

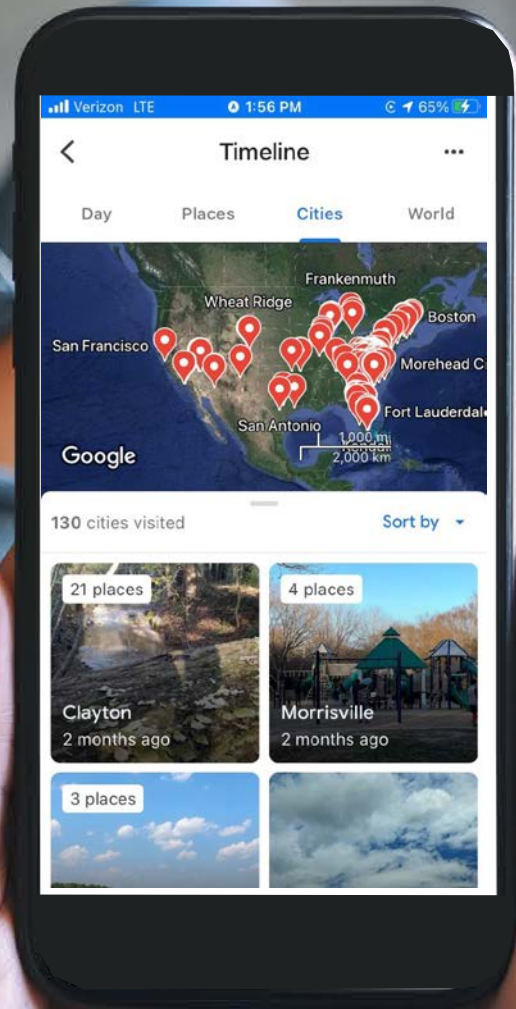
Google Geofence Warrants & Location History

YOUR STEPS

IN 3 STEPS

"Creates a private map of where you go..."

What is Google Location History?



Google Location History On/Off

Google Maps > ☰ > Timeline > Places

iOS and Android

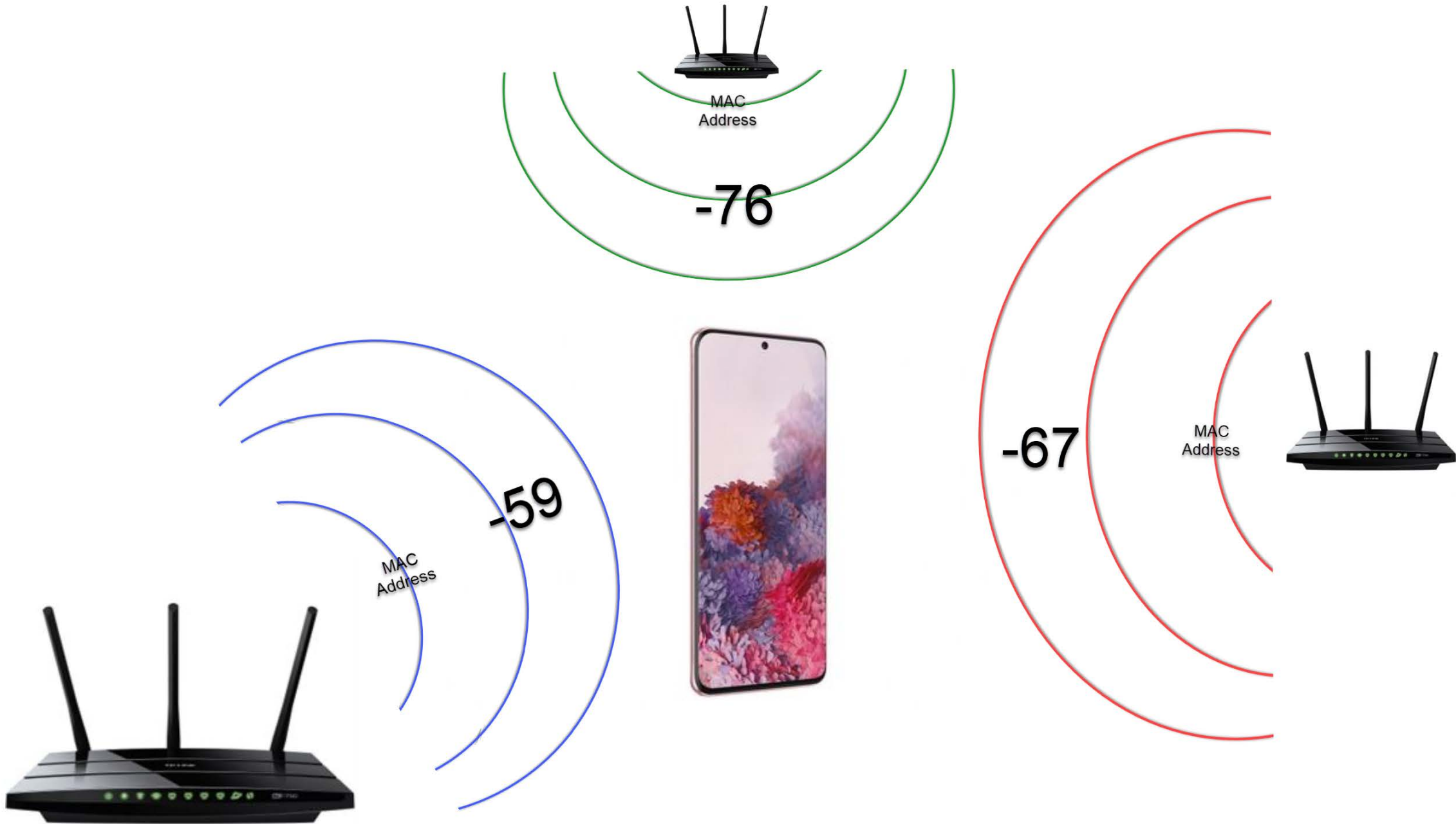












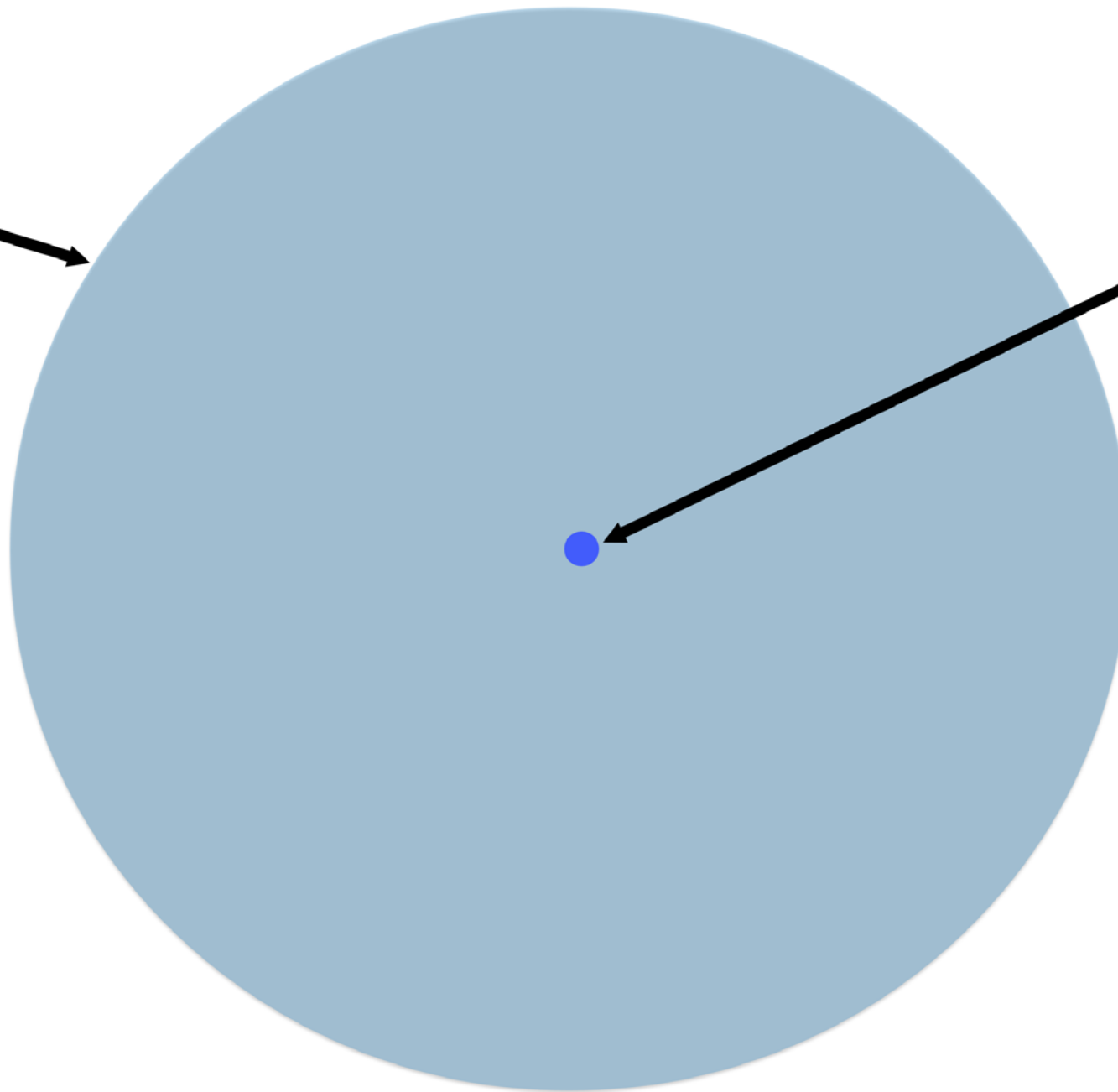


Timestamp (UTC)	Latitude	Longitude	Display Radius (Meters)	Source	Device Tag
2019-04-07T23:59:12.955	40.101161	-75.3300472	17	GPS	-616411066
2019-04-07T23:57:57.800	40.101161	-75.3300472	17	WIFI	-616411066
2019-04-07T23:56:57.784	40.101161	-75.3300472	17	WIFI	-616411066
2019-04-07T23:55:57.722	40.101161	-75.3300472	17	WIFI	-616411066
2019-04-07T23:54:11.962	40.1011643	-75.33005	16	GPS	-616411066
2019-04-07T23:52:52.287	40.1011643	-75.33005	16	WIFI	-616411066
2019-04-07T23:51:52.269	40.1011643	-75.33005	16	WIFI	-616411066
2019-04-07T23:50:52.252	40.1011643	-75.33005	16	WIFI	-616411066
2019-04-07T23:49:52.232	40.1011643	-75.33005	16	WIFI	-616411066
2019-04-07T23:49:11.653	40.1011643	-75.33005	16	WIFI	-616411066
2019-04-07T23:48:52.126	40.1011643	-75.33005	16	WIFI	-616411066
2019-04-07T23:48:08.113	40.1100325	-75.3308324	1000	CELL	-616411066
2019-04-07T23:44:49.835	40.1011582	-75.3300463	16	WIFI	-616411066
2019-04-07T23:44:26.491	40.1011613	-75.3300285	17	WIFI	-616411066
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2019-04-07T23:25:43.509	40.1011131	-75.3301029	28	GPS	-616411066
2019-04-07T23:25:14.659	40.101605	-75.3297825	40	WIFI	-616411066
2019-04-07T23:24:39.752	40.101262	-75.3298885	32	WIFI	-616411066
2019-04-07T23:24:13.725	40.1012586	-75.3299033	31	WIFI	-616411066
2019-04-07T23:22:25.731	40.1012061	-75.3299561	30	WIFI	-616411066
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2019-04-07T23:18:25.748	40.1011714	-75.3300474	59	WIFI	-616411066
2019-04-07T23:18:05.164	40.1012446	-75.3299733	53	WIFI	-616411066
2019-04-07T23:18:04.539	40.1100325	-75.3308324	1000	CELL	-616411066
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2019-04-07T23:11:41.985	40.1108151	-75.3344765	699	CELL	-616411066
2019-04-07T23:09:28.960	40.1013107	-75.3313847	34	WIFI	-616411066



Map Display Radius (light blue circle)

This is Google's Confidence rating. Goal of 68% for the device to be located within display radius. Display radius is drawn around the estimated location.

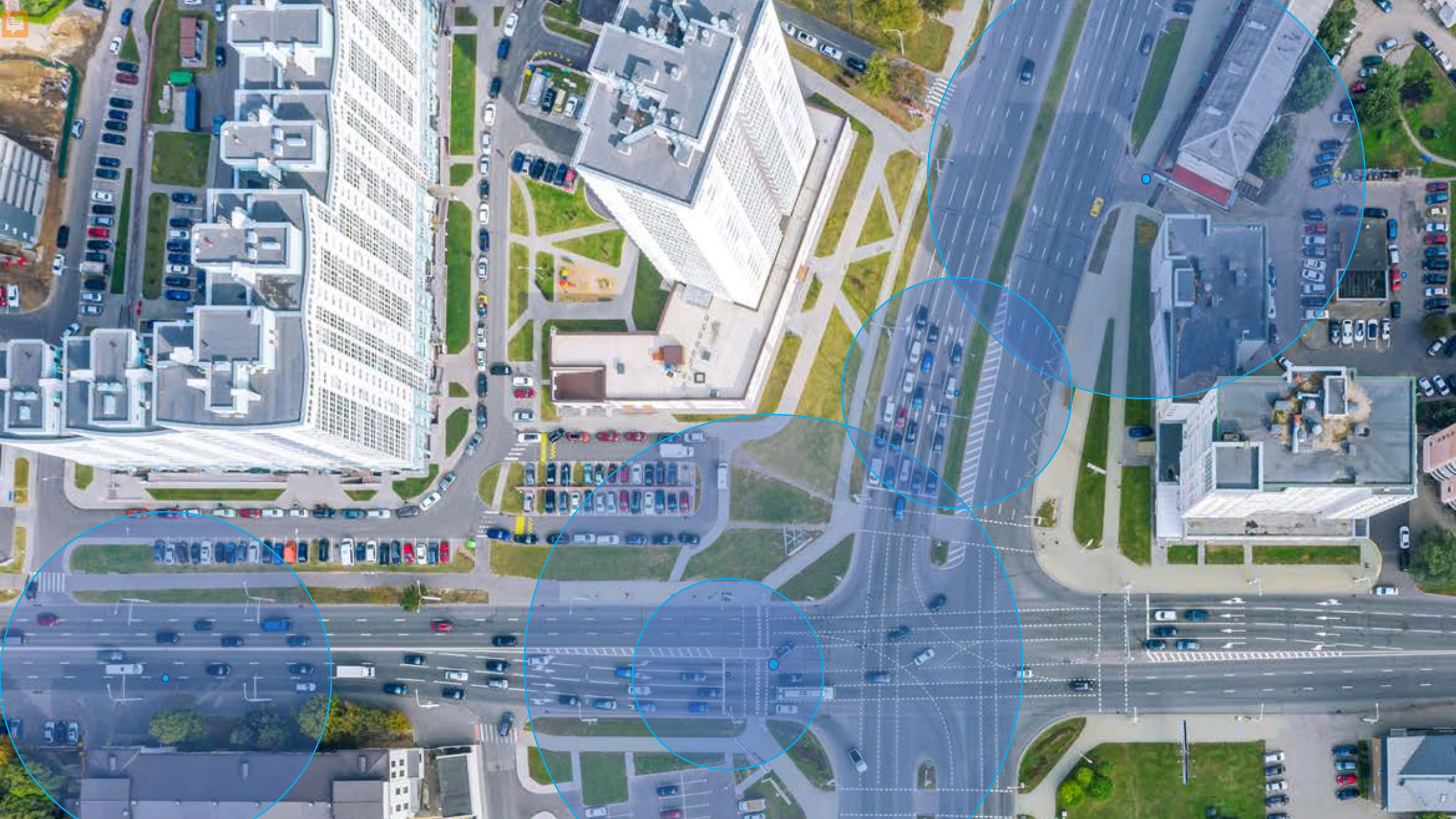


Estimated location (latitude/Longitude) (blue dot)

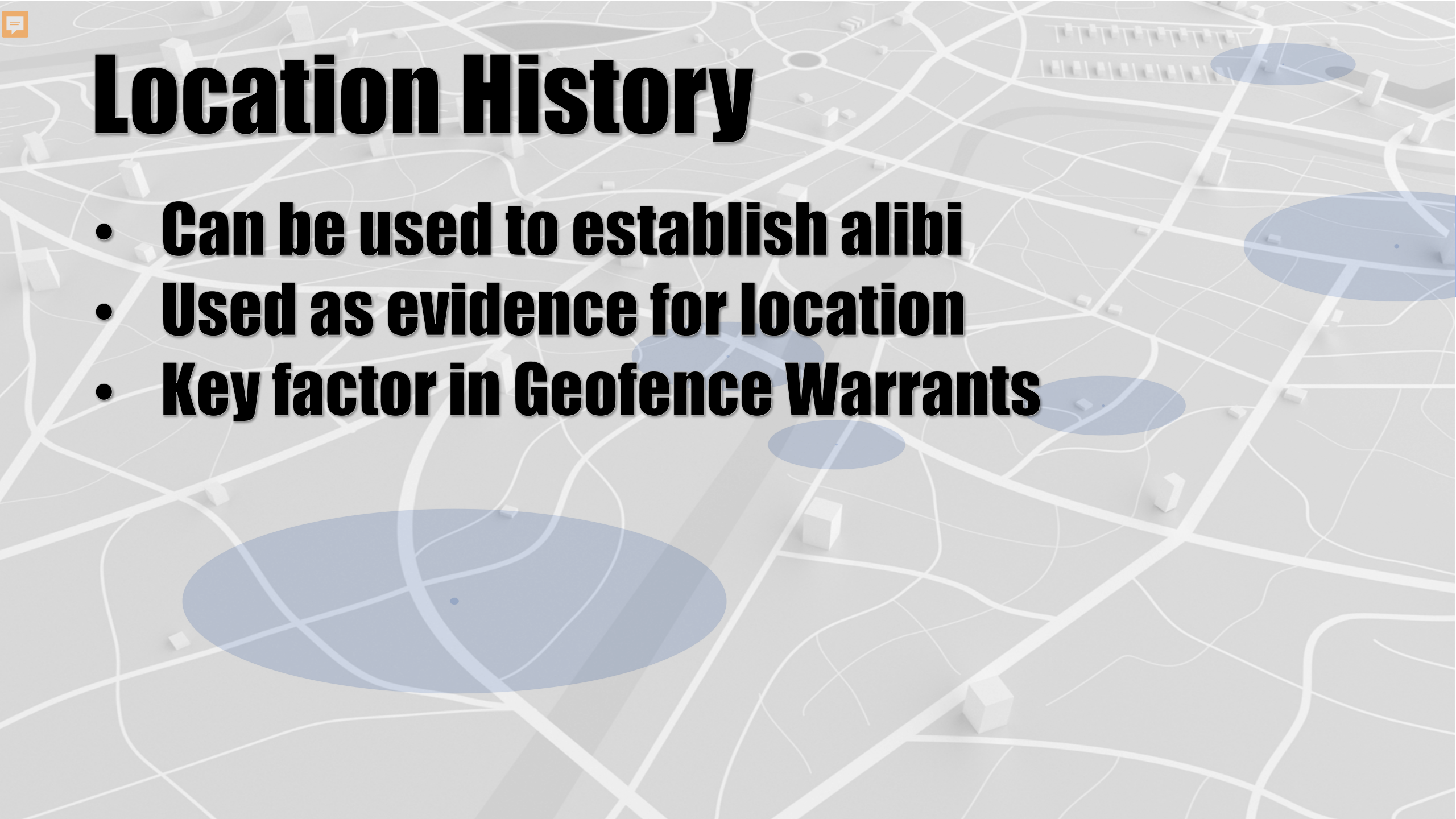
Not the exact location of the device. If this point is estimated to be in the Geofence, the point is reported in the records as responsive

* If the estimated location (latitude/longitude) are reported erroneously within the Geofence when the user was outside the Geofence, the user will be recorded in the Geofence response (Stage 1). This is a







The background is a stylized, light gray map showing a network of white lines representing roads and small white 3D cubes representing buildings. Overlaid on this map are several semi-transparent blue ellipses of varying sizes, which represent geofence areas. A small blue dot is visible within one of the larger ellipses in the lower-left quadrant. In the top-left corner, there is a small orange square icon containing a white speech bubble with a dot inside.

Location History

- **Can be used to establish alibi**
- **Used as evidence for location**
- **Key factor in Geofence Warrants**



Google Geofence Warrants

Your steps, in 3 steps

Google Geofence Warrants

Your steps, in 3 steps

1

2

3

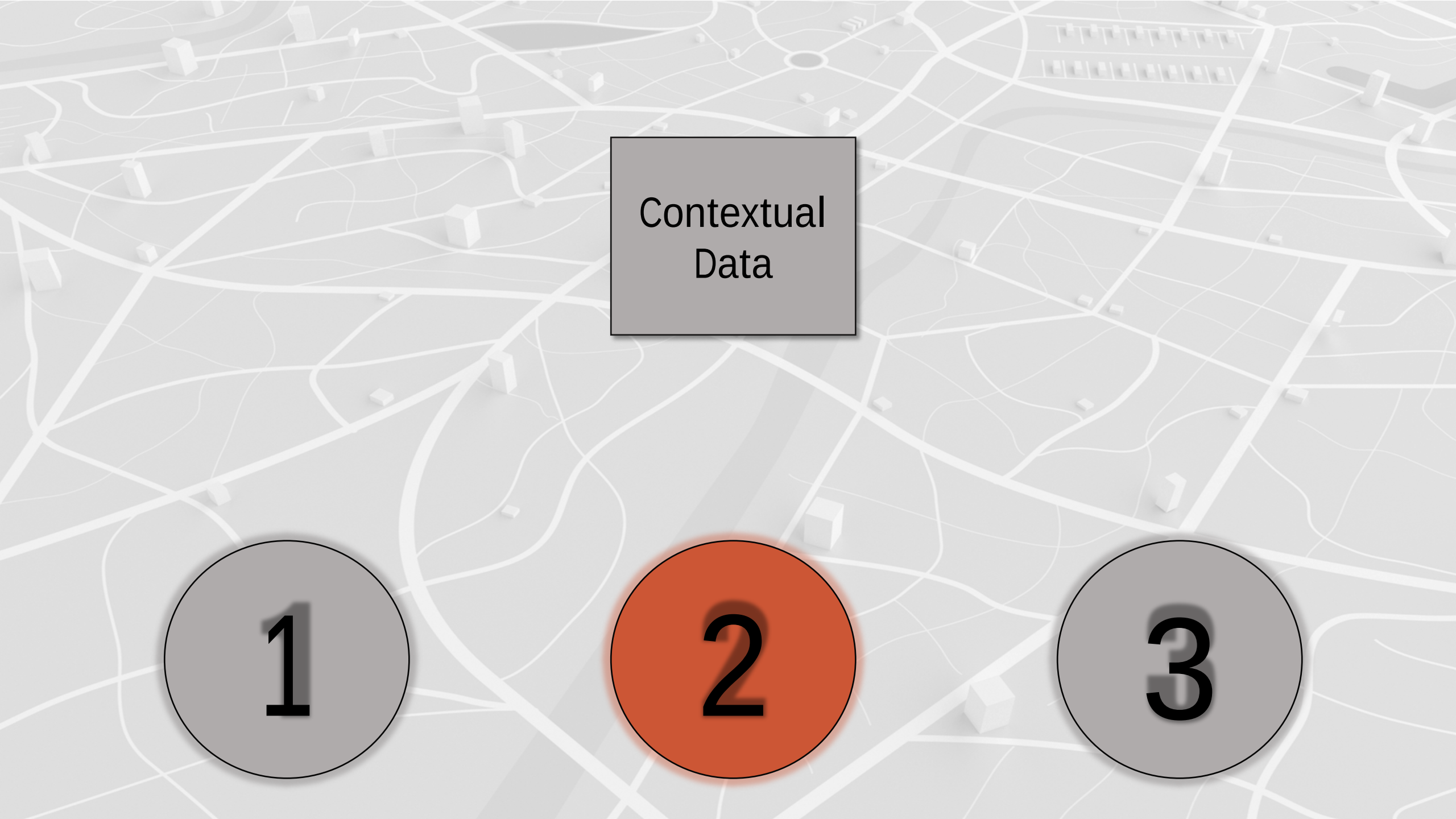


Drawing the Geofence

1

2

3



Contextual
Data

1

2

3

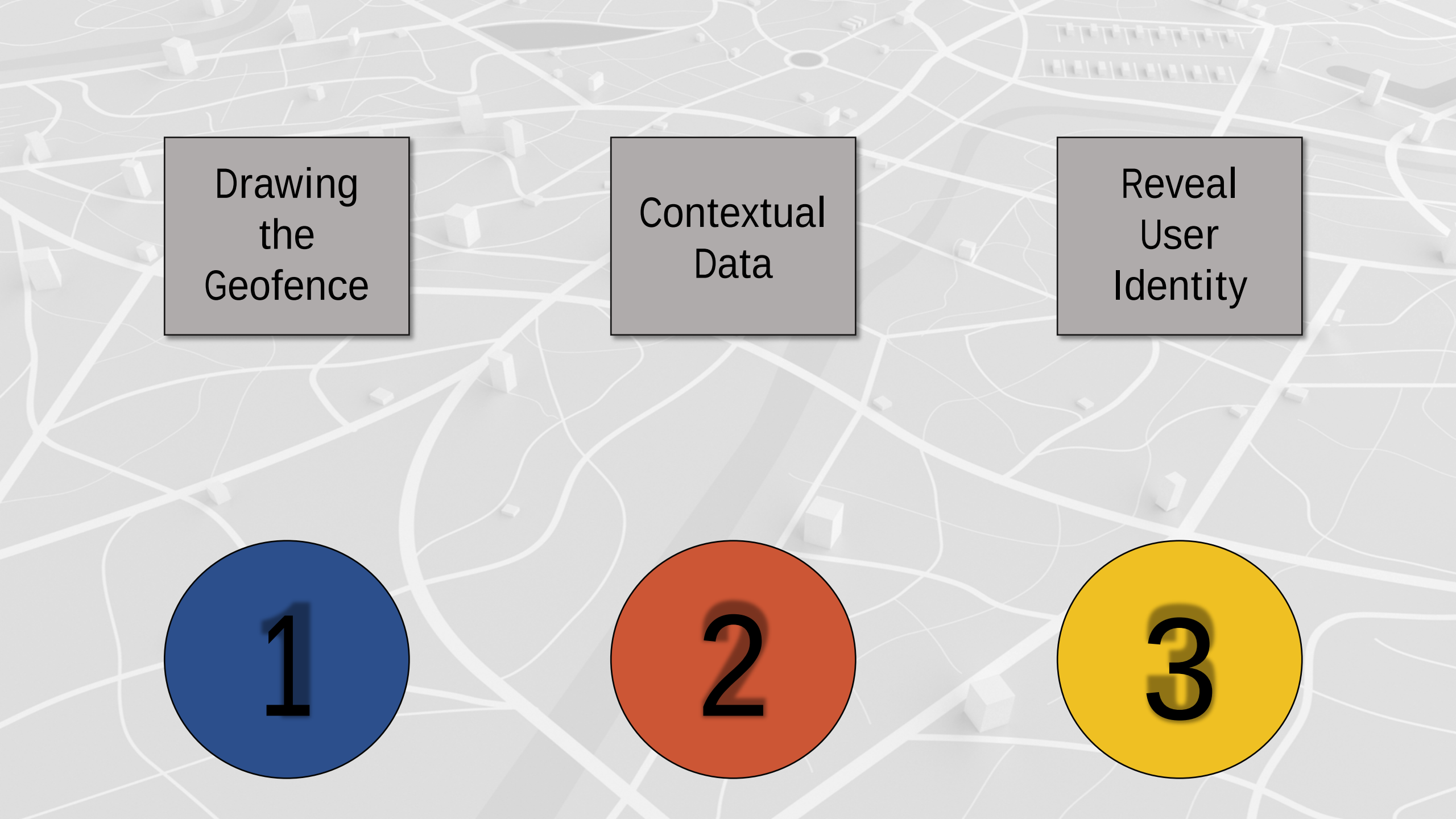


1

2

3

Reveal
User
Identity



Drawing
the
Geofence

Contextual
Data

Reveal
User
Identity

1

2

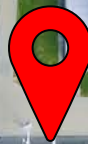
3



1

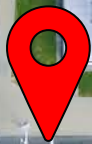
Drawing the Fence

1

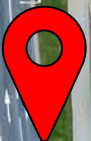
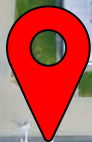


**Incident
Location**

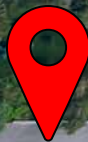
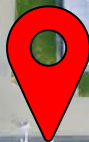
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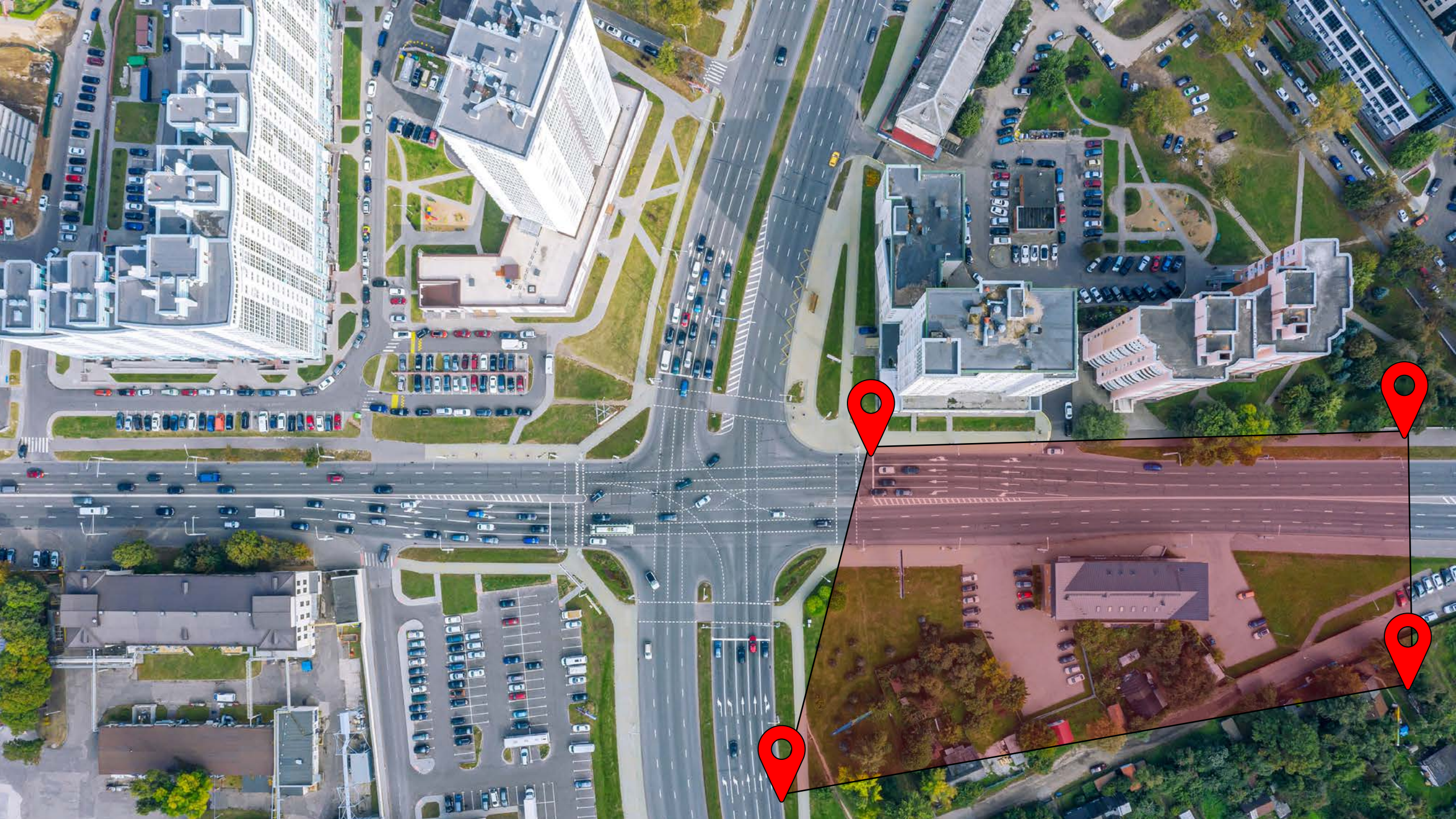


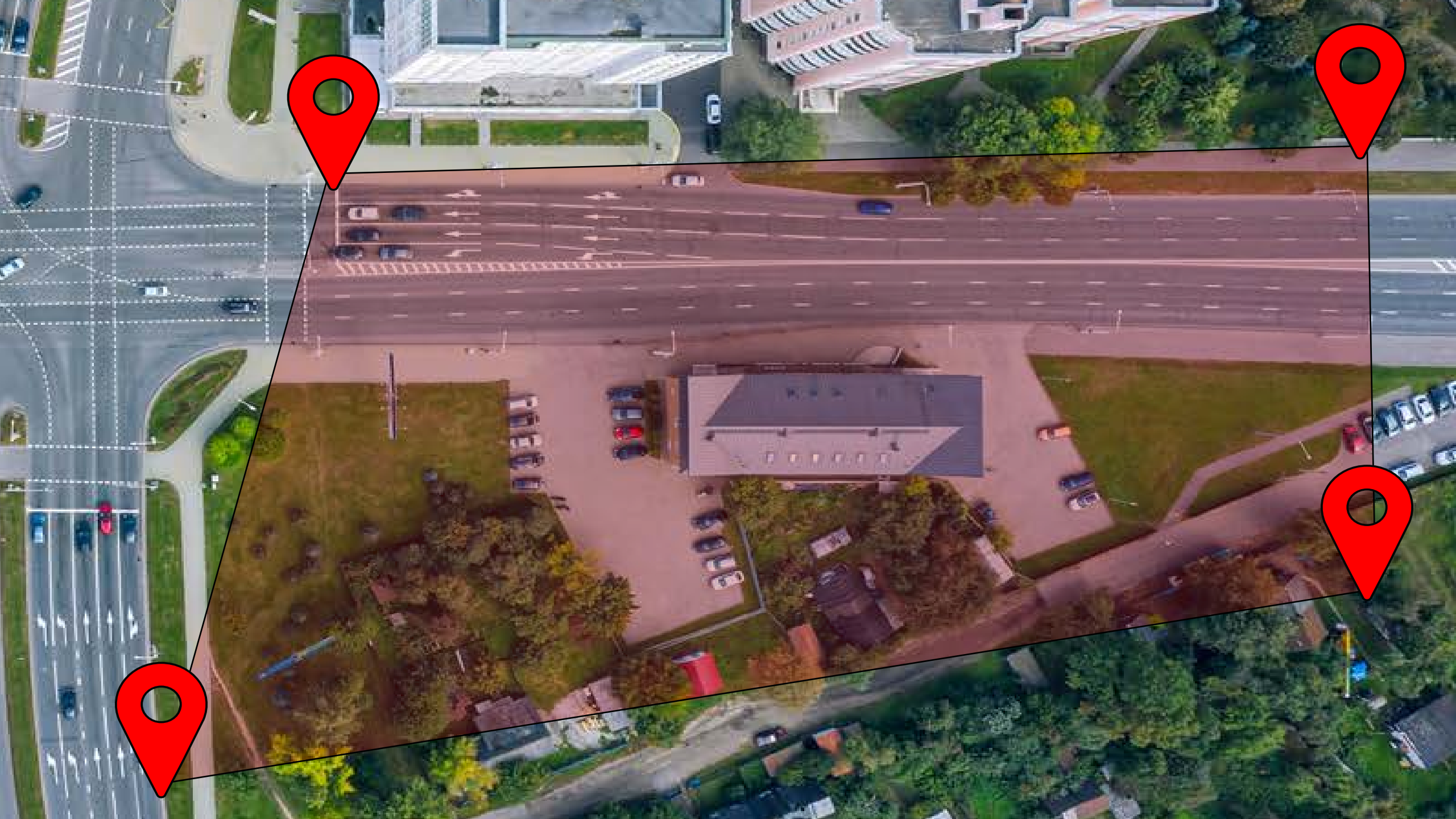
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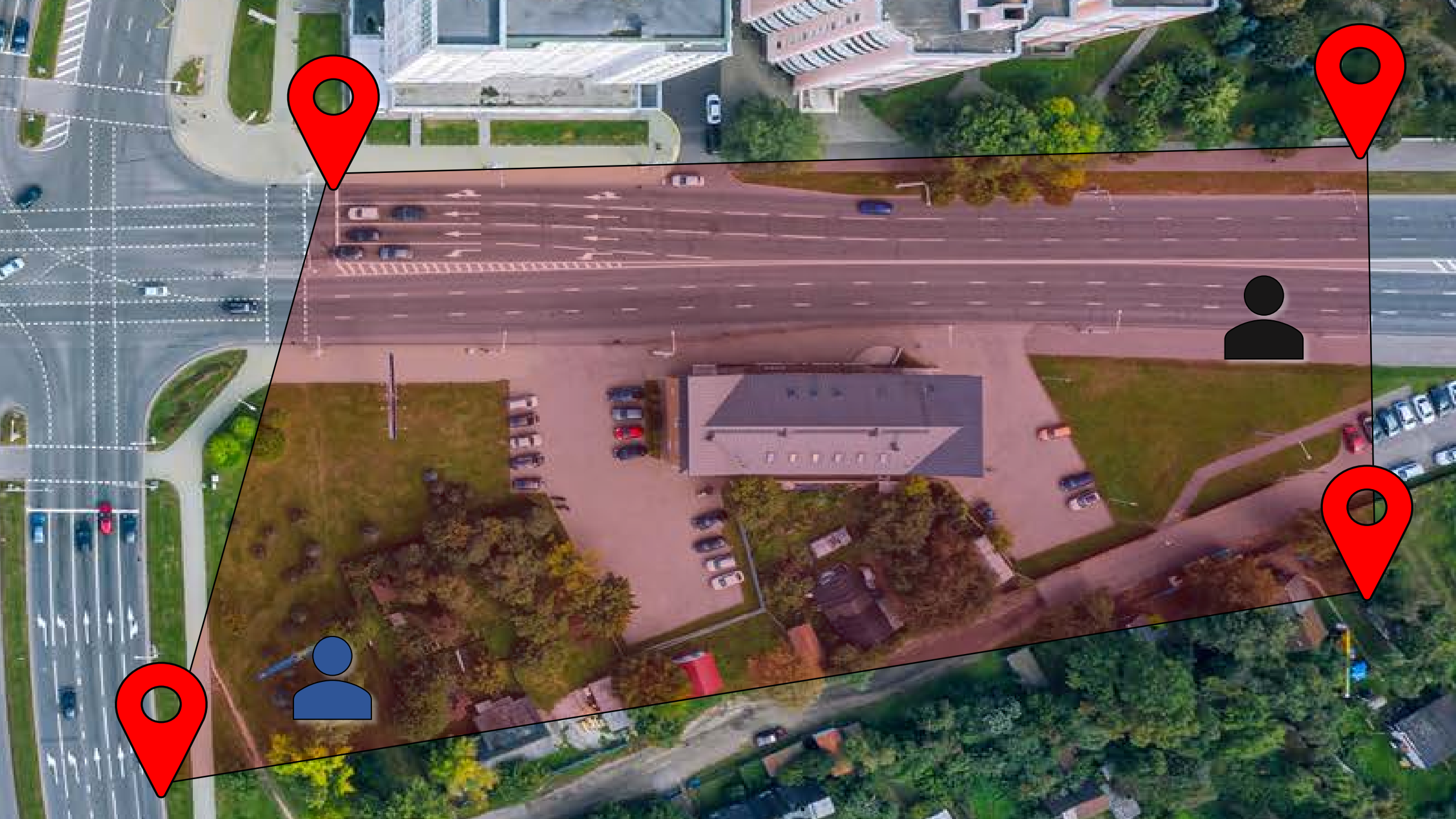


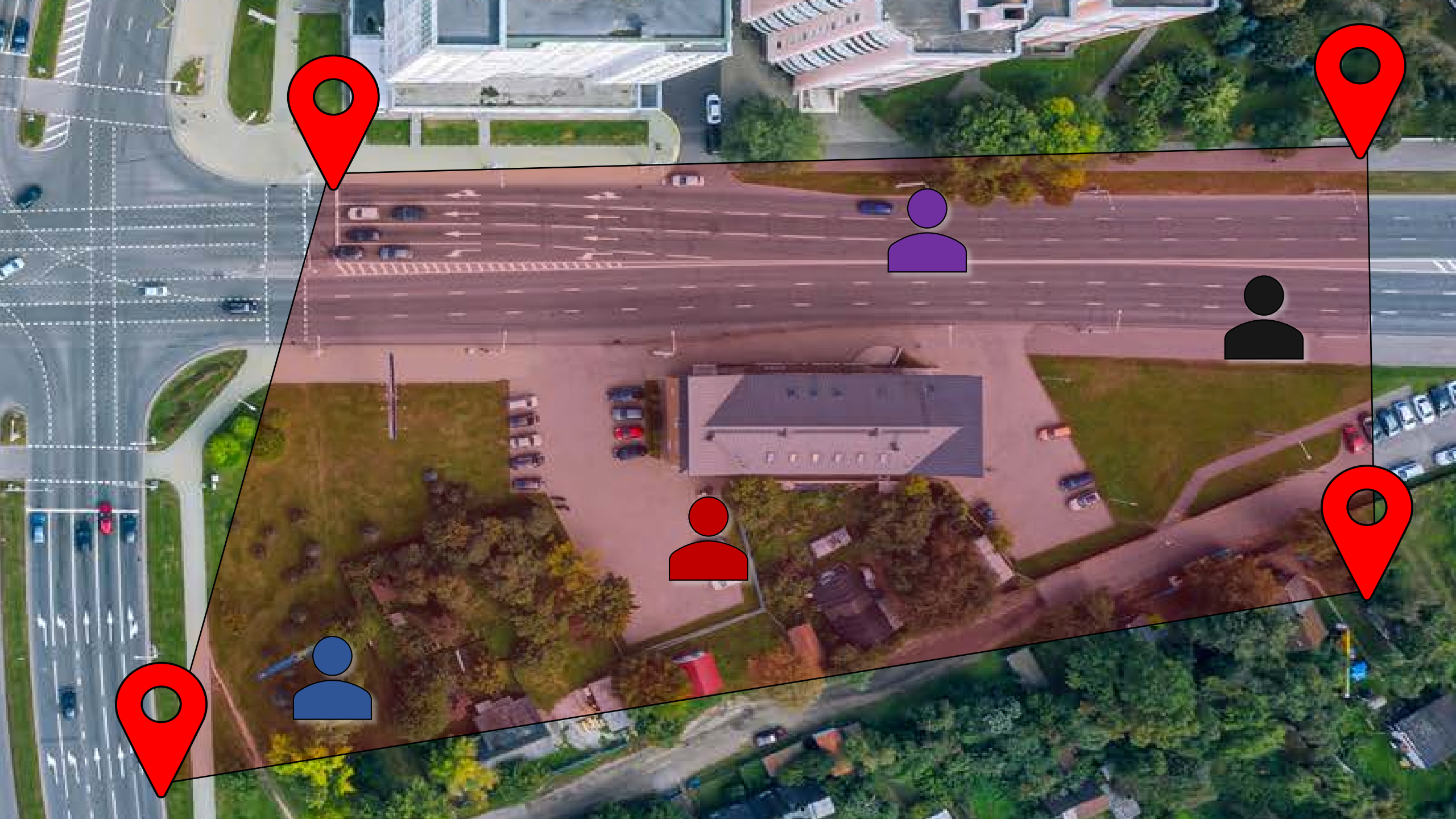
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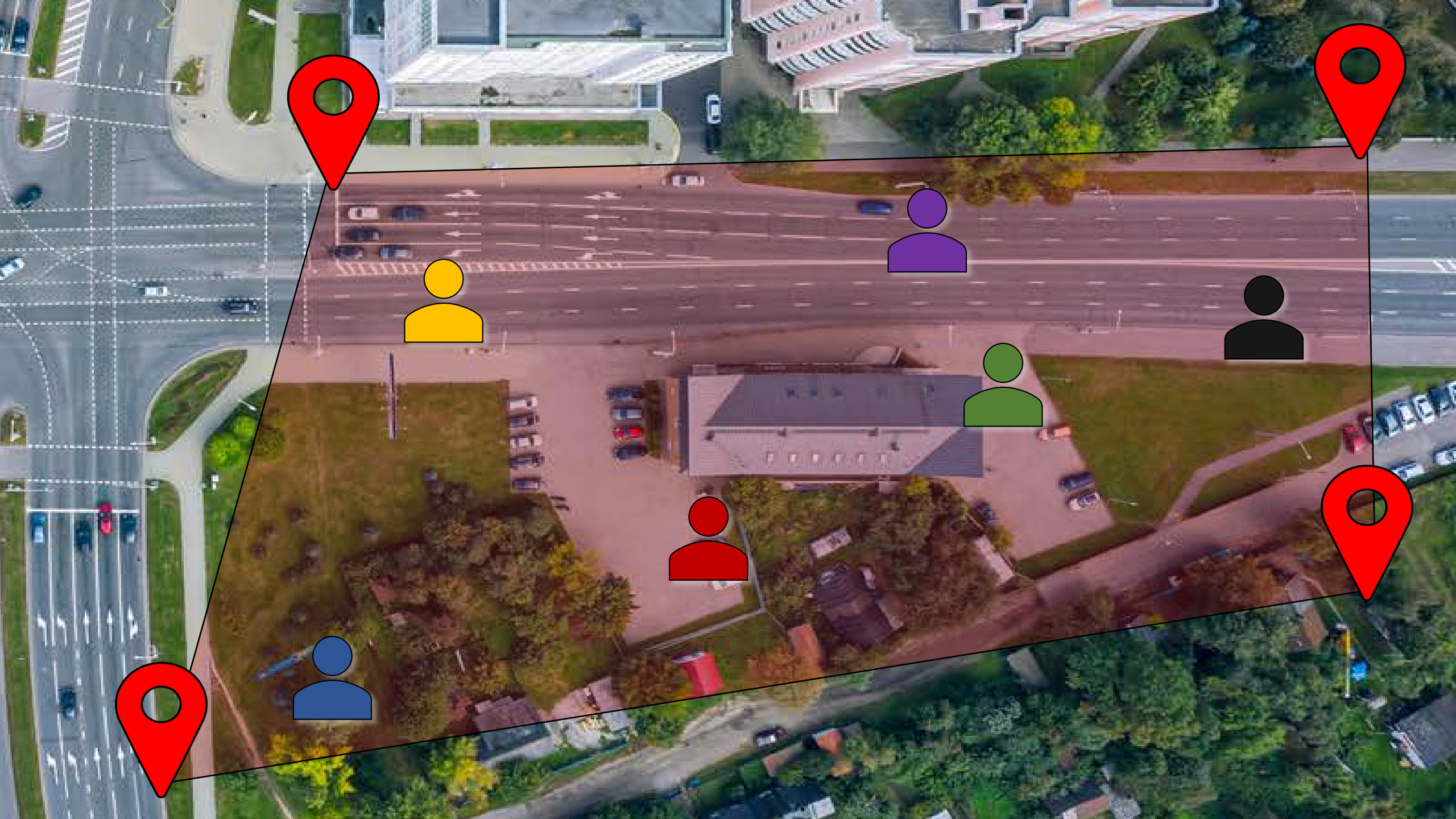






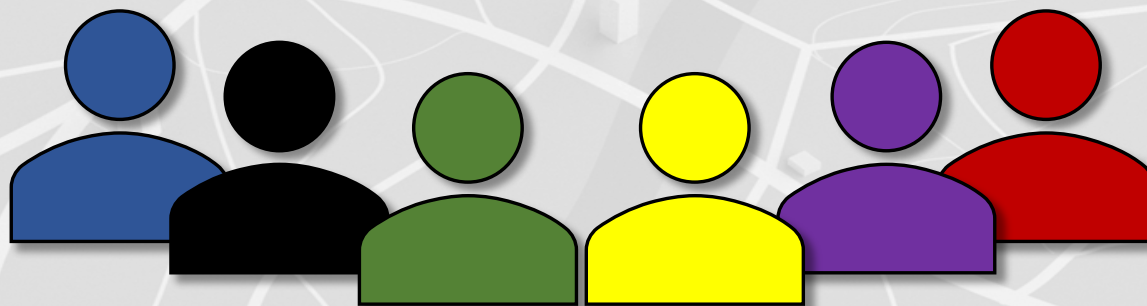






1

Captured in Step 1



What do we know about these users?

What time I entered the Geofence.



Only one data point.



Various data points within the Geofence



300m Wi-Fi Map Display radius.



What time I left the Geofence.

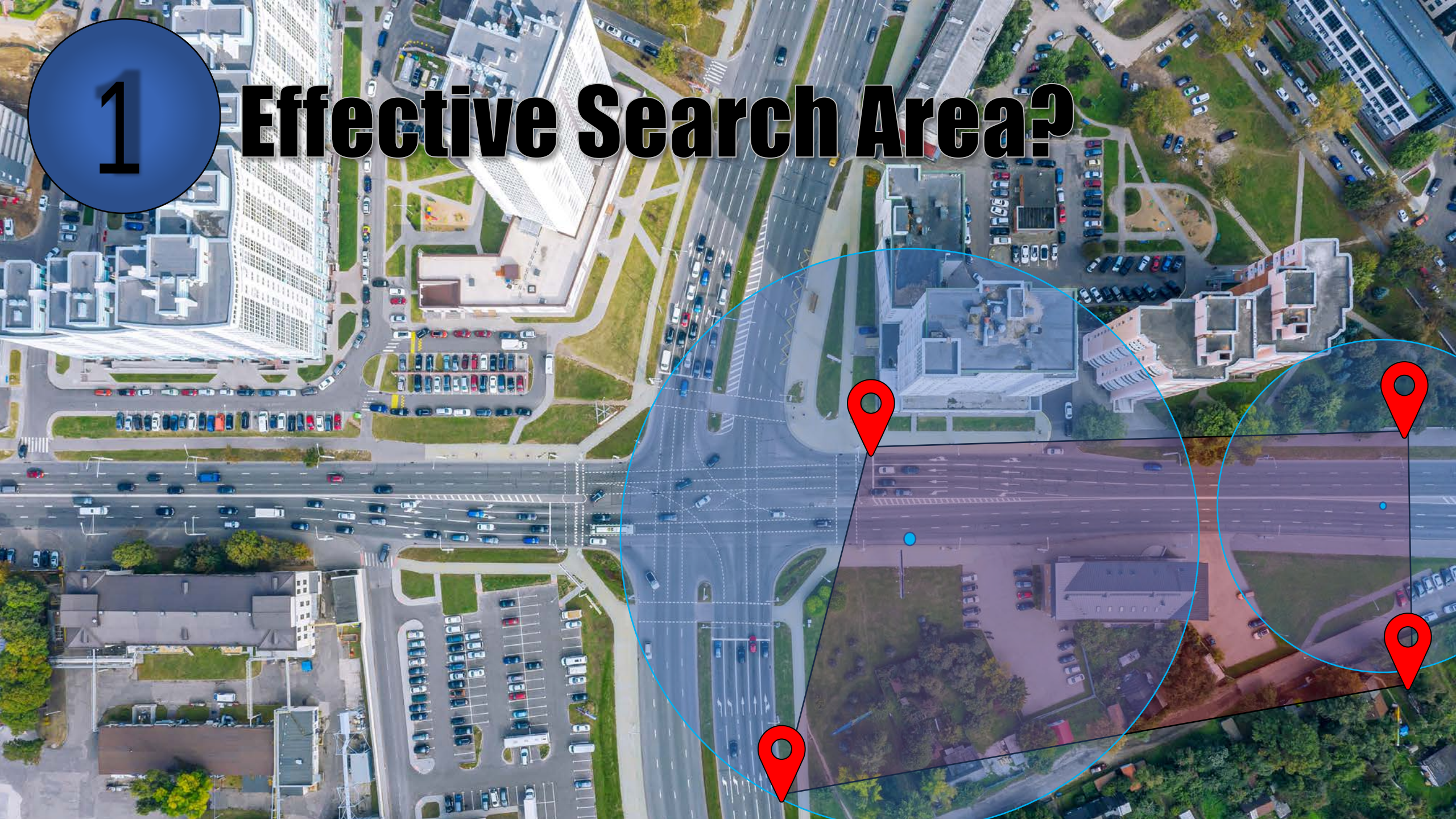


What is location history???
Anonymous #??

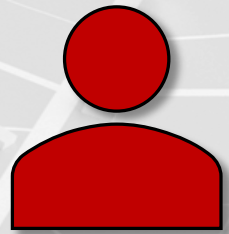
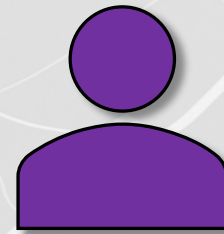
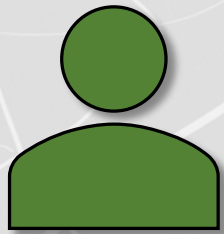


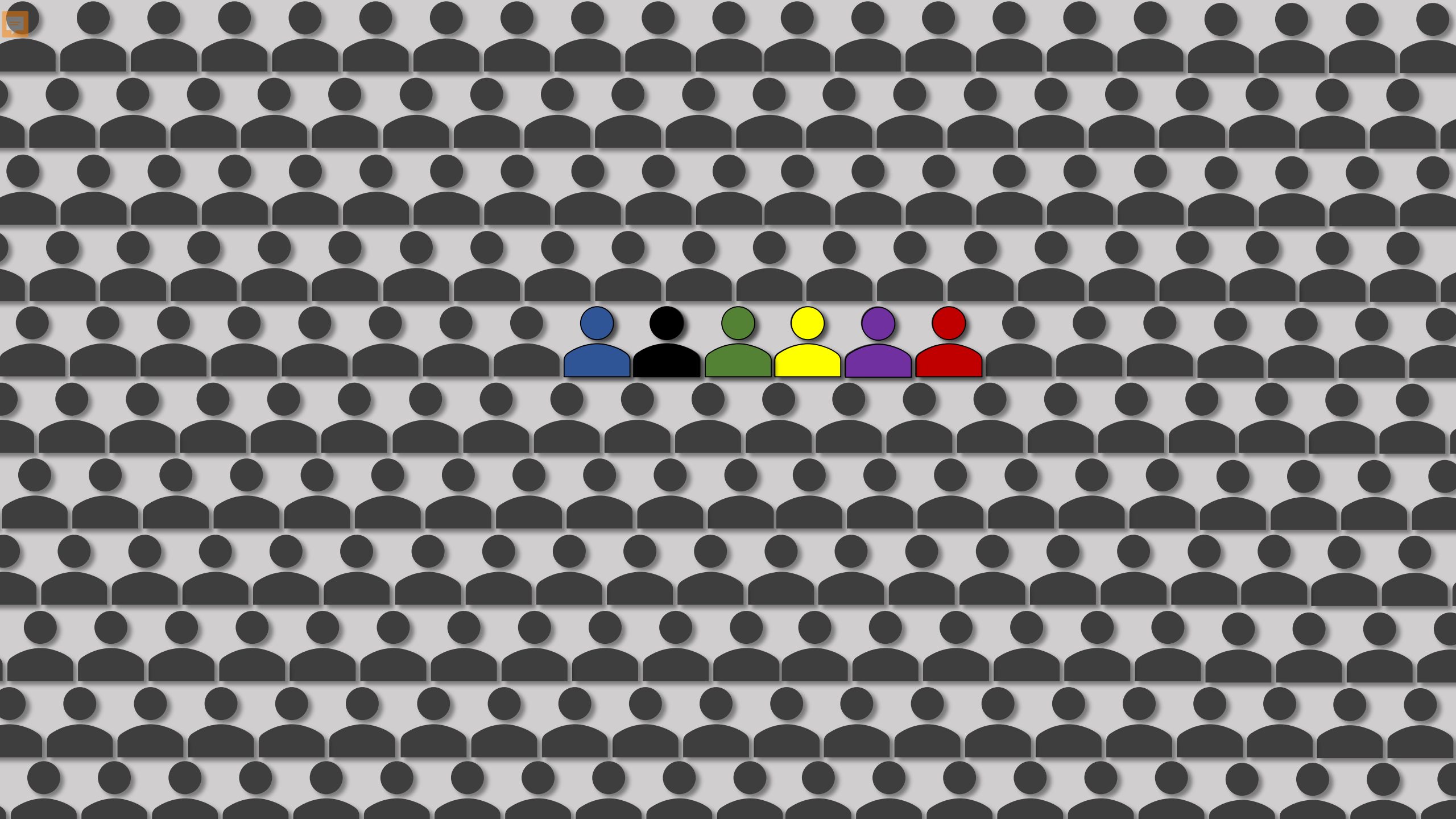
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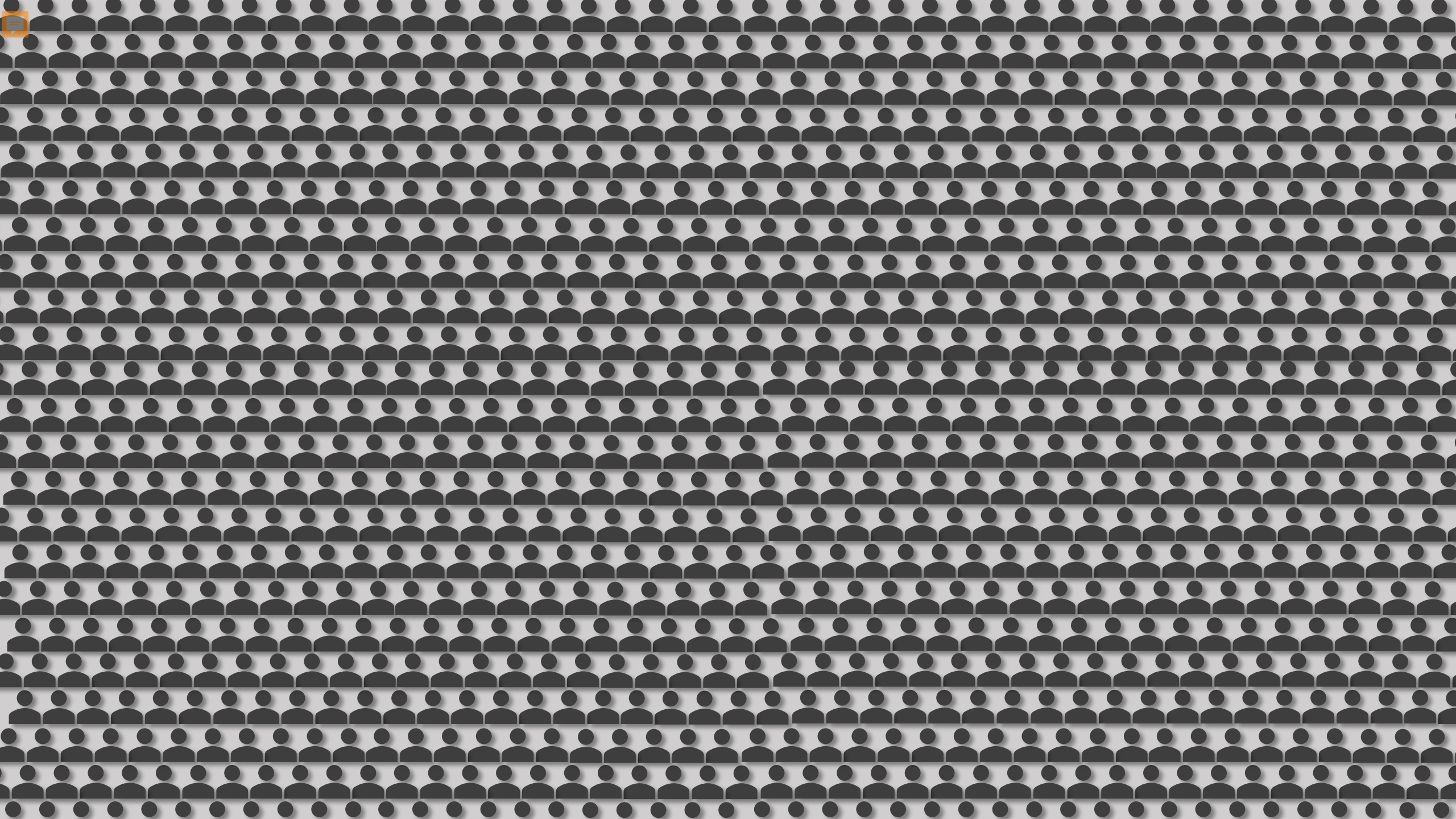
Effective Search Area?

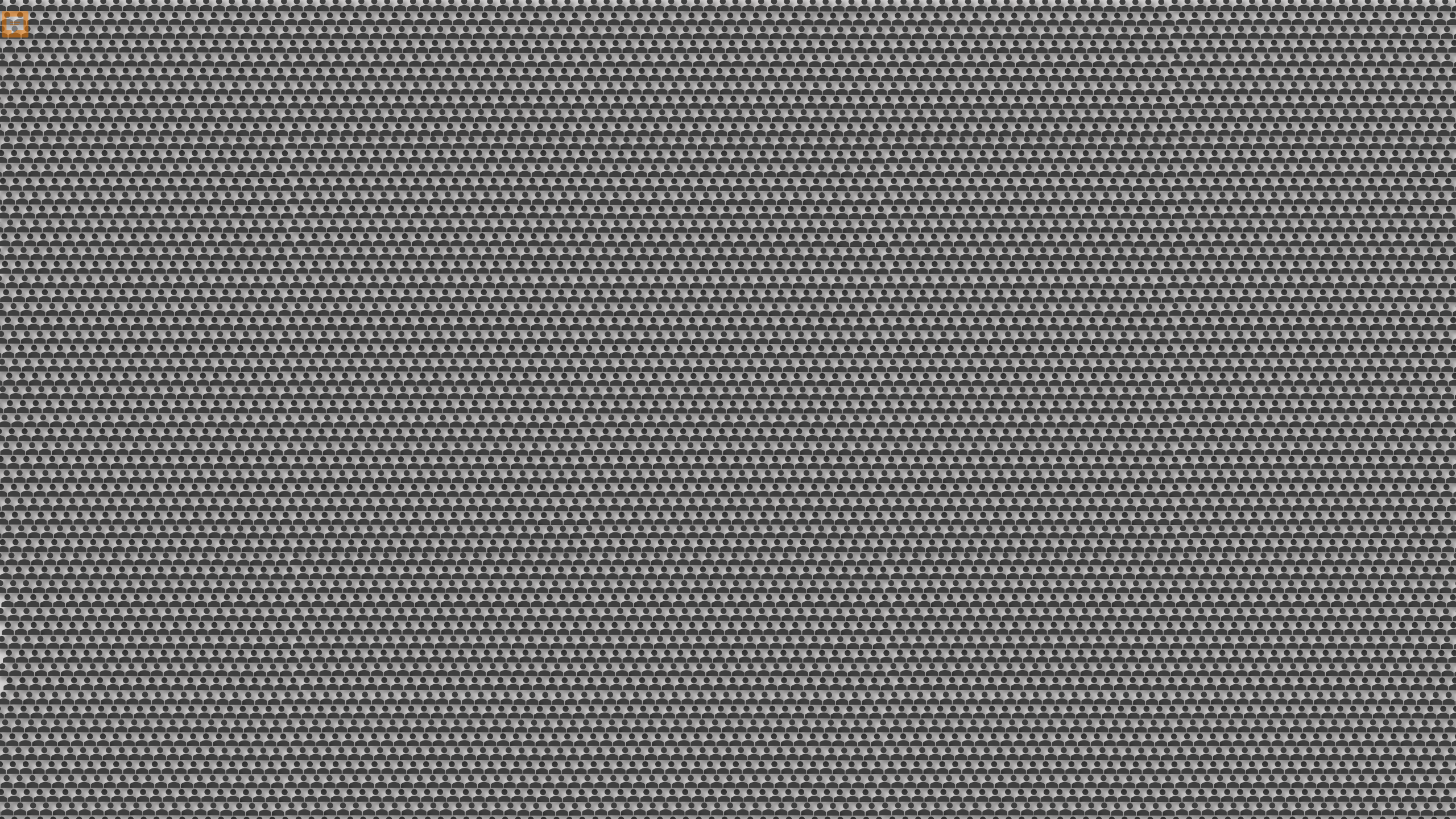


Only 6 users were searched, right?











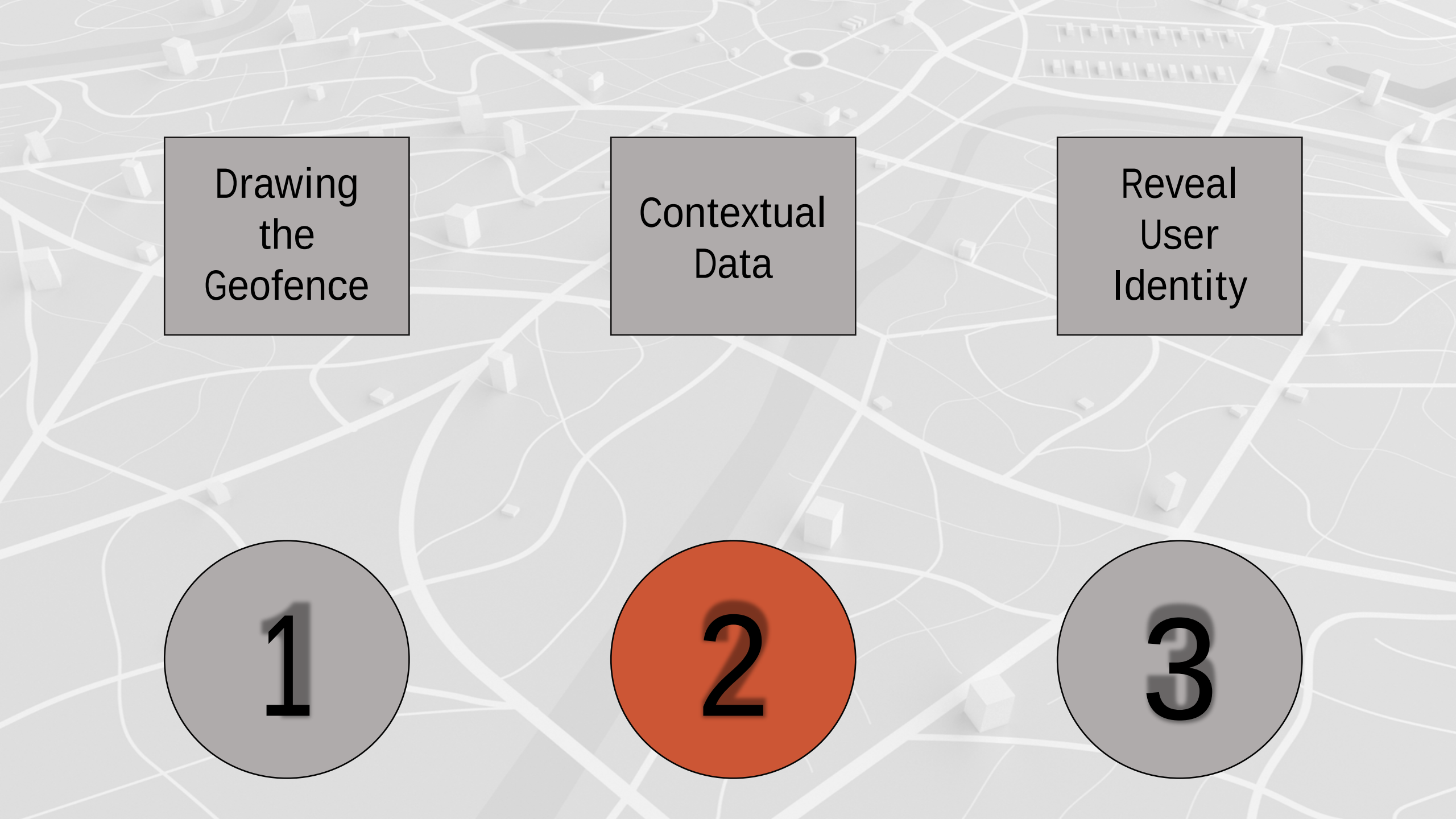
Google Representatives testified they search “numerous tens of millions” of user accounts for each Geofence.



**This is because Google stores all their
user's Location History, in one
repository.**



**This search occurs
for each warrant, and for every
location detailed within a Geofence
Warrant.**



Drawing
the
Geofence

Contextual
Data

Reveal
User
Identity

1

2

3



2

Contextual Data

Location Identity

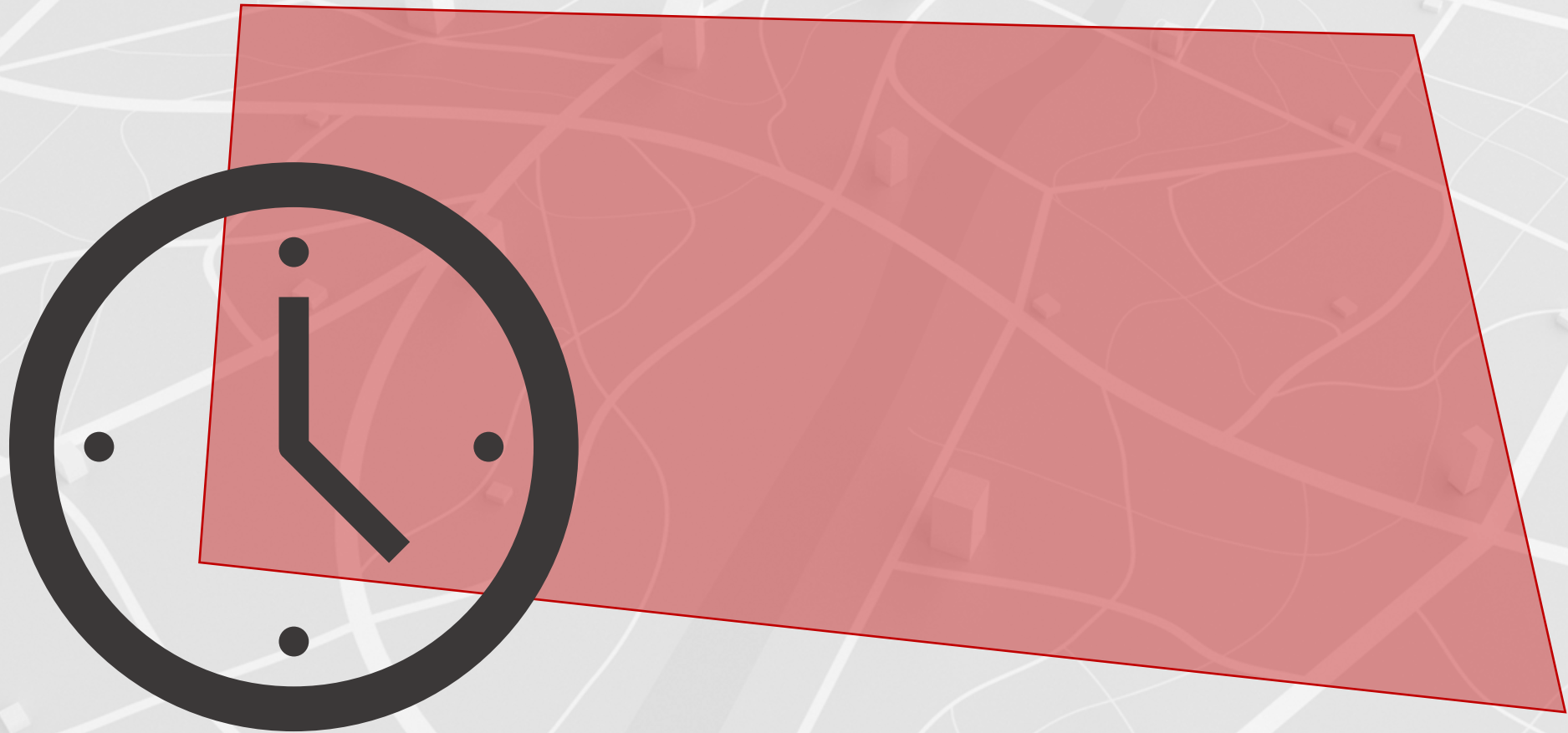
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**Providing context to the movements
of those in the Geofence**



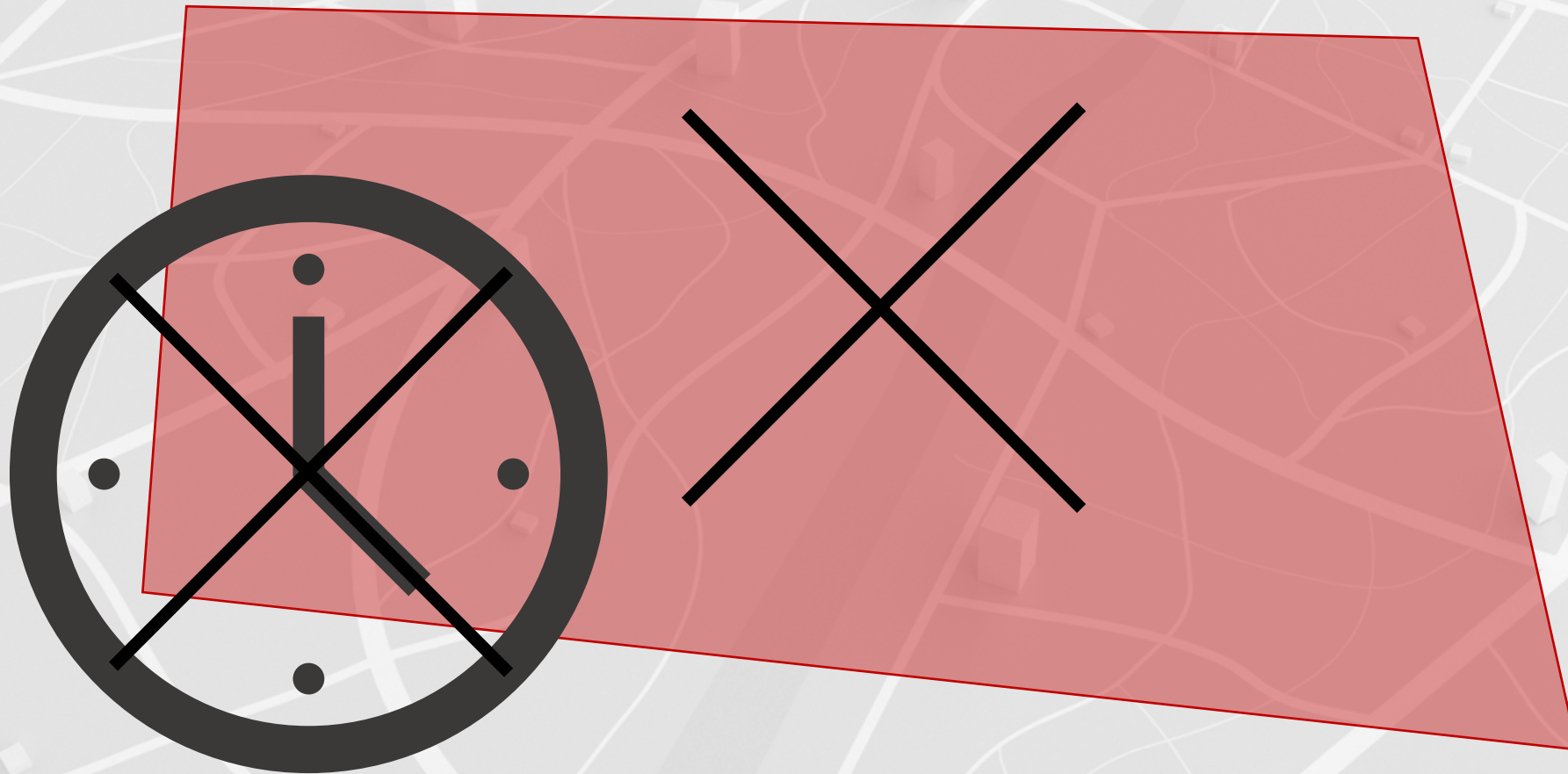
2

Providing context to the movements of those in the Geofence



2

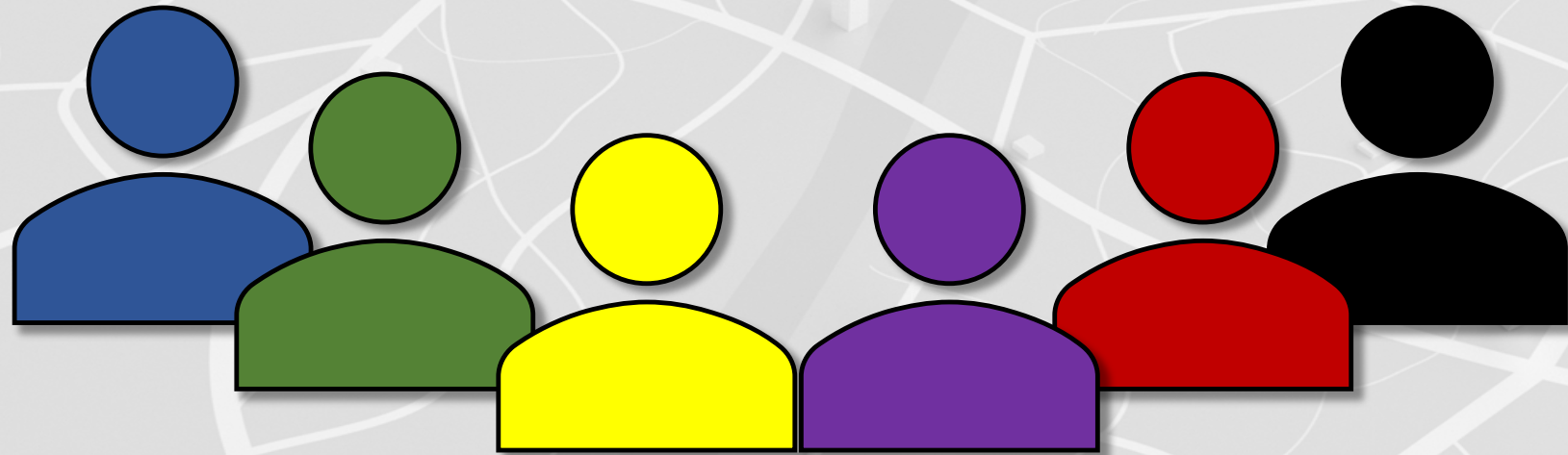
Providing context to the movements of those in the Geofence



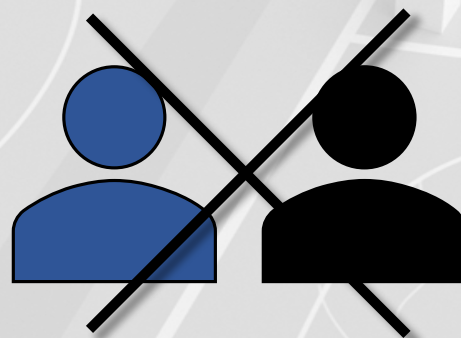
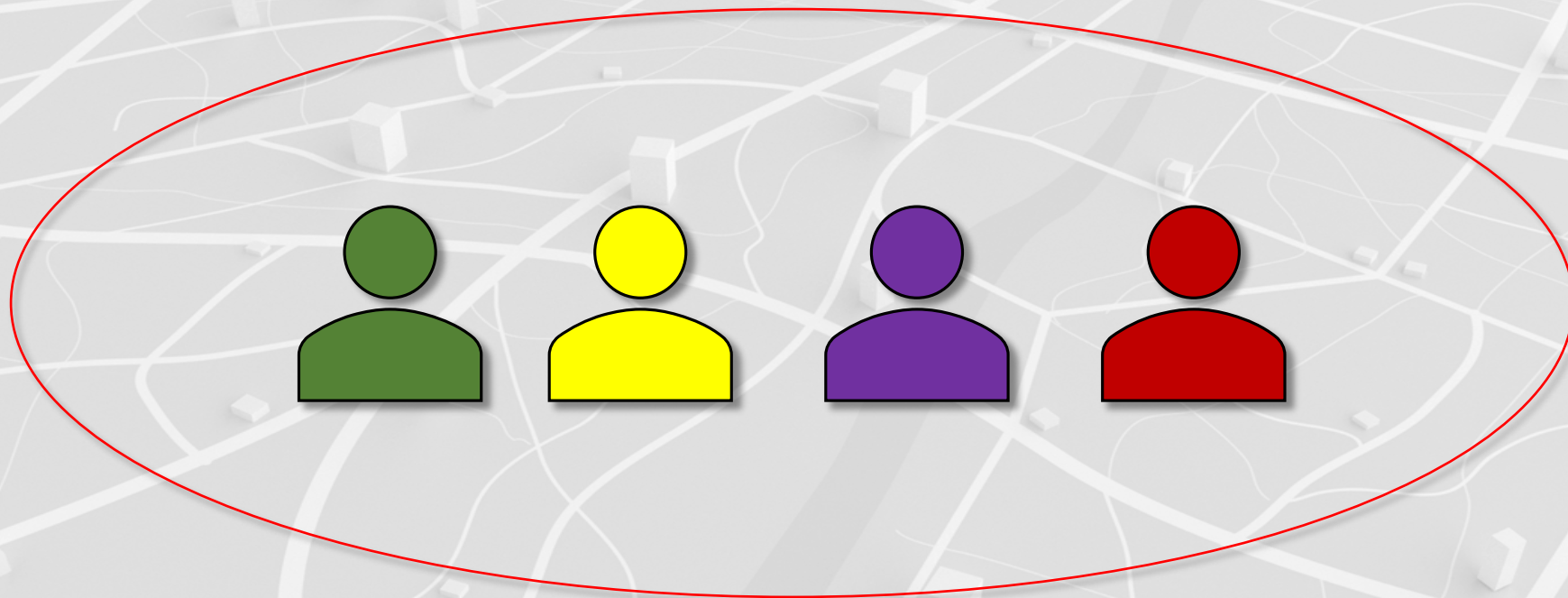


2

Selecting those from Step 1 for Contextual Data

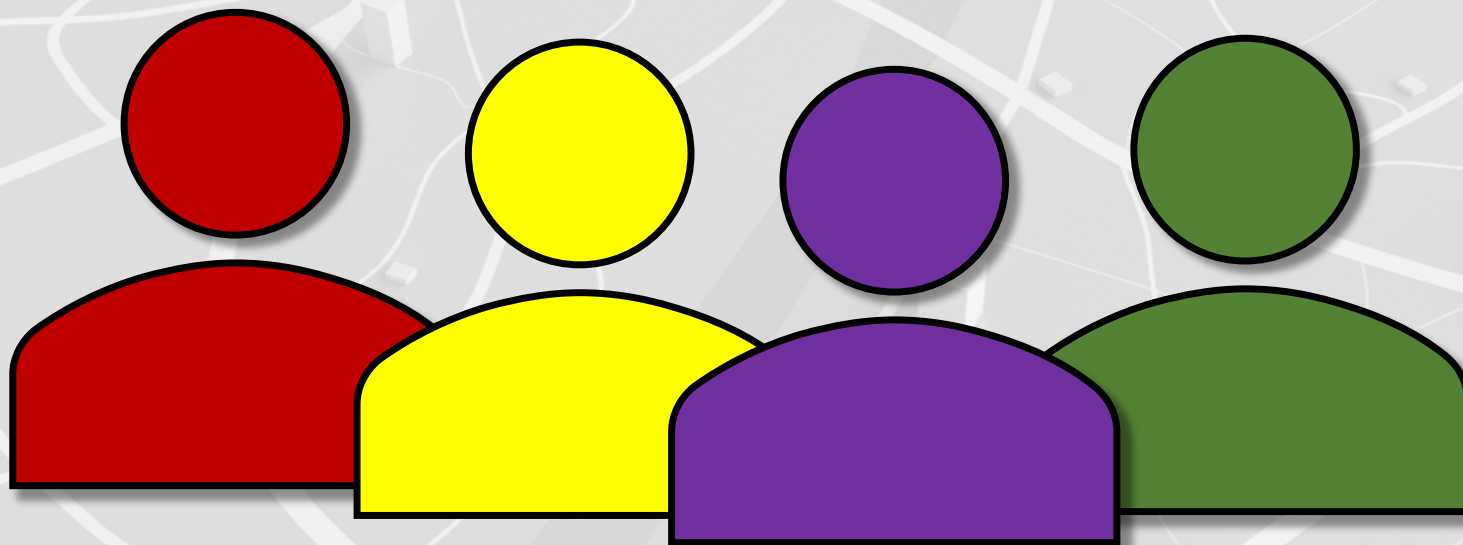


2



2

Remove Geographical Boundaries
Expand the Time of the Search









MANUFACTURED AND DISTRIBUTED IN THE UNITED KINGDOM UNDER LICENCE BY
WADDINGTONS GAMES LTD, CASTLE GATE, CULTON, LEEDS LS26 8HG, ENGLAND



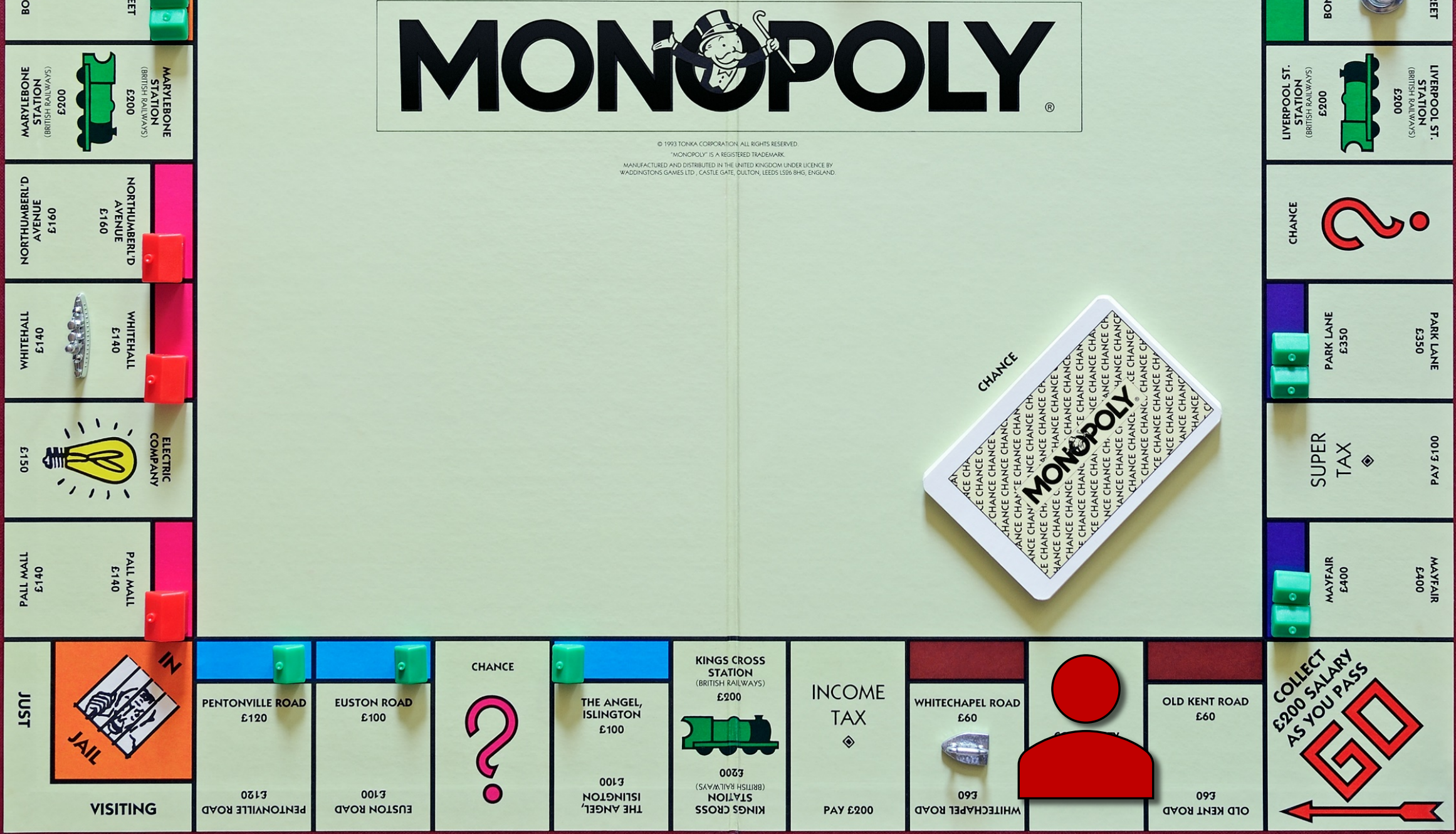
CHANCE

MONOPOLY

© 1993 TONKA CORPORATION. ALL RIGHTS RESERVED.

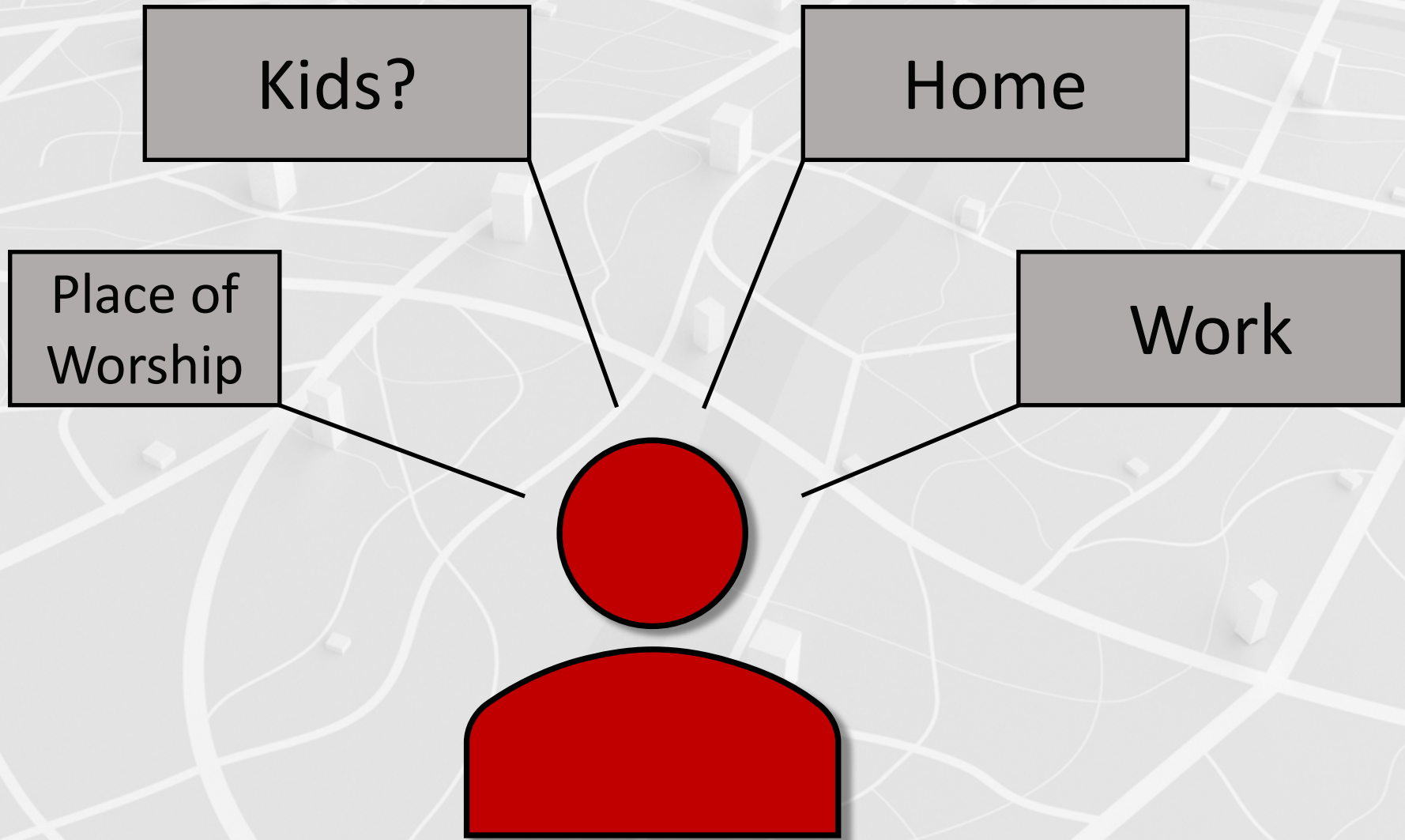
"MONOPOLY" IS A REGISTERED TRADEMARK.

MANUFACTURED AND DISTRIBUTED IN THE UNITED KINGDOM UNDER LICENCE BY
WADDINGTONS GAMES LTD., CASTLE GATE, DULTON, LEEDS LS26 8HG, ENGLAND.



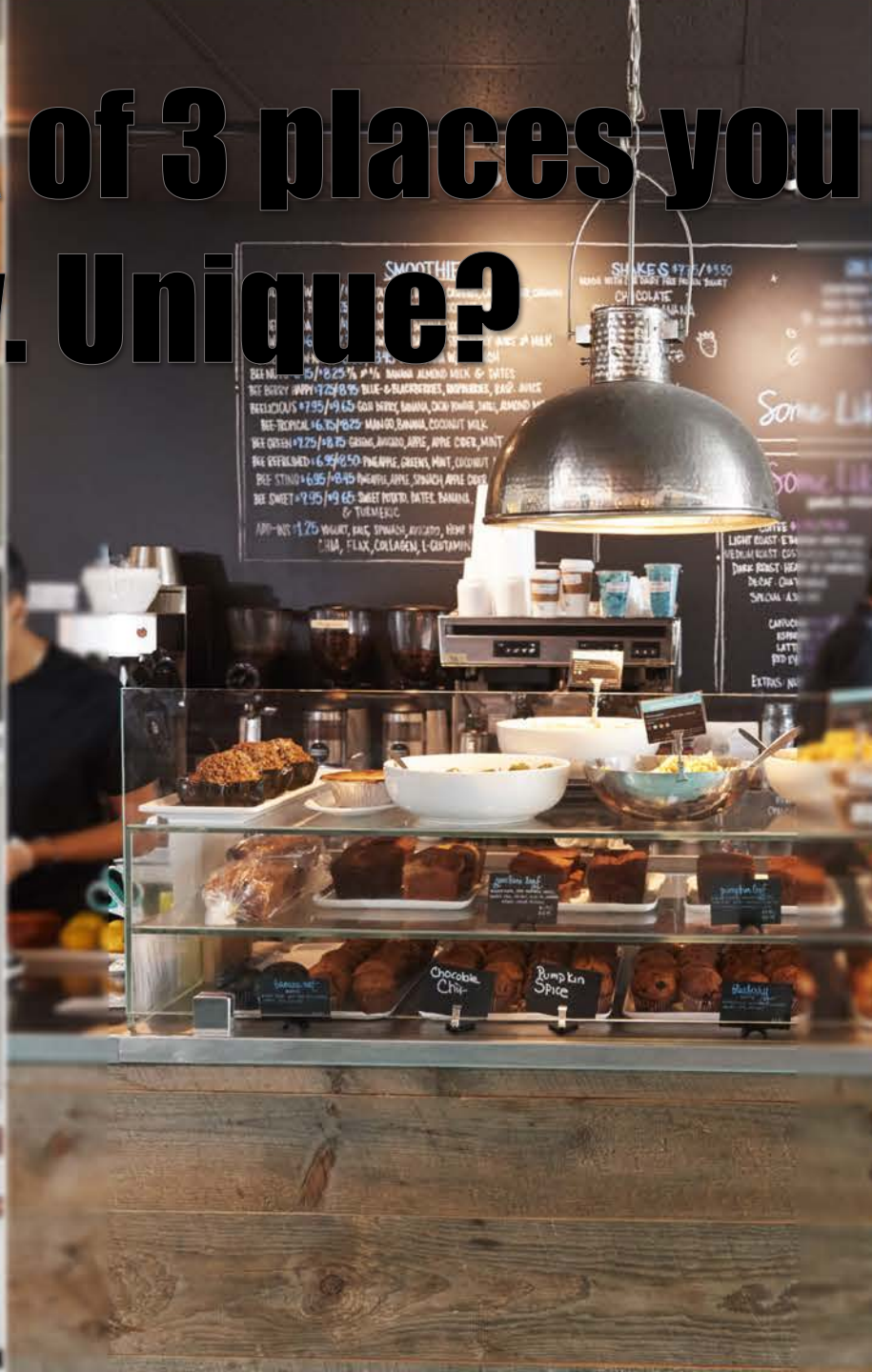


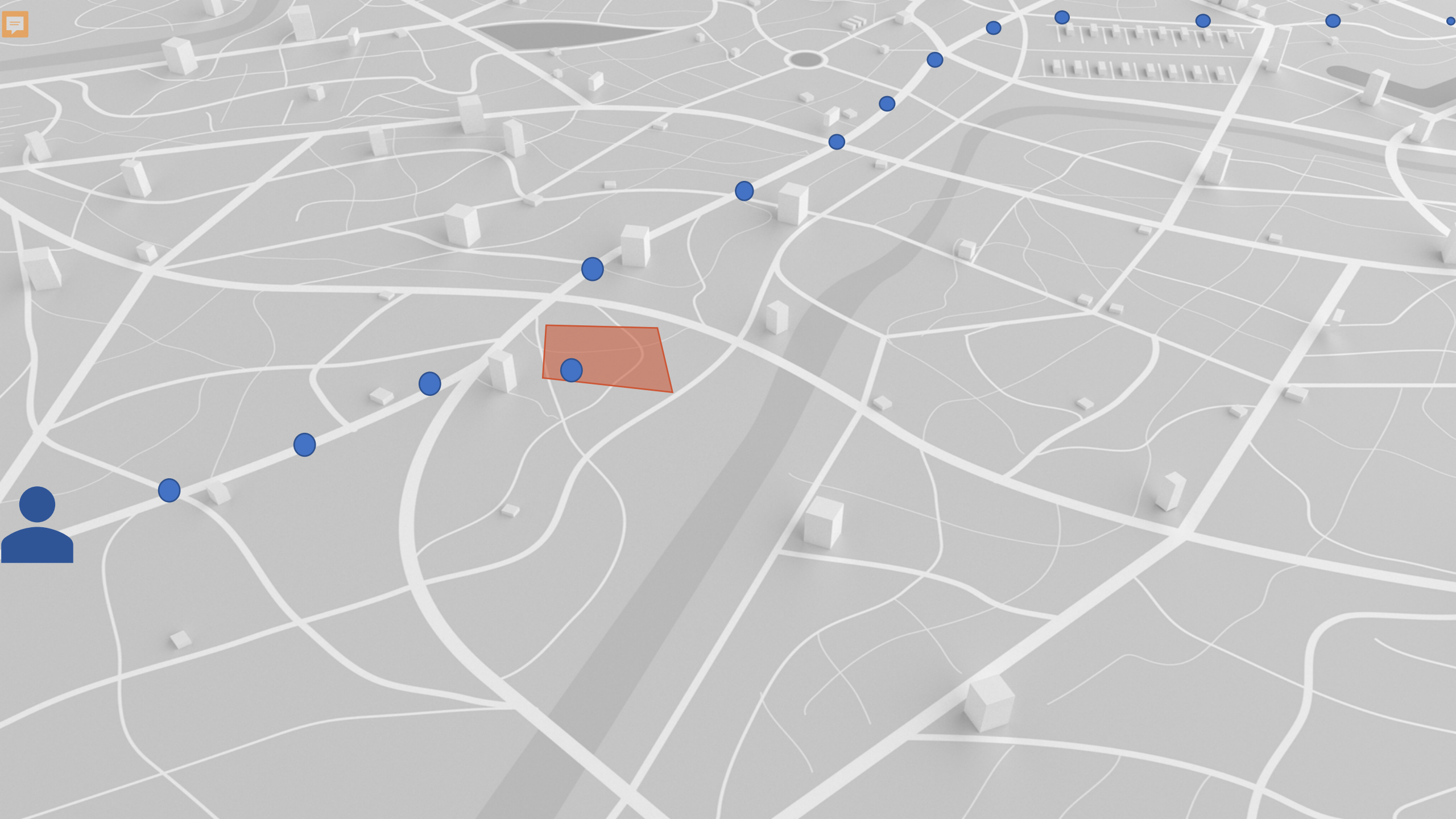
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2

Think of 3 places you travelled today. Unique?



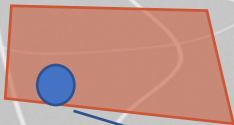




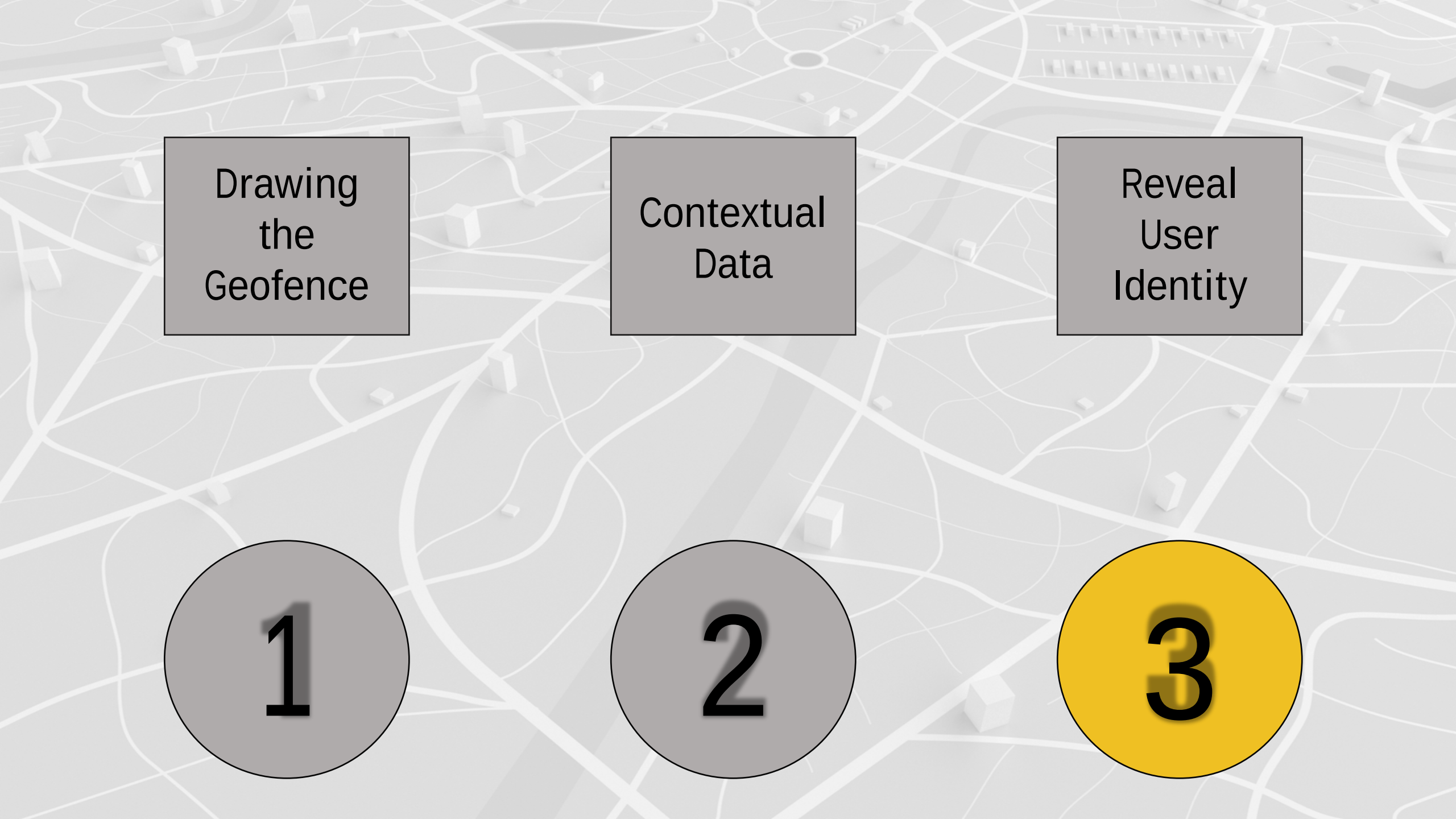
Low Confidence or erroneous latitude and longitude estimates can cause users to be captured by the geofence, though they never entered the fence.



Step 2 data can be very revealing about the user and aids in determining if false positives occurred.



Low Confidence or erroneous latitude and longitude estimates can cause users to be captured by the geofence, though they never entered the fence.



Drawing
the
Geofence

Contextual
Data

Reveal
User
Identity

1

2

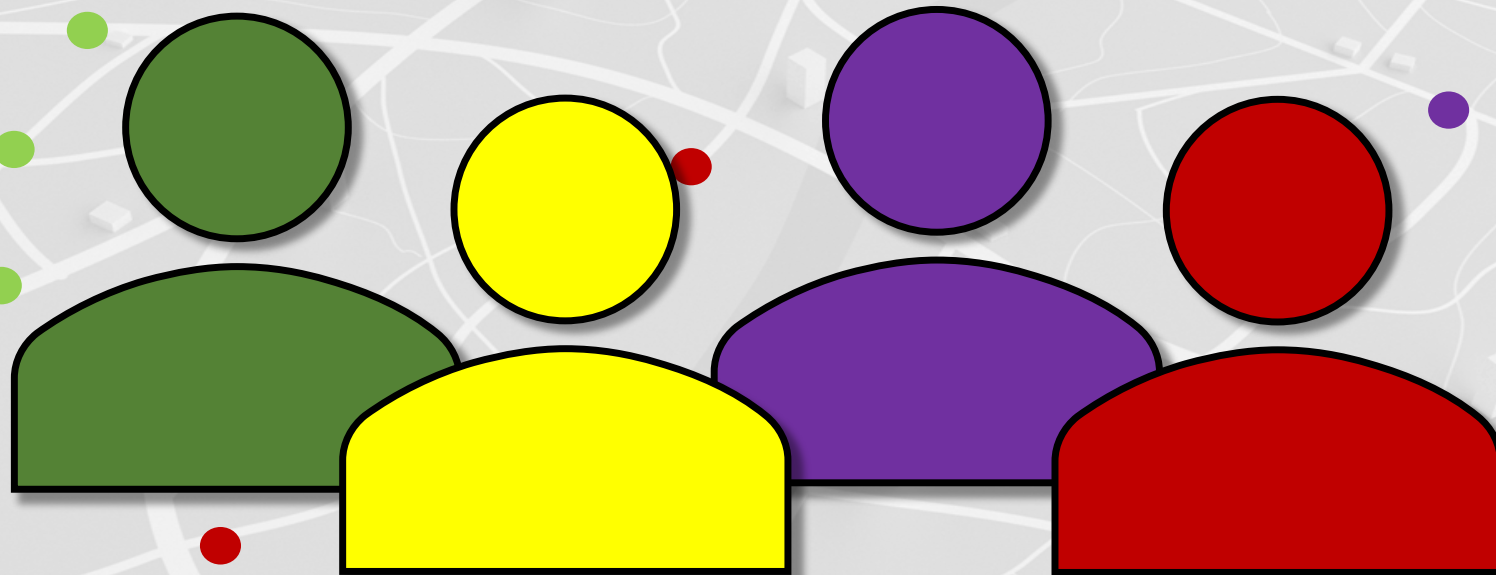
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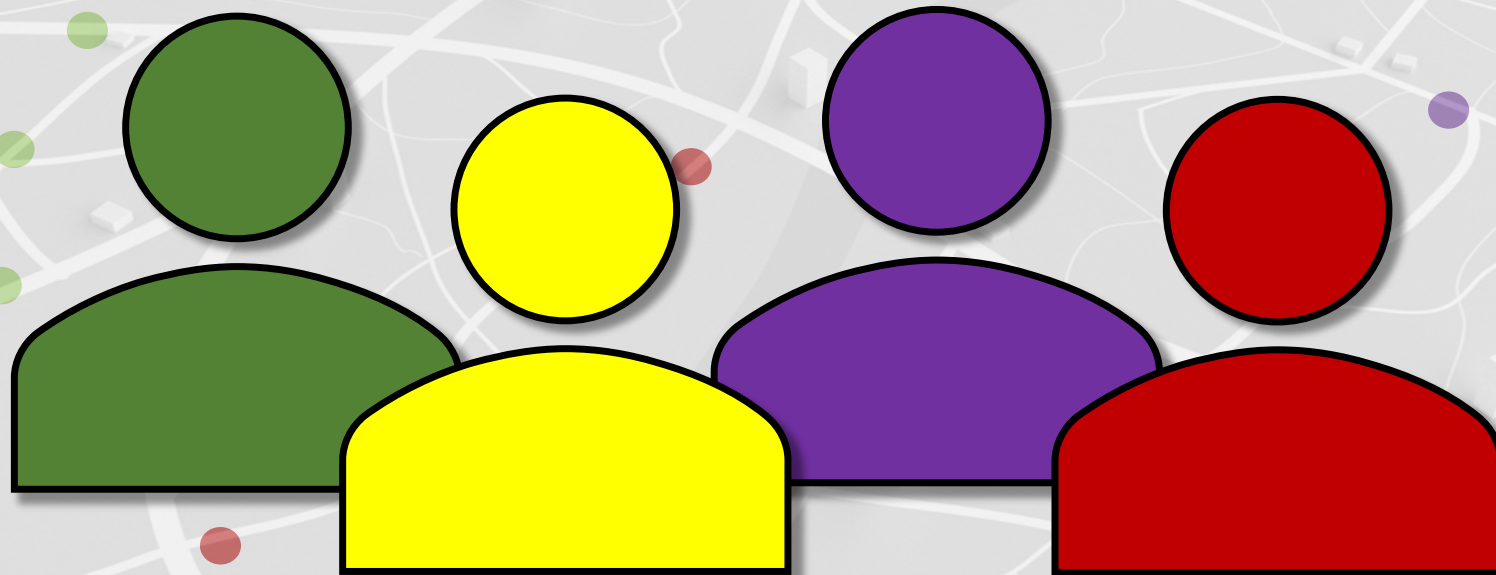
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**Reveal User
Identity**

3

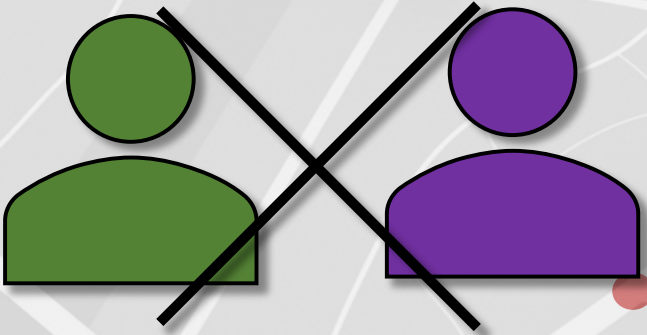
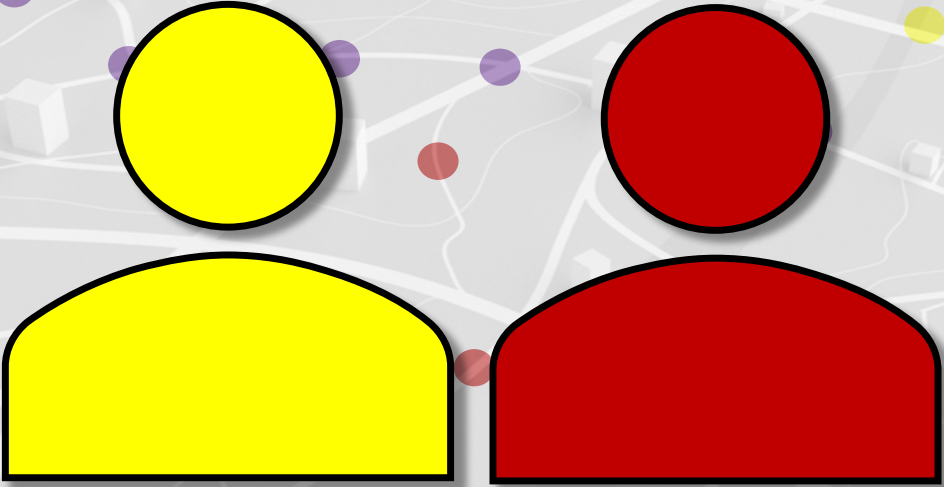


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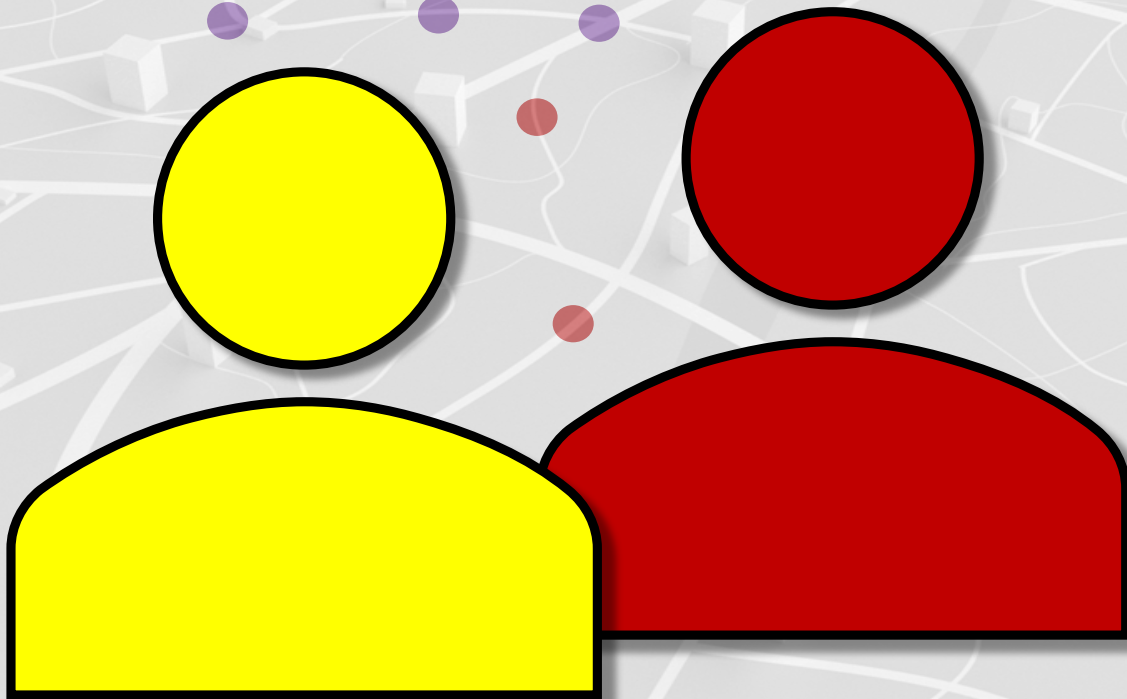




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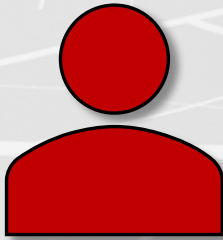


3



3

What is Revealed?



***** * Google Confidential and Proprietary * *****

Google Subscriber Information

Name: Jane Doe

email: Janedoe@gmail.com

Status: Enabled

Services: Android, Android Device Console, Android Market, Gmail, Google Calendar, Google Chrome Sync, Google Cloud Print, Google Drive, Google Hangouts, Google Keep, Google Maps Engine, Google My Maps, Google Payments, Google Photos, Google Play, Google Play Music, Google+, Location History, Project Fi, Web & App Activity, YouTube

Created on: 2020/01/01-17:00:00-UTC

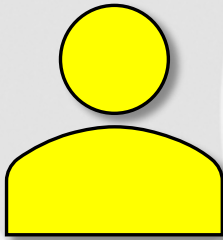
Terms of Service IP: 255:255:255:255 2020/01/01-17:00:00-UTC

Language Code: en_US

SMS: +15558675351

Google Account ID: 35356789

***** * Google Confidential and Proprietary * *****



***** * Google Confidential and Proprietary * *****

Google Subscriber Information

Name: John Doe

email: Johndoe@gmail.com

Status: Enabled

Services: Android, Android Device Console, Android Market, Gmail, Google Calendar, Google Chrome Sync, Google Cloud Print, Google Drive, Google Hangouts, Google Keep, Google Maps Engine, Google My Maps, Google Payments, Google Photos, Google Play, Google Play Music, Google+, Location History, Project Fi, Web & App Activity, YouTube

Created on: 2020/01/01-17:00:00-UTC

Terms of Service IP: 255:255:255:255 2020/01/01-17:00:00-UTC

Language Code: en_US

SMS: +15558675309

Google Account ID: 123456789

***** * Google Confidential and Proprietary * *****

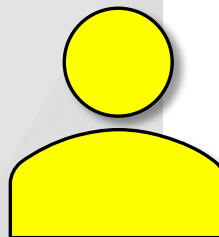
3

Search Warrants for All Account Data and Location History Requested



```
##### * Google Confidential and Proprietary * #####  
  
Google Subscriber Information  
Name: Jane Doe  
email: Janedoe@gmail.com  
Status: Enabled  
Services: Android, Android Device Console, Android Market, Gmail, Google Calendar,  
Google Chrome Sync, Google Cloud Print, Google Drive, Google Hangouts, Google Keep,  
Google Maps Engine, Google My Maps, Google Payments, Google Photos, Google Play,  
Google Play Music, Google+, Location History, Project Fi, Web & App Activity, YouTube  
Created on: 2020/01/01-17:00:00-UTC  
Terms of Service IP: 255:255:255:255 2020/01/01-17:00:00-UTC  
Language Code: en_US  
SMS: +155586753531  
Google Account ID: 35356789
```

```
##### * Google Confidential and Proprietary * #####
```



```
##### * Google Confidential and Proprietary * #####  
  
Google Subscriber Information  
Name: John Doe  
email: Johndoe@gmail.com  
Status: Enabled  
Services: Android, Android Device Console, Android Market, Gmail, Google Calendar,  
Google Chrome Sync, Google Cloud Print, Google Drive, Google Hangouts, Google Keep,  
Google Maps Engine, Google My Maps, Google Payments, Google Photos, Google Play,  
Google Play Music, Google+, Location History, Project Fi, Web & App Activity, YouTube  
Created on: 2020/01/01-17:00:00-UTC  
Terms of Service IP: 255:255:255:255 2020/01/01-17:00:00-UTC  
Language Code: en_US  
SMS: +15558675309  
Google Account ID: 123456789
```

```
##### * Google Confidential and Proprietary * #####
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Where do I begin with a Geofence Warrant?



Excel
Spreadsheets

Location1.csv



Excel
Spreadsheets

Location
Supplemental.csv



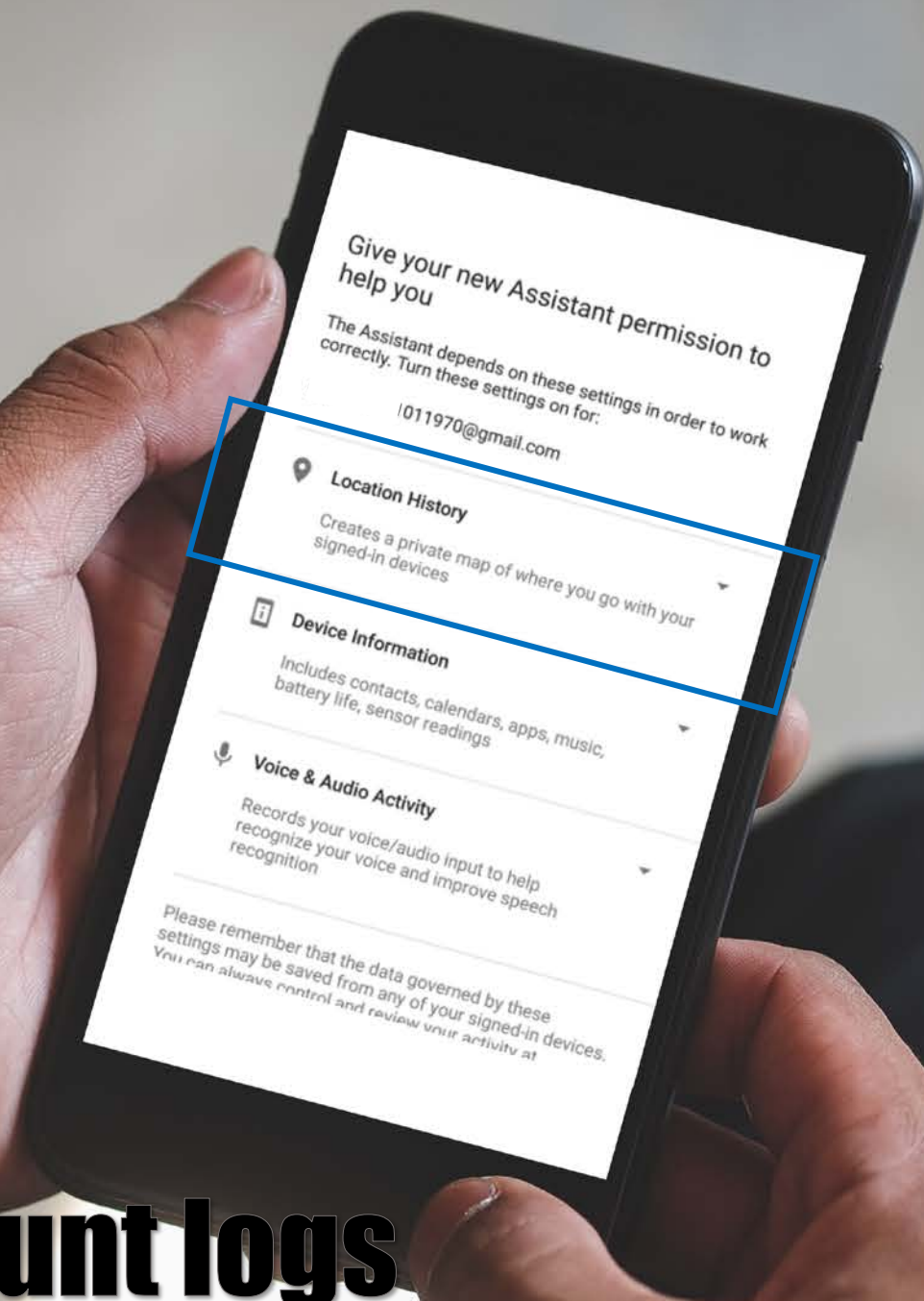
Key Identifying
both Anonymous
ID and User ID

```
***** * Google Confidential and Proprietary * *****  
  
Google Subscriber Information  
Name: Jane Doe  
email: Janedoe@gmail.com  
Status: Enabled  
Services: Android, Android Device Console, Android Market, Gmail, Google Calendar,  
Google Chrome Sync, Google Cloud Print, Google Drive, Google Hangouts, Google Keep,  
Google Maps Engine, Google My Maps, Google Payments, Google Photos, Google Play,  
Google Play Music, Google+, Location History, Project Fi, Web & App Activity, YouTube  
Created on: 2020/01/01-17:00:00-UTC  
Terms of Service IP: 255:255:255:255 2020/01/01-17:00:00-UTC  
Language Code: en_US  
SMS: +15558675307  
Google Account ID: 35356789  
  
***** * Google Confidential and Proprietary * *****
```

```
***** * Google Confidential and Proprietary * *****  
  
Google Subscriber Information  
Name: John Doe  
email: Johndoe@gmail.com  
Status: Enabled  
Services: Android, Android Device Console, Android Market, Gmail, Google Calendar,  
Google Chrome Sync, Google Cloud Print, Google Drive, Google Hangouts, Google Keep,  
Google Maps Engine, Google My Maps, Google Payments, Google Photos, Google Play,  
Google Play Music, Google+, Location History, Project Fi, Web & App Activity, YouTube  
Created on: 2020/01/01-17:00:00-UTC  
Terms of Service IP: 255:255:255:255 2020/01/01-17:00:00-UTC  
Language Code: en_US  
SMS: +15558675307  
Google Account ID: 123456789  
  
***** * Google Confidential and Proprietary * *****
```

Besides Step 1-3 data, what else do we need?

- **Audit Logs for the Account**
- **Google Takeout**
- **Email Correspondence
(Google and LE)**
- **Analysis Reports of Geofence
Data**



We need user account logs

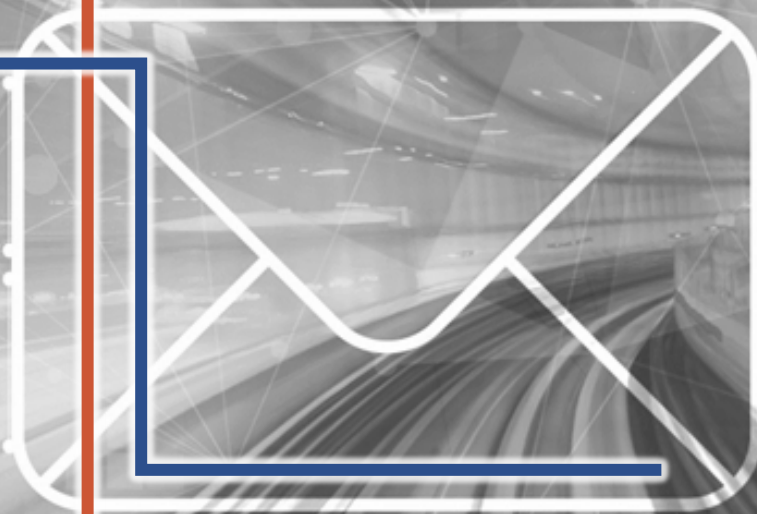
The Google logo is positioned above the sign, featuring its characteristic multi-colored letters (blue, red, yellow, green, red) with a thin black outline. It is centered horizontally against the wooden background.

Google

A dark blue wooden sign with the words "TAKE OUT" in white, hand-painted, sans-serif capital letters. The sign is mounted on a wooden wall with two warm-toned Edison-style light bulbs on either side. The sign is secured with two small metal screws at its ends.

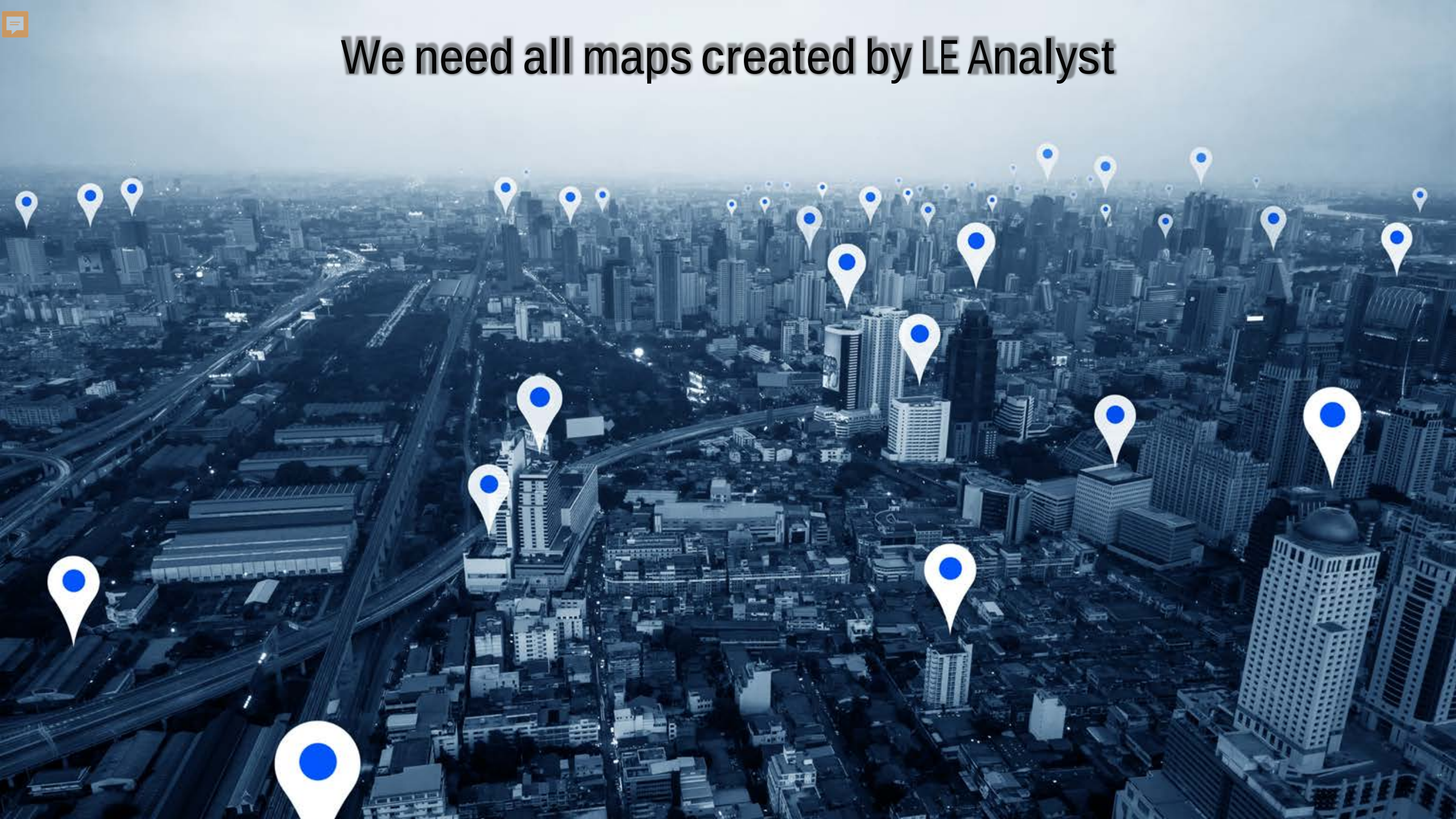
TAKE OUT

LE



Google

We need all maps created by LE Analyst



Spencer McInvaille

Digital Forensic Examiner

spencer@envistaforensics.com



www.envistaforensics.com