




Extending ArcGIS Survey123

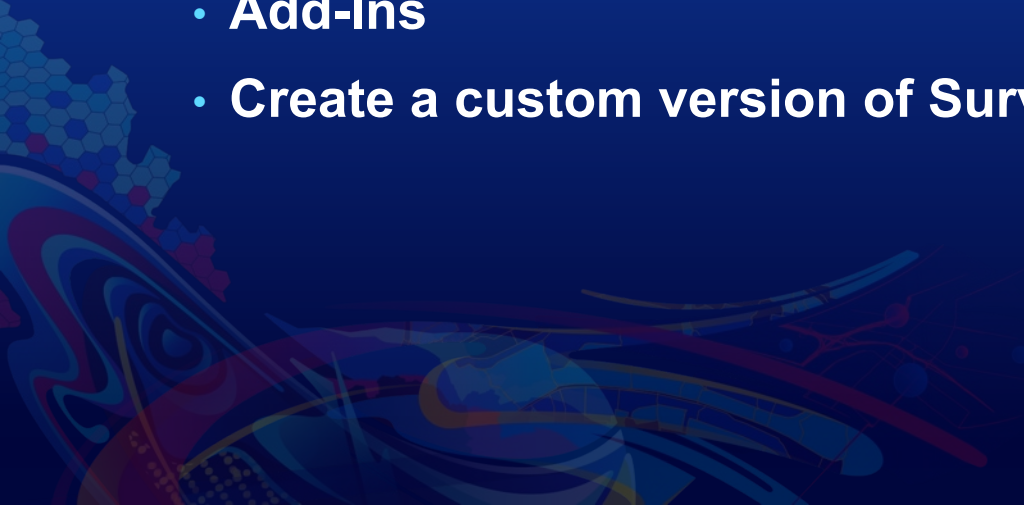
James Tedrick

2021 ESRI
DEVELOPER SUMMIT

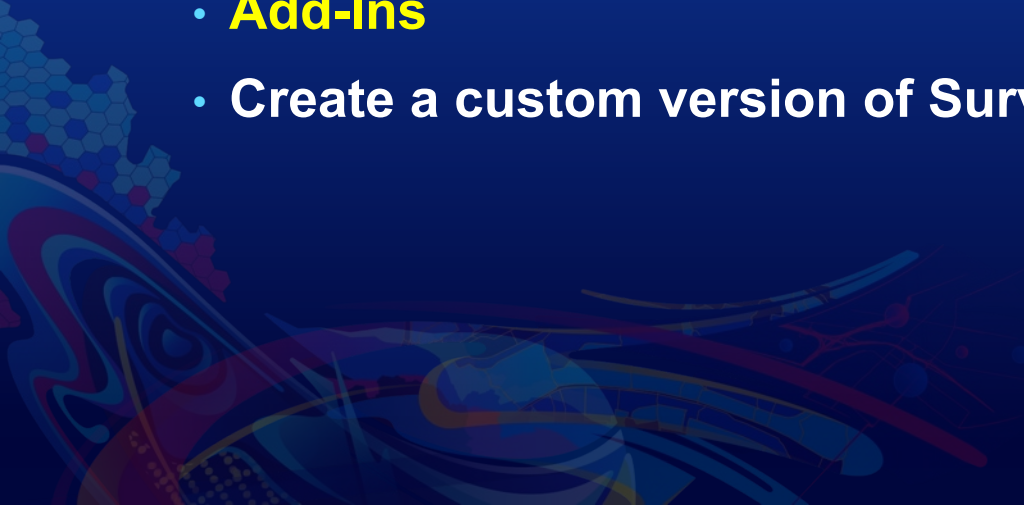
Why extend Survey123?

- 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
 - Python
 - Embedding into Web Apps
 - Webhooks
 - Custom JavaScript Functions
 - Add-Ins
 - Create a custom version of Survey123
- 

Ways to extend Survey123

- Themes
 - App links
 - **Python**
 - **Embedding into Web Apps**
 - Webhooks
 - Custom JavaScript Functions
 - **Add-Ins**
 - Create a custom version of Survey123
- 

Automating Tasks using Python



How to use Python with Survey123

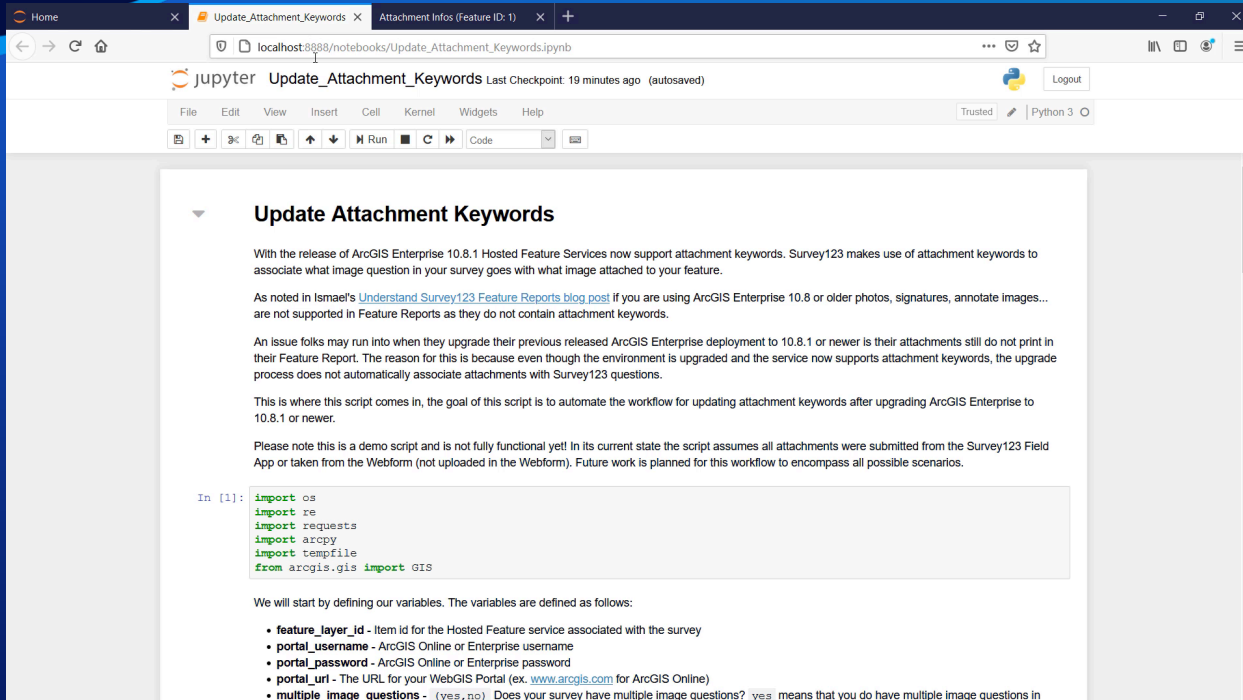
- **Python helps automate processes around Survey123 workflows**
 - Copy data
 - Run analysis on data
 - Generate reports
- **Key Python modules:**
 - **ArcGIS API for Python: Analysis & management in ArcGIS Online/ArcGIS Enterprise**
 - **arcpy: ArcGIS Pro tools & tasks**

Automating Tasks

- **Several Esri Community (GeoNet) blog posts on using Python Scripts to Automate Tasks**
 - [Moving survey data from hosted feature services to enterprise geodatabases](#)
 - [Downloading photos](#)
 - [E-mail notification for new submissions](#)
- **Survey123 team will be offering new workflows via sample notebooks**

Updating Attachments

Presenter(s)



The screenshot shows a Jupyter Notebook interface in a web browser. The browser tabs include 'Home', 'Update_Attachment_Keywords', and 'Attachment Infos (Feature ID: 1)'. The address bar shows the URL 'localhost:8888/notebooks/Update_Attachment_Keywords.ipynb'. The Jupyter Notebook title bar says 'jupyter Update_Attachment_Keywords Last Checkpoint: 19 minutes ago (autosaved)'. The menu bar includes 'File', 'Edit', 'View', 'Insert', 'Cell', 'Kernel', 'Widgets', and 'Help'. The toolbar shows icons for file operations, running, and code execution. The notebook content is titled 'Update Attachment Keywords' and includes the following text:

With the release of ArcGIS Enterprise 10.8.1 Hosted Feature Services now support attachment keywords. Survey123 makes use of attachment keywords to associate what image question in your survey goes with what image attached to your feature.

As noted in Ismael's [Understand Survey123 Feature Reports blog post](#) if you are using ArcGIS Enterprise 10.8 or older photos, signatures, annotate images... are not supported in Feature Reports as they do not contain attachment keywords.

An issue folks may run into when they upgrade their previous released ArcGIS Enterprise deployment to 10.8.1 or newer is their attachments still do not print in their Feature Report. The reason for this is because even though the environment is upgraded and the service now supports attachment keywords, the upgrade process does not automatically associate attachments with Survey123 questions.

This is where this script comes in, the goal of this script is to automate the workflow for updating attachment keywords after upgrading ArcGIS Enterprise to 10.8.1 or newer.

Please note this is a demo script and is not fully functional yet! In its current state the script assumes all attachments were submitted from the Survey123 Field App or taken from the Webform (not uploaded in the Webform). Future work is planned for this workflow to encompass all possible scenarios.

```
In [1]: import os
import re
import requests
import arcpy
import tempfile
from arcgis.gis import GIS
```

We will start by defining our variables. The variables are defined as follows:

- **feature_layer_id** - Item Id for the Hosted Feature service associated with the survey
- **portal_username** - ArcGIS Online or Enterprise username
- **portal_password** - ArcGIS Online or Enterprise password
- **portal_url** - The URL for your WebGIS Portal (ex. www.arcgis.com for ArcGIS Online)
- **multiple_image_questions** - (yes,no) Does your survey have multiple image questions? **yes** means that you do have multiple image questions in

ArcGIS REST Services Directory

Logged in user : portaladmin | [Logout](#) |

[Home](#) > [services](#) > [Hosted](#) > [service_23f01688ba3e479298292e8f26a88645 \(FeatureServer\)](#) > [ImageQuestions](#) > [1](#) > [attachments](#) [Help](#) | [API Reference](#)

[JSON](#)

Attachment Infos (Feature ID: 1)

attachments: 4

[photo1-20201221-171407.jpg](#)
ID: 1
Content Type: image/jpeg
Size: 237164
Keywords:

[photo1-20201221-171415.jpg](#)
ID: 2
Content Type: image/jpeg
Size: 179399
Keywords:

[photo1-20201221-171420.jpg](#)
ID: 3
Content Type: image/jpeg
Size: 148619
Keywords:

[photo2-20201221-171447.jpg](#)
ID: 4
Content Type: image/jpeg
Size: 273979
Keywords:

Geodatabase Version Name:

Historic Moment:

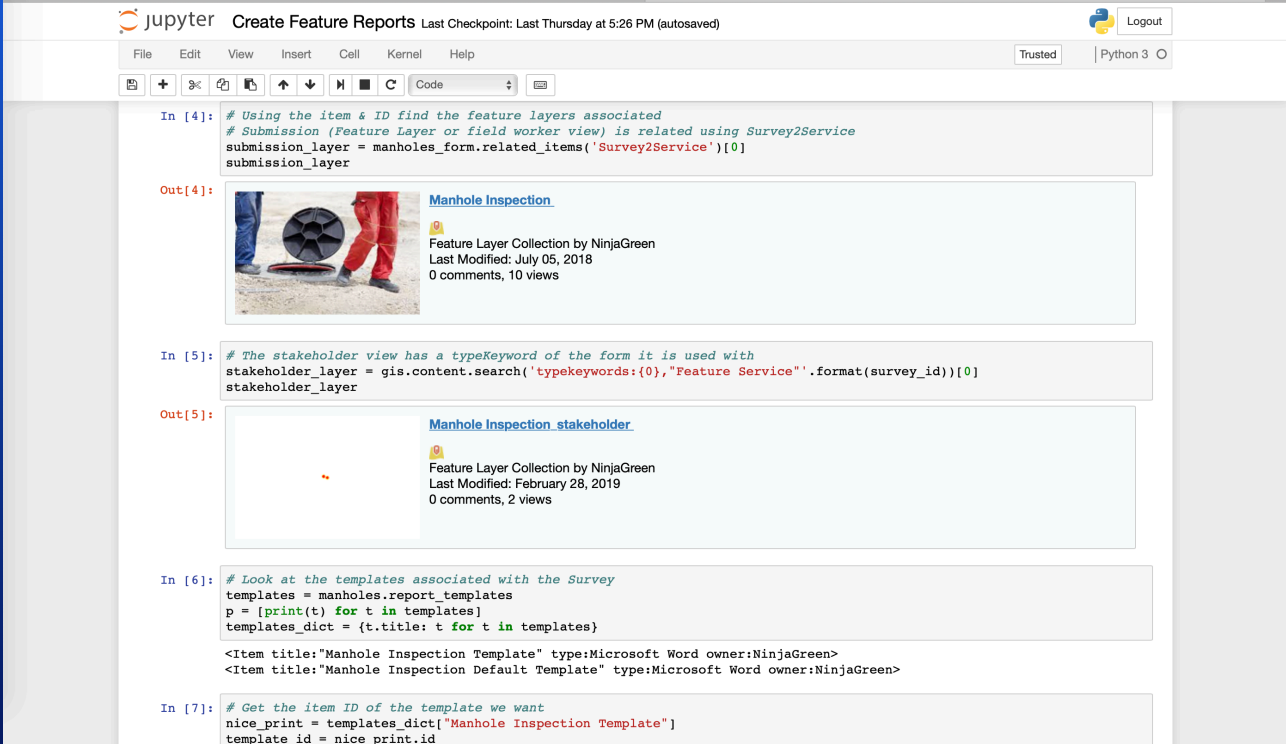
Format:

HTML

Get Attachments

ArcGIS API for Python – Survey123 submodule


- Create reports
 - Generate templates
 - Export the form data
 - Create Pandas dataset
-
- More info in the on-demand session
Understanding the ArcGIS Survey123 REST API



The screenshot shows a Jupyter Notebook interface with the title "Create Feature Reports" and a subtitle "Last Checkpoint: Last Thursday at 5:26 PM (autosaved)". The notebook contains several code cells and their outputs:

```
In [4]: # Using the item & ID find the feature layers associated
# Submission (Feature Layer or field worker view) is related using Survey2Service
submission_layer = manholes_form.related_items('Survey2Service')[0]
submission_layer
```

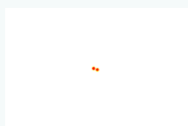
Out[4]:

 [Manhole Inspection](#)

Feature Layer Collection by NinjaGreen
Last Modified: July 05, 2018
0 comments, 10 views

```
In [5]: # The stakeholder view has a typeKeyword of the form it is used with
stakeholder_layer = gis.content.search('typekeywords:{0}', "Feature Service".format(survey_id))[0]
stakeholder_layer
```

Out[5]:

 [Manhole Inspection stakeholder](#)

Feature Layer Collection by NinjaGreen
Last Modified: February 28, 2019
0 comments, 2 views

```
In [6]: # Look at the templates associated with the Survey
templates = manholes.report_templates
p = [print(t) for t in templates]
templates_dict = {t.title: t for t in templates}

<Item title:"Manhole Inspection Template" type:Microsoft Word owner:NinjaGreen>
<Item title:"Manhole Inspection Default Template" type:Microsoft Word owner:NinjaGreen>
```

```
In [7]: # Get the item ID of the template we want
nice_print = templates_dict["Manhole Inspection Template"]
template_id = nice_print.id
```

Survey123 Web App JSAPI

The background of the slide is a dark blue gradient. On the left side, there is a complex, abstract graphic design. It features several overlapping, flowing shapes in shades of blue, red, and yellow. Some of these shapes resemble stylized waves or liquid splashes. There are also some geometric elements, like a hexagonal pattern in the lower-left corner and a grid-like structure in the upper-left corner. The overall aesthetic is modern and tech-oriented.

Use Cases

- Programmatically embed a Survey123 Web App within a web application
- Apply a custom CSS style to the embedded Web App
- Programmatically read and write values into the Survey123 Web App
- Subscribe to Web App events, such as
 - onFormLoaded
 - onFormSubmitted
 - onValueChanged

Import Survey123 Web App JS API

```
<head>
  <script src='https://survey123.arcgis.com/api/jsapi'></script>
</head>
<body>
  <div id='survey123webform'></div>

  <script>
    // create survey123webform instance by setting survey123webform options
    let webform = new Survey123WebForm({
      clientId: 'yourClientId',
      container: 'survey123webform',
      itemId: 'formItemId'
    });
  </script>
</body>
```


JSAPI Basic

codepen.io/tedrick/pen/MWKaOqa?editors=1010

JSAPI Basic

James Tedrick

HTML

```
1
2 <!-- Provide a div to load the form -->
3 <div id="formDiv"></div>
4
5 <!-- Load the Survey123 webform JSAPI -->
6 <script src="https://survey123.arcgis.com/api/jsapi">
7 </script>
8
```

CSS

JS

```
1 // Load a form by creating a Survey123WebForm object
2 webForm = new Survey123WebForm({
3   itemId: "4bc83b6adc8e48ae801c494764ac5fb1",
4   container: "formDiv",
5   clientId: "TG.          |cQ"
6 });
```

NinjaGreen (Lloyd)

Internet Speed Survey

Complete this form to help us understand the quality of internet service throughout the US

Internet Speed*

Measured as Mbps

12³

Console

Assets

Comments

⌘ Keys

Last saved LESS THAN A MINUTE ago

Delete

Add to Collection

Fork

Embed

Export

Share

Survey123WebForm() initial properties

- **clientId**
- **container**
- **itemId**
- **Optional: Display**
 - **hideElements**
 - **autoRefresh**

ArcGIS clientId for your website

HTML element (div) to place the form into

Survey123 form's ArcGIS item ID

Specify form elements to hide (see URL parameter)

Automatically reload the form after submission
(# of seconds after submission)

Survey123WebForm() initial properties

- Optional: Data Handling

- **defaultQuestionValue**
- **isDisabledSubmitToFeatureService**
- **token**

Set the default value for questions

Do not send data when 'submit' is pressed

ArcGIS token to pass authentication to form

- Optional: Event Handlers

- **onFormLoaded**
- **onFormSubmitted**
- **onFormResized**
- **onQuestionValueChanged**

Function will run when form is loaded

Function will run when form is submitted

Function will run when form is resized

Function will run when a value is changed

JSAPI Methods

- **setQuestionValue({<question1>:<value>, <question2>,<value>,...})**
Set the values of questions in the web app
- **setGeopoint({"x":<value>,"y":<value>})**
Set the value of the geopoint question (commonly use with browser Geolocation API)
- **setStyle({<css_selector>: {<css_proeprty>:<value>}})**
Change the style of a form component (example selectors: .question-label, .form-header)
- **setItemId(<itemId>)**
Set the ID of the form to show (i.e., change forms)

Connection Speed Test

1 Test Current Internet Speed

click here to test download speed

Your connection speed is: 6.63 Mbps

2 Submit Internet Speed Survey

NinjaGreen (Lloyd)

Internet Speed Survey

Complete this form to help us understand the quality of internet service throughout the US

Internet Speed*

Measured as Mbps

6.63

Are you satisfied with internet access at your location?

☐ Yes

☐ No

Your Location*

Speed Test & Form

<https://apl.esri.com/jg/SpeedTest/index.html>

1

EXPLORED

OPEN EDITORS

1 UNSAVED

JS Main.js app

SPEEDTEST

app

JS dojo.js

JS Main.js

assets

styles

index.html

oauth-callback.html

README.md

OUTLINE

TIMELINE

APPSTUDIO PROJECTS

JS Main.js

define() callback

initializeSurvey

42

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/**

* INITIALIZE SURVEY123 FORM AFTER CONNECTION SPEED TEST //

*/

initializeSurvey: function(){

// CONNECTION SPEED TEST //

const speedTestBtn = document.getElementById("speed-test-btn");

speedTestBtn.addEventListener("click", () => {

// TEST CONNECTION SPEED //

this.initiateSpeedDetection().then(({ speedMbps }) => {

speedTestBtn.classList.add("btn-disabled");

//

// SURVEY123 WEB FORM //

//

const survey123WebForm = new Survey123WebForm({

container: "survey123-webform",

clientId: "Sv85I8dekRvelYpr",

portalUrl: "https://www.arcgis.com",

itemId: "4bc83b6adc8e48ae801c494764ac5fb1",

onFormLoaded: (data) => {

//

// ANSWER INTERNET SPEED QUESTION WITH CONNECTION SPEED INFO //

//

survey123WebForm.setQuestionValue({ "internet_speed": speedMbps });

// https://developer.mozilla.org/en-US/docs/Web/API/Geolocation_API //

if(navigator.geolocation){

Ln 45, Col 34

Spaces: 2

UTF-8

LF

JavaScript


JSAPI considerations

- Works with public surveys
- Private Survey? Ask user for login in your app, pass the token into the Survey123WebForm options
- onFormSubmitted – SurveyFeatureSet is like ArcGIS JSAPI FeatureSet and may contain multiple individual features (repeat sections are their own feature)
- Documentation: <https://developers.arcgis.com/survey123/api-reference/web-app>
- Esri Community blog: <https://community.esri.com/t5/arcgis-survey123-blog/introducing-the-survey123-web-app-javascript-api/ba-p/896667>

Survey123 Field App Add-ins



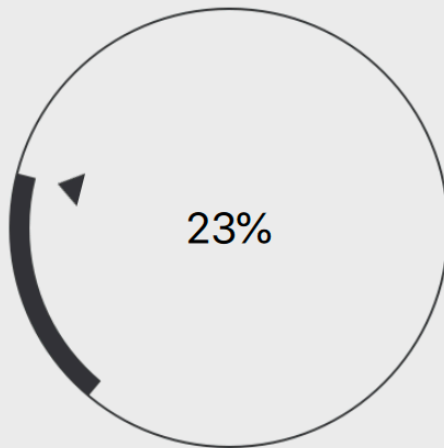
What are Add-Ins?

- In-development technology to extend the Survey123 field app
 - Developed with the same cross-platform technology (write once, run anywhere) as Survey123
 - Interacts with Survey123 through a consistent API that will be stable between releases (no/minimal changes to your code will be needed with a new app release)
 - Can be deployed/updated based on your development cycles
- 

Add-In Types

- **Custom Question Types**
 - Control – question with text/numeric values
- **Tool – Modify the application**
 - Tab on main screen
 - Tile – peer item with forms
 - Service – no direct user UX
- **Custom application input (usable as questions and other input locations)**
 - Scanner – text/numeric values & activation button to read a value (i.e., barcode scanning)
 - Camera – retrieve collect & process an image

Percent Complete



A quick tour of add-ins

15:10 Fri Feb 5

97%

My Survey123



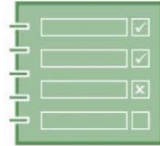
Search



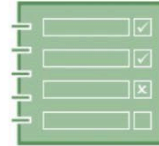
Control add-in
examples



Daily and Incident
Forms



Daily Log



Incident Report



Scanner & Camera
add-ins



Gallery



Web Map Viewer

Control

- Custom questions in a form
- Developer controls
 - Question UI
 - How value is calculated internally
- Survey123 supplies
 - Form information
 - Calculations with other question's values
 - Question labels/hints
- Returns text/numeric value
 - Complex data? Create JSON text

The screenshot shows a mobile application interface for a survey titled "My Survey". The interface includes a green header bar with a close button (X), the title "My Survey", and icons for signal strength and a menu. Below the header, there is a section labeled "Example" with a text input field. Underneath, a section labeled "Percent Complete" features a circular progress indicator showing 23% completion. Below this, a section labeled "Elapsed Time:" displays "00:00:09" and a pause button. The bottom of the screen has a green bar with a checkmark icon.

My Survey

Example

Percent Complete

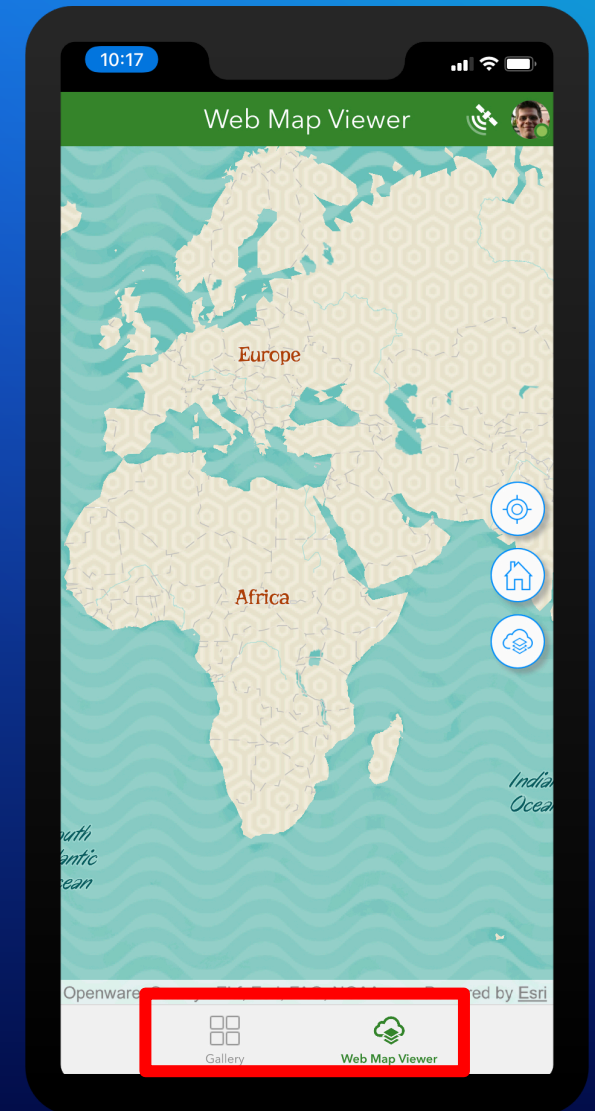
23%

Elapsed Time:

00:00:09

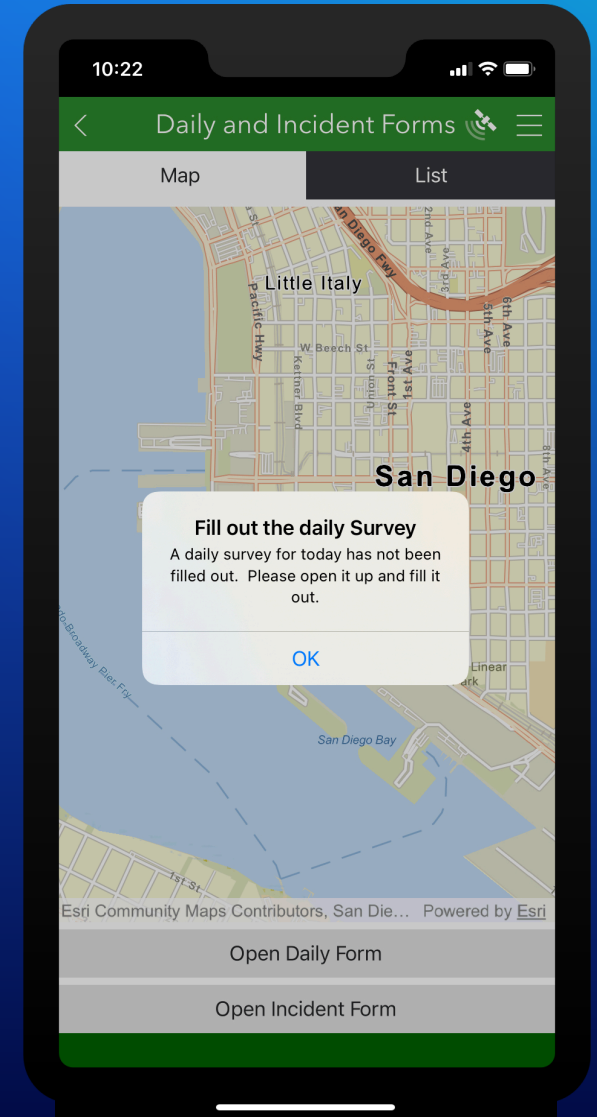
Add-In Tools – Tab Mode

- 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” tile
- Add-In tools launched by user from gallery
- Each tool appears as a new full screen page when started

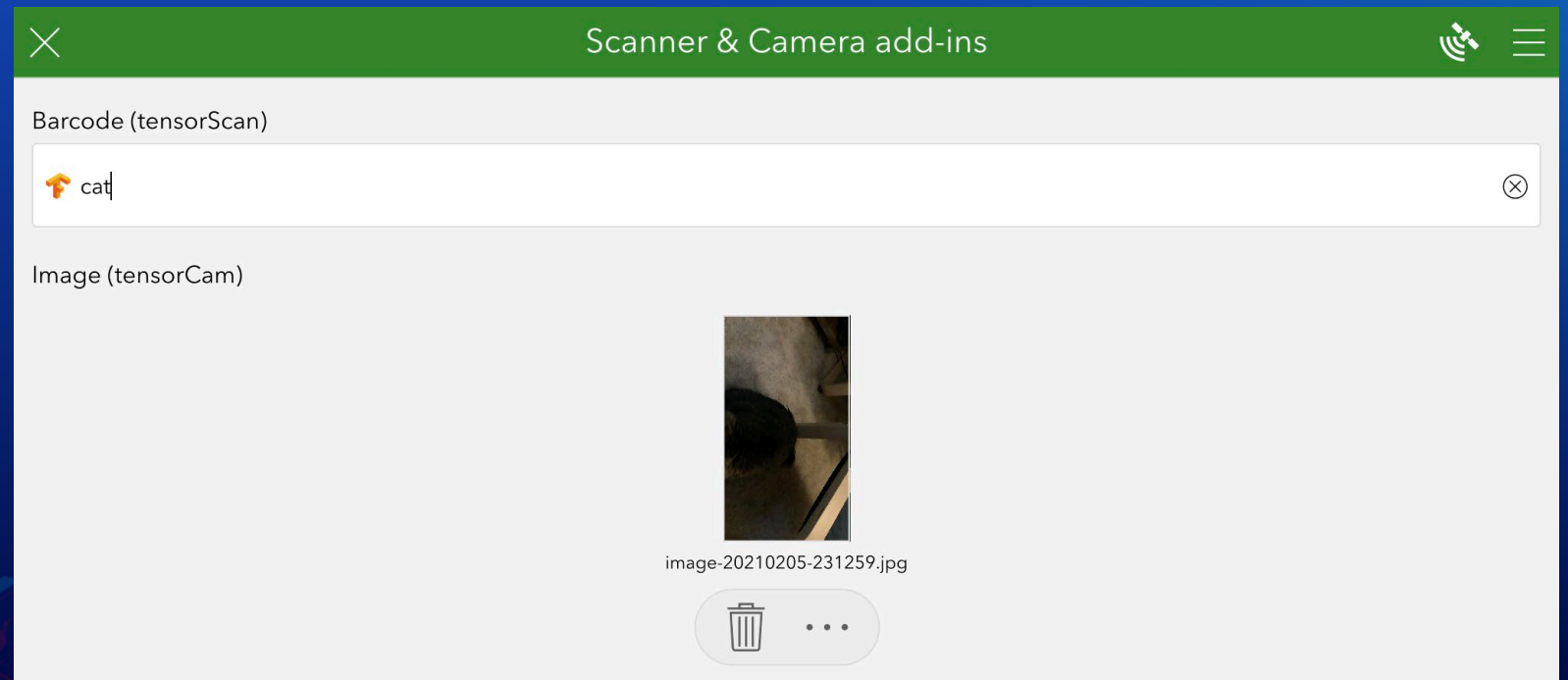


Add-In Tools – Service Mode

- Custom task in background
 - Not visible to the user
 - May have settings
- 

Add-In Cameras & Scanners

- **Expose advanced custom UX in many contexts (form, other UI)**
- **Primary purpose: enable custom connection to devices (cameras, other)**
- **Difference is return data**
 - **Camera: image**
 - **Scanner: text/numeric (could include JSON)**



Add-In Architecture

- Add-ins sit on top of the Survey123 app and can use
 - Survey123 API
 - AppStudio AppFramework
 - ArcGIS QML Runtime
 - QML
- Add-ins are developed in QML (Qt)
 - Objects defined in markup language
 - JavaScript functions run business logic



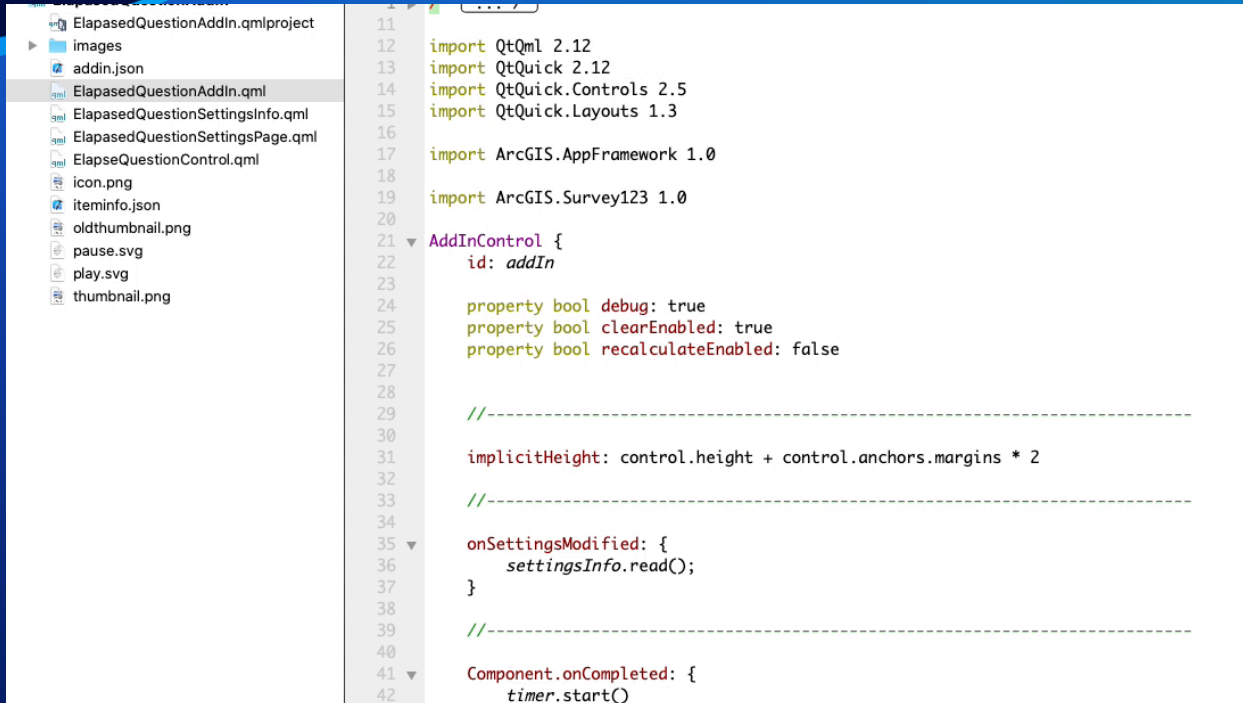
Survey123 API

- 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

Add-In Project/Item Structure

- Project file - <projectname>.qmlproject
- Add-In Configuration file – addin.json
- Main add-in component file
 - Additional components as you write them
- Settings info & components (optional)
- ArcGIS item metadata – iteminfo.json
- Thumbnail image
- Code, assets and data files as required

Building an add-in



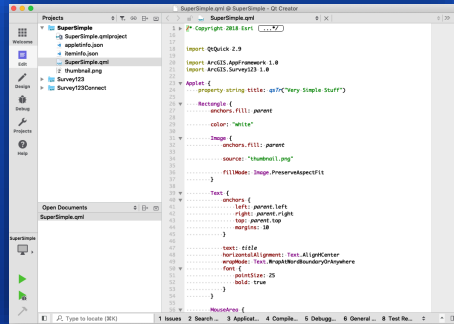
```
11
12 import QtQml 2.12
13 import QtQuick 2.12
14 import QtQuick.Controls 2.5
15 import QtQuick.Layouts 1.3
16
17 import ArcGIS.AppFramework 1.0
18
19 import ArcGIS.Survey123 1.0
20
21 AddInControl {
22     id: addIn
23
24     property bool debug: true
25     property bool clearEnabled: true
26     property bool recalculateEnabled: false
27
28     //-----
29
30     implicitHeight: control.height + control.anchors.margins * 2
31
32     //-----
33
34     onSettingsModified: {
35         settingsInfo.read();
36     }
37
38     //-----
39
40     Component.onCompleted: {
41         timer.start()
42     }
```



Add-In Development & Deployment

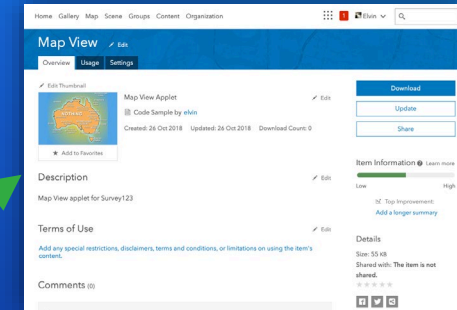
Survey123 Add-In
Item

Qt Creator



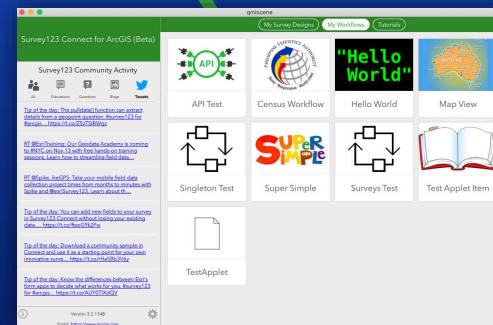
Edit code

Upload



Download

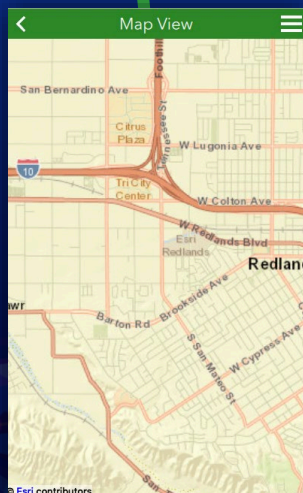
Test code



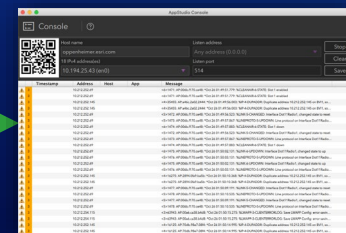
Survey123 Connect
Add-In Projects
Gallery

Run

Survey123
Playing
Add-In

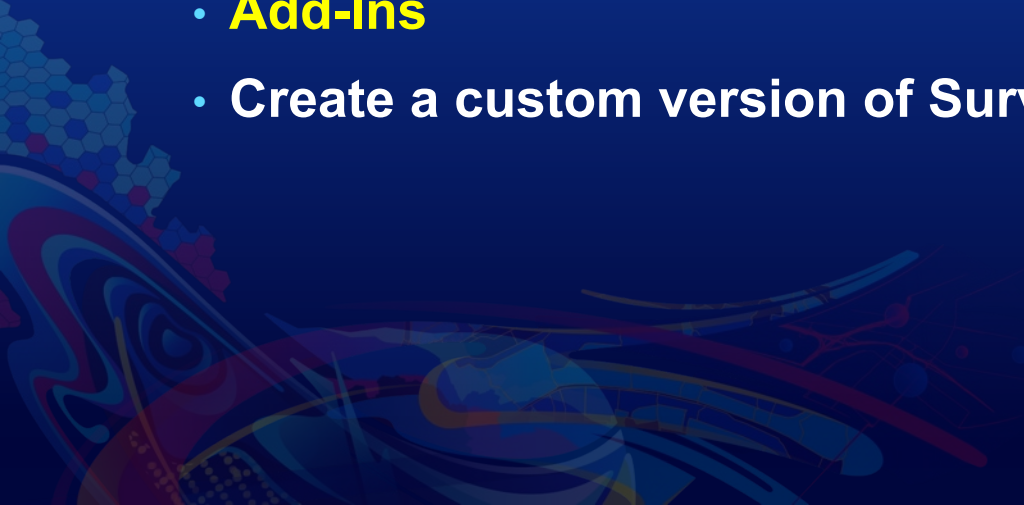


AppStudio
Console

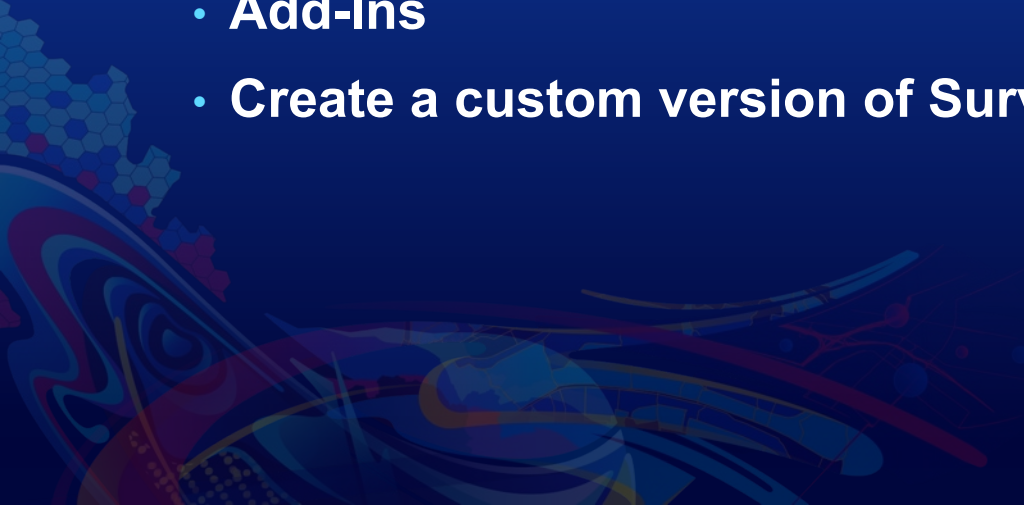


Debug
Output

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 - **Embedding into Web Apps**
 - Webhooks
 - Custom JavaScript Functions
 - **Add-Ins**
 - Create a custom version of Survey123
- 

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- 

Survey123 Documentation

Help Documentation

Survey123 Resource Center

The screenshot shows the 'Survey123 for ArcGIS' resource center. It features a navigation bar with 'Overview', 'Resources', 'Free Trial', and 'Launch Survey123'. The main section is titled 'Resources' with the subtitle 'Create your own surveys, share them with others, and analyze their results.' Below this is a search bar for 'Survey123 Resources'. The 'Get Survey123' section highlights three options: 'Survey123 website' (with a 'Launch Survey123' button), 'Survey123 field app' (with download links for the App Store, Google Play, and Amazon Appstore), and 'Survey123 Connect' (with download links for Windows x64, macOS, and Linux).

This screenshot displays the 'Survey123 for ArcGIS' product page. It includes a navigation menu with 'Home', 'Reference', 'Create Surveys', 'Get Answers', and 'Analyze Results'. The main heading is 'Smarter Forms, Smarter Field Work', followed by a brief description of the product. A search bar is present, and below it are links for 'What's new', 'Requirements', 'Quick reference', and 'Learn ArcGIS lessons'. Four featured images illustrate different survey creation and analysis capabilities.

Tutorial Videos @ YouTube

The screenshot shows a YouTube playlist titled 'Survey123 for ArcGIS Product Overview'. It contains seven videos, each with a thumbnail and title. The videos cover topics such as 'Survey123 for ArcGIS Product Overview', 'Creating Smart Forms with Survey123 Web Designer', 'Creating and Publishing Surveys', 'Creating Selection Questions in a Survey', 'Collecting Images and Signatures in a Survey', 'Enabling Survey Questions with the Relevant Property', and 'Creating Groups and Using HTML tags in a Survey'.

Latest Activity

(191 Posts)

Working with Survey123 attachments in Integromat



by IsmaelChivite Esri Frequent Contributor

Tuesday

This article describes some advanced techniques to help you work with multiple Survey123 attachments in Integromat.

[more >](#)

0 1 69

What's new in ArcGIS Survey123 (December 2020)



by IsmaelChivite Esri Frequent Contributor

12-12-2020 08:13 PM

The Survey123 website and web app have just been updated. Learn what's new in this article.

[more >](#)

3 0 399

Blog @ Esri Community



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THE
SCIENCE
OF
WHERE®