Esri International User Conference | San Diego, CA

Technical Workshops | July 13th, 2011

ArcGIS for Developers

an Introduction

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Andy Gup @ *agup*

Goals

- Cover all of ArcGIS, high pass, developer's angle

- *What is there?*
- *What can I do with it?*
- *What resources are available to get the most from it all?*
- *Where is the community?*

- How do I get started?

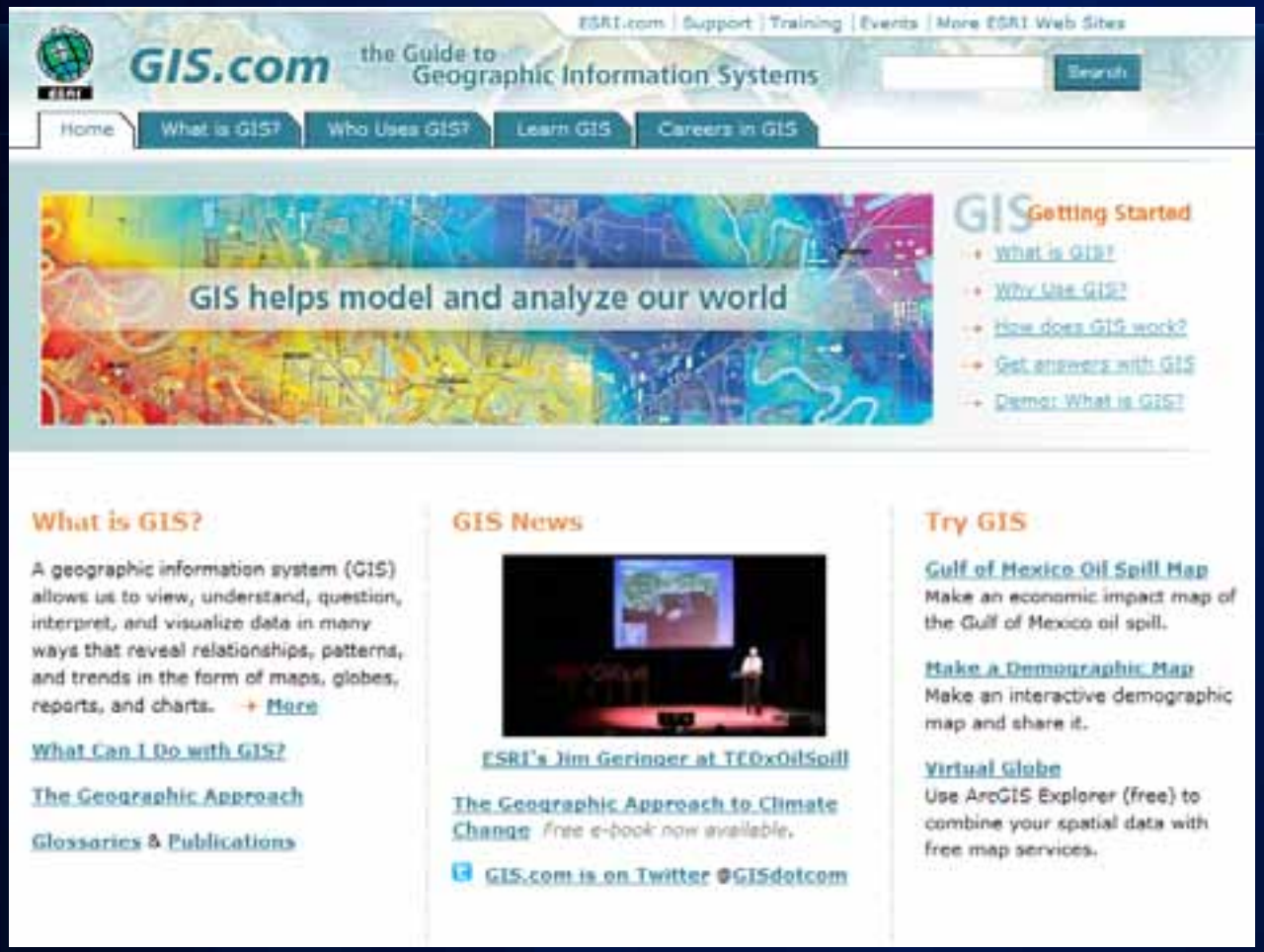
Who are you?

- GIS pro
  - new to dev?
- Experienced developer
  - new to ArcGIS?
- Project Lead?

Agenda

- ArcGIS as a developer's toolbox
  - Desktop applications
    - ArcGIS Explorer Desktop, ArcGIS Desktop, ArcGIS Engine
  - Geoprocessing
  - Geodatabase
  - Client-Server applications
    - ArcGIS Server
    - Web and Mobile Apps and APIs
- Developer Resources

esri.com/what-is-gis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GIS Getting Started
What is GIS?
Why Use GIS?
How does GIS work?
Get answers with GIS
Demo: What is GIS?
What is GIS?
A geographic information system (GIS) allows us to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts. More
What Can I Do with GIS?
The Geographic Approach
Glossaries & Publications
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ESRI's Jim Geringer at TEDxOilSpill
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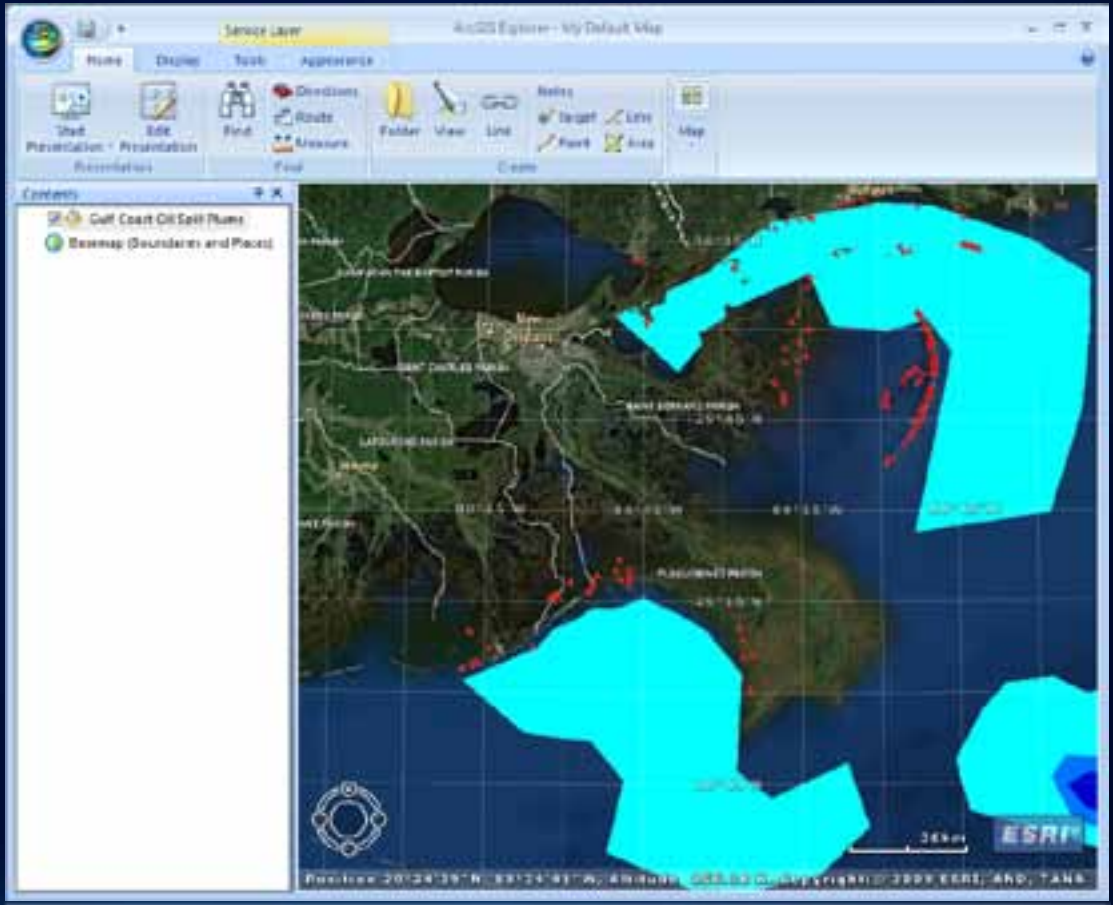
Gulf of Mexico Oil Spill Map
Make an economic impact map of the Gulf of Mexico oil spill.
Make a Demographic Map
Make an interactive demographic map and share it.
Virtual Globe
Use ArcGIS Explorer (free) to combine your spatial data with free map services.

www.GIS.com

ArcGIS Explorer



ArcGIS Explorer

Free to use, develop against, and deploy

For Developers

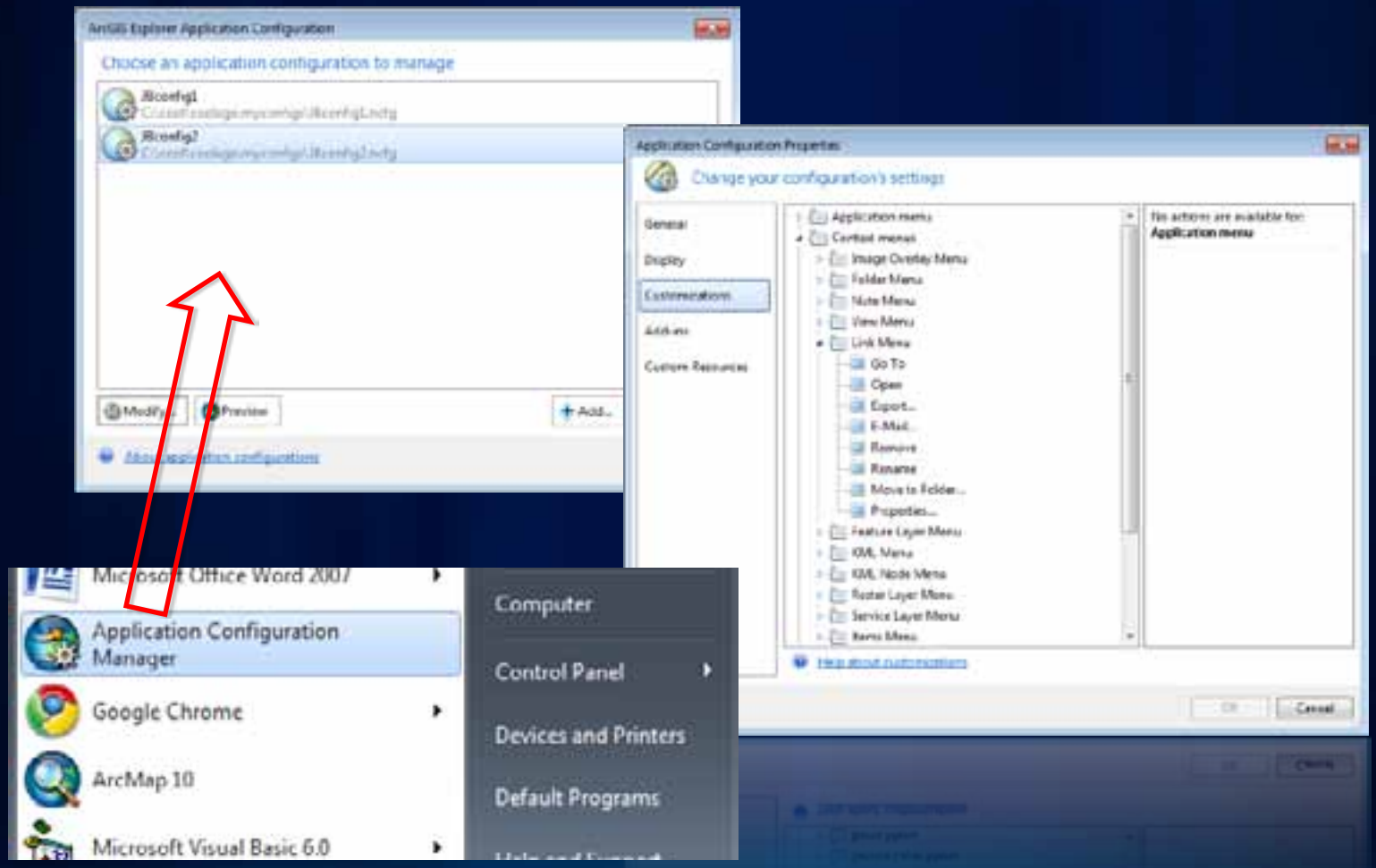
1. **Application Configuration**
   - **UI and functional customization, no code necessary**

2. **ArcGIS Explorer SDK**
   - **Create Add-ins with Visual Studio**

- **Portable files, easy to share**

ArcGIS Explorer

Application Configuration

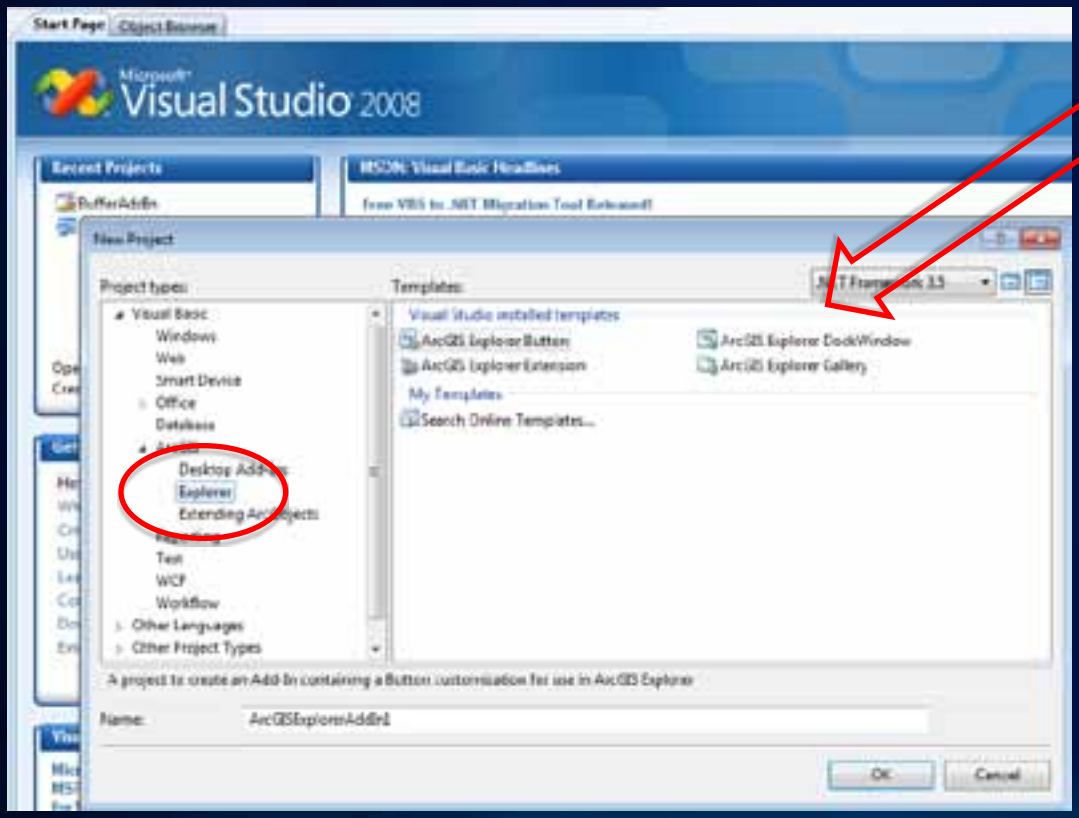


ArcGIS Explorer

SDK

ArcGIS Explorer

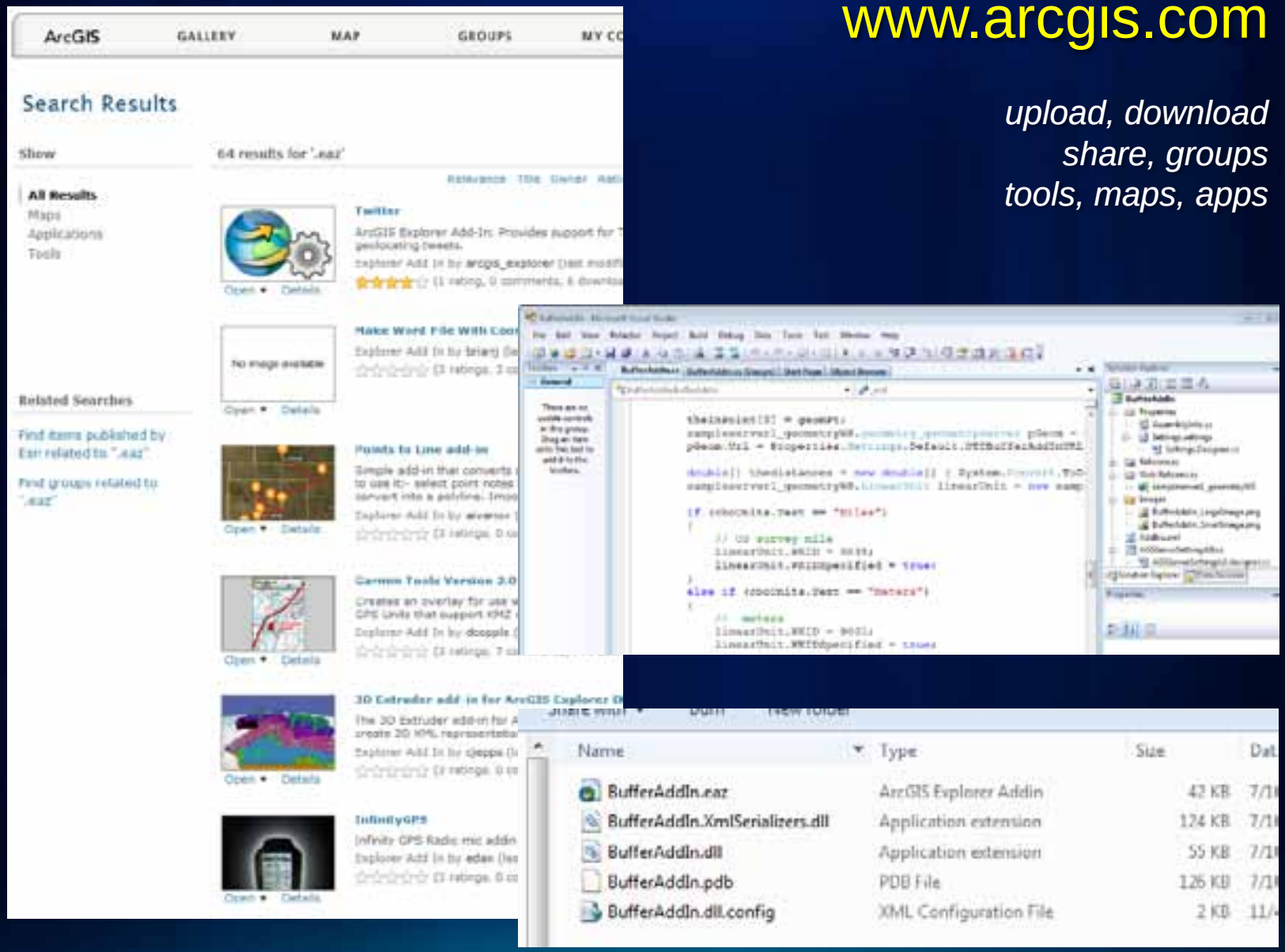
Creating Add-Ins

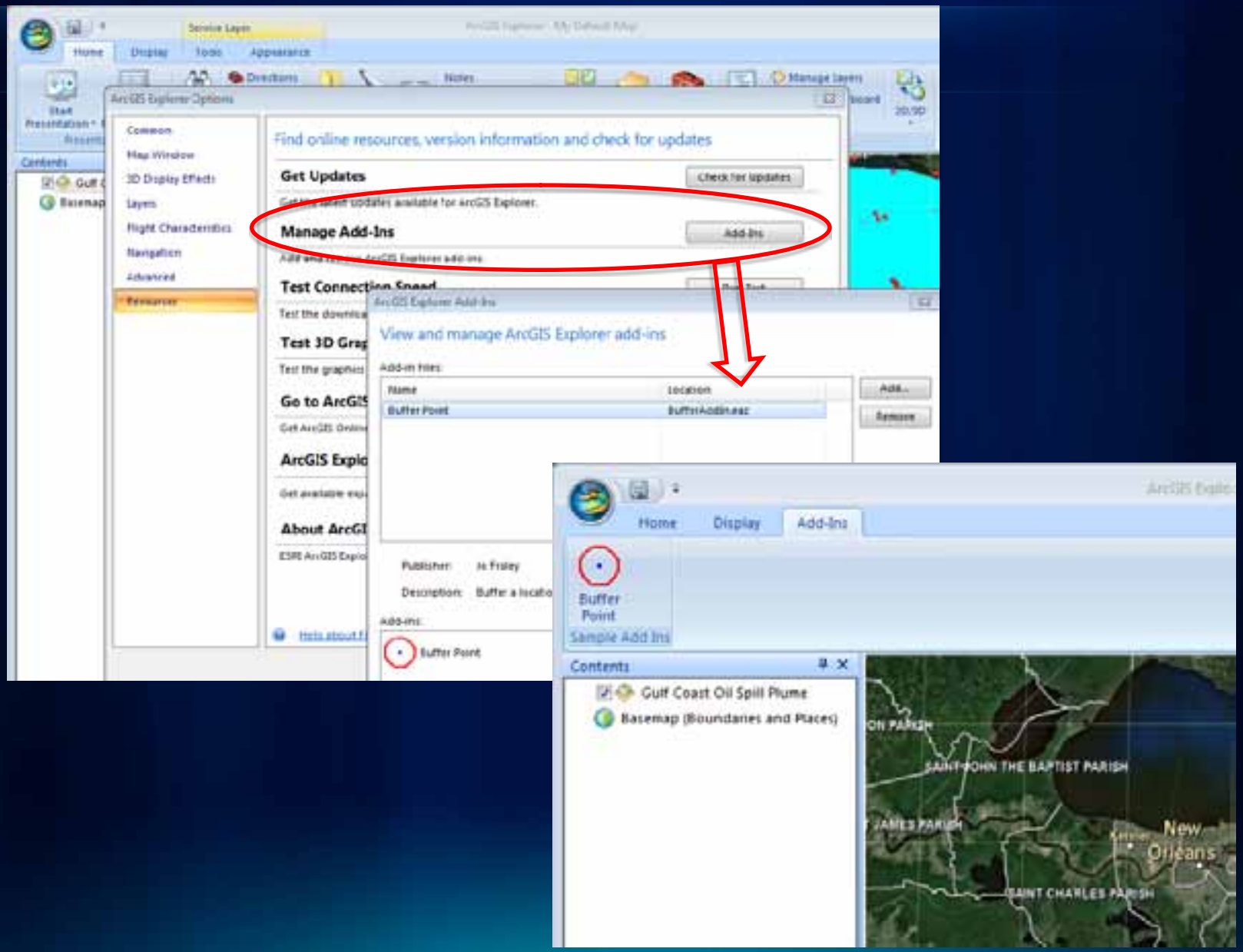


Templates

www.arcgis.com

upload, download
share, groups
tools, maps, apps

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Appearance
ArcGIS Explorer Options
Common
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3D Display Effects
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Flight Characteristics
Navigation
Advanced
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Get Updates
Check for updates
Manage Add-Ins
Add-Ins
Test Connection Speed
Test 3D Gra
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Add-in files:
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Buffer Point
Sample Add Ins
Contents
Gulf Coast Oil Spill Plume
Basemap (Boundaries and Places)
SAINT JOHN THE BAPTIST PARISH
New Orleans
SAINT CHARLES PARISH

ArcGIS Resource Center

ArcGIS Explorer SDK 1500

Home | Concepts & Samples | API Reference | Forum | Blog

- Welcome to the ArcGIS Explorer .NET developer help
  - Welcome to the ArcGIS Explorer .NET developer help
  - Glossary
  - New API types and members
  - Getting Started with ArcGIS Explorer customizations
  - Visual Studio
  - Deploying Add-ins
  - ArcGIS Explorer namespace overviews
  - Programming with the ArcGIS Explorer API
  - Samples
    - Samples
    - Application Conditions
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    - Drive Time Analysis
    - GeoNames Find
    - Layer Attributes
    - Locale Specific ComboBox
    - Map Content Updates
    - Query Demographics
    - Query Features
    - Track Shapes
    - Update Note Geometry
    - VehicleTracker Extension
  - Class diagrams and namespace reference

Download the files for all languages

C# | VB.NET

Extension.cs (view code)	This class defines the Extension, and also contains all code to read the XML information and show Graphics on the map.
Vehicle.cs (view code)	This class holds information about a vehicle.
ZoomToLouisville.cs (view code)	This class defines a Button which zooms to the area used to display Graphics.

Download the C# files

See Also:

BackgroundWorker

Blog

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ArcGIS Explorer Desktop Blog

This Blog

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Recent Posts

- What's New in ArcGIS Explorer Desktop (build 1700)
- Using Features From a Service As Input To Analysis Tools
- Extracting features from services using Explorer Desktop
- Creating 3D cross sections for use in ArcGIS Explorer

Tuesday, June 14, 2011 5:30 PM

What's New in ArcGIS Explorer Desktop (build 1700)

ArcGIS Explorer is a free, downloadable GIS viewer that provides an easy way to explore, visualize, share, and present geographic information.

The latest release of ArcGIS Explorer builds upon previous releases and adds new features that make it a great choice for providing wider access to your geographic information and GIS capabilities. These new features include the following:

GPS Integration

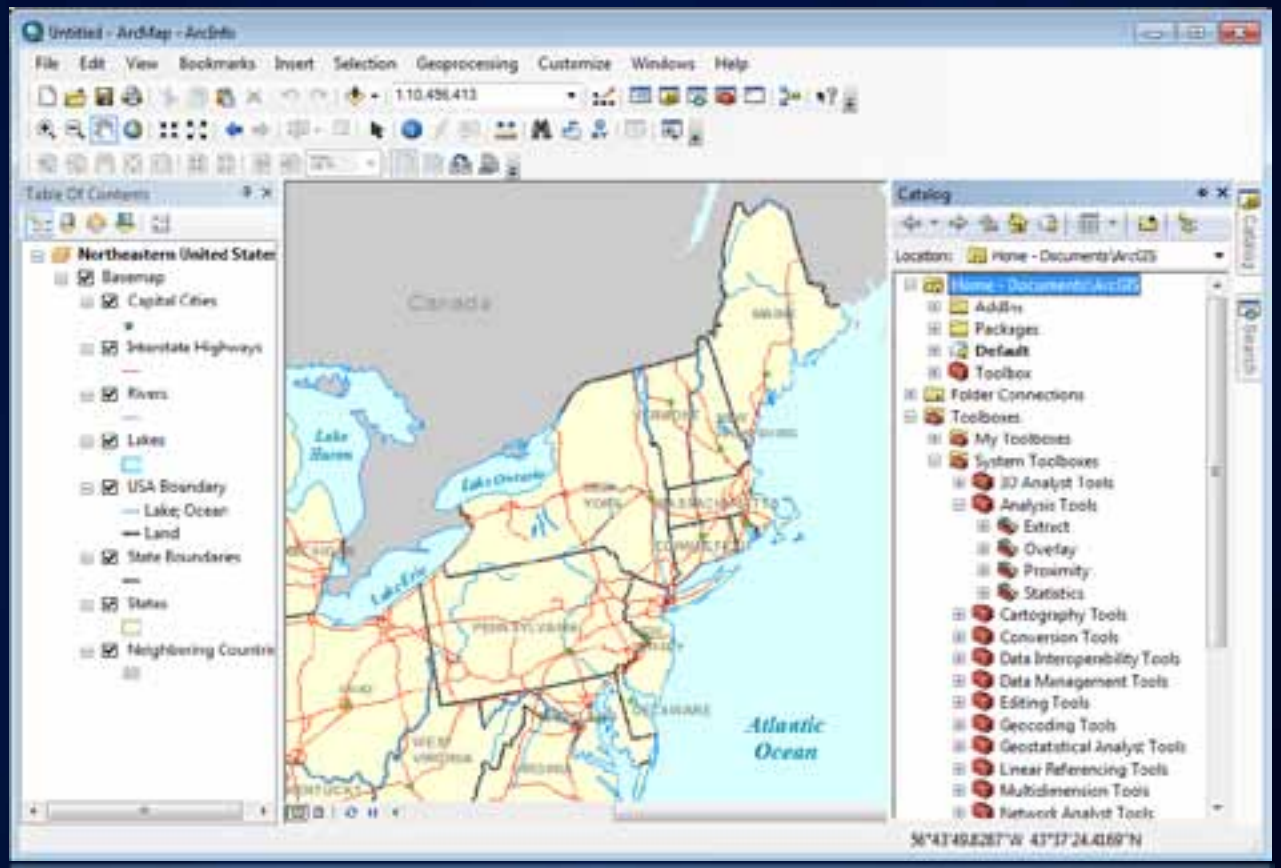
Any GPS device (NMEA compliant) can be connected to ArcGIS Explorer to collect data. GPS data can be collected at the click of a button, or collected at specified regular time intervals. Explorer also includes tools to manage and display waypoints, tracks, and routes, which are stored and managed as notes.

Demo Theater

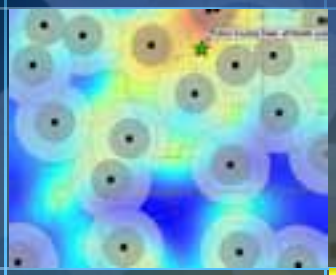
- Configuring and Customizing ArcGIS Explorer Desktop

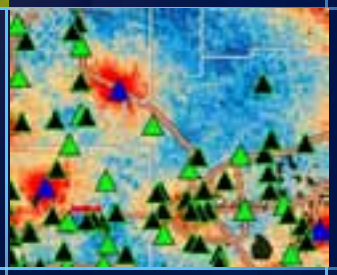
- Wednesday @ 5:00pm
- Thursday @ 10:00am

ArcGIS Desktop



Create a Map





ArcGIS Desktop

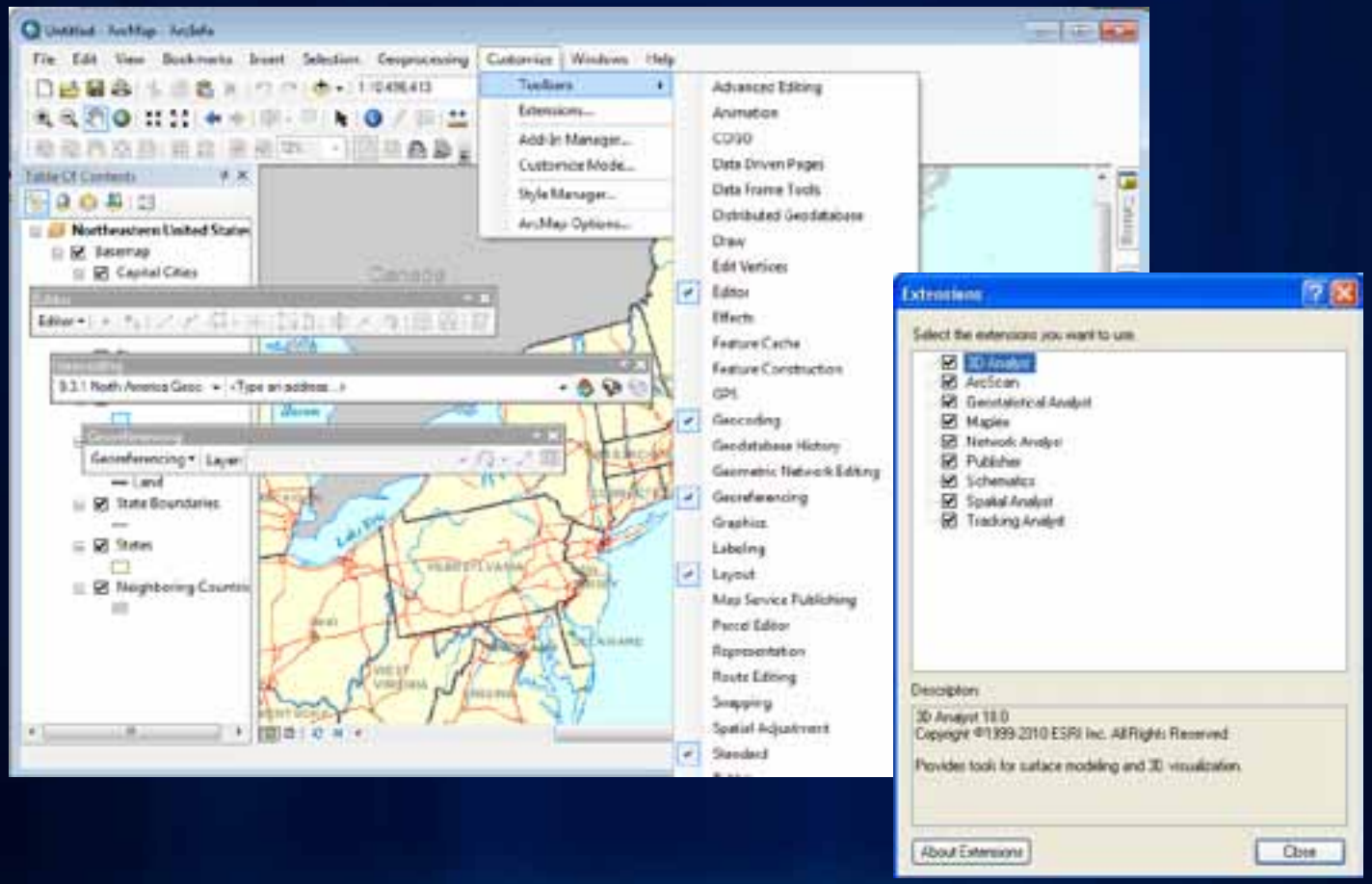
The professional GIS workstation

For Developers

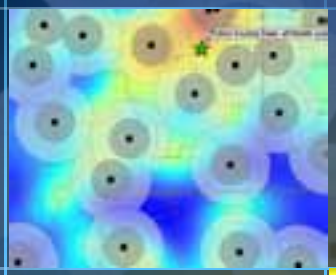
1. **Customization of UI and functionality**
2. **ArcObjects SDK**
   - .NET, VC++
3. **Add-ins**
   - .NET, Java (Eclipse)
4. **Script Tools**
   - Python

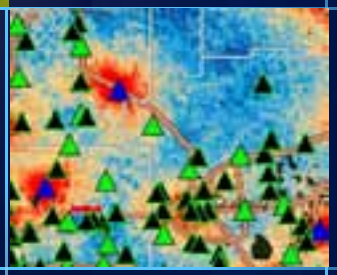
ArcGIS Desktop

Customizing



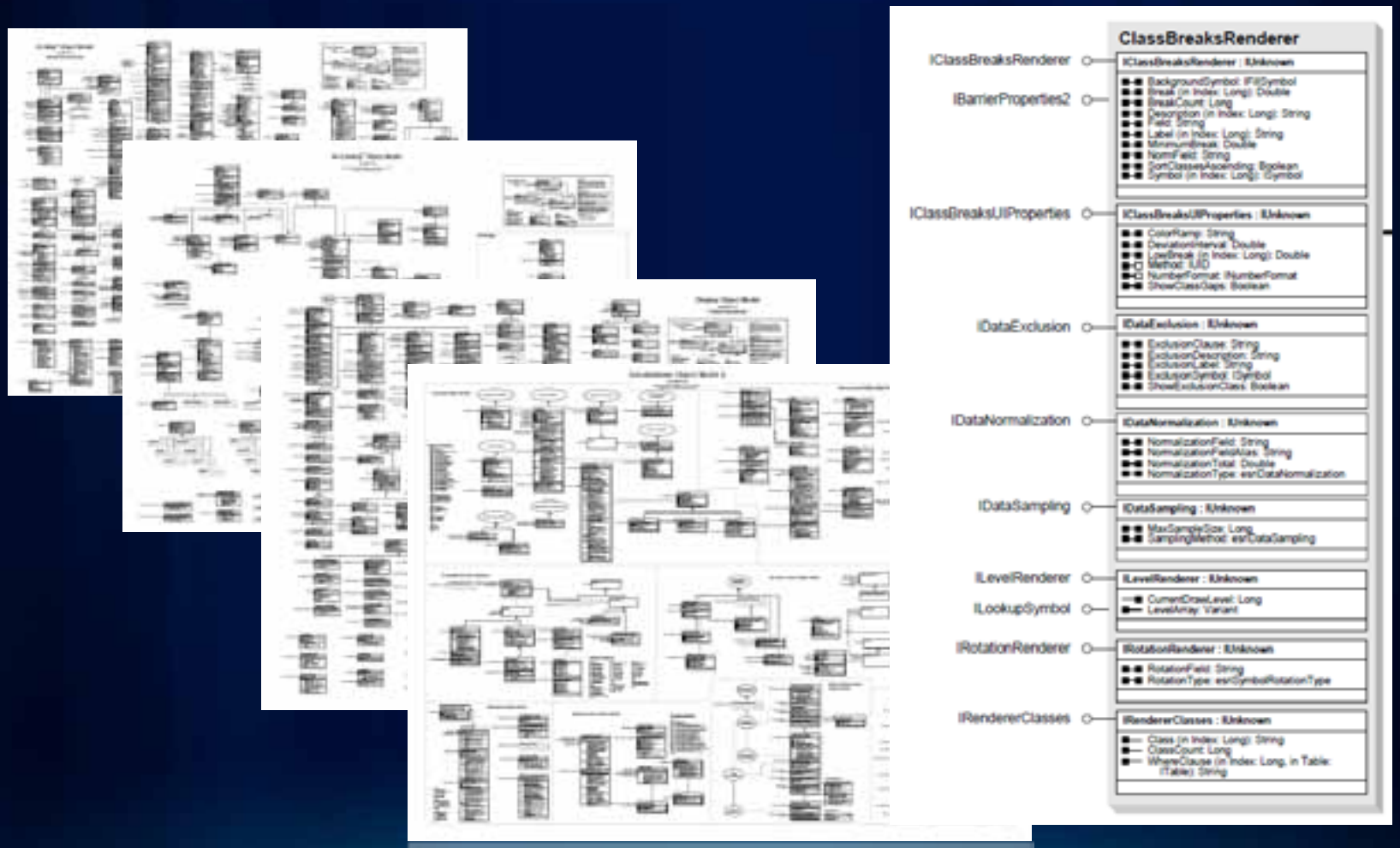
Customize the UI





ArcGIS Desktop

ArcObjects



ArcGIS Desktop

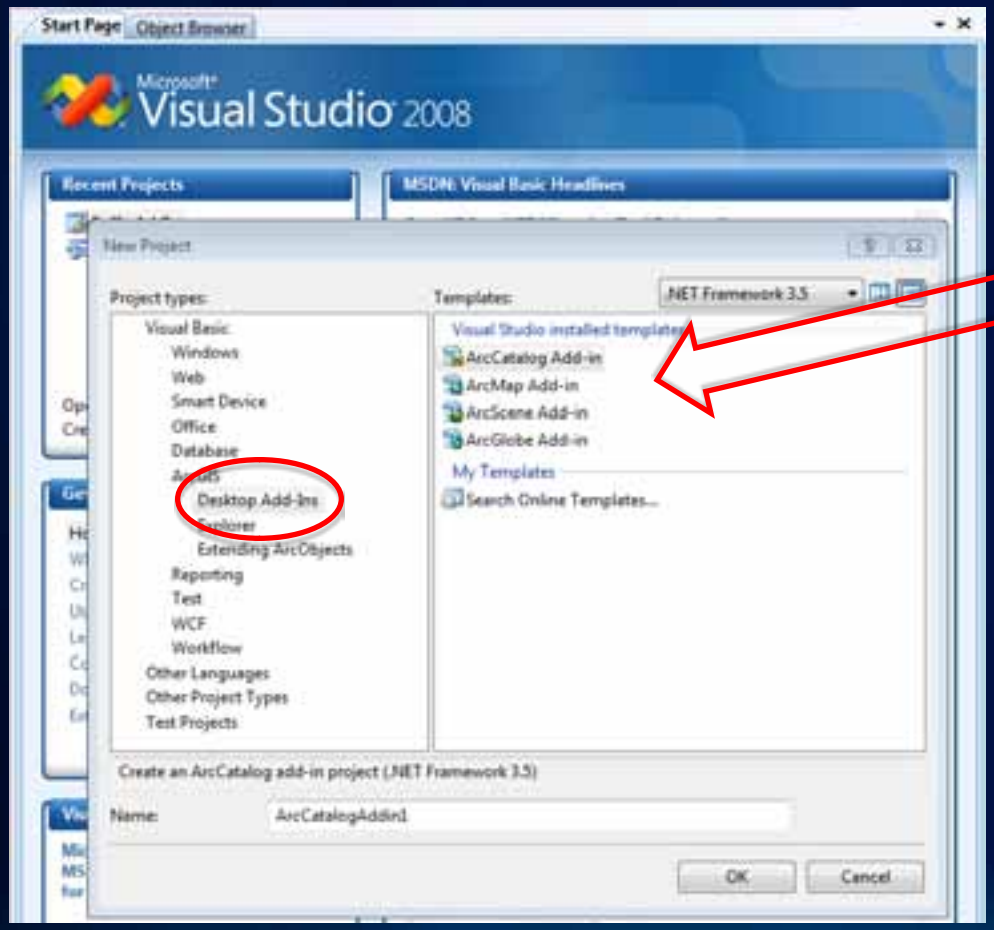
Creating add-ins

- **Create or share -** *.esriAddin
- **Copy into well-known location -** local or network
- **Install wizard**
- **Use**

- **Key advantages over classic ArcObjects dev pattern**

ArcGIS Desktop

Creating add-ins

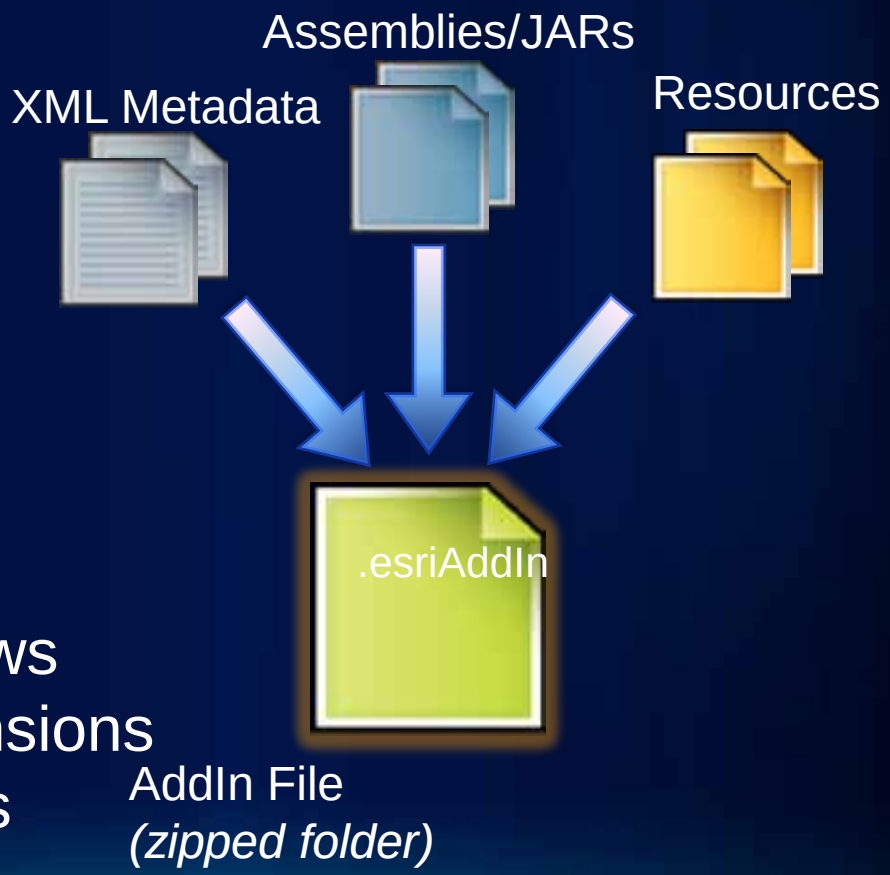


Templates

ArcGIS Desktop

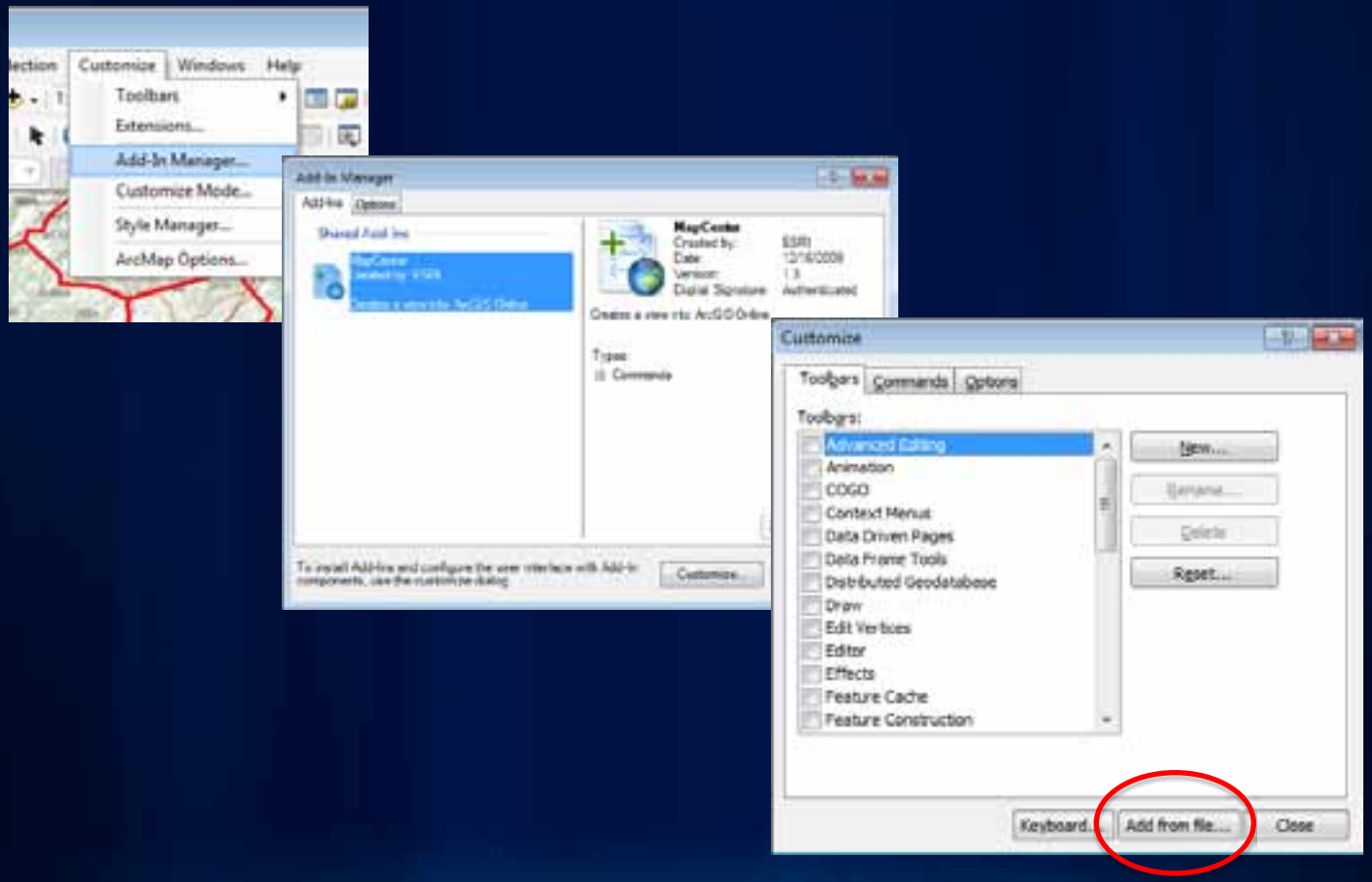
Creating add-ins

- Buttons
- Tools
- Combo Boxes
- Multi-Items
- Menus
- Context Menus
- Toolbars
- Tool Palettes
- Dockable Windows
- Application Extensions
- Editor Extensions



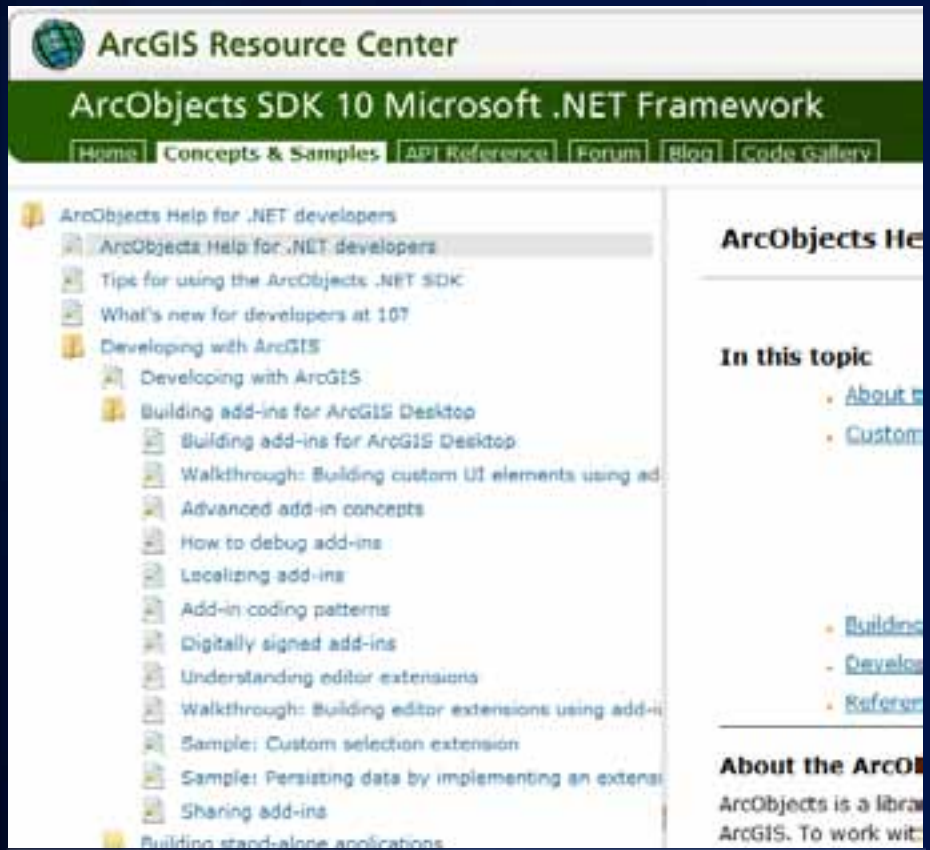
ArcGIS Desktop

Creating add-ins

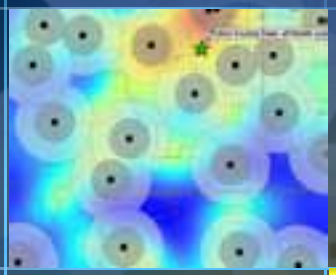


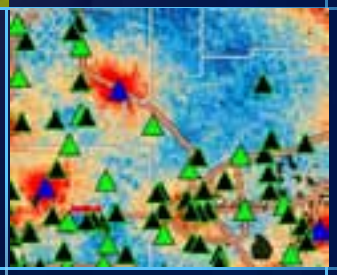
ArcGIS Desktop

Creating add-ins

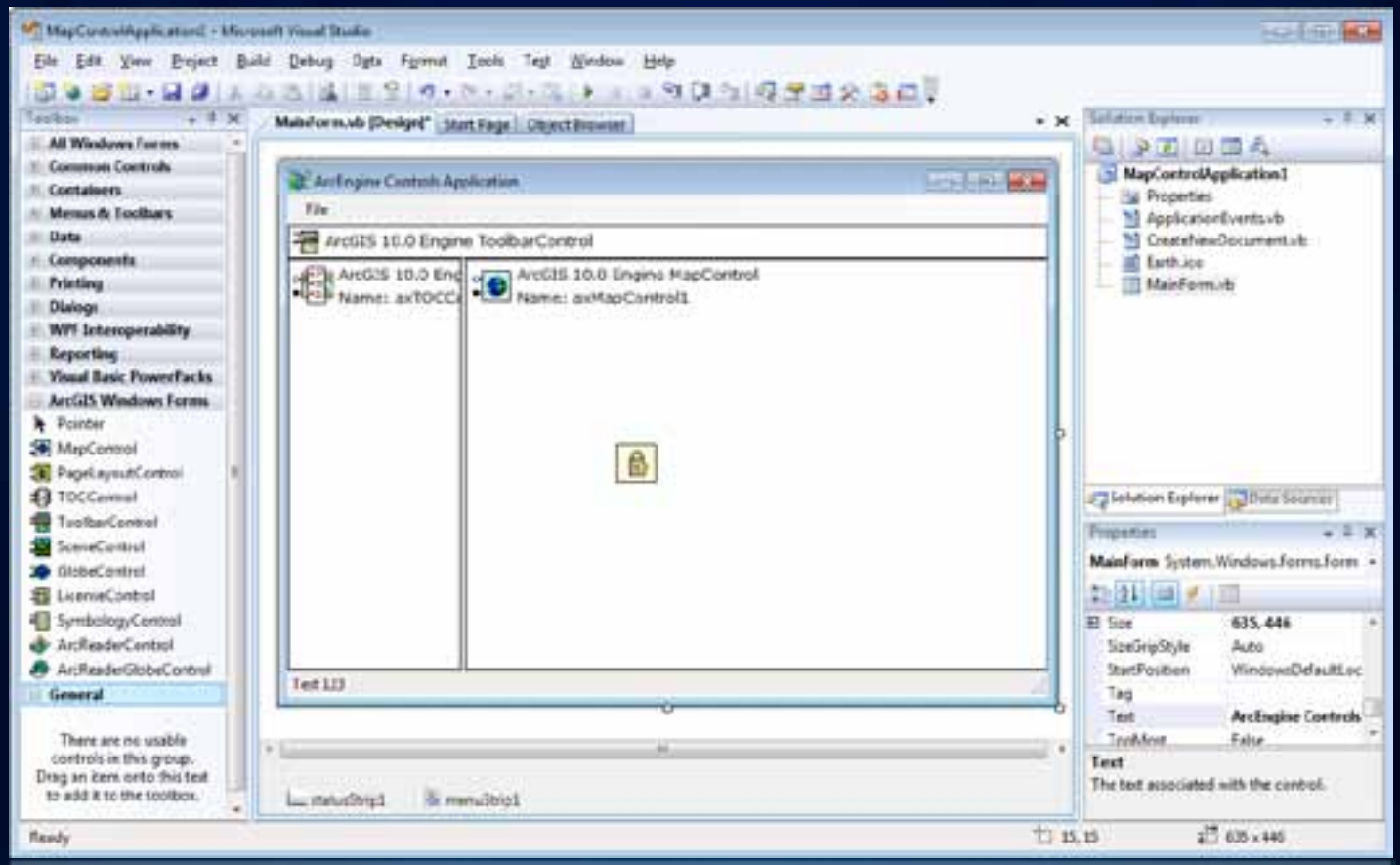


Find and Install and Add-in





ArcGIS Engine



ArcGIS Engine

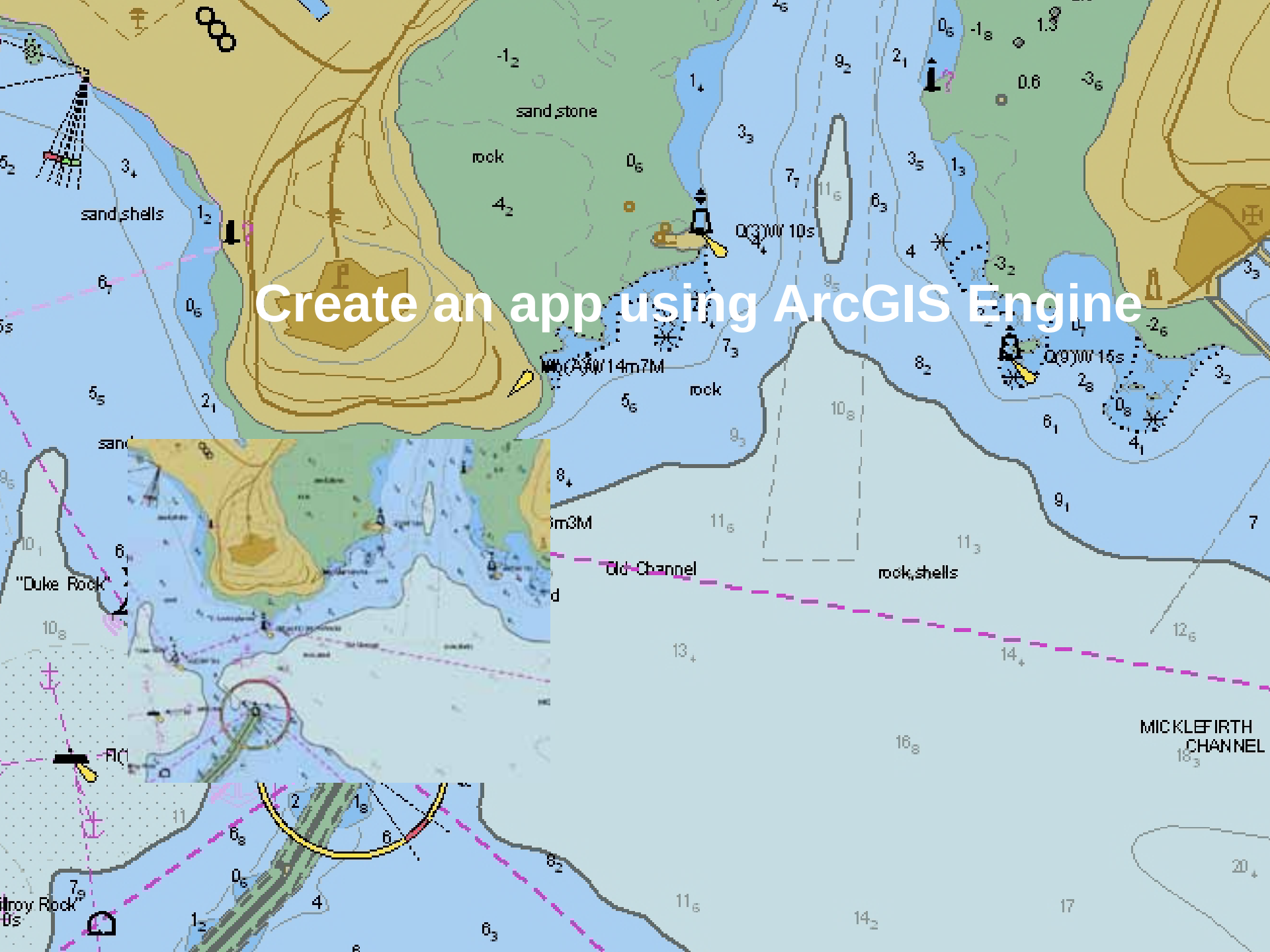
Embeddable and Extensible GIS Components

For Developers

- **ArcObjects SDK**
  - **.NET, Java, VC++, Cross-platform C++**
  - **1000s of classes, interfaces, methods**
  - **10+ controls**

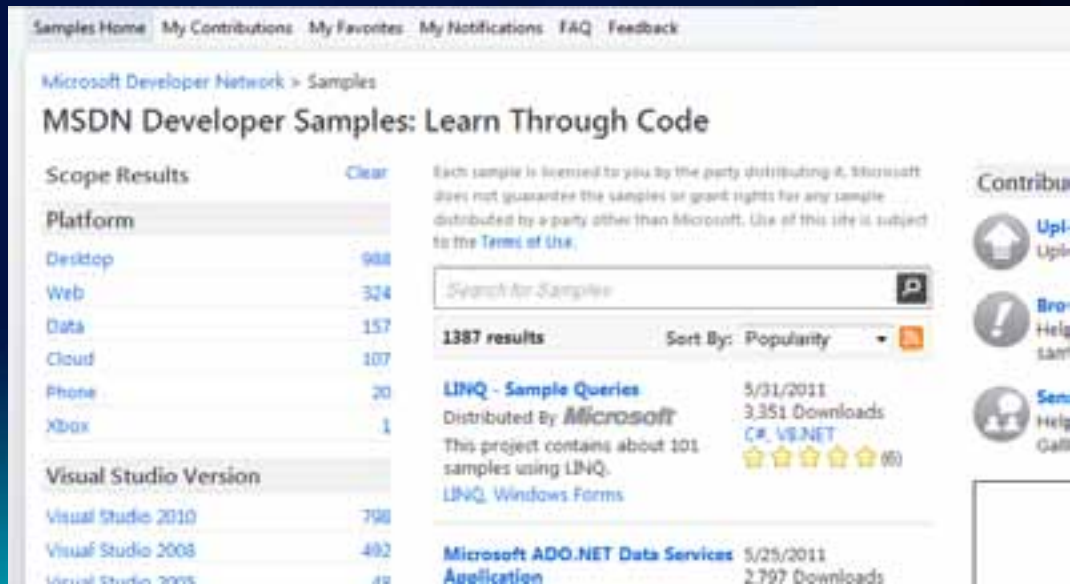
- **Compiled and deployed stand-alone applications**

Create an app using ArcGIS Engine



How to get started with Microsoft Visual Studio

- Express editions are free
  - VB, C#, substantial capabilities
  - online training, beginner's books
- MS site
  - tutorials, videos, sample code



Visual Studio Community

vbforums.com

xtremevbtalk.com

Geoprocessing

Interrogating, manipulating, managing map data

For Developers

Interactive scripting window

Use Modelbuilder then export as a script

Portable files, easy to share

- .py, .gpk, .esriAddIn

ArcGIS Resource Center | Help | Blogs | Forums | buffer

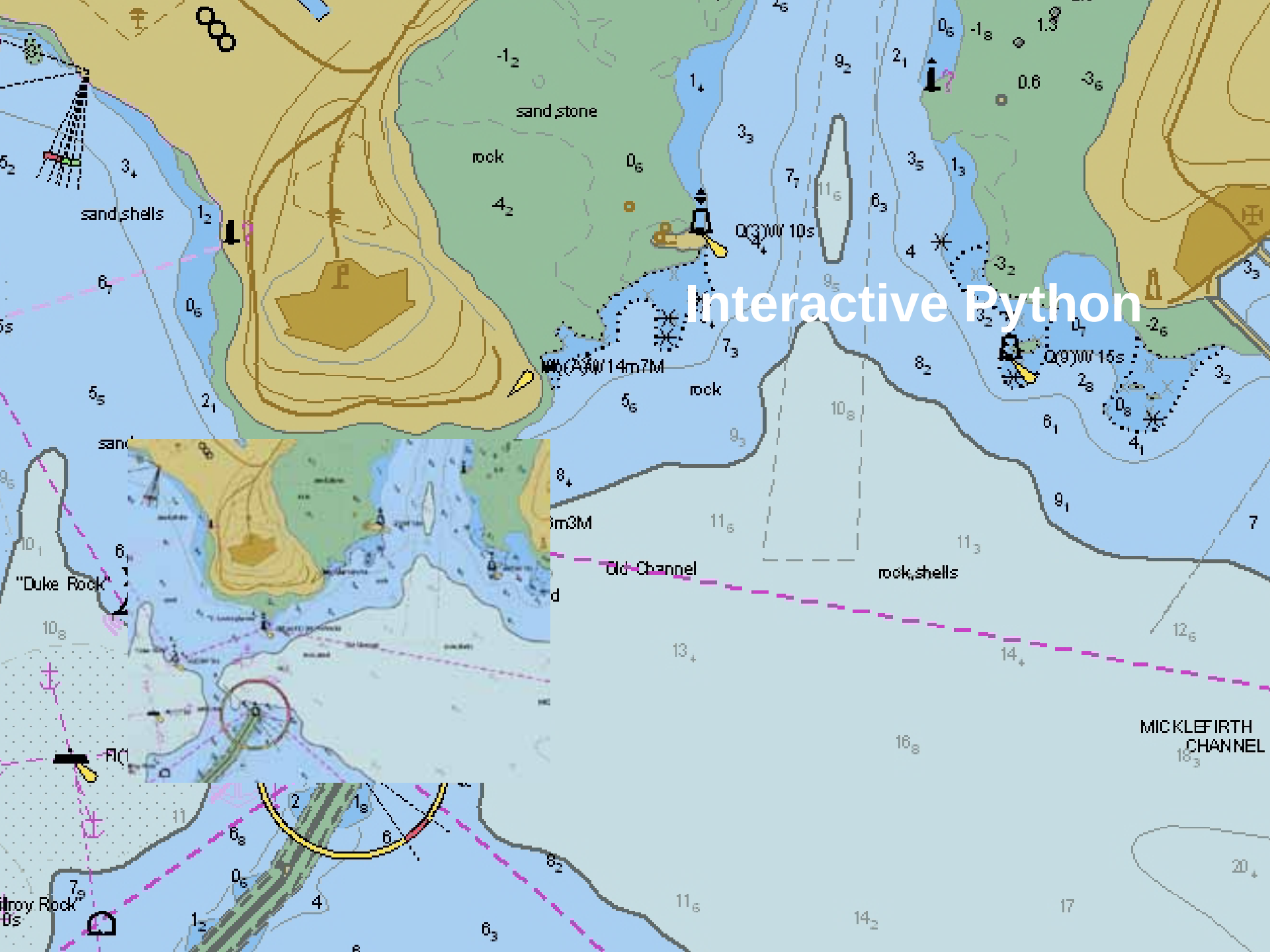
Desktop 10


```
import arcpy

roads = "c:/St_Johns/data.gdb/roads"
output = "c:/St_Johns/data.gdb/roads_Buffer"

# Run Buffer using the variables set above and pass the remaining parameters
#   in as strings
#
arcpy.Buffer_analysis(roads, output, "distance", "FULL", "ROUND", "NONE")
```

In the following code example, the CreateFeatureClass tool is executed using a spatial reference object for its optional Coordinate System parameter. The spatial reference object is created using the SpatialReference class, and its information is loaded from a projection file.

```
import arcpy

inputWorkspace = "c:/temp"
outputName =  "rivers.shp"

# Create a spatial reference object
#
spatialRef = arcpy.SpatialReference()

# Use a projection file to define the spatial reference's properties
#
spatialRef.createFromFile("c:/program files/arcgis/Desktop10.0/Coordinate Systems/"
                          "Projected Coordinate Systems/Continental/North America/No

# Run Createfeatureclass using the spatial reference object
#
arcpy.CreateFeatureclass_management(inputWorkspace, outputName,
                                    "POLYLINE", "", "", "", spatialRef)
```

Tool organization


Interactive Python
sand,stone
rock
sand,shells
Q(3)W 10s
Q(9)W 15s
rock
Old Channel
rock,shells
"Duke Rock"
MICKLEFIRTH
CHANNEL

python

Search titles text

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- Login

http://www.python.org/about/gettingstarted/

The Python Wiki

Python is a great object-oriented, interpreted, and interactive programming language. It is often compared (favorably of course) to Lisp, Tcl, Perl, Ruby, C#, Visual Basic, Visual Fox Pro, Scheme or Java... and it's much more fun.

Python combines remarkable power with very clear syntax. It has modules, classes, exceptions, very high level dynamic data types, and dynamic typing. There are interfaces to many system calls and libraries, as well as to various windowing systems. New built-in modules are easily written in C or C++ (or other languages, depending on the chosen implemenration). Python is also usable as an extension language for applications written in other languages that need easy-to-use scripting or automation interfaces.

Getting Started

Beginners Guide	Documentation
Links to tutorials, courses and resources	Learning materials, topic guides and links to central resources
Beginner Errors	Python Books
Some common pitfalls of beginners	Books about Python plus reviews
Asking for Help	Python Audio Materials
Questions asked by beginners, answered here	A mixture of introductory and topical material
Languages	Python implementations
Resources written in languages other than English	Different software which runs programs in the Python language
See also the documentation category for all known documentation-related pages.	

Events, Courses, Conferences, Community

- Python Conferences - information about the Python conference scene
- Python Events - covers conferences, training courses and more
- Local User Groups - find a Python group near you
- Participating in the Community - where people using and producing Python get together

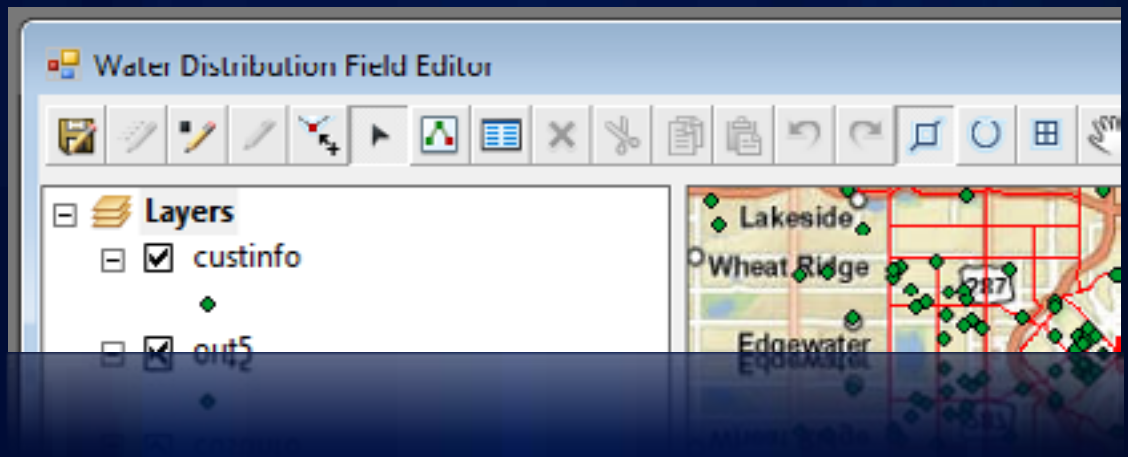
Python Software

Geodatabase

- Components
- ArcObjects
- File Geodatabase API

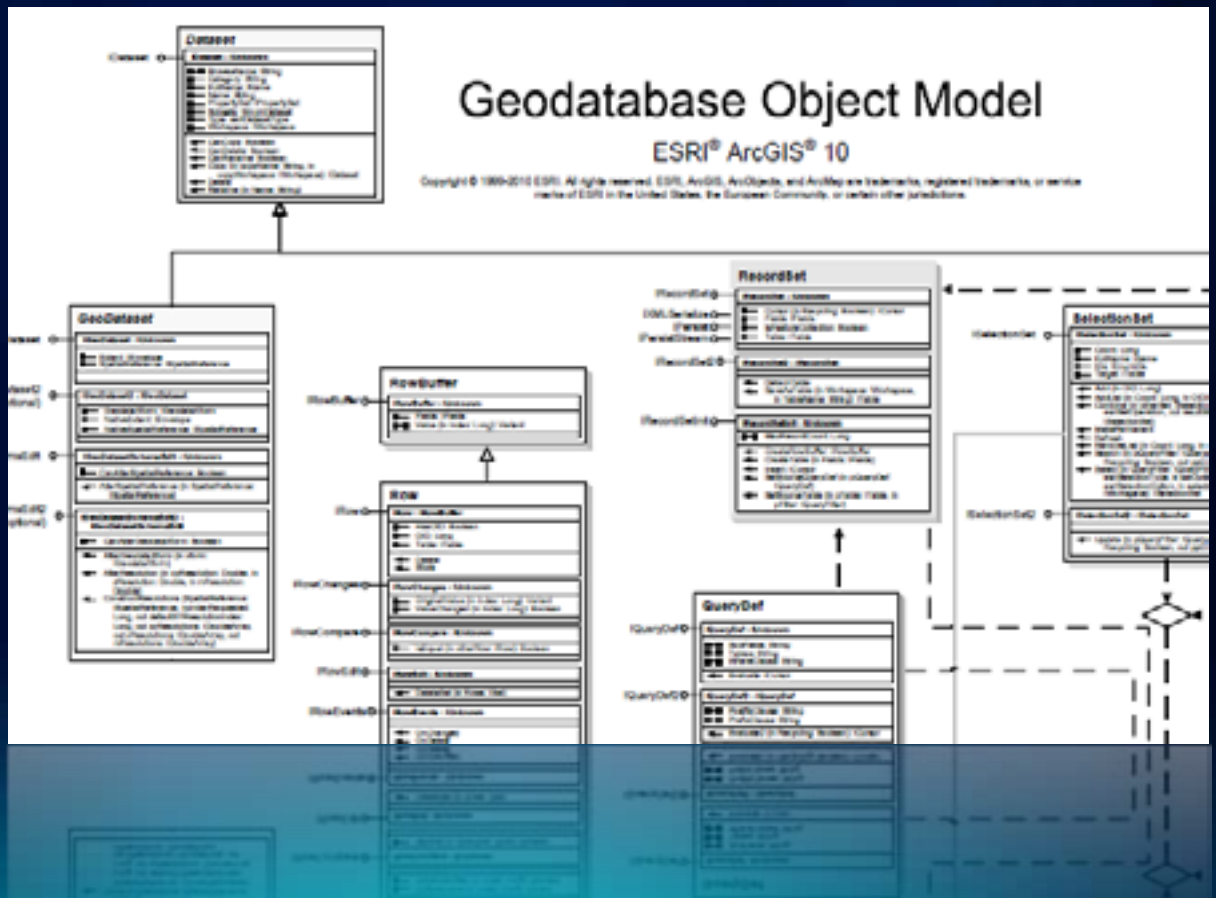
Geodatabase

- Components



Geodatabase

- **ArcObjects**



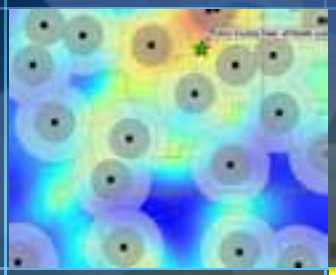
Geodatabase

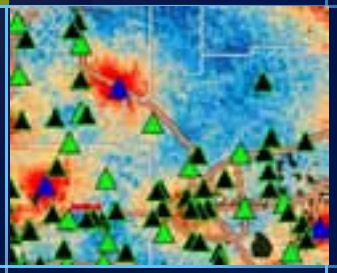
- **File Geodatabase API**

Agenda

- ArcGIS as a developer's toolbox
  - Desktop applications
    - ArcGIS Explorer Desktop, ArcGIS Desktop, ArcGIS Engine
  - Geoprocessing
  - Geodatabase
  - Client-Server applications
    - ArcGIS Server
    - Web and Mobile Apps and APIs
- Developer Resources

Resource Center: Quick Tour





resources.arcgis.com

Geoprocessing

Geoprocessing is for everyone that uses ArcGIS. Whether you're a new or advanced user, geoprocessing is likely an essential part of your day-to-day work with ArcGIS. The fundamental purpose of geoprocessing is to provide tools for performing analysis and managing your geographic data. The modeling and analysis capabilities geoprocessing provides make ArcGIS a complete geographic information system.

Geoprocessing provides a large suite of tools for performing GIS tasks that range from simple buffers and polygon overlays to complex regression analysis and image classification. Geoprocessing also provides methods for automating GIS tasks and developing custom workflows that can be shared with others both within and outside your organization.

Learn more about geoprocessing

Learn more about the role of geoprocessing in ArcGIS

Learn more about what's new for geoprocessing in ArcGIS 10

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Desktop 10

What is geoprocessing?

Geoprocessing is for everyone that uses ArcGIS. Whether you're a beginning user or a pro, geoprocessing will become an essential part of your day-to-day work with ArcGIS.

The fundamental purposes of geoprocessing are to allow you to automate your GIS tasks and perform spatial analysis and modeling. Almost all uses of GIS involve the repetition of work, and this creates the need for methods to automate, document, and share multiple-step procedures known as workflows. Geoprocessing supports the automation of workflows by providing a rich set of tools and a mechanism to combine a series of tools in a sequence of operations using models and scripts.

The kinds of tasks to be automated can be mundane—for example, to wrangle herds of data from one format to another. Or the tasks can be quite creative, using a sequence of operations to model and analyze complex spatial relationships—for example, calculating optimum paths through a transportation network, predicting the path of wildfire, analyzing and finding patterns in crime locations, predicting which areas are prone to landslides, or predicting flooding effects of a storm event.

Geoprocessing is based on a framework of data transformation. A typical geoprocessing tool performs an operation on an ArcGIS dataset (such as a feature class, raster, or table) and produces a new dataset as the result of the tool. Each geoprocessing tool performs a small yet essential operation on geographic data, such as projecting a dataset from one map projection to another, adding a field to a table, or creating a buffer zone around features. ArcGIS includes hundreds of such geoprocessing tools.

Geoprocessing allows you to chain together sequences of tools, feeding the output of one tool into another. You can use this ability to compose an infinite number of geoprocessing models (tool sequences) that help you automate your work and solve complex problems.

To learn more about geoprocessing and what users like you do with geoprocessing, visit the Geoprocessing Resource Center.

Project and Clip

ArcGIS Resource Center

ArcGIS API for JavaScript

Home | Concepts | Samples | API Reference | Forums | Code Gallery

JavaScript API Samples

- Samples Overview
- Map
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  - Add graphics to a map
  - Select graphic points within an exte
  - Multiple graphics layers
- Renderers
- Editing
- Query Task
- Identify Task
  - Identify features
- Find Task
- Geocode Task
- Geoprocessor Task
  - Service area task

Identify features on a map

View live sample

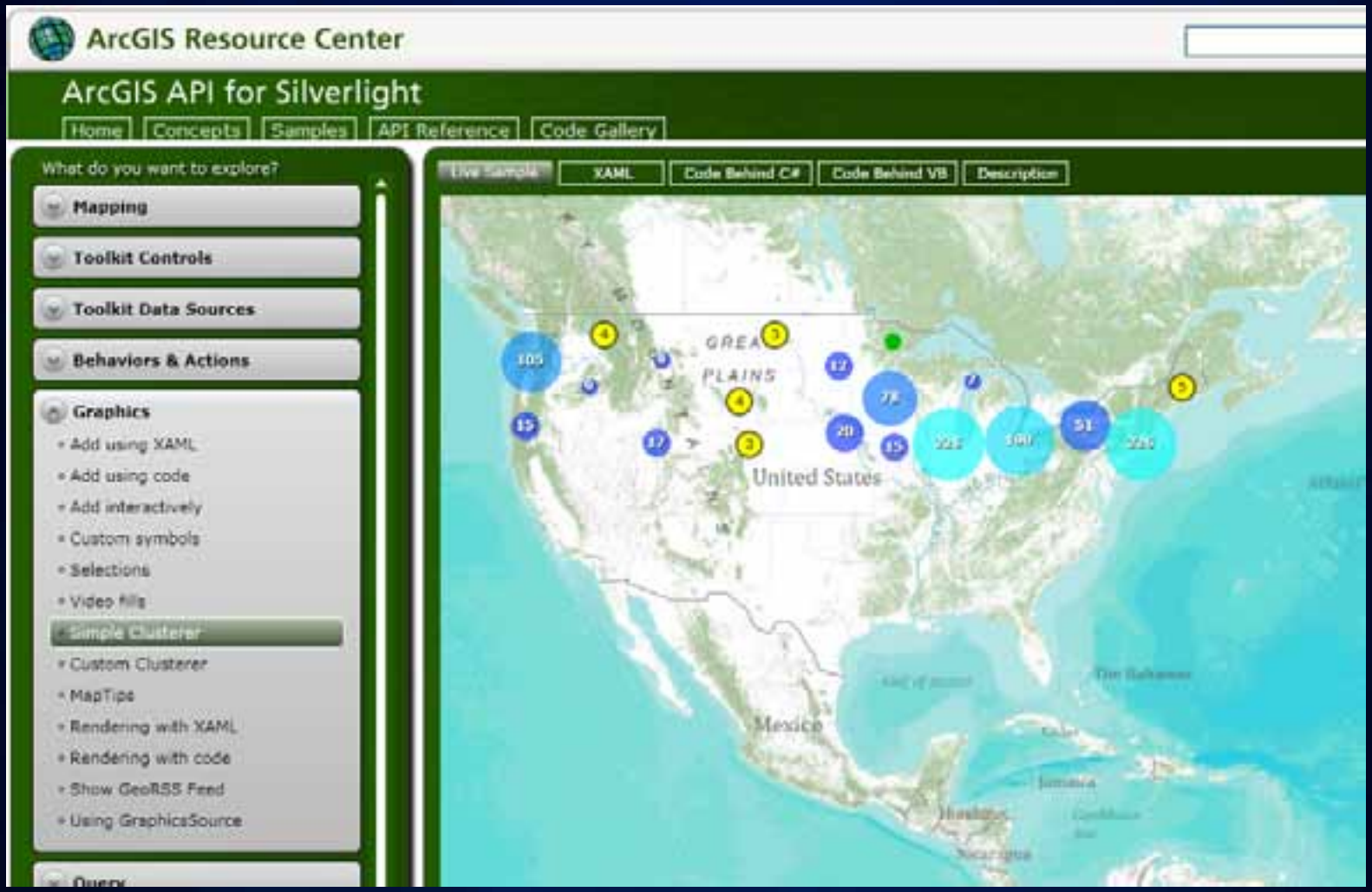
Description

This sample demonstrates how to identify features at a point you click on the ma
The Identify task can retrive information from multiple layers at once, whereas th
layer at a time.

Identify operations can potentially return a lot of information, depending on the
tolerance you set. The tolerance is the number of pixels a feature is allowed to l
be counted as a result. You can limit the layers and the tolerance using identify
a small space can still be a challenge. This sample uses a TabContainer from the
in a tabbed interface.

This sample contains numerous functions that run in the following sequence:

- **init** - Sets up the map and adds an imagery base map from ArcGIS On
  Portland from the ESRI Sample Server.
- **initFunctionality** - Called when the map loads. Sets up the IdentifyTa
  the options for the Symbol and InfoWindow that will display the result
  the URL to the ArcGIS Server map service whose layers will be identifi
  services using the Services Directory.
- **doIdentify** - Called when someone clicks the map. Clears any existing
  coordinates to the identify parameters, and executes the identify.
- **addToMap** - Called when the Identify task completes. Loops through
  depending on which layer the result came from. This produces three a
  designated as content for the TabContainer Dijit. This function also di
  result information.
- **layerTabContent** - Called as a helper function to **addToMap**. Formats
  TabContainer Dijit.
- **showFeature** - Called when someone clicks the "Show" link in the res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Add using code
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Custom symbols
Selections
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Rendering with XAML
Rendering with code
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ArcGIS API for Silverlight

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- Mapping
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- Toolkit Data Sources
- Behaviors & Actions
- Graphics
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  - Add using code
  - Add interactively
  - Custom symbols
  - Selections
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  - Simple Clusterer
  - Custom Clusterer
  - MapTips
  - Rendering with XAML
  - Rendering with code
  - Show GeoRSS Feed
  - Using GraphicsSource
- Query

Live Sample | XAML | Code Behind C# | Code Behind VB | Description | Copy to Clipboard

```
using System.Windows;
using System.Windows.Controls;
using ESRI.ArcGIS.Client;
using ESRI.ArcGIS.Client.Tasks;

namespace ArcGISSilverlightSDK
{
  public partial class SimpleClusterer : UserControl
  {
    public SimpleClusterer()
    {
      InitializeComponent();
    }

    void MyMap_PropertyChanged(object sender, System.ComponentModel.PropertyChangedEventArgs e)
    {
      if (e.PropertyName == "SpatialReference")
      {
        LoadGraphics();
        MyMap.PropertyChanged -= MyMap_PropertyChanged;
      }
    }

    private void LoadGraphics()
    {
      QueryTask queryTask =
        new QueryTask("http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Specialty/ESRI_StatesCitiesRivers_USA/M
      queryTask.ExecuteCompleted += queryTask_ExecuteCompleted;

      Query query = new ESRI.ArcGIS.Client.Tasks.Query();
      query.OutSpatialReference = MyMap.SpatialReference;
      query.ReturnGeometry = true;
      query.Where = "1=1";
```

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Geoprocessing

Geoprocessing is for everyone that uses ArcGIS. Whether you're a new or advanced user, geoprocessing is likely an essential part of your day-to-day work with ArcGIS. The fundamental purpose of geoprocessing is to provide tools for performing analysis and managing your geographic data. The modeling and analysis capabilities geoprocessing provides make ArcGIS a complete geographic information system.

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User Conference 2011 -- Analysis and Geoprocessing

Wednesday, July 06, 2011 10:28 AM

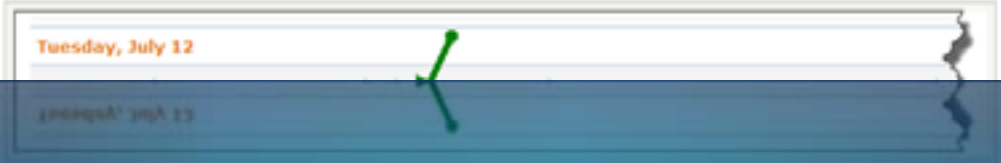
The 2011 User Conference is just days away and the adrenaline and coffee is flowing here! We – the Spatial Analysis Teams – look forward to meeting you, answering questions, and taking your suggestions and comments. So do visit us in the Esri Showcase at the Spatial Analysis Island. We'll have individual areas set up for the following functionality/subject area:

- 3D Analyst
- Geocoding
- Core geoprocessing (geoprocessing tools/techniques)
- Geostatistical Analyst
- ModelBuilder
- Network Analyst
- Python Scripting
- Spatial Analyst
- Spatial Statistics

The map of the island is at the bottom of this post. We've set up our schedule so that there will always be two people staffing each function/subject area. If you need to meet a specific team member, check her/his schedule at the Esri Info Desk – a few short steps from us at the Esri Showcase entry

The Esri Showcase and Spatial Analysis island hours are: Tuesday and Wednesday 9 am – 6 pm, and Thursday 9 am – 1.30 pm.

Note that in the Online Agenda you find our Technical Workshops and Demo Theater presentations under the Track Title *Analysis and Geoprocessing*.



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UpdateCursor.Reset() method not working. Started by NeilOllerhead, 02-28-2011 08:27 AM	Replies: 2 Views: 217	olivier57 Today 01:27 PM
AttributeError: 'Raster' object attribute 'save' is read-only Started by marvinb, Today 09:17 AM	Replies: 1 Views: 12	passiveoptical Today 12:53 PM
Email when python encounters an error (9.3.1) Started by u40301, Yesterday 12:26 PM	Replies: 3 Views: 44	tony.farndon Today 12:11 PM
Calculate field @SQUAREMETERS Started by rstephany, Today 07:37 AM	Replies: 6 Views: 43	rstephany Today 12:09 PM
Does arcpy.mapping module allow you to run tools on layers within current mxd? Started by CrystalCarreon, Today 10:40 AM	Replies: 1 Views: 21	tlsilveus Today 10:47 AM
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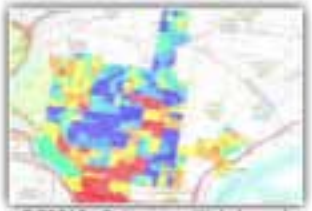

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DS2010: Building and Optimizing Geoprocessing Services in ArcGIS

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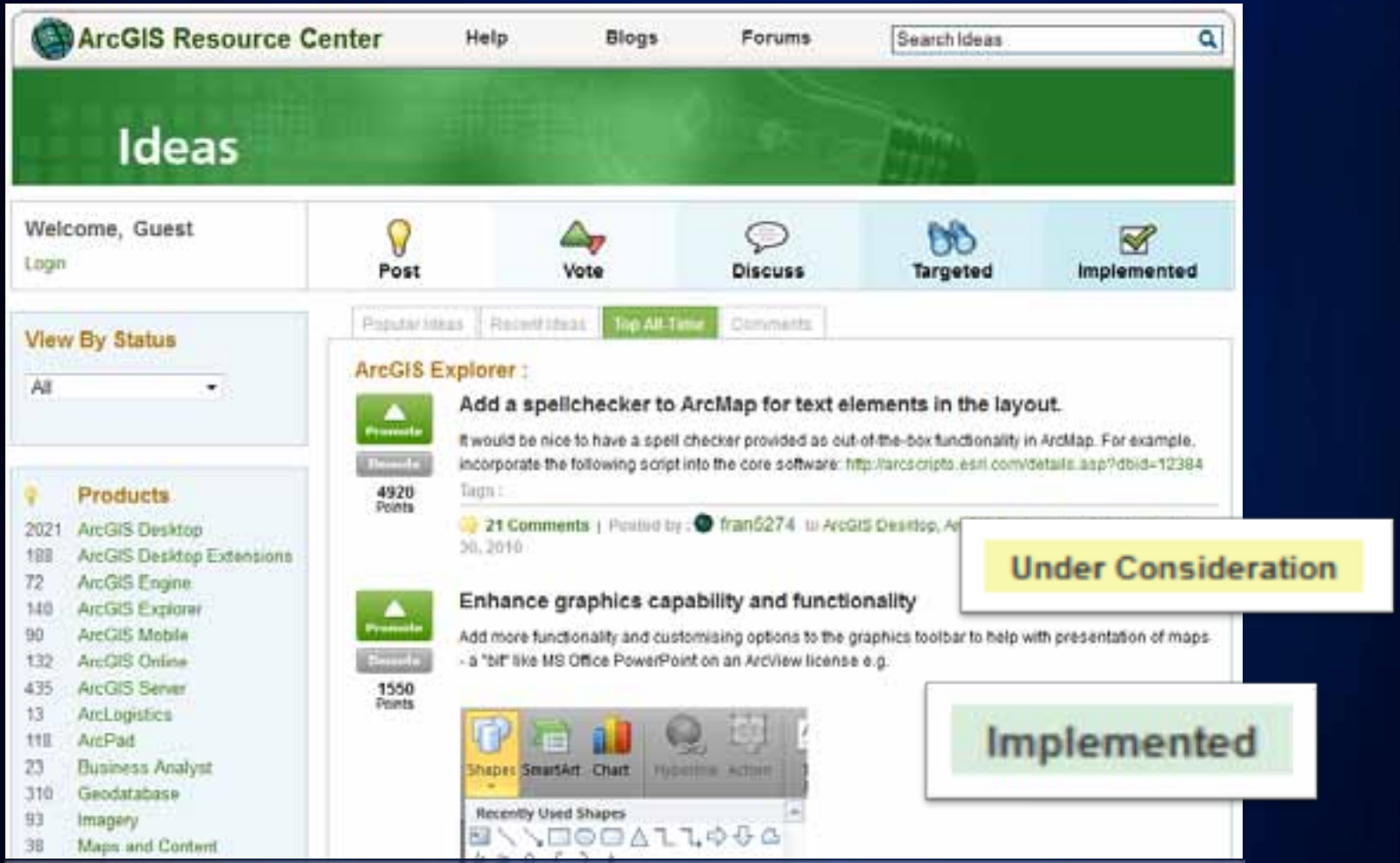

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Developing

You can create your own tools using ModelBuilder or Python. Tools you create are called custom tools and become an integral part of geoprocessing, just like system tools (those installed with ArcGIS Desktop). You can open and run your tools from the Search, Catalog, or ArcToolbox window, use them in ModelBuilder and the Python window, call them from another script, or add them as a toolbar buttons.

Learn more about creating your own tools

Learn more about adding tools to a toolbar

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  - Geoprocessing tool reference

Adding and removing tools on menus and toolbars

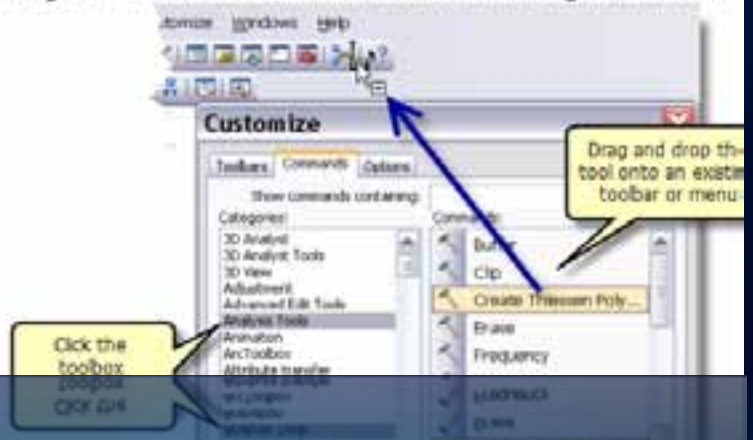
Resource Center > Professional Library > Geoprocessing > Finding tools

Note: Before you can add a tool to a menu or toolbar, you must know the na
toolbox that contains the tool.

Adding a system tool to a menu or toolbar

Steps:

1. On the ***Standard*** toolbar, click **Customize** > **Customize Mode**.
2. In the ***Customize*** window, click the **Commands** tab.
3. In the **Categories** list, click the toolbox that contains the tool. All too
   their name. For example, the Analysis toolbox will say Analysis Tools.
   The **Commands** list shows all tools within the toolbox.
4. Drag the tool from the **Commands** list onto an existing menu or toolba



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What is a Web app?

Create your own app using the ArcGIS API for:

- JavaScript
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Resource Center

The ArcGIS Resource Center contains the integrated support and community resources to help you be successful.

- ArcGIS Resource Center
- Developer resources for ArcGIS version 9.2 and prior

Developer Community

Interact and share resources with developers around the World.

- Esri Developer Summit
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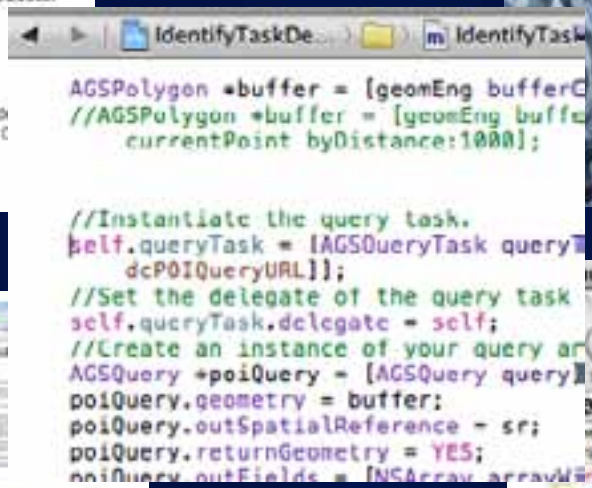
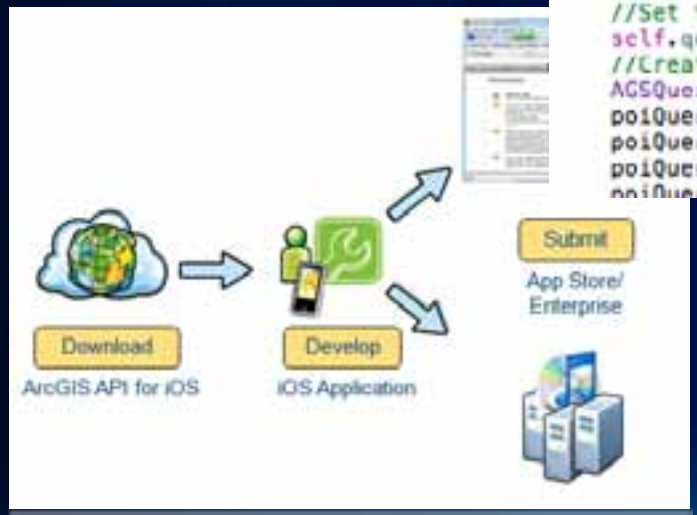

IdentifyTaskDe...
IdentifyTask
AGSPolygon *buffer = [geomEng bufferC
//AGSPolygon *buffer = [geomEng buffe
currentPoint byDistance:1000];
//Instantiate the query task.
self.queryTask = [AGSQueryTask queryT
dcPOIQueryURL]];
//Set the delegate of the query task
self.queryTask.delegate = self;
//Create an instance of your query ar
AGSQuery *poiQuery = [AGSQuery query]
poiQuery.geometry = buffer;
poiQuery.outSpatialReference = sr;
poiQuery.returnGeometry = YES;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DS2011: Python for Working with ArcGIS

By EsriVideos

Rating: (2 ratings)

Description

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Not to be confused with Java (programming language).
For the use of JavaScript on wiki.gis.com, see wiki.gis.com JavaScript.
JavaScript is a scripting language used to enable programmatic access to objects within both the client application and other applications. It is primarily used in the form of client-side JavaScript, implemented as an integrated component of the web browser, allowing the development of enhanced user interfaces and dynamic websites. JavaScript is a dialect of the ECMAScript standard and is characterized as a dynamic, weakly typed, prototype-based language with first-class functions. JavaScript was influenced by many languages and was designed to look like Java, but to be easier for non-programmers to work with.
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2.4 Prototype-based
2.5 Miscellaneous
2.6 Vendor-specific extensions
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4.2.2 Misplaced trust in the client
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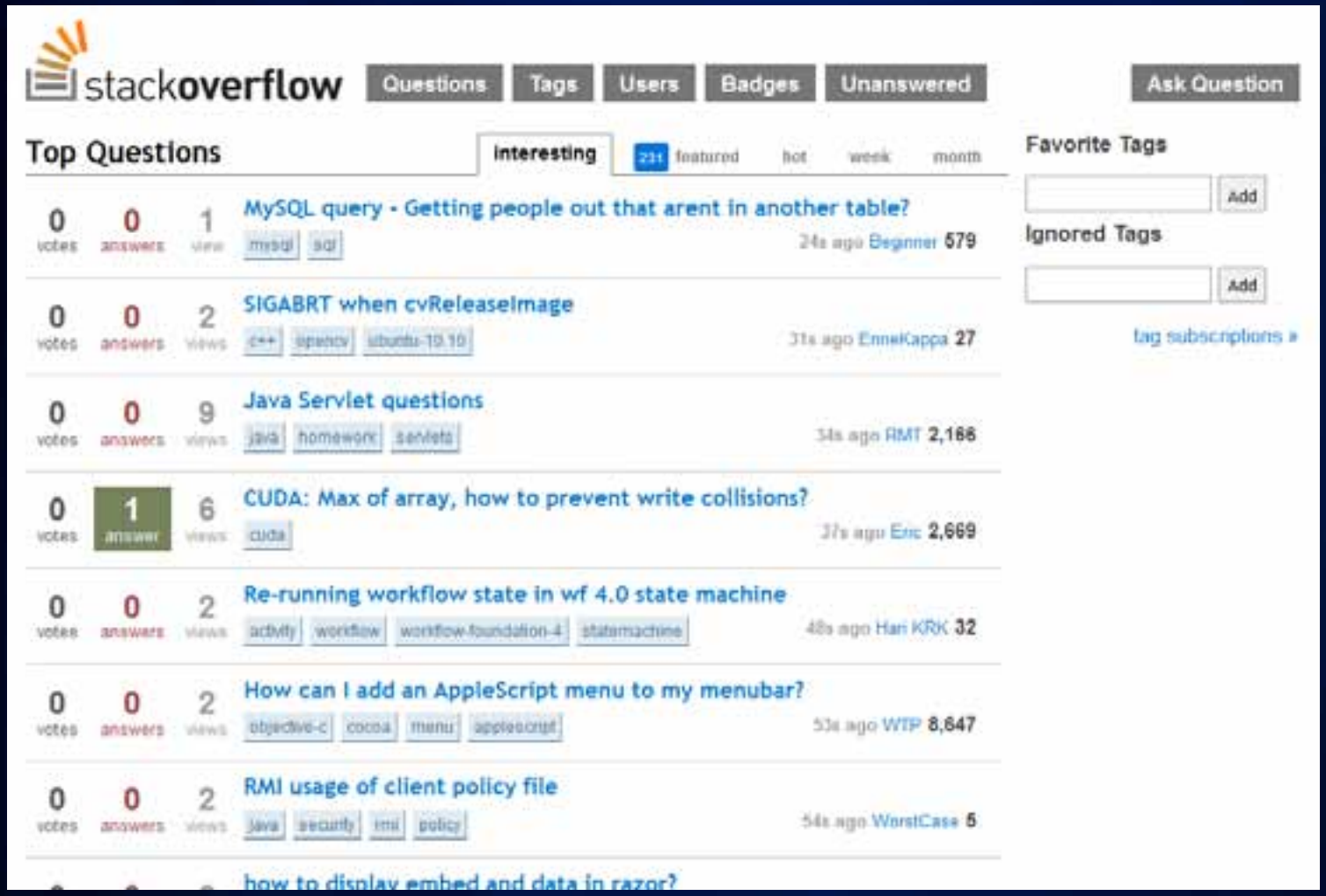

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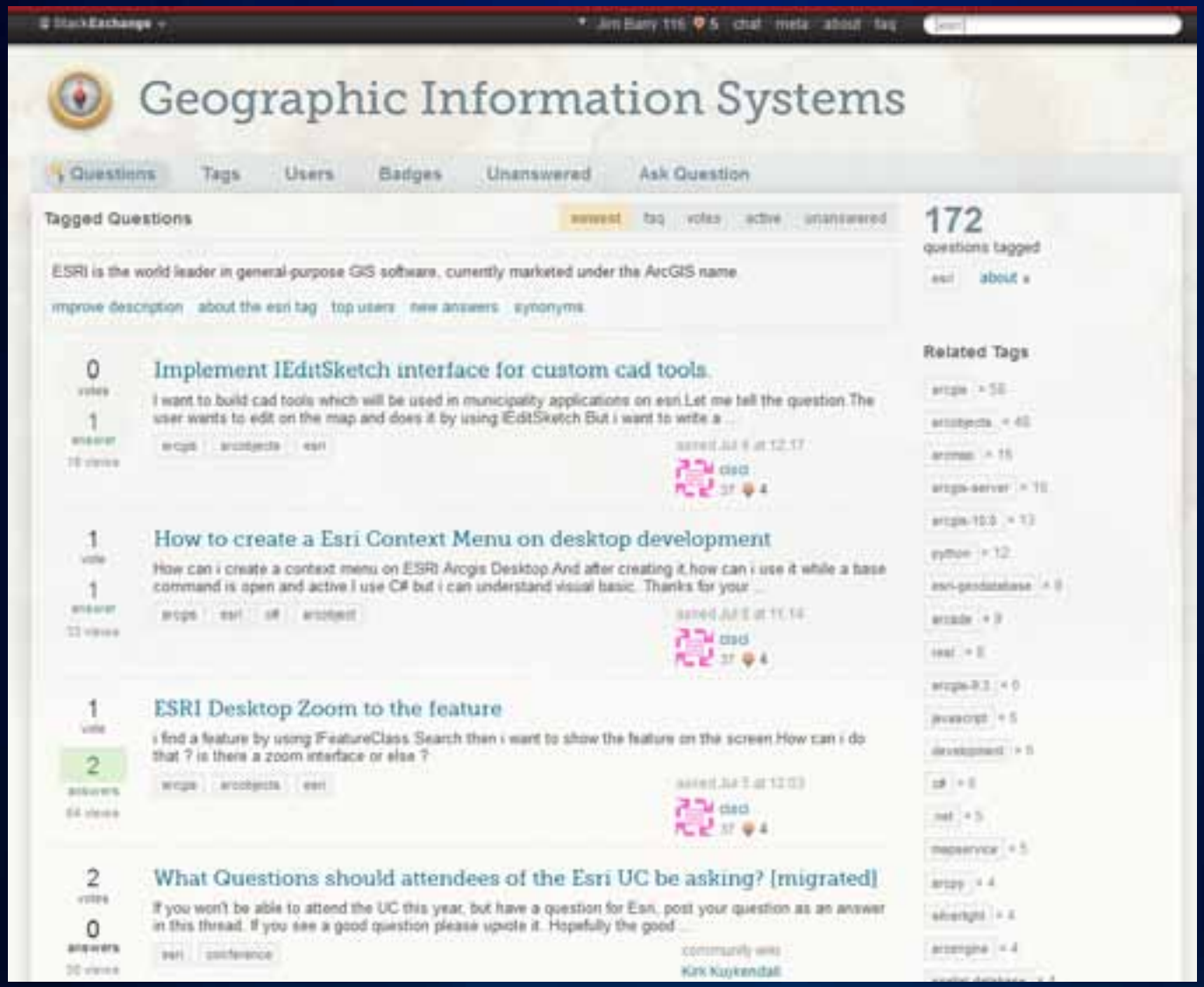

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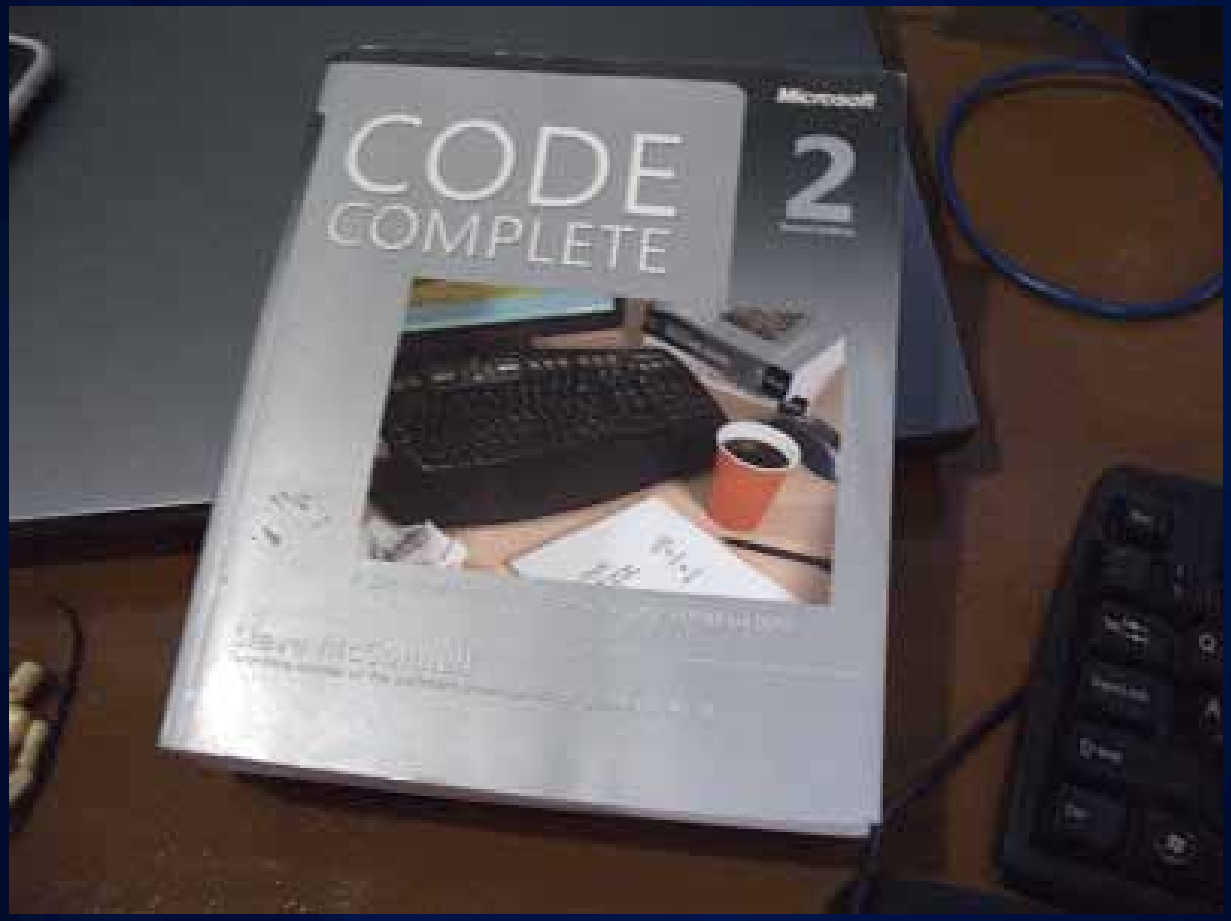
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  - Desktop Developer Island & Demo Theater
- Tech Support Island
  - Discuss good ideas, solve tough problems

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