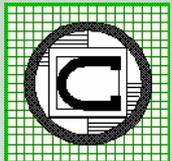


Developing ArcGIS Web Mapping Applications

Nick Tonias, P.E.
The CEDRA Corporation

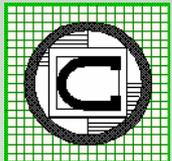
Ian Peebles, GISP
The City of Edmond

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Topics to be Covered

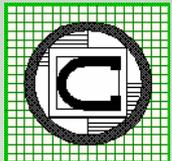
- ◆ Brief Intro to CEDRA and City of Edmond
- ◆ Creating Apps using ArcGIS Online
- ◆ Creating Apps using ArcGIS Server
- ◆ Presentation of City of Edmond Web Mapping Apps
- ◆ Pros and Cons of ArcGIS Online and ArcGIS Server
- ◆ Summary then Q&A



The CEDRA Corporation

- 1985 The CEDRA Corporation is established.
- 1987 CEDRA begins a long standing relationship with Esri.
- 1993 CEDRA becomes an authorized Esri Business Partner and Developer.

CEDRA offers engineering/GIS solutions in the form of **software** and **services** to governmental agencies, engineering consultants, tax assessors, oil companies and various utility enterprises.



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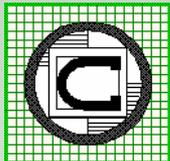


The City of Edmond

The City has more than 5 years of experience in developing web based mapping applications and 26 live web based applications.

The City maintains their web applications on a number of platforms.

These applications currently use the Esri JavaScript API, Silverlight application viewer, and the Web Application Builder (WAB).



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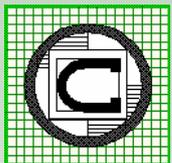


CEDRA and The City of Edmond

CEDRA-DataEditor has been embedded in 9 of The City of Edmond's web applications.

CEDRA-DataEditor is a JavaScript ArcGIS Server based application for data editing and maintenance.

CEDRA-DataEditor provides for custom single and multi-column user-dialog boxes via configuration file thereby eliminating any programming.

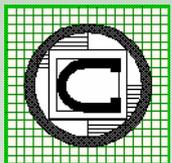


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Why go Web Based?

1. Cross-platform compatibility (Wide variety of browsers running on Windows, Linux, Mac OS)
2. More manageable (need to install on server rather than numerous PCs)
3. Highly deployable (just need a URL address to access an application and data)
4. Reduced costs (less support, maintenance and lower end user requirements, i.e. less desktop licenses)



Creating Web Applications

ArcGIS Online (Cloud Based Mapping Platform)

ArcGIS Online application templates

Web App Builder

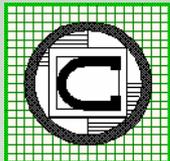
ArcGIS Viewer for Flex

ArcGIS Viewer for Silverlight

ArcGIS Server (Organization Server Platform)

Web Mapping APIs (JavaScript, Flex, Silverlight)

HTML, CSS



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ArcGIS Online vs. ArcGIS Server

ArcGIS Online

Subscription based (minimal cost)

No Server infrastructure required

Application Customization via Configuration

Multi-platform support including mobile

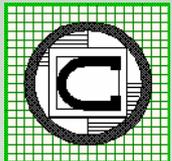
ArcGIS Server

Server infrastructure required

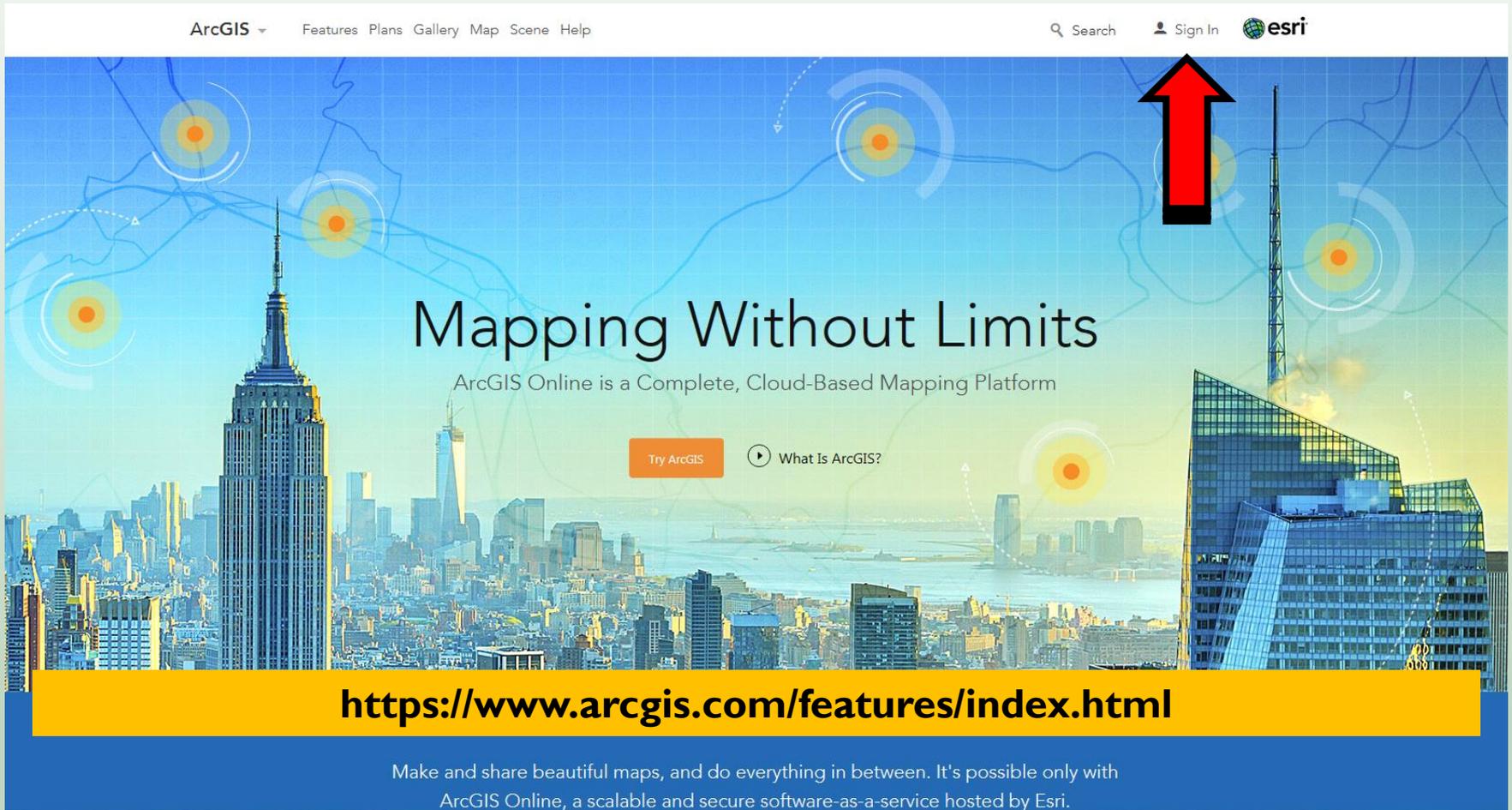
Programming and IT Expertise required

Application Customization via Programming

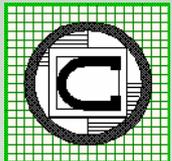
\$\$\$



ArcGIS Online – Sign In



The screenshot shows the ArcGIS Online homepage. The navigation bar at the top includes 'ArcGIS', 'Features', 'Plans', 'Gallery', 'Map', 'Scene', and 'Help'. On the right side of the navigation bar, there is a search icon, a 'Sign In' button with a user icon, and the Esri logo. A large red arrow points to the 'Sign In' button. The main content area features a cityscape background with a grid overlay and several circular heatmaps. The text 'Mapping Without Limits' is prominently displayed, followed by the subtitle 'ArcGIS Online is a Complete, Cloud-Based Mapping Platform'. Below this, there are two buttons: 'Try ArcGIS' and 'What Is ArcGIS?'. At the bottom of the page, a yellow banner contains the URL <https://www.arcgis.com/features/index.html>, and a blue footer contains the text: 'Make and share beautiful maps, and do everything in between. It's possible only with ArcGIS Online, a scalable and secure software-as-a-service hosted by Esri.'

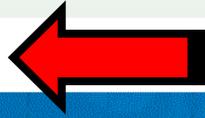


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ArcGIS Online – My Organization

Home Gallery Map Scene Groups My Content My Organization



Use the Tabs to navigate
ArcGIS Online



EDIT SETTINGS INVITE MEMBERS VIEW STATUS VIEW SYSTEM HEALTH MANAGE LICENSES

Members

Viewing:

Search for Name...

Name	Username	Last Login	Role	Action
muniroute	muniroute	Mar 31, 2015	<input type="text" value="User"/>	
Nick Tonias	nicktonias	Aug 8, 2016	<input type="text" value="Administrator"/>	

Subscription Status

2,500 credits remaining
Expires: 09/30/2016 [RENEW](#)
ID: 6384400033

Find...

The most viewed items in the organization

The last items added to the organization

The items added to the organization that are public

The organization's groups

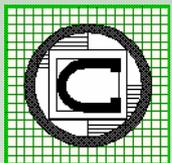
The organization's groups that are public

The organization's registered apps

My Organization Tab can be used to manage the Organization's members and view information regarding the organization

Page 1 of 1

Viewing 1 - 2 of 2



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ArcGIS Online – My Content

Home Gallery Map Scene Groups **My Content** My Organization

Nick



Folders

NEW DELETE

nicktonias (Home)

Show

All

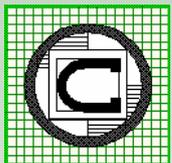
- Maps
- Layers
- Scenes
- Apps
- Tools
- Files

+ Add Item Create Share Delete Move Change Owner

<input type="checkbox"/>	Type	Modified	Shared
<input type="checkbox"/>	MuniRoute	Aug 26, 2015	Everyone
<input type="checkbox"/>	MuniRoute Lite	Aug 26, 2015	Everyone
<input type="checkbox"/>	NYS Counties	Aug 26, 2015	Everyone
<input type="checkbox"/>	NYS Counties and Bridges	Aug 8, 2016	Everyone
<input type="checkbox"/>	NYScounties	Aug 25, 2015	Not Shared
<input type="checkbox"/>	Oneida County Sections	Nov 4, 2015	Not Shared
<input type="checkbox"/>	Route	Mar 18, 2015	Everyone
<input type="checkbox"/>	Web AppBuilder for ArcGIS	Aug 27, 2015	Not Shared

1 - 8 of 8 results

My Content Tab can be used to manage the Organization's Maps and Applications



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ArcGIS Online – Map Viewer

Home ▾ My Map New Map Nick ▾

Details Add ▾ Basemap Analysis Save Share Print Directions Measure Bookmarks Find address or place

About Content Legend

Guided tours to quickly get you started

Pick a tour to learn more about using the map viewer.

- Learn to make a map [START TOUR >](#)
- Learn to style a map [START TOUR >](#)
- Learn to explore Living Atlas Layers [START TOUR >](#)

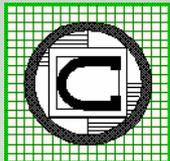
Esri.com ArcGIS Marketplace Help Terms of Use Privacy Contact Esri Report Abuse

0 150 300mi

Esri, HERE, DeLorme, NGA, USGS

POWERED BY esri

Prior to creating an App, a map must be created by clicking the Map Tab



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ArcGIS Online – Add Layer

Home ▾ My Map New Map Nick ▾

Details Add Basemap Analysis Save Share Print Directions Measure Bookmarks Find address or place

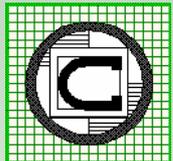
Map Layers can be added on top of the basemap by specifying a URL to a Map Service

<http://www.xxxxxx.com/arcgis/rest/services/NYSbridges/MapServer/0>

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OBM, Ontario MNR, Province of Ontario, Esri, HERE, DeLorme, USGS, NGA, EPA, USDA, NPS

esri



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ArcGIS Online – Layers Added

Home ▾ My Map New Map Nick ▾

Details Add ▾ Basemap Analysis Save ▾ Share Print Directions Measure Bookmarks

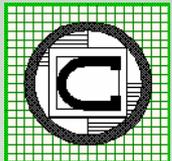
About Content Legend

Contents

- NYScounties - Counties
- NYSbridges - Bridges GCS
- Topographic

As the Map Layers are added they appear in a Table of Contents

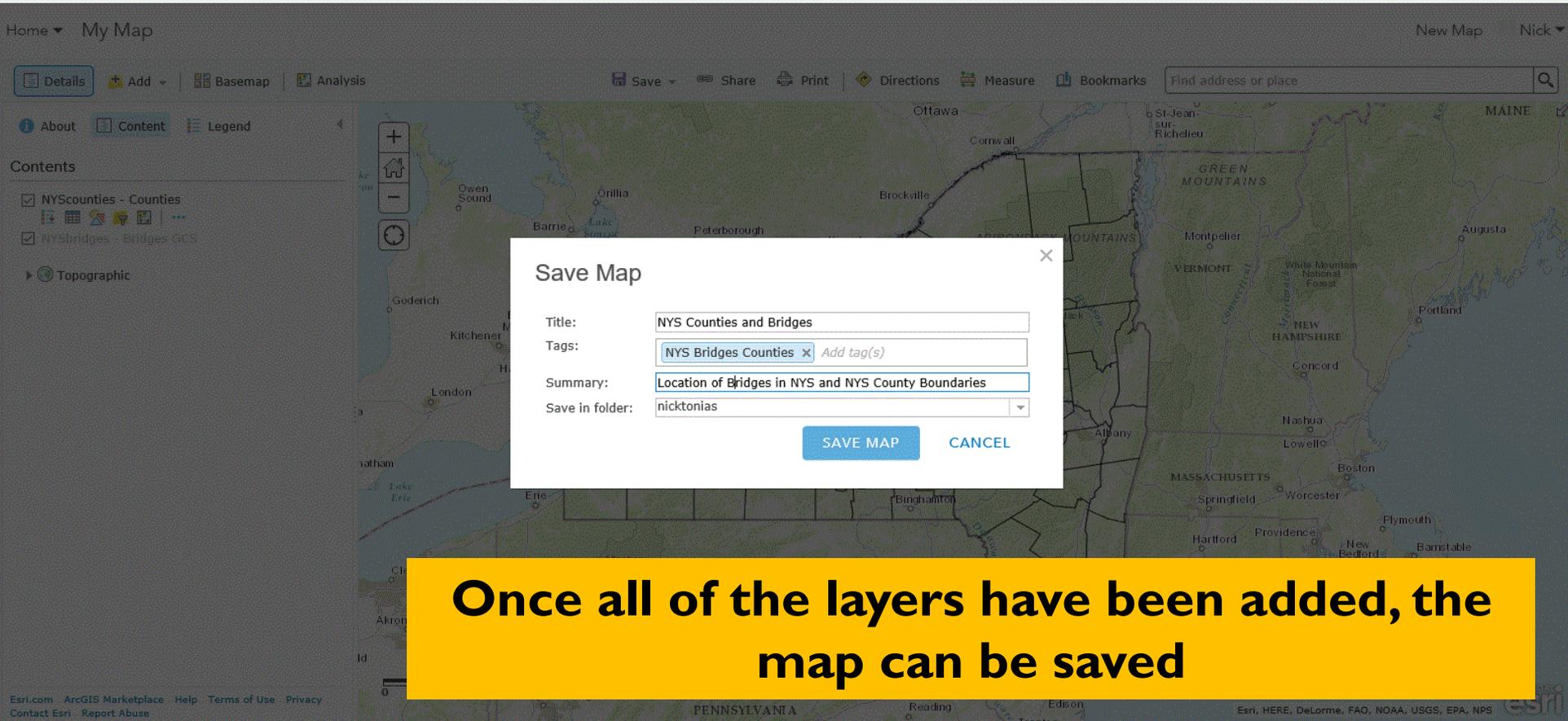
The screenshot shows the ArcGIS Online interface. The main map displays a geographical area including parts of Ontario, Canada, and New York, Pennsylvania, and New Jersey, USA. The 'Contents' panel on the left lists three layers: 'NYScounties - Counties', 'NYSbridges - Bridges GCS', and 'Topographic'. A red arrow points from the 'Contents' panel towards the map. A yellow text box on the right side of the map contains the text 'As the Map Layers are added they appear in a Table of Contents'. The interface includes navigation tools like zoom in (+), zoom out (-), home, and full screen, as well as a search bar at the top right.



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ArcGIS Online – Save the Map



Home ▾ My Map New Map Nick ▾

Details Add ▾ Basemap Analysis Save ▾ Share Print Directions Measure Bookmarks Find address or place 🔍

About Content Legend

Contents

- ✓ NYScounties - Counties
- ✓ NYSbridges - Bridges GCS
- Topographic

Save Map ✕

Title:

Tags: Add tag(s)

Summary:

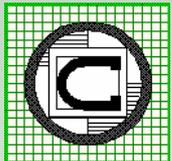
Save in folder:

SAVE MAP **CANCEL**

Once all of the layers have been added, the map can be saved

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PENNSYLVANIA Reading Edison Esri, HERE, DeLorme, FAO, NOAA, USGS, EPA, NPS



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ArcGIS Online – Share the Map

The screenshot shows the ArcGIS Online interface with a 'Share' dialog box open. The dialog box contains the following text and options:

Share

Currently, only you can view your map. Before you can link to it or embed it, you need to allow others to view your map.

- Everyone (public)
- The CEDRA Corporation

Link to this map

<http://arcg.is/2aG9y2P>

- Share current map extent

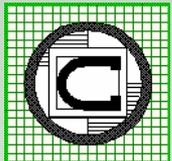
Embed this map

EMBED IN WEBSITE CREATE A WEB APP

DONE

A yellow callout box on the right side of the dialog box contains the text: **The map can then be saved for Internal or Public Consumption**

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ArcGIS Online – Create an App

Home ▾ NYS Counties and Bridges

Details Add ▾ Basemap A

About Content Legend

Contents

- ✓ NYScounties - Counties
- ✓ NYSbridges - Bridges GCS
- Topographic

Categories of Configurable Maps

To create an App, a Configurable App can be used or the Web App Builder

Create a New Web App

Configurable Apps Web AppBuilder

What do you want to do? Select a configurable app. ?

Search

- Show All
- Build a Story Map
- Collect/Edit Data
- Compare Maps/Layers
- Explore/Summarize Data
- Map Social Media
- Provide Local Information
- Route/Get Directions
- Showcase a Map

Basic Viewer Compare Analysis Crowdsourcing Polling

Directions Edit Elevation Profile

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Pennsylvania Reading Edison

Esri, HERE, DeLorme, FAO, NOAA, USGS, EPA, NPS

ArcGIS Online – Basic Viewer

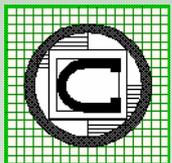
The screenshot displays the ArcGIS Online Basic Viewer interface. At the top left, there is a search bar with the text "NYS Counties and Bridges" and a search icon. Below the search bar is a map of Ontario, Canada, showing county boundaries and major cities. A popup window titled "Counties: Ontario" is open over the map, displaying the following data:

Counties: Ontario	
DATEMOD	
NAME	Ontario
POP1990	95,101
POP2000	100,224
SP_ZONE	Central
DoS_LL	
DoS_LL_Dat	
GNIS_ID	974133

At the top right, there is a "Layers" panel with two layers checked: "NYSCounties - Counties" and "NYSbridges - Bridges GCS". A yellow text box is overlaid on the right side of the map, containing the text: "The Basic Viewer is an example of a configurable App". Another yellow text box is overlaid at the bottom of the map, containing the text: "Configurable Apps offer specific functionality as well as look and feel".

Configurable Apps offer specific functionality as well as look and feel

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ArcGIS Online – Web App Builder

The Web App Builder can be used in the following manners:

ArcGIS Online

Develop and Deploy the App in the Cloud

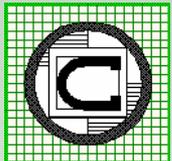
Web App Builder (Developer Edition)

Download and install the WAB locally

Develop the App locally

Upload the App to ArcGIS Online

Upload the App to Organization's Server



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ArcGIS Online – Web App Builder

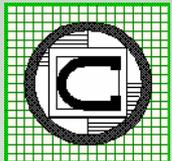
The screenshot shows the ArcGIS Online Web App Builder interface. A dialog box titled "Create a New Web App" is open, prompting the user to specify a title, tags, and summary for a new web mapping application. The dialog fields are filled with the following information:

- Title: NYS Counties and Bridges - WAB
- Tags: NYS Bridges Counties
- Summary: Example using the Web AppBuilder
- Save in folder: ..

The background shows a map titled "NYS Counties and Bridges" with a navigation menu (Overview, Usage, Settings) and a description section. A yellow callout box on the right contains the following text:

The WAB is the alternative to a configurable App

WAB provides more flexibility in customizing the App



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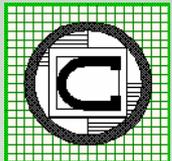


ArcGIS Online – Web App Builder

Home ▾ Web AppBuilder for ArcGIS NYS Counties and Bridges - WAB

nickionias ▾

Configure the App by clicking on the desired Theme, Style, Layout



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ArcGIS Online – Web App Builder

Home ▾ Web AppBuilder for ArcGIS NYS Counties and Bridges - WAB

nicktonias ▾

Theme | **Map** | Widget | Attribute

NYS Counties and Bridges - WAB with Web AppBuilder for ArcGIS Esri World Geocoder 🔍

Web Map
Owner nicktonias
Last Modified: 8/8/2016
More Details...
Choose Web Map ▾

NYS Counties and Bridges
Location of Bridges in NYS and NYS County Boundaries

Set Initial Extent
Specify the initial map extent when the application starts up.

Use Current Map View

Use Web Map's Default Extent

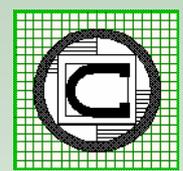
Customize Visible Scales
Customize the visible scales of the map to limit or extend the scale levels which the map can zoom to.

Customize...

Launch | Previews | Save



Configure the App by specifying the desired Map Properties Initial Extent Visible Scales Etc.



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ArcGIS Online – Web App Builder

Home ▾ Web AppBuilder for ArcGIS NYS Counties and Bridges - WAB nicktonias ▾

Theme Map Widget Attribute

Attribute T... Coordinate Home My Location

Overview... Scalebar Search Splash

Zoom Slider

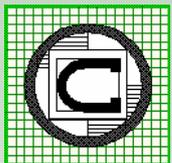
Print Widget Widget Widget

Widget

Launch | Previews | Save

NYS Counties and Bridges - WAB with Web AppBuilder for ArcGIS Esri World Geocoder

Configure the App by specifying the desired widgets to be included in the App



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ArcGIS Online – Web App Builder

Home ▾ Web AppBuilder for ArcGIS Online

nicktonias ▾

Esri World Geocoder

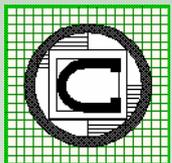
Choose Widget

Type widget name to search

Available Widgets for:
Printing
Querying
Basemaps
Drawing
Editing
...

Launch | Previews

Esri, HERE, DeLorme, FAO, NOAA, USGS, EPA, NPS



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ArcGIS Online – Web App Builder

Home ▾ Web AppBuilder for ArcGIS NYS Counties and Bridges - WAB nicktonias ▾

Theme Map Widget **Attribute**

Branding
Add logo, title, or subtitle for your app.

	NYS Counties and Bridges - WAB	A
	with Web AppBuilder for ArcGIS	A

Links
+ Add New Link

App state
 Keeps map extent and layers visibility while leaving the app.

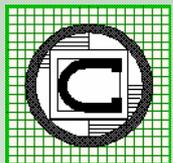
Premium content access
Configure ArcGIS Online Premium Services used by the app to allow users to access through your subscription.

Launch | Previews | Save

NYS Counties and Bridges - WAB with Web AppBuilder for ArcGIS

Esri World Geocoder

Configure the App by specifying a logo and additional text in the App's title bar



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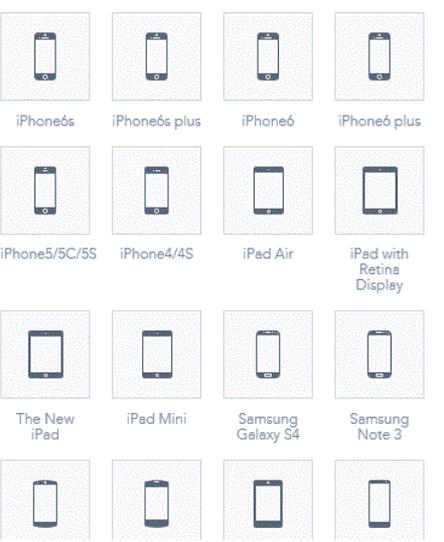


ArcGIS Online – Web App Builder

Home ▾ Web AppBuilder for ArcGIS NYS Counties and Bridges - WAB

nicktonias ▾

Width 1024 Px Height 768 Px

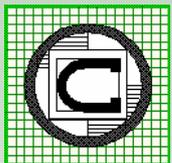


iPhone6s iPhone6s plus iPhone6 iPhone6 plus
iPhone5/5C/5S iPhone4/4S iPad Air iPad with Retina Display
The New iPad iPad Mini Samsung Galaxy S4 Samsung Note 3

Scan QR code to view application on your mobile device



Launch | < Configure | Save ▶



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ArcGIS Online – Web App Builder



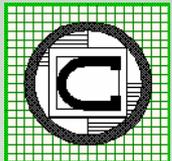
NYS Counties and Bridges - WAB with Web AppBuilder for ArcGIS

Esri World Geocoder

Once the App has been configured, it can be Saved and Launched for Internal or Public Consumption

Powered by esri

Esri, HERE, DeLorme, FAO, NOAA, USGS, EPA, NPS



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ArcGIS Online – Summarizing

Apps can be created using:

1. a Configurable Template or
2. the Web App Builder (locally or cloud)

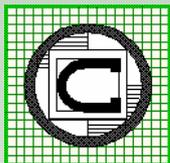
Using the ArcGIS Online interface, Apps can be created by the user starting from the following:

Map Viewer (Map Tab)

Gallery (Gallery Tab)

My Content (My Content Tab)

Item Details (My Content Tab)



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ArcGIS Server

“Things to have”

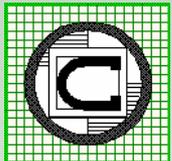
ArcGIS Server, SQL Server, Windows Server software

A Development Environment

Notepad ++, Sublime Text Editor, etc.

Web Mapping APIs (JavaScript, Flex, Silverlight)

Programming Experience (JavaScript, HTML, CSS)



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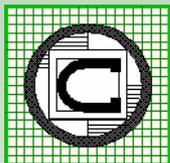


Application Location

“Ever wonder where an Application is stored”

Applications reside in the inetpub\wwwroot folder on the Organization’s Server

Development can occur locally or on a server

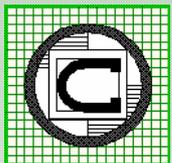


ArcGIS Server – Sample App

Developer has total control of the App's look and feel as well as its functionality

**Developed using
JavaScript API
HTML
CSS**

Attribute Group 1		Attribute Group 2	
County Name:	Onondaga	Abbreviation:	ONON
Population 1990:	468973	Layer Name:	Counties
Population 2000:	458336	Date Modified:	08/12/2016
SP Zone:	Central		
GNIS ID:	974132		



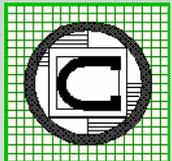
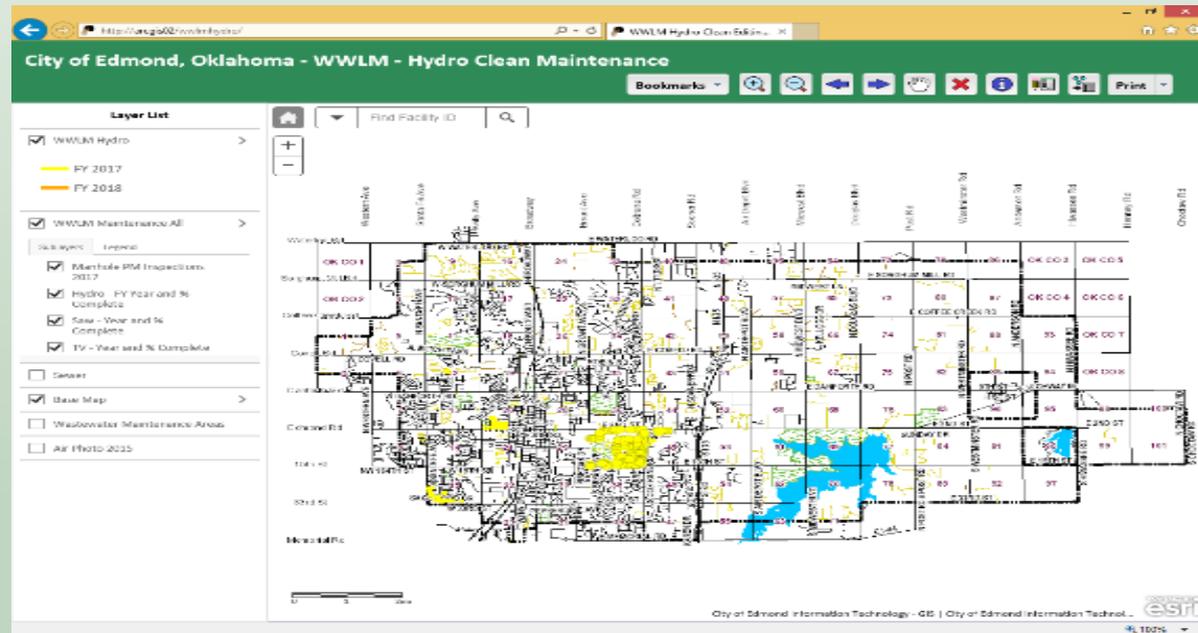
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COE – Wastewater Line Maintenance

Platform: JavaScript API 3.17
Purpose: To mark completed inspections of wastewater lines according to fiscal year.
Who uses it? Wastewater Line Maintenance Crews (TV, Saw and Hydro applications)
Browsers: Internet Explorer, Firefox, Chrome, Safari
Deployed: July 2016

Data editor form, export attributes, bookmarks, navigation tools, find asset facility ID number, printing, and popups. CEDRA custom data editor tools incorporated into the application.



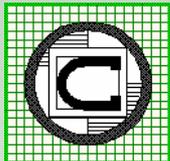
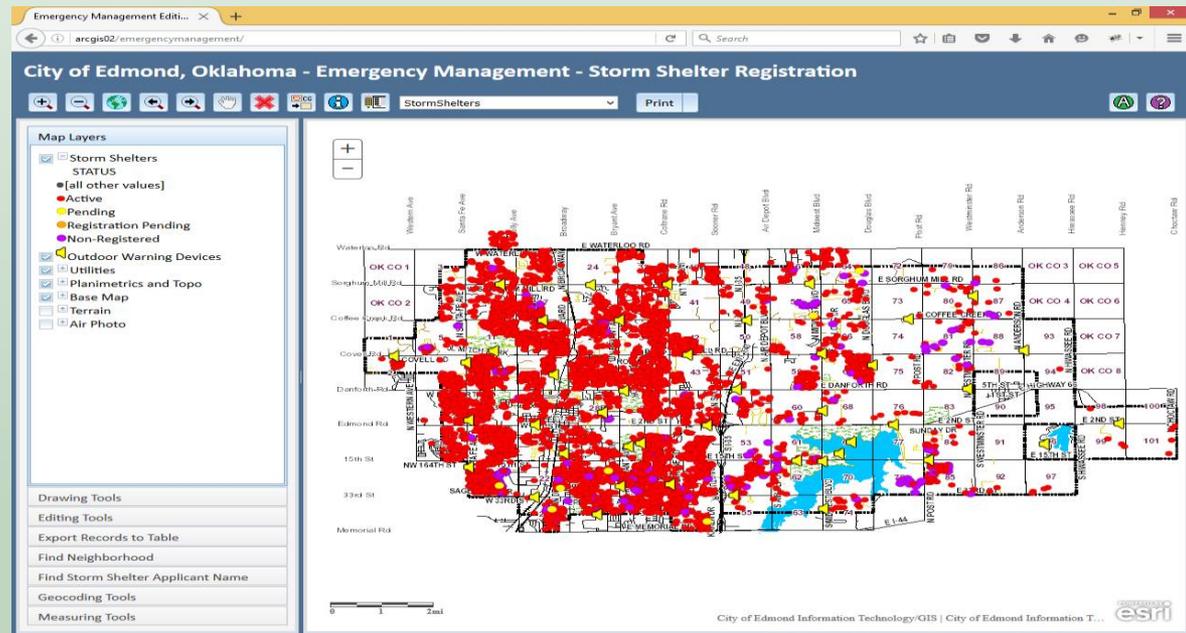
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COE – Emergency Management

Platform: JavaScript API 3.09
Purpose: To edit storm shelter registration information.
Who uses it? Emergency Management
Browsers: Firefox, Chrome
Deployed: September 2014

Data editor form, export attributes, navigation tools, search tools, printing, measuring, and template picker for adding features. CEDRA custom data editor tools incorporated into the application. Application is used on desktop.



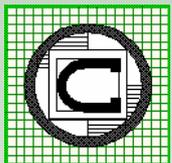
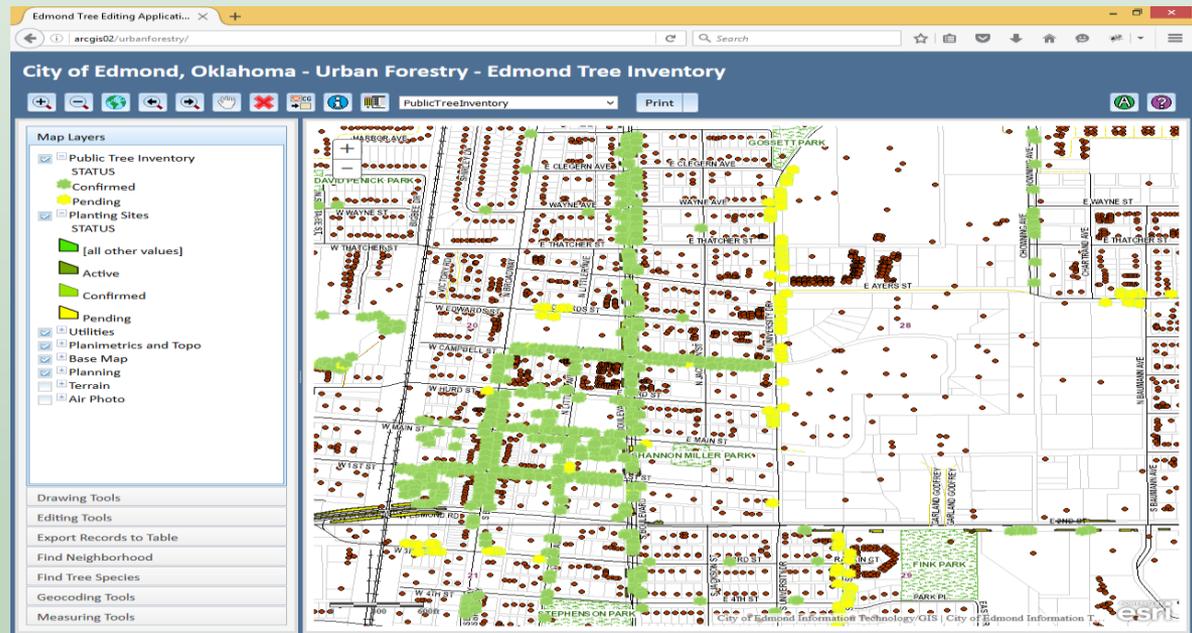
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COE – Urban Forestry

Platform: JavaScript API 3.09
Purpose: Maintaining and editing public tree inventory information.
Who uses it? Urban Forestry
Browsers: Firefox, Chrome
Deployed: September 2014

Data editor form, export attributes, navigation tools, search tools, printing, measuring, and template picker for adding features. CEDRA custom data editor tools incorporated into the application. App has been used in mobile (iPad).



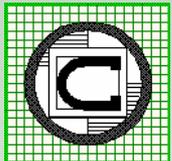
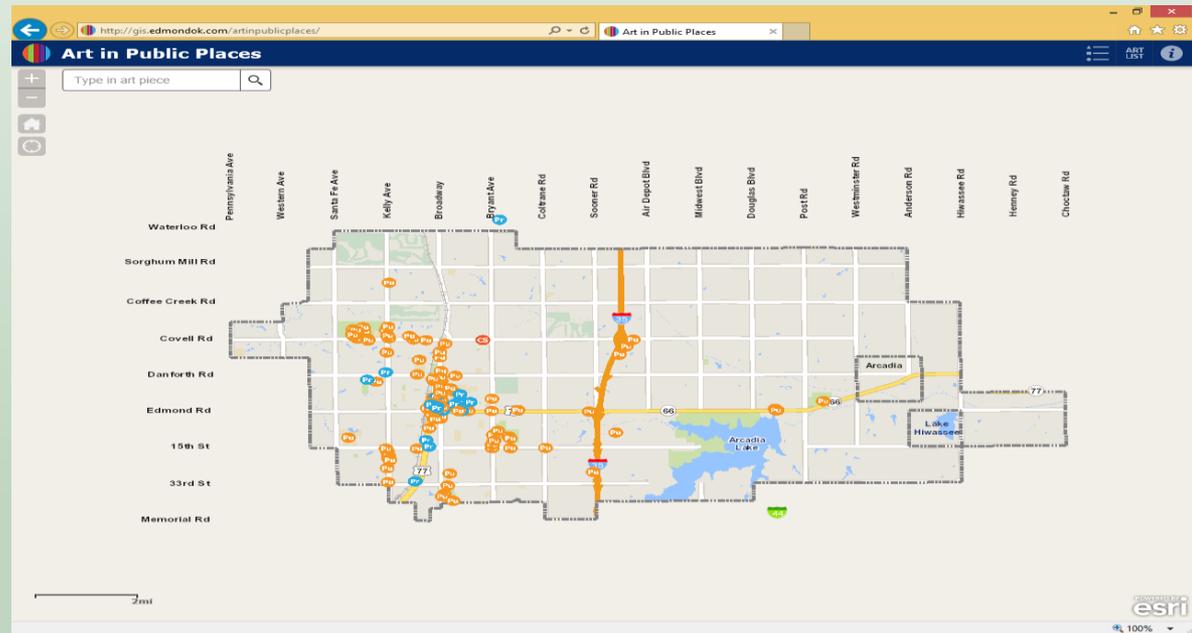
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COE – Art in Public Places

Platform: Web App Builder Version 1.3
Purpose: Used for finding and identifying public art. Fact sheets are available.
Who uses it? Open to the Public
Browsers: Internet Explorer, Edge, Firefox, Chrome, Safari
Deployed: February 2016

Art list, Popups, links to factsheets. Required the development of the search tool using a data grid (JavaScript API). Custom fact sheets were built using HTML.

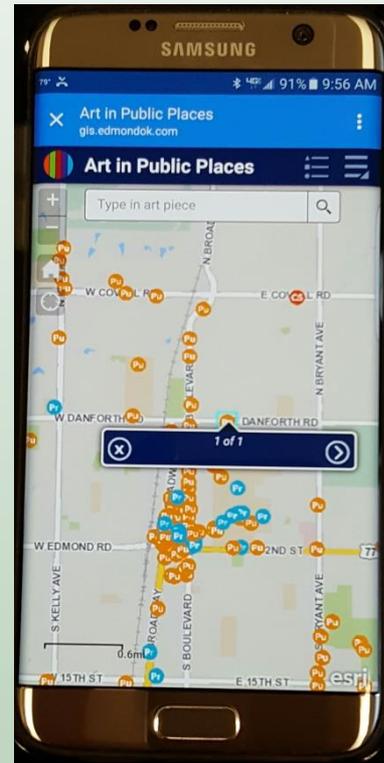
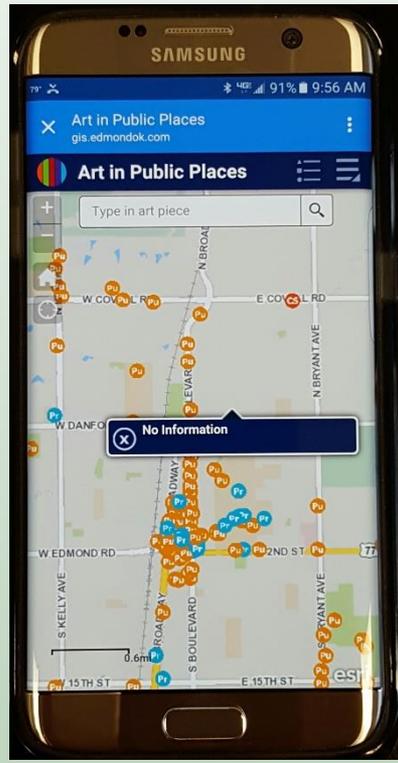
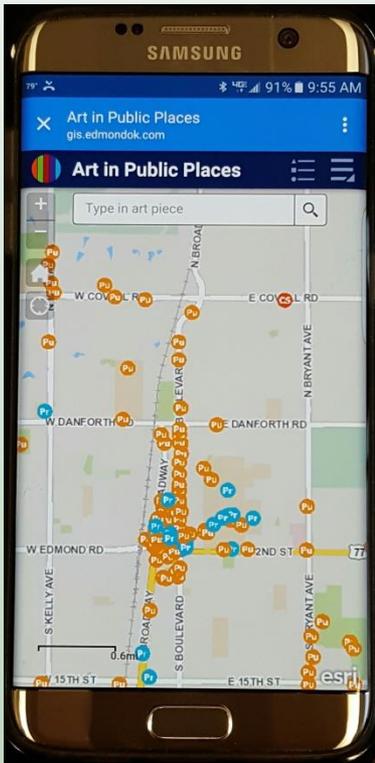


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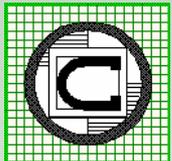


COE – Art in Public Places

No ability to control pixel tolerance results in the application being



“Not Fat-Finger Friendly”



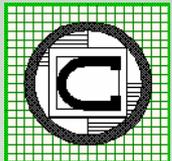
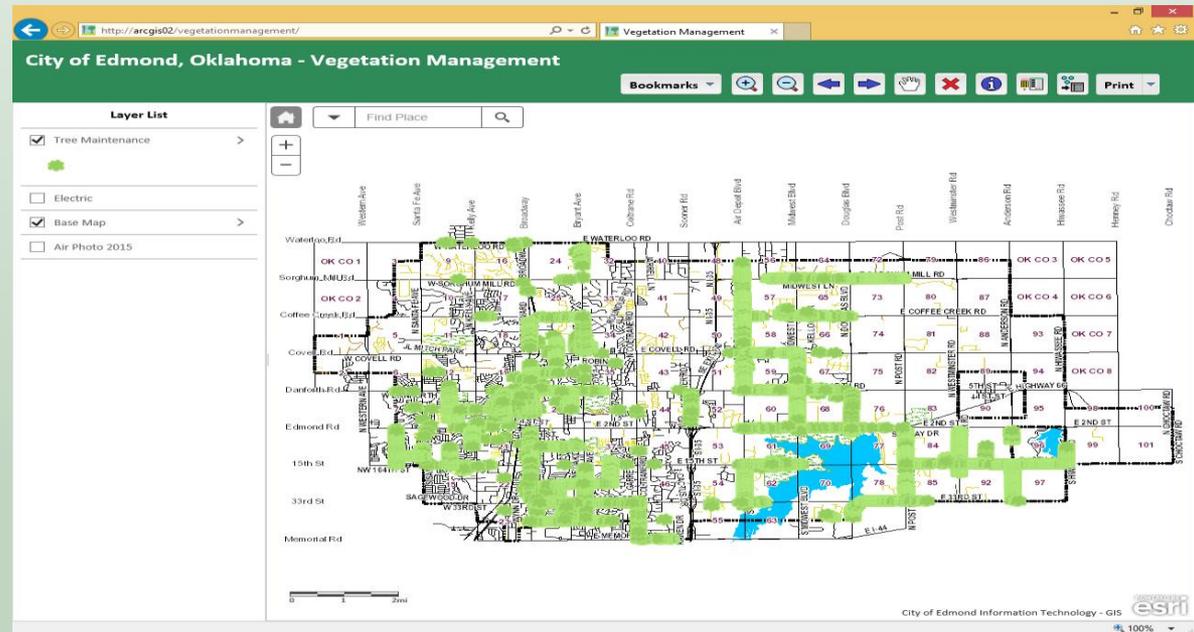
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COE – Vegetation Management

Platform: JavaScript API 3.17
Purpose: To mark completed maintenance/work completed for trees near power lines.
Who uses it? Urban Forestry will be using this application.
Browsers: Internet Explorer, Firefox, Chrome, Safari
Deployed: August 2016

Data editor form, export attributes, bookmarks, navigation tools, find asset facility ID number, printing, measuring, and popups. CEDRA custom data editor tools incorporated into the application.

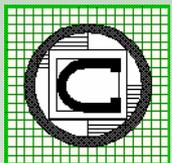
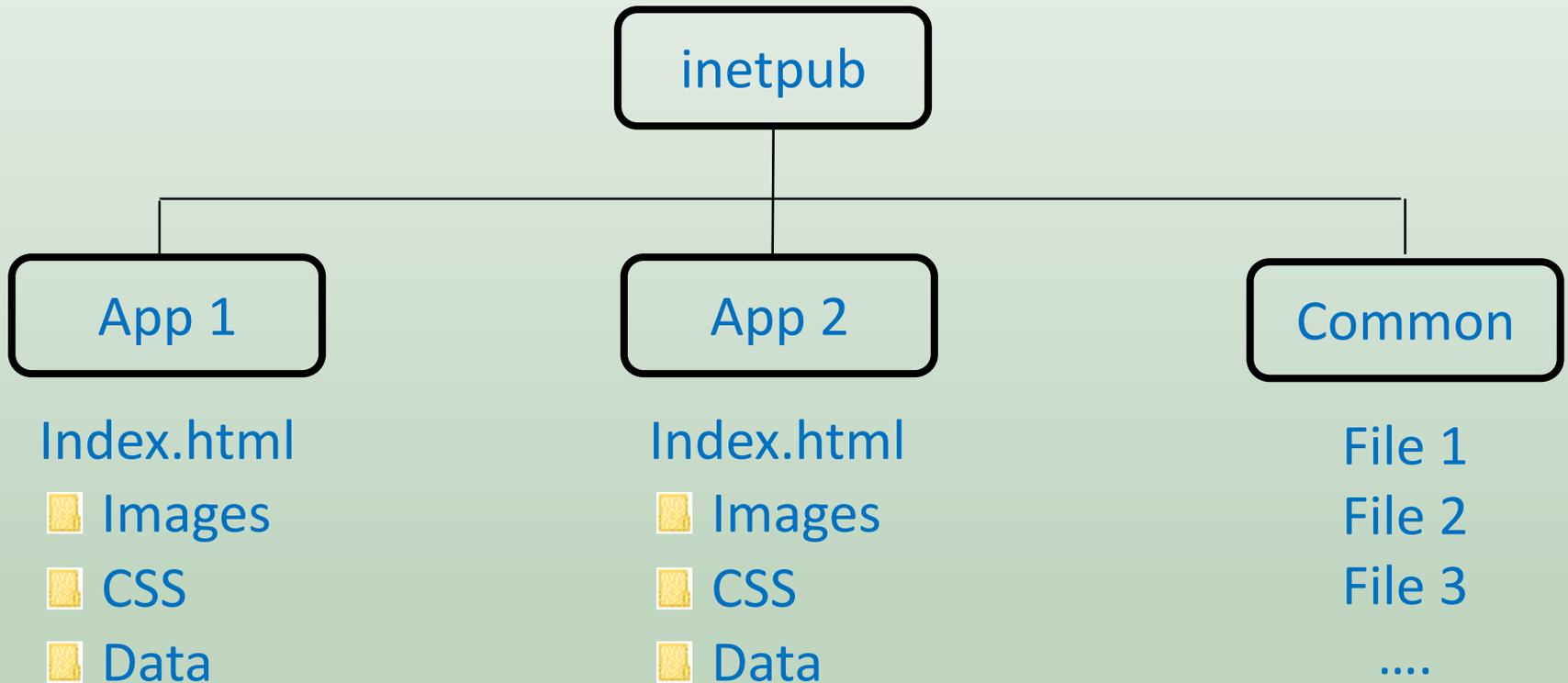


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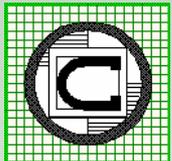
File Management

When developing multiple Applications, some with identical code bases, consideration should be given to the **inetpub** organization



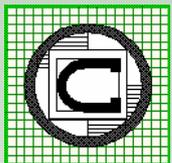
Deployment Issues

- ❖ User expectation that App will act like ArcMap
web apps and desktop apps are different
- ❖ Different browsers behave differently
decide on the preferred browser to be used
- ❖ Browser Cache getting in the way (clear it)
- ❖ Network bandwidth impacting performance
- ❖ Training
- ❖ Designing UI pleasing to all



JavaScript Application Pros

- ❖ ESRI JavaScript API provides lots of functionality
- ❖ A variety of widgets can be added into an application
- ❖ Build the App the way you want (look and feel)
- ❖ Can be built for desktop and mobile environments
- ❖ Light weight applications, no installs required
- ❖ Easy to deploy

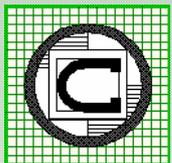


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JavaScript Application Cons

- ❖ Must have knowledge of programming and CSS
- ❖ Not intuitive for regular GIS users
- ❖ Application development takes time
- ❖ Hard to replicate ArcGIS Desktop functionality

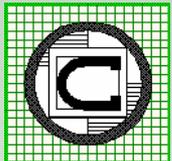


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Web App Builder Pro

- ❖ Easy to install and configure
- ❖ Can run on any machine
- ❖ Can be used by developers and regular GIS users
- ❖ Provides easy solution to build applications
- ❖ Does not require the use of a cached base map
- ❖ Numerous out-of-the-box widgets available
- ❖ Compatible in any browser and mobile devices
- ❖ Application builder is highly customizable
- ❖ Easy to deploy application

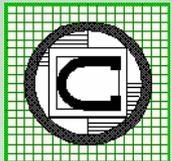


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Web App Builder Cons

- ❖ Requires the use of ArcGIS Online to use the WAB
- ❖ Popup Identify/pixel tolerances are not configurable
- ❖ Hard to identify feature on mobile device
- ❖ Multiple related objects are not supported can go only one level down when using the popup or displaying attribute table.
- ❖ Some styling and custom settings are lost when deploying the application to inetpub



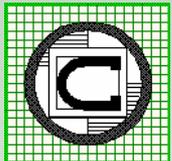
Summary

ArcGIS Online for those with:

*No or few Development/Support Staff
No in-house Server
Budget limitations*

ArcGIS Server for those:

*Not subject to the above items
Wanting complete control over the App's
hosting environment
design and development*



Application Development Considerations

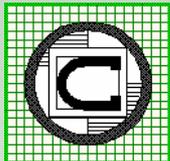
ArcGIS Online good for:

general viewing and map interaction

ArcGIS Server good for:

when specific functionality, such as editing, drawing, printing, etc. is desired

Very feasible for ArcGIS Online and ArcGIS Server to coexist (both be used in application development)



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Thank you!

Questions And Answers

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