

ArcGIS for Desktop: Enabling Spatial Push Notifications Using the Geotrigger Service and Python

Doug Carroll
Graham Eichman

Esri Geotrigger Service

- **What is the Geotrigger Service?**
 - The Geotrigger Service allows developers to easily add location awareness to your mobile applications. Create an immersive experience with your app by sending messages to your customers or other systems when they enter or leave geofenced areas
- **What is a Geofence?**
 - Essentially an invisible button on a map, and when your customer's or employee's phone gets within that button - that invisible region - a relevant action will be triggered
- **What is a Geotrigger Action?**
 - The properties that direct the notification (text, sound), what gets notified (callback server) and the tracking profile

Best thing about Geotriggers are the use cases

“The only limitation is your imagination”

Connected Home Technology Customer Loyalty and Customer Rewards Disaster Alerts Entertainment and Games Targeted Marketing Asset Management / Work orders	Pickup and Delivery Notifications Self Guided Touring Traffic and Weather Alerts Salesforce Management High Tech Parenting
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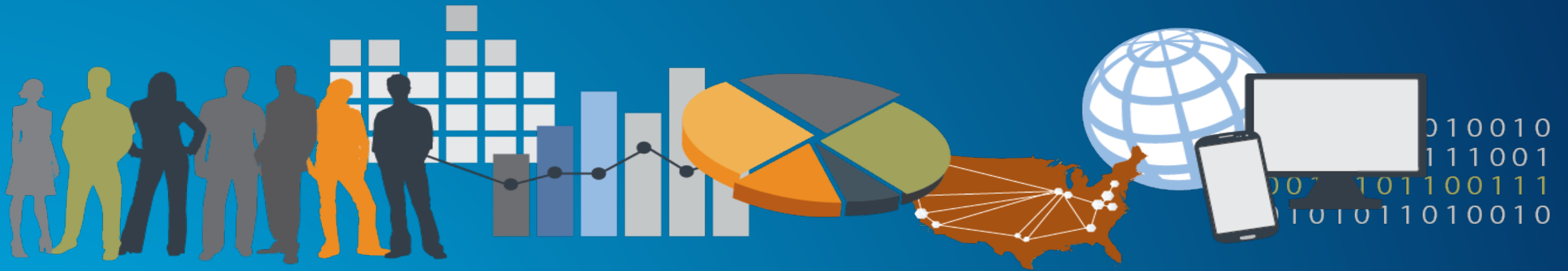
Outsourced field sales and marketing



- 1.5 million store fronts visited annually
- 3+ million annual in-store activities
- \$5 billion annual in-store sales influenced
- Active in 48 N.A. Retail Chains
- Top 10 in Retail Services by PROMO
- Approved Third Party Labor Vendor



Core Strengths: Smart **people**, enabled by **technology** and **insights** to maximize sales



PEOPLE

- Field marketing & sales
- Inside sales & support
- Social & community managers
- Training & event staffing

INSIGHT

- Coverage modeling
- Market research
- Data management & analytics
- Go-to-market strategies

TECHNOLOGY

- Dynamic reporting dashboards
- Customer relationship tools
- Marketing automation
- Social engagement platforms

Why the TrackStar mobile app?



Work smarter, not harder

- Rep presence – Know who's in the store
- Push communication – Timely communication to/from field
- Suggest a stop – Understand needs nearby

Financial/Time benefits

- 2014 fines due to audit results = \$250K
- Savings of 30 seconds/visit = 8 FTE/year

Platform for Future Integrations

- Scheduled to be part of PD Retail app (CRM)
- Integration with Connect+ (Brand Specific Social)
- MarketStar Gigwalk app (Jobs App)

Key End User Personas



Keep it Vanilla Vince

A knowledgeable professional & father.

"I LOVE THE TRUST
MARKETSTAR SHOWS I
GET MY JOB DONE."

Tech profile

Overall Tech Savvy: ● ● ● ● ●
Desktop Access: ● ● ● ● ●
Mobile Access: ● ● ● ● ●



Getting it done Greta

More than a rep with direct reports

This is Greta, a regional manager for one of MarketStar's Retail teams. She manages 12-15 reps depending on the client's budget and their current initiatives. She has been with MarketStar for 8 years, the last 5 in this role. Her job requires that she spend 2 or 3 days in the field with every team member once each quarter. As a result she travels each week to a different market and visits 1 or 2 reps. On her travels she has to observe, train, and mentor the rep she's visiting while keeping an eye on the region at large.

She occupies a tricky role within the organization, acting as the day-to-day contact for all of her reps and the conduit that delivers the client's and "corporate's" messages to them. One of her greatest assets is that both the reps and management think of her as a peer.

Connected in the home and on the road

Greta relies on technology to get her job done. During regularly hosted WebExes she shares spreadsheets she's prepared as well as PowerPoints. She sends and receives a fair amount of email, though that has gone down recently as she's adopted new technology. She often communicates with reps via text messages, both to individuals as well as group texts. She knows her way around her preferred airline's and hotel's apps. On the road she often uses Yelp!, OpenTable, and the Starbucks app. Client requirements have made her familiar with Dropbox, which she uses on both at home and on the road.

She uses her corporate issued laptop as her primary work device. When she's home she prefers the full screen and keyboard, but wishes she could get more done on her phone while on the road. Her reps have tablets and she sees that as a viable alternative to her laptop in the future. Given the apps MarketStar requires her to use, she's sticking with her laptop for now.

"I RELY ON BEING ABLE TO BE
'IN THE OFFICE' WHILE ON THE
ROAD OR AT HOME."

Tech profile

Overall Tech Savvy: ● ● ● ● ●
Desktop Access: ● ● ● ● ●
Mobile Access: ● ● ● ● ●

"MarketStar could help me do my job better by making it easier to stay connected with my reps. I need to know about problems before they make it onto my manager's or, worse, the client's radar. Knowing where reps are and being able to communicate quickly would be ideal."

Key Attributes and Needs

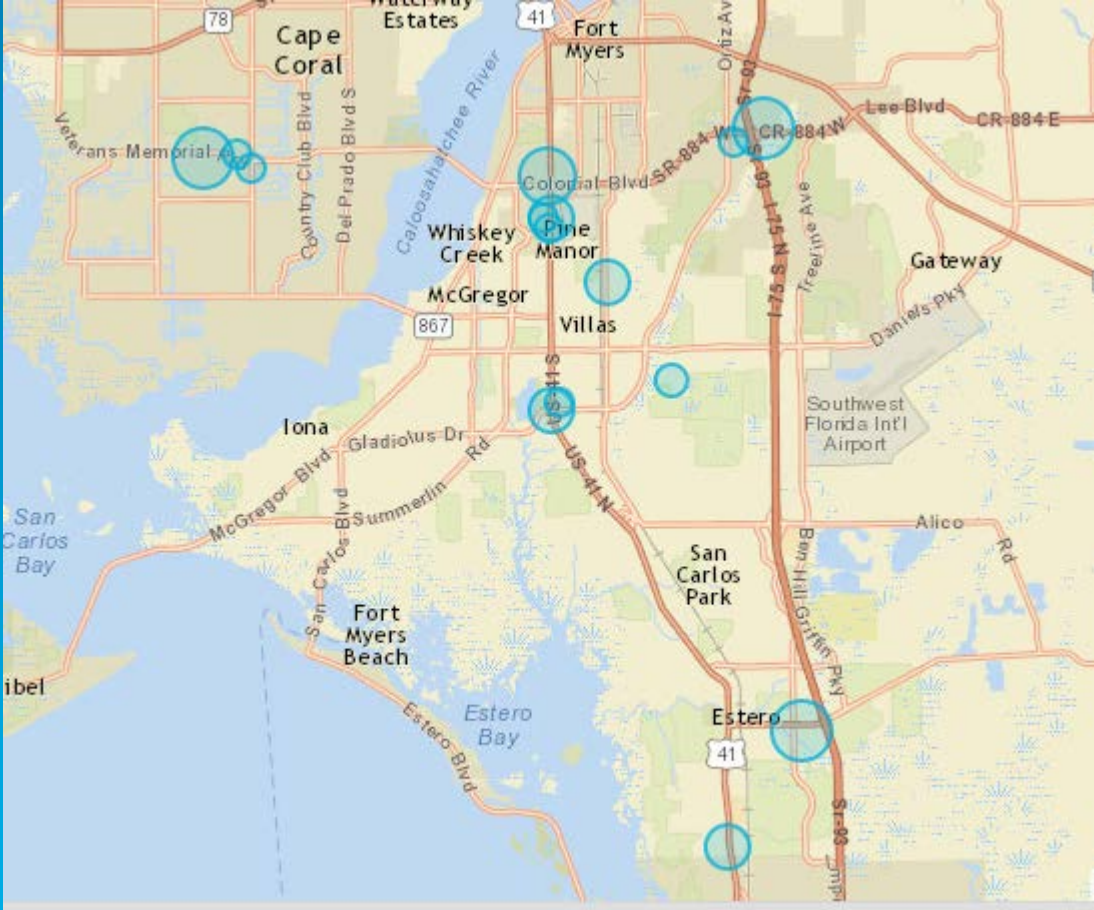
Attributes

Mobile
Developer/Mentor
Communicator
Connected
Self-assured

Technology Needs

Access "everywhere"
Connected to reps
Clear interface
Strong battery/low power drain

Where we ended up...



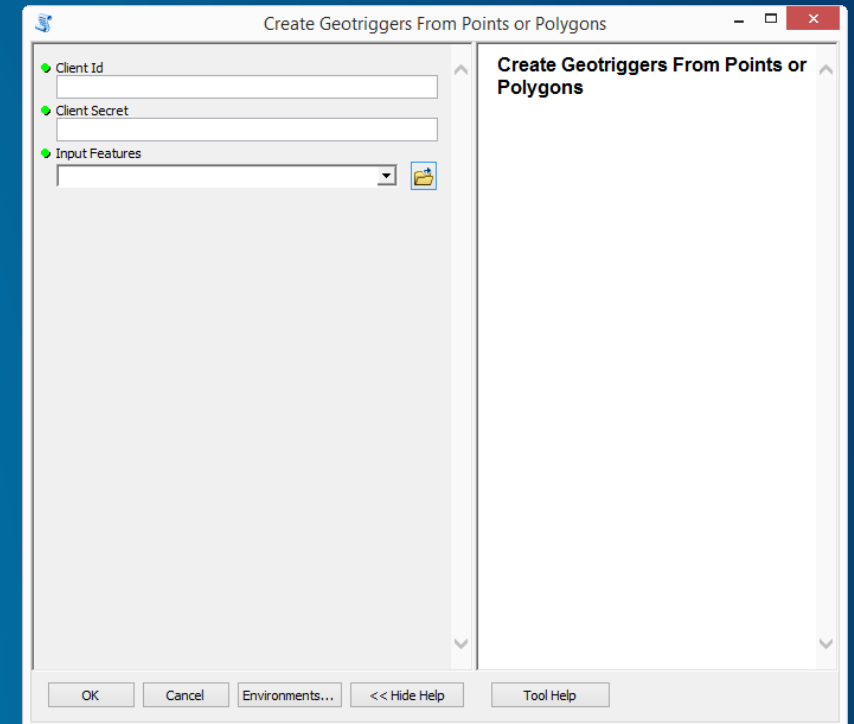
- ArcMap can now be used to publish geofences in ArcGIS Online
- <https://developers.arcgis.com/geotrigger-service/editor?itemId=c2874614e5164ec1a0292575bc0372c9>
- <https://developers.arcgis.com/geotrigger-service/editor?itemId=cae85871cb084dfa9adb6dbada5dca72>

Development goals

- Use GIS data already in shapefiles and feature classes
- Develop click button experience to create, update and delete geofences
- Enable visualization of mass geofences at once
- Deliver functionality exposed in the service, through the tools
- Achieve a class based approach that results in reusable code (.pyt vs script tool)

Initial considerations and decisions

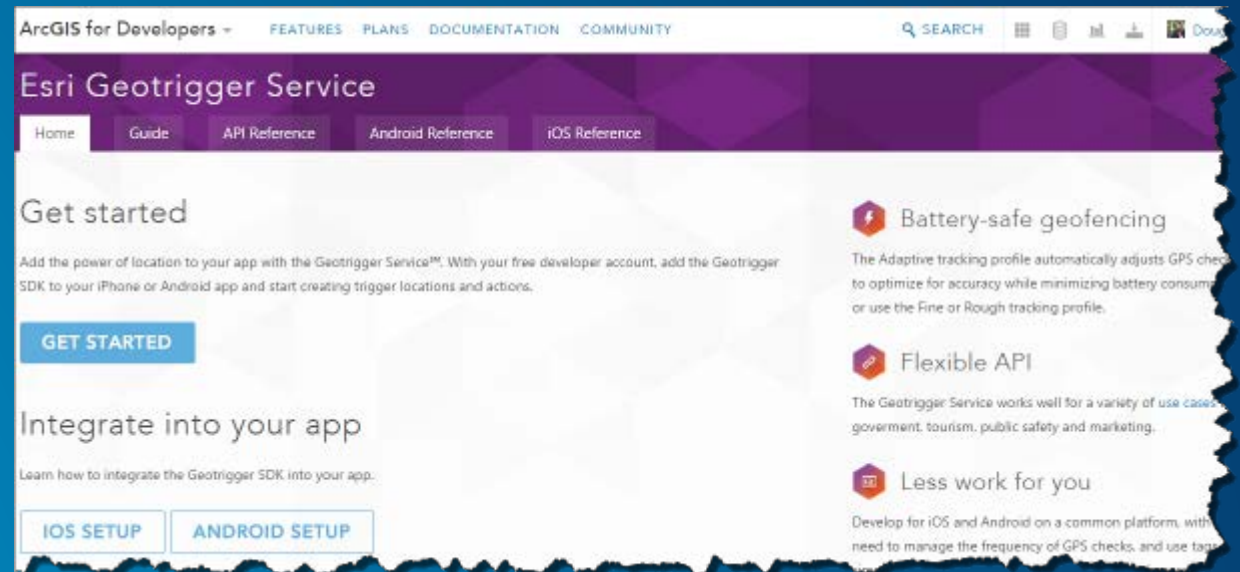
- Consider everything choose what you need
- Development options (ArcGIS for Runtime, ArcGIS JavaScript API, ArcPy)
- ArcMap includes tooling for selecting, querying sorting etc...
- ArcMap and Pro include python toolboxes ([project sample](#))



Identify important REST requests

- [Trigger/Create](#)
- [Trigger/Update](#)
- [Trigger/Delete](#)

- **As implemented in Python**
 - [Ex 1](#)



Create schema (map shapefile to service properties)

- Each property in Geotrigger Service should map to a Shapefile field value
 - [Ex 2](#), [Ex 3](#), [Ex 4](#)

Shapefile Properties

General XY Coordinate System Fields Indexes Feature Extent

Field Name	Data Type
ARC_Zip	Text
GISID	Double
ID	Double
Channel	Text
Retailer	Text
Store_Name	Text
Store_Numb	Double
Address_1	Text
Address_2	Text
City	Text
State	Text
Zip	Text

Click any field to see its properties.

Field Properties

Import...

To add a new field, type the name into an empty row in the Field Name column, click in the Data Type column to choose the data type, then edit the Field Properties.

OK Cancel Apply

Shapefile Properties

General XY Coordinate System Fields Indexes Feature Extent

Field Name	Data Type
Address_2	Text
City	Text
State	Text
Zip	Text
GTSTAGS	Text
GTSDIRECT	Text
GTSCALLURL	Text
GTSNOTIFY	Text
GTSFTIME	Date
GTSTTIME	Date
GTSTRIGGER	Text
GTSBUFMETR	Short Integer

Click any field to see its properties.

Field Properties

Import...

To add a new field, type the name into an empty row in the Field Name column, click in the Data Type column to choose the data type, then edit the Field Properties.

OK Cancel Apply

Use ArcMap's Field Calculator (achieve data management)

- Time management

`datetime.datetime.now() + datetime.timedelta(days=10)`

- Data management batch operation (random or with conditions)

Feature iteration and web requests to Geotrigger Service

- When each tool (Create, Update or Delete) gets executed a simple ArcPy Search Cursor is used to iterate through the Shapefile or Feature Class
- Ex. 5
- Ex. 6
- Ex. 7

Enable debugging capabilities with logging

- Since web requests are dependent on a Network Connection it's important to track server responses to verify that all geofences were created in the service
- Logs also can identify problem that may be related to the data's integrity
 - Ex. If certain condition fields are missing (such as direction) the service will return a dependency type error

Get the code

- Browse or download the code inside Esri's developer-support repository
- <https://github.com/Esri/developer-support>
- <https://github.com/Esri/developer-support/tree/master/arcpy-python/geotrigger-toolbox>