

Introduction to Field Data Collection using Collector for ArcGIS

Reference Guide

Achieving proficiency using ArcGIS Online and Collector for ArcGIS requires a certain amount of dedication to understanding the capabilities of this software. To help enhance your training experience, this Reference Guide provides a variety of definitions, tips, recommendations, and links to additional resources. To get the most out of your training experience, please take some time to refer to this guide as you acquaint yourself with the various options and settings you'll find in and Collector for ArcGIS. We hope that the information contained here helps put you on the path to getting the most from these powerful GIS tools.

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Key Terms

- **AGOL** – ArcGIS Online, a web-based mapping platform for creating and sharing interactive maps.
- **Arcade** – A scripting language that can be used to perform calculations and create custom visualizations in ArcGIS Online and ArcGIS Pro.
- **Attribute Table** – Table associated with a spatial layer that stores information about each geographic feature.
- **Authoritative Status** – Organizational status indicating that data is official, accurate, and current.
- **Basemap** – A collection of layers that serve as the contextual background for a map. Base maps often include roads, political boundaries, cities, and water features.
- **Cloud-based** – Applications and services that are on-demand and made available via the internet.
- **Credits** – Esri’s currency for using tools and data hosted on their cloud infrastructure.
- **Esri** – Company that develops ArcGIS products.
- **Form** – Interface for adding attribute information in Collector for ArcGIS.
- **Geodatabase** – A specialized database that stores spatial data as well as tables, relationship classes, and domains.
- **ArcGIS Online Groups** – A collection of ArcGIS Online content such as data layers, maps, and apps. Groups are used to facilitate shared access and collaboration among specific groups of users.
- **Hosted Layers/Hosted Feature Layers** - Layers that have been published or shared to ArcGIS Online.
- **Layer** – Collection of spatial data that is added to a map.
- **List** – Predefined set of values used to populate fields; also referred to as pick lists or domains.
- **Living Atlas of the World** – Collection of data layers hosted on the ArcGIS cloud.
- **Maryland Open Data Portal** – The [Maryland Open Data Portal](#) provides centralized access to thousands of datasets made available from agencies throughout the State of Maryland.
- **MD iMAP** – The [MD iMAP](#) platform provides centralized access to Geographic Information Systems (GIS) resources maintained by the State of Maryland and the broader GIS community throughout Maryland.
- **ArcGIS Online Organization** – An ArcGIS Online organization is used to share maps and facilitate collaboration. State of Maryland employees and contractors have access to the State of Maryland’s ArcGIS Online Organization.
- **Query** – A request for information from a database.
- **REST** – REST stands for Representational state transfer. REST is a protocol used for sharing data over the internet.
- **Shapefile** – Standalone GIS file that stores geographic locations and attribute information.
- **Sharing** – Content in ArcGIS Online can be private, shared to an ArcGIS Online group, shared to the ArcGIS Online organization, or shared to the public. When content is shared to the public, no sign in is required.
- **Spatial Query** – A request for information from a database based on location or other spatial properties.
- **SQL** – Language used to query or otherwise interact with a database.
- **Symbology** – Use of symbols, shapes and colors to represent map features; also referred to as style.
- **Web Map** – An interactive map accessible via a web browser.

Planning for Data Collection

- What needs to be collected? What attribute information will be attached to the spatial data?
- What data already exists? Do any relevant ArcGIS Online data templates exist?
- If others will be collecting features, share content to an ArcGIS Online [group](#).
- Will collectors need the ability to add photos or other attachments? If so, enable attachments on the overview section of the layer's item details page.
- Will collectors need the ability to use Collector offline? If offline/disconnected editing is needed, ensure your data and map are prepared to work offline (see [Going Offline](#) below).
- Does information need to be stored in related tables?
- What level of accuracy is needed? Is high accuracy collection needed? See the [Fieldwork Checklist](#) and [External GPS Receivers](#) sections below.

Fieldwork Checklist

- Before conducting fieldwork, test your map in the Collector app to ensure you can collect features. A few aspects you may want to verify are:
 - Data collection form – Collect test points to ensure that appropriate values can be entered in the form, and that any lists or ranges are functioning properly. If applicable, test adding photos or other attachments.
 - Symbology – Ensure the color, size, and shape of symbols are clear and discernable.
 - Labels – If labels are in use, ensure that they are legible against the basemap and other layers.
 - Scale – Make sure symbology and labels are visible when zoomed in as needed for data collection.
 - Bookmarks – Test that bookmarks zoom to the appropriate area (or if additional bookmarks need to be created in the web map).
 - Map clean up – Any layers that are not pertinent to the data collection effort should be turned off or removed from the web map.
- Experiment with accuracy settings.
 - Default accuracy is 30 feet. It is recommended to set the accuracy to 15 feet, review results, and adjust accordingly.
 - If high accuracy collection is needed, set up your GPS receiver and check that the GPS metadata is correct (see [External GPS Receivers](#) below).

Troubleshooting

- Does Collector have permission to use my location?
- Am I signed into my State of Maryland organizational account?
- Has the web map been saved?
- Does the map have the *Use in Collector for ArcGIS* setting enabled (Item details page > Settings)?
- Has editing been enabled for the data collection layers (Item details page > Settings)?
- Have attachments been enabled for the data collection layers (Item details page > Overview)?
- Am I a member of the ArcGIS Online group where the maps are located?

Best Practices Summary

Managing your data

- Create folders on your My Content page to organize maps and layers by project.
- Work through all sections of the layer's item details page to describe and configure your layer.
- **Overview:** Fill out the **Summary**, **Description**, **Tags**, **Credits**, and **Terms of Use** sections to help others find and interpret your data.
- **Data**
 - If possible, create a list to provide field collectors with a list of predefined values to choose from. This makes data collection more efficient and ensures consistency.
 - For numeric fields, define a minimum and maximum value for numeric fields to prevent entry errors.
 - Fill out the **Field Description** and **Field Value Type** to help users interpret your data.
- **Visualization**
 - Set default symbology, filters, pop-up configuration, labels, and visibility range.
 - Use the **Save As New Layer** function to create an alternate view of the same layer. This view will have its own item details page.
- **Settings**
 - Enable **Delete Protection** to prevent your layer from being accidentally deleted.
 - Enable **Editing** to allow others to edit or to use in the field.
 - Edit the **Extent** to accurately reflect the geographic extent of your layer.
- Review results after capturing and adjust accuracy as needed. Lower accuracy values are preferred, but not always necessary.
- Avoid deleting features in the field. Instead, create a field where collectors can flag features for deletion.

Managing your web map

- Review and refine layer names, symbology, basemap option, and pop-up configuration prior to field collection.
- Work through all sections of the web map's item details page to describe and configure your web map.
- **Overview:**
 - Use the Overview page to indicate that this map is in use as part of a field collection project.
 - Additional information can be added to the **Summary**, **Description**, **Terms of Use**, and **Tags**.
- **Settings:**
 - Use **Delete Protection** to prevent your web map from being accidentally deleted.
 - Edit the **Extent** to accurately reflect the extent of the web map.
 - Check the **By Layer** box to configure location searching using information in a layer attribute table (e.g., name or asset ID).

Configuring pop-ups

- When possible, set up default pop-up configuration on the layer's item details page (Visualization).
- Uncheck **Display** to hide any fields (columns) that are not needed for field collection.
- Uncheck **Edit** for fields that should be visible to collectors but not editable.
- Reorder fields so that they are in a logical order for field collection.
- Update field aliases to be readable and include units.
- Add a **Hint** to help collectors in the field.
- For numeric fields:

- Use the **Format** dropdown to control the number decimal places that are displayed (default is 2).
- Check/uncheck the **Use 1000 Separator** checkbox to control whether the thousands separator (comma) is displayed.
- For numeric fields that store zip codes, phone numbers, or asset numbers, set the number of decimal places to 0 and uncheck the box for **Use 1000 Separator**.

Collector Links

Send a link via email or text message to open a map in Collector and zoom to a specific location. Visit the help documentation for more information: <https://doc.arcgis.com/en/collector/ipad/help/deploy-map.htm>

Use the following format to construct your link: `https://collector.arcgis.app?parameter=value¶meter=value`

Examples:

- Open the Collector training CollaborationMap using the web map's item ID (obtained from the map URL): <https://collector.arcgis.app?itemID=83c0052858264e168fdc5e4111047a6b>
- Open the Collector training CollaborationMap at a specific location: <https://collector.arcgis.app?itemID=83c0052858264e168fdc5e4111047a6b&referenceContext=center¢er=39.284961,-76.620733>

Going Offline

Sometimes data needs to be collected in areas with unreliable network coverage. Prepare your data and maps to make seamless edits when disconnected. Visit the help documentation for more information:

<https://doc.arcgis.com/en/collector/ipad/help/offline-prep.htm>

Before you begin:

- Offline mode cannot be enabled for web maps that contain MD iMAP basemaps, MD iMAP reference layers, or any other layer where offline use (sync) cannot be enabled. Esri basemaps such as Imagery, Navigation or Topography can be used instead.
- Consider creating two web map versions for data collection:
 - Connected/robust version: Contains MD iMAP and other reference layers and basemap.
 - Disconnected version: Contains only layers that can be enabled for offline use and an Esri basemap.

1. Enable your data for offline use.

- Hosted feature layers: Check the *Enable Sync* option (Item Details > Settings).

2. Enable your map for offline use.

- Toggle on *Enable offline mode* (Item Details > Settings > Offline).
- Use the *Advanced Options* section to specify whether attachments and the basemap are included when data is downloaded to the device. For more information see:

<https://www.esri.com/arcgis-blog/products/collector/field-mobility/increase-efficiency-going-offline-sync-collector/>

3. Options for offline data collection:
 - Add preplanned map areas in ArcGIS Online before fieldwork.
 - Create up to 16 polygon map areas (Map item details page > Settings) and download to the device. For more information, see the following blog posts: <https://www.esri.com/arcgis-blog/products/collector/field-mobility/collect-data-offline/> and <https://www.esri.com/arcgis-blog/products/collector/field-mobility/use-polygon-offline-areas-collector/>
 - On-demand map areas can be defined in Collector in the field (Overflow > Add Offline Area).
 - A basemap can be copied and downloaded to a device. A basemap tile package must be created in ArcGIS Pro or ArcMap to create basemaps that load quickly for offline field work. This is also known as sideloading, and allows downloaded basemaps to be used across multiple maps and across different user accounts (for cases where several users are sharing a device). For more information, see: https://doc.arcgis.com/en/collector/ipad/help/configure-collector.htm#ESRI_SECTION2_9DC8BD3DEEC1411D9D4027DED6678358
4. Configure Collector for offline use.
 - Download any preplanned map areas or on-demand map areas to the device prior to fieldwork.
 - If applicable, copy a basemap to the device.
 - Go to Profile > Download & Sync to configure sync options:
 - Enable/disable Wi-Fi Only syncing.
 - Enable/disable Auto-Sync to sync on the specified time interval (default is 15 minutes) as long as the device has a connection and the app is on screen. Enabling auto-sync is recommended.
 - For more information, see: <https://doc.arcgis.com/en/collector/ipad/help/configure-collector.htm>

External GPS Receivers

External Bluetooth GPS receivers can improve the locational accuracy of collected data. Prior to using an external receiver, additional fields should be added to the data layers to record GPS metadata.

In order to use an external receiver with the Collector app:

- Use the Settings menu on your mobile device (Settings > Bluetooth) to pair the receiver to the device.
- Use the Collector profile menu to change the location provider to use the receiver.
- Use the Collector profile menu to configure accuracy distance, confidence level, and GPS averaging (optional).
- Use this help page for more information: <https://doc.arcgis.com/en/collector/ipad/help/high-accuracy-prep.htm>

Esri Mobile App Overview

More information on Esri mobile applications can be found at <https://www.esri.com/en-us/arcgis/products/field-operations/>.

Collector for ArcGIS

- Map-based app for data collection in the field.

ArcGIS QuickCapture

- Simplified data collection app designed to capture location photos and other data at road speed.
- Linear and point features can be captured simultaneously.

Survey123 for ArcGIS

- Form-based app which allows users to answer a series of questions. A point is collected based on the location of the device and the responses are tied to that location.
- Surveys are created using the Survey123 web app or desktop app (Survey123 Connect). The survey has the ability to support skip logic and branching questions. The survey designer has the option to include a survey question to allow users to adjust their location using a map.
- Can be connected to Collector by configuring the collection data layer's pop-up to contain the Survey123 URL: <https://doc.arcgis.com/en/survey123/reference/integratewithotherapps.htm>

Tracker for ArcGIS

- Premium app which allows users to share their current location and past location tracks.
- Locations can be monitored via the Track Viewer web app.
- Locations captured on your device can be viewed in the Collector map by turning on the 'My Tracks' layer.

Workforce for ArcGIS

- Coordination app which allows mobile users to receive and respond to assignments and share their location.
- Dispatchers use a web app to create and send work assignments based on location.

Navigator for ArcGIS

- Premium navigation app which generates optimized routes and uses custom basemap and asset layers.
- Users can generate routes using custom road networks, as well as load preplanned routes (route layers).

Additional Training

Esri Training

Free Esri training is available at <https://www.esri.com/training/catalog>. To request access to Esri 'Maintenance' courses, visit: <https://imap.maryland.gov/Pages/training-esri.aspx>

MD iMAP Training

Visit the [MD iMAP](#) training page for training and documentation related to ArcMap, ArcGIS Pro, ArcGIS Online, and Collector for ArcGIS.

See the **Intermediate ArcGIS Online and MD iMAP** Reference Guide and course materials for more information on working with Maryland data in ArcGIS Online.

Export Features with Attachments

Use *Create Replica* from the layer's REST endpoint to export large datasets with attachments.

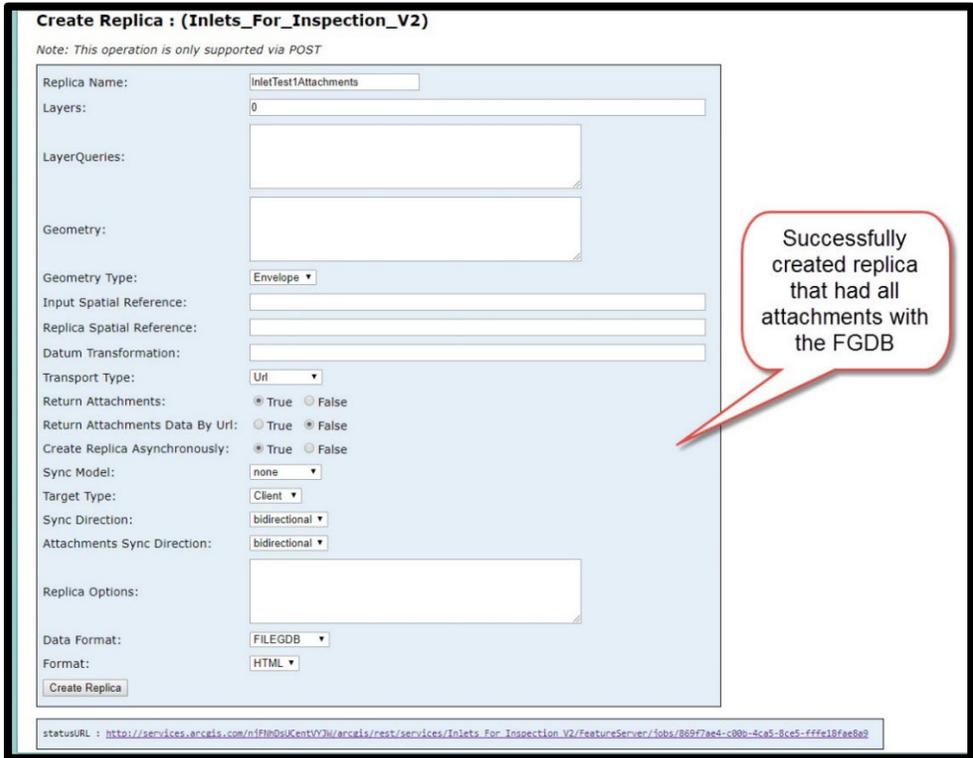
1. Go to the item detail page for the layer to be exported. From the Overview tab, scroll to the bottom. Under URL, click **View** to open the REST endpoint.



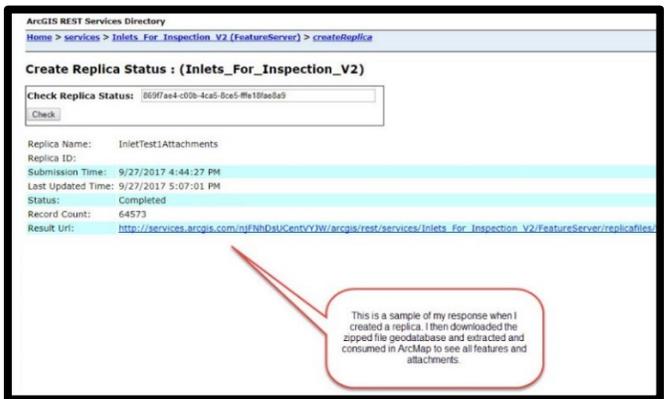
2. Scroll to the bottom of the page to the Supported Operations sections. Click **Create Replica**.



3. Update the Create Replica page to match the screen shot below. Click **Create Replica**.



4. Click the **Result Url** to initiate the download.



Note: A script can be used to batch export images or other attachments from a geodatabase. Download here: <https://bit.ly/2xaJnvP>