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ARCGIS ONLINE
TOPIC 4: FIELD DATA COLLECTION

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Introduction

- The Learner will:
 - Create a map in ArcGIS Online (AGO) using data published from a desktop application.
 - Create a map utilizing a map service from ArcGIS Server.
 - Create a map utilizing a feature class service from ArcGIS Server.
 - Create a Collector application and take at least 10 data points on a smart device.
- **Note:** AGO is only being used for web map creation, none of the analysis tools will be used in this class. AGO is not a free product, credits are charged to the organizational account for certain tools that are used.

What is ArcGIS Online

- AGO is a web component of the Esri mapping suite.
- AGO does allow web maps to be created as well as conducting data analysis completely online.
- An Esri account is required to utilize these services and applications, free accounts are available with limitations. The instructor may have institutional accounts that can be used.

Creating a Desktop Application on ArcGIS Online

- Start ArcMap Desktop and log into the created AGO account (in the file menu).
- Construct a map containing at least three layers that will be saved either on a desktop or a network drive. The data can be in a personal geodatabase or folder. These layers should not contain a large amount of data since this will slow the process.
- The process of publishing the map to AGO will be covered in the next several slides.

Publishing Map to ArcGIS Online

- In ArcMap under File select Share and then Service.
- Select Next on the Publish Window and then using the pull down arrow select My Hosted Services, see Figure 1.

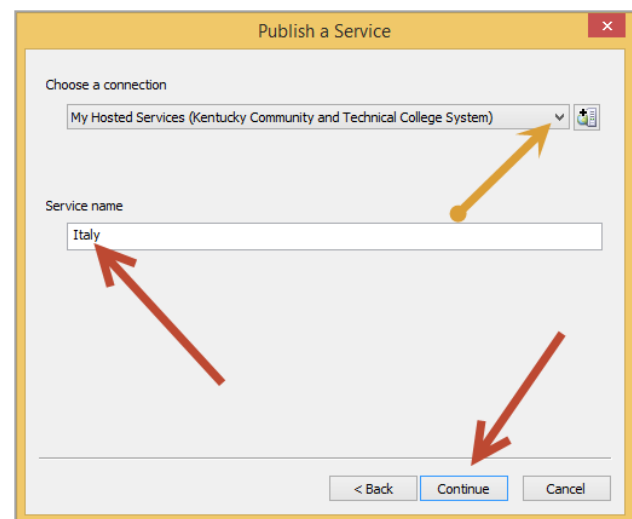


Figure 1: Publish a Service

- The window in Figure 2 is similar to the window when publishing to the ArcGIS Server.
- First Analyze to see if there are any errors that should be corrected.
- It is important to look at the Caching level and make sure that it is not making more tiles than are needed for the operation. This example is a map of Italy and only zooms to the province sub-division level. Therefore, creating tiles at the street level would not be appropriate.

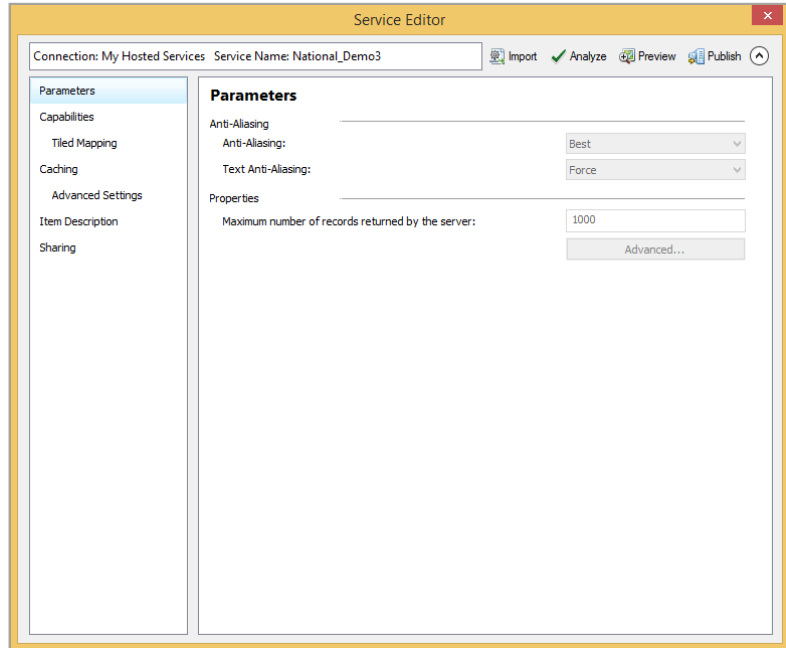


Figure 2: Service Editor

- Other parameters can be modified as was demonstrated with ArcGIS Server. This list contains, in general, less items than was seen previously when publishing to your ArcGIS Server.
- Analyze the map and correct any critical problems.
- Finally publish the map. It is recommend that the map only be shared with the class organization initially, this can be changed later.
- This process has only created a service on ArcGIS Online and has not yet created a web map.
- Using a Web Browser log onto AGO. Locate the service that was created in ArcMap Desktop. Click the service name, which will open a new window that gives information about the service.
- Click On Open, and add the service to a new map.
- Click Save As and give the map a name.
- Share the map to the course group.
- The URL of the work created by the author for this component is; <http://arcg.is/1P7h7GK>, when you zoom into the map, it should appear to be filled. The basemap was not part of what was published.



Assignment

- Provide your instructor the URL and a screen image of your final work.



Using a Map Service with ArcGIS Online

- In the first example with AGO a service was created for AGO from ArcGIS Desktop.
- In this example, a service will be created on the ArcGIS Server and a map created in AGO.
- Connect to the provided AGO account in using a web browser, click on the pull down next to Create and select Map. Complete the information for the new map, see Figure 3.

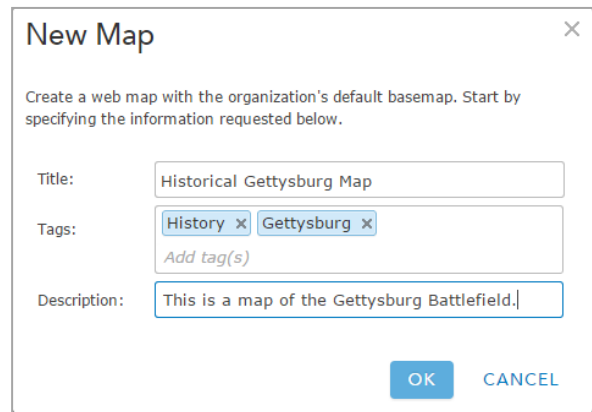


Figure 3: Metadata

- Use the Add pull down, select add layer from the web, see Figure 4.

- Additional layers may be added to the map, which can come from multiple servers.
- In this example OpenStreetMap is used as the basemap.

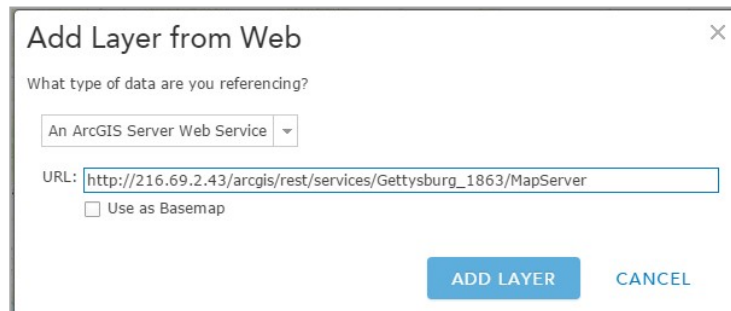


Figure 4: Add Layer from Web

- Note in this example, there are numerous layers included in the service, see Figure 5.

- Click Save and then click Share to the class group.
- Provide the instructor with the URL and an image of the map.

- The link to the author's map is: <http://arcg.is/1nlnfTd>

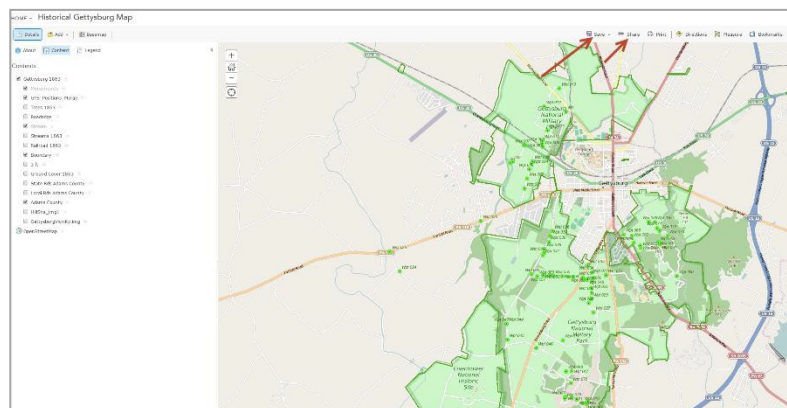


Figure 5: Gettysburg Map



Using a Feature Class Service with ArcGIS Online

- To complete this section a feature class service must be running on your server, which means that the server is connected to a relational database.
- The relational database that is used in this module is a Microsoft SQL Server, other types of relational database may be used, both open source and those from other vendors.
- Start a new map like in the previous exercise.
- Once again, layers will be added from the web, this layer needs to be a feature class layer.
- Note the path of this layer is different then used in the previous example since it is a Feature Service, see Figure 6.

- Click Add Layer
- Select a basemap, for this example OpenStreetMap was used.
- A new button now appears, for editing.

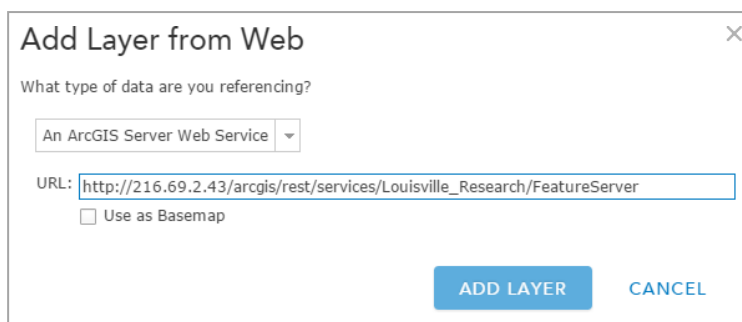


Figure 6: Adding a Feature Layer

- Click Save and Share
- Make sure the web map is shared with at least the class group. However, **not** with everyone. In a production environment, only select individuals would have editing rights. Because of the nature of this layer, the authors work will not be shared as a URL, since the data is on a relational database production server.

- In this example, the map cannot be embedded because it is not shared with everyone see Figure 7.

- Copy the link to the map, which will be used shortly.

- Click Done to exit this screen.

- The edit button is a new item that was not previously available when the map service was created.

- The software realizes that a feature class service is being used and thus modifies the ribbon, see Figure 8.

- Click on the Edit button.

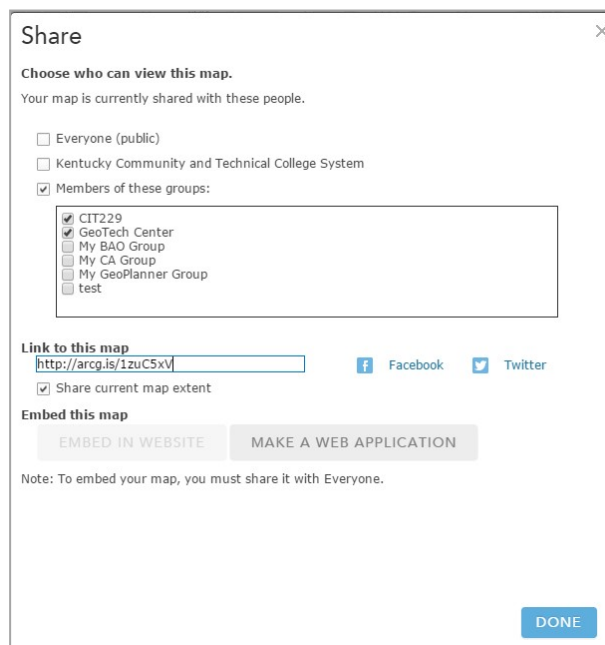


Figure 7: Share

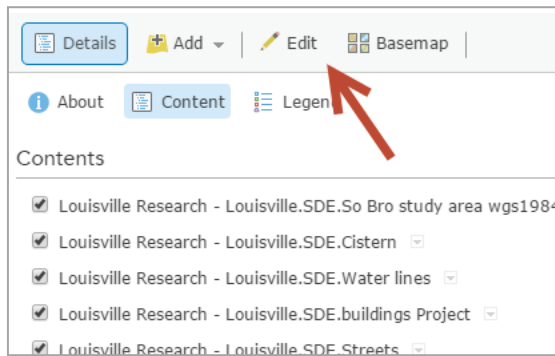


Figure 9: Edit Button

- Each of the layers shows details about them in the left hand panel, see Figure 9.
- Click on any icon, this enables the ability to add new features on the map.
- For example clicking on the Cistern icon, gives the ability to add Cisterns to the map.
- Click on any object on the map, at the bottom of the map the selection will be visible.

- In Figure 10, the editing characteristics of an item is visible. If more than one object is at the same general location the user must select the item, which will be edited. Note this window shows the first item of three, the building layer, the other layers are not visible.

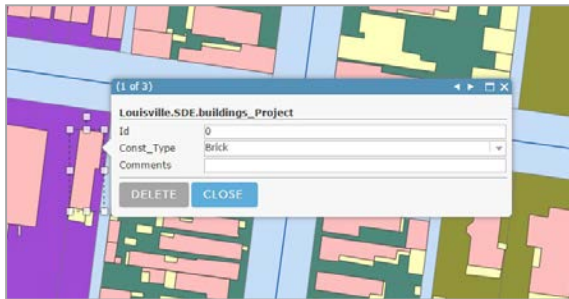


Figure 10: Editing Objects



Figure 8: Layers

- Save the changes on the created map, note no hyperlink is provided for the example shown by the instructor since this is a production map.
- Open a new browser window
- Paste the map URL that was obtained while sharing. Since this map has not been shared to the general public, logging in will be required. In general, never share a feature class to the public (everyone) as this will allow everyone the ability to change the map and thus can cause major problems.
- Return to the sharing page and click on make a web application to see the results.



Web Application

- Creating a web application can be done with either a map service (non-editable) or a feature service.
 - The difference between these two types of maps will be in the ability to edit the map. A feature class can be edited and a map service cannot.

- The left part of the screen of the Web AppBuilder is displayed in Figure 11.
 - Some items have been configured and each tab will be discussed to show how to configure this viewer.
- Selected is the Theme Tab
 - Additional themes may occur as future development continue.
 - The Theme Tab is selected and the color black was chosen for the boarder
 - The buttons location was selected to be on the left side (1, 2, 3)
 - Always save before moving to the next tab.

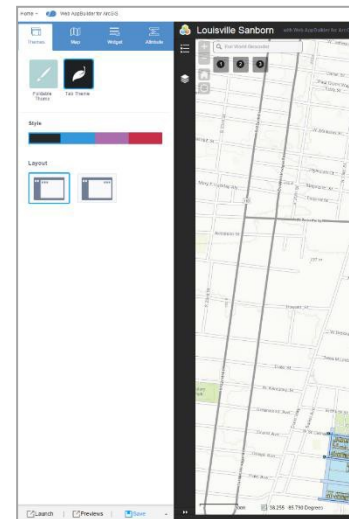


Figure 11: Web AppBuilder

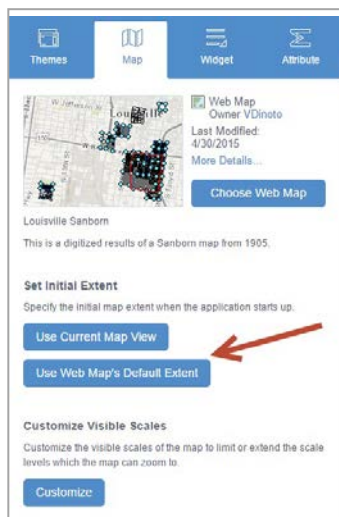


Figure 12: Map Tab

- Select the Map Tab, see Figure 12
- On this screen, the initial view will be set.
- There are basically two choices
- If the current map view is selected the user will see the map that was on the designers screen.
- The default view will zoom to the data source level, i.e. insuring that all data points are visible. This will allow the view to change as data is added or removed from the map. This makes the map more functional as the view dynamically changes. It is suggested to use the default extent.

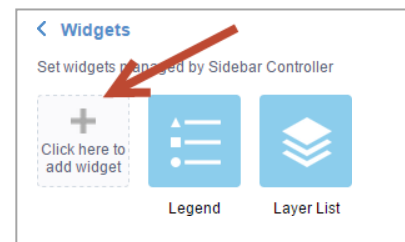


Figure 13: Widgets

- Click on the Widget Tab, see Figure 13.
- There are three basic areas of configuration.
 - The sidebar Controller is a black vertical bar on the left side used in this example.
 - The other widgets.
 - The three button on the upper left corner.
- Each of these three areas of widgets will be explored.
- Click on the arrow to the right next to the Sidebar Controller, see Figure 14.

- There are two widgets already installed on the left side vertical bar.
- Click add widget, see Figure 15.
- These widgets can be added to the vertical bar. Add widgets that are desired. Be both creative and functional.
 - About, Basemap, Bookmark, Edit (are not available for a map service), Measurement, and Print will be added to the author's map.
 - Click the first icon and press the control key, then select other icons.
 - Each icon selected should be highlighted, Press Ok

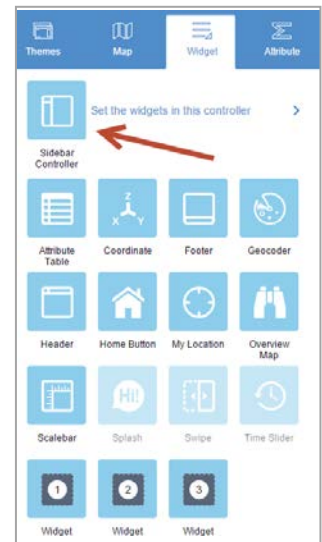


Figure 14: Controls

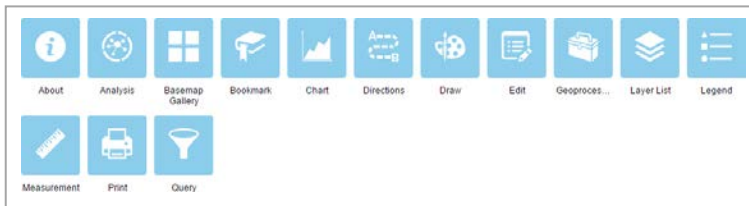


Figure 15: Tools

- The icons should appear on the vertical bar. Only a limited number of icons will appear and the rest can be accessed from the last icon.

- Return to the previous window of icons.
- As you hover over the middle set of icons, an edit pencil will appear, each icon has a different edit window that will open if selected. Some of these items should be placed on the actual map.
- Select the items to add to the map.
- The author added:
 - Overview, coordinates, home button, my location, and scale bar
- Click on the first of the three number buttons to place widgets here.
- Since the vertical bar has a limited amount of space, the author decided to remove the edit, basemap and bookmark icon from the vertical bar and place them in the numbered icon boxes. Make sure work is saved periodically.
- Click on Attributes.
- In Attribute Tab, see Figure 16.

- Change the logo (not done in this example)
- Title the map
- Subtitle
- Add a hyperlink
- Save after making these edits
- Click Preview
 - The preview window can shows how the map will look on a smart device.
 - The QR code allows the developer to look at the map on an actual smart device.
 - Edit if needed
- Click Launch

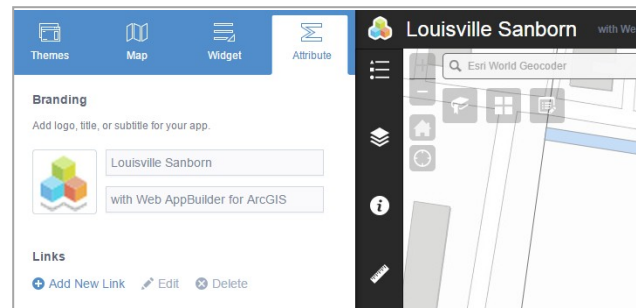


Figure 16: Logo

The data pathway for the feature class is the following:

1. Data is stored on an SQL server behind a firewall.
2. Data is served to a public facing ArcGIS Server.
3. ArcGIS Online consumes the service and using the Web App displays the data. AGO can function as a feature service provider or can provide a data stream from an ArcGIS Server.

Assignment

- Provide the instructor with a URL to the web application with the editable layers that were created and as well as a screen image. Creativity and functionality will be the criteria used by the instructor to score this assignment.



Creating a Collector Application with ArcGIS Online

- Collector is a smart device application that is used for gathering field data, utilizing the built in GPS of the smart device or connecting to an external antenna.
- Collector requires a feature class service from either the designers relational database or from AGO.
 - ArcGIS Online can provide a feature class service or can connect to the created feature class service on the ArcGIS Server. In this example, the service will be completely contained on AGO.
- It is suggested that data be collected with an existing Collector application before creating one to understand how Collector functions. Instructors can provide access to apps developed by the GeoTech Center.
- It is suggested that the initial map be created on ArcGIS desktop and domains (pull downs) be used where applicable and then publish the map to ArcGIS Online.

- Once the feature service is active, a map should be constructed to use on the Collector application.
- A good tutorial to use as a reference: <http://doc.arcgis.com/en/collector/android/create-maps/create-and-share-a-collector-map.htm>
- Sign into AGO, locate the feature layer that will be used, click Open and select add layer to a new map.
- The map should zoom to the region in which the data is going to be collected.
- Select a basemap, in this example OpenStreetMap will be used.
- Collector uses the data in a feature map set. The map that is being used is Automotive Collisions in Adair Co., KY from 2012.
- Configure the feature layer, highlight the layer name and click the three dots.
 - Configuring the Pop-up is very important.
 - It is always important to define Domains (lists that can be used in a pull down) created in ArcMap Desktop, this gives the user only a set of choices. This makes the application much easier on a smart device in the field; it also eliminates misnaming and typographical errors.
 - Share the map and then save.
- On a smart device (Apple or Android), download the Collector App.
- Run the Collector App which will require signing in to your AGO account.
- Collect the data that will appear on the online map.
- The ideal way that field data collection should work in an enterprise production network would be somewhat different from the application that was created using ArcGIS Online as your data repository.
- In a production network,
 - The data would be stored in a relational database that would be protected by a local firewall. **Never give a relational database server a public IP Address.**
 - Build a feature service on an Enterprise level ArcGIS Server.
 - Create a map on ArcGIS Online that displays the data.
 - Using the Collector App to modify/add data in the field (to access the information requires a login), which would send the data directly back to the relational database server.
- In some field data collection cases, it may require an approver to view the data before it becomes live. For example, a utility worker making modifications to the electric substation might require a supervisor's approval.



- A live map would be created from a Map Service (not feature service) on an ArcGIS Server that would display the information for a general audience. The live map could be created either through AGO or the developers webserver.

Case Study

- Define a real world problem
- Create a complete functional diagram of how enterprise level field data collection would be done and the viewable results displayed on a Flexviewer online map for the general public. Make sure to label which services are editable and which are not.
- Create an ArcGIS Online Map that can be utilized in Collector, put it in the proper course group and provide the name to your instructor. The student will determine what will be collected.
- Create ArcGIS Online Web Mapping Application and provide the URL to your instructor and your fellow classmates.



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