

Address Cleansing in Michigan Lessons Learned

Michigan Care Improvement Registry

Address Cleansing: what is it

- **Break the address** into parts (ie. primary number, street name, city name, state name, ZIP Code, etc.).
- **Standardize** each part so that it matches the format of the official database to be referenced. (ie. South -> S, Road -> Rd, etc)
- **Validate** the standardized address against an official address database.

What is SmartyStreets

All of the above using:

- USPS Monthly Extract
- Combined with GPS Coordinate (TIGER) data and emergency systems data from USPS (LACSLink)
- Through a web REST API

Address Cleansing: what we get

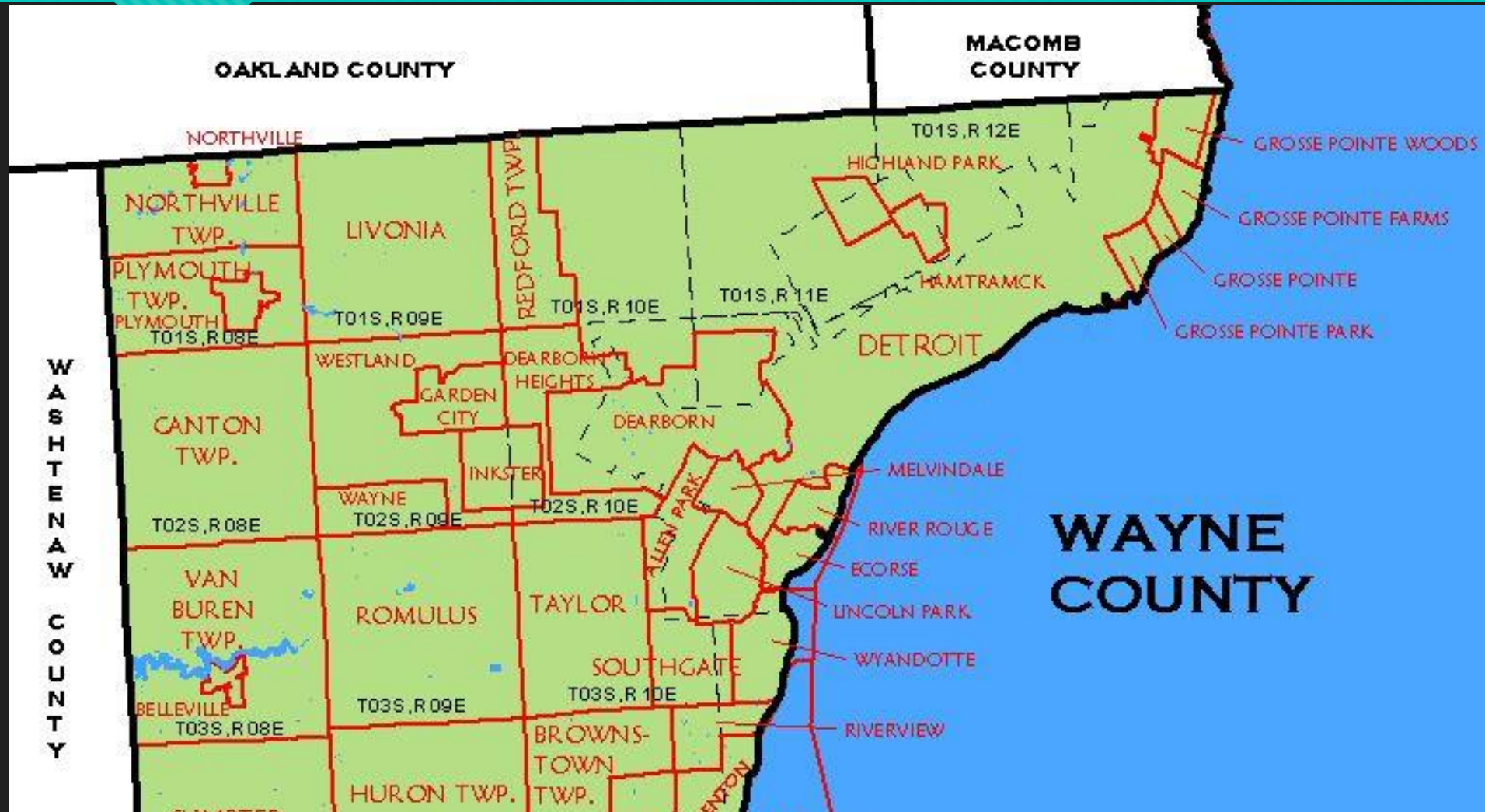
- Address Status
- Standardized Expression
- Additional Metadata

Why we started with Address Cleansing

Which health department for this person?

Wayne County v.s. City Of Detroit

Wayne County



We want to know v.s. Can we know

NO ○ Is it a real place

YES ○ Where is it? (coordinates, census track, county, etc)

YES ○ Will USPS Deliver to the location

NO ○ Does the person live there

NO ○ Does a business operate there

And then...

The standardized address would allow us to do even more.

Enter: The Hash

The Hash

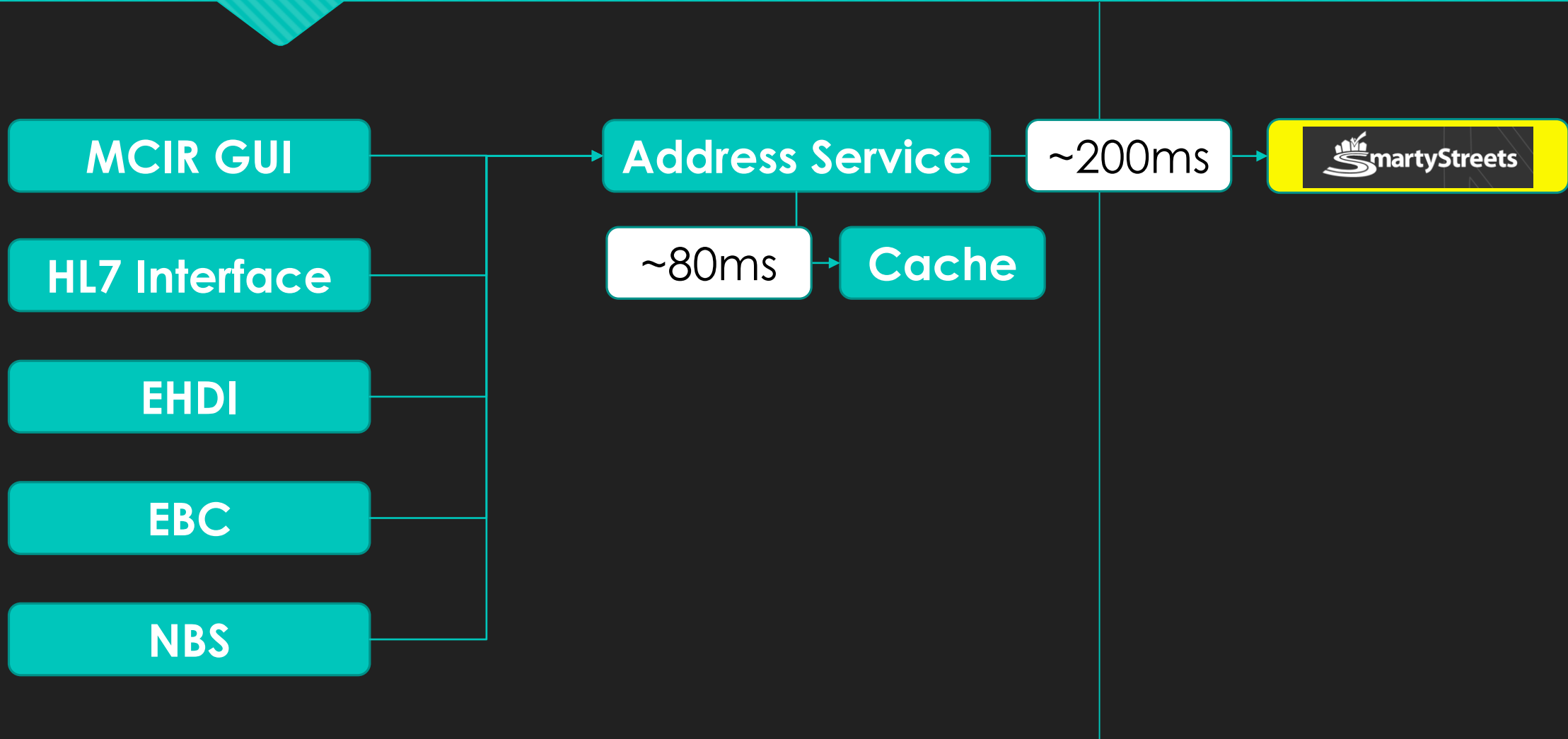
- primary_street
- secondary_street
- city
- state
- zip
- country

MD5



2FC916647576ADBA4AB3EFBBC1B454C5

MCIR: Current Ecosystem



Using the hash to talk



Story Time!



NIXIE	444	1	05 03/24/05
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RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD

BC: 44482080909 *1432-00188-21-35



Reminder Recall

- 50,738 letters sent
- Yellow labels (returned) for two reasons:
 1. Person doesn't live there (and can't be forwarded)
 2. Address is not known

Reason	Count
Forward Time Expired	2906
Attempted – Not Known (person)	804
Vacant	204
No Mail Receptacle	85
Unclaimed/Refused	78
Temporarily Away	9
Illegible	2
Blank (Hand written note)	2
Bad Address (Insufficient, No such..)	541

Things Change

For the 1%

- Houses get Condemned
- Addresses Change Status (Inactive, Undeliverable)

Lessons about Stale Data

We will have stale data!

- When we don't need speed (user interface) always hit SmartyStreets
- With HL7, we care about speed above all else. We use the cache.
- Need a process to re-cleanse things.

Lessons about Valid/Invalid

- Historically we scan the 2D Barcode and mark records

Invalid Address

- With Address cleansing we checked closer and saw that some of the addresses were valid, but sent back because the person didn't live there anymore:

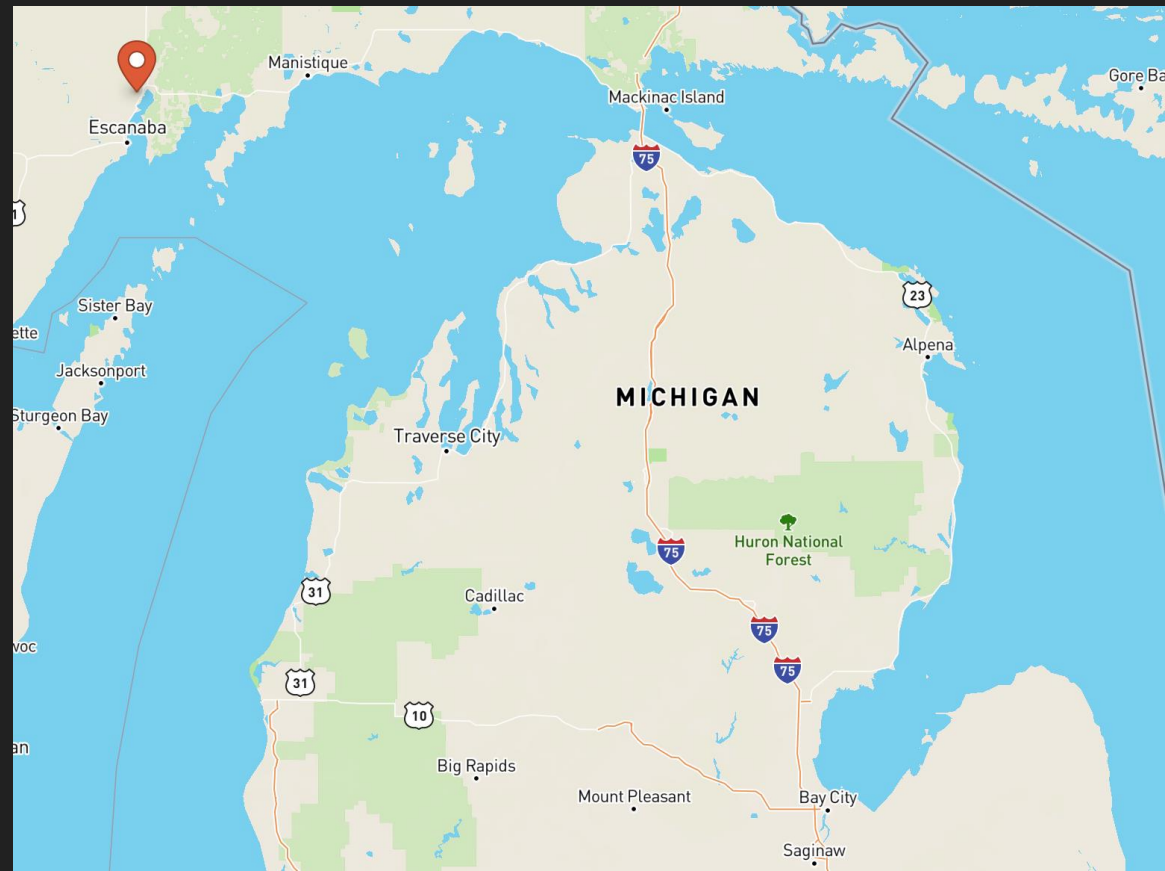
Valid Address

- We had to make a way to mark an address as

“Not valid for this person” vs “Not valid address”.

Story Time!

○ Gladstone, Michigan



Gladstone – 4th Ave N... E?

- http://www.gladstonemi.org/government/city_departments/public_safety.php

Public Safety



906-428-3131 Phone

906-428-1730 Fax

Dial 911 for emergencies

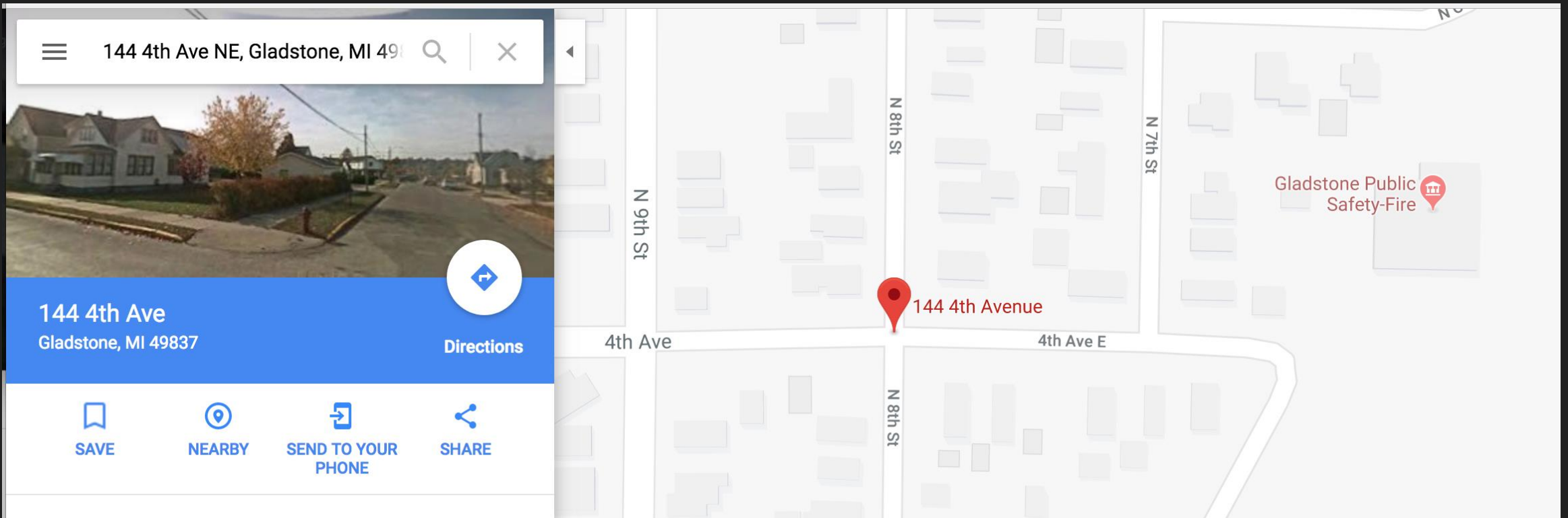
144 4th Ave. NE . Gladstone, MI 49837

Office Hours: Monday - Friday 9am to 3pm

Officers are on duty 24 hours a day.

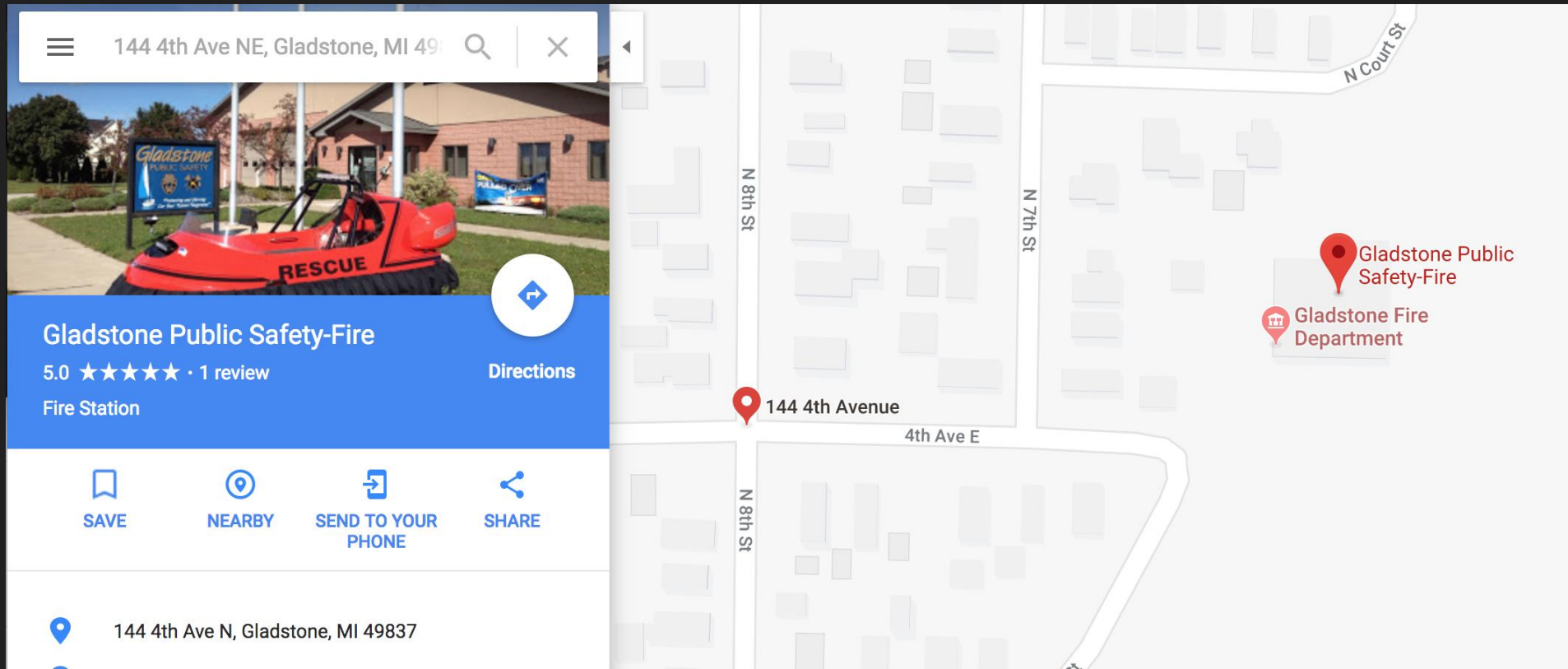
Gladstone – 4th Ave N... E?

- 144 4th Ave, Gladstone, MI 49837 -> Random Spot on the street



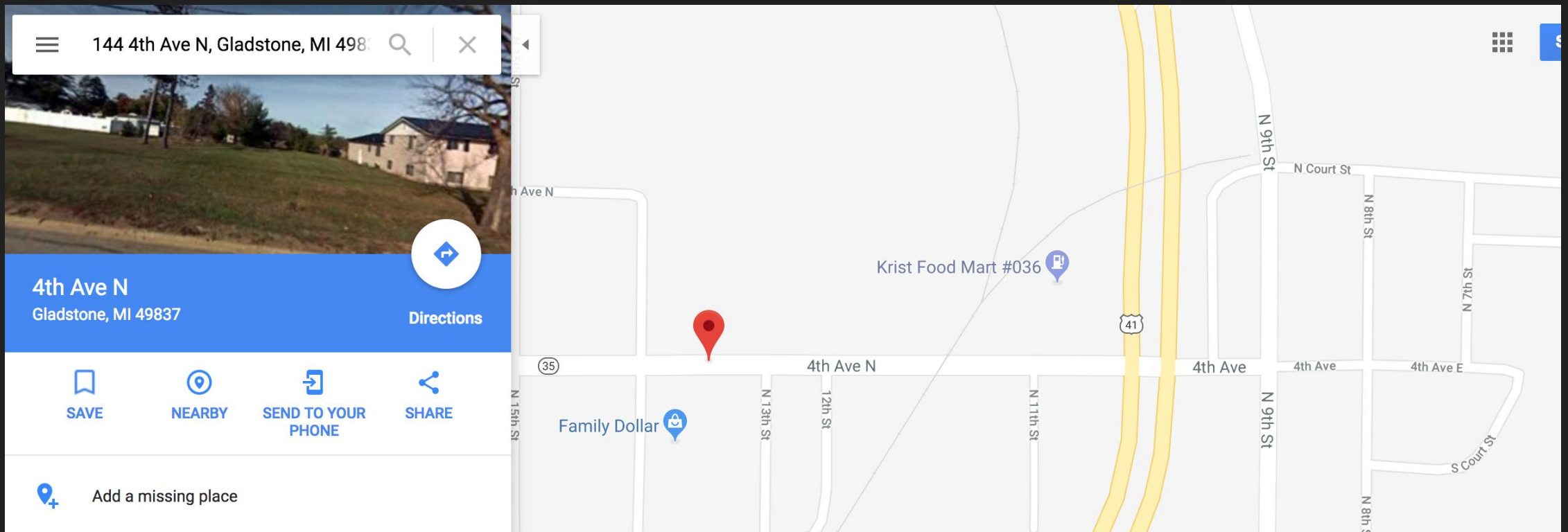
Gladstone – 4th Ave N... E?

○ Gladstone Public Safety (clicked pin)



Gladstone – 4th Ave N... E?

○ Searched “144 4th Ave N” -> “Add a missing place”



Gladstone – 4th Ave N... E?

- 144 4th Ave N Gladstone, MI

You entered:

144 4th Ave N Gladstone, MI 49837

✓ Found 1 valid address:

144 4th Ave N

Delivery line 1

Gladstone MI 49837-1137

City, State, ZIP Code, +4 Code



Matched street and city and state



Confirmed entire address

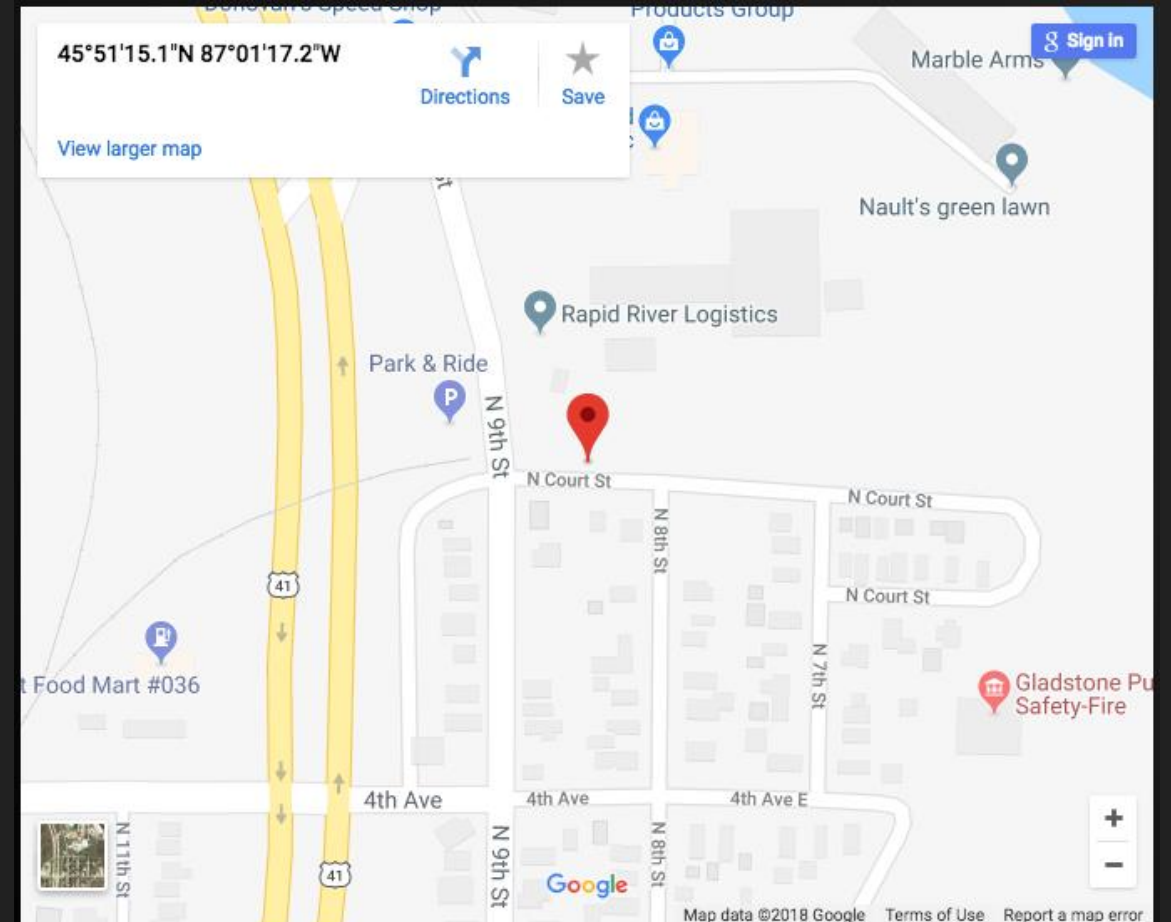
Gladstone – 4th Ave N... E?

- 144 4th Ave N Gladstone, MI

```
"carrier_route": "C008",  
"congressional_district": "0  
"rdi": "Commercial",  
"elot_sequence": "0137",  
"elot_sort": "A",  
"latitude": 45.85418,  
"longitude": -87.02143,  
"precision": "Zip8",  
"time_zone": "Eastern",  
"utc_offset": -5,  
"dst": true  
},  
"analysis": {  
  "dpv_match_code": "Y",  
  "dpv_footnotes": "AABB",  
  "dpv_cmra": "N",
```

Gladstone – 4th Ave N... E?

○ 144 4th Ave N Gladstone, MI



Gladstone – 4th Ave N... E?

○ Google Street View



Gladstone – 4th Ave N... E?



Gladstone – 4th Ave N... E?

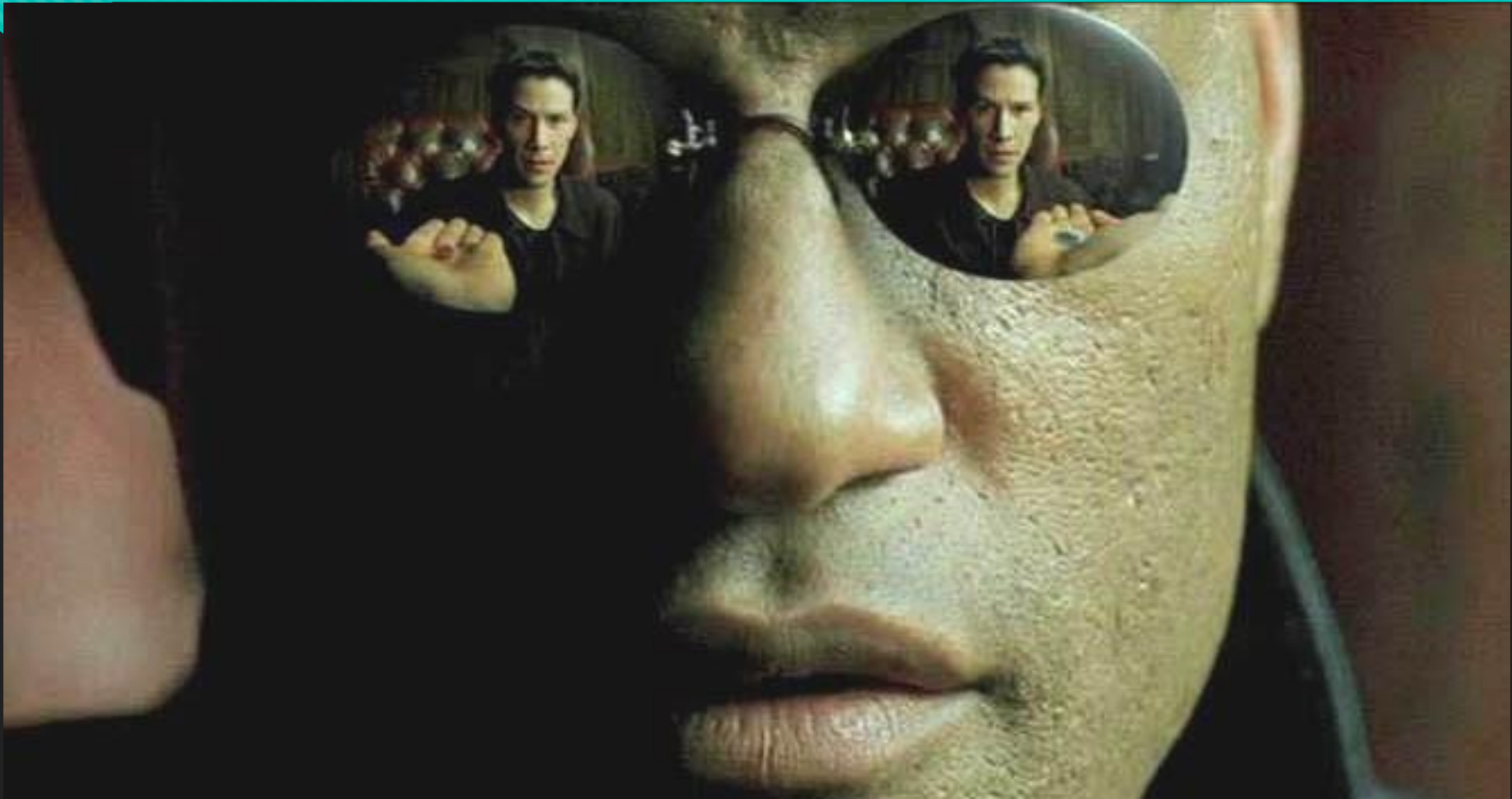


Gladstone – 4th Ave N... E?

“Use what the resident says”

-Post office

What is real?



Lessons about Ambiguity

- Let the user choose which to use
- We don't want to be in the business of managing ambiguity

Like Amazon!

Add a new address

There's a problem with the address provided - we've marked our suggestions in red below. Please choose or edit which version of the address you want to use.

- ☐ **Original address:**
Michael Mouse, 121 S Capitol Ave, Lansing, MI, 48912, United States
- ☒ **Suggested Address:**
Michael Mouse, 121 S CAPITOL AVE, LANSING, MI, **48933-1520**, United States

Edit this Address

Save Address

Who is Right?

Surprise!

- Sometimes USPS has incorrect information
- We saw this at the county level

MCIR Incorporates New Data

- City Name (Default v.s. City Name)
- Zip +4
- Response Codes
- Other Services! (FCC/Census data)
- Other Metadata (Flint Water Crisis)
- GPS Precision

Lessons about incorporating data

- We incorporate new pieces of data more often than we anticipated
- We tend to think it's the last time
- Should have stored the whole Smarty Streets response in its raw form so we could reference it later.
- We leveraged our caching system far more than we thought we would

Environment Changes

- Network Issues (what's between us and them)
- Available Data (Census vs FCC)
- Randomly Long Transactions (unknown anomalies)
- Services become unreliable (Census and Previous Address Service)

Lessons about Environment Changes

- Be able to gracefully handle timeouts and long transactions
- Caching can help reduce the exposure to these changes
- Make it possible to change the implementation (Address cleansing, or additional data like Census Tract)

Why we love address cleansing

- Sending Mail
- Shipping Vaccines
- Matching data coming into the system
- Data Consolidation
- Family Grouping
- *Statistics Mapping

Smarty Streets

- Free through AIRA
- Outstanding Support
- High Availability
- Very Fast! (surprisingly fast)

