Advanced Field Data Collection

ArcGIS Collector & Survey123

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Overview

I. Collector
   A. Technology
   B. GPS Configuration
   C. Feature Class Creation
   D. Data Collection
II. Survey123
   A. Web Form Builder
   B. Survey123 Connect
   C. Syncing feature service data with Survey123 form
   D. Upcoming Features

Technology

- EOS Arrow 200
  - 1-3 cm Accuracy with RTK

- Apple iPad Pro
  - Lifeproof Case

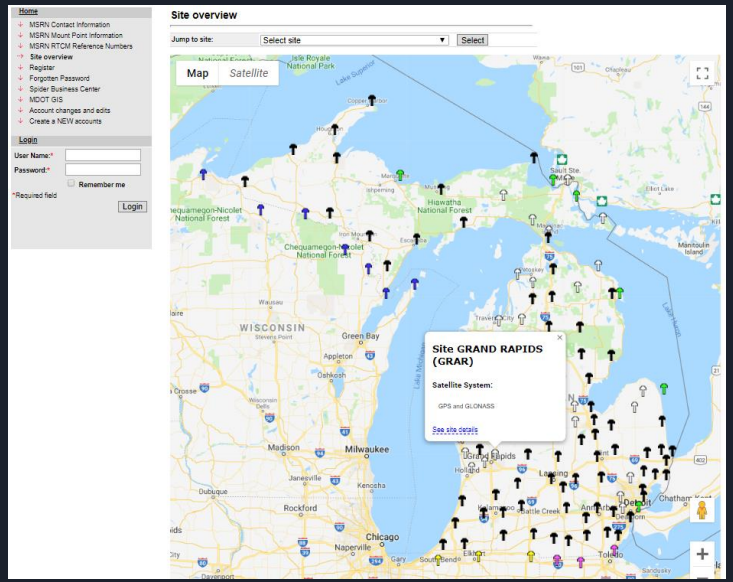
iOS Field Apps

- Esri
  - Collector
  - Collector Classic
  - Explorer
  - Survey123

- EOS Tools Pro

MDOT Cors

RTK Base Stations

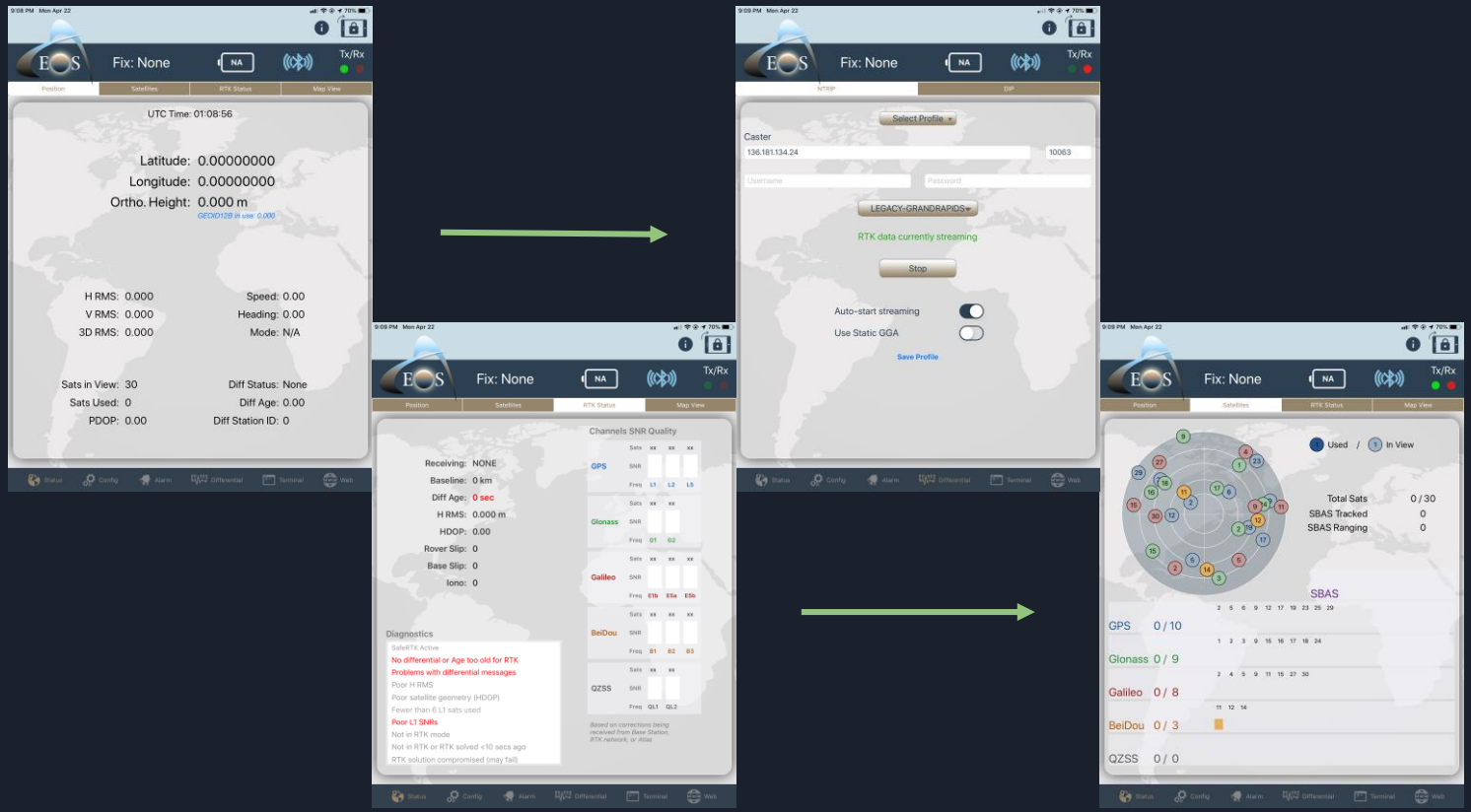


NEW MDOT CORS/MSRN Port List - New IP address: 136.181.134.24 - Effective 4/1/2015

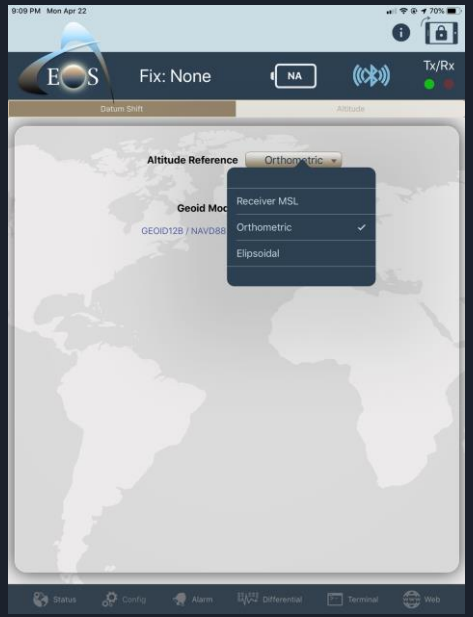
All Ports below are available with GPS only message and are designed for legacy systems with limited authentication. Users will need to email or call MDOT after your account creation of the user

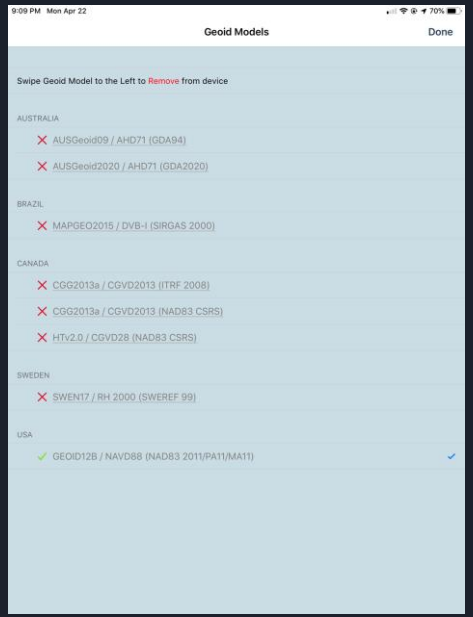
System	Port #	Product	Mountpoint	Message type	Site	Port #	Product	Mountpoint	Message type	Site
GPS + Glonass	10033	ADRIAN	LEGACY-ADRIAN	RTCM 2.3	ADRI	10070	HOLLAND	LEGACY-HOLLAND	RTCM 2.3	MIHO
	10034	ALPENA	LEGACY-ALPENA	RTCM 2.3	NOR3	10071	HOUGHTON	LEGACY-HOUGHTON	RTCM 2.3	MITU
GPS + Glonass	10035	ANN ARBOR	LEGACY-ANNARBOR	RTCM 2.3	UOFM	10072	HOUGHTON LAKE	LEGACY-HOUGHTONLAKE	RTCM 2.3	MIHL
GPS + Glonass	10036	AUBURN HILLS	LEGACY-AUBURNHILLS	RTCM 2.3	METR	10073	HUDSON	LEGACY-HUDSON	RTCM 2.3	MIKS
GPS Only	10037	AVOCA	LEGACY-AVOCA	RTCM 2.3	AVCA	10074	HUDSONVILLE	LEGACY-HUDSONVILLE	RTCM 2.3	MIHV
GPS Only	10038	BAD AXE	LEGACY-BADAXE	RTCM 2.3	MIBA	10075	INDIAN RIVER	LEGACY-INDIANRIVER	RTCM 2.3	MIND
GPS + Glonass	10039	BARAGA	LEGACY-BARAGA	RTCM 2.3	MIBX	10076	IONIA	LEGACY-IONIA	RTCM 2.3	MION
GPS + Glonass	10040	BATTLE CREEK	LEGACY-BATTLECREEK	RTCM 2.3	MIBC	10077	IRON RIVER	LEGACY-IRONRIVER	RTCM 2.3	MIIR
GPS Only	10041	BAY CITY	LEGACY-BAYCITY	RTCM 2.3	MIBY	10078	IRONWOOD	LEGACY-IRONWOOD	RTCM 2.3	MIIW
GPS Only	10042	BENTON HARBOR	LEGACY-BENTONHARBOR	RTCM 2.3	MIBH	10079	ITHACA	LEGACY-ITHACA	RTCM 2.3	MIIT
GPS + Glonass	10043	BIG RAPIDS	LEGACY-BIGRAPIDS	RTCM 2.3	BIGR	10080	JACKSON	LEGACY-JACKSON	RTCM 2.3	UNIV
GPS + Glonass	10044	BIRCH RUN	LEGACY-BIRCHRUN	RTCM 2.3	BIRCH	10081	KALAMAZOO	LEGACY-KALAMAZOO	RTCM 2.3	SOWR
GPS Only	10045	BOYNE CITY	LEGACY-BOYNECITY	RTCM 2.3	MIBO	10082	KALKASKA	LEGACY-KALKASKA	RTCM 2.3	MIKK
GPS Only	10046	BRIGHTON	LEGACY-BRIGHTON	RTCM 2.3	BRIG	10083	LANSING	LEGACY-LANSING	RTCM 2.3	LANS
GPS + Glonass	10047	CADILLAC	LEGACY-CADILLAC	RTCM 2.3	NOR1	10084	LIVONIA	LEGACY-LIVONIA	RTCM 2.3	MILI
GPS + Glonass	10048	CAPAC	LEGACY-CAPAC	RTCM 2.3	CPAC	10085	MACKINAW CITY	LEGACY-MACKINAWCITY	RTCM 2.3	MIMC
GPS + Glonass	10049	CARSONVILLE	LEGACY-CARSONVILLE	RTCM 2.3	MICA	10086	MANCHESTER	LEGACY-MANCHESTER	RTCM 2.3	MIMR
GPS Only	10050	CASS CITY	LEGACY-CASSCITY	RTCM 2.3	MICC	10087	MANISTEE	LEGACY-MANISTEE	RTCM 2.3	MIMN
GPS Only	10051	CENTERVILLE	LEGACY-CENTERVILLE	RTCM 2.3	MICV	10088	MANISTIQUE	LEGACY-MANISTIQUE	RTCM 2.3	MIQE
GPS Only	10052	CHARLEVOIX	LEGACY-CHARLEVOIX	RTCM 2.3	MICX	10089	MARINE CITY	LEGACY-MARINECITY	RTCM 2.3	CLRE
GPS + Glonass	10053	CHESANING	LEGACY-CHESANING	RTCM 2.3	CHSN	10090	MARQUETTE	LEGACY-MARQUETTE	RTCM 2.3	MIMQ
	10054	COLDWATER	LEGACY-COLDWATER	RTCM 2.3	MICW	10091	MASON	LEGACY-MASON	RTCM 2.3	MIMA
TBD	10055	COOPERSVILLE	LEGACY-COOPERSVILLE	RTCM 2.3	MICO	10092	MIO	LEGACY-MIO	RTCM 2.3	MIO2
	10056	DAVISON	LEGACY-DAVISON	RTCM 2.3	MIDS	10093	MONROE	LEGACY-MONROE	RTCM 2.3	MIMO
	10057	DETROIT	LEGACY-DETROIT	RTCM 2.3	MIDT	10094	MT PLEASANT	LEGACY-MTPLEASANT	RTCM 2.3	MPLE
	10058	DUNDEE	LEGACY-DUNDEE	RTCM 2.3	MIDD	10095	MUNISING	LEGACY-MUNISING	RTCM 2.3	MIMU
	10059	ESCANABA	LEGACY-ESCANABA	RTCM 2.3	SUP2	10096	MUSKEGON	LEGACY-MUSKEGON	RTCM 2.3	MSKY
	10060	FORT GRATIOT	LEGACY-FORTGRATIOT	RTCM 2.3	FRTG	10097	MUSKEGON HEIGHTS	LEGACY-MUSKEGONHEIGHTS	RTCM 2.3	MIMK
	10061	GAYLORD	LEGACY-GAYLORD	RTCM 2.3	MIGD	10098	NEW HAVEN	LEGACY-NEWHAVEN	RTCM 2.3	MINH
	10062	GRAND HAVEN	LEGACY-GRANDHAVEN	RTCM 2.3	MIGH	10099	NEWBERRY	LEGACY-NEWBERRY	RTCM 2.3	SUP3
GPS + Glonass	10063	GRAND RAPIDS	LEGACY-GRANDRAPIDS	RTCM 2.3	GRAR	10100	NILES	LEGACY-NILES	RTCM 2.3	MINI
GPS + Glonass	10064	GRAYLING	LEGACY-GRAYLING	RTCM 2.3	MIGL	10101	NORWAY	LEGACY-NORWAY	RTCM 2.3	MINW
GPS + Glonass	10065	HARRISON	LEGACY-HARRISON	RTCM 2.3	MIHA	10102	ONTONAGON	LEGACY-ONTONAGON	RTCM 2.3	MIOT
	10066	HART	LEGACY-HART	RTCM 2.3	MIHT	10103	PARSHALLVILLE	LEGACY-PARSHALLVILLE	RTCM 2.3	MIPV
	10067	HASTINGS	LEGACY-HASTINGS	RTCM 2.3	HAST	10104	PAW PAW	LEGACY-PAWPAW	RTCM 2.3	MIPP
	10068	HEMLOCK	LEGACY-HEMLOCK	RTCM 2.3	HMLK	10105	PLAINWELL	LEGACY-PLAINWELL	RTCM 2.3	MIPW
	10069	HILLSDALE	LEGACY-HILLSDALE	RTCM 2.3	MIHD	10106	SAGINAW	LEGACY-SAGINAW	RTCM 2.3	BAYR

GPS Setup - RTK Base Station



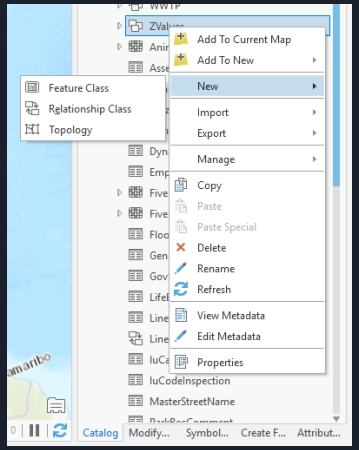
GPS Setup - Elevation

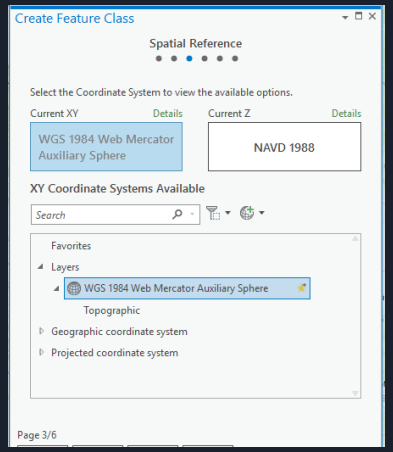


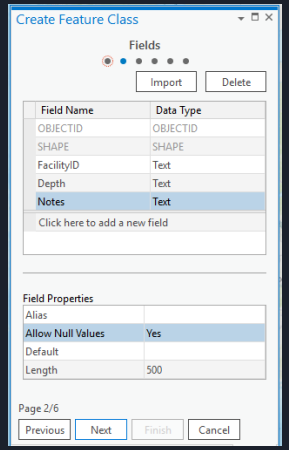


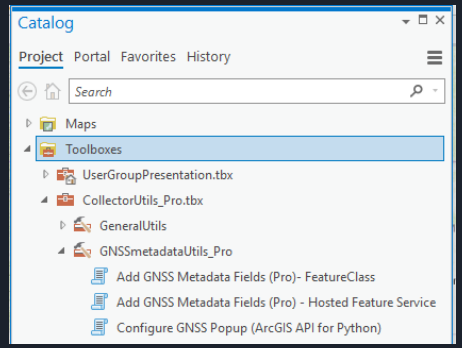
ArcGIS Pro

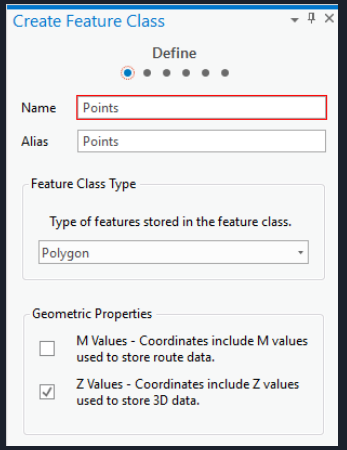
Z-Value Feature Classes



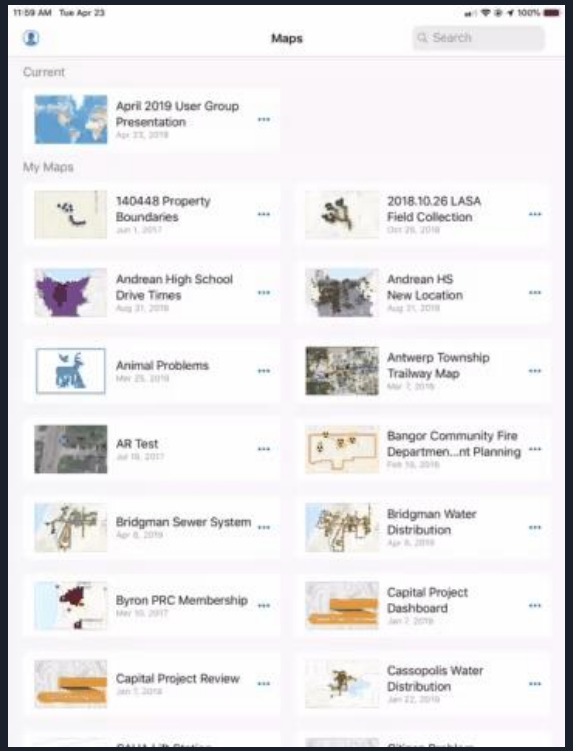








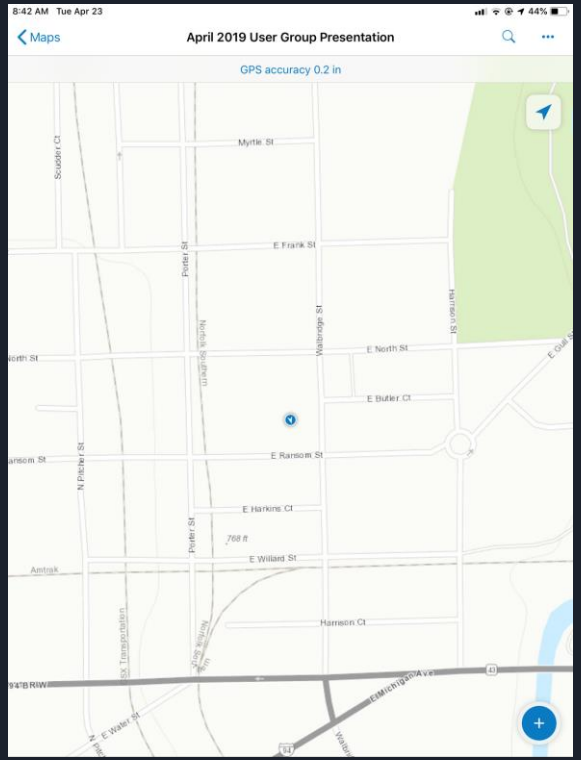
ArcGIS Collector Setup

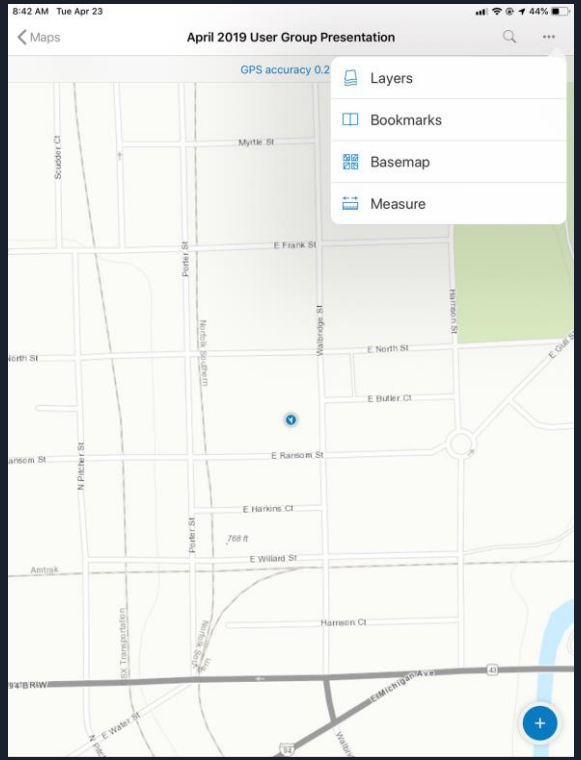


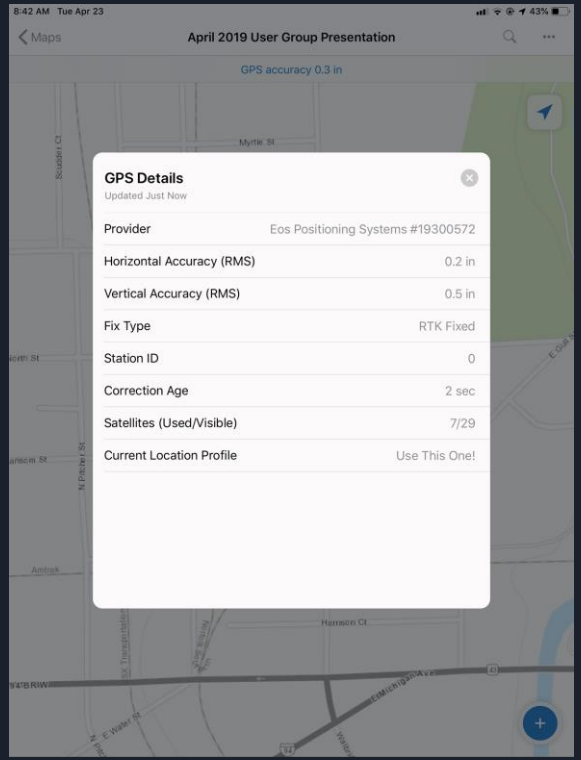
- Sign-in Using ArcGIS Online Account
- Select Profile to Update Settings
- Add Location Provider
  - EOS Arrow
- Update Location Profile
  - GCS WGS 1984
- Optional
  - Change Accuracy Settings
  - Change Averaging Settings

Field Collection

Map Interface

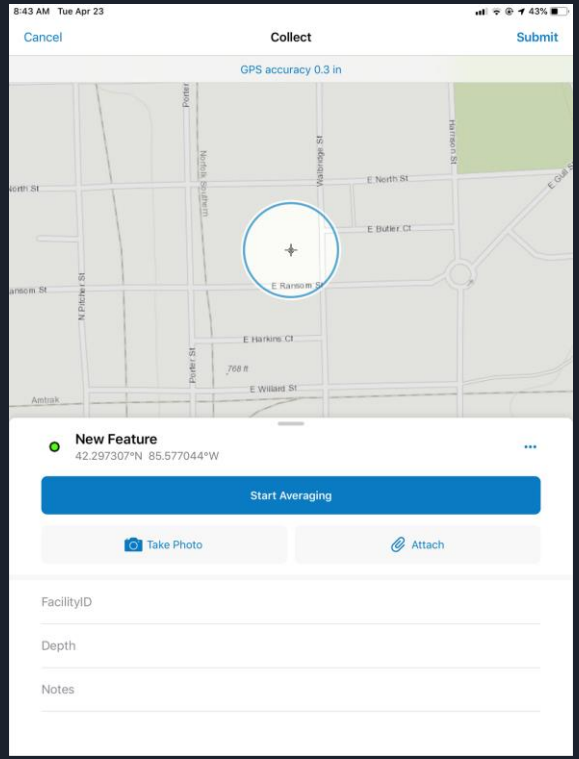






Data Collection

- Add Features
  - Averaging
- Select Field to Populate
  - Field Types
- Update Point
  - Offset
- Submit



Edit Data

- Select Feature
- Editing Options
  - Edit
  - Copy
  - Delete
  - Directions
- Submit

Survey123

An introduction

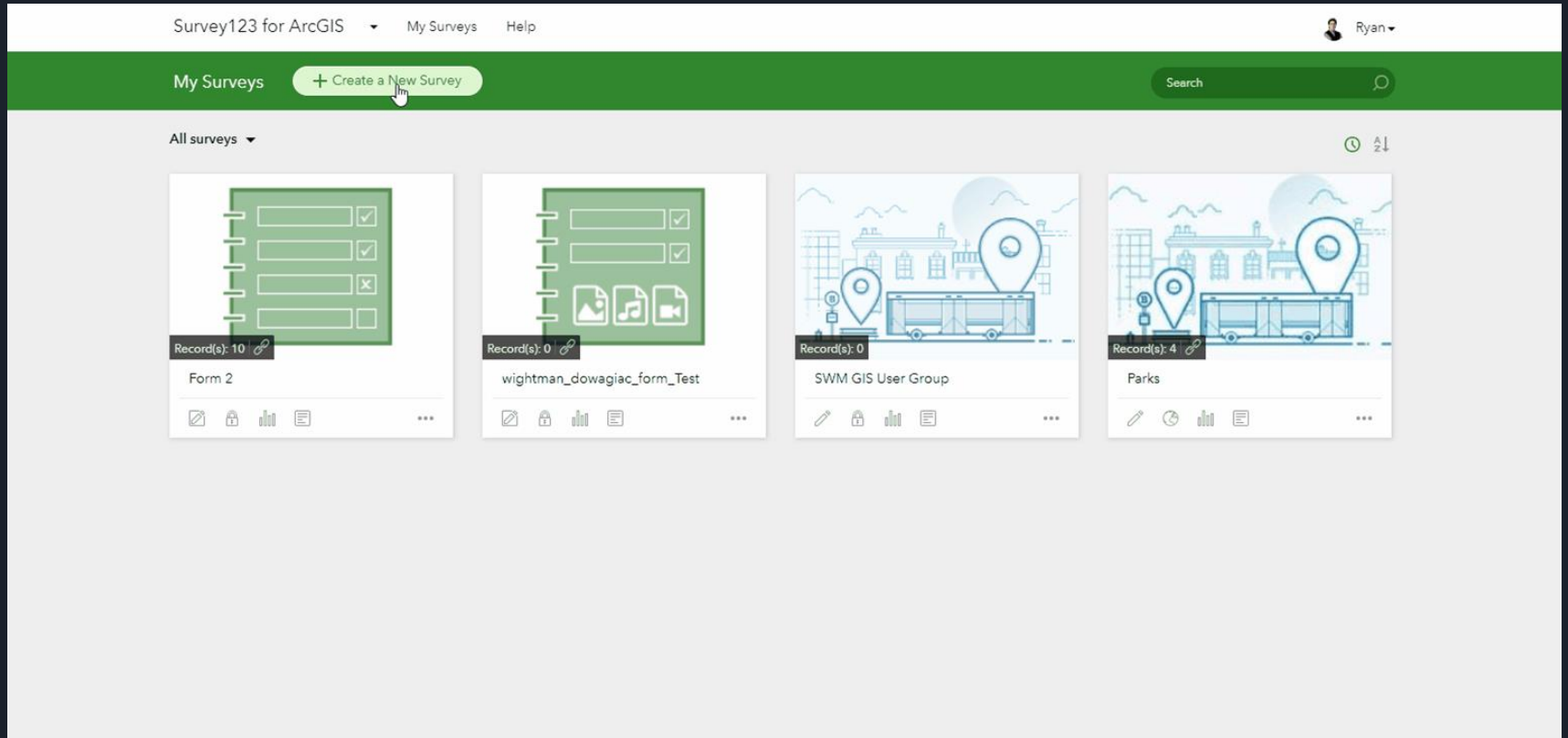
- Surveys, not surveying
- Quick and Simple
- Complex and Scalable

Crowdsourced Data

Asset Management

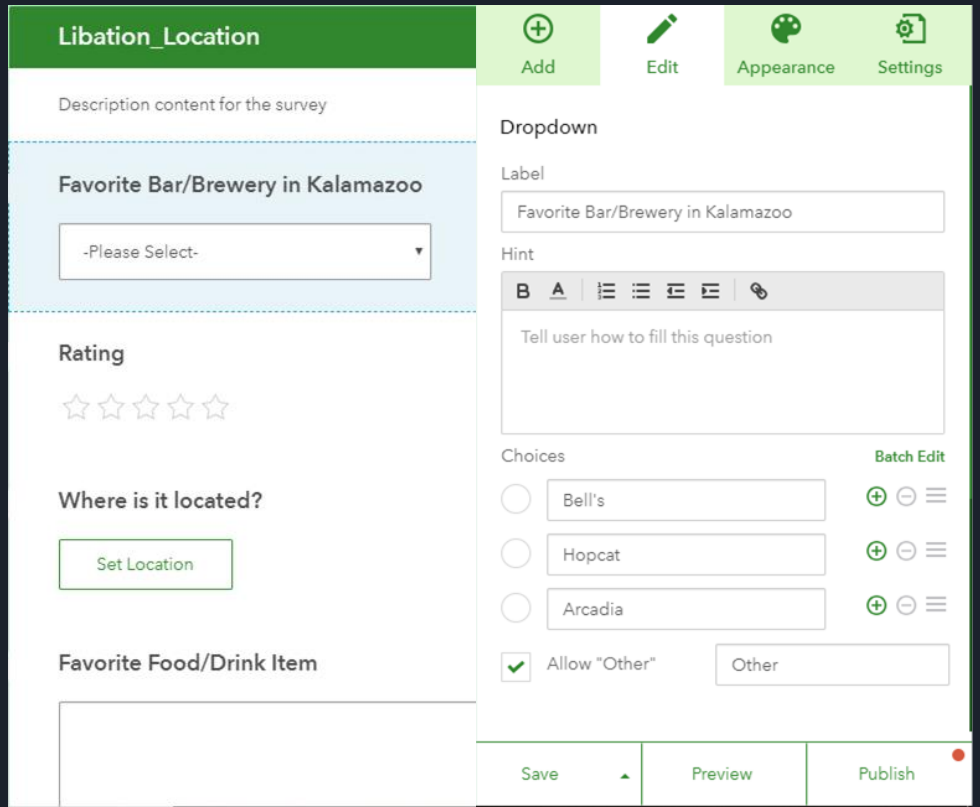
Web Form Builder

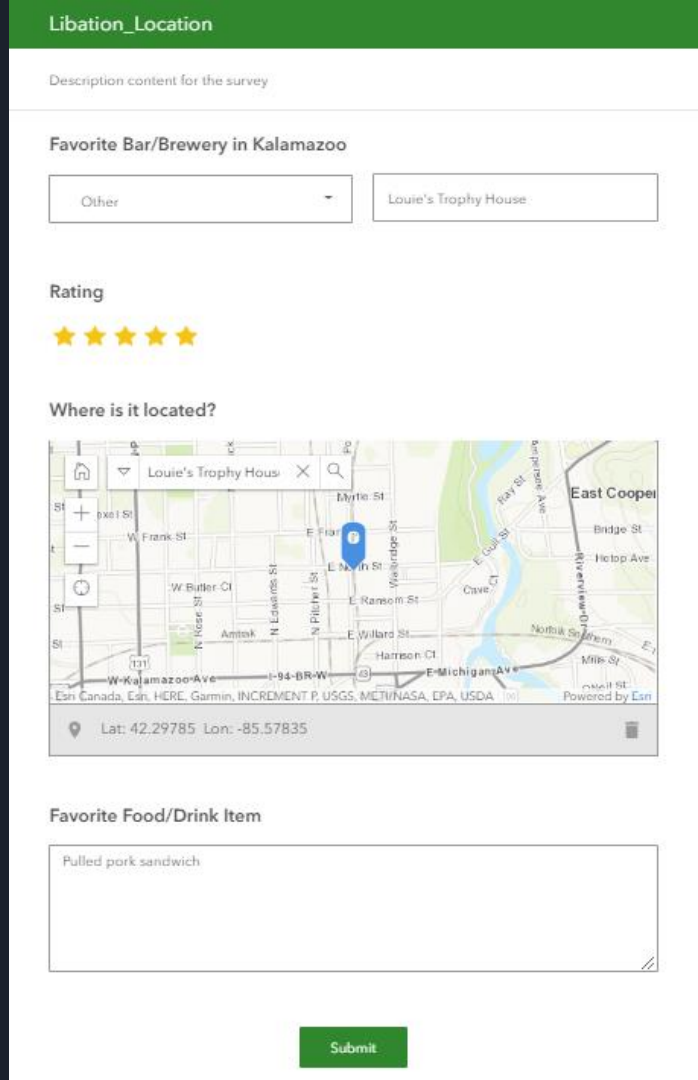
https://survey123.arcgis.com/surveys → Create New Survey → Modify



Survey123

Web Form Builder

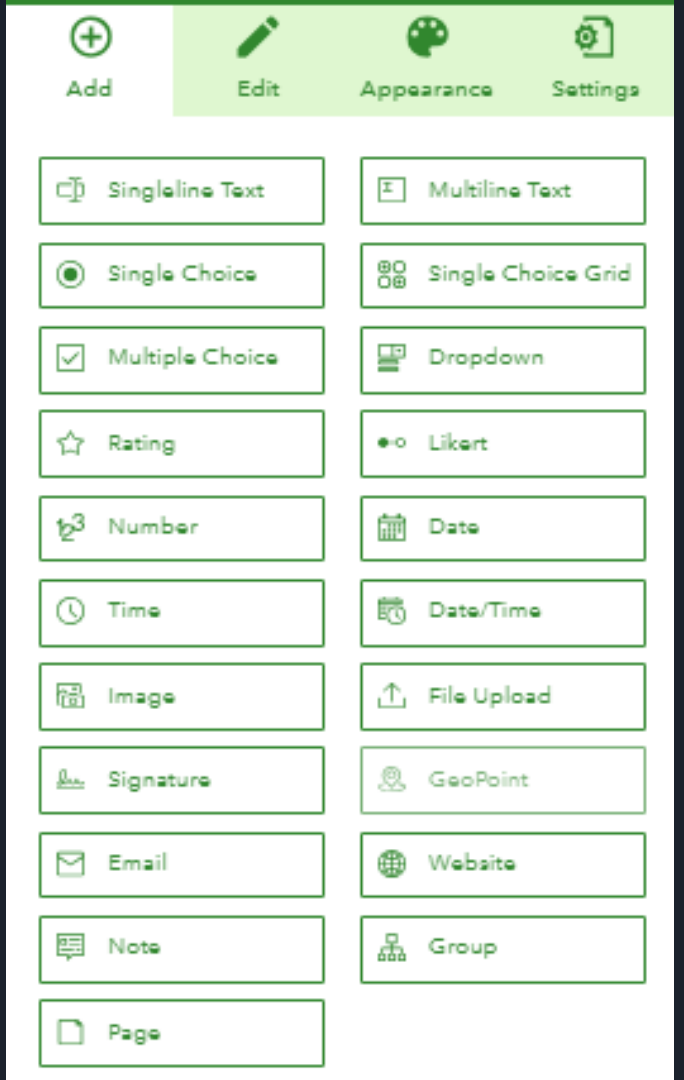




Survey123

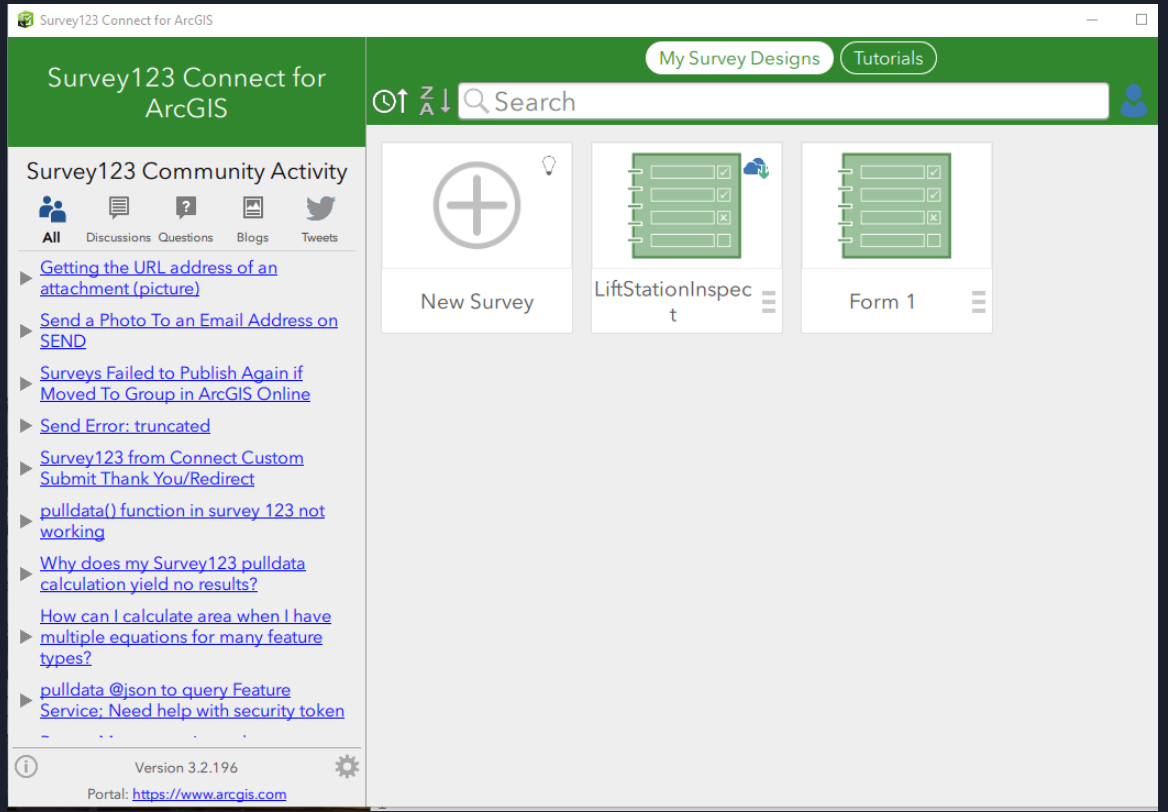
Web Form Builder

More options available

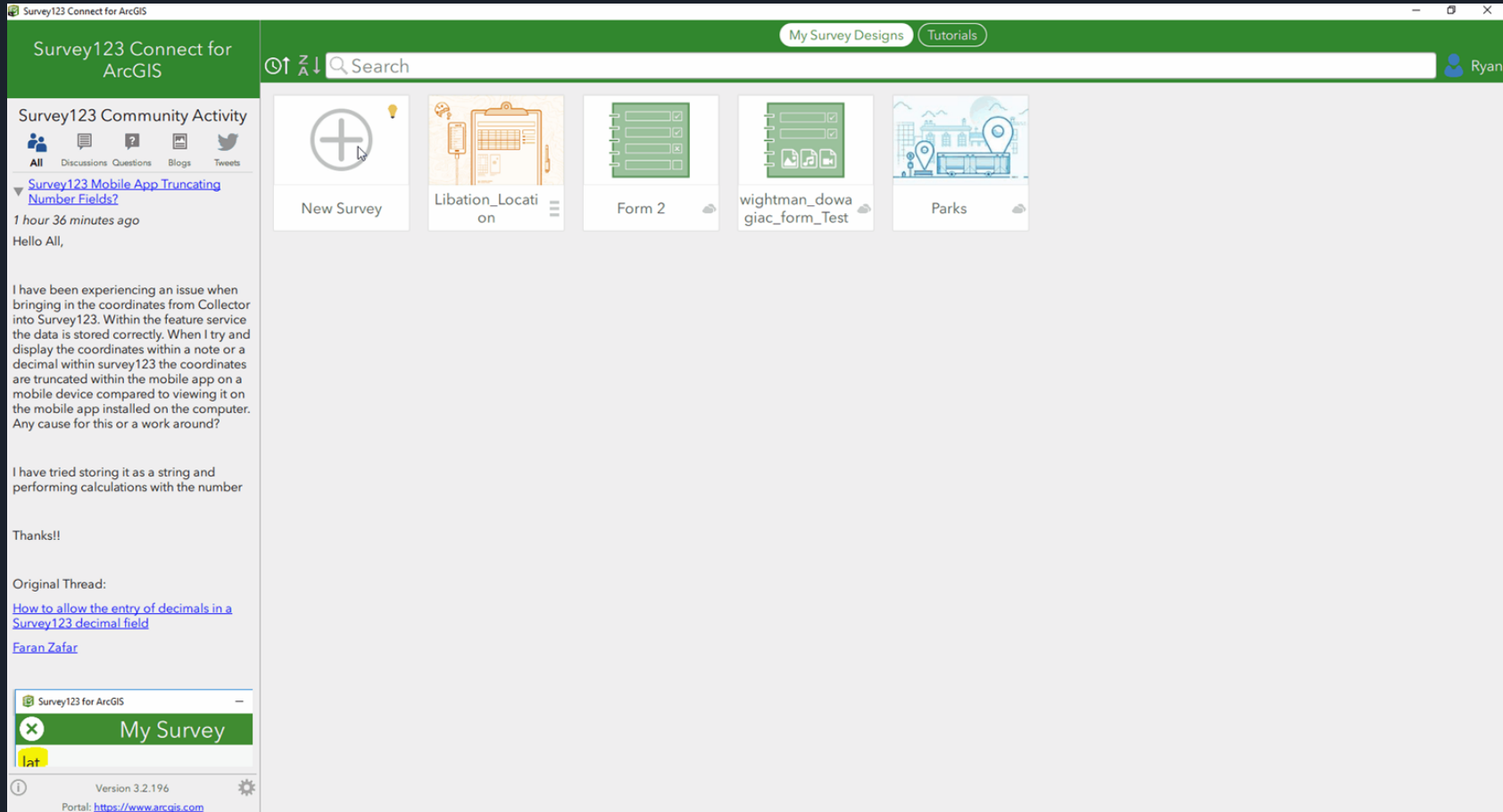


Complex Forms: Survey123 Connect

- Desktop application
- Access to advanced functions
  - Calculations
  - Images/Audio Files
  - Pulling Data
  - Populate related tables in AGOL
- Build surveys from feature classes



Survey123 Connect



Survey123 Connect: Calculations

Built on Arcade

Simple Addition:

```
${question_1} + ${question_2} + ${question_3}
```

Calculate Someone's Age:

```
int((today() - ${birth_date}) div (1000 * 24 * 60 * 60 * 365.25))
```

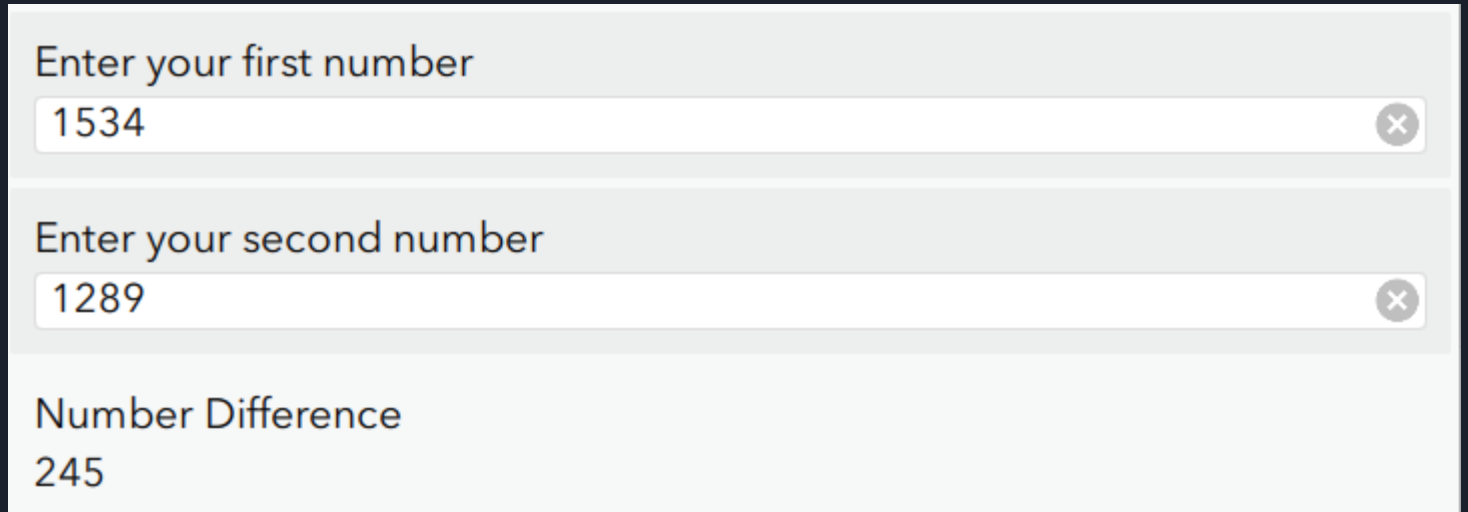
Area of a plot (given radius):

```
pi() * pow(${plotRadius}, 2)
```

Survey123 Connect: Calculations

Built on Arcade

5	integer	num1	Enter your first number	
6	integer	num2	Enter your second number	
7	calculate	calc_num_diff		${num1} - ${num2}
8	note	num_diff	Number Difference	${calc_num_diff}



Survey123 Connect: pulldata() function

- Allows you to pull data from a spreadsheet
- Useful for data that stays relatively static
  - e.g. Estimated fish weight

Syntax:

```
pulldata(<csvfile>, <returnColumn>, <lookupColumn>, <lookupValue>)
```

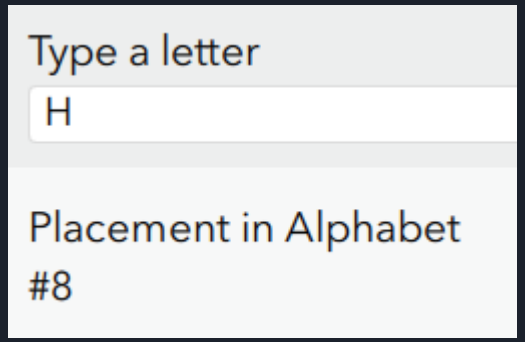
Survey123 Connect: pulldata() function

```
pulldata(<csvfile>, <returnColumn>, <lookupColumn>, <lookupValue>)
```

XLSForm

9	text	letter	Type a letter	
10	note	note_letter	Placement in Alphabet	pulldata('data','letter_col','name',${letter})

Survey123 Connect



data.csv

	A	B
1	name	letter_col
2	A	#1
3	B	#2
4	C	#3
5	D	#4
6	E	#5
7	F	#6
8	G	#7
9	H	#8

Survey123 Connect: pulldata() function

```
pulldata(<csvfile>, <returnColumn>, <lookupColumn>, <lookupValue>)
```

XLSForm

9	text	letter	Type a letter	
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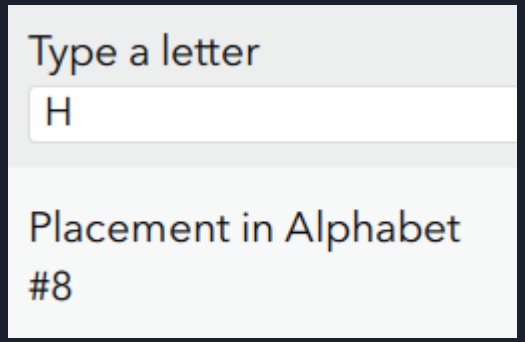
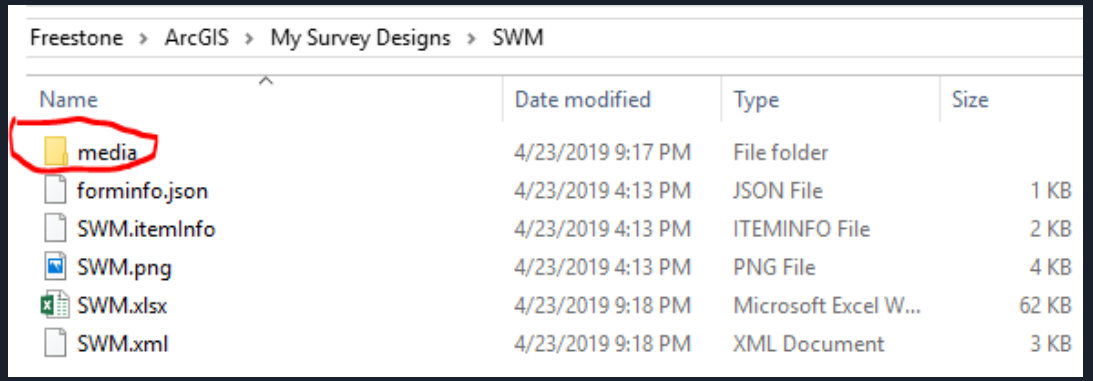
Survey123 Connect



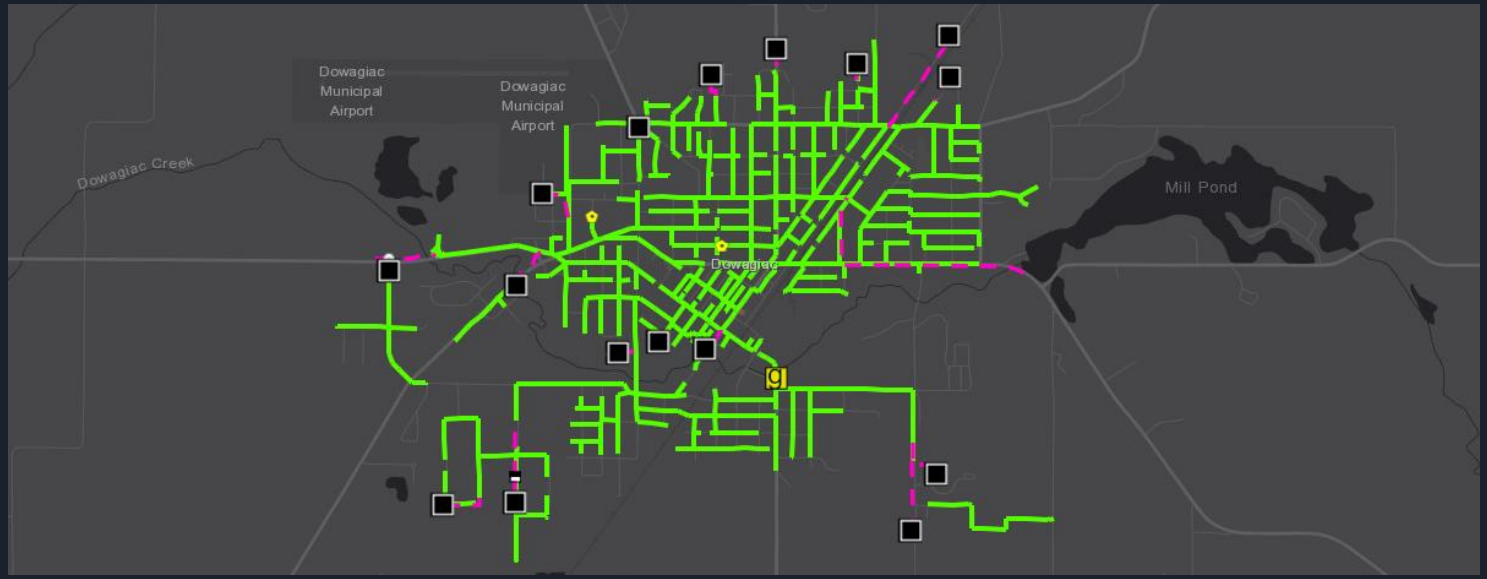
data.csv



Sample Case: City of Dowagiac

Purpose: to dynamically view previous entries when data is being submitted in a form

Solution: Survey123 and Python scripting



Survey123

Dowagiac's Previous Form

CITY OF DOWAGIAC
LIFT STATION LOG

LIFT STATION	PUMP #1 HOURS	PUMP #2 HOURS
Chestnut Street		
Michigan Avenue		
Walnut Street		
Woodhouse Drive		
M-51 South		
Pokagon/M-62 West		
Wolf Street		
N. Lowe / Green Street		
Indian Hills Apartments		
Pizza Hut/M-51 North		
Florence Avenue		
Rudy Road		
Vineyard Place		
Middle School		
Cass Avenue		

Employee: _____

Time on Stations: _____

Date: _____

Sample Case: City of Dowagiac

New survey → Create Survey from Feature Service → Customize

Problem: how do we dynamically and automatically update our data?

	A	B	C	M
1	type	name	label	calculation
2	text	FACILITYKEY	Facility ID	
3	text	NAME	LS Name	
4	text	EMPLOYEE	Employee Name	
5	dateTime	INSPDATE	Inspection Date	
6	decimal	PUMP1HRS	Pump #1 Hours	
7	calculate	calc_pump1_prev		pulldata('prevHour','prev_hour1','name',${FACILITYKEY})
8	note	PUMP1PREV	Pump #1 Previous Hour	${calc_pump1_prev}
9	calculate	calc_pump1_diff		${PUMP1PREV} - ${PUMP1HRS}
10	note	PUMP1DIFF	Pump #1 Hour Difference	${calc_pump1_diff}
11	decimal	PUMP2HRS	Pump #2 Hours	
12	calculate	calc_pump2_prev		pulldata('prevHour','prev_hour2','name',${FACILITYKEY})
13	note	PUMP2PREV	Pump #2 Previous Hour	${calc_pump2_prev}
14	calculate	calc_pump2_diff		${PUMP2PREV} - ${PUMP2HRS}
15	note	PUMP2DIFF	Pump #2 Hour Difference	${calc_pump2_diff}
16	text	REMARKS	Remarks	
17	image	ssLiftStationInspection_image	Image	

Survey123

City of Dowagiac: Methodology

Download Form Item from AGOL → Read Attribute Table from AGOL → Query the most recent inspection date in table → Write the query to a CSV inside of the Form Item's Folder → Upload new Form Item (overwrites old Item)

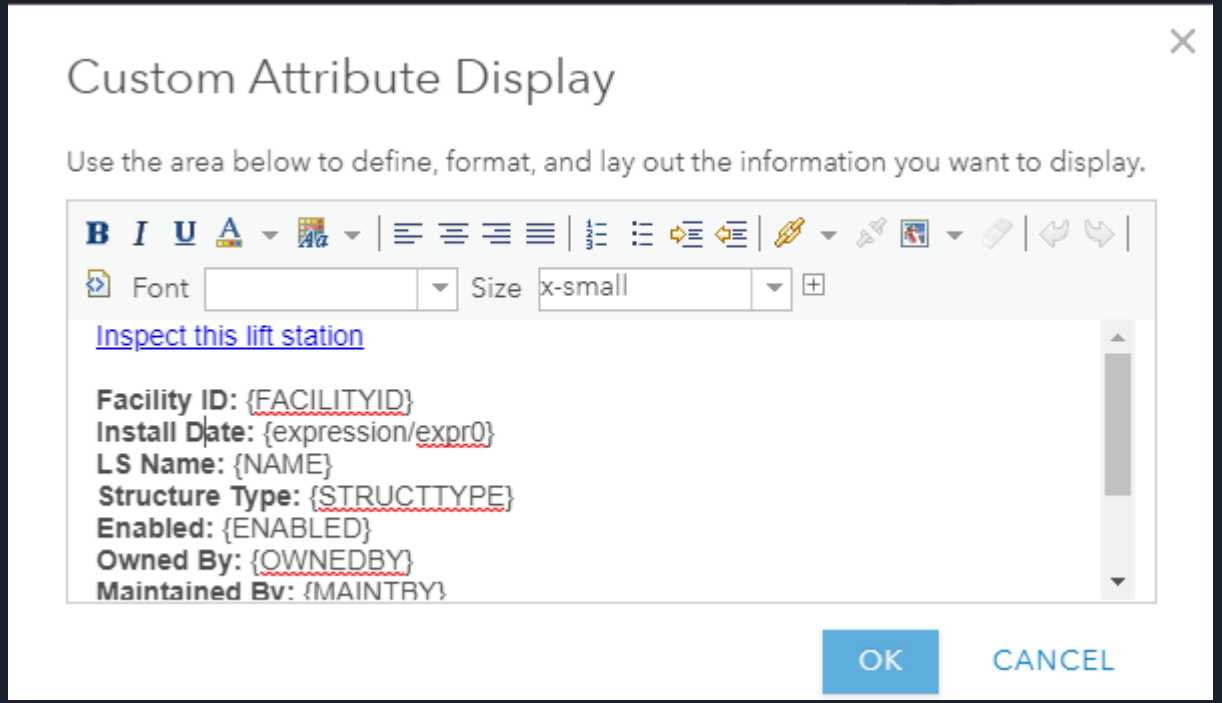
```
# item ID of the form item on AGOL
form_item = 'XXXXXXXXXXXXXXXXXXXXX'
# item ID of the feature class that contains the related table
feature_item = 'XXXXXXXXXXXXXXXXXXXXXXXX'
# Address of your ArcGIS portal
portal_url = r'https://yourSite.maps.arcgis.com'
# ArcGIS user credentials to authenticate against the portal
(case sensitive)
credentials = {'userName' : 'yourUsername', 'passWord' :
'yourPW'}
# ArcGIS portal security type (LDAP, NTLM, OAuth, Portal, PKI)
security_type = 'Portal'
```

Survey123

From Explorer to Survey123

From Explorer to Survey123

Set-up URL in Custom Attribute Display in ArcGIS Online



From Explorer to Survey123

Set-up URL in Custom Attribute Display in ArcGIS Online

arcgis-survey123://?itemID=YOUR_FORM_ID&field:FACILITYKEY={FACILITYID}&field:NAME={NAME}

What's New: JavaScript Extension

- pulldata() Javascript extensions
  - perform calculations
  - return JSON objects, parse results
  - Manipulate live data

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

What's New: JavaScript Extension

Fahrenheit to Celsius Example:

myJSFunctions.js (to be put in extensions folder)

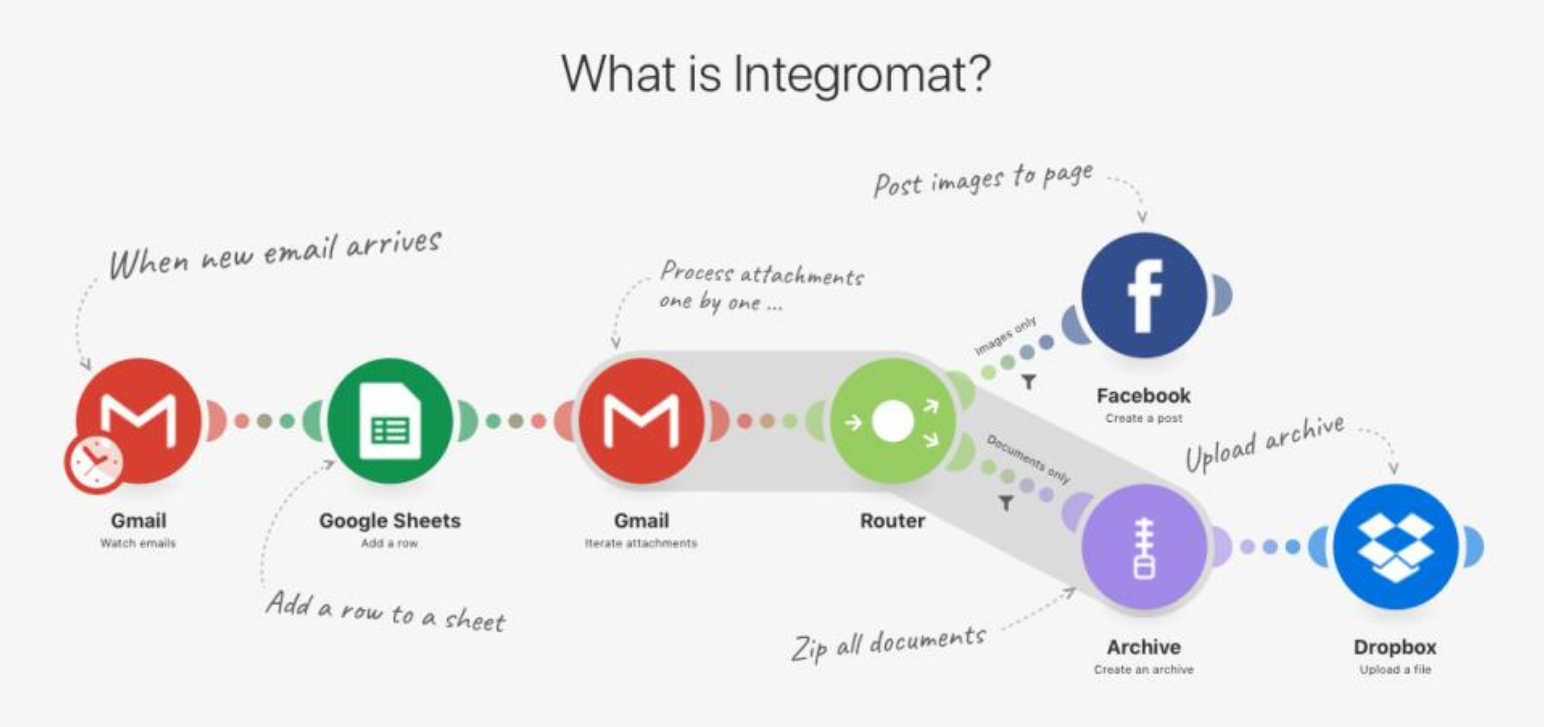
```
function toCelsius(fahrenheit) {
     return (5/9) * (fahrenheit-32);
}
```

XLSForm

```
pulldata("@javascript","myJSFunctions.js","toCelsius",${farenheit})
```

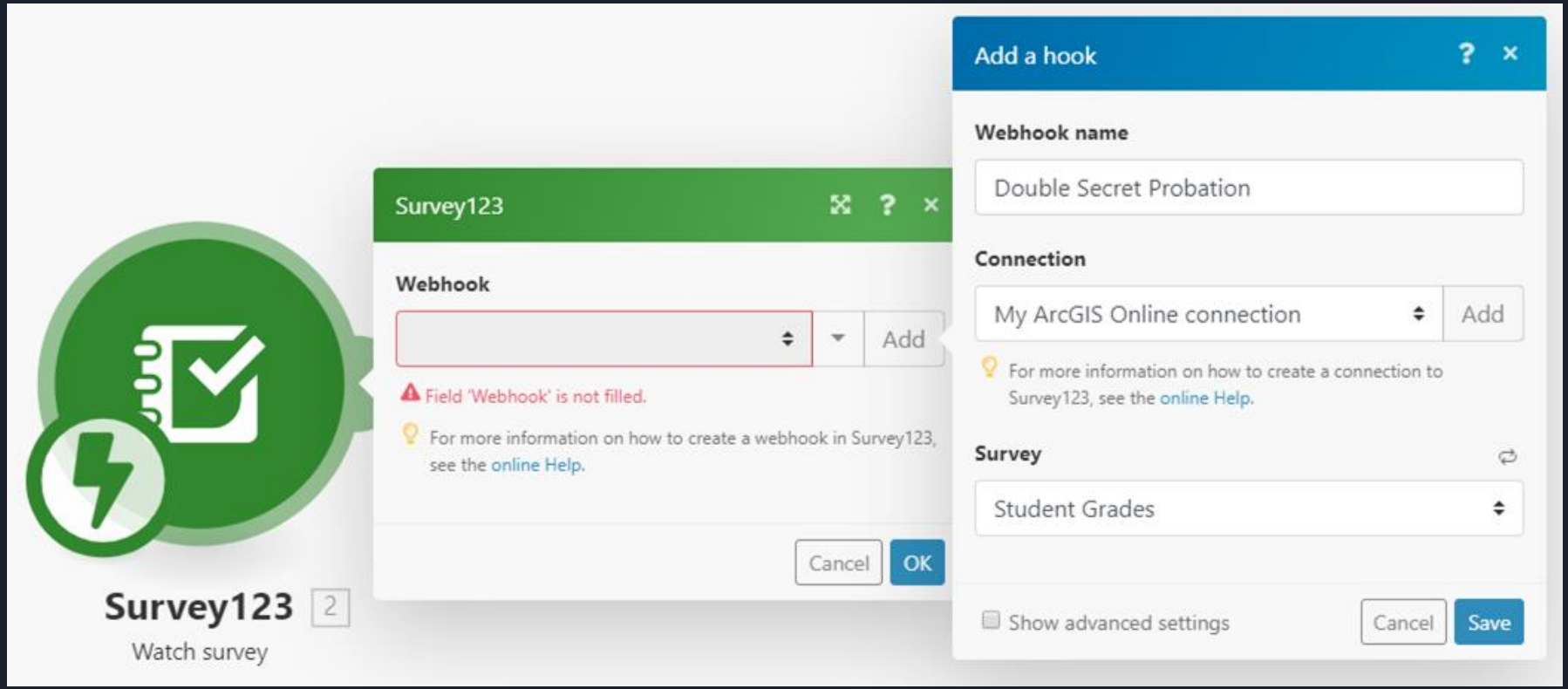
Survey123

What's New: webhooks

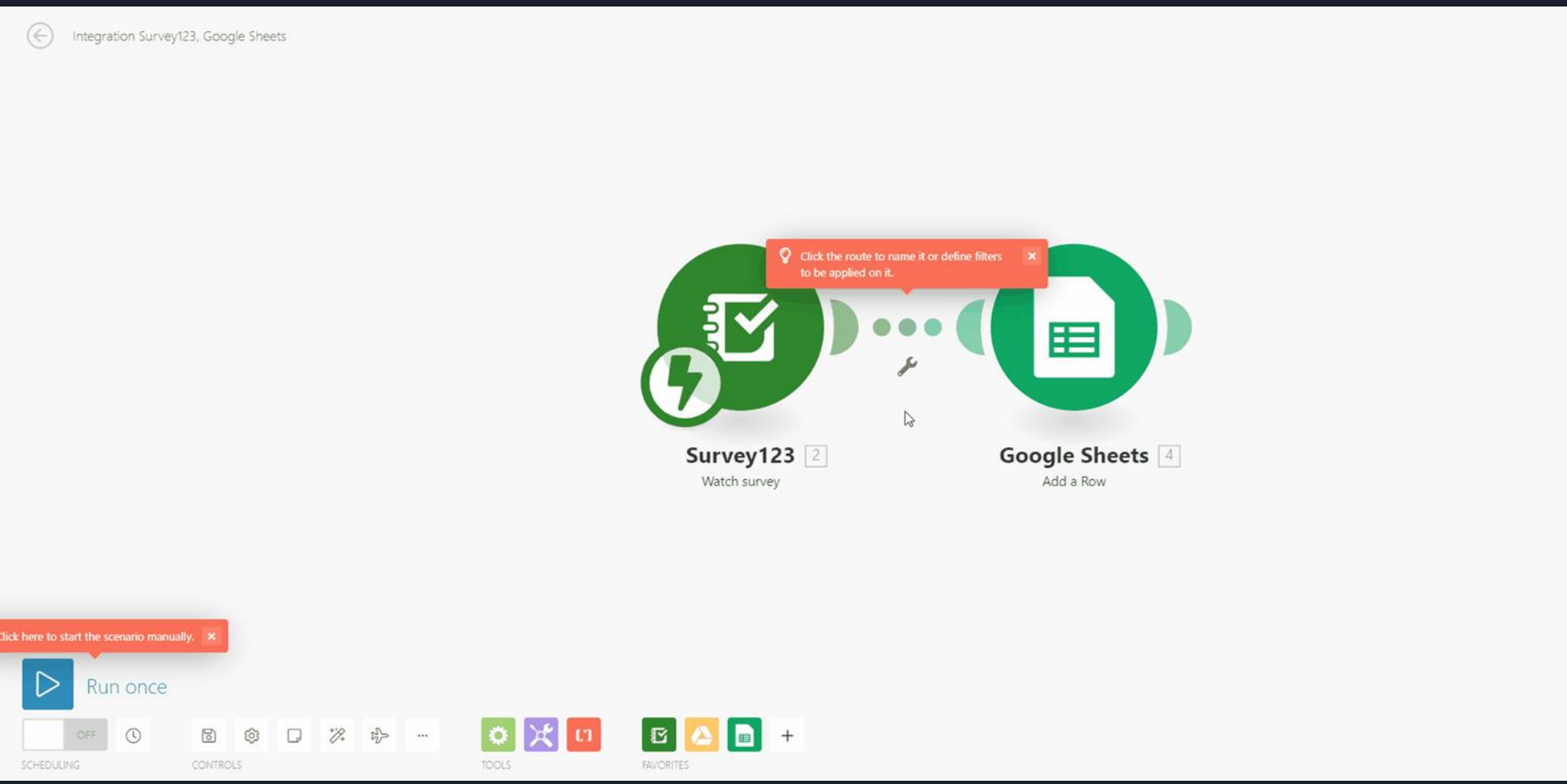


DOUBLE SECRET PROBATION
imgflip.com

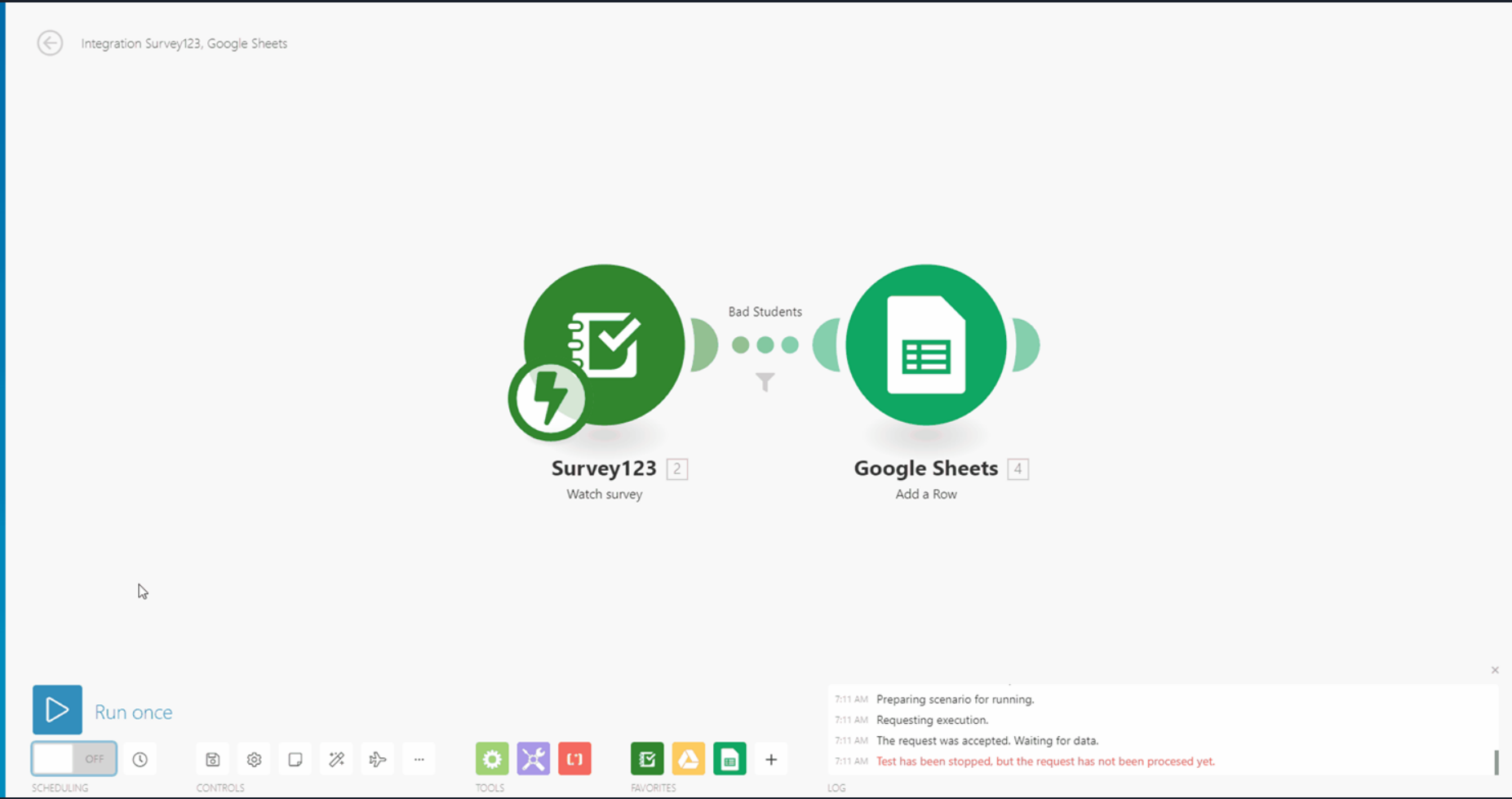
What's New: webhooks



Survey123


Integration Survey123, Google Sheets
Click the route to name it or define filters to be applied on it.
Survey123 2
Watch survey
Google Sheets 4
Add a Row
Click here to start the scenario manually.
Run once
OFF
SCHEDULING
CONTROLS
TOOLS
FAVORITES

Survey123


Integration Survey123, Google Sheets
Bad Students
Survey123 2
Watch survey
Google Sheets 4
Add a Row
Run once
OFF
SCHEDULING
CONTROLS
TOOLS
FAVORITES
7:11 AM Preparing scenario for running.
7:11 AM Requesting execution.
7:11 AM The request was accepted. Waiting for data.
7:11 AM Test has been stopped, but the request has not been procesed yet.
LOG

Questions?

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The End