessor
  - Geometry
  - RouteTask
ArcGIS JavaScript API – What do you need to know?

• Online SDK
  – http://resources.esri.com/arcgisserver/apis/javascript/arcgis
  – Sample driven
  – Code gallery
  – Samples powered by an ArcGIS Server sample server
    • http://sampleserver1.arcgisonline.com/arcgis/rest/services
    • http://sampleserver2.arcgisonline.com/arcgis/rest/services

• JavaScript hosted by ESRI
  – http://serverapi.arcgisonline.com/jsapi/arcgis/?v=1.4
  – Flexible release cycle
  – Hosted by ArcGIS Online
    • 24/7
Demonstration

- ArcGIS Server Resource Center
- JavaScript Resource Center
  - Samples
  - Mashup: Operational Service and Basemap Service
What is Adobe Flex?

**Flex is an application framework**
- Enables rich internet application development
- Based on Adobe Flash platform (runtime and player)
- Offers free Flex SDK or Eclipse based Flex Builder
- Available to 97% connected PC with all browsers
- Current version is Flex 3.0
What the ArcGIS API for Flex does...

- Display maps
  - Tiled, Dynamic, ArcIMS and Image Service
- Tasks
  - Geoprocess
  - Query
  - Identify
  - Find
  - Geometry Service
- Events
- Geometry
- Symbols
- Controls
Sample Flex Viewer Architecture

- Composite Application Architecture
  - Widget programming model allows for horizontal implementation
  - Business focused solution
- Designed for service centric web oriented architecture
- Map and ESRI technology centric
- Free!
Obtain the Software

• ArcGIS API for Flex
  – http://resources.esri.com/arcgisserver/apis/flex/
  – Need ESRI Global Account to download

• Sample code
  – API samples:
  – Code Gallery:
    http://resources.esri.com/arcgisserver/apis/flex/index.cfm?fa=codeGallery

• Adobe Flex Builder
  – http://www.adobe.com/flex
Sample Flex Viewer Widget Programming Model

- Very lightweight programming model
- A Widget is a standalone file (.swf)
- A Widget encapsulates focused business logics (task)
- A Widget can be deployed by configuration
- A set of widgets can represent a business solution
- A solution can be expanded by adding widgets without increasing the complexity of the application
- Developing a widget is much easier than developing whole application
Configuring Existing Widgets

• Can be found in
  …\\FlexViewer\\com\\esri\\solutions\\flexviewer\\widgets

• Each widget comes with a
  – SWF file: compiled widget code
  – XML file: widget configuration

PrintWidget.swf

PrintWidget.xml

Print Widget
Download Widgets from the ESRI Community

- Can be found at

- Caution! - Not all code samples can be plugged into Sample Viewer
  - Look for *Widget* in the name
  - Check Flex version it was compiled in
Demonstration

- Flex Resource Center
  - Sample Flex Viewer
    - Configure Viewer
    - Configure Widgets
What Is Silverlight?

- Browser plug-in for creating rich interactive web applications.
- .NET-based API (subset of full .NET framework)
- XAML-based UI (mostly compatible subset of WPF)
- Microsoft’s response to Adobe Flex
- Available on Windows, Mac OS X, and Linux
Expression Blend and Visual Studio

Integration designer

Developer

.xaml

.vb / .cs
ArcGIS API for Microsoft Silverlight/WPF

- **Built on Silverlight and WPF Platform**
  - Combine Rich Interactive Applications with ArcGIS Server and Bing Map Enterprise Services
  - Applications rendered by Microsoft Silverlight plug-in
- **Powered by ArcGIS Server REST services**
  - Only need URL to access a GIS Server
- **Free to use**
  - No development or deployment license required for non-commercial use
  - Access the online SDK and download the API library at the ArcGIS API for Microsoft Silverlight/WPF Server Resource Center
Features of the API

- **Task**
  - Find
  - Identify
  - Query
  - Address Locator
  - Geoprocessing
  - Routing

- **Toolkit**
  (also available on codeplex)
  - Bookmark
  - FeatureDataGrid
  - Magnifyer
  - MagnifyingGlass
  - MapProgressBar
  - MapTip
  - Navigation
  - OverviewMap
  - Toolbar
Design Time

- **Starter Templates**
  - Drag & Drop Application Creation Experience
- **Builds on the Expression Interactivity SDK**
  - Behaviors
  - Actions
  - Triggers
Resources

Interactive samples

Symbol Gallery
Demonstration

- Silverlight Resource Center
  - Expression Blend IDE
  - Configure Starter Application
Making Great Web Maps
Streamlining workflows and communicating with maps

Create Beautiful maps

Desktop + OnLine

Build Great User Experiences

Ready-to-use Templates & RIA technology

Publish Fast Map Services

Compact Cache

Fast on-the-fly & Cached Map Services

Create Beautiful maps
ArcGIS Online Resource Center
A New Portal for Online Resources

Online Maps and Globe Services

Supporting and Building the ArcGIS Community

Now
- Online Help
- Developer SDK’s
- Blogs and Forums
- Code Galleries
- Knowledge Base
- Software Updates
- Videos

Future
- Metadata Catalog of GIS Services

http://resources.esri.com
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800-0900</td>
<td>Registration</td>
</tr>
<tr>
<td>0900-0915</td>
<td>Welcome and Introductions</td>
</tr>
<tr>
<td>0915-1000</td>
<td>Getting Started with ArcGIS Server</td>
</tr>
<tr>
<td>1000-1015</td>
<td>Break</td>
</tr>
<tr>
<td>1015-1200</td>
<td>Building Rich Internet Applications on the ArcGIS Platform</td>
</tr>
<tr>
<td>1200-1300</td>
<td>Lunch</td>
</tr>
<tr>
<td>1300-1500</td>
<td>What’s New at ArcGIS 10</td>
</tr>
<tr>
<td>1500-1600</td>
<td>Closing Remarks</td>
</tr>
<tr>
<td></td>
<td>Refreshments</td>
</tr>
<tr>
<td></td>
<td>Networking</td>
</tr>
</tbody>
</table>