

Building Open Source Projects in Government Esri Ecosystems

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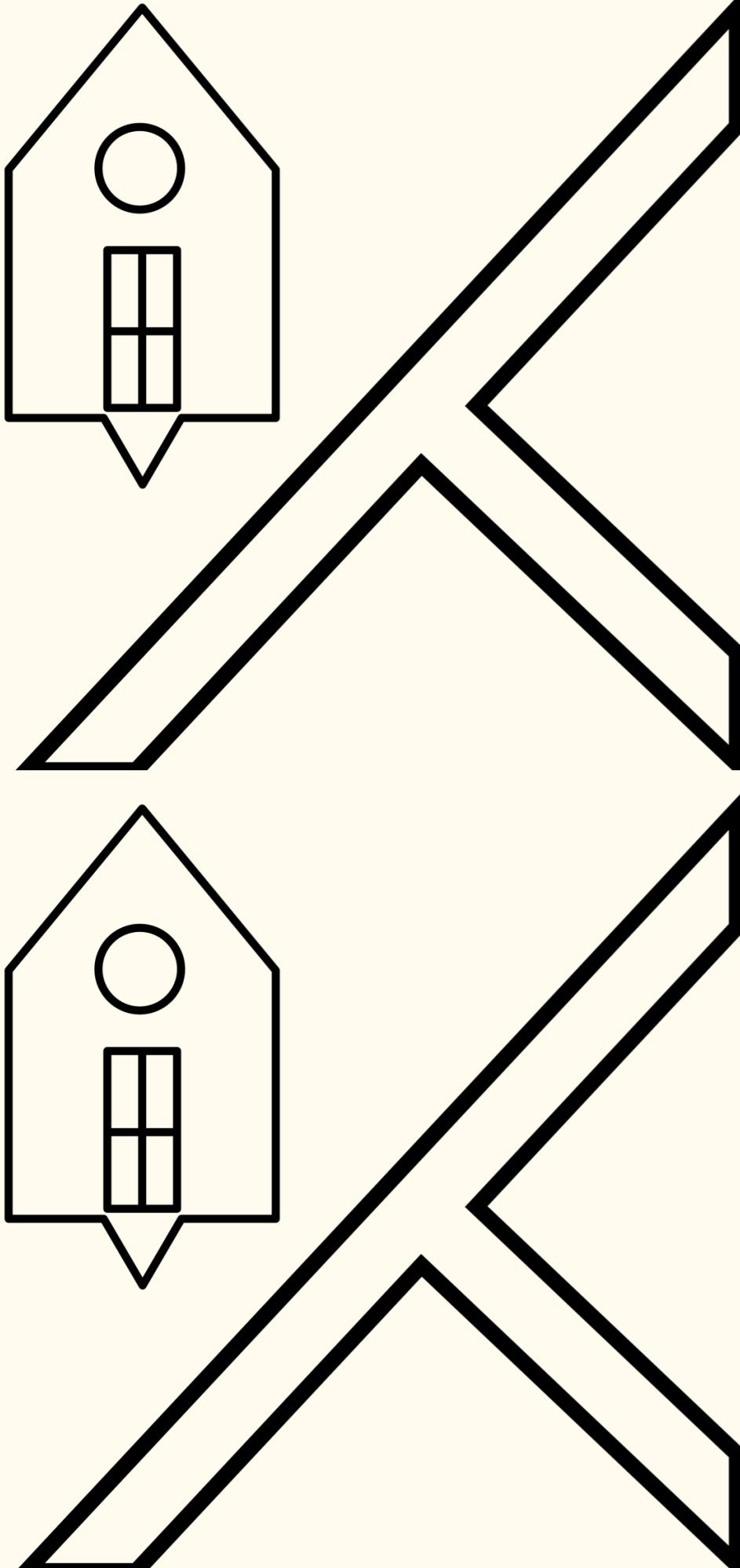
This talk is about
building open
source web
applications
with government
GIS data.



Every day at **Code for America**, we work with local governments on applications that:

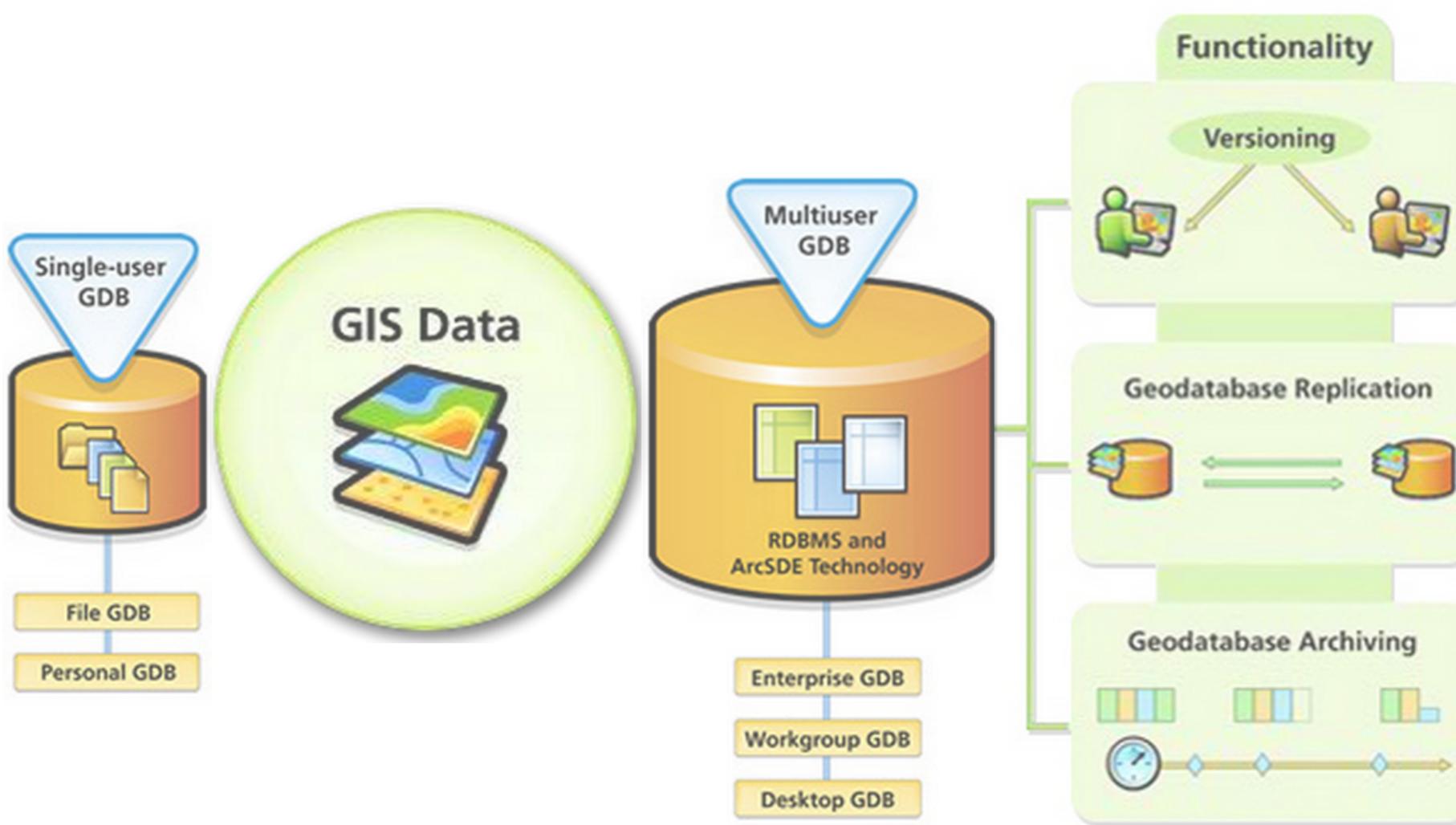
- use **open data** from a variety of sources;
- are typically **constituent-facing web applications**;
- are **manageable** by the city;
- **attack** government problems with small, technological solutions;
- encourage the civic technology community to stay **active**; and
- are designed to stay **updated** and **sustained**.





Esri is clearly the dominant vendor in enterprise GIS. Civic technologists just need to learn how to play nice with it.

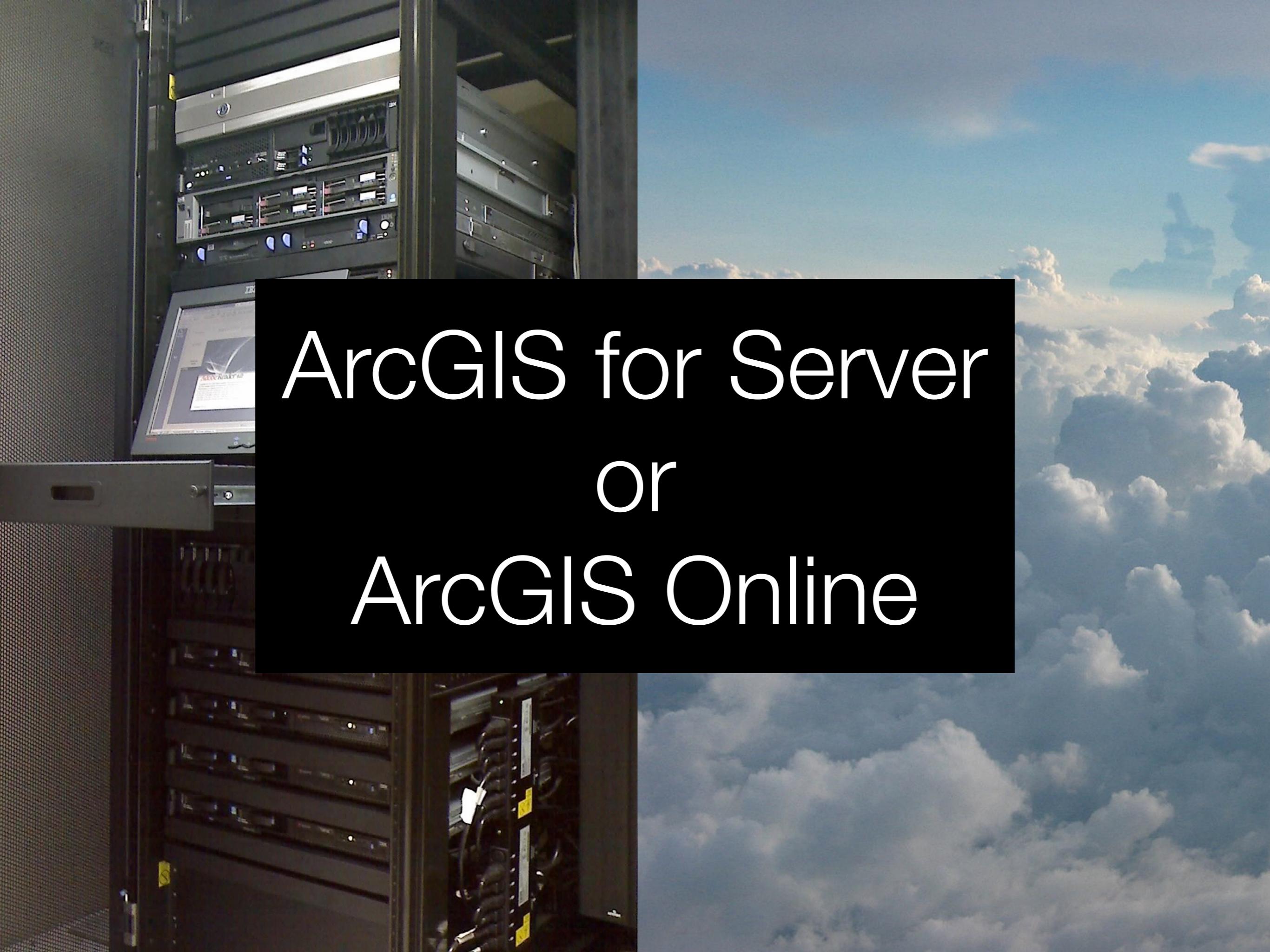
So let's talk about how
we can build an open-
source web application
inside of an Esri
technology stack.



STEP ONE:
Understand the ecosystem infrastructure.

DISCLAIMER:

I am neither a backend developer nor a sysadmin.
I just like GIS and maps and open source.
Take everything I say with a grain of salt.



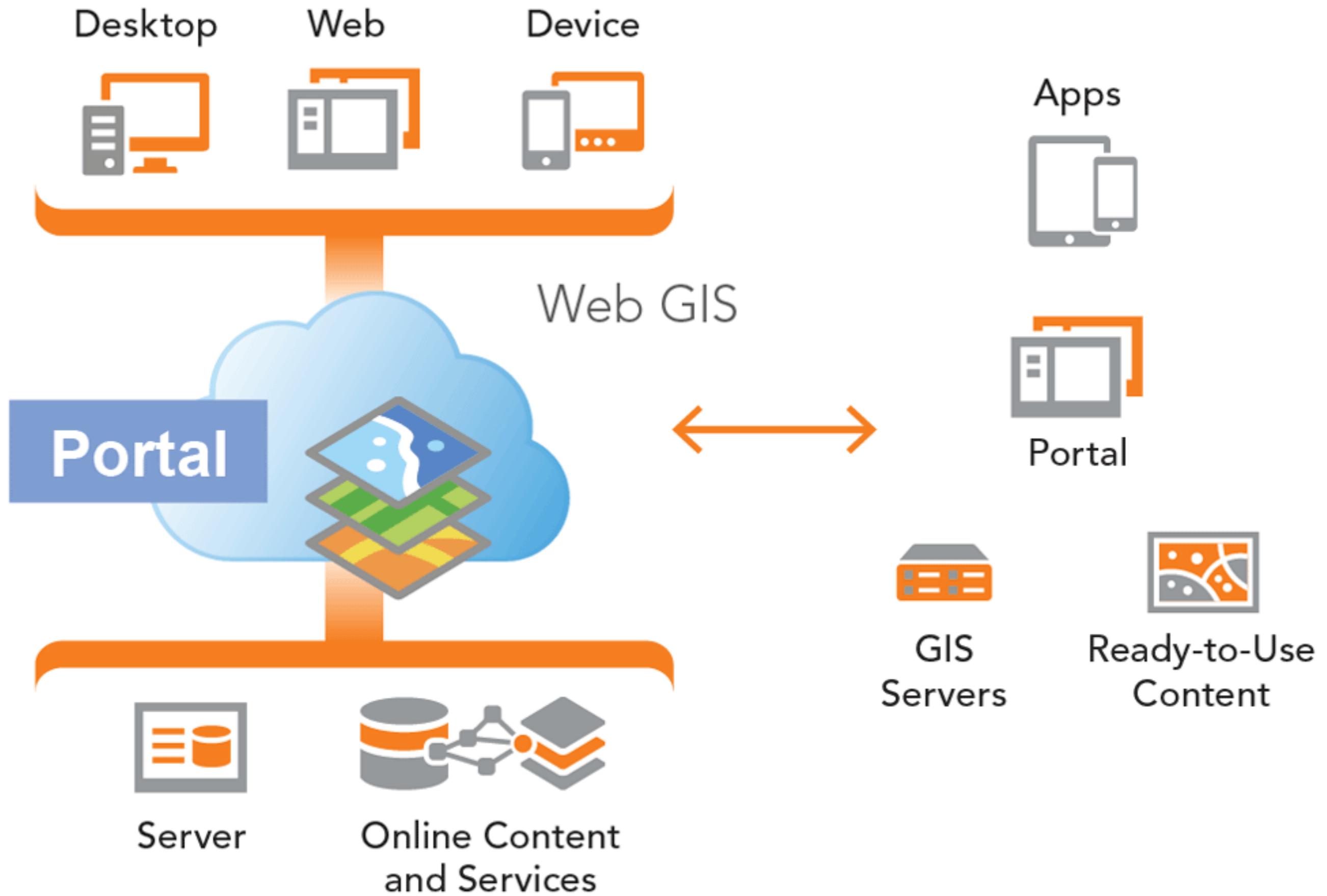
ArcGIS for Server
or
ArcGIS Online

Web applications

==

web access to data.

(Plus: open.)

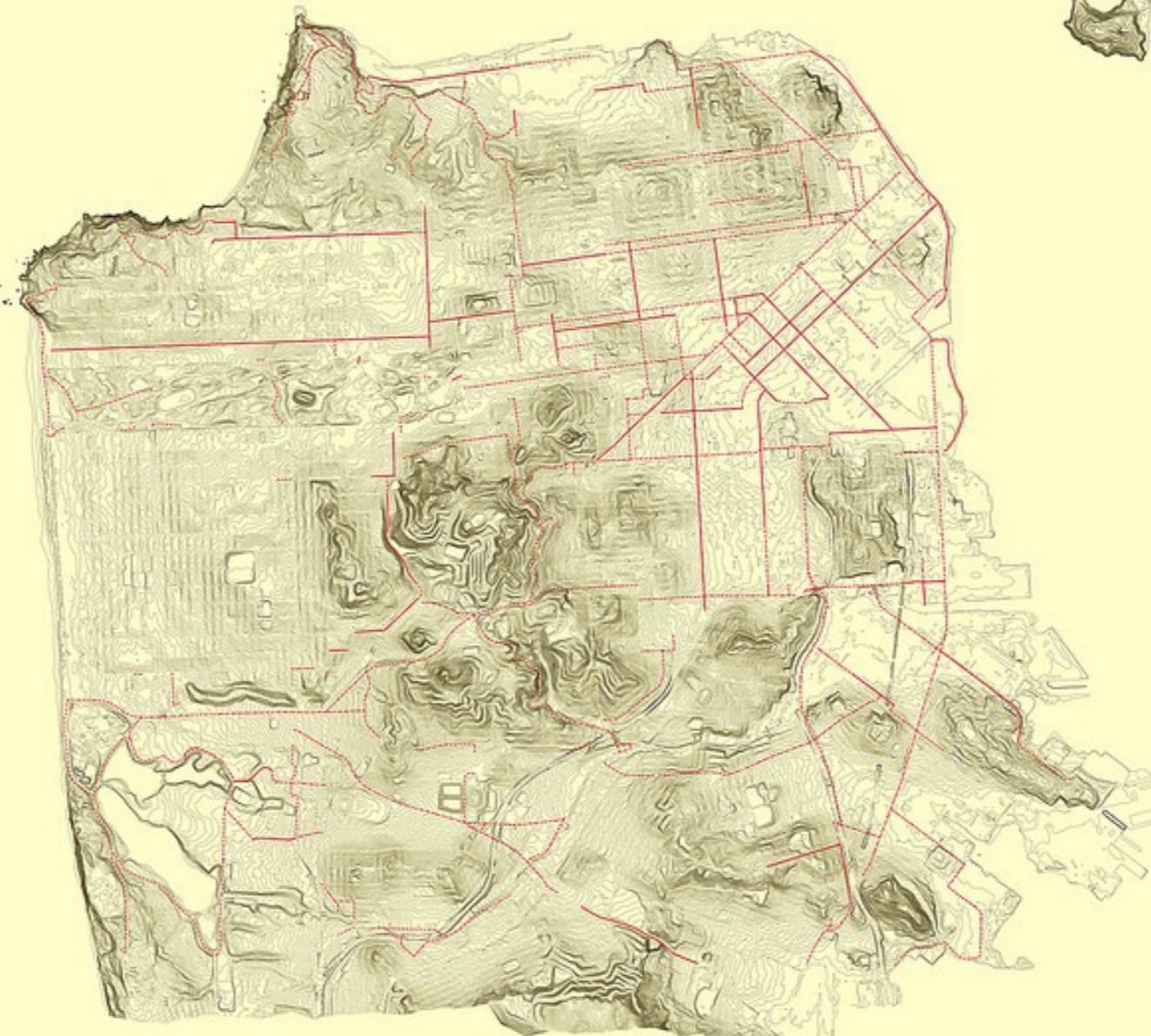


The main idea:
Use what you have.
DO LESS.



SAN FRANCISCO

changes in elevation and bike routes



STEP TWO:

Identify the data you need for your project.



CHPA

CERTIFIED HIPAA
PRIVACY ASSOCIATE

TM

NOTE: Is the data you want protected?

NOTE: Does the data you want have information that can't be shared in bulk?

NOTE: Who owns the data?

NOTE: How is the data stored?



STEP THREE:
Enable access to the data.



Understanding our world.

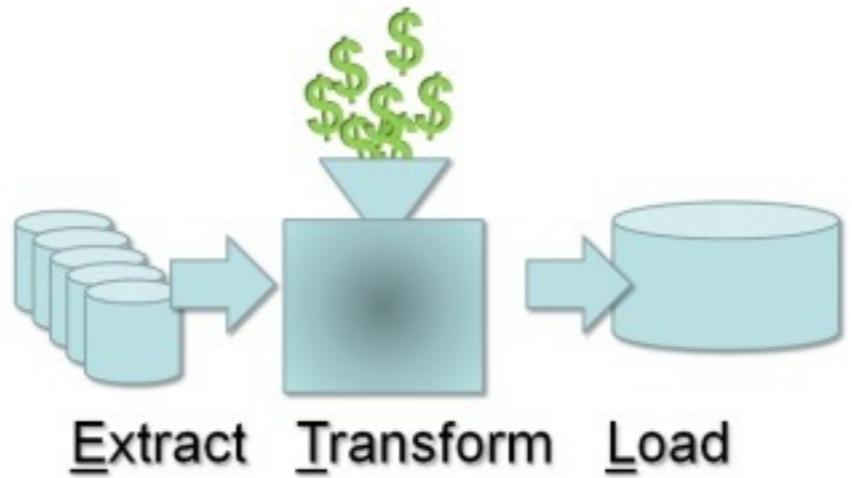
GeoServices REST Specification

With ArcGIS Online, you can
**publish hosted, publicly-
accessible layers**, which
enables **API access**.

<http://bit.ly/esri-publish>



Open data portals, too.



STEP FOUR:

Extract, transform, load
(celebrate)

ArcGIS REST Services Directory

[Home](#) > [services](#)

[JSON](#) | [SOAP](#)

Folder: /

Current Version: 10.2

View Footprints In: [ArcGIS.com Map](#)

Folders:

- [Canvas](#)
- [Demographics](#)
- [Elevation](#)
- [Ocean](#)
- [Reference](#)
- [Specialty](#)
- [Utilities](#)

Extract.

GEOJSON

GeoJSON is a format for encoding a variety of geographic data structures.

```
{  
  "type": "Feature",  
  "geometry": {  
    "type": "Point",  
    "coordinates": [125.6, 10.1]  
  },  
  "properties": {  
    "name": "Dinagat Islands"  
  }  
}
```

GeoJSON supports the following geometry types: Point, LineString, Polygon, MultiPoint, MultiLineString, and MultiPolygon. Lists of geometries are represented by a GeometryCollection. Geometries with additional properties are Feature objects. And lists of features are represented by a FeatureCollection.

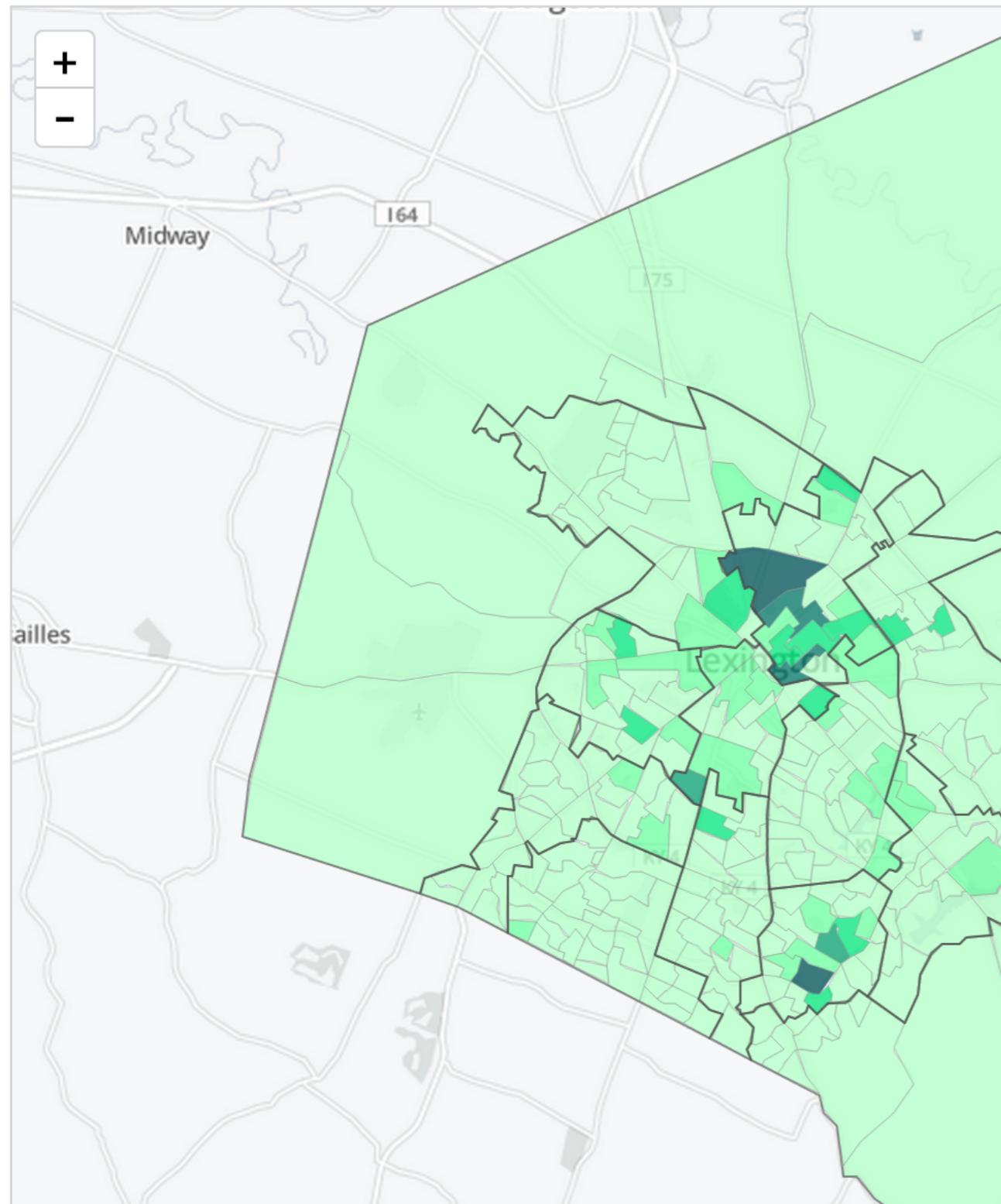
Learn More

See the [full specification](#) for more detail.

Transform.

Lexington Housing Dashboard

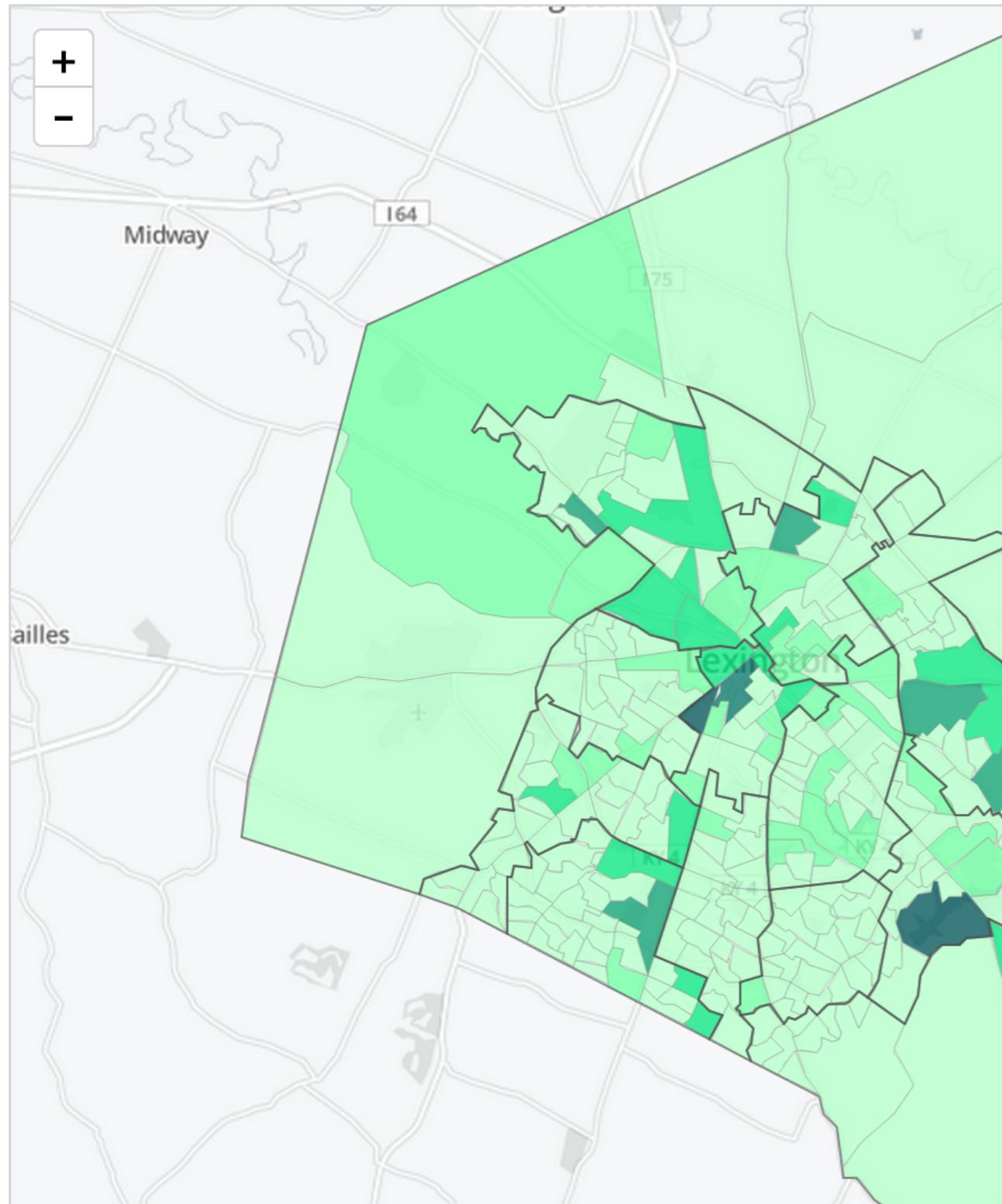
Explore neighborhood housing trends in your area.



Load.

Lexington Housing Dashboard

Explore neighborhood housing trends in your area.



Repeat.



CITYGRAM

<http://seattlegram.herokuapp.com>

Subscribe to your city.

Get updates on the topics and areas you care about in Seattle.

Get started

1. Select a topic.

Choose one to start, and you can add more later.

911 Fire
Dispatches

Code
Violations

Building
Permits

Electrical
Permits

Land Use
Permits

EXAMPLE #1: Citygram and Spyglass

1. Select a topic.

Choose one to start, and you can add more later.

911 Fire Dispatches



Code Violations



Building Permits



Electrical Permits



Land Use Permits

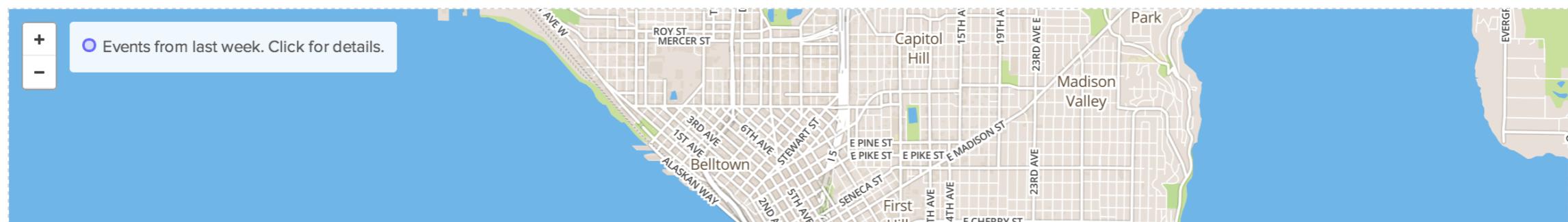


2. What's your address?

Your home, your work, or wherever's important to you.

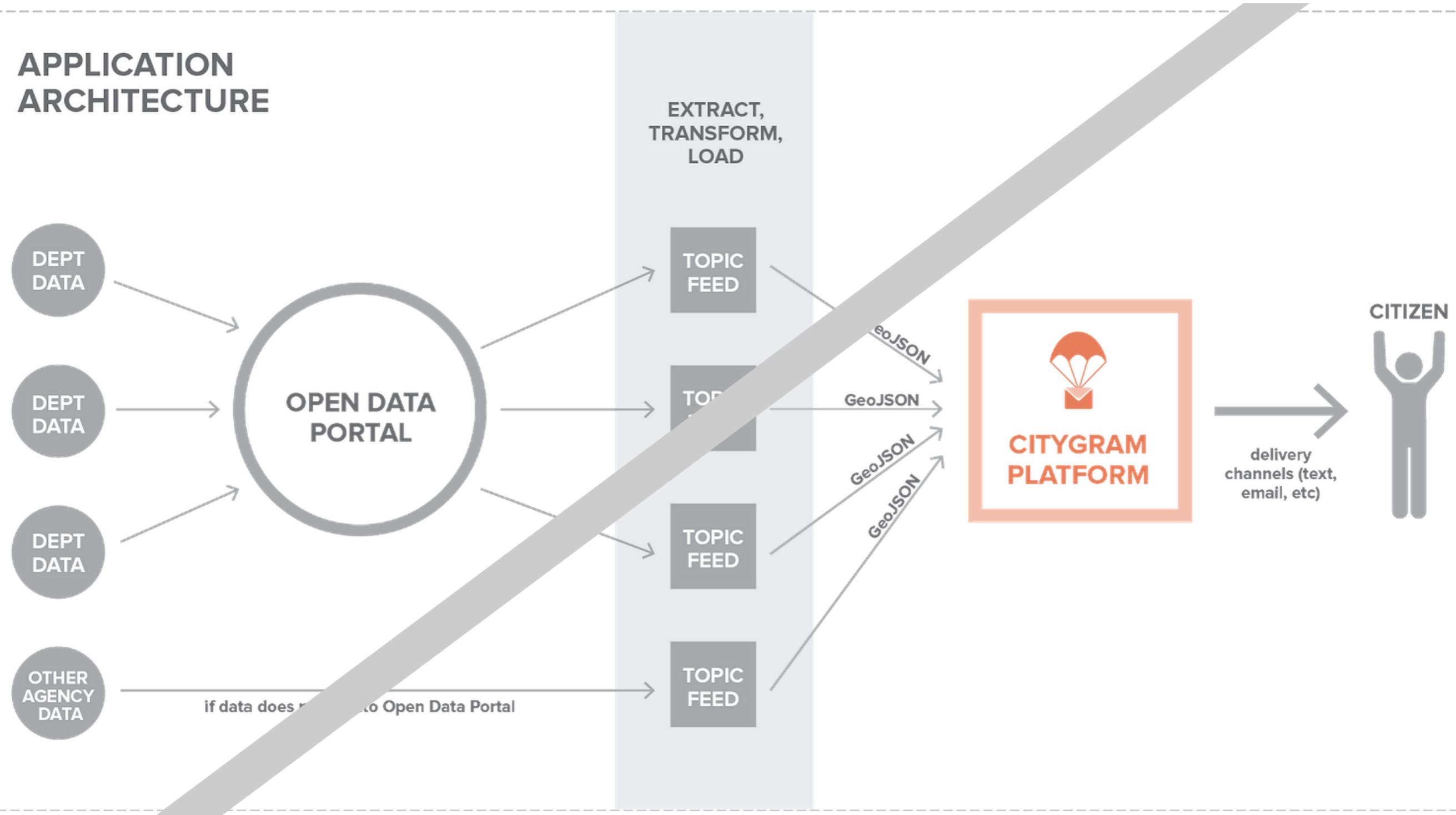
Your address

Within a 1/4 mile (about a 5 min leisurely stroll)



Citygram: location-based, opt-in text message
and email notifications about city services.

APPLICATION ARCHITECTURE



Spyglass: ETL layer that pulls data from APIs, conforms data for use in Citygram (to GeoJSON), caches data.

OpenTrails Tools

<http://open-trails.herokuapp.com>

Create open data for your region's trail system, ready for use across the web.

This tool is incomplete and under active development. [Learn More on Github.](#)

Convert data to OpenTrails

This tool **converts Shapefiles to OpenTrails**.

Our converter tool transforms shapefiles into the OpenTrails format, which is a suite of GeoJSON and CSV files. The tool offers helpful feedback if there are problems, and suggestions about how to make the most of OpenTrails data.

Convert Your Data

Validate OpenTrails data

This tool **validates OpenTrails GeoJSON and CSV files**.

Upload your various OpenTrails data, and this tool will evaluate its conformance with the [OpenTrails specification](#). The tool provides helpful feedback about how to update your data to meet the specification, and by extension, the expectations of third party developers and data consumers.

Validate Your Data

EXAMPLE #2: OpenTrails Data Converter

OpenTrails Data

A home for the OpenTrails Data community.

<http://opentraildata.org>



Parks and trails are a cornerstone of public health and quality of life. The Open Trail System Specification (OpenTrails) helps citizens get outdoors to enjoy them.

This page was generated
Pages using the Archit
Jason Long.

// What is OpenTrails?

The Open Trail System Specification (OpenTrails) defines a simple, common format for public trails and associated geographic information. OpenTrails allows public land agencies to publish their trail data and developers to write applications that consume that data in an interoperable way.

// How Do I Get Started?

- [Preview the Spec](#)

OpenTrails: A data standard for enabling parks to undertake quality digital user experience design.

OpenTrails Converter



First: Upload your trail segment shapefile.

No file chosen

Note: data uploads make take a minute on poor connections.

ZIP up your shapefile

Upload a **zipped** shapefile that describes your trail system. This data should be a 'polyline' shapefile of features that represent the actual paths your trails take.

As you probably know, a "shapefile" is actually a set of several files. To use this converter, we require the following files be included in a single zipped upload:

What we expect from your data

This converter tool makes a number of assumptions about the data you upload. The tool is **under active development**, and as such currently supports only a narrow range of all trail data.

- This tool expects to receive a shapefile with many features, each representing a segment of trail.

OpenTrails Converter: A tool for converting trail data (shapefiles) to OpenTrails format.

<http://lexington-geocoder.herokuapp.com>

Lexington Address Service



332

```
{"type": "Feature", "geometry": {"type": "Point", "coordinates": [-84.5227488097614, 38.07336776393766]}, "properties": {"formatted_address": "332 HILLSBORO AVE", "parcel_id": "43922200"}}

{"type": "Feature", "geometry": {"type": "Point", "coordinates": [-84.46761233620924, 38.045286856330335]}, "properties": {"formatted_address": "332 HILLCREST AVE", "parcel_id": "12752150"}}
```

EXAMPLE #3: Lexington Geocoder



Lexington Geocoder: Uses open parcel data and ElasticSearch to do fuzzy matching on addresses.

You can see many more projects and examples on **Code for America's GitHub**:
[http://github.com/
codeforamerica](http://github.com/codeforamerica)



Other considerations:

- Hosting applications
- Changing infrastructure and data storage
- Relationship management



SHAMELESS PLUGS:

Code for America Brigades and
Maptime chapters can help!

<http://codeforamerica.org/brigade>

<http://maptime.io>



This talk was
about building
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with government
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It is not that
difficult, and
certainly not
impossible.



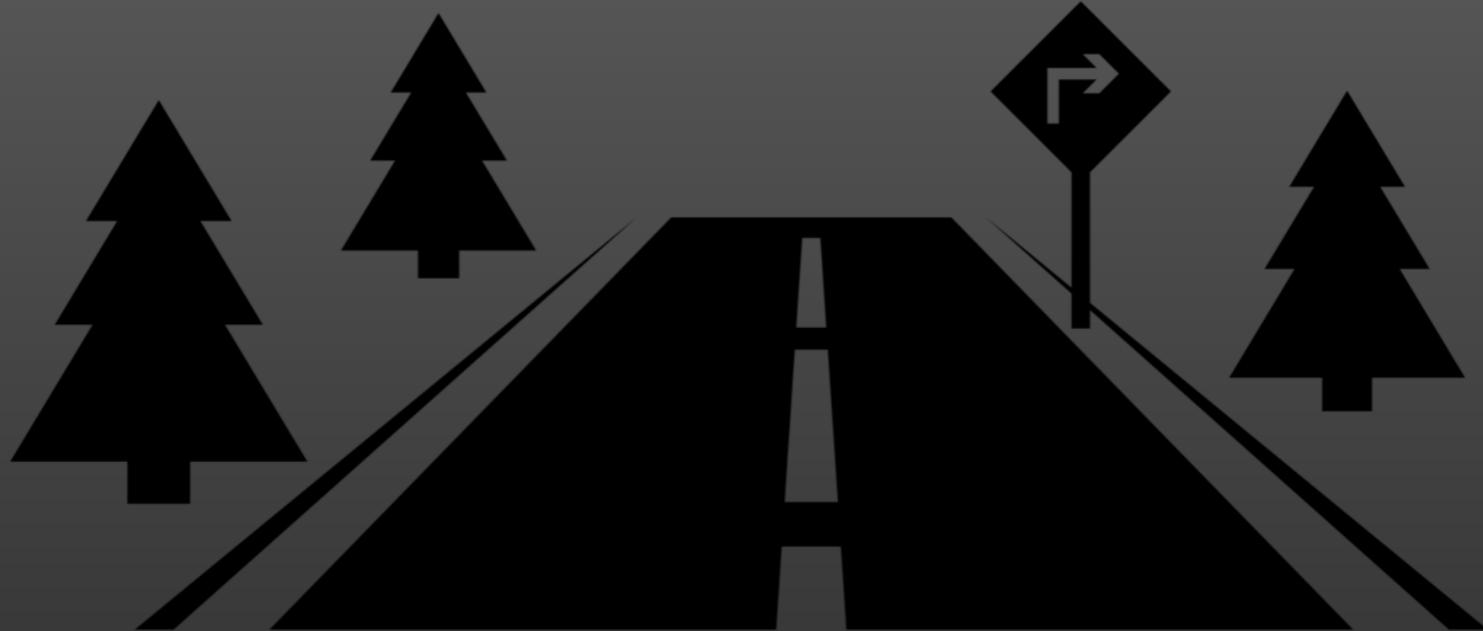
Opening government
data is a big deal.

You are a champion.

Keep doing the
hard work.

It's worth it.





Thanks!

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Slides: <http://lizidiamond.com/foss4g-talk-slides>

Come to the **Maptime** party tonight!