ArcGIS Server - An Introduction

Dan Haag and Derek Law
Agenda

• What is ArcGIS Server?
• Types of Web services
• Publishing resources onto the Web
• Clients to ArcGIS Server
• Editions and Licensing levels
• Summary
• Questions
ArcGIS 10 — A Complete System

Easier
More Powerful
and Everywhere

- Discover
- Create
- Manage
- Visualize
- Analyze
- Collaborate

Cloud
Enterprise
Local

Web
Mobile
Desktop
ArcGIS Server

Delivering GIS with powerful services and applications

• Complete, out-of-the-box Web based GIS
  - Ready to use applications and GIS services for
    - Spatial data management
    - Visualization
    - Analysis

• Platform for developing Web and enterprise applications and services
  - Available for .NET and Java platforms
ArcGIS Server – GIS Services

Many different types available

Applications = User Experience

Services = Capabilities
ArcGIS Server – Main Components

- 4 main product components:
  1. **Web server**
  2. **Server Object Manager (SOM)**
     - Manages the services running on the server
     - Monitors and balances server resources
  3. **Server Object Container (SOC)**
     - Process that runs GIS services
     - Typically have many SOC processes running
  4. **Geodatabase**
     - ArcSDE technology

- Can be all on one machine or distributed over several machines
ArcGIS Server – Architecture

Conceptual overview of main components

Internet

Web server
SOM
SOC
SOC
Geodatabase

Web
Mobile
Desktop

Database server

GIS server
What are GIS Services?

- **GIS Service = GIS resource running on a server**
  - vs. GIS application on your local computer
- Almost any GIS operation that you can do locally can also be run using a service

- Enables sharing of GIS resources across the Web
Types of Services in ArcGIS Server

- **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
ArcGIS Server – Web protocols

Support industry standards

- Its GIS services can be accessed via
  - Representational State Transfer (REST)
  - Simple Object Access Protocol (SOAP)
  - Keyhole Markup Language (KML)
  - Open Geospatial Consortium (OGC)
ArcGIS Server – Services Directory

View of ArcGIS Server REST endpoint

- ArcGIS Services Directory exposes REST API
  - http://localhost/ArcGIS/rest
ArcGIS Server Manager

Web-based administration tool
Demo

Explore ArcGIS Server Manager
ArcGIS Server Workflow

3 main steps

1. Author
   - Create MSDs, globes
   - Create geodatabases
   - Create GP models
   - Create address locators

2. Publish
   - Use ArcCatalog
   - Use ArcMap
   - Use ArcGIS Server Manager

3. Use
   - ArcGIS Desktop
   - Share with ArcGIS Online
   - ArcGIS Viewer for Flex
   - ArcGIS Viewer for Silverlight
   - Web mapping applications (APIs)
Authoring Maps for ArcGIS Server

*Create professional looking maps for the Web*

- Leverage ArcMap’s powerful cartographic capabilities
- **WYSIWYG** map authoring
  - Support for all ArcGIS data types
- Follow best practices for optimal maps
Web Map Design – Terminology

Common ArcGIS Server concepts

- Map service
  - 2 types
    - Cached vs. Dynamic
  - 2 formats
    - Optimized vs. Classic

- Web Map
  - Data content
    - Base Maps vs. Operational layers
Cached Map Service

**Type 1**

- Pre-render data as a collection of images stored on the server
- Used for data that does not change frequently
- Can be vector and raster data
- ArcGIS 10: **compact cache**

0. map tile creation when service is published (preprocessing operation)

1. client request

2. pre-created image tile sent
Dynamic Map Service

Type 2

- Map service data content is generated on-the-fly as needed
- Used for data that changes/updated frequently
- Typically vector data
Map Service Formats

*Depends on the map source file format*

- **Optimized Map Service**
  - Published from a MSD file
  - Leverages *Map Services Publishing* toolbar in ArcMap
    - Optimizes map document for the Web
  - Available since 9.3.1 release
  - Strongly recommended

- **Legacy info: “Classic” Map Service**
  - Published from a MXD file
2. Publishing GIS Services

Making resources available over the Web

• Use ArcCatalog

• Use ArcMap

• Use ArcGIS Server Manager
Data Content in a Web Map

Common design pattern

- **Base Maps**
  - Geographic frame of reference
  - Contain static data

- **Operational layers**
  - Information overlays that end users interact with
  - Contain dynamic data

- Operational layers display on top of Base Maps
Related UC Sessions …

- **Designing and Using Cached Map Services**
  - Thurs 3:15 PM Room 8
Demo

Publishing a map service
Clients to ArcGIS Server

Many options available

- **ArcMap**, **ArcGIS Explorer**, **ArcReader**, and **ArcGIS Engine** applications
- **Web Applications**
  - ArcGIS Online: ArcGIS.com Viewer, ArcGIS Explorer Online
  - Browser based: JavaScript, Flex, and Silverlight
- **ArcGIS for SharePoint**
- **Mobile clients**
  - ArcGIS Mobile, ArcGIS for iOS, Android
- **OGC clients**
  - Access via Open Source standards
  - E.g., OpenLayers, Gaia, Google Earth …
ArcGIS Online

*Find, create, and share geographic information*

- GIS for everyone
  - *Empowering the non-GIS expert!*
- Public and Private Groups
- Hosted Web applications:
  - ArcGIS.com Viewer
  - ArcGIS Explorer Online
- Map templates
What is a web map?
The foundation for your maps and applications

Intelligent Maps

Supporting
- Visualization
- Editing
- Popups
- Analysis
- Time

Services And Data
ArcGIS Online templates

- Easily create a web application for a web map with predefined templates
Demo

Explore ArcGIS Online templates
ArcGIS Viewer for Flex

Built on the ArcGIS API for Flex

• Configure application via XML files
  • Look and feel
  • Capabilities
  • Content
• Ideal for focused/vertical applications
• Application Builder forthcoming
• Extensible with Flex API

esri.com/flexviewer

Formerly ‘Sample Flex Viewer’, now fully supported
ArcGIS Viewer for Silverlight

*Built on the ArcGIS API for Silverlight*

- **Easily and quickly** build Web applications
- Includes Application Builder
  - **WYSIWYG user experience**
- No programming, nor configuration file editing
- Ideal for novice Web application creators
- Extensible with Silverlight API

beta-community.esri.com

Currently beta 2 release
Demo

ArcGIS Viewer for Silverlight
and
Related UC Sessions …

- **Working with ArcGIS Online**
  - Fri 9:00 AM Room 3

- **Creating Web Applications with ArcGIS**
  - Thurs 3:15 PM Room 6C

- **ArcGIS Viewer for Silverlight – An Introduction**
  - Thurs 1:30 PM Room 5 A/B

- **ArcGIS Viewer for Flex – An Introduction**
  - Thurs 8:30 AM Room 5A/B
ArcGIS Server Web Mapping APIs

Client-side programming

• Allow developers to easily build custom Web applications
  - ArcGIS API for JavaScript
  - ArcGIS API for Flex
  - ArcGIS API for Silverlight

• Built on a simple architecture
  - Use REST services endpoint
  - Web services based

• Enables creation of RIAs utilizing ArcGIS Server

• Choice depends on developer experience and style preference
### Web Application Development Options

<table>
<thead>
<tr>
<th></th>
<th>ArcGIS API for JavaScript</th>
<th>ArcGIS API for Flex</th>
<th>ArcGIS API for Silverlight</th>
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</thead>
<tbody>
<tr>
<td><strong>Web interfaces</strong></td>
<td>REST</td>
<td>REST</td>
<td>REST</td>
</tr>
<tr>
<td><strong>Execution</strong></td>
<td>Client side (pure browser)</td>
<td>Client side (browser and Flash player)</td>
<td>Client side (browser and Silverlight player)</td>
</tr>
<tr>
<td><strong>Development</strong></td>
<td>Any text editor or Aptana, Visual Web Developer, etc.</td>
<td>Flash Builder or text editor with Flex SDK compiler</td>
<td>Visual Studio or Visual Web Developer</td>
</tr>
<tr>
<td><strong>Languages</strong></td>
<td>JavaScript and HTML</td>
<td>ActionScript and MXML</td>
<td>.NET (C#, VB.NET) and XAML</td>
</tr>
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Related UC Sessions …

- **ArcGIS API for JavaScript (Intro)**  
  - Thurs 10:15 AM Room 27B

- **ArcGIS API for Microsoft Silverlight/WPF (Intro)**  
  - Thurs 10:15 AM Room 8
<table>
<thead>
<tr>
<th>Edition</th>
<th>Includes</th>
<th>Level</th>
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<tbody>
<tr>
<td>Basic</td>
<td>• ArcSDE technology</td>
<td>Workgroup: • SQL Server Express&lt;br&gt;Enterprise: • Any supported database</td>
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<tr>
<td></td>
<td>• Geodata services for replication</td>
<td>Workgroup: • 10 users&lt;br&gt;Enterprise: • Unlimited users</td>
</tr>
<tr>
<td>Standard</td>
<td>Basic features plus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Map, globe, geocoding, geoprocessing (ArcView tools),&lt;br&gt;Web editing</td>
<td></td>
</tr>
<tr>
<td>Advanced</td>
<td>Standard features plus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Advanced geoprocessing&lt;br&gt;ArcGIS Mobile</td>
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ArcGIS Server Resource Center

- Central location for ArcGIS resources
- SDK for ArcGIS Server APIs
- Sample GIS Server
- ArcGIS Online
- Help
- ArcGIS Server Development Blog
- Support
Summary

**ArcGIS Server: Complete, out-of-the-box Web based GIS**

- Enables sharing of GIS services
- 4 main components:
  - Web server, SOM, SOC, and geodatabase
- Publishing map services
  - Design patterns and terminology
- ArcGIS Server has many different clients
- Web Mapping APIs future direction
  - JavaScript, Flex, and Silverlight
- Editions and licensing
Related UC Sessions …

- Best Practices for Designing Effective Map Services
- Designing and Using Cached Map Services
- Creating Web Applications with ArcGIS
- Working with ArcGIS Online
- ArcGIS Viewer for Silverlight – An Introduction
- ArcGIS Viewer for Flex – An Introduction
- ArcGIS API for JavaScript (Intro)
- ArcGIS API for Flex (Intro)
- ArcGIS API for Microsoft Silverlight/WPF (Intro)

- Online evaluations

www.esri.com/sessionevals