Implementing Collector for ArcGIS: Lessons Learned

CHESAPEAKE

• ENVIRONMENTAL MANAGEMENT, INC. •

Applying Practical Science to Improve Communities

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Chesapeake Environmental Management, Inc.

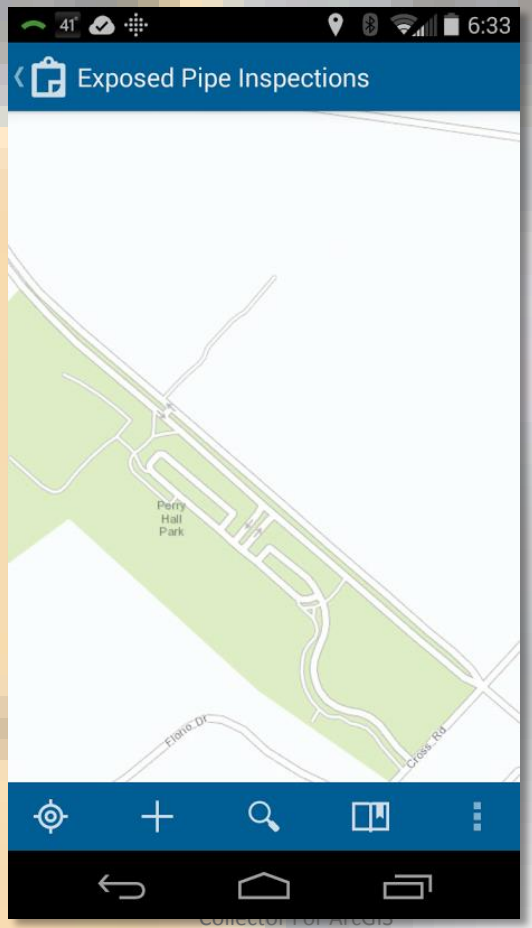
- Founded in 1993
- Headquartered in Harford County, MD (Staff 50+)
- MBE Woman-Owned Small Business
- Maryland Top 100 MBE in 2006, 2008, 2010, 2012 and 2013
- SBA MD Small Business Person of the Year (2014)
  - Stephanie Hau: President and CEO
- MSGIC Corporate Sponsor
- Relevant Technical Services
  - Natural Resource Assessments & Permitting
  - Environmental Site Assessments (ESA)
  - Asset Protection/Stream Stabilization
  - NEPA Documentation/Permitting
  - Information Technologies (GPS/GIS)
  - Engineering and Landscape Architecture

Overview

- Collector for ArcGIS
  - Free app for iOS and Android
  - Allows clean interface for mobile editing of maps hosted by ArcGIS.com
  - Requires Organizational ArcGIS.com login
- ArcGIS.com
  - “ArcGIS Online is a collaborative, cloud-based platform that allows members of an organization to use, create, and share maps, apps, and data, and access authoritative base maps and ArcGIS apps” – Esri
  - Web mapping platform with a collection of geoprocessing tools and layers that can be used to create and share maps.

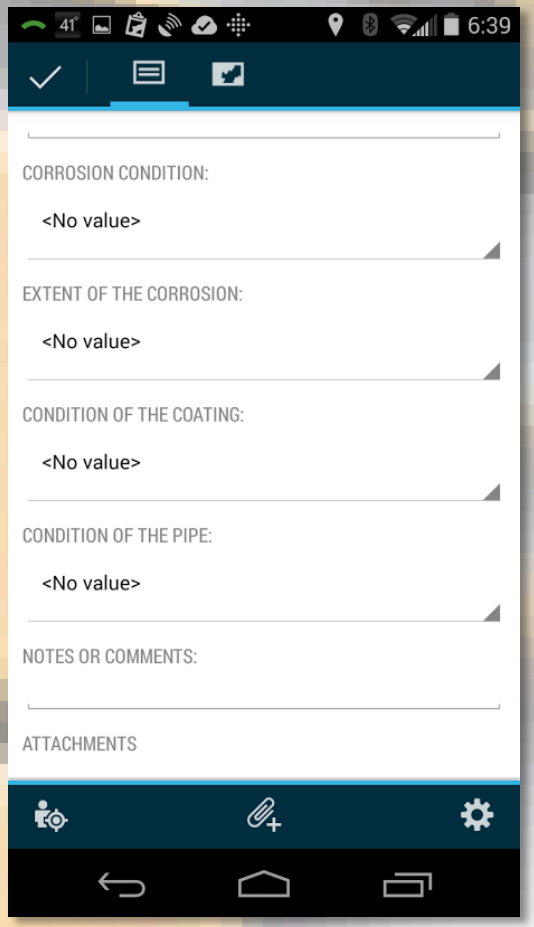
Why use Collector?

- Easy-to-use interface
  - It's on familiar operating systems (iOS and Android), with familiar functionality and interface



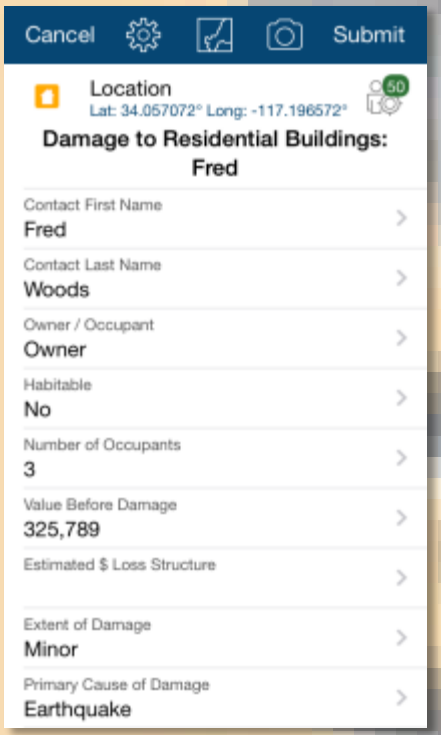
Why use Collector?

- Clear layout of attributes with little setup
  - Out-of-the box clean interface with a natural workflow. Touch where you want to create a feature, attribute entry immediately begins.

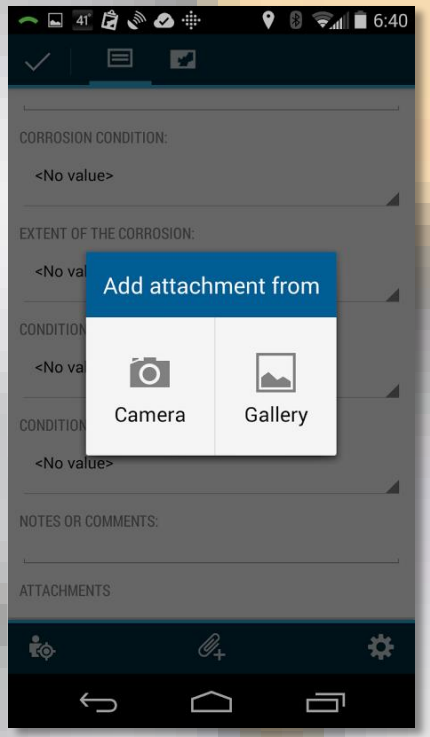


Why use Collector?

- Easy photo integration
  - Because it's on mobile operating systems that users already know, they will recognize common icons to capture data. Photos are easily integrated into attribute table.



iOS



Android

Why use Collector?

- Available on many devices
  - iPhone, iPod, iPad, iPad Mini, Android phones and tablets
  - Sometimes the best device for the job is “the one you have with you”

Can Use External GPS with Collector for ArcGIS

- Trimble Pro XT
- Trimble GeoExplorer 6000 and 7000 series
- SX Blue

(We were unsuccessful with a Trimble GeoExplorer 7000 using Android OS with Bluetooth connection)

Two ways to use ArcGIS.com:

- Data hosted by Esri
  - Using your organizational login, create data layers or upload shape files to be edited with the app
    - Data is stored on Esri's servers
- Host your own data as map services through ArcGIS.com
  - Create an MXD using ArcGIS for desktop and then publish it to ArcGIS for Server.
  - Create a map service using ArcGIS for Server
  - Add that map service to an ArcGIS.com map under an organizational account that you have access to
  - Edit the data in your map service under the organizational login.

Using Collector to edit a service:

- Need to have an ArcGIS for Server license
- Create maps using familiar tools in ArcGIS for Desktop
- Data remains “locally” housed on your own servers
- Maintained in an SDE database vs managing shape files
- Might be more difficult to manage, depending on familiarity with databases

Real world examples:

- NPDES
  - Task in Anne Arundel Co., MD required that we edit existing SWM features as well as have the ability to add new and proposed features
  - Connectivity was not an issue- field crews were able to work online the entire time
  - Users unfamiliar with GIS were able to use the Collector app with minimal training
- HAZMAT site identification
  - Task in Prince Georges Co., MD required ability to identify and mark HAZMAT features near site of proposed water tank
  - Field crews had cellular connectivity, but the connection was very slow. Offline editing was not needed, but this was a case where it almost was.

Frank Bowne, GIS Developer

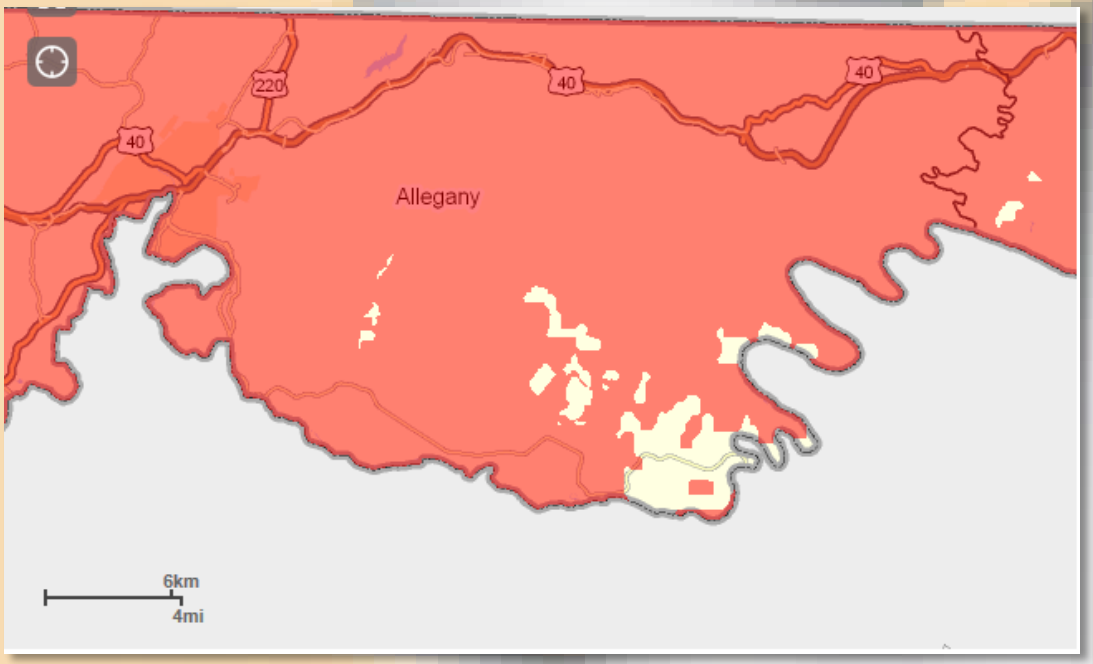
Prep Data

- Data prep is the most important and time consuming part of Collector for ArcGIS
- Because the whole point of Collector is collecting and editing, the data must be an editable ArcGIS Map Service with **Feature Access Capability** often referred to as a Feature Layer or Feature Service
- If all of your data is view-only, you don't need Collector. *ArcGIS Online* for iOS or Android is sufficient

Prep layer for Offline (On Device) Use

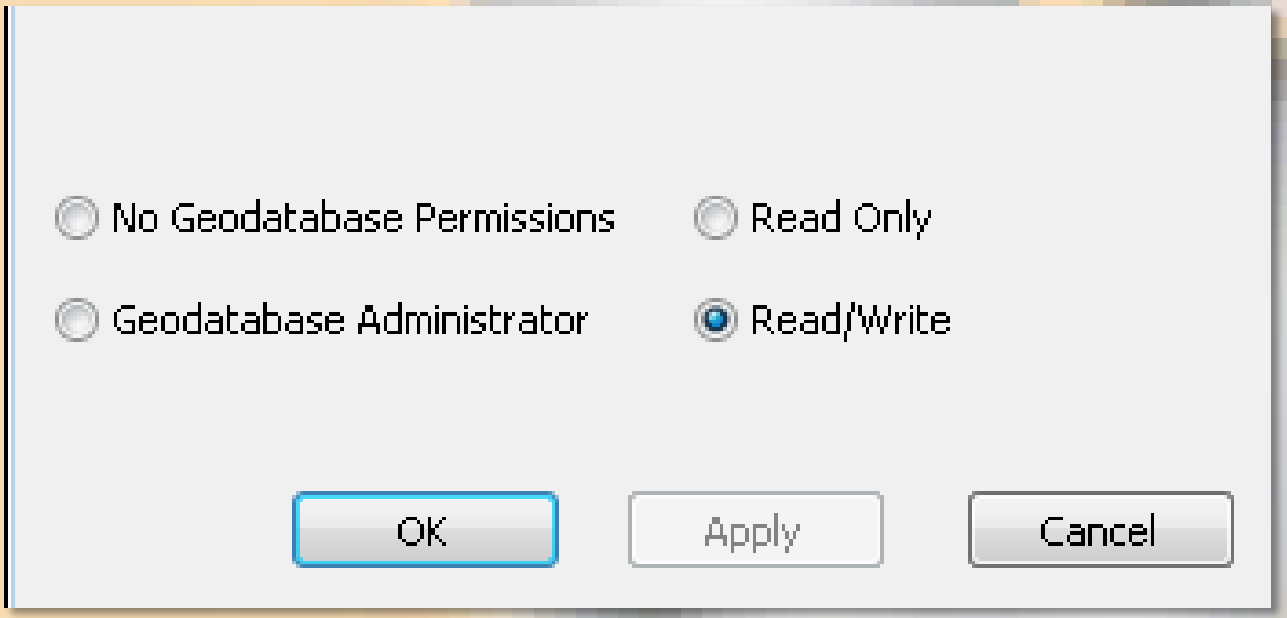
Coverage

- You will want Offline enabled unless you are positive your broadband provider has 100% coverage in the geographic area you are going to collect in



SDE data

- The Layer in ArcMap must be Sourced to a SDE data connection/feature class that has read/write privileges using a DB authenticated (not OS) user even if you don't want to edit it in Collector



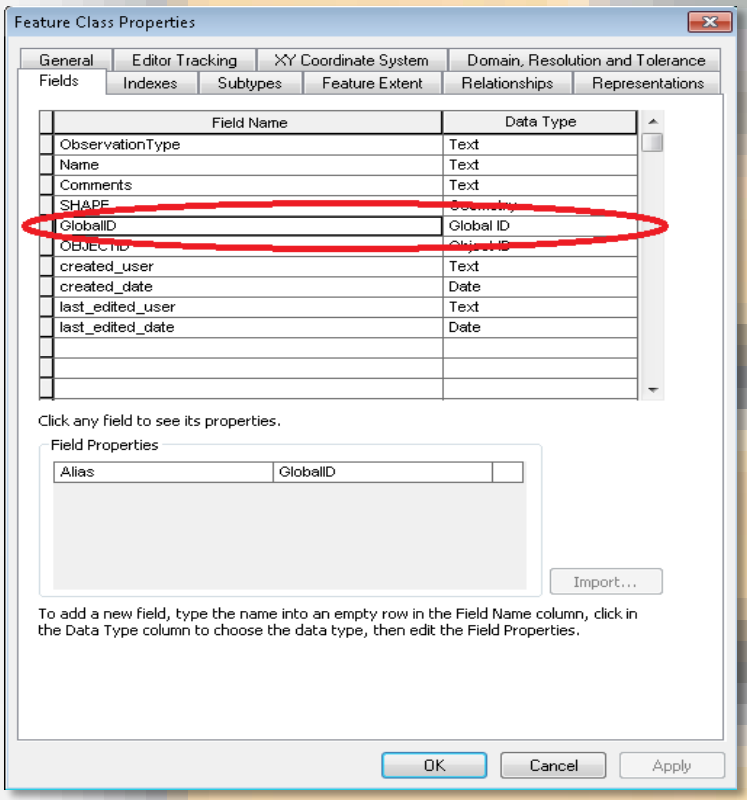
Web Mercator

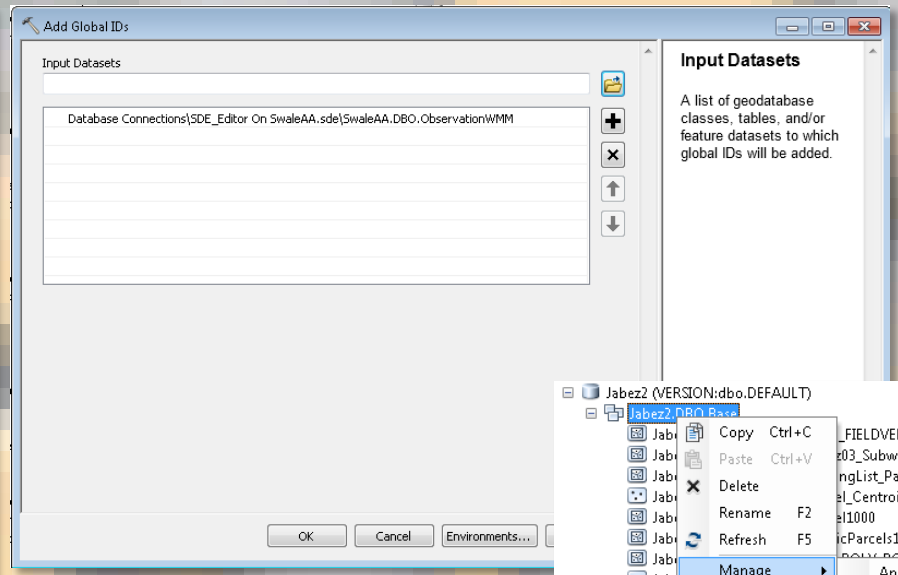
- If your layer is going to be a Feature Service **using tiles from a cache** and overlaid in the web Map with the *ArcGIS Online/Bing Maps/Google Maps* Tiling Scheme your layer should be WGS_1984_Web_Mercator_Auxiliary_Sphere

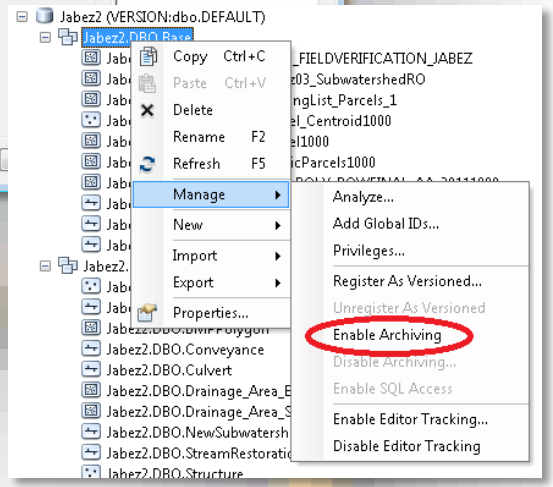
Global ID, Archive Enabled

The feature class must:

- Have a globalid column
  - Run GeoProcess Tool: Add Global IDs
- Be Archive Enabled

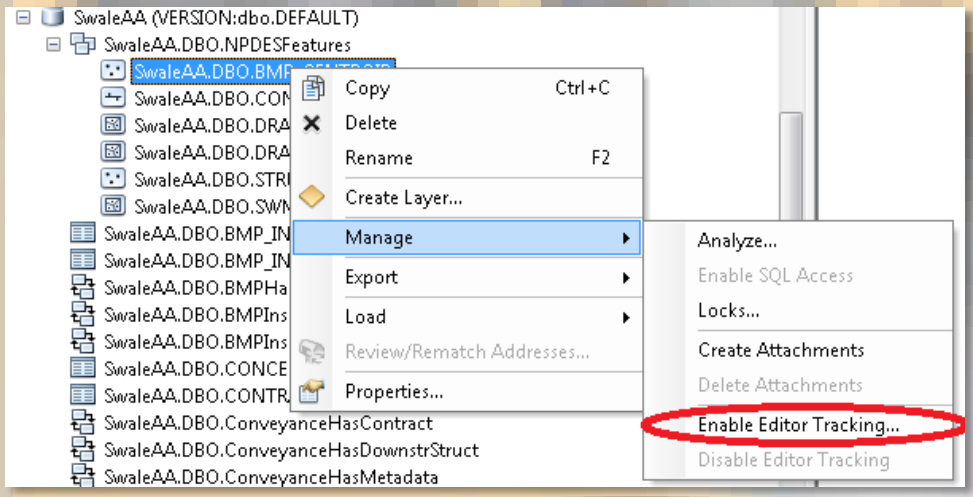




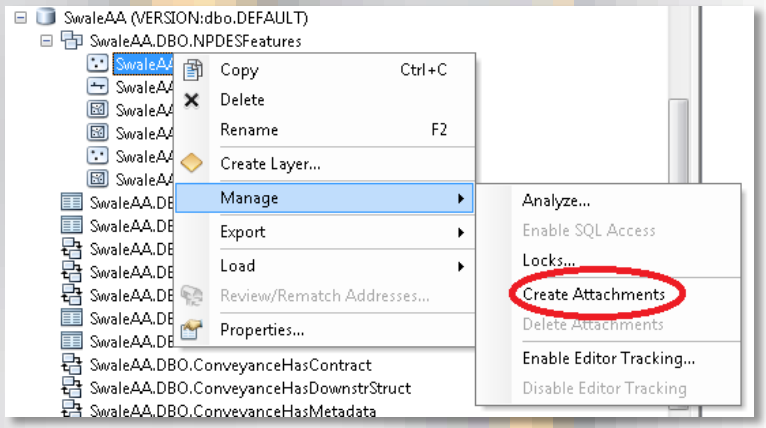


Optional

- The feature class optionally may have:
- Editor Tracking

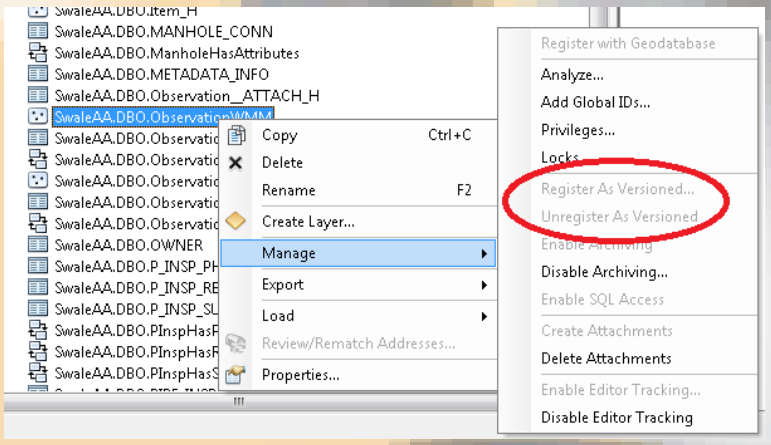


- Attachments Enabled (Do this after Global ID creation and Archive Enabling)

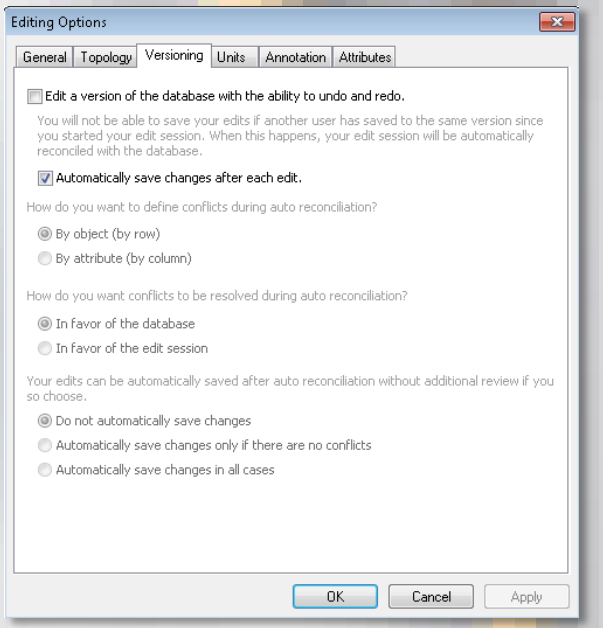


No Versioning

- The feature class must not be Registered as Versioned

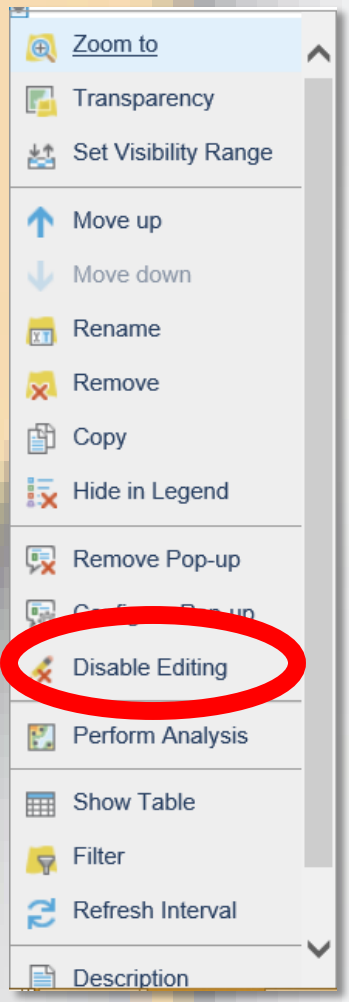


- In ArcMap, untick “Edit a version…”



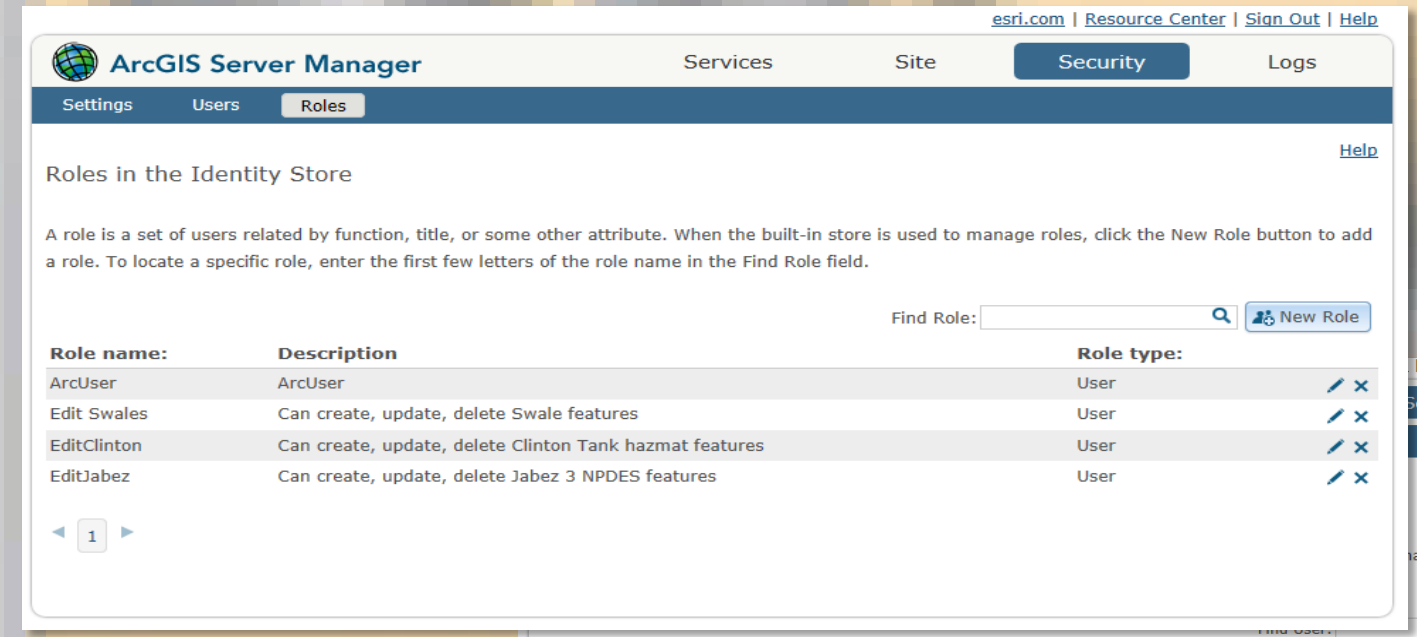
Publish Service

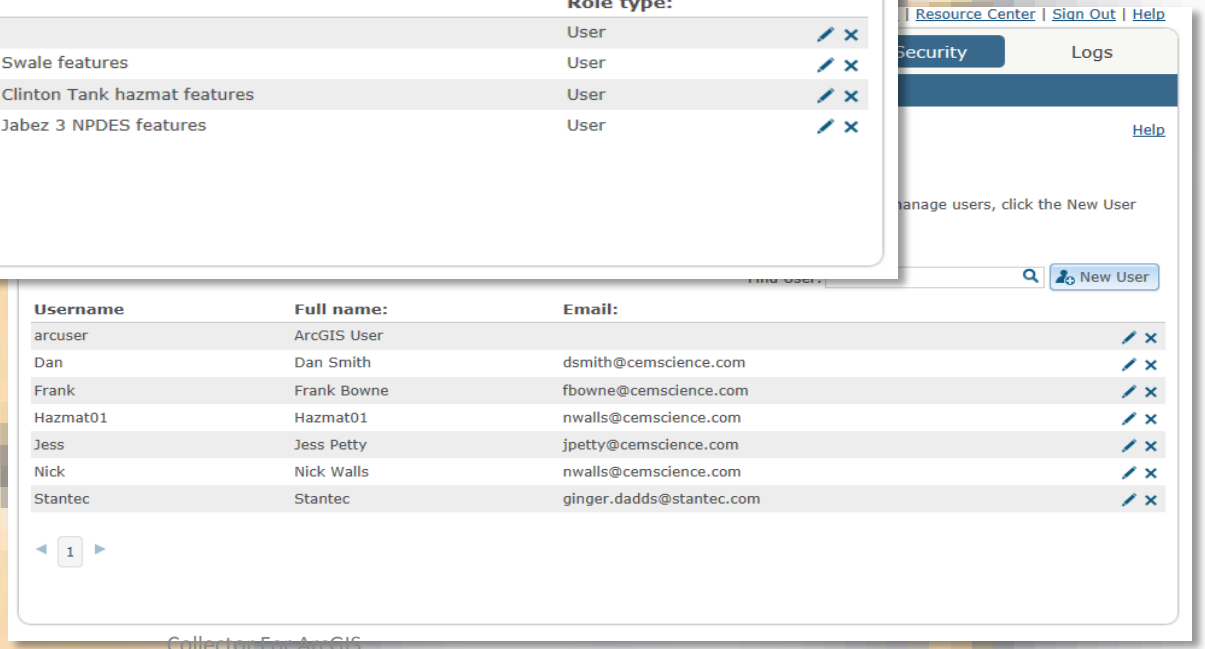
- Publish your layer to a Service that has Mapping **and** Feature Access capabilities
- The Feature Access capability **must** have these Operations and Properties allowed even though you don't want to edit the feature class in Collector.
    - Sync
    - Query
    - Create
    - Update
    - Delete
- If you don't want to allow editing attributes, once in the Web Map in ArcGIS OnLine, in the Table Of Contents you can click the down arrow and then *Disable Editing*.



Service Security

- Using ArcGIS Server Manager:
  - Create Roles





- And Users and assign them to Roles

Create Web Map

- In ArcGIS Service Manager go into your service and under capabilities click on Feature Access
- Copy the REST URL into paste buffer, e.g., https://cem-gis-web:6080/arcgis/rest/services/MDSHA/SwaleBaseAA/FeatureServer
- In your Web Map in ArcGIS OnLine :
  - Add layers
  - Add layer from web
    - URL: paste in the above URL but change the Intranet URL

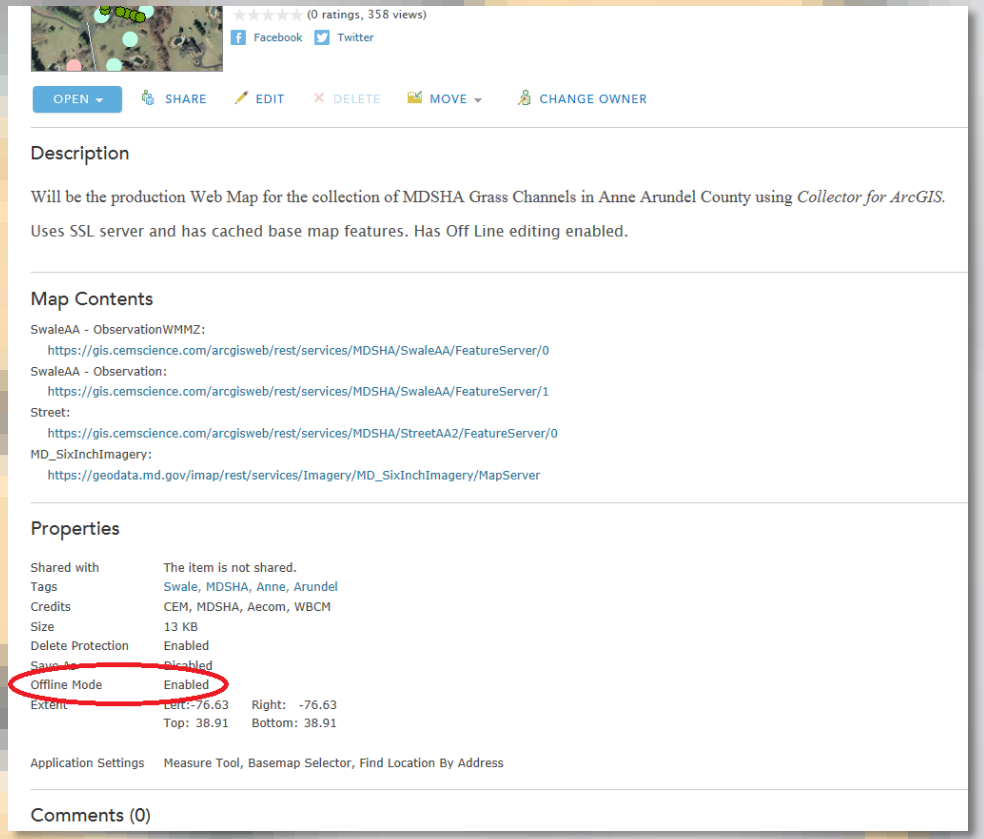
      "https://cem-gis-web:6080/arcgis/rest"

      to the Internet URL

      https://gis.cemscience.com/arcgisweb/rest
  - Save
  - Share
    - Don't share with anyone at this stage (tick all boxes off)

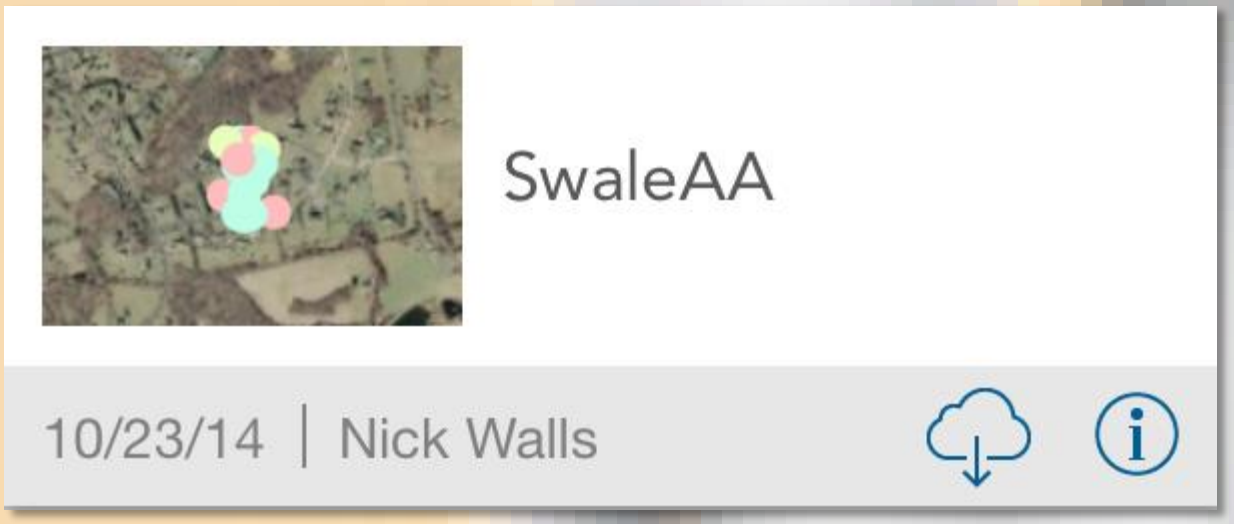
Check Your Web Map is Offline Enabled

- In ArGIS Online;
  - Click *About* and More *Details…*



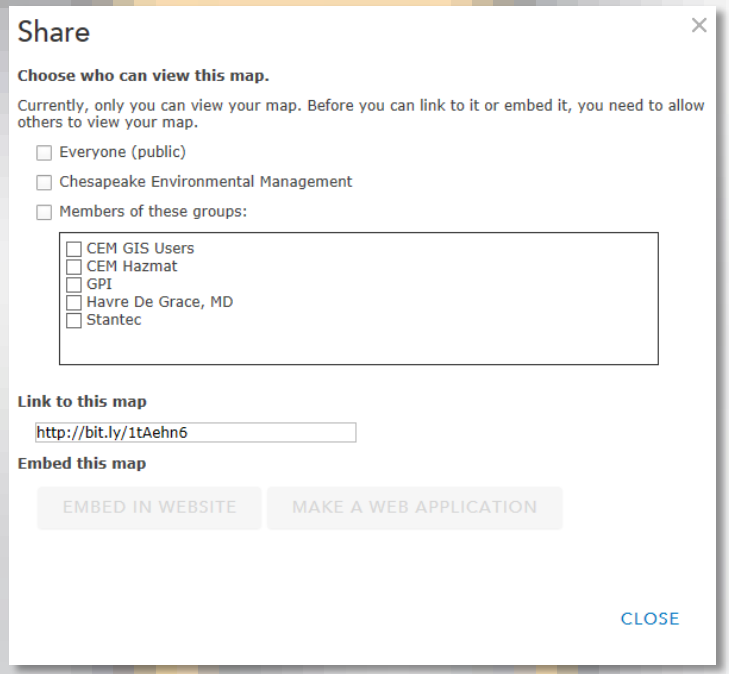
Test

- Start ArcGIS Collector
  - Login to the Web Map's owner account
  - You will see your Web Map
    - If it is offline enabled, you will see a cloud and arrow icon



Share

- If everything works, go into ArcGIS Online and:
  - Invite members to your Organization
  - Create Groups
  - Invite users to the Group
  - Open the Web Map In Map Viewer and
    - Share with:
      - Everyone
      - Just your organization
      - Members of one or more Groups



If you enabled attachments before enabling Global Ids you will get theses errors in Collector:

- iOS
  - "1 attachment could not be sent" from iOS:
  - SEVERE Aug 21, 2014, 2:52:24 PM Unable to process request. Extension not found Rest
- Android
  - "1 attachment failed to upload" from Android:
  - SEVERE Aug 21, 2014, 2:54:36 PM Unable to process request. Error parsing multi-part request Rest

Map Download Failed Error

- Got error trying to download to device in Collector for offline use:
- Map Download Failed. Unable to download the map. This map does not support being downloaded to a device. The operation couldn't be completed. (AppFramework error 5.)
- Even though Offline Mode Enabled in Web Map and Cloud icon appears in Collector 
- Cause:
  - Map contained MdImap2 Six inch ortho service
  - Using Esri "Imagery With Labels" base map works ok.

Z Aware Feature Class

- If you untick “Apply Default z values“ in service creation, when you go to add a new feature in Collector, you'll get: *“Update Failed. Updates could not be sent. Unable to complete operation, geometry does not have z values or has null values.”*
- If you tick “Apply Default z values“ in service creation and make it 0, and you add a new feature in Collector there is no error message. Then look at its Sketch Properties in ArcMap. It didn’t collect the z from the gps collection. It is 0. (And no, I wasn’t standing at sea level)
- Per Russell Roberts, Product Engineer on the Apps Group at ESRI, Mar 21, 2014: “The Collector app currently does not support m/z values.”

Sub Meter GPS Data Capture (Android)

- *Trimble GeoExplorer, GeoXT, SX Blue, etc.* GPS receiver - $3000-$6000+
- NMEA Output option (GeoExplorer 6000) $495.00
- Android Tablet $150.00+
- Mobile Hotspot (MiFi) $49.99 (with 2 yr. contract)
- *Bluetooth GPS* software for Android $0
- *Collector For ArcGIS* software $0
- ArcGIS On Line Subscription (up to 5 users) Included in existing ArcGIS Server 10.2.2 license)

Sub Meter GPS Data Capture (iOS)

- *Trimble GeoExplorer, GeoXT, SX Blue, etc.* GPS receiver - $3000-$6000+
- NMEA Output option $495.00
- iPad Tablet
  - GPS Cable from Aman Enterprises $250.00-$350.00
  - iSXBlue II GNSS – Bluetooth compatible with iOS devices $3000.00+
- *Collector For ArcGIS* software $0
- ArcGIS Online Subscription (up to 5 users) Included in existing ArcGIS Server 10.2.2 license)

Conclusion

- Collector for ArcGIS is a clean, easy to use app without a steep learning curve that is available on many devices.
- Has some limitations- sometimes you will still need a custom ArcGIS 10.x Engine app if you have complex business requirements that Collector cannot handle
- Connecting to external GPS seems to be something that users want to do. It seems like it should be easier. Android requires an additional, non-Esri app to override bluetooth stack.
- Awkwardly named. “Collector for ArcGIS” can be difficult to search on to find answers. “Collector” is too generic.

Contact

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