



Extending Survey123 for ArcGIS


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Why extend Survey123?

- Make smart forms smarter
 - Complex business logic
 - Focused user workflows
 - Integrate with other apps and systems
 - Automate processes
 - Corporate identity
 - Add new functionality
 - Change existing functionality
- 

Ways to extend Survey123

- Themes
- App links
- Imbedding into Web Apps
- Python
- Webhooks
- JavaScript Functions
- Re-brand the field app
- Modify the code!
- Add-Ins



Introduction to custom JS functions in Survey123 for ArcGIS

Some context first...

- You can use custom logic in the `pulldata()` function using JavaScript functions
- The output of your own functions can be used for:
 - Data validation
 - Calculations
 - Relevant statements...

Custom JS Functions

Demo

Common use cases

- **Query external web services**
 - Perform a point in polygon query to get the ZIP Code or Soil Type at a given location
 - Automatically get the local weather
 - Validate data entered by the user (A valid VIN number)
- **Execute complex operations locally**
 - Parse complex data structures (barcode values...)
 - Run sophisticated validation rules and mathematical models...

The basics (authoring 1 of 2)

1. Copy your JavaScript file into the survey's *extensions* folder.

- You can add as many parameters as you need
- You cannot use DOM or JS Frameworks in your JS functions
- You cannot make asynchronous calls to http resources
- You cannot access local files in your device

2. Invoke functions from an XLSForm expression:

`pulldata("@javascript","yourJSFile.js","yourFunction","parameter1","parameter2")`

Note: If working with Survey123 Connect, restart Survey123 Connect after you make changes in your JS file

The basics (authoring 2 of 2)

- Useful functions:

- pulldata("@json")
- pulldata("@property")
 - token
 - online
 - utcoffset (var utcOffset = - new Date().getTimezoneOffset)

The basics (using)

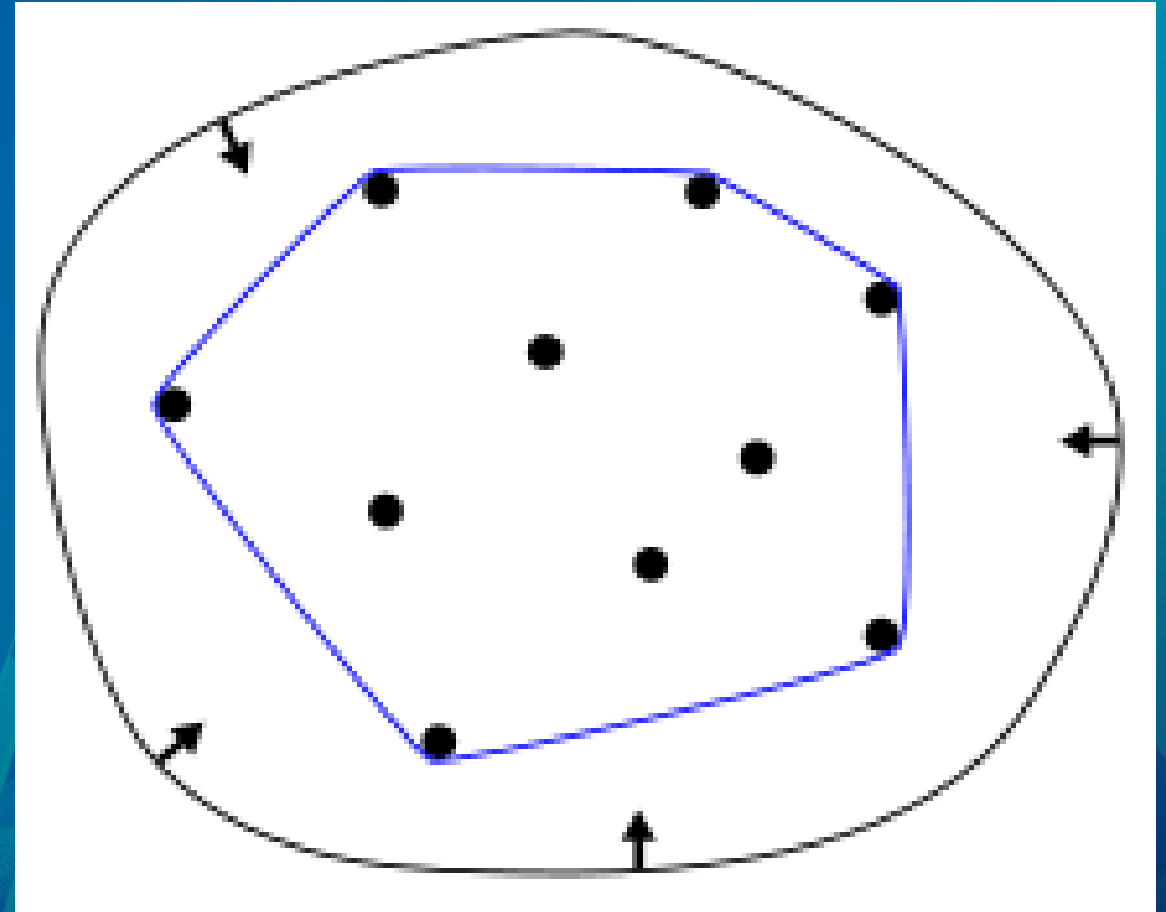
- Only the Survey123 Field App supports custom JS Functions (as of 3.3)
- End-user must be logged-in
- The JS Function must be hosted in the SAME Online organization as the logged-in user



Going further with JavaScript functions

Using JavaScript functions to create new geometry

- In mathematics, the **convex hull** or **convex envelope** or **convex closure** of a set X of points in the Euclidean plane or in a Euclidean space (or, more generally, in an affine space over the reals) is the smallest convex set that contains X .
- *I want the smallest polygon that encloses a bunch of points collected in a repeat*





Re-branding the app

Why re-brand the field app?

- Re-publish the field app with you corporate identity
 - Icon
 - Splash screen
 - App color scheme



User Story


City of Cilantro





The City of Cilantro wants to have a custom version of Survey 123 that is branded and that will be used by various city departments to conduct surveys.



Extending Survey123 Blog – White Labeling


<https://community.esri.com/groups/survey123/blog/2018/04/29/customizing-survey123-part-1-white-labeling>




Extending Survey123, Part 1: White Labeling

 Blog Post created by [Jayson Ward](#)  on Apr 29, 2018

 Liked • 4  Comment • 3

For this blog post, and the subsequent blog post on extending Survey123's functionality, I've created a user story for a fictitious municipality called the City of Cilantro that will help guide the customization process. Also, a public repo with the customized app is available at [Github: Cilantro Surveys](#) 

I. User Story



The City of Cilantro needs a custom version of Survey123 that will be used by various city departments to conduct public and private surveys. The city currently has three customization needs:

1. The app needs to be branded to match the organization. [Not extending core functionality]
2. The city needs the ability to print the time and location onto new photos taken with some surveys. [Extending core functionality]
3. Some surveys used in the field will include the scanning of barcodes as the only action required of the survey. The application will need to automatically submit the survey after the barcode is successfully scanned and then open a new survey immediately upon



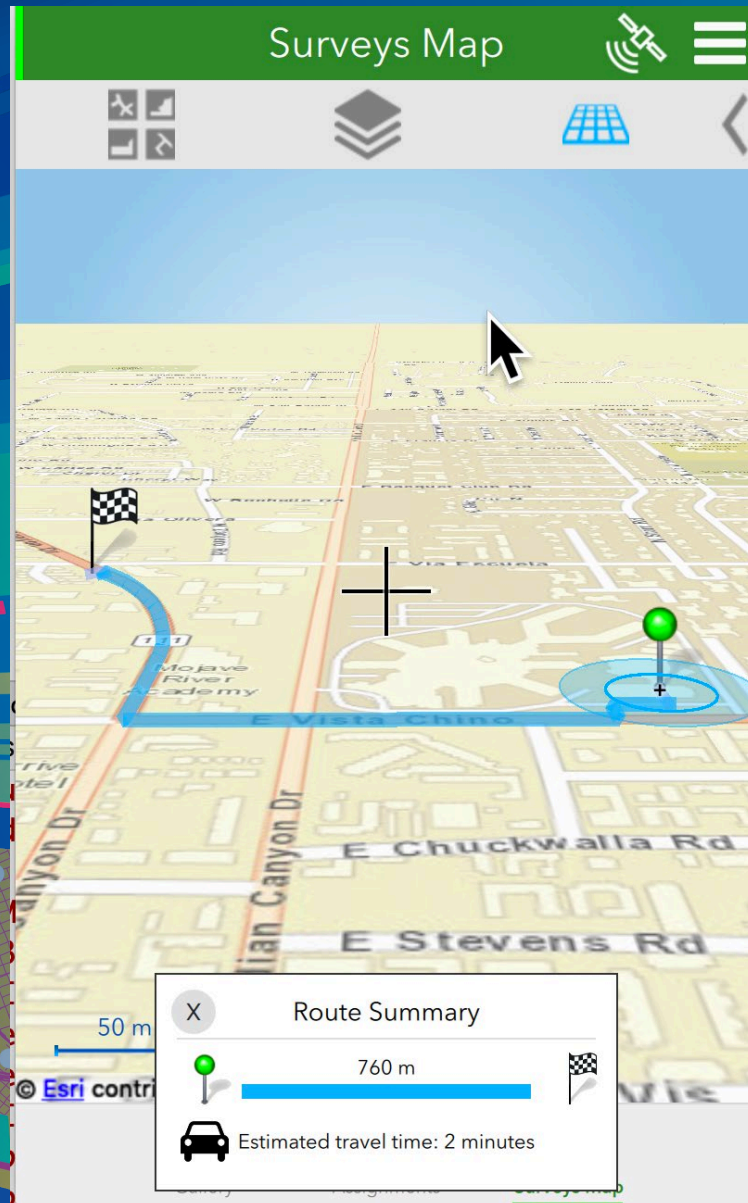
Modifying the Source Code

Whys and Why Nots

- **Re-Branding is modify the source code**
- **Why**
 - Create a new app derived from Survey123 source code
 - Change existing functionality
 - Add specialized functionality
- **Why not**
 - Maintainability
 - Keeping up with codes changes
- **What's the alternative**
 - Add-Ins

Add-Ins





Lets take a look at
some Add-Ins

Cross-platform support

- Write once – run anywhere
- Supported by all platforms support by the Survey123 field app (iOS, Android, Windows, MacOS, Linux)
- Windows UWP will be supported when Survey123 is released in Microsoft App Store (2019)

Maintainability

- Customising core Survey123 code is a potential maintenance issue each time a new version of Survey123 is released
- Survey123 Add-Ins use published interfaces into Survey123 that will be maintained to be backward compatible with each release
- Add-In updates can be pushed to users without having to re-release app to app stores



Add-In Types

Survey123 Add-In Tools

Add-In Tool – Tab/Tile Mode

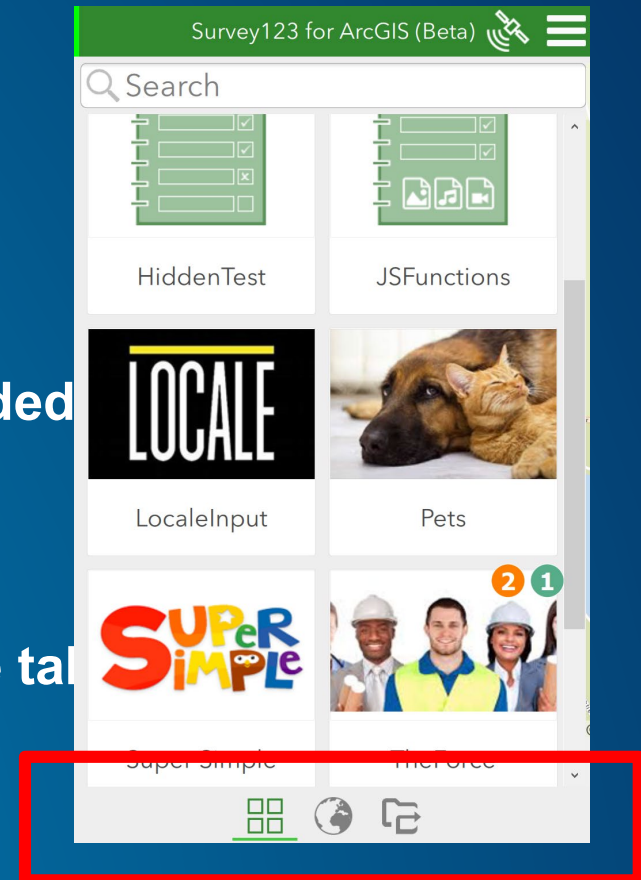
- **User interface**
- **Can be launched –**
 - On start-up
 - By user from a gallery
 - By another Add-In
- **Can work alongside out of the box Survey123 UI or overload with a tailored experience**

Add-In Tool – Service Mode

- **No user interface**
- **Automatically started**
- **Can run in background**
- **Typical use cases include –**
 - Location tracking
 - Background data updates

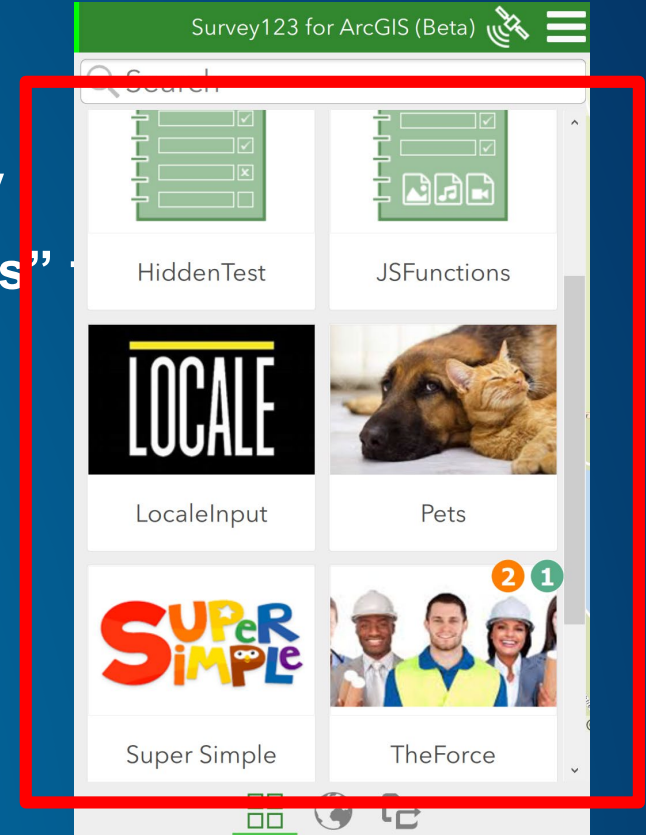
Add-In Tools – Tab Mode

- Automatically load on start up
- Icon appears in the tab bar
- Tabs bar will appear only when more than tab icon is needed
- Hamburger menu is context sensitive to the active tab
- May operate asynchronously
- Can indicate activity with tab bar icon when not the active tab



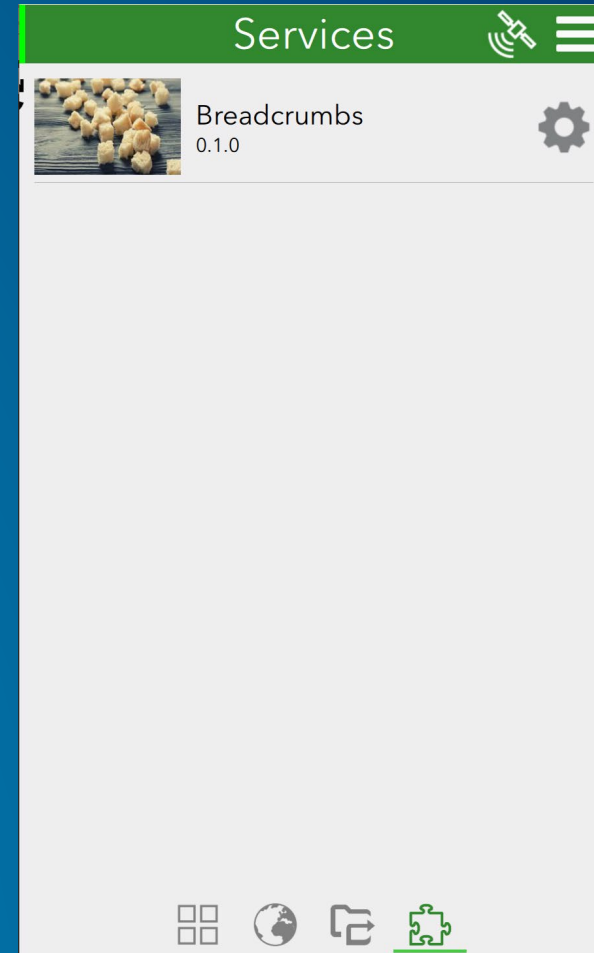
Add-In Tools – Tile Mode

- Seamless experience for users for surveys and tools
- Surveys and Add-In tools integrate together in the tiles gallery
- Surveys may appear as individual tiles or a single “My Surveys”
- Add-In tools launched by user from gallery
- Each tool appears as a new full screen page when started



Add-In Tools - Services Tab

- Tab is hidden by default
- Shows add-in tools running as services in background



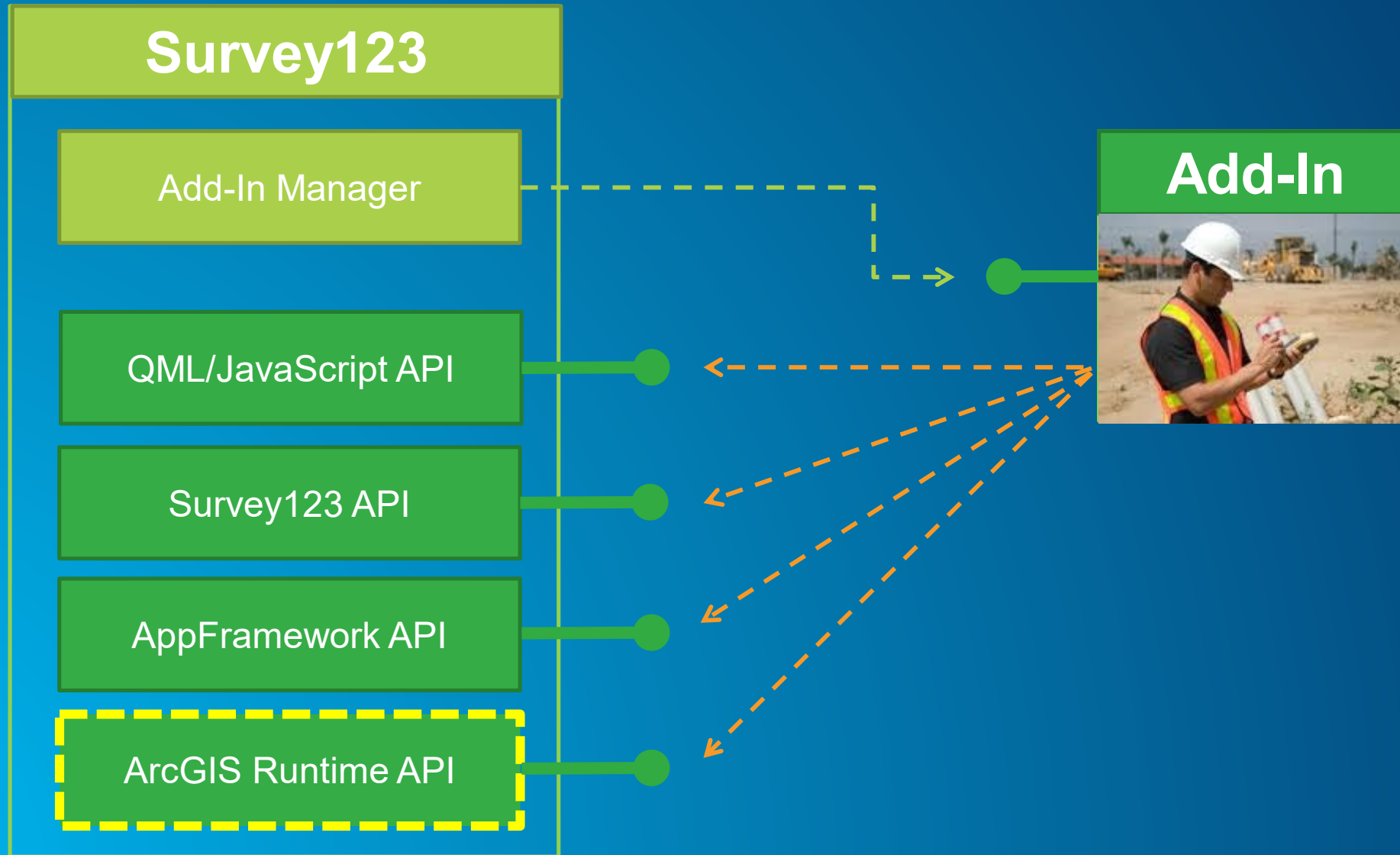
Other Add-In Types

- **Control**
 - New question controls that can be used by Survey forms
- **Camera**
 - Provide custom camera interface for taking photos
- **Coordinate System Notations**
 - Custom coordinate systems. E.g. National Grids such as British National Grid, Irish National Grid, Map Grid of Australia, New Zealand Map Grid



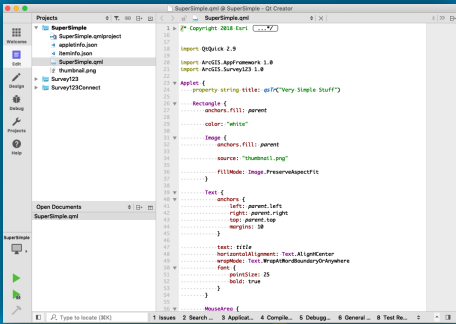
Add-Ins Architecture

High Level Add-In Architecture



Add-In Item

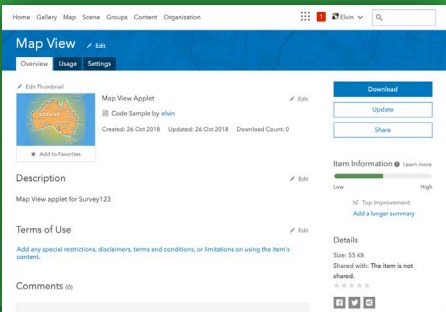
Qt Creator



Edit code

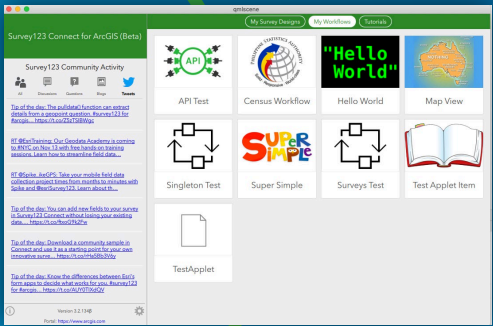
Upload

Survey123 Add-In Item (new)



Download

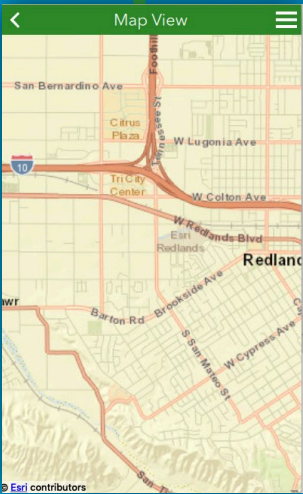
Test code



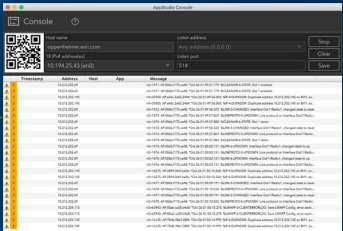
Survey123 Connect Add-In Projects Gallery (new)

Run

Survey123 Playing Add-In (new)



AppStudio Console



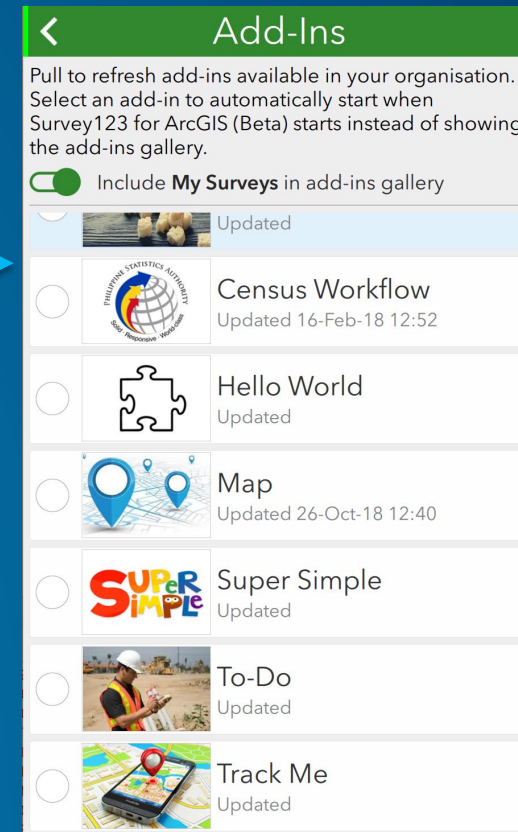
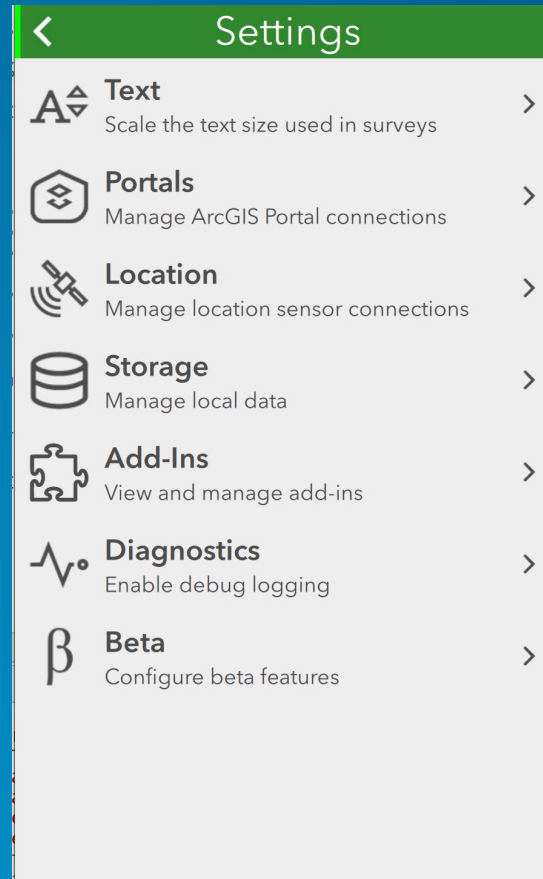
Debug Output

Add-In Project/Item Structure

- Project file - <projectname>.qmlproject
- Add-In Configuration file – addin.json
- ArcGIS item metadata – iteminfo.json
- Thumbnail image
- Main component file
- Settings component file (optional)
- Code, assets and data files as required

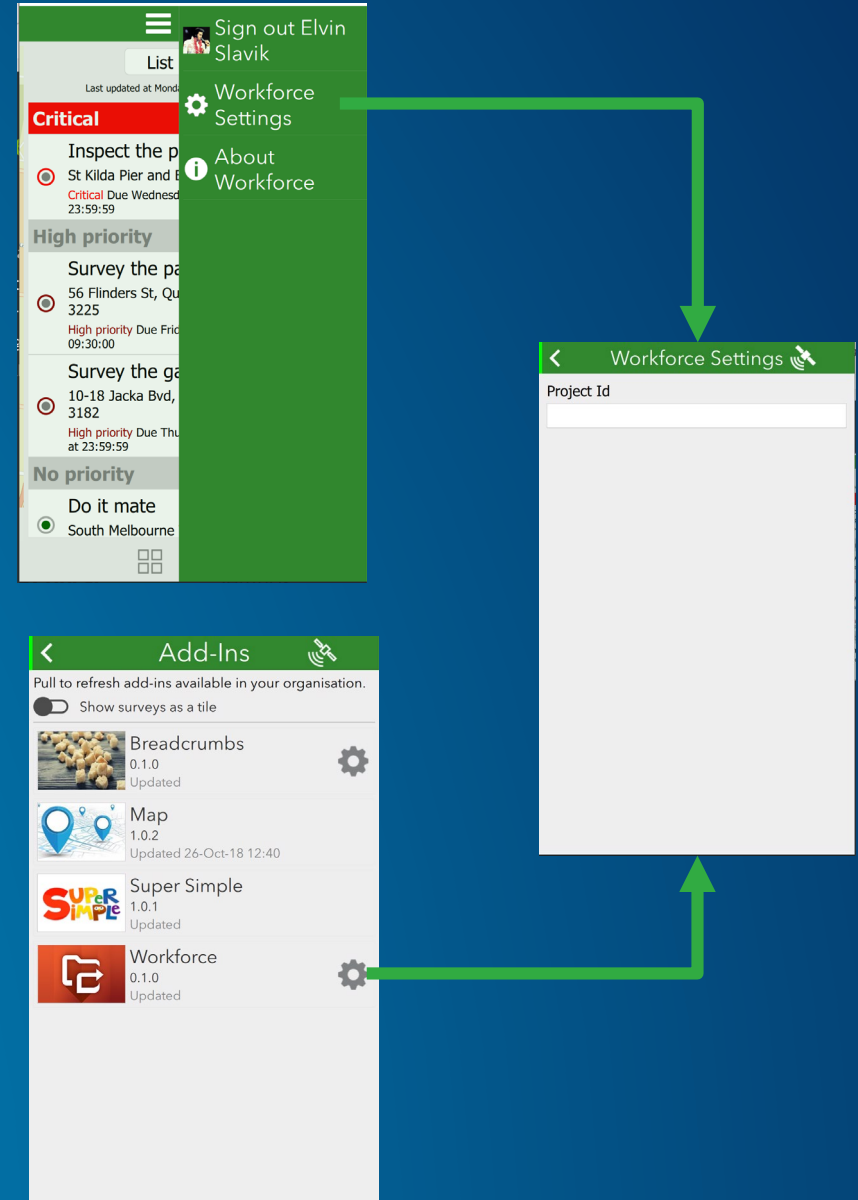
User Experience

- Add-in author designs the experience specific to requirements
- Survey123 provides the UI container
- Add-Ins are downloaded from the user's organisation via the field app's settings



Add-In Settings

- Each add-in can include a custom settings page
- Per add-In settings can be access via
 - Hamburger menu
 - Add-Ins list in app settings
 - Services tab



Survey123 API

- Exposed via `import ArcGIS.Survey123 1.0`
- Common user interface components and functions for UI pages
- Launch surveys to collect or edit data
- Launch Survey123 built-in user interfaces including –
 - Survey gallery
 - Survey pages – Info, inbox, outbox, drafts sent
- Access to surveys and offline survey database
- Current signed in user's context for access to hosted services and data
- Abstracted location sensor interface

import ArcGIS Survey123 1.0

- AddIn

- Root level component which all add-ins inherit from
- Exposes functions and properties related to the current instance of the add-in
- Meta data and configuration properties as defined in the add-in item and associated configuration file
- Add-In specific persisted settings
- User interface functions show built-in and custom pages and views

- Survey123

- Singleton object that exposes interfaces to the host Survey123 app
- Global properties such as current font and current locale
- Current set of survey forms and functions to open surveys for to capture or edit data
- Offline surveys database with functions to query and update the database. Encryption handled by Survey123 as required.
- App level persisted settings

import ArcGIS Survey123 1.0

- PortalRequest

- Make authenticated network requests to the currently active ArcGIS Online or Enterprise organisation
- Uses current signed in user's token

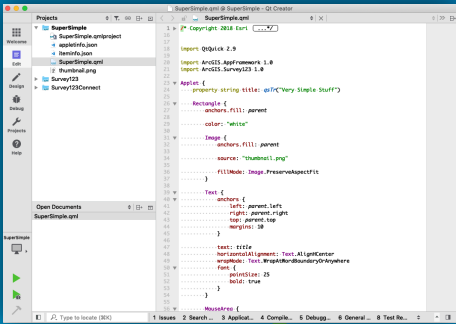
- LocationSensor

- Abstracted access to the currently configured location sensor
- Sensor management and connectivity handled by Survey123
- Supports internal and external (e.g. high precision) location sensors

Typical Add-In Developer Cycle

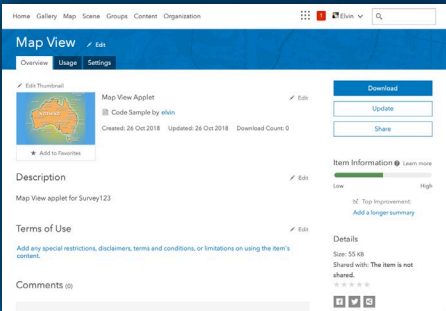
Survey123 Add-In
Item (new)

Qt Creator

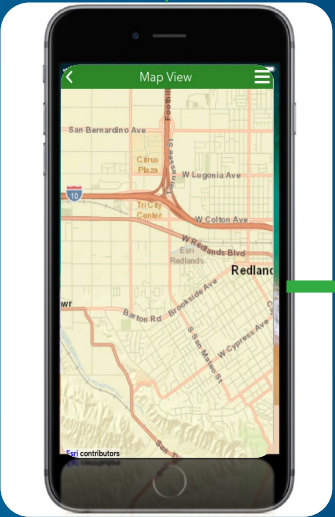


Edit code

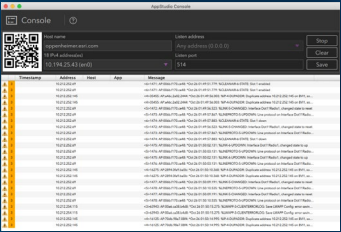
Upload



Download

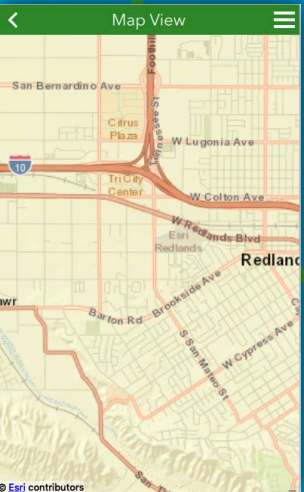


AppStudio
Console



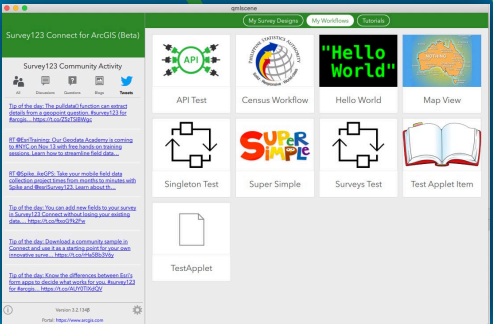
Debug
Output

Test code



Run

Survey123 Connect
Add-In Projects
Gallery (new)



Survey123
Playing
Add-In
(new)

Survey123 Add-In Developer Tooling

- Survey123 Connect
- Survey123 Field App
- AppStudio Desktop
 - Qt Creator (Edit source code)
 - Documentation (Framework etc.)
 - Console (for device debugging)
 - Other AppStudio tools are not used

Deploying Add-Ins

The background is a solid blue gradient. On the right side, there are several overlapping, semi-transparent geometric shapes and patterns. These include diagonal stripes in shades of green, yellow, and pink. There are also patterns of small white dots and a faint map of Europe. The overall design is modern and tech-oriented.

Deployment Models

- **ArcGIS Online or Enterprise**
 - Published as an ArcGIS item
 - ArcGIS item sharing model
- **App store or MDM release**
 - Add-In(s) imbedded with Survey123 app code
 - Published as standalone app

ArcGIS Online or Enterprise Deployment

- Simplest method to deploy
- Add-In is uploaded to organisations as ArcGIS item
- Shared to users via standard ArcGIS item sharing model
- Users download add-ins via the off-the-shelf version of Survey123 field app
- Also supported by re-branded releases of Survey123
- Easy to update Add-Ins

App store and MDM deployment

- Users download a customised version of Survey123 from app stores
- Also support enterprise deployment via MDM
- Can be combined with re-branding
- User only needs to install the app
- Delivers a tailored branding + add-ins experience

Getting Started

The background features a vibrant blue gradient. On the right side, there are several diagonal stripes in shades of green, yellow, and pink. A stylized map of Europe is visible in the lower right corner, rendered in a light blue color. In the top left corner, there are some abstract geometric shapes in green, yellow, and pink.

How do I get started with Add-Ins??

- Beta builds of Field App and Connect on Early Adopter Community
 - <https://earlyadopter.esri.com/>
 - Includes “Survey Map” Add-In
- AppStudio 3.3 release (Scheduled for April)
- New Survey123 Add-In Type Coming in ArcGIS 7.1

Questions

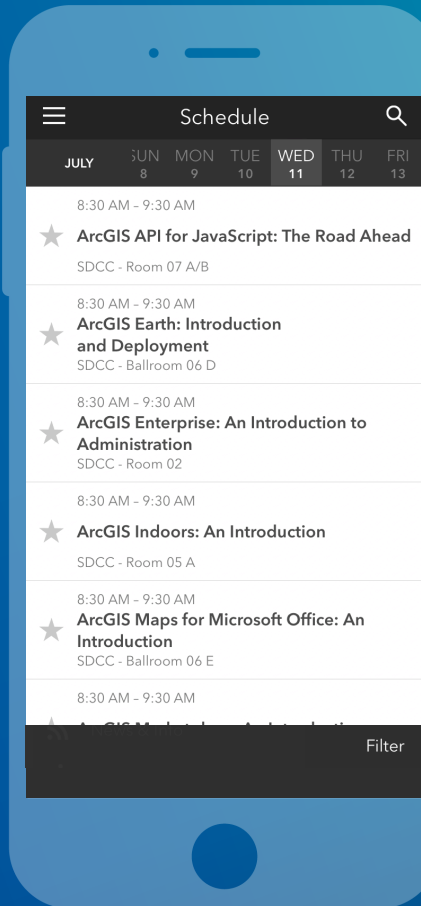


Please Take Our Survey on the App

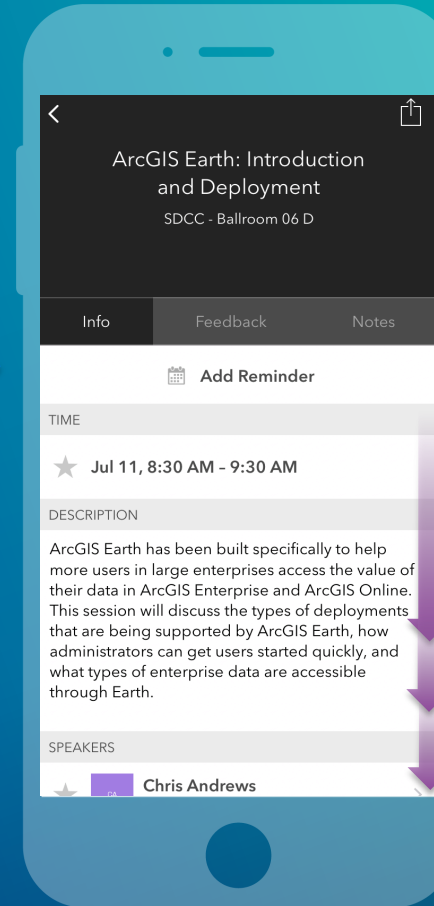
Download the Esri Events app and find your event



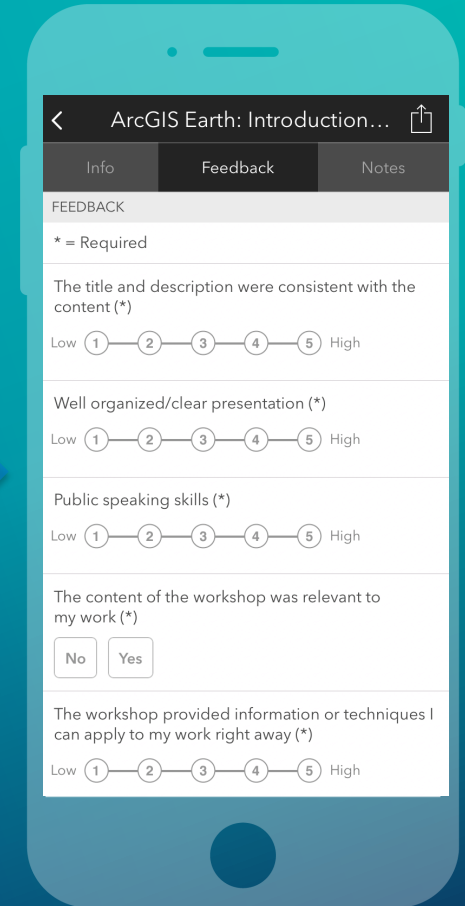
Select the session you attended



Scroll down to find the feedback section



Complete answers and select "Submit"





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