



Esri International User Conference | San Diego, CA
Technical Workshops | July 12, 2011

ArcGIS for Developers – An Introduction

Jim Barry (@jimbarry) and Andy Gup (@agup)

ArcGIS Server – An end-to-end GIS system

Developer architecture

Services

APIs

Demos

ArcGIS Server – Works with many different clients



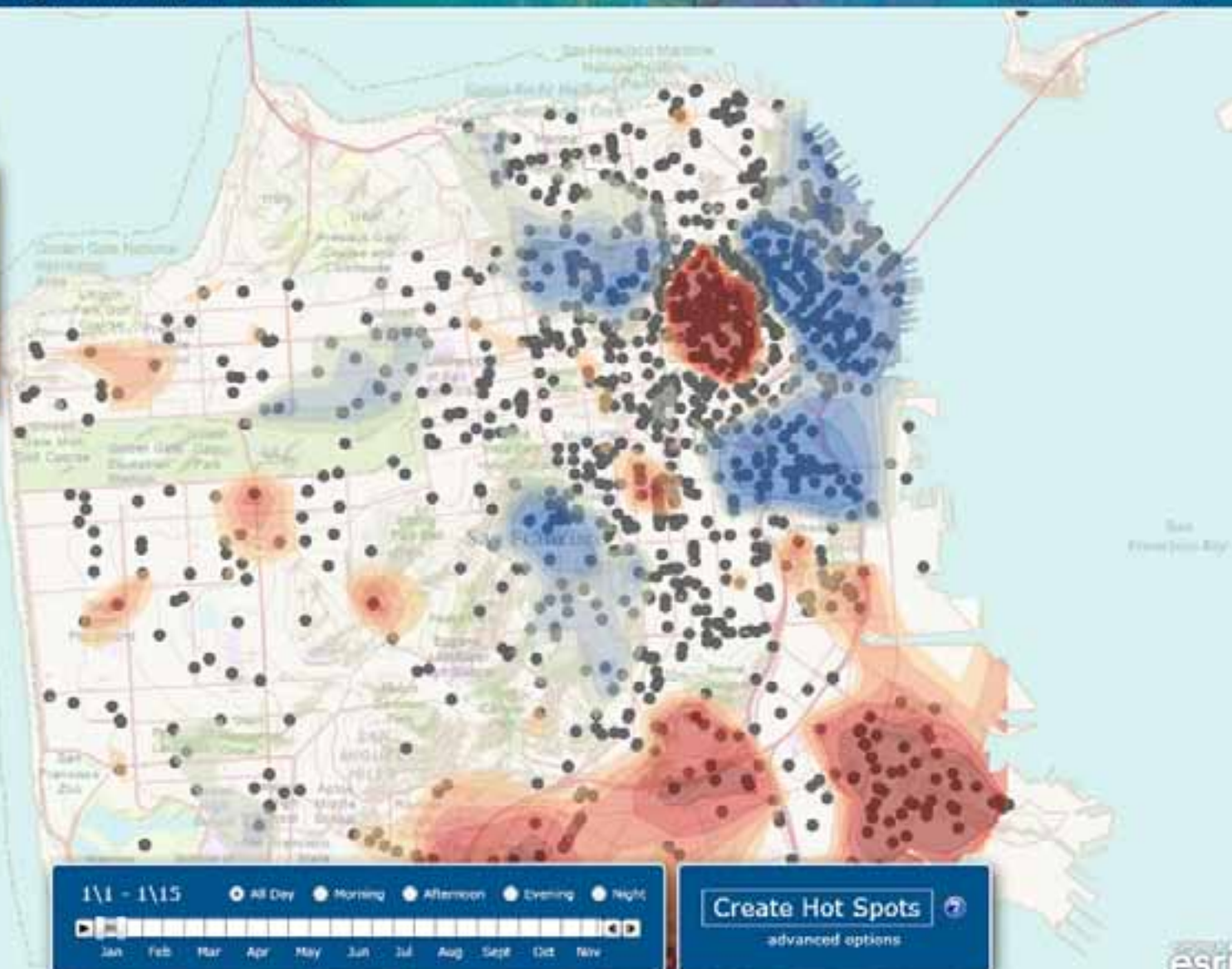
San Francisco Crime Mapping

Exploring patterns in your community

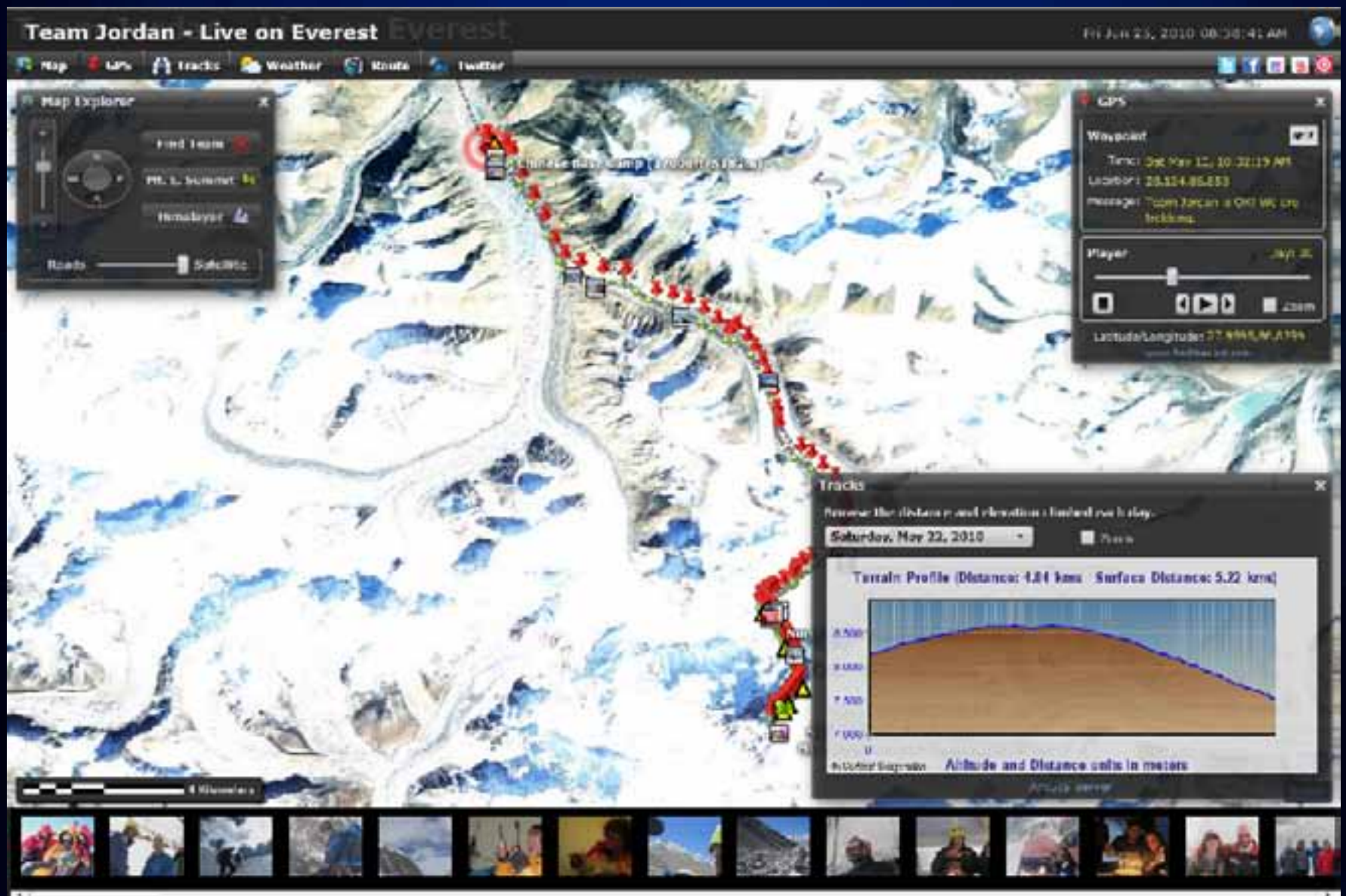
[Help](#) [Feedback](#) [About](#)



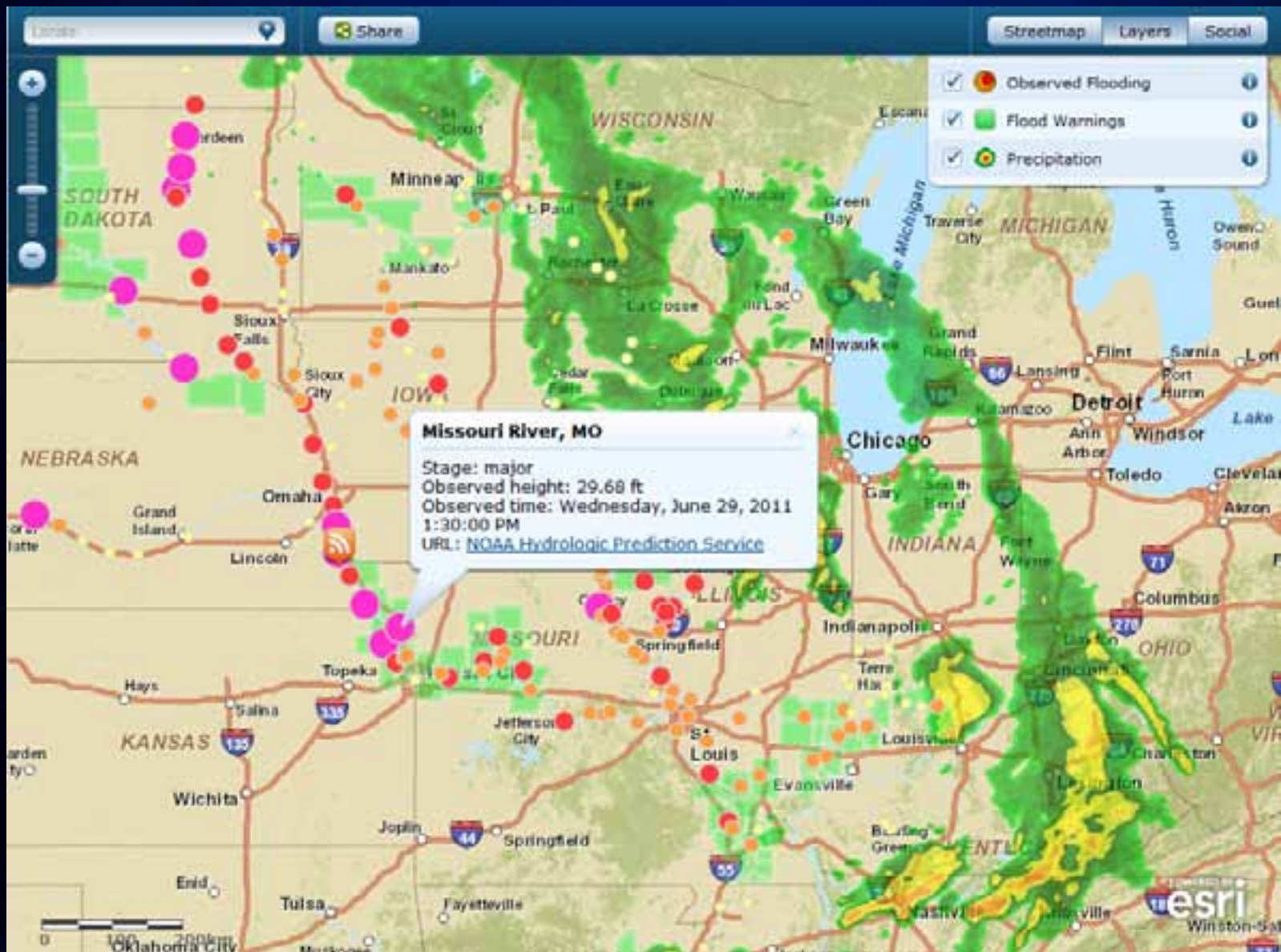
☒ Hot Spots



esri



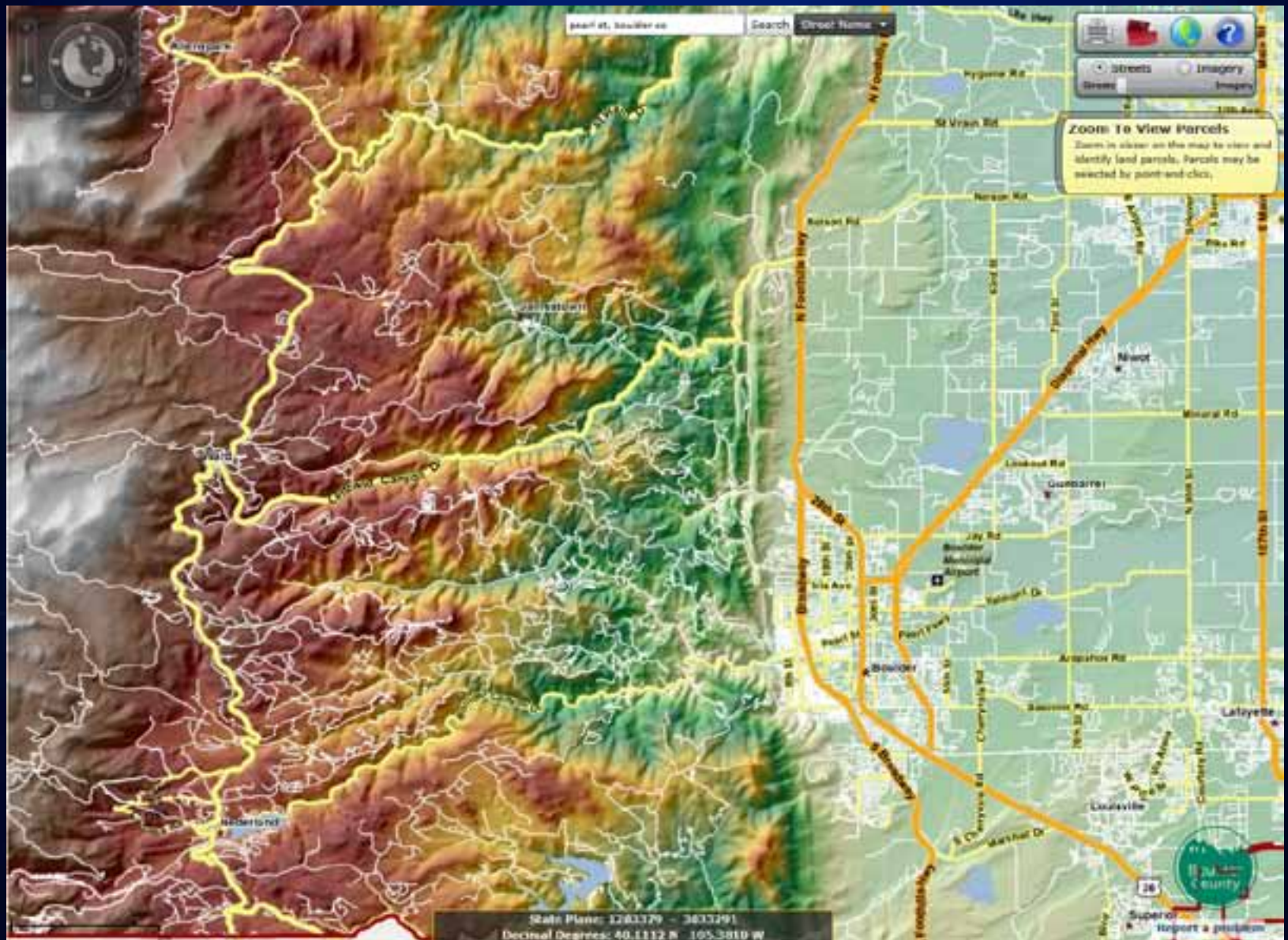
<http://edn1.esri.com/everest>



<http://www.esri.com/services/disaster-response/floods/latest-news-map.html>



<http://gis.greeleygov.com/origin/propinfo.html>



<http://maps.bouldercounty.org/boco/emapping/>

ArcGIS Server - Architecture

Client
APIs

Web
Services

GIS
Services

Data

Mobile

Javascript

Flex

Silverlight

JSON
XML
AMF
KML

REST

SOAP

OGC

Map Services

Geoprocessor Services

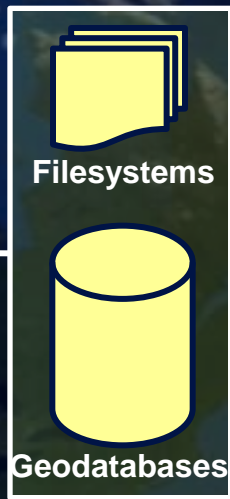
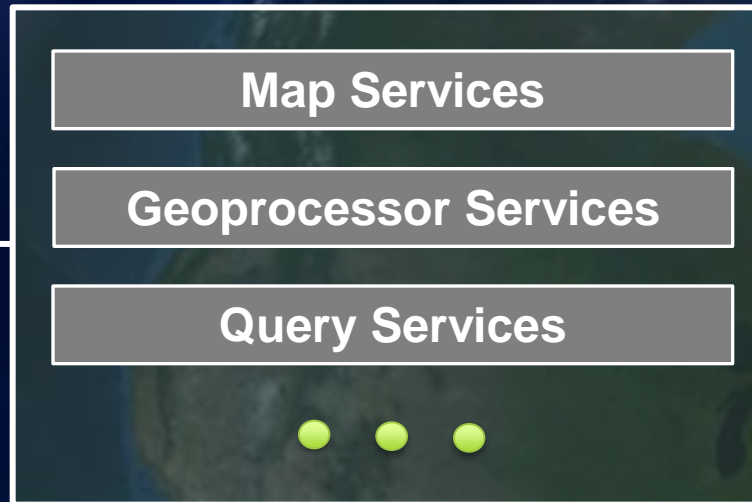
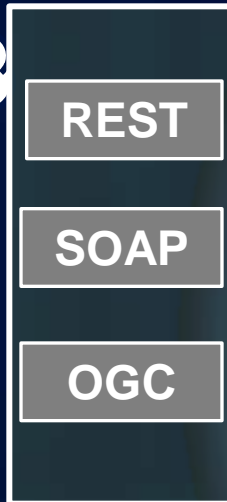
Query Services

File
IO

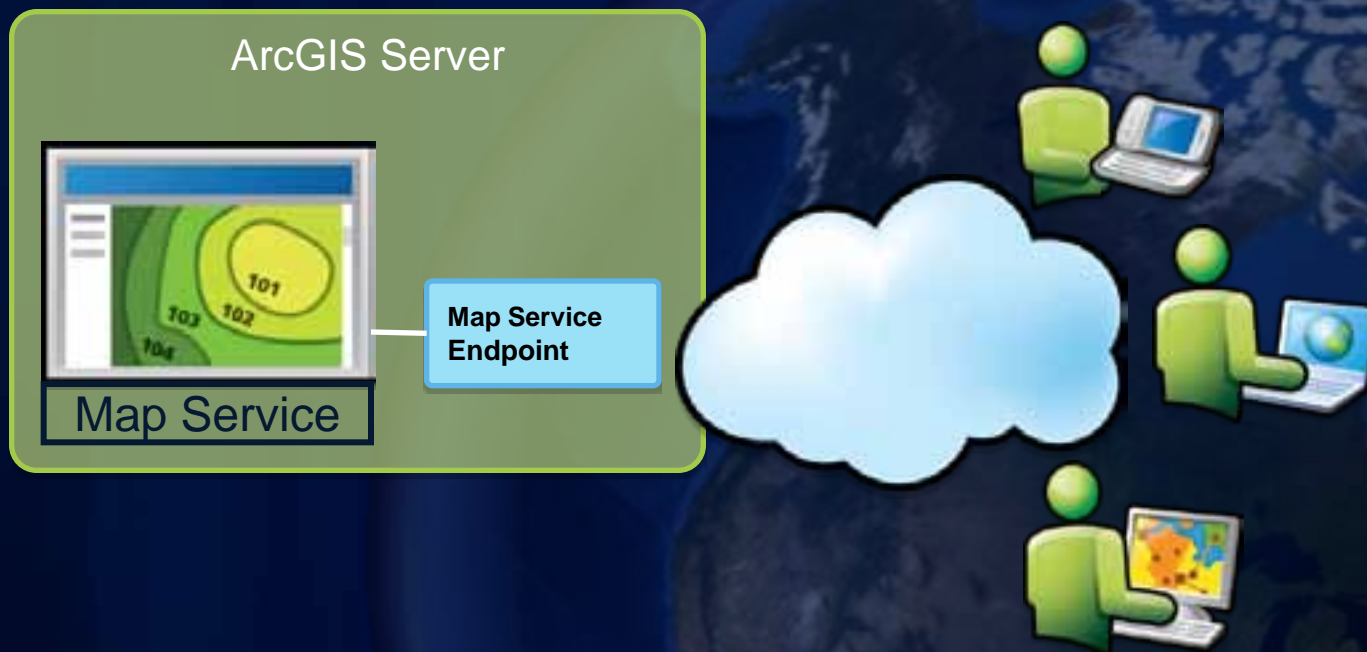
SQL

Filesystems

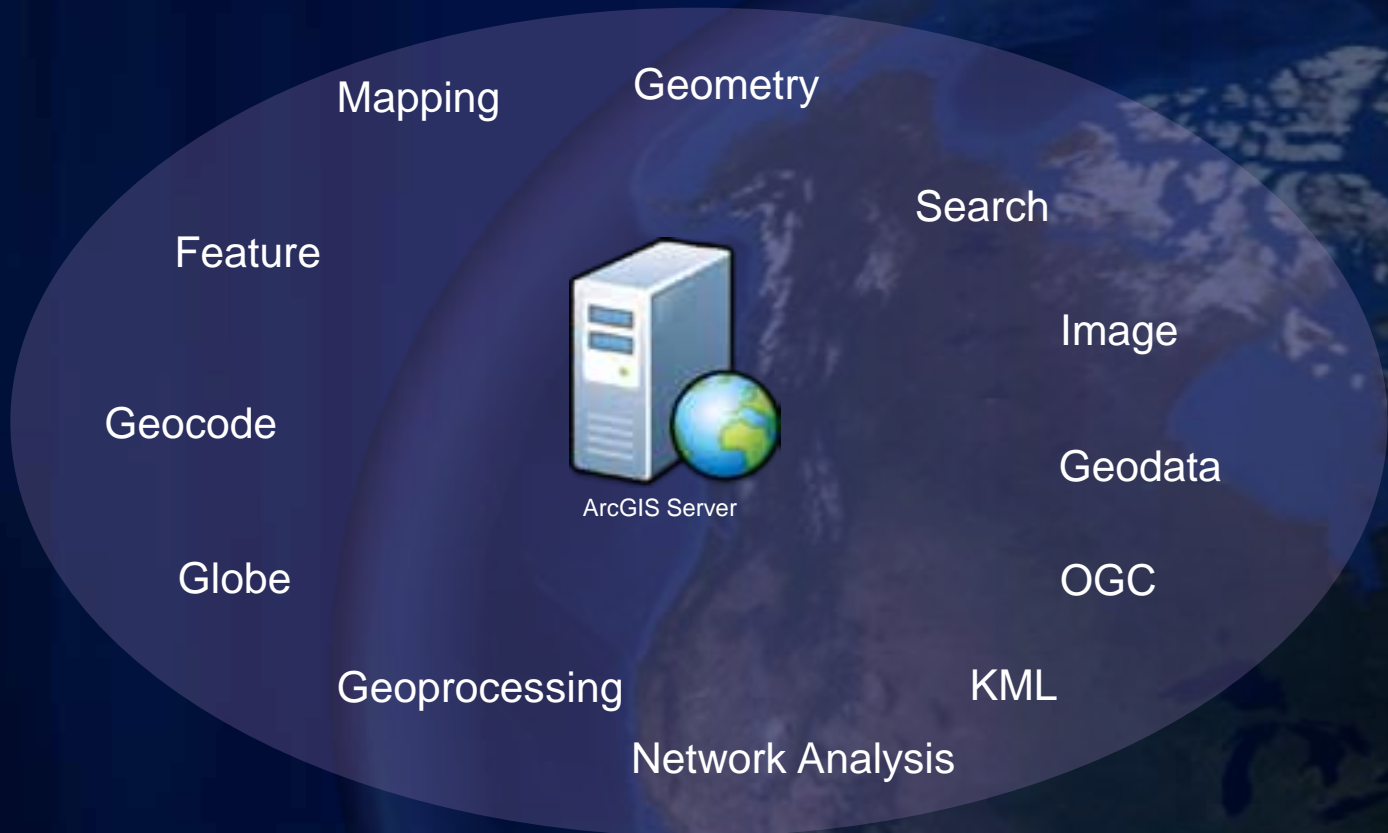
Geodatabases



What is a GIS Service?

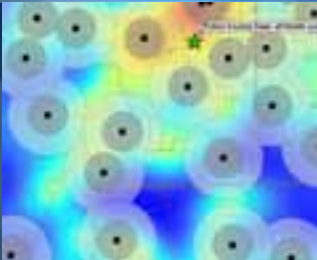


ArcGIS Server – GIS Services



<http://esriurl.com/arcgisservices>

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

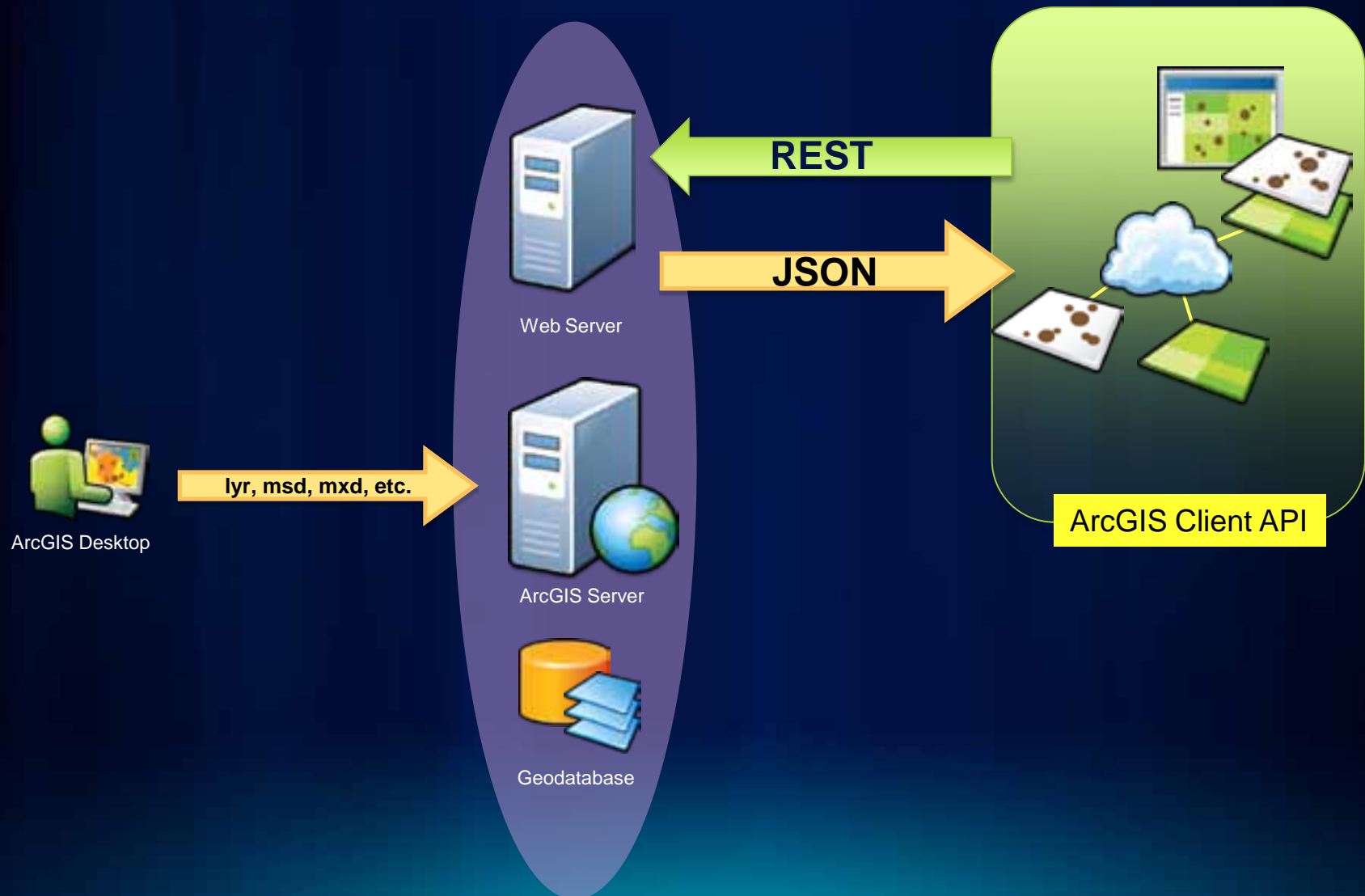
REST

SOAP

OGC



Example ArcGIS REST API Architecture



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,-63.5,63.5&f=pjson

Why use the Web APIs?

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

vs.

```
dojo.io.script.jsonp_dojoIoScript2._jsonpCallback({"serviceDescription":"","mapName":"Layers","description":"","copyrightText":"","layers":[{"id":0,"name":"arcgis2.DBO.custinfo","parentLayerId":-1,"defaultVisibility":true,"subLayerIds":null},{"id":1,"name":"arcgis2.DBO.DenverCO_CensusTracts","parentLayerId":-1,"defaultVisibility":true,"subLayerIds":null}], "tables":[],"spatialReference":{"wkid":4326},"singleFusedMapCache":false,"initialExtent":{"xmin":105.13659819355,"ymin":39.55113300385,"xmax":104.556422044239,"ymax":40.014492861728},"spatialReference":{"wkid":4326},"fullExtent":{"xmin":105.13659819355,"ymin":39.55113300385,"xmax":104.57486577945,"ymax":39.9313831191501},"spatialReference":{"wkid":4326},"units":"esriDecimalDegrees","supportedImageFormatTypes":["PNG24","PNG","JPG","DIB","TIFF","EMF","PS","PDF","GIF","SVG","SVGZ","AI","BMP"],"documentInfo":{"Title":"","Author":"","Comments":"","Subject":"","Category":"","Keywords":"","Credits":""},"capabilities":{"Map","Query","Data"}});
```

ArcGIS API for Flex 2.0 beta

Map

Graphics

Query

Editing

Geometries

Geoprocessing

FeatureLayers

Extents

Routing

Time-awareness

GraphicsLayer

API “Syntax”

JavaScript (.js)

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

Silverlight (C#.NET)

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

Flex (ActionScript)

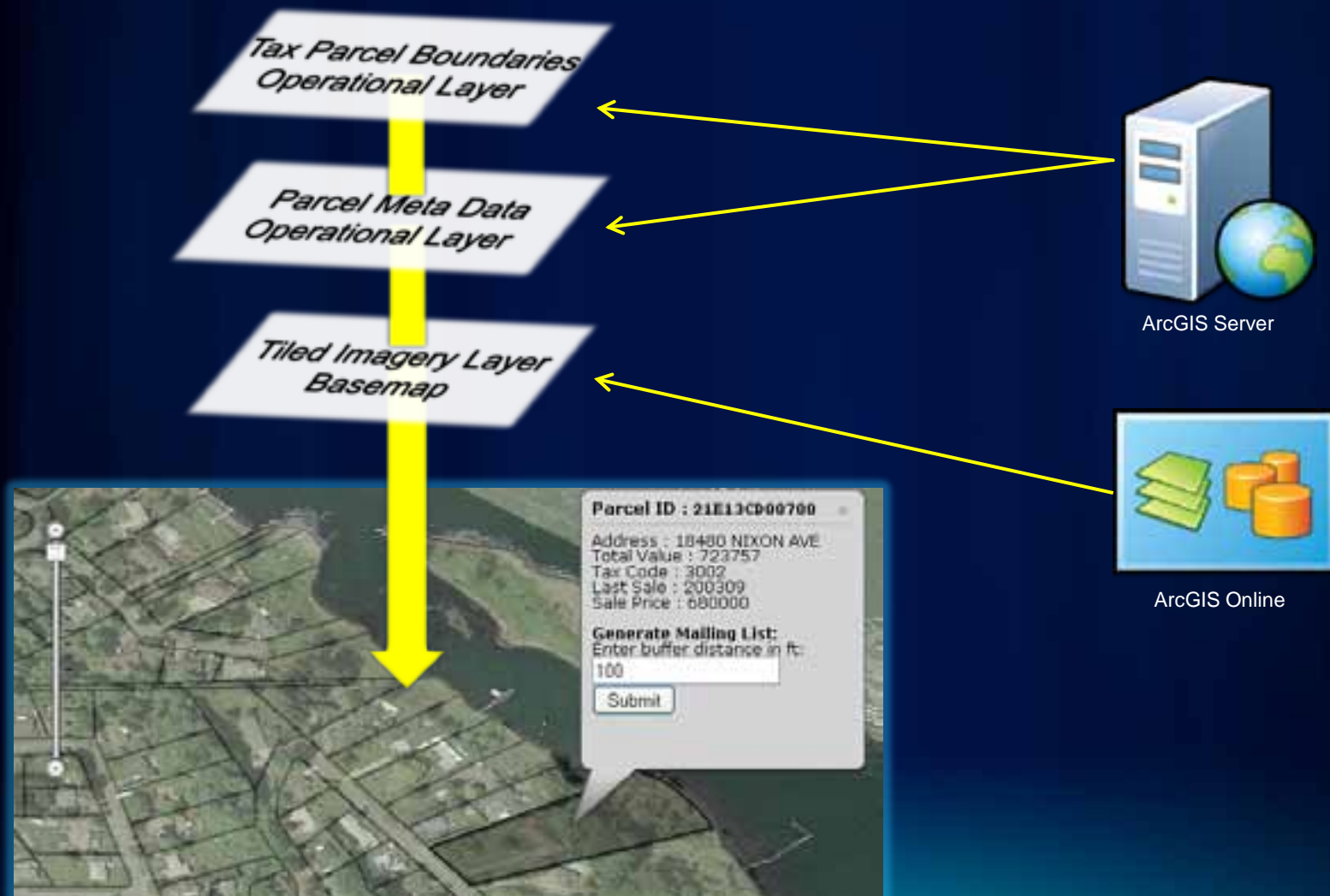
```
queryTask.execute(query, new AsyncResponder(onResult, onFault));
```

API Patterns

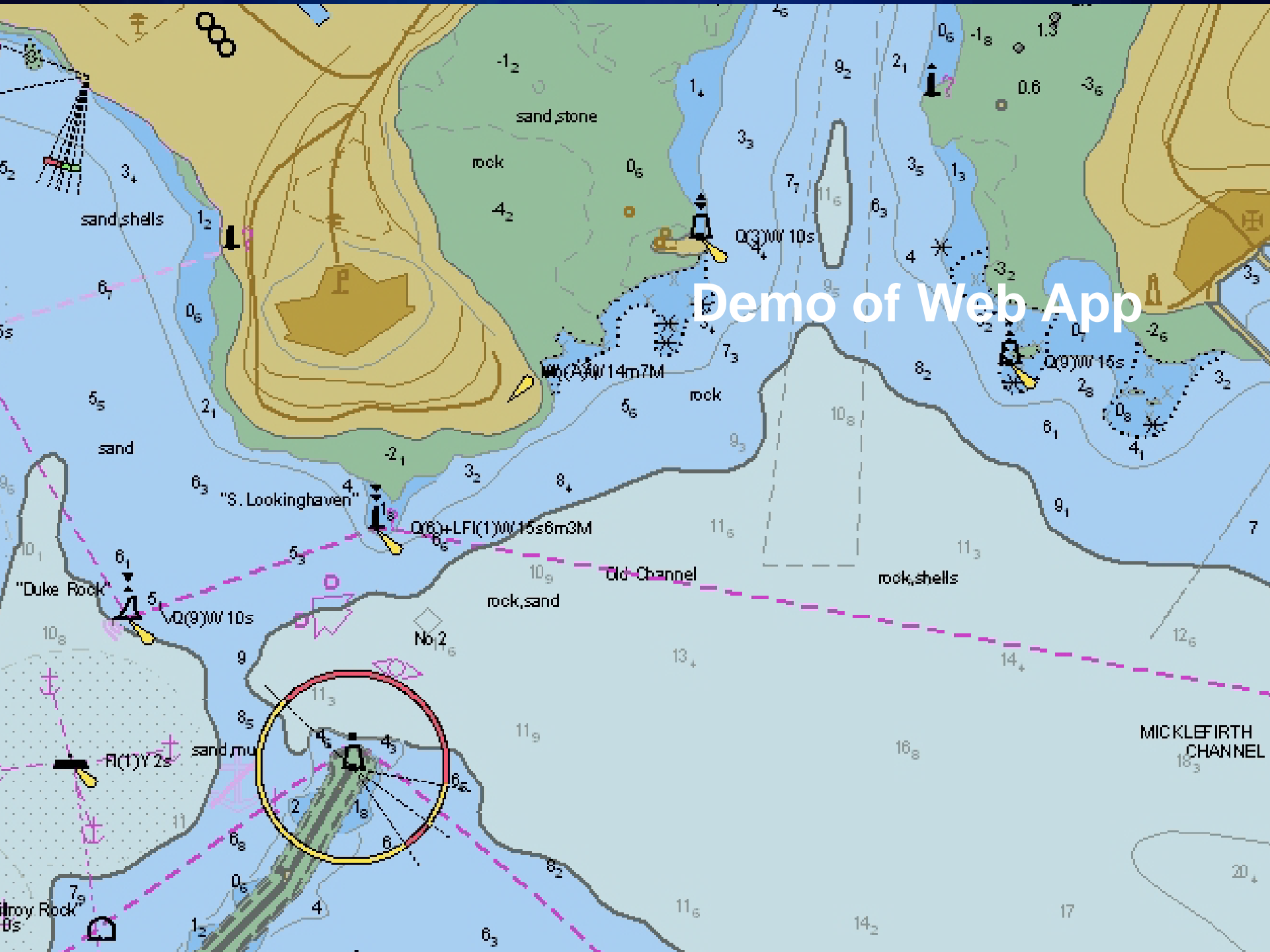
JavaScript (.js) Example

```
1 var queryTask = new esri.tasks.QueryTask("http://someserver/arcgis/...");
2 dojo.connect(queryTask, "onComplete", doSomething);
3 query = new esri.tasks.Query();
  query.spatialRelationship = esri.tasks.Query.SPATIAL_REL_INTERSECTS;
  .
  .
  .
4 queryTask.execute(query);
5 function doSomething(event){
  };...
```

Framework for Integrating Multiple services



Demo of Web App



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!

Touch-based workflows

Multiple form factors

Smaller Screens

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

Flash Player (debug): [Flash Player Support Center](#)

Online Resources: help.adobe.com

Training: [Flex.org](http://flex.org), [Adobe Video Training](#)

Community: actionscript.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](http://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



esri