Developing Advanced Applications with the ArcGIS JavaScript API

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Introductions

- Who are we?
  - Lead Developer for ArcGIS JavaScript API
  - Lead Product Engineer for REST & JavaScript APIs
- Who are you?
  - Developers using ArcGIS JavaScript API
  - Want to do more with the API

Schedule

- Dijits
  - Dijit?
  - Anatomy of a Dijit
  - Mapping Dijits
  - Dijit usage
  - Tips & Tricks
- Printing
  - Web page
  - Layout/preview page
  - Export + Merge + Output

Please complete the session survey!

Schedule

- API features
  - Custom layers
  - esri.request
  - Error handling
- Custom functionality
  - Clustering
  - dojo.data? Datastore? DataGrid?
  - FeatureSet + Datastore + DataGrid
  - Map Legend
  - Integrating with 3rd party JavaScript toolkit (ExtJS)

Please complete the session survey!

Schedule

- Info Window
  - Customizing InfoWindow
  - Custom InfoWindow
  - Using esri.dijit.InfoWindow
- Advanced JavaScript
- Q&A

Please complete the session survey!

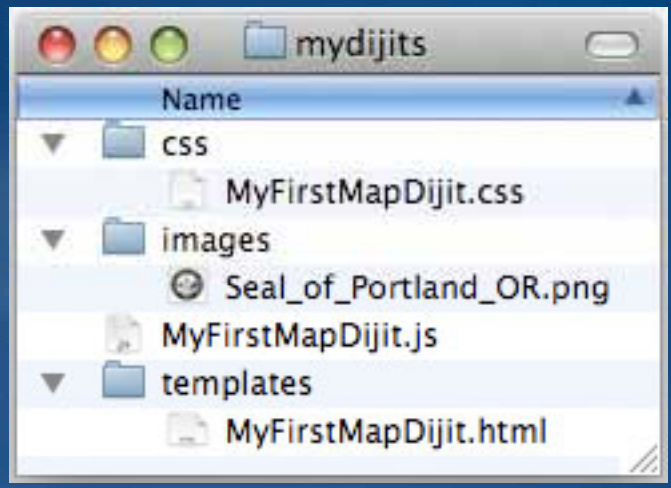
DIJITS

Dijits: Dijit?

- Dijit = Dojo + Widget
- Pre-packaged modular widgets
  - http://dojocampus.org/explorer/ - Dijit_Form Controls_Button_Simple
  - http://dojocampus.org/explorer/#Dijit_Tree_With%20Popup%20Menu
  - http://dojocampus.org/explorer/#Dijit_Editor_Basic
  - http://resources.esri.com/arcgisserver/apis/javascript/arcgis/index.cfm?fa=codeGalleryDetails&scriptID=15998
  - http://blogs.esri.com/Dev/blogs/arcgisserver/archive/2008/11/03/Creating-a-simple-map-dijit-with-the-ArcGIS-JavaScript-API.aspx

Dijits: Anatomy of a Dijit

- HTML Template
  - Layout of HTML elements
  - May/not contain more Dijits
  - Connect objects & events
- CSS/Images
  - If required by Dijit
- JavaScript
  - Class declared and recognized by Dojo
- Test page
  -
  - new mydijits.MyFirstMapDijit(...);



Dijits: Usage

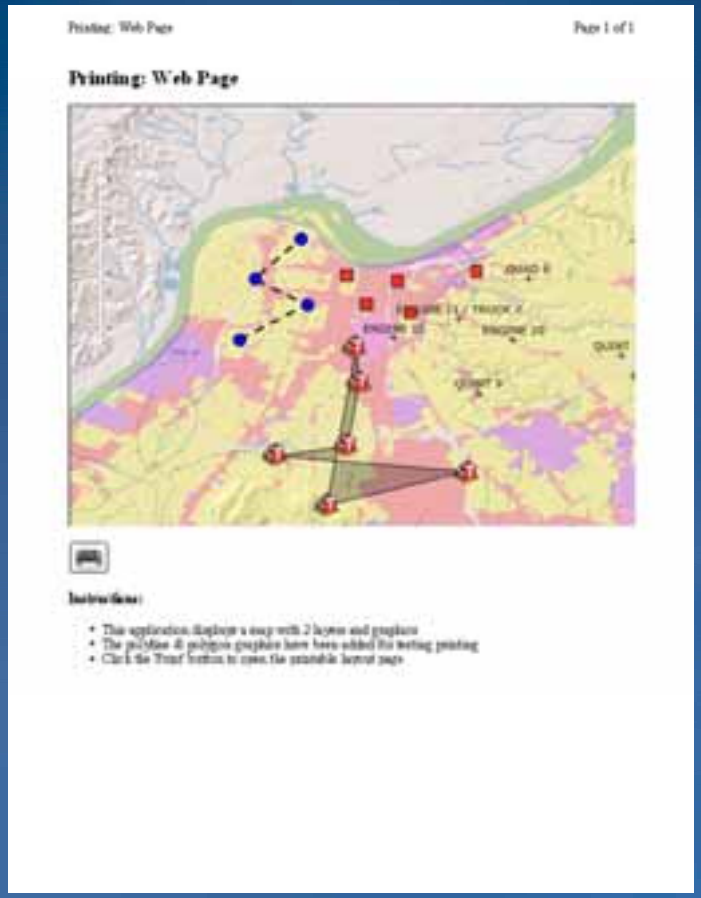
- I build it, I use it
- Someone built it, I use it
- Just tell me how to put your thingy on my website!

Dijits: Tips & Tricks

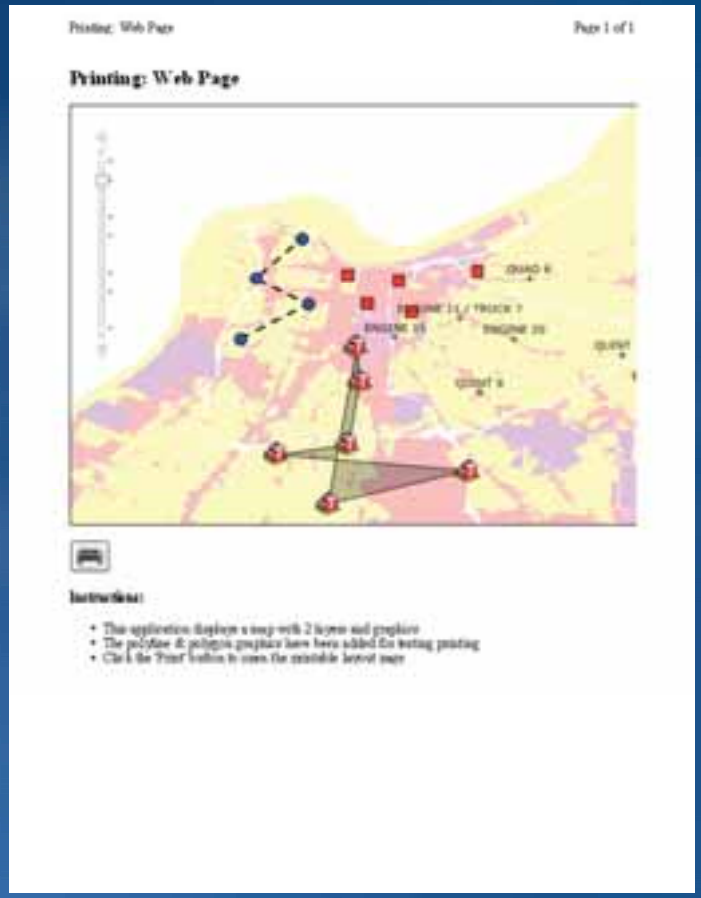
- Template file
  - One top level element (div) in template
  - dojoAttachPoint
  - dojoAttachEvent
  - Use variable substitution for dynamic content (${...})
- Class file
  - widgetsInTemplate: true
  - templatePath: dojo.moduleUrl("...", "...")
- Using Dijits
  - dojo.require("dijit.dijit")/dojo.require("dijit.dijit-all");
  - jsId="myDijitId" instead of myDijitId = dijit.byId("…")

PRINTING

Printing: The problem

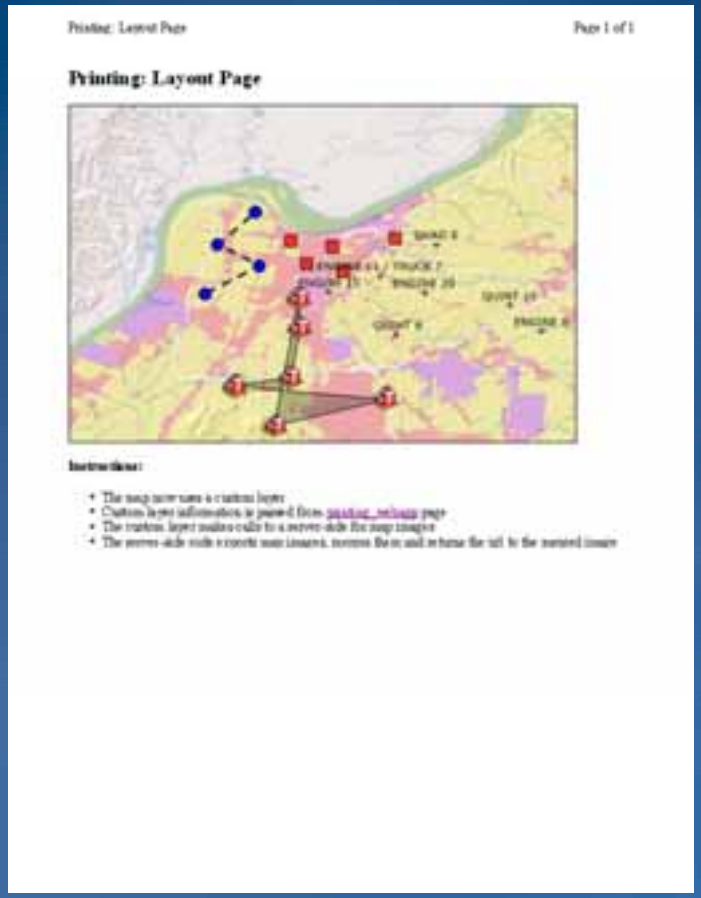


Preview

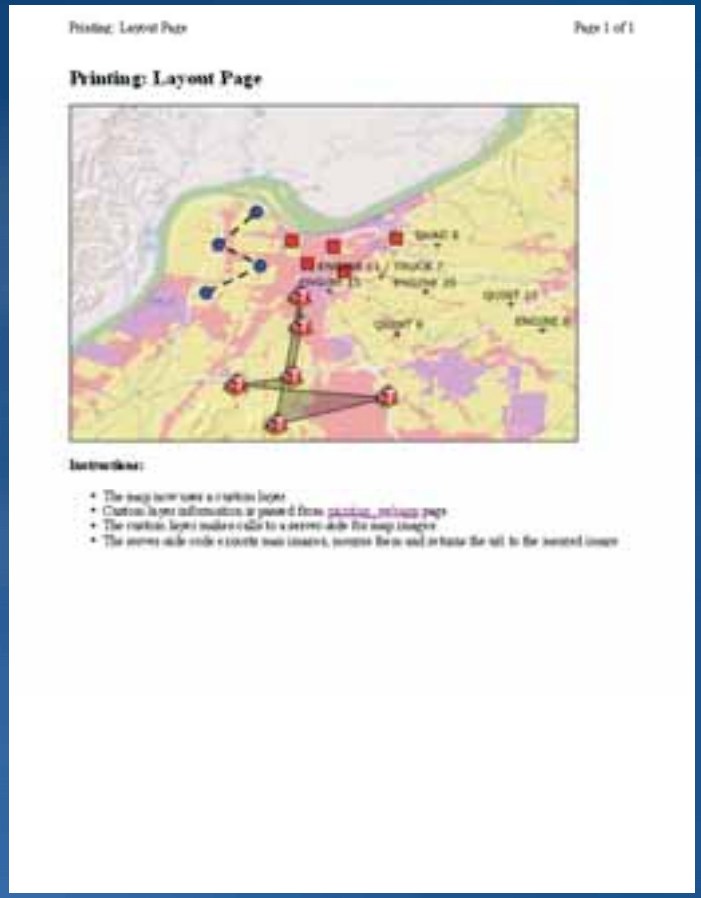


Print-out

Printing: The solution (Demo)

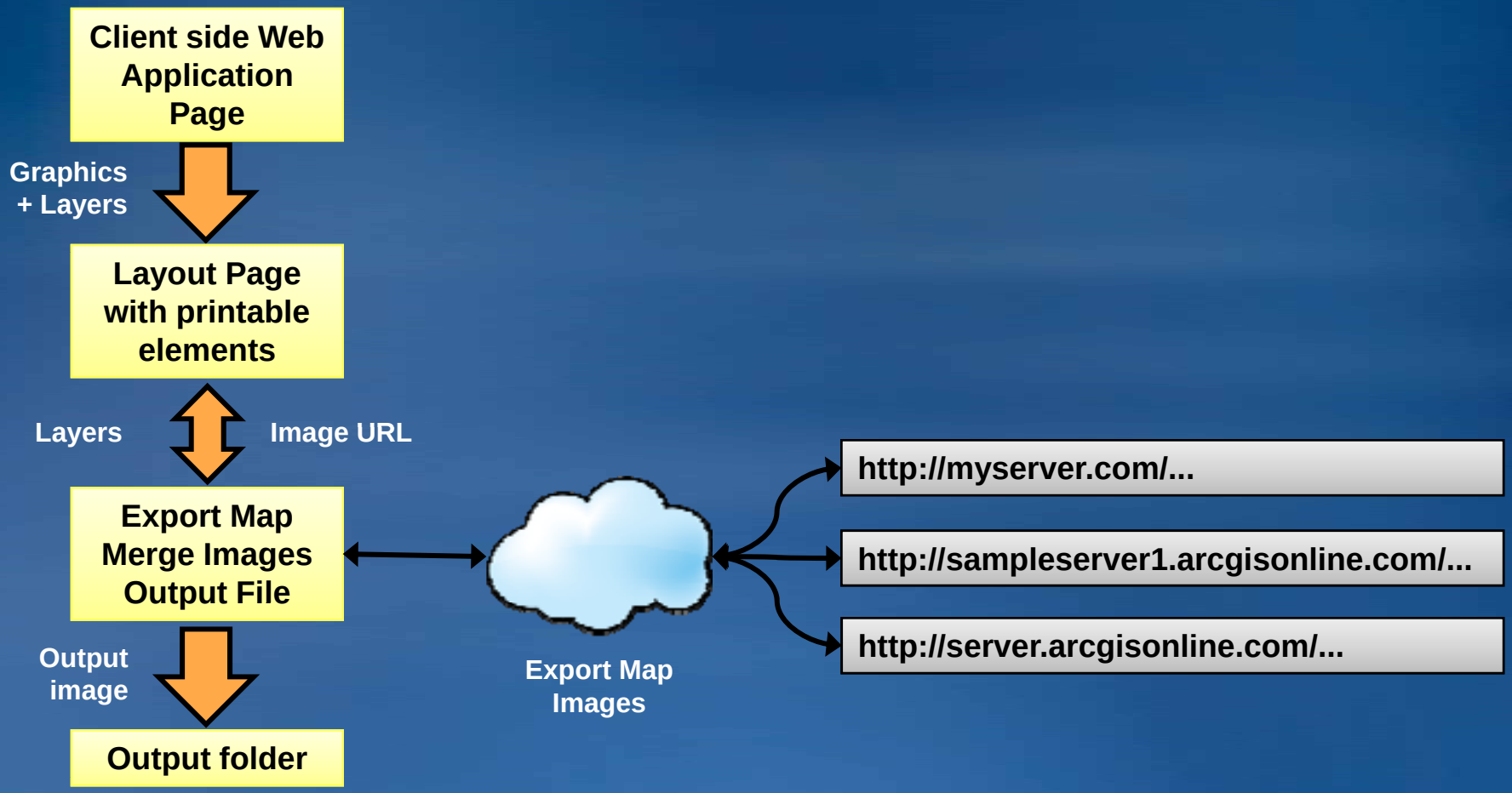


Preview



Print-out

Printing: Application Flow



Printing: Web Page

- Map with 2 layers + Graphics
- Use a hidden iFrame to POST serialized data to layout page

```
dojo.addOnLoad(function() {
  printingHiddenFrame = document.createElement("iframe");
});

function printMap(m) {
  var state = { map: getMapState(m) }
  iframeDocument.getElementById("form").submit();
}

function getMapState(m) {
  return { extent, layers, graphics };
}
```

Printing: Layout Page

- Custom Layer to display map layers

```
var layer = new my.PrintableLayer(..., {
  layers:...,
  extent:...
});
```

- De-serialize graphics and display on map

```
function addGraphicsToMap() {
  dojo.forEach(appState.map.graphics, function(graphic) {
    map.graphics.add(new esri.Graphic(graphic));
  });
  ...
}
```

Printing: Export + Merge + Output

- **Create and merge exported map images**

```
create output image
for each (layer) {
  image = export map image using layer url & settings
  merge image with output image
}
write output image to file
```

- **Return JSON with URL to merged image**

```
{ href, width, height, extent }
```

API FEATURES

API Features: Custom Layer: my.PrintableLayer

- **Declaring the class**

```
dojo.declare("my.PrintableLayer", esri.layers.DynamicMapServiceLayer, {
  constructor: function(url, options) { ... },
  ...
});
```

- **Implementing getImageUrl**

```
getImageUrl: function(extent, width, height, callback) {
  //Serialize layers as JSON
  dojo.forEach(this.layers, function(layer) { ... });
  //JSON for request
  var json = { width, height, extent, layers };
  //POST request to server-side code, process and call callback
  esri.request(...);
}
```

API Features: Using esri.request()

- Wrapper around dojo.io.script.get & dojo.xhrRawPost

```
esri.request({
  url, load, error, timeout,
  content:{...}, handleAs:"json", callbackParamName:"callback"
});

esri.request({
  url, load, error, timeout,
  postData:"...", handleAs:"xml/text"
}, true);
```

- Handles posting through proxy if request length > 2k
- Handles errors and calls error handler
- Demo

API Features: Error Handling

- Version < v1.3
  - esri.Error
    - Only works with server-side errors
- Version 1.3+
  - esri.Error
    - Very generic, no context
  - onError event (layers & tasks)
    - Specific to layer or task
    - But, no context if using multiple operations on same task
  - Errback functions (tasks)
    - Specific to each operation call
- Demo

CUSTOM FUNCTIONALITY

Client-side Clustering

- Improve client side graphics performance when working with large numbers of points
- Group graphics if number of features in spatial grid > n
- As user zooms, display individual graphics

dojo.data? Datastore? DataGrid?

- dojo.data
  - Uniform data access layer
  - http://docs.dojocampus.org/dojo/data
  - http://docs.dojocampus.org/dojo/data/api
- Datastore
  - Provide API interface by hiding structure of data
  - http://docs.dojocampus.org/dojo/data/ItemFileReadStore
- DataGrid
  - A visual grid/table much like a spreadsheet
  - http://docs.dojocampus.org/dojox/grid

FeatureSet -> DataStore -> DataGrid

- Demo
- Convert FeatureSet to FileItemReadStore

```
dojo.forEach(featureSet.features, function(feature) {
  ...
  items.push(dojo.mixin({}, feature.attributes));
});
var data = { identifier: "OBJECTID",            //unique id
             label:featureSet.displayFieldName, //name field or display
             items: items };                    //set items
store = new dojo.data.ItemFileReadStore({ data:data });
```

- Use FileItemReadStore in DataGrid

```
grid.setStore(store, {OBJECTID:"*"});
```

Map Legend

- **Integrating Custom REST Service**
  - Rest Legends (Custom REST Service - Map Service Legends)
  - Custom functionality to get map service legend
- **Call the REST service to get JSON**

```
esri.request({
  url: this.restLegendsEndpoint,
  content: { f:"json", soapUrl:url },
  load: dojo.partial(this._addLegend, layer),
  ...
});
```

- ***'Using the ArcGIS Server REST API'* session**

3rd Party JavaScript toolkits: ExtJS

- ExtJS
  - Map slider, InfoWindow
  - Data grid, Layers drop-down menu

```
<script type="text/javascript" src="http://extjs.cachefly.net/ext-
  2.2/adapter/ext/ext-base.js"> </script>
<script type="text/javascript" src="http://extjs.cachefly.net/ext-
  2.2/ext-all.js"> </script>
```

- Demo
- Tips & Tricks
  - Don’t mix-and-match event registration

```
dojo.connect(map, ”onClick", handler);
extSlider.on("change", handler);
```

INFO WINDOW

InfoWindow: Customizing Look-and-feel

- Changing Font

```
.infowindow .window .top .right .user .titlebar .title { ... }
.infowindow .window .top .right .user .content { ... }
```

- Changing background image
  - Create PNG image using Adobe Photoshop
  - Modify Info Window CSS

```
.infowindow .sprite { ... }
.tundra .infowindow .sprite { ... }
.nihilo .infowindow .sprite { ... }
.soria .infowindow .sprite { ... }
```

- Demo

InfoWindow: Custom

- Simple Div

```
dojo.declare("my.InfoWindow", null, {
  constructor: function(map) { ... },
  _initInfoWindowDOM: function() { ... },
  show: function(point, anchor) { ... },
  hide: function() { ... },
  setTitle: function(title) { ... },
  setContent: function(content) { ... }
  _on*Handler: function() { … }
});

iw = new my.InfoWindow(map);
iw.show(evt.mapPoint, map.getInfoWindowAnchor(evt.screenPoint));
```

- Demo

InfoWindow: Dijit

- Dijit markup

```
<div jsId="infowindow" dojoType="esri.dijit.InfoWindow" title="Info
  Window">Foo bar</div>
```

- JavaScript code

```
var map = new esri.Map(node, { showInfoWindowOnClick: false });

dojo.connect(map, "onClick", function(evt) {
  infowindow.setTitle("coords")
            .setContent(evt.mapPoint.x + ", " + evt.mapPoint.y)
            .show(clickPt, anchor);
});
```

- Demo

ADVANCED JAVASCRIPT

Advanced JavaScript

- Functional programming & Lambda functions
- dojo.
  - declare
  - hitch
  - partial
- Defining your own events and firing them
  - dojo.connect
  - dojo.publish/subscribe
- Exploring objects with FireBug
- Protecting your objects, from FireBug

Summary

- Today we covered
  - Dijits
  - Printing
  - Using API features
  - Custom functionality
  - Customizing the InfoWindow
  - Advanced JavaScript
- Demos at http://tinyurl.com/c6956k

Still have questions?

Additional Resources

Questions, answers and information…

- ***Tech Talk***
  - ***Outside this room right now!***
- ***Meet the Team***
  - ***Wednesday 25th, 6pm – 7pm, Oasis 2***
- ***Other sessions***
  - ***An overview of the ArcGIS JavaScript APIs***
  - ***Patterns and Best Practices for Building Applications with ArcGIS API for JavaScript***

- ***ESRI Resource Centers***
  - **PPTs, code and video**

resources.esri.com

- ***Social Networking***

www.twitter.com/ESRIDevSummit

tinyurl.com/ESRIDevSummitFB

Want to Learn More?

ESRI Training and Education Resources

- **Instructor-Led Training**
  - **Introduction to ArcGIS Server**
- **Free Web Training Seminar**
  - **Building Mashups Using the ArcGIS JavaScript APIs**

Q&A

Body Content Master (24 point white)

Subtitle (16 point yellow italic)

- **Bulleted text (24 point with drop shadow)**
  - **Sub-bullet**

Body text (24 point with drop shadow)

Code (Min 16 Point with background window)

```
public class BufferTask {
  double bufferDistance = 40;
  String selectLayer;
  . . .
}
```

Closing Statement… (16 point yellow italic)

Successful Presentation Guidelines

- Remember your target audience
- Keep your slides uncluttered and to the point
  - Only use a key phrase or a few words to reinforce your point
  - 1-5 words per bullet point
  - 3-5 bullet points per page
  - Refrain from using more than two levels of bullet points
- Use several title slides for each section for branding
  - Make it clear where you are going
- Avoid too much animation
  - Keep it simple

- Ensure code is legible in slides and demos!

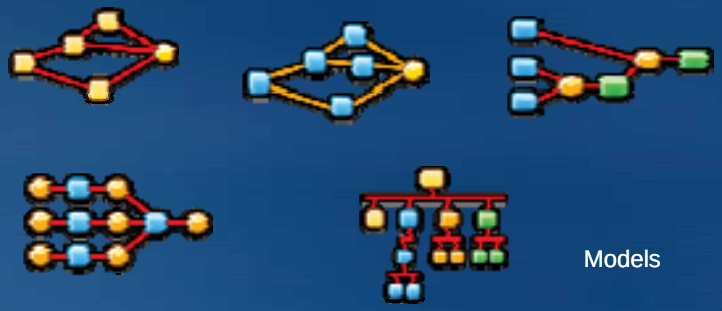
PowerPoint Resources

Supplementary Background Imagery

- **For supplementary background imagery to use in your PowerPoint presentation, please go to http://arczone.esri.com/resources/presentations.cfm and click the "ESRI Slide Backgrounds 2008" link.**


ArcGIS Desktop Authors
ArcGIS Servers
GIS Users
Geodatabase
Web Users
Web GIS
Raster Files
Desktop
Desktop
Desktop
Mobile
Mobile
Mobile
Mobile
Mashups
Explorer
ArcGIS Server
ArcGIS Online
Map
Map
Map
Web Map
Mashups
Browser
Browser
Web Blog
Web Blog
Web Map
Web Map
Open Standards
Web Map

Designing & Planning



Models

Layers

Professional Services

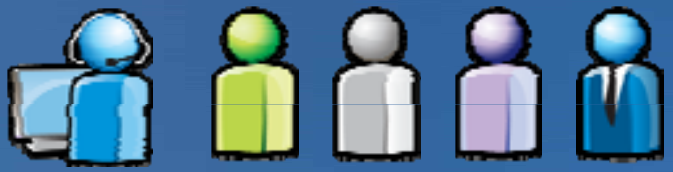
Professional Services

Situational Awareness

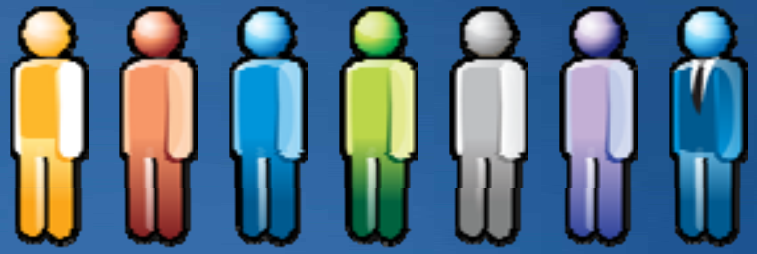
Education

Education

Tech Support



Tech Support



Business Partner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GIS
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ArcGIS
ArcGIS
ArcGIS
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ESRI
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