



**Esri International User Conference | San Diego, CA**  
**Technical Workshops | July 11-15, 2011**

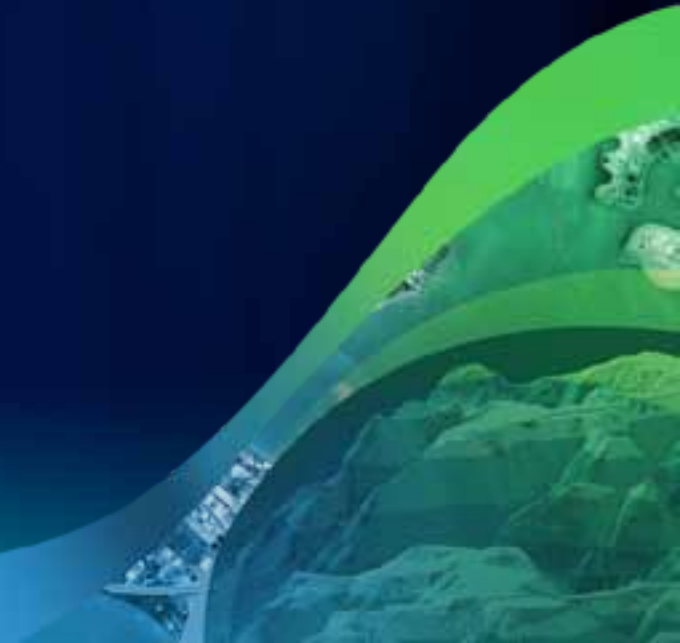
# **ArcGIS API for Flex - An Introduction**

Canserina Kurnia, Lloyd Heberlie

# Agenda

- **API Introduction**
- **Getting started**
- **API concepts and examples**
- **Developer/Deployment workflow**
- **Road Ahead**
- **Getting more information**

# API Introduction



# ArcGIS 10 — A Complete System

**Easier  
More Powerful  
and Everywhere**



# ArcGIS Web APIs overview

- **ArcGIS Server REST API foundation**
  - ArcGIS resources exposed in a restful manner
- **JavaScript, Flex, Silverlight/WPF**
- **Patterns are the same across all the APIs**

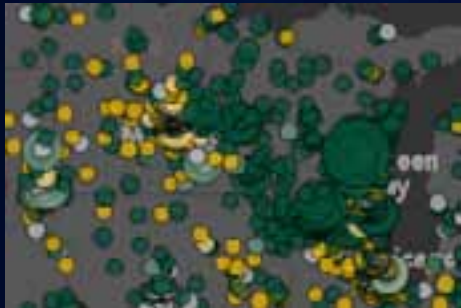
## A little history

- **Well Adopted**
- **Very active forum**
- **Community code gallery**
- **Release schedule**

	<b>Flex API</b>	<b>Flex Viewer</b>
April 2011	2.3.1	2.3.1
December 2010	2.2	2.2
September 2010	2.1	2.1
July 2010	2.0	2.0 beta
2008-2009	1.0, 1.1, 1.2 and 1.3	

# Live Sites

**FanMap: Super Bowl**



**Stroke Center Locator**



**Solar Boston**



**Business Analyst Online**



**StateStat – Stimulus Recovery**



**Renewable Energy Atlas**



# Demo: Some examples





# What is your relationship with the API?

- **ArcGIS Viewer for Flex**
  - Extends the API
  - Industry Templates
    - Public Safety, Water/Wastewater, Land Records
- **Custom Application using the ArcGIS API for Flex**
  - Task focused application
  - Roll your own: business logic leverage the API

# Adobe Flash Platform

- The leading solution for delivering rich apps and content across screens and devices
- Enterprise applications
- Consumer / Social applications
- Mobile devices / TV
- <http://www.adobe.com/flashplatform/customers/>
- <http://www.adobe.com/flashplatform/>



# Adobe Flash Platform

Multiscreen  
Content and Applications



Design / Develop



Creative Suite



Flash Professional



Flash Catalyst



Flash Builder

Framework



Flex

Clients



AIR



Flash Player

AMF, XML, JSON, SOAP, RSS, ATOM, etc.  
HTTP/S, Sockets, RTMP, etc.

Servers  
and  
Services



Flash Media Server



Flash Data Services



Flash Platform Services

# Adobe Flash Platform and ArcGIS

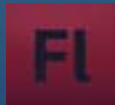
Multiscreen  
Content and Applications



Design / Develop



Creative  
Suite



Flash  
Professional



Flash  
Catalyst



Flash  
Builder

Framework



Flex



ArcGIS API  
for Flex

Clients



AIR



Flash Player

AMF, XML, JSON, SOAP, RSS, ATOM, etc.  
HTTP/S, Sockets, RTMP, etc.

Servers  
and  
Services



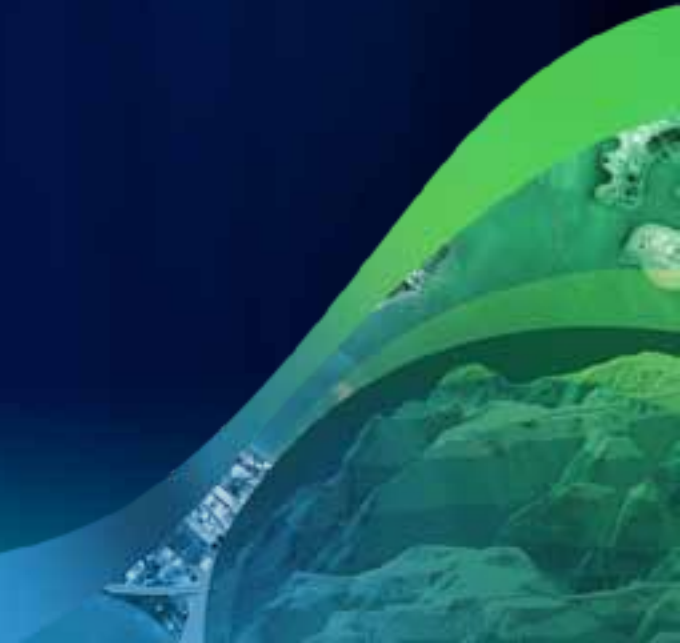
ArcGIS Server



# Why Adobe Flex Framework?

- **Create applications that are,**
  - Interactive, responsive
  - Easy to extend
  - Simple, yet powerful
- **Consistent across browsers, desktops, devices, and operating systems**
- **Highly productive, open source, IDE support**
- **Rich set of components**
- **Strong developer community**
  - <http://www.adobe.com/devnet/flex>

# Getting started



# How do I get the API?

- **Resource center**
  - **Download**
- **Contents**
  - **Readme, API library, samples, skins**
- **API Library: collection of classes and assets (“the swc”)**
- **Samples: same as the resource center**
- **Skins: look and feel of a UI component**

# Demo: Resource Center

<http://links.esri.com/flex/>

<http://links.esri.com/flexviewer/>

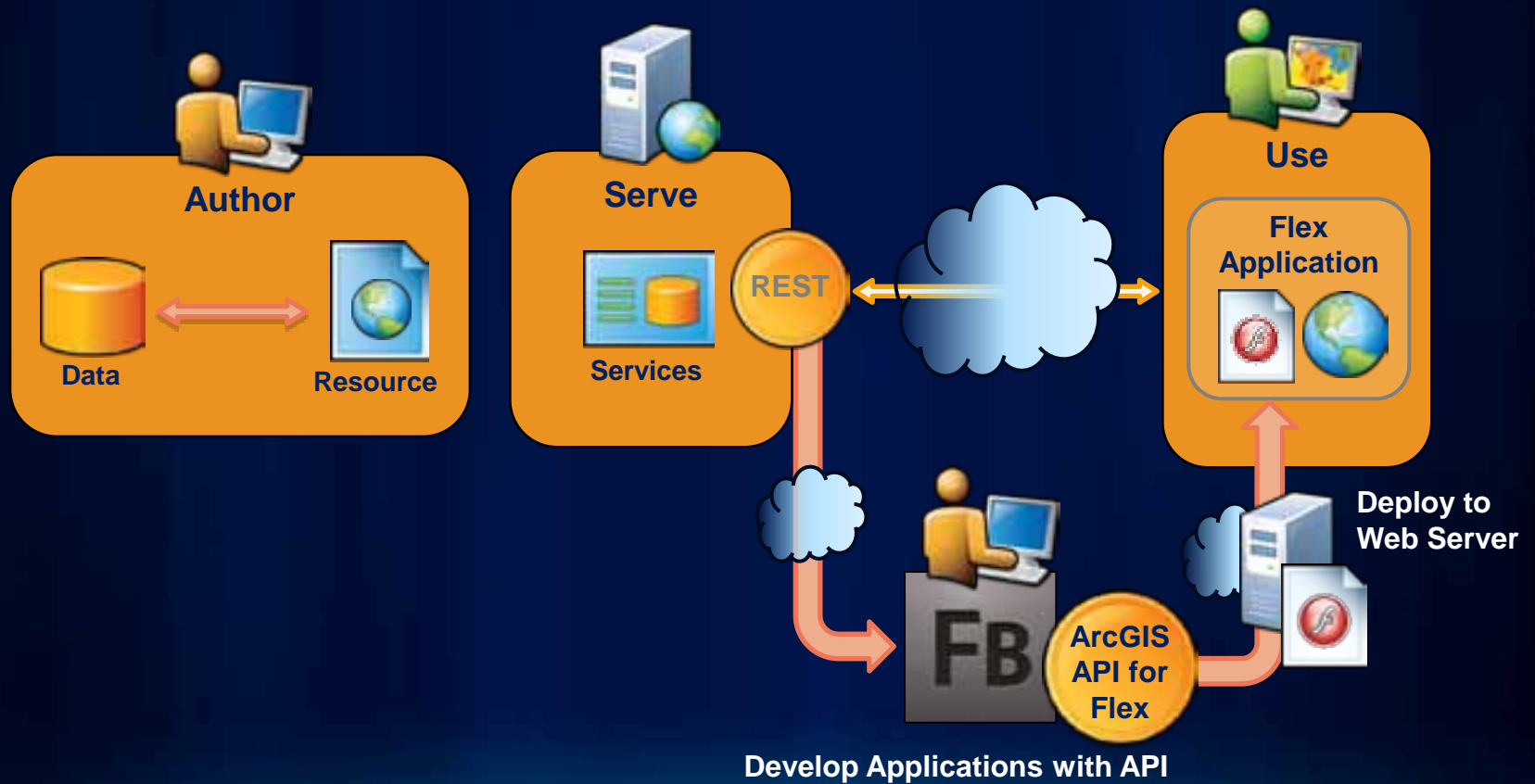




# What do I need to get started?

- **Requirements for ArcGIS API for Flex 2.x**
  - Adobe Flash Player 10
  - Adobe Flex 4 SDK
  - Access to ArcGIS Server services \*
- **Recommendations**
  - Adobe Flash Builder 4.5 (IDE)
- **Optional**
  - Adobe Creative Suite
    - Flash Catalyst, Flash Professional, Fireworks, etc

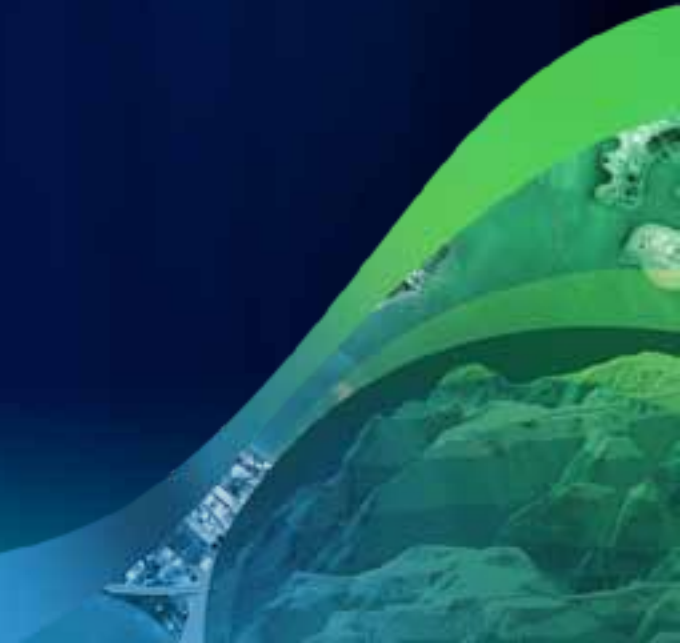
# ArcGIS Server and ArcGIS API for Flex



# What will I need to know / learn?

- **MXML**
  - Declarative XML that gets converted to ActionScript
  - UIComponent, Skinning and Layout
- **ActionScript**
  - Based on ECMAScript specification
  - Programming language for Flash Player and Flex SDK
- **CSS**
  - Styling UIComponents and Skins

# API concepts and examples



# Overview

- **Mapping and Visualization**
  - Basemaps
  - Operational layers
  - Graphics
- **Analysis**
  - Tasks

# Map

- **Main component of the Flex API**
- **Mouse & keyboard navigation**
- **Scale bar, pan arrows, cross hair, rubberband, zoomslider (Navigation) can all be styled**
- **Spatial reference & scale levels**
  - **Determined by the first visible layer**
  - **Or can be set explicitly**
- **Collection of layers**

# Basemaps, operational layers, and graphics

- **Basemaps**
  - Provide geographic framework
  - Tiled (cached), static, multi-scale
- **Operational layers**
  - Focus map
  - Associated with tools and user interaction
  - Typically dynamic in content
- **Graphics**
  - Use for visualizing task results or user input
  - Client-side features
  - Two types: Graphics Layer and Feature Layer
- **Custom layers**

# **Demo: Integrating basemaps and operational layers**





# ArcGIS ImageService Layer

- **ArcGIS ImageService Layer – since 9.3**
  - Single source and/or ArcGIS Server Image extension
- **Time aware**
- **Specify bands to display**
- **Compression quality**
- **Mosaic rule**
- **Raster function – Colormap, Hillshade, etc**

# Graphics Layer

- **Graphic = geometry + attributes + symbol**
- **Rich symbolization**
  - Points, Lines, Polygons
  - Pictures, TextSymbol, InfoSymbol
- **Event driven model**
  - Mouse, keyboard
- **Native flex properties**
  - alpha, visible, ..
- **New in 2.0 clustering**



# Feature Layer

- Extends Graphics Layer
- Feature Service or Map Service
- Can be layer or table
- Query mode
- Supports:
  - Selections
  - Definition expression
  - Attachments \*
- Editable when source is Feature Service \*
- Uses drawing info from ArcGIS Server \*



\* Requires ArcGIS Server 10 or above

# Symbol

- **Graphics are rendered using symbols**
- **Uses Flash graphics**
- **The symbol of a graphic is determined by (in order of preference):**
  - **The graphic's defined symbol**
  - **The renderer defined in the layer**
  - **The symbol defined in the layer**
  - **The default symbol defined by our API**

# Renderers

- **SimpleRenderer**
  - Uses one symbol only
- **ClassBreaksRenderer**
  - Array of ClassBreakInfo
- **UniqueValueRenderer**
  - Array of UniqueValueInfo
  - Support for multiple attributes
- **TemporalRenderer**
  - Use the time field of a FeatureLayer



# Demo: Feature Layer

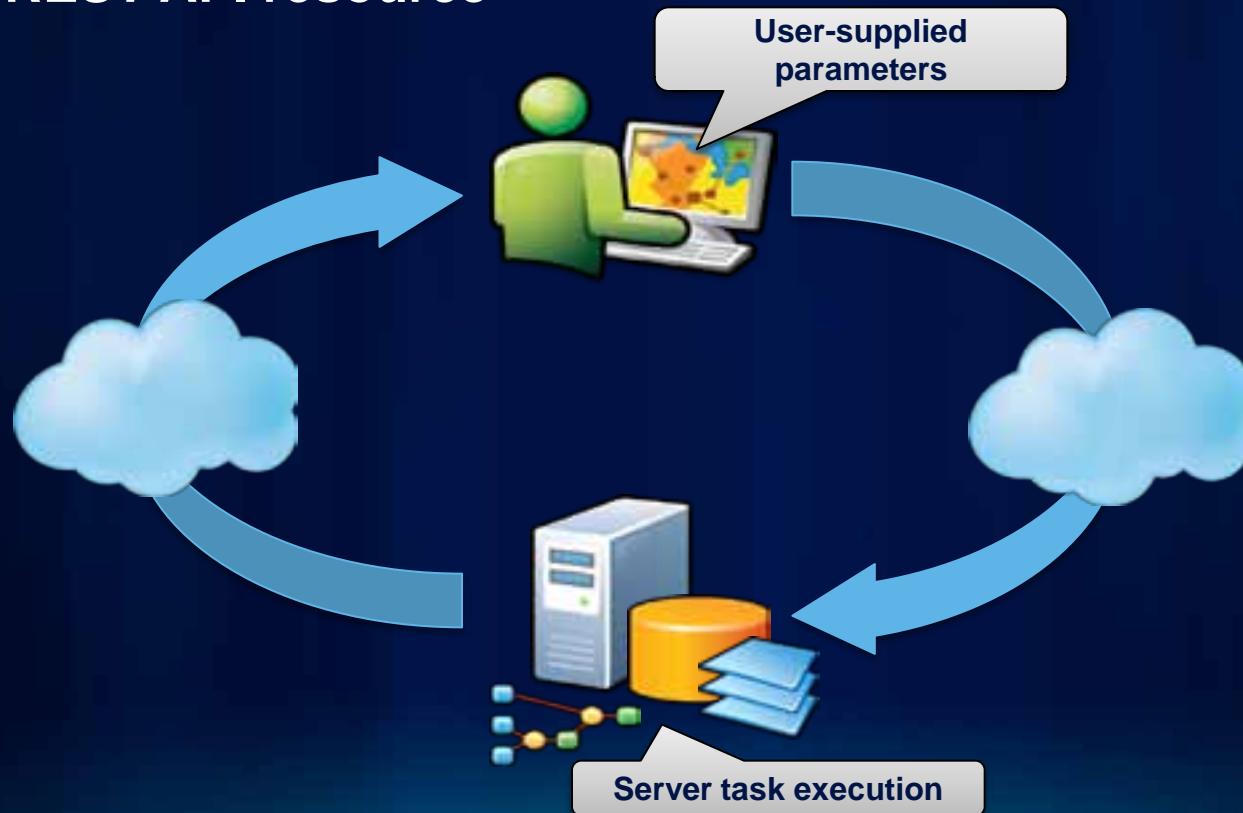


# Overview Tasks

- **Query, Find (Search), Identify**
- **Locator Service**
- **Geoprocessing Service**
- **Route, Service Area, Closest Facility**
- **Geometry Service**

# Tasks

- Analysis capabilities exposed by an ArcGIS Server REST API resource





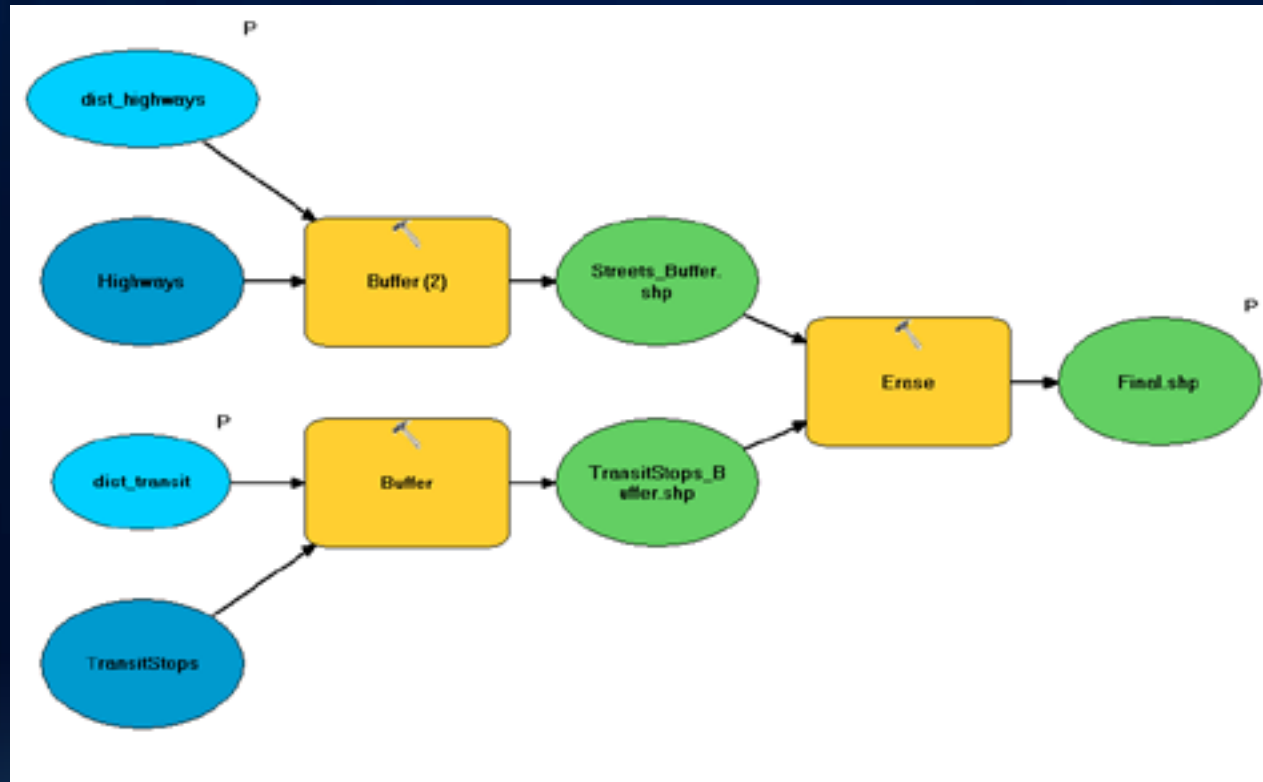
# Comparing Query, Find and Identify Tasks

	Query	Find	Identify
Input type(s)	Where clause Search Text Geometry	Search Text	Click on Map
Specify spatial relationship?	<b>Y</b>	<u>N</u>	<b>Y</b>
# of (query) layers	1	>=1	>=1
Specify attributes to return?	<b>Y</b>	<u>N</u>	<u>N</u>
Return features only?	<b>Y</b>	<u>N</u>	<u>N</u>
Return attributes only?	<b>Y</b>	<u>N</u>	<u>N</u>

# Locator Tasks

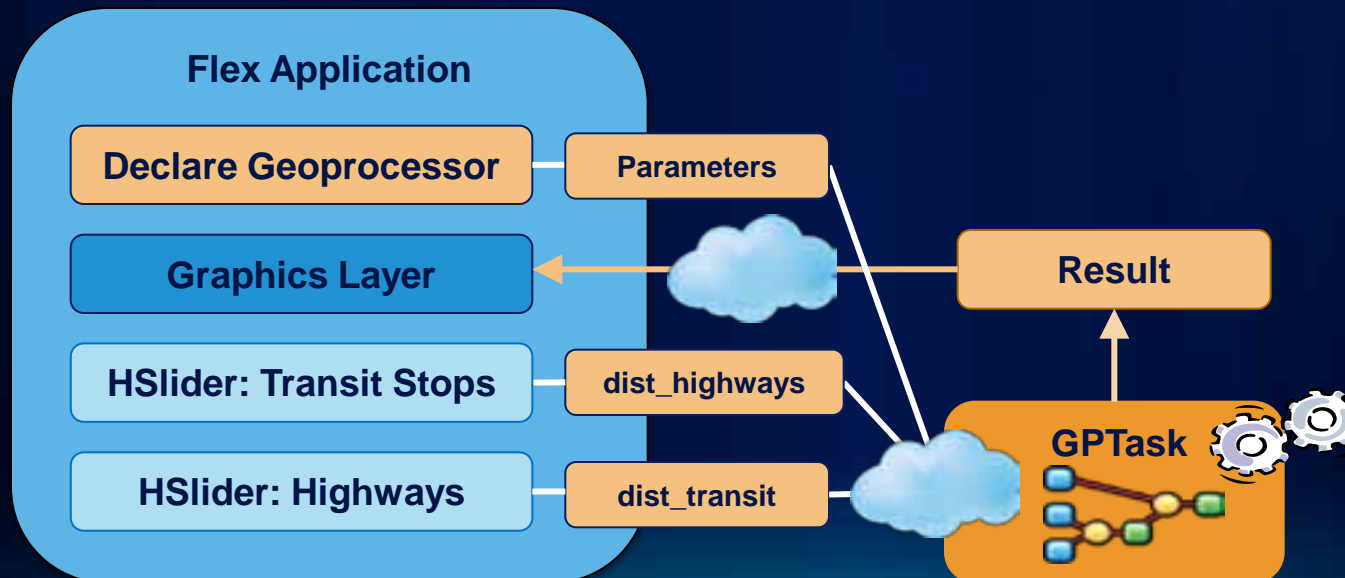
- Capabilities / address styles are tied to the underlying address locator which is the source for the locator service
- Forward and reverse address lookup
- Get candidates for an address (forward)
- Get an address for a given location (reverse)
- Specify the output spatial reference

# Geoprocessing model



# Geoprocessing Task

- Exposes a Geoprocessing model through an ArcGIS Server service
- Execute = synchronous
- SubmitJob = asynchronous



# Network analysis tasks

- Exposes Network Analyst functionality through an ArcGIS Server service



**Service Area**



**Routing**



**Closest Facility**

# Geometry Service

- **A server-side processing and algorithmic resource**
- **Supports operations related to manipulating geometries**
  - Project, buffer, simplify, cut, densify, difference, generalize, union, split
  - Many more ....
- **Supports editing functionality with Feature service**

# Demo: Tasks

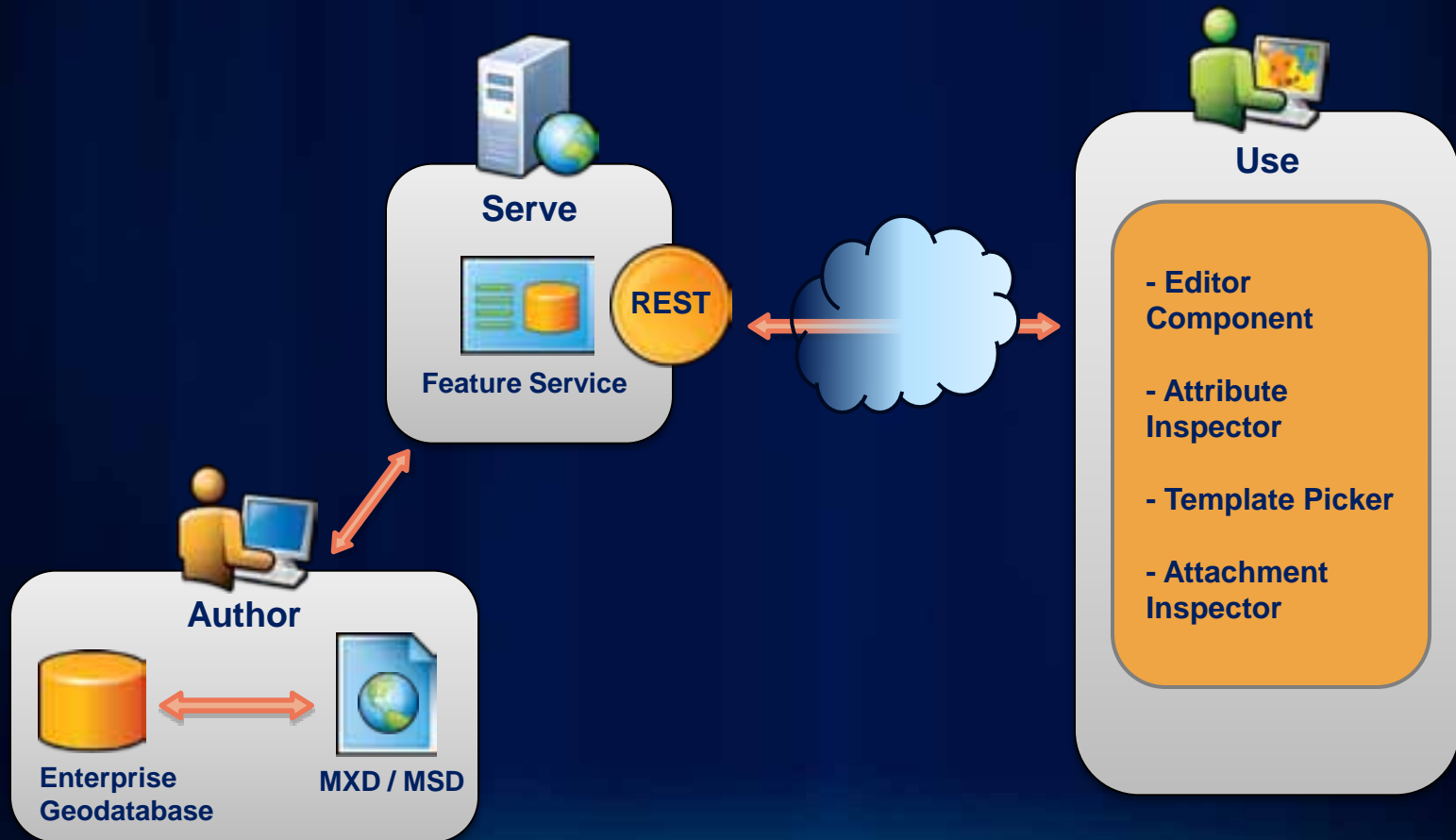


# UIComponents

- Editor
  - Template Picker
  - AttributeInspector
  - AttachmentInspector
- 
- Navigation, ScaleBar, Legend
  - TimeSlider
  - LabelDataRenderer



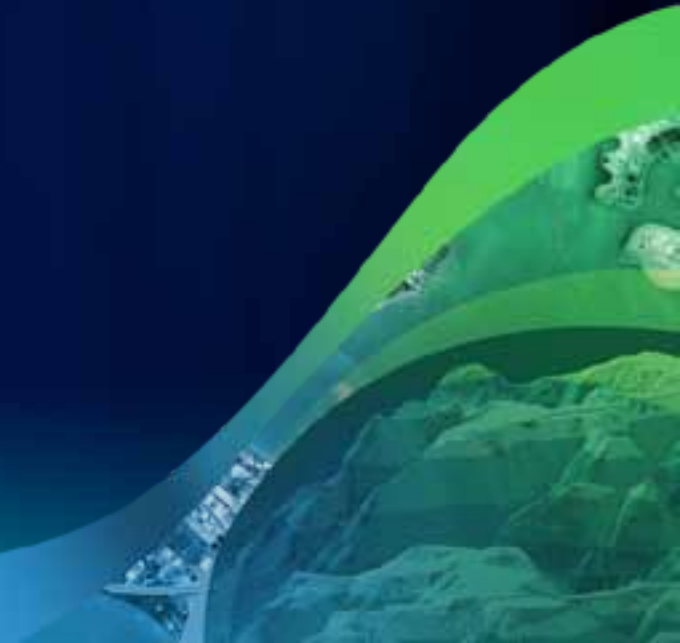
# Editing Workflow



# Demo: Editing



# Developer / Deployment workflow



# Developer workflow

## Author Application



- § MXML
- § ActionScript
- § Debug

## Compile Application



- § SWF
- § HTML Wrapper

## Deploy to Web Server



- § Export Release Build

## Run Application



Deliver  
SWF to  
Client

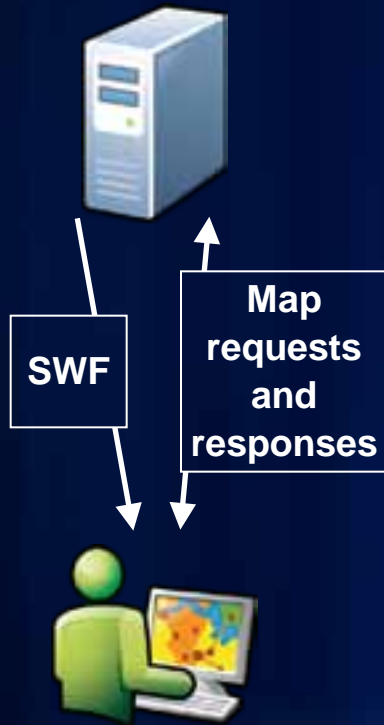


# Thinking about deployment

- **Minimum Flash Player installation (10.x)**
  - Wrapper streamlines process
- **Uncheck enable integration with browser navigation**
- **Use Runtime Shared Library (RSL)**
- **Export “Release build”**
- **Flash Player cross-domain issues**
  - `crossdomain.xml`
  - proxy page (for security)

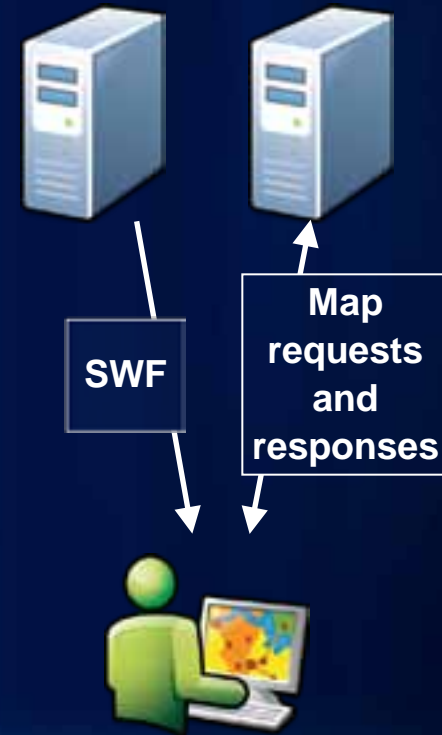
# Placement of the crossdomain file

Web Server with  
application  
and ArcGIS Server



Web Server with  
application

ArcGIS Server  
with  
crossdomain.xml



# Road Ahead



## Road ahead

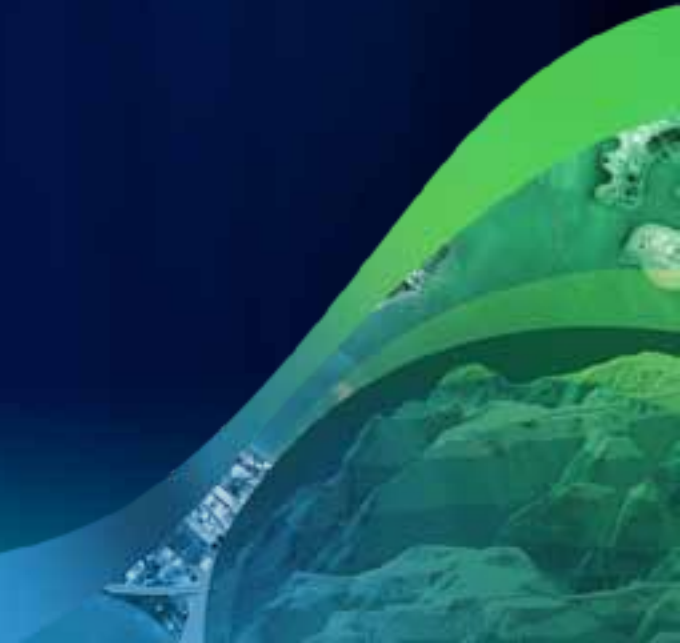
- **ArcGIS API for Flex 2.4**
- **ArcGIS Viewer for Flex 2.4**
- **KML, WMS enhancements**
- **Better support Adobe 4.5 and mobile development**
  - **Android, iOS**
  - **Mobile samples**
- **More languages / localization**
  - **Arabic, Russian, Brazilian Portuguese, Italian**
- **Compatible with Flex 4.5 and Flash Builder 4.5**



# Road ahead matching versions

- **2.x API matched 10.0\***
- **3.x API will match up with 10.1**
- **ArcGIS API for Flex 3.0**
  - Adobe 4.5 SDK requirement
  - Flash Player 10.2 requirement
- **Thanks to REST 1x, 2x and 3x API all work with 9.3 thru 10.1**
- **Certain functionality requires certain server and API versions**

# Getting more information



# Where can I get more information?

## Adobe and Esri resources

- **Esri**

- <http://resources.arcgis.com>
- **Forums, samples**
- <http://links.esri.com/flex>
- <http://links.esri.com/flexviewer>



- **Adobe**

- <http://www.adobe.com/devnet/flex.html>
- <http://www.adobe.com/devnet/flex/videotraining.html>
- <http://www.adobe.com/devnet/flex/tourdeflex.html>
- <http://groups.adobe.com>



# Esri Training for Developers

<http://www.esri.com/training>



- **Instructor-Led Courses**

- Building Web Applications Using the ArcGIS API for Flex, JavaScript, or Microsoft Silverlight/WPF
- Introduction to ArcGIS Server
- Creating Effective Web Applications Using ArcGIS Server

- **Online Training Seminars**

- Free, one-hour presentation and demos by Esri technical experts
- Live seminar broadcast on a new topic every month

# UC 2011 Agenda: Technical Workshops

- **ArcGIS API for Flex - Advanced Topics**
  - Tues 10:15 – 11:30 AM      Room 8
  - Thurs 8:30 – 9:45 AM      Room 8
- **ArcGIS Viewer for Flex - An Introduction**
  - Tues 10:15 – 11:30 AM      Room 5 A/B
  - Thurs 8:30 – 9:45 AM      Room 5 A/B
- **The Road Ahead**
  - Wed 4:05 – 4:25 PM      Room 6A
- **Flex Appeal**
  - Wed 12:00 – 1:00 PM      Room 8

# **UC 2011 Agenda: Demo Theater Presentations**

- **Changing the Look and Feel of Your ArcGIS Viewer for Flex Application**
  - Wed 5:00 – 5:45 PM Exhibit Hall C
  - Thurs 12:00 – 12:45 PM Exhibit Hall C
- **Creating Your Own Custom Widget for the ArcGIS Viewer for Flex**
  - Thurs 11:00 – 11:45 AM Exhibit Hall C

## **UC 2011 Agenda: additional information**

- **Adobe Flex Special Interest Group (SIG)**
  - **Tues 12:00 – 1:00 PM      Room 5 A/B**

# Summary

- **API Introduction**
- **Getting started**
- **API concepts and examples**
- **Developer/Deployment workflow**
- **Road Ahead**
- **Getting more information**



## Questions / Answers

Please fill in the survey..... Thank you

- <http://www.esri.com/sessionevals>



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