

Using ArcGIS Online and AppStudio to Create a Comprehensive Citizen Problem Reporting Platform

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OVERVIEW OF PROCESS

1. Feature Class
2. Crowdsource Reporter Web Application
 - Create the web map
 - Configure web application
3. Internal Management Web Application
 - Create the web map with views for each department
 - Configure the web application
4. Custom Workflows
 - E-mail notifications using Python and HTML
 - Set up Windows Task Scheduler to run Python script hourly, or more frequently
5. Use AppStudio To Publish Mobile Applications To App Stores
 - Deep Customizations Using QML Editor (JavaScript)
6. Future Enhancements



CREATE THE FEATURE CLASS

Required Fields

- Request Type, Status, Address, User Info, Submission Details, Staff Notes, Open & Closed Dates
- Public View: Yes/No, Notification Status, User Tracking: UserID, Contact Info Fields

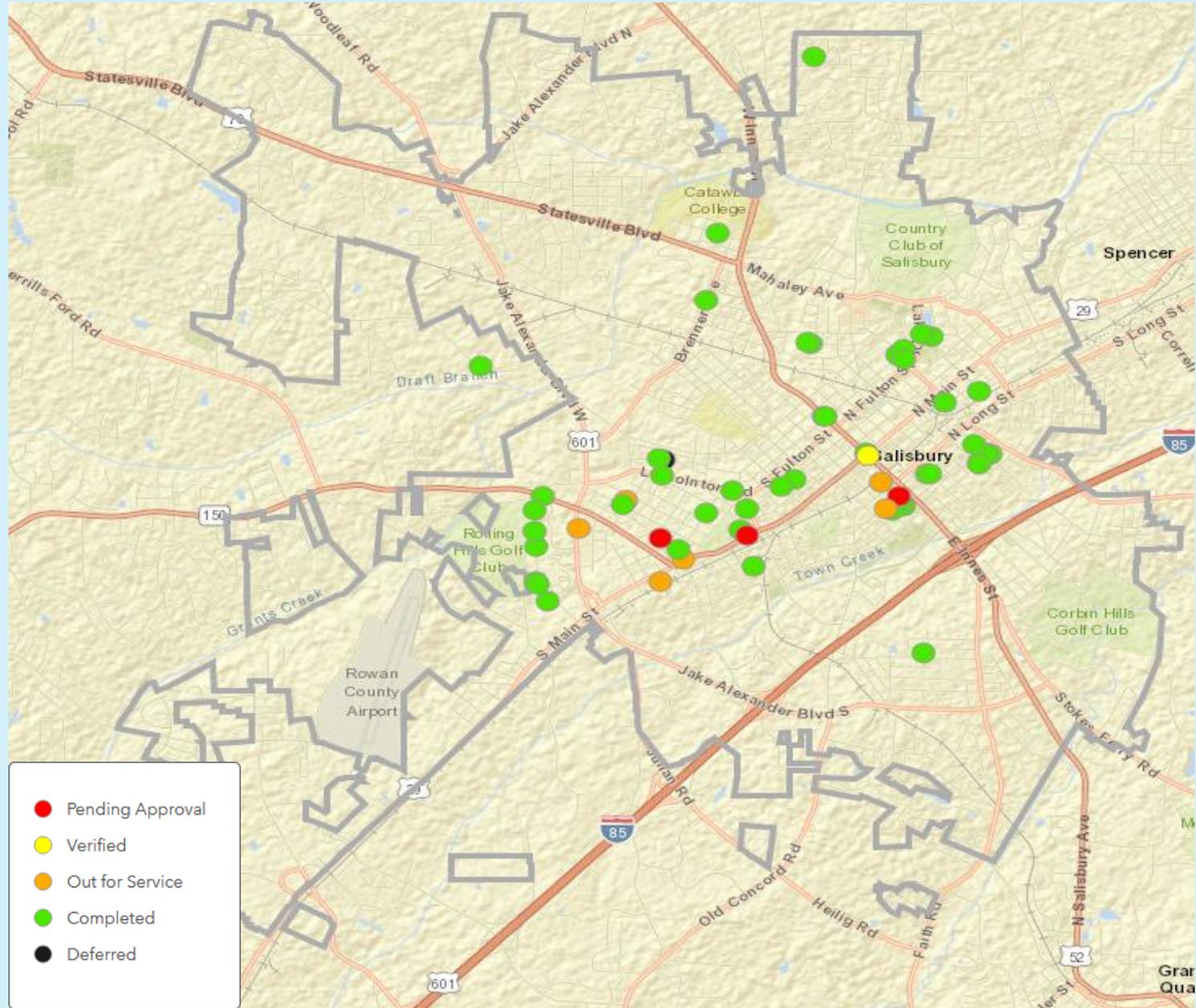
Symbology And Representation For Your Audience

- Request Type or Status or something else

Host On AGOL/Portal Or On Local Server

- Local ArcGIS Server does not allow for user tracking
- AGOL automatically adds fields for photo attachments, user tracking, editor tracking, etc. when you select those settings in AGOL.

Symbolized by Status



CREATE WEB MAP TO DRIVE WEB APP

Add boundary feature class for jurisdiction(s)

- Note the Table Of Contents name to configure in the web app
- Multi-Jurisdictional apps should have a jurisdiction field in the feature class to determine notification e-mail routing

Create Filters

- Hide requests from public until verified (PUBLICVIEW=Yes)
- Show only requests that are open or have been closed in the past month (or any amount of time)

[CLOSED DATE] IS **BLANK** OR [CLOSED DATE] IS WITHIN THE LAST **MONTH**

Configure Pop-Ups to determine what the public sees when they click on an issue

- Withhold requestor name and contact information

CREATE WEB APP FROM GROUP

Create AGOL Group for your public facing application to reference.

- The application references an AGOL group instead of a single map.

From the group page, click share button and click Create Web App button

- Select Crowdsourc Reporter template and start configuring

Pick a unique splash page background image

Sign-in and User Tracking Options

BUG ALERT!!!

ESRI is not allowing public accounts to submit reports unless the account has explicit permission. This isn't feasible for a public application of this nature.

- Anonymous Login (you can still ask for a user's name and contact info via fields)
- Social Media Login



Must register your app with Facebook and Google and provide IDs. Search Google for instructions.

CREATE INTERNAL MANAGEMENT APP

Create a management group in your AGOL organization

- Internal staff will need AGOL accounts and join this group to access management app
- Add Requests feature layer to this group

Create an Admin Web Map

- Add Requests feature layer and jurisdiction boundary for reference
- Filters
- Create Hosted Feature View Layers for filtering by department
- Create departmental groups and add users
- Create View Layers from the Requests Feature Layer Item Page
- Set permissions
- Add View Layers to the web map
- Set filters for each View Layer to only display requests types that the department handles
 - Request Type = Overgrown Grass OR Request Type = Upholstered Furniture Outside of Home AND Closed Date is Blank OR Closed Date is within the last month



Salisbury311 Management



Salisbury311 Admin



Salisbury311 All Departments



Code Services



Engineering



Public Services



Salisbury-Rowan Utilities



Stormwater



CREATE INTERNAL MANAGEMENT APP (CONT.)

From the ADMIN group page, click share button and click Create Web App button

- Select Crowdsourcing Manager template and start configuring
- **Share to Admin Group Only**

The screenshot displays the 'Salisbury311 Management' web application. At the top, there is a red header with the application name and a user profile for 'Levi Coldiron'. Below the header is a dark blue navigation bar with the text 'Code Services' and '1 selected / 49 records'. The main content area features a table with the following columns: Request Type, Status, PUBLICVIEW, Address, Date Submitted, Details, and City Staff Co. The table contains several rows of data, with one row highlighted in orange: 'Grass Overgrown', 'Completed', 'Yes', '200 W 14th St Salisbury, NC 28144', 'April 05, 2018', 'Extremely long grass between sidewalk', and 'THANK YOU'. Below the table, there is a map view showing a street grid with a red pin marking the location of the selected record. To the left of the map is a sidebar with a list of filters: 'Grass Overgrown', 'PUBLICVIEW: Yes', 'Status: Completed', 'Address: 200 W 14th St Salisbury, NC 28144', and 'City Staff Comments: THANK YOU FOR YOUR SUBMITAL CODE SERVICES WILL INSPECT ON MONDAY.' The bottom right corner of the map area includes the text 'Rowan County, State of North Carolina DOT, Esri, HERE, Garmin, INCREMENT P...' and the 'esri' logo.

Request Type	Status	PUBLICVIEW	Address	Date Submitted	Details	City Staff Co
Abandoned Housing / Bad Housing Co	Out for Service	Yes	927 S Jackson	April 17, 2018	abandoned house not secure	THANK YOU
Upholstered Furniture or Appliances in	Completed	Yes	526 & 530 e bank st	April 13, 2018	Upholstered furniture and other crap or	THANK YOU
Grass Overgrown	Completed	Yes	514/516 e fisher st	April 10, 2018	Bushes grown into sidewalk, lot overgr	THANK YOU
Grass in Street	Completed	Yes	530 e fisher st	April 10, 2018	No curb, dirt in gutter, grass in street	THANK YOU
Abandoned Housing / Bad Housing Co	Completed	Yes	This is an abandoned home with an aba	April 07, 2018		THANK YOU
Abandoned Housing / Bad Housing Co	Completed	Yes	corner of E. Lafayette & N. MLK Jr. Ave	April 07, 2018	There is & has been a trailer park here. I	THANK YOU
Abandoned or Illegally Parked Vehicle c	Completed	Yes	1117 Crosby St	April 06, 2018	Cars parking on grass	THANK YOU
Grass Overgrown	Completed	Yes	200 W 14th St Salisbury, NC 28144	April 05, 2018	Extremely long grass between sidewalk	THANK YOU
Rollcart - Damaged, Missing or Left Out	Completed	No	Spankys	April 04, 2018	Alyssa	THANK YOU

CUSTOM WORKFLOWS

Python Script for E-mail Notifications

- URL is Requests Feature Service URL + “0/query” (0 is the LayerID in the map service)
- Outfields are the fields you wish to output in the query
- If CreateDate > Current time – 1 hour then we start appending the OBJECTID and RequestType to the oidList

```
import urllib2, json, urllib, datetime, time, smtplib
from datetime import timedelta, datetime
from email.mime.multipart import MIMEMultipart
from email.mime.text import MIMEText

oidList = []

URL = 'http://services.arcgis.com/FKrJWv8CWiyT6Rsn/arcgis/rest/services/Salisbury311_Requests/FeatureServer/0/query'
params = {'f': 'pjson', 'where': "1=1", 'outfields': 'OBJECTID, CreationDate, RequestType', 'returnGeometry': 'false'}
req = urllib2.Request(URL, urllib.urlencode(params))
response = urllib2.urlopen(req)
data = json.load(response)
for feat in data['features']:
    createDate = feat['attributes']['CreationDate']
    createDate = int(str(createDate)[0:-3])
    t = datetime.now() - timedelta(hours=1)
    t = time.mktime(t.timetuple())
    if createDate > t:
        oidList.append(feat['attributes']['OBJECTID'])
        oidList.append(str(feat['attributes']['RequestType']))
```

CUSTOM WORKFLOWS — EMAIL NOTIFICATIONS

Use HTML to draft the body of the e-mail

```
FROM = 'Salisbury311@salisburync.gov'
TO = ['Salisbury311@salisburync.gov']

# Create message container - the correct MIME type is multipart/alternative.
msg = MIMEMultipart('alternative')
msg['Subject'] = 'New Salisbury311 Requests Added'
msg['From'] = FROM
msg['To'] = ', '.join(TO)

text = "The following request(s) have been created for Salisbury311" + str(oidList)
html = """\
<html>
<head><a href="http://imgur.com/XtcUPpb"></a></head>
<body>
<p><b><font size="5" color="black" face="Lora">The following request(s) have been created for Salisbury311:</font></b><br>
<br>
<u><b>ID | Request Type</b></u></b><br>
<br>
{oidList}<br>
<br>
<br>
Please log in to the
<a href="http://salisburyncgis.maps.arcgis.com/apps/CrowdsourcingManager/index.html?appid=8e96ff4f819043668577596cb256e04e">
Salisbury311 Management Application</a> to verify and approve the request for public viewing.<br>
You may add any other relevant notes and details as they pertain to the completion of this request in the City Staff Comments field.
</p>
</body>
</html>
""" .format(oidList=str(oidList))
```

EMAIL OUTPUT

New Salisbury311 Requests Added - Message (HTML)

FILE MESSAGE

Ignore Delete Reply Reply All Forward More

Meeting

NGGIS To Manager Team Email

Rules OneNote Actions

Mark Unread Categorize Follow Up

Translate Zoom

Fri 4/20/2018 11:00 PM

Salisbury311 <Salisbury311@salisburync.gov>

New Salisbury311 Requests Added

To Salisbury311

This message was AutoForwarded.

Salisbury 311

The following request(s) have been created for Salisbury311:

ID | Request Type

[393, 'Complaint Regarding Rental Property']

Please log in to the [Salisbury311 Management Application](#) to verify and approve the request for public viewing.
You may add any other relevant notes and details as they pertain to the completion of this request in the City Staff Comments field.

CUSTOM WORKFLOWS...

Send the email if any feature meets the time requirements and if not, else: pass
(if createdate < current time – 1 hour, then take no action)

```
part1 = MIMEText(text, 'plain')
part2 = MIMEText(html, 'html')

msg.attach(part1)
msg.attach(part2)

# Send the message via local SMTP server.
s = smtplib.SMTP('email.salisburync.gov', 25)
# sendmail function takes 3 arguments: sender's address, recipient's address
# and message to send - here it is sent as one string.
s.sendmail(FROM, TO, msg.as_string())
print "Successfully sent email"
s.quit()

else:
    pass
```

Set up Windows Task Scheduler to run this python script at the top of every hour

Set up Inbox rules to forward messages based on Request Types

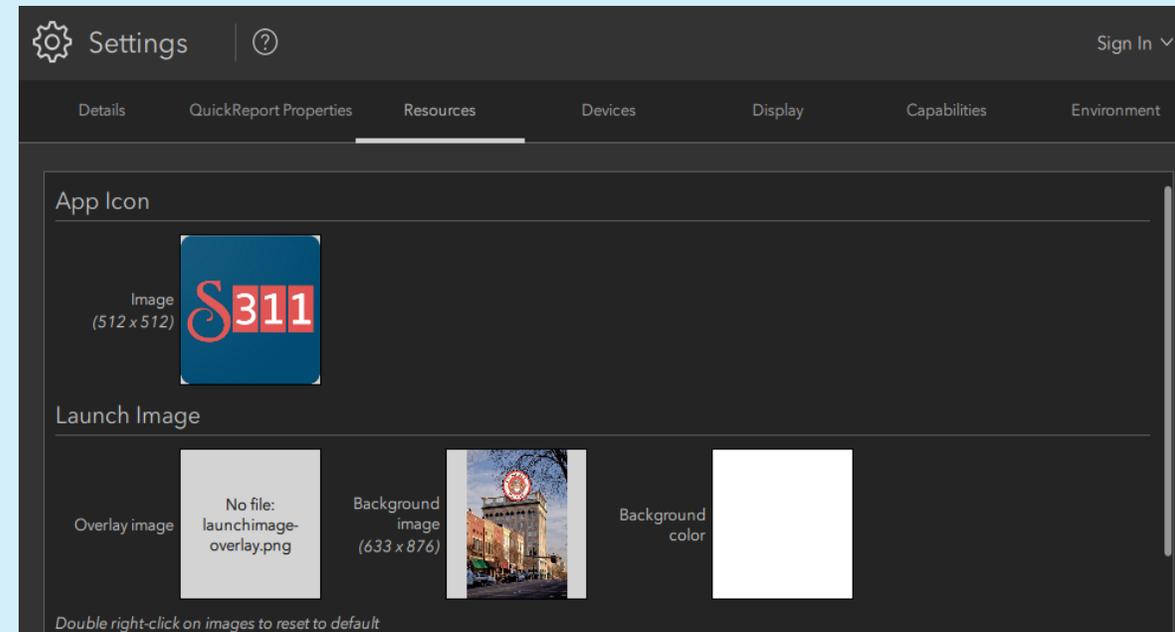
USING APPSTUDIO TO CREATE NATIVE MOBILE APPS

AppStudio Set Up

- Need ESRI Developer Subscription and AppStudio Standard License. ELA comes with 1 free license.
- You will create a separate developer organization in AGOL to store and register your app(s).
 - developers.arcgis.com

Choose AppStudio Template

- “New App” in AppStudio
- Choose Quick Reporter template for crowdsource reporting
- Configure and customize inside AppStudio
 - Use same old “Requests” layer
 - Logos, fonts, front page background, page colors, etc.
 - Device, Display, and Capability settings
(Hint: Do not include capabilities that aren’t necessary. Apple reviewers will reject the app.)



CUSTOMIZATIONS IN QML EDITOR

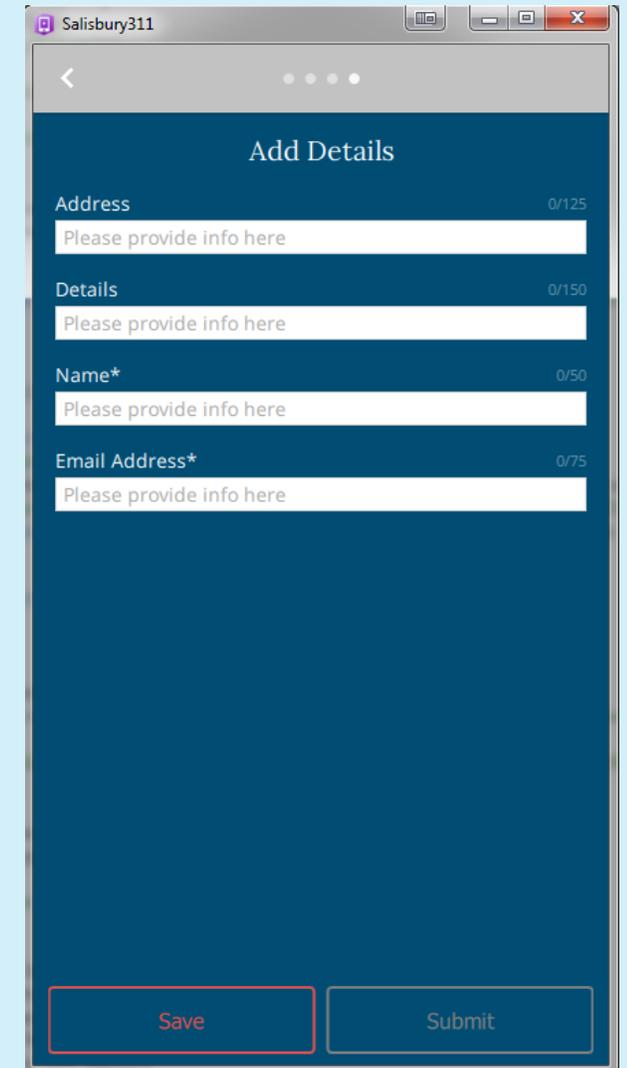
ALWAYS MAKE A COPY OF FILE BEFORE EDITING!

Deep Customizations to:

- Fonts and sizes for individual pages, page section background colors, text colors, button colors, button text colors, opacity, etc. with Dark Mode toggles

```
color: app.isDarkMode? "lightgray":"white"
```

- Feedback message texts
- Depending on your app's color scheme, you may need to make some changes to font and text input colors.
- Remove fields from Add Details Page <<<This is a crucial customization!



The screenshot shows a mobile application window titled "Salisbury311". The main content is a form titled "Add Details" with a dark blue background. The form contains four input fields, each with a placeholder text "Please provide info here" and a character count on the right: "Address" (0/125), "Details" (0/150), "Name*" (0/50), and "Email Address*" (0/75). At the bottom of the form, there are two buttons: "Save" and "Submit".

REMOVING FIELDS FROM ADD DETAILS PAGE

```
676 ▲         if(capabilities.indexOf("Create")>-1){
677             var fields = root.fields
678 ▲         for(var i=0;i<fields.length;i++){
679             //@@@f structure not right
680 ▲         if(fields[i].editable===true && fields[i].name!=root.typeIdField && fields[i].name!="CLOSE_DATE" && fields[i].name!="STAF_FEEDBK" && fields[i].name!="Lat" &&
fields[i].name!="Long" && fields[i].name!="Status" && fields[i].name!="GUID" && fields[i].name!="PUBLICVIEW" && fields[i].name!="Username" && fields[i].name!="CreationDate" && fields[i].name!
="EditDate" && fields[i].name!="Creator" && fields[i].name!="Editor" && fields[i].name!="AccountID" && fields[i].name!="SUBMIT_DAT" && fields[i].name!="GLOBALID" ) {
681             var f = fields[i];
682             app.fields.push(f);
683             fieldsMassaged.push(f);
684         }
685     }
```

Protip: Field names are case sensitive!!!

PUBLISHING TO GOOGLE PLAY AND APP STORE

 [ESRI.COM/VIDEOS](https://esri.com/videos) Publishing Apps to Google Play
Publishing Apps to Apple App Store 

Developer Account Fees

- Google Play is \$25 one time fee. Apple is \$105 annually.

Publishing an iOS app requires use of a Mac computer.

FUTURE ENHANCEMENTS

1. Geofencing

- Routes e-mail notifications to correct code services officer based on territory or zone
 - Will require code service zone layer and a field in the requests layer to be populated by code representing officers' territory.

2. More robust e-mail notification system

- Tiers that e-mail staff multiple times if a request hasn't been touched after a set number of days

3. AutoReply e-mails to citizens upon submission and status changes

KEYS TO SUCCESS

- Set up the apps according to your organization's structure
- Find your super users, internal and external
- Commit to training for management and department staff
- **Outreach**

THANK YOU!!!!

E-Mail: LCOLD@salisburync.gov

Web: salisburync.gov/government/engineering/gis-maps

Salisbury311 URL: salisburync.gov/311

Twitter: [@VPI_GeoHokie](https://twitter.com/VPI_GeoHokie)

