ArcGIS for Developers – An Introduction

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ArcGIS Server – An end-to-end GIS system

Developer architecture
Services
APIs
Demos
ArcGIS Server – Works with many different clients

- iPhone
- Yahoo Pipes
- SAP
- Android
- Microsoft Silverlight
- Yahoo! Maps
- Ruby
- OpenLayers
- .Net
- Java
- ArcGIS Explorer
- ArcGIS Desktop
- Flex/Flash
- Google Earth
- ArcMap
- PHP
- ArcGIS Mobile
- JavaScript
- Python
http://gis.greeleygov.com/origin/propinfo.html
What is a GIS Service?

ArcGIS Server

Map Service

Map Service Endpoint

Clients
Demo of Publishing a Service

http://links.esri.com/help/rest

Sample REST Endpoint

ArcGIS API for JavaScript Map Service
How do I get my data into an app? Web Services

REST

SOAP

OGC

*Image from Microsoft Clip Art*
Example ArcGIS REST API Architecture

ArcGIS Desktop -> ArcGIS Server -> Geodatabase -> Web Server

REST

JSON

ArcGIS Client API
Example REST API usage

**URL-based** requests (GET or POST)

Format works with all client-side application languages

http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Specialty/ESRI_StateCityHighway_USA/MapServer/export?bbox=-127.8,15.4,-63.5,60.5&f=pjson
In the browser: ArcGIS Web APIs

JavaScript

JavaScript Compact Build (Mobile)

Adobe Flex

Microsoft Silverlight/WPF

http://esriurl.com/webapis
Why use the Web APIs?

Let’s you focus on rapid application development!

map.addLayer(basemap)

vs.

http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Specialty/ESRI_StateCityHighway_USA/MapServer/export?bbox=-127.8,15.4,-63.5,61.5&f=pjson
Why use the Web APIs?

```html
<div id="mapDiv" style="width:800px; height:600px;">
</div>
```

vs.

```javascript
```
ArcGIS Web API capabilities include:

- Map
- Editing
- Geometries
- Time-awareness
- Routing
- Query
- Geoprocessing
- Graphics
- Symbols
- FeatureLayers
- Extents
- GraphicsLayer
API “Syntax”

JavaScript (.js)

```
dojo.connect(queryTask, "onComplete", showResults);
```

Silverlight (C#.NET)

```
queryTask.ExecuteCompleted += QueryTask_ExecuteCompleted;
```

Flex (ActionScript)

```
queryTask.execute(query, new AsyncResponder(onResult, onFault));
```
var queryTask = new esri.tasks.QueryTask("http://someserver/arcgis/...");
dojo.connect(queryTask, "onComplete", doSomething);
query = new esri.tasks.Query();
query.spatialRelationship = esri.tasks.Query.SPATIAL_REL_INTERSECTS;
queryTask.execute(query);

function doSomething(event){
};...
Framework for Integrating Multiple services

- Tax Parcel Boundaries Operational Layer
- Parcel Meta Data Operational Layer
- Tiled Imagery Layer Basemap

ArcGIS Server
ArcGIS Online
Want an out-of-the-box/Extendable solution?

ArcGIS Viewer for Flex

Visual Studio 2010 Silverlight Templates

ArcGIS Silverlight Toolkit

ArcGIS Mapping for Sharepoint
Mobile GIS

- ArcGIS Mobile
  - ArcPad
- Rugged Devices
- iOS
- Microsoft Windows Phone
- Android
- Smartphones and Slates
ArcGIS on Smartphones and Slates

iOS, Windows Phone and Android Devices

- Designed for touch-screen phones
- One handed use
- Connected Workflows (Wifi, 3G)
- Assisted-GPS Integration
- Replace Paper Surveys
  - Intelligent forms
  - Field Validation
  - Media Integration

Emergency Operations

Service Requests

Parcel Valuation

VGI

Campus Maps
ArcGIS API for iOS

Native Objective C/Cocoa API

REST-Based

Requires Mac

ArcGIS for iOS on iTunes
ArcGIS for Windows Phone

C#/Silverlight API

Visual Studio 2010 Integration

REST-based

ArcGIS Windows Phone Application
ArcGIS API for Android (beta)

Native Java API

Windows, Mac OS X (Intel), Linux

Runs on many devices

ArcGIS API for Android (Eclipse Plug-ins)
ArcGIS on Rugged Devices

Windows and Windows Mobile Devices

• Designed for harsh field conditions
• One handed/vehicle-mounted use
• Occasionally connected workflows
• High accuracy data collection
  - GPS integration
  - Laser integration
• Replace Paper Surveys
  - Intelligent forms
  - Barcode integration

Water Facilities Mapping
Asset Maintenance/Inspection
First Responders
Land Management
ArcGIS Mobile SDK

.NET API (C#, VB.NET, WPF)

Windows Mobile (notebooks/tablets)

Pocket PC/.NET Compact Framework

Connected or Disconnected
ArcPad

.NET and XML based
Windows Mobile
High accuracy
Field data collection
Disconnected Use
Developing for mobile is different from the web!

- Smaller Screens
- Touch-based workflows
- Multiple form factors
- Battery life
- Inconsistent internet
- Slower connections
- Slower CPU

*Image from Microsoft Clip Art*
Getting Started With Adobe Flex

IDE: **Flash Builder**
ArcGIS API for Flex: [help.arcgis.com](http://help.arcgis.com)
Flash Player (debug): [Flash Player Support Center](http://www.adobe.com/support/)
Online Resources: [help.adobe.com](http://help.adobe.com)
Training: [Flex.org](http://flex.org), [Adobe Video Training](http://video.adobe.com)
Community: [actionsctipt.org](http://actionsctipt.org)
Getting Started with JavaScript

IDE: Notepad++, Aptana
ArcGIS API for JavaScript: resources.arcgis.com
Online Resources : dojotoolkit.org
Tutorials: w3schools.com
Community: dojotoolkit.org/community
Getting Started with Silverlight (Web)

IDE: Visual Studio Express (free!)
ArcGIS API for Microsoft Silverlight: help.arcgis.com
Silverlight SDK: silverlight.net/getting_started
Online Resources: MSDN.microsoft.com
Community: silverlight.net/community
Getting Started with Android

IDE: Eclipse
ArcGIS API for Android:
Online Resources: developer.android.com
Community: developer.android.com
Misc: Mobile device for testing!
Getting Started with iOS

IDE, SDK: Xcode 4 + iOS 5 SDK
ArcGIS API for iOS: resources.arcgis.com/mobile
Online Resources: iOS Developer Library
Community: developer.apple.com
Misc: Mobile device for testing
Getting Started with Windows Phone

IDE: Visual Studio Express (free!)
ArcGIS for Windows Phone: resources.arcgis.com
Online Resources/Community: App Hub
Misc: Mobile device for testing