



# Moving Desktop Applications to ArcGIS Server

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# Introductions

- **Who are we?**
  
- **Who are you?**
  - **Development experience with ArcObjects**
  - **Development experience with ASP.NET**
  - **Basic understanding of ArcGIS Server**

# Questions?

- **How many:**
  - Want to migrate Desktop applications?
  - Want to migrate Engine applications
  - VB.NET, C#, C++, VB6?
  - Already have ArcGIS Server development experience?

# Schedule

**Please!**  
Turn **OFF** cell phones  
and paging devices



- Today we will cover
  - ArcGIS Desktop customizations
  - How to migrate customizations to Server
  - Best practices for migrating
  
- We will answer questions during session or at the end?

**Please complete the session survey!**

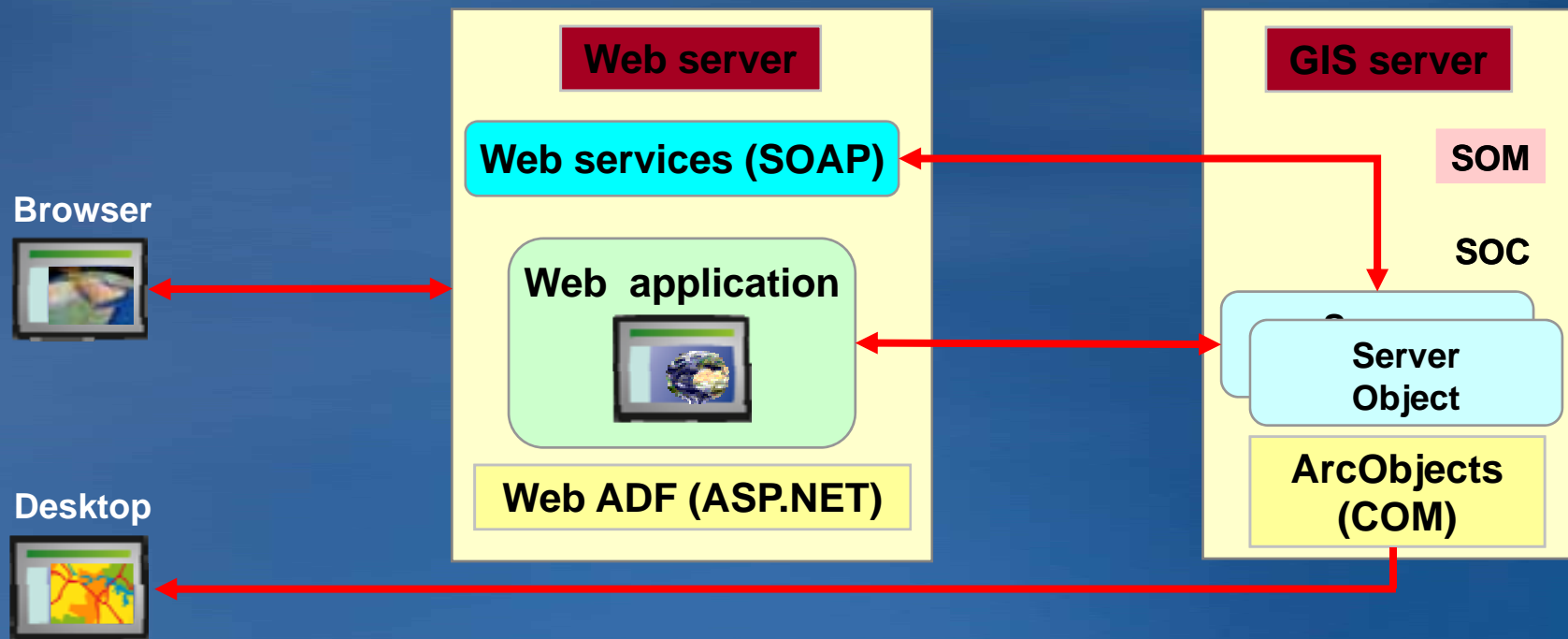
# Types of customizations

- **ArcGIS Desktop**
  - Commands, tools, toolbars, windows, extensions
  - VB 6, VC++, .NET
- **ArcGIS Engine**
  - Forms based and utility applications
  - Commands, Tools, extensions
  - VB6, VC++, .NET and Java
- **ArcObjects Components**
  - Utility components and DLLs



# Migrating Desktop Applications: The Challenge

1. ArcGIS Server is a multi-tiered, multi-API system
2. ArcObjects code runs remotely on GIS Server
3. User interface is a web browser



# Migration options

- 1. Migrate directly to ASP.NET**
- 2. Build Server Object Extension or Com Utility Object**
- 3. Geoprocessing**
- 4. ArcGIS Server WEB ADF**
  - Common data-source API
  - Data-source specific API
- 5. JavaScript or Flex APIs**

# Which ArcObjects libraries can be used?

- Most of the Engine libraries
- Capabilities
  - Display
  - Symbolization
  - Analysis
  - Query
  - Data Access
  - Editing
  - Output

*ArcObjects Library Reference*

## **System Library Overview**

**Supported with:** ArcGIS Engine, ArcGIS Desktop, ArcGIS Server

**Library dependencies:** None

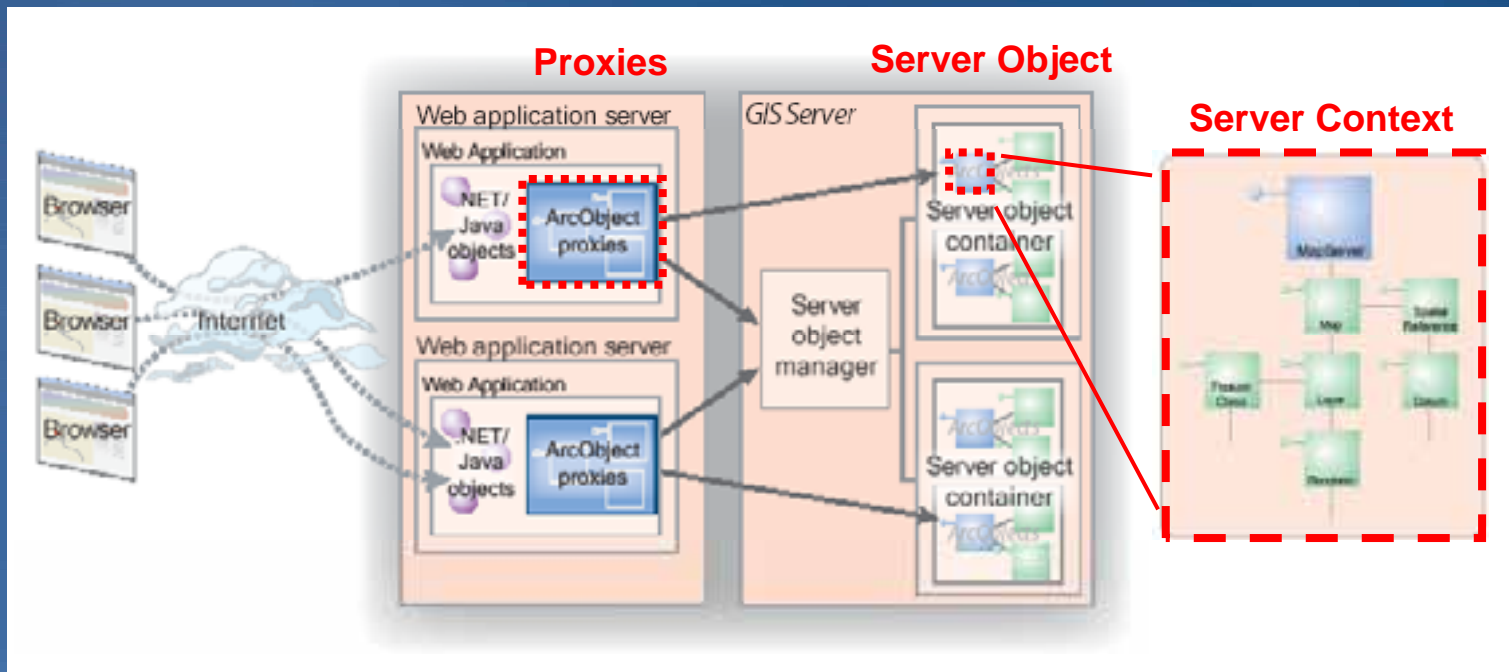
**Additional library information:** [Contents](#), [Object Model Diagram](#)

[http://resources.esri.com/help/9.3/ArcGISEngine/ArcObjects/shared\\_libs.htm](http://resources.esri.com/help/9.3/ArcGISEngine/ArcObjects/shared_libs.htm)



# Accessing ArcObjects remotely

1. Web app communicates through ArcObjects proxies
2. Accesses a Server Object through the SOM
3. Works with ArcObjects in a Server Context (ArcSOC.exe)



# Migrate ArcObjects code directly to ASP.NET

- **Build an ASP.NET application**
  - Copy code to new Application
  - Create ArcObjects in a server context

```
Dim pPoint as IPoint = Net Point
```

```
Dim pPoint as IPoint =  
    serverContext.CreateObject("esriGeometry.Point")
```

- **When to use?**
  - Quick migration of code for testing/demo
  - Small amounts of ArcObjects code

*Hint: Use Library Locator to find correct value for CreateObject*

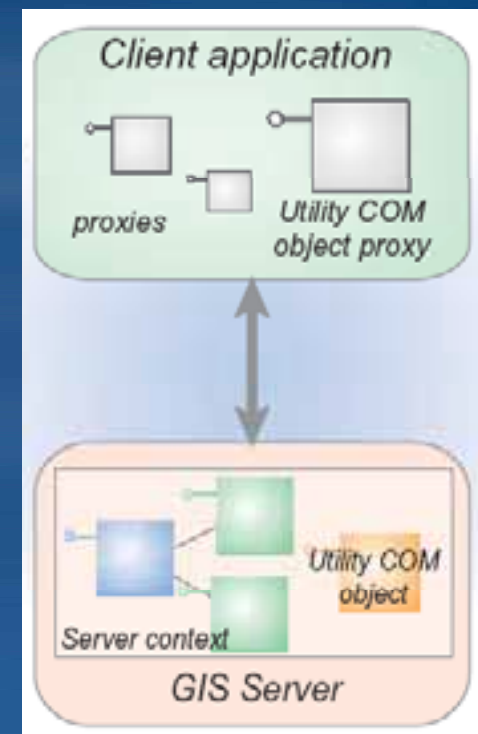
## Steps to migrate code

1. Build ASP.NET Web application
2. Copy/paste your ArcObjects code
3. Replace “New” with “CreateObject”
4. Manage objects in the server context



# Migrating ArcObjects code to a COM Utility Object

- **Build a custom COM component**
  - Moves code to the GIS Server (SOC)
  - Reduces number of fine-grained calls
- **When to use?**
  - Lots of ArcObjects code
  - Simplify code sharing
  - Optimize performance



## Steps to create a COM utility object)

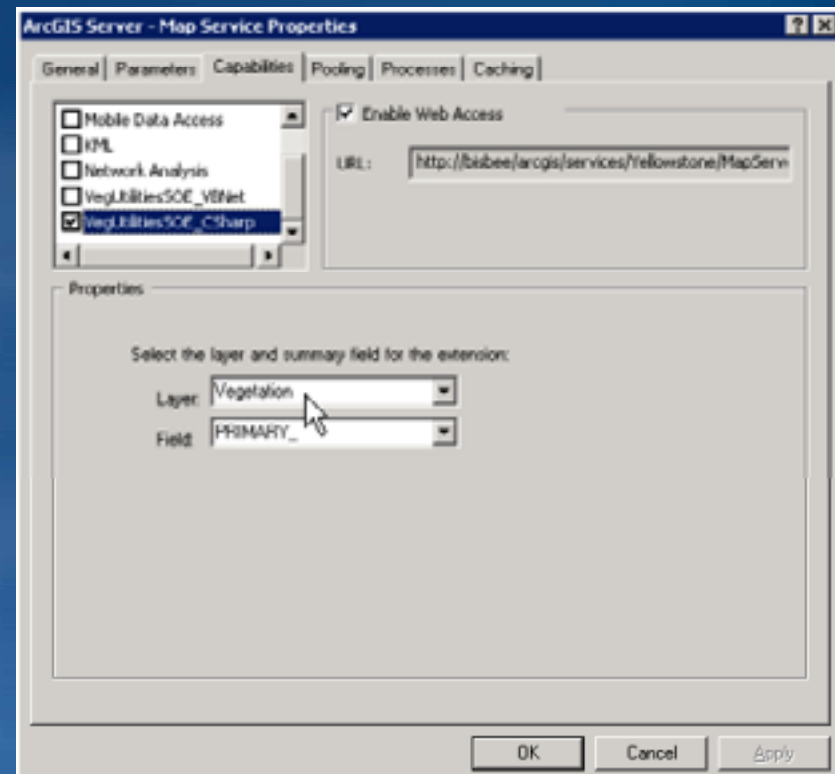
1. Create a new project ( VB 6, .NET, C++)
2. Reference necessary libraries
3. Define a COM Class
4. Define a public interface or public members
5. Migrate existing ArcObjects code
6. Use CreateObject to create and access objects

**Required to register COM component on all SOC machines**



# Migrating to a Server Object Extension (SOE)

- Extends the capabilities of a service
- Benefits
  - Initialized once
  - Configurable via ArcCatalog property page



## Steps to create a Server Object Extension (SOE)

1. Create a Class Library project
2. Implement `IServerObjectExtension`
3. Optionally build a custom property page
4. Access SOE from ASP.NET Web application



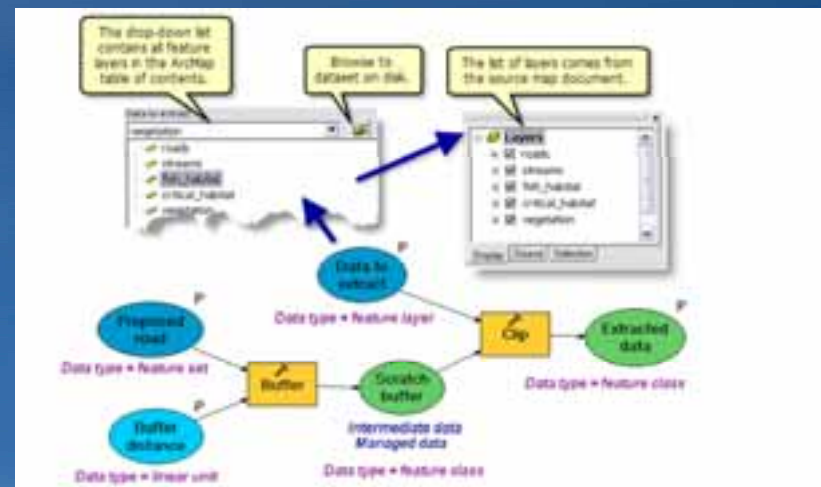
# Compare COM Utility Object to SOE

COM Utility Object	Server Object Extension
Initialized when required by GIS Server	Initialized once at startup
Created ad-hoc using the server context	Registered with a specific service
	Configurable via a custom property page



# Migrating – Geoprocessing Service

- Replace ArcObjects code with a Geoprocessing Service
- Build a model and return results to Web application
- When to use?
  - Optimize ArcObjects tasks
  - Processes that can be modeled



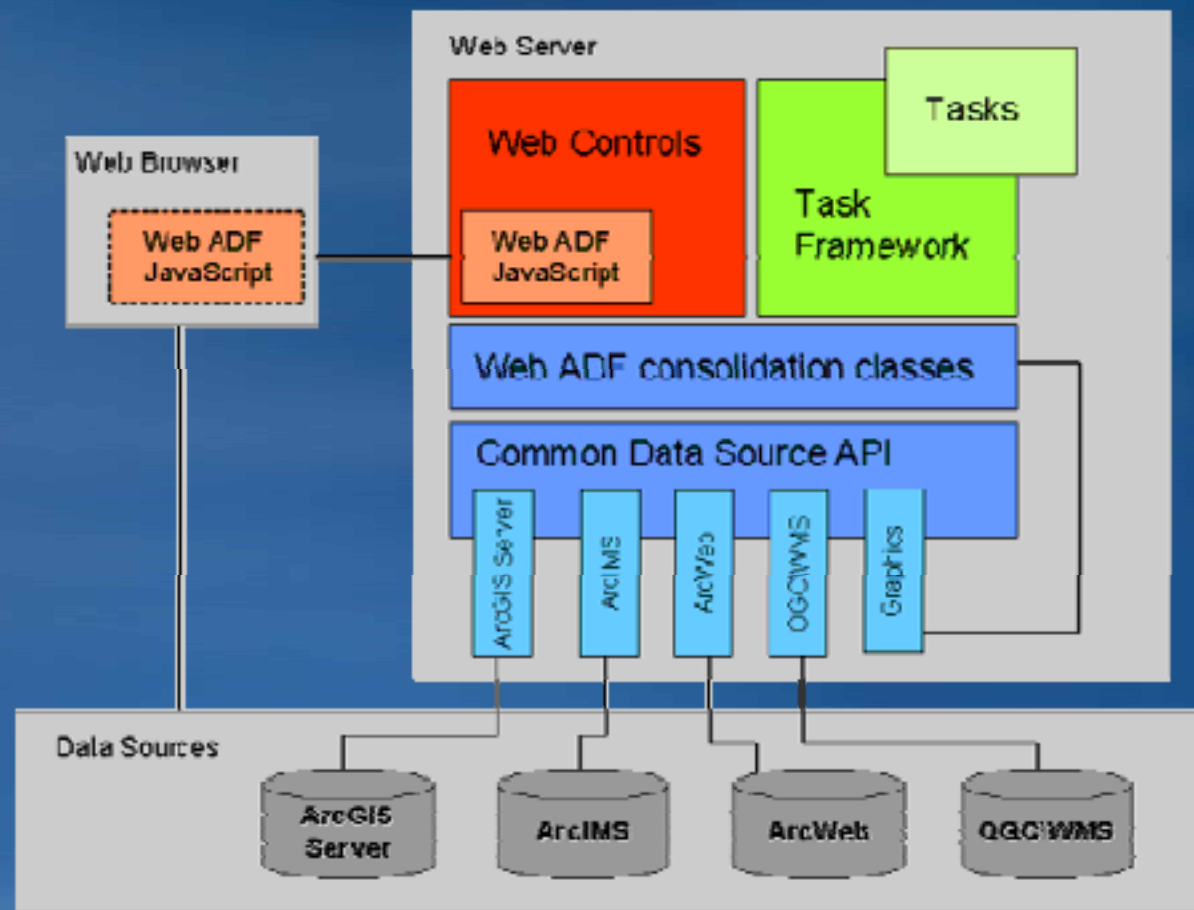
## Steps to migrate to a geoprocessing service

1. Build and test your geoprocessing model
2. Publish the model
3. Consume as a task in your ASP.NET application

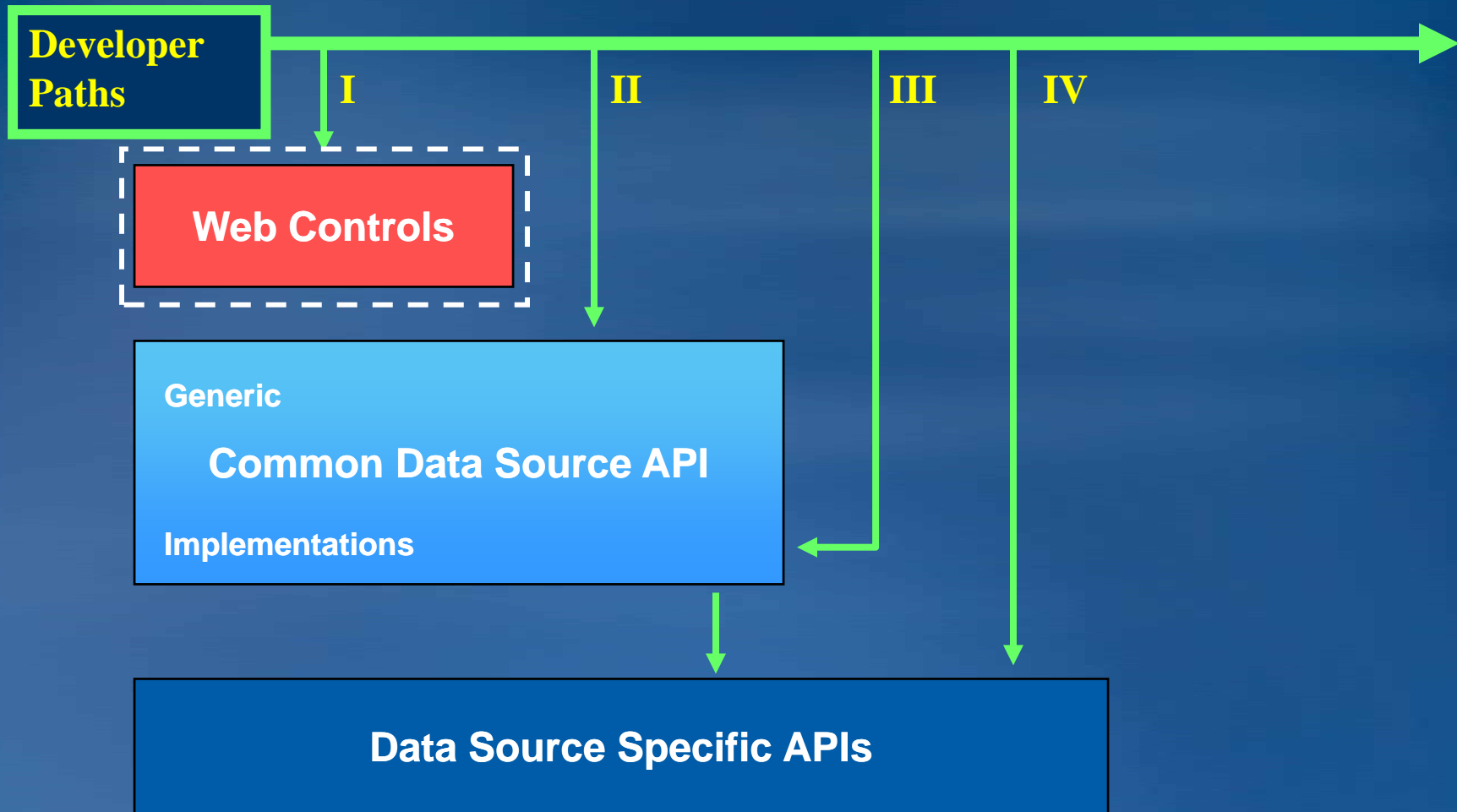


# Migration – Web Application Developer Framework (ADF)

- Replace ArcObjects functionality



# Web ADF - Development Paths



# Migrating the User Interface

## Web Controls

- Visual Studio Map template

- WebControls

- Pure ASP.NET controls
- AJAX enabled

- Functionality

- Visualization
- User interaction

MapResourceManager - MapResourceManager1  
MapResourceManager WebControl

**Warning:** You must enter a valid value for the ResourceItems property.

MapResourceManager Tasks  
[Edit Resources](#)



Map Contents

- Redlands
- Streets
  - <all other values>
  - CLASS
  - === Highways
  - Local Streets
  - Major Roads
- citylimit
- Parcels

# Migrating the User Interface

## *Commands and Tools*

1. Start with Web Mapping Application template
2. Add new item to the Toolbar
3. Specify client-side action
4. Create a new class and Implement required interface
5. Define server-side action

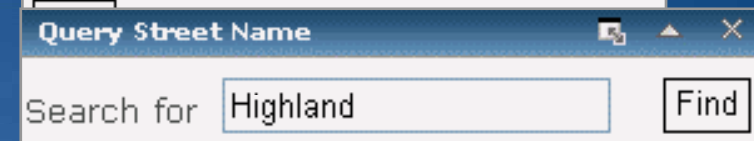
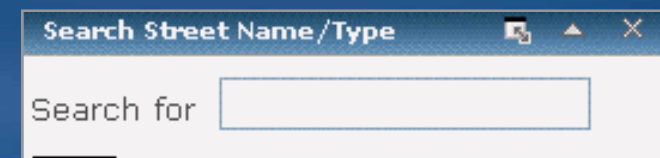
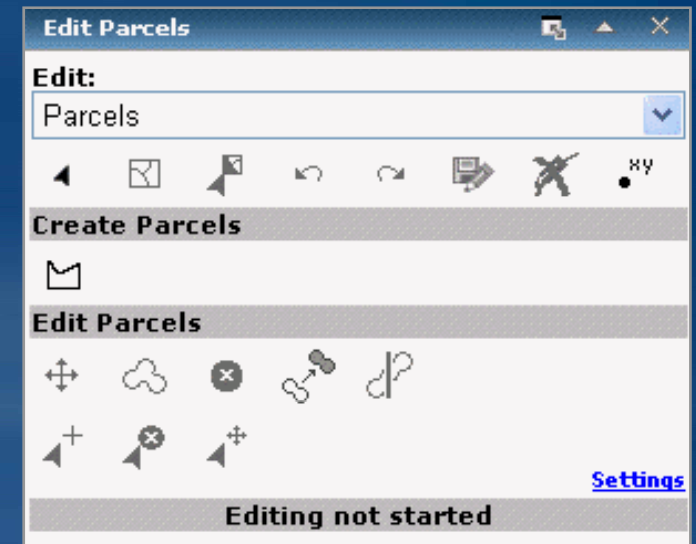
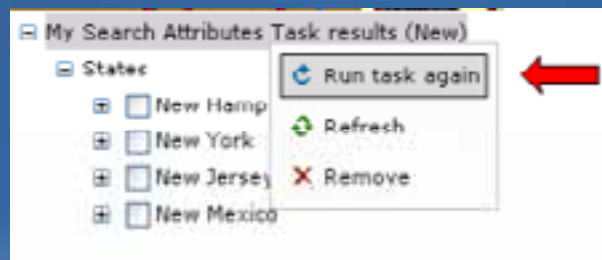


Customization	Interface
Tool	IMapServerToolAction
Command	IMapServerCommandAction
DropDownBox	IMapServerDropDownBoxAction

# Migrating the User Interface

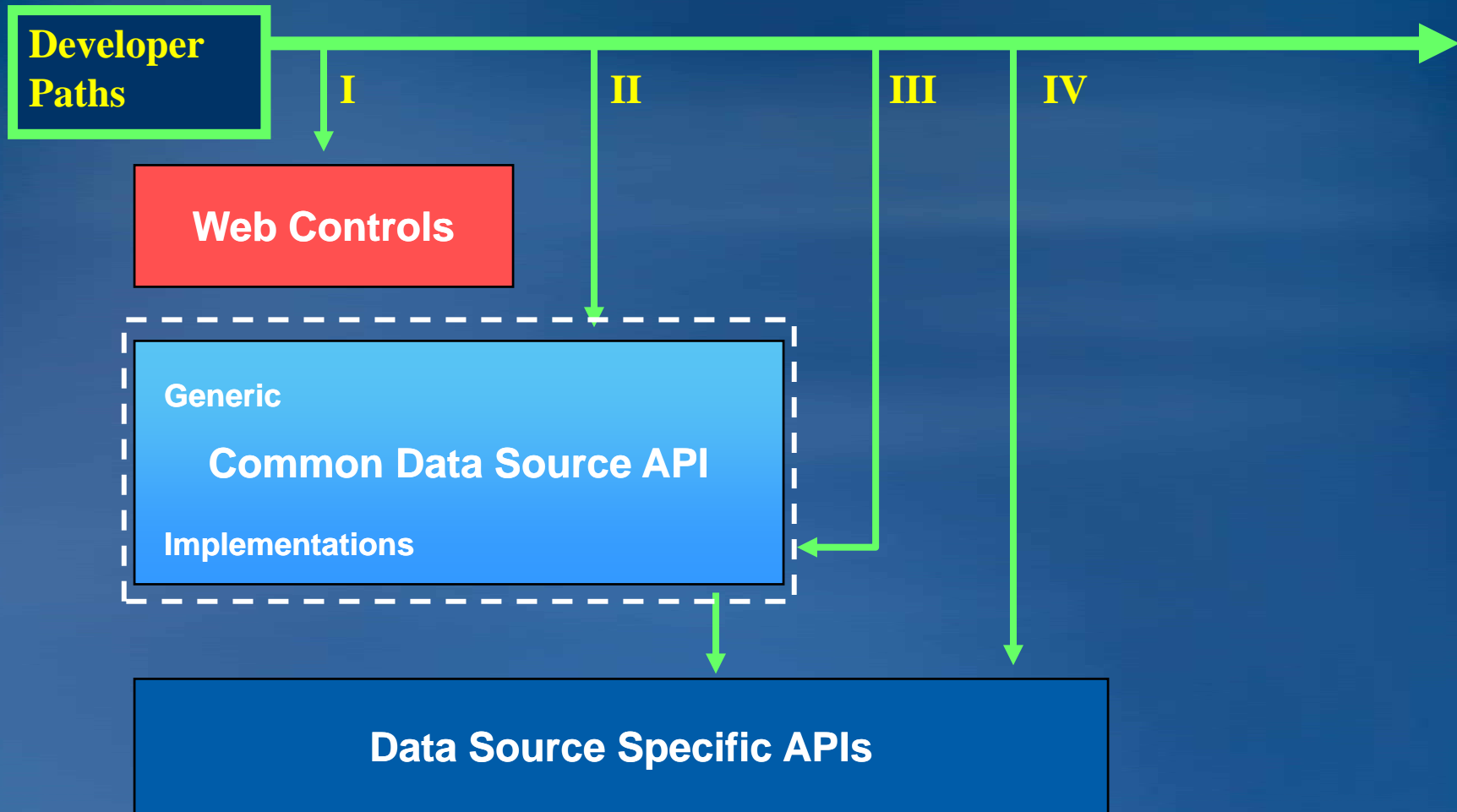
## Task Framework

- Tasks – objects that encapsulate business logic
- Out of the box tasks include:
  - Search Attributes
  - Find Address
  - Editor Task
  - Print Task
- Container for displaying task results



# ArcGIS Server Web ADF

## *Development Paths*





# Migration – The Common DataSource API

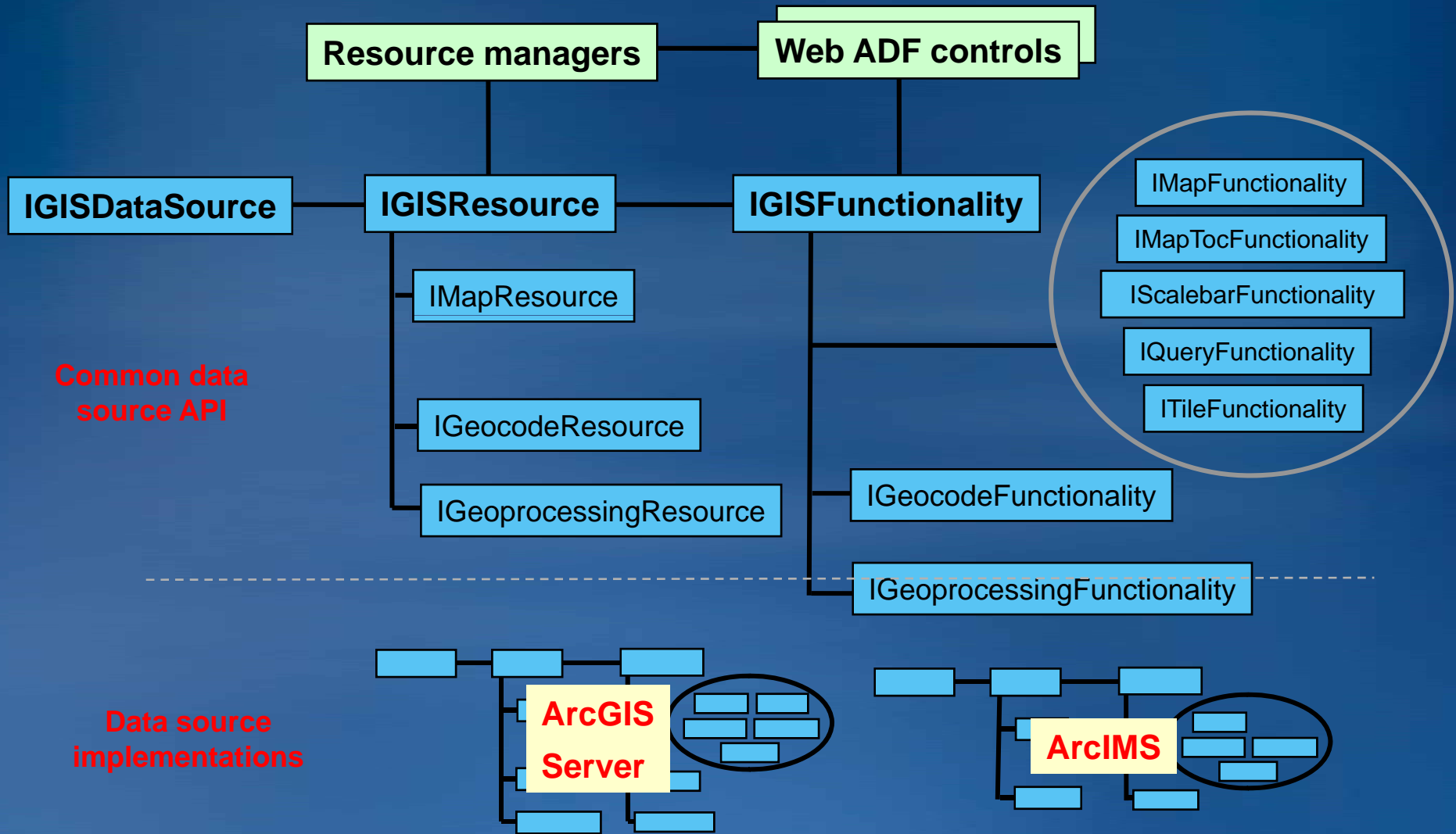
- **ArcGIS Server supports multiple data sources**
  - ArcGIS Server, ArcIMS, ArcWeb services, OGC, Graphics
- **Common Datasource API**
  - .NET classes for the Web ADF
  - Access and interact with all data sources the same way!
- **Provides different functionalities - query, find, identity...**

**Common data source API**



```
ESRI.ArcGIS.ADF.Web.DataSources
ESRI.ArcGIS.ADF.Web.DataSources.ArcGISServer
ESRI.ArcGIS.ADF.Web.DataSources.ArcWebService
ESRI.ArcGIS.ADF.Web.DataSources.Graphics
ESRI.ArcGIS.ADF.Web.DataSources.IMS
ESRI.ArcGIS.ADF.Web.DataSources.OCWMSService
```

# The Common Datasource API



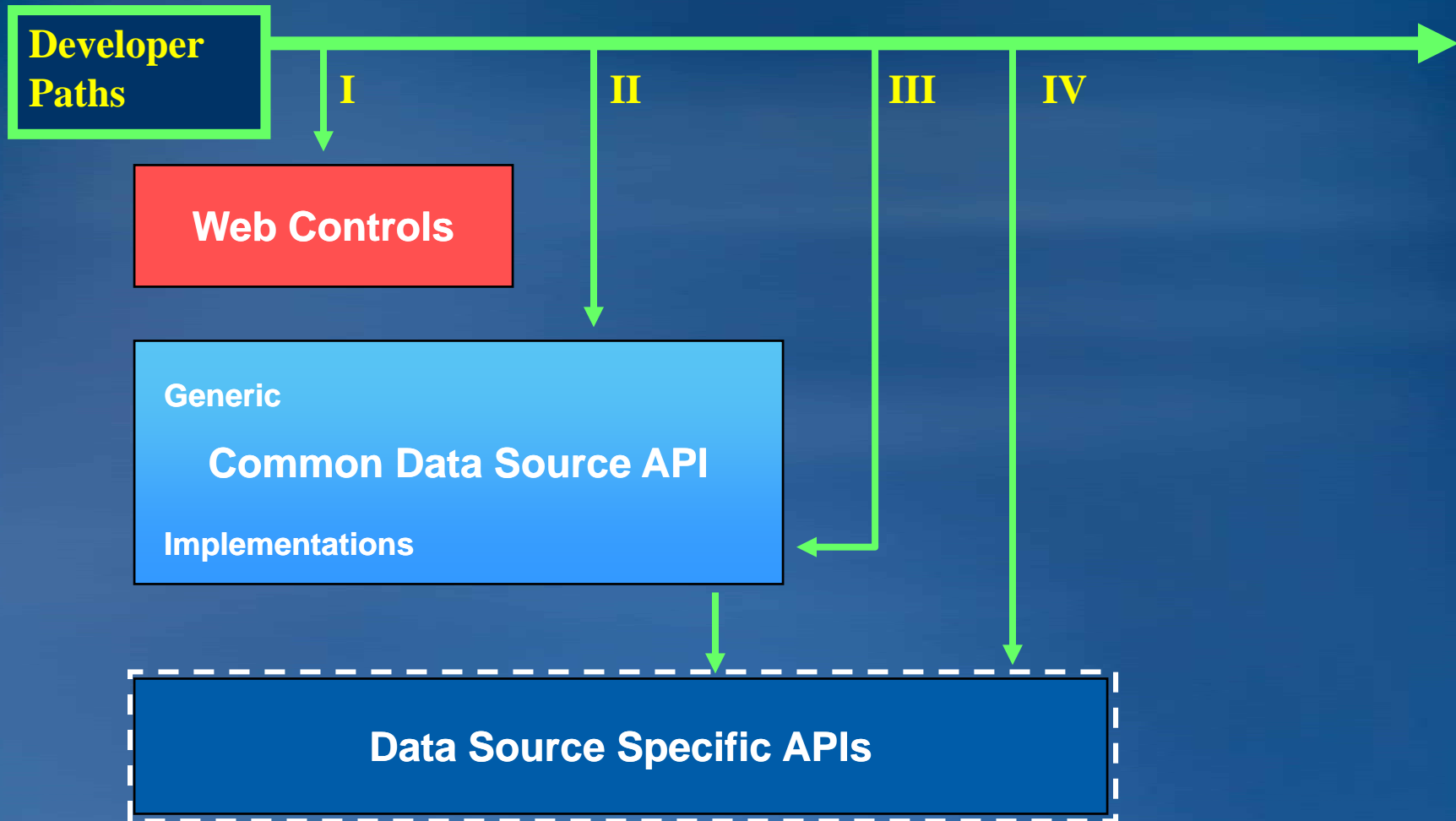
# Using the Common Datasource API

- **Replace ArcObjects code**
  - Query, Identify, Find etc
- **Steps**
  1. Identify the code to replace
  2. Search help to find Common API functionality
  3. Reuse code to access other data sources

*Review SDK, code samples, OMDs .....*

# ArcGIS Server Web ADF

## *Development Paths*



# Migration – Data source specific APIs

- Composed of data sources that have functionality beyond Common data source API
  - ArcGIS Server
  - ArcIMS
  - ArcWeb Services

**Data source-specific APIs**

**Web ADF API**

**Common data source API**

```
ESRI.ArcGIS.ADF
├── ESRI.ArcGIS.ADF.ArcGISServer
├── ESRI.ArcGIS.ADF.ArcGISServer.Editor
├── ESRI.ArcGIS.ADF.ArcWebService
├── ESRI.ArcGIS.ADF.Connection
├── ESRI.ArcGIS.ADF.IMS
├── ESRI.ArcGIS.ADF.Tasks
├── ESRI.ArcGIS.ADF.Web
├── ESRI.ArcGIS.ADF.Web.DataSources
│   ├── ESRI.ArcGIS.ADF.Web.DataSources.ArcGISServer
│   ├── ESRI.ArcGIS.ADF.Web.DataSources.ArcWebService
│   ├── ESRI.ArcGIS.ADF.Web.DataSources.Graphics
│   ├── ESRI.ArcGIS.ADF.Web.DataSources.IMS
│   └── ESRI.ArcGIS.ADF.Web.DataSources.OGCWMSService
└── ESRI.ArcGIS.ADF.Web.UI.WebControls
```

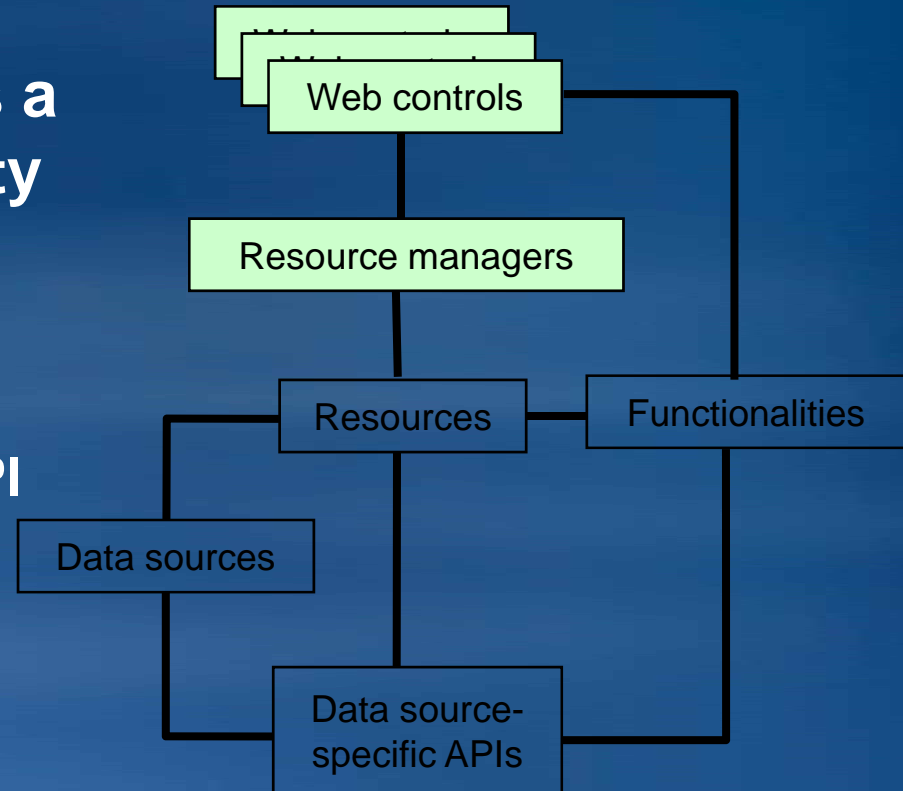
# Working with Data Source Specific APIs

- Each data source exposes a different set of functionality

- ArcGIS Server
  - SOAP, ArcObjects
- ArcIMS – AXL
- ArcWeb Services – SOAP API

- What does this mean?

- Many other data source-specific classes available
- More business/GIS logic
- Different APIs use different communication protocols
- Requires different programming patterns for each data source

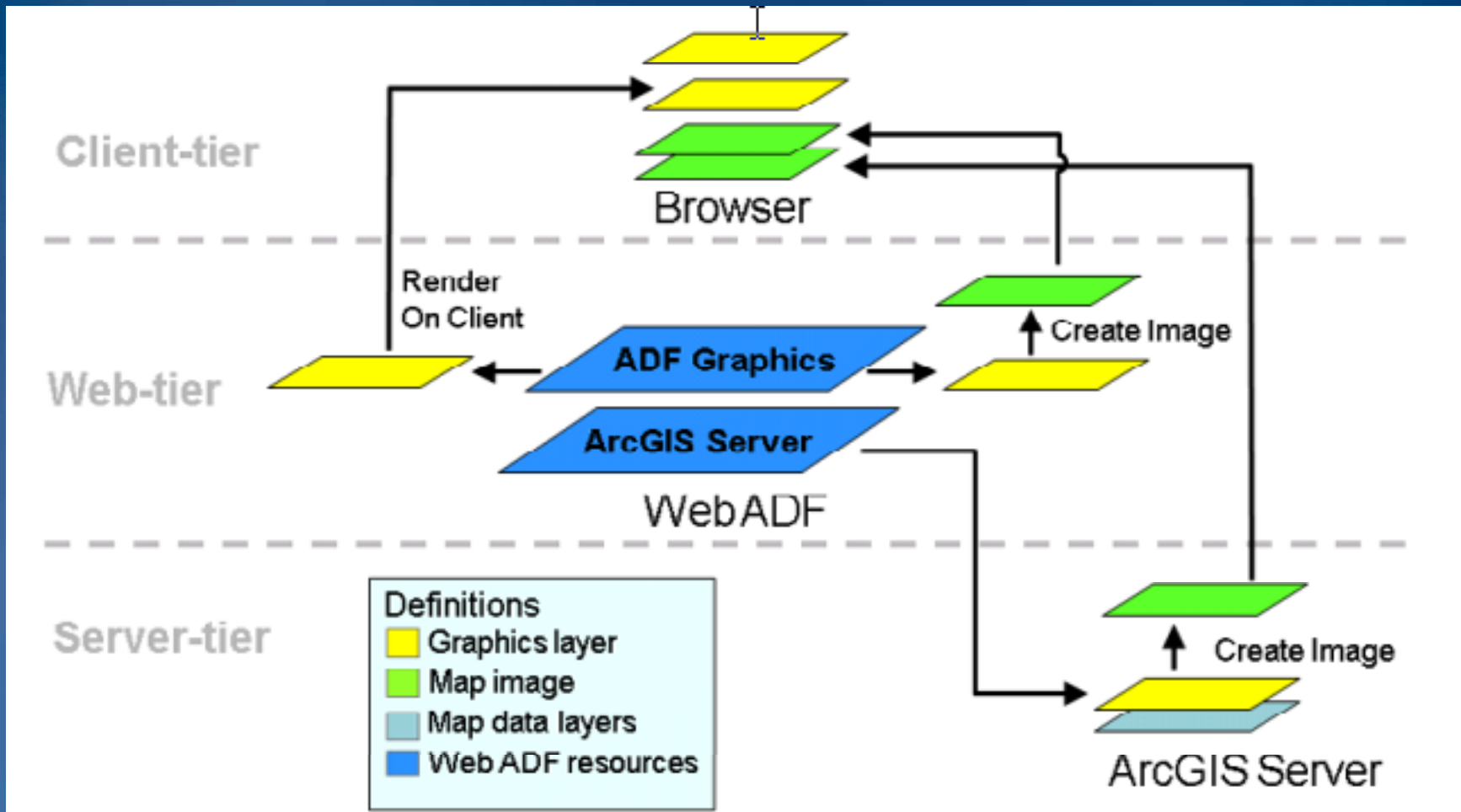


## Migrating graphics – Web ADF graphics data source

- **Draws on top of layers in map**
- **Used to perform tasks such as:**
  - Highlighting features
  - Labeling
  - Displaying buffers
  - Geocoding
  - Display dynamic data
- **Rendering occurs independently from map**
  - Map redraw is not required



# Migrating graphics - Options





# Additional APIs

## *JavaScript and Flex*

- Take advantage of the mapping, geoprocessing and geocoding capabilities of ArcGIS Server services
- **JavaScript API**
  - Lightweight
  - High performance
  - Browser based GIS applications
  - Mashups
  - Extensions for Google Maps and Virtual Earth
- **ArcGIS Server Flex API**
  - Build applications with intuitive, visually rich user interface
  - Create mashups
- **ArcGIS API for Microsoft Silverlight**



[http://webhelp.esri.com/arcgisserver/9.3/dotNet/develop\\_with\\_server.htm](http://webhelp.esri.com/arcgisserver/9.3/dotNet/develop_with_server.htm)

# Summary

- **Today we covered**
  - **Migrating Desktop applications to Server**
    - ASP.NET, SOE, COM Utility objects
    - Geoprocessing
  - **Migrating the User Interface**
    - ArcGIS Server Web controls
    - Commands and Tools
  - **Replacing ArcObjects**
    - Common Datasource API (Query, Identify, Find...)
    - Datasource specific API (ArcGIS Server and Graphics)

*Still have questions?*

# Additional Resources

*Questions, answers and information...*

- ***Tech Talk***

- *Outside this room right now!*

- ***Meet the Team***

- ***Other sessions***

- ***ESRI Resource Centers***

- PPTs, code and video



[resources.esri.com](http://resources.esri.com)

- ***Social Networking***



[www.twitter.com/  
ESRIDevSummit](http://www.twitter.com/ESRIDevSummit)

facebook

[tinyurl.com/  
ESRIDevSummitFB](http://tinyurl.com/ESRIDevSummitFB)

## Other Sessions

- *Building your First RIA with ArcGIS API for Flex (4:30)*
- *Introduction to the ArcGIS API for Microsoft Silverlight (Wed 1:00)*
- *Customizing Graphics and MapTips with the .NET Web ADF (Wed 1:00)*
- *Top 10 How-tos for the ArcGIS Server .NET ADF (Wed 2:45)*
- *Best Practices for Designing Effective Map Services (Wed 4:30)*
- *Harnessing Server Object Extensions (Wed 12:00)*

*Still have questions?*

# Want to Learn More?

## *ESRI Training and Education Resources*

- **Instructor-Led Training**

- [Developing Applications with ArcGIS Engine Using the Microsoft .NET Framework](#)
- [Developing Applications with ArcGIS Server Using the Microsoft .NET Framework](#)

- **Free Web Training Seminar**

- [Building Applications with ArcGIS Server Using the Microsoft .NET Framework](#)