

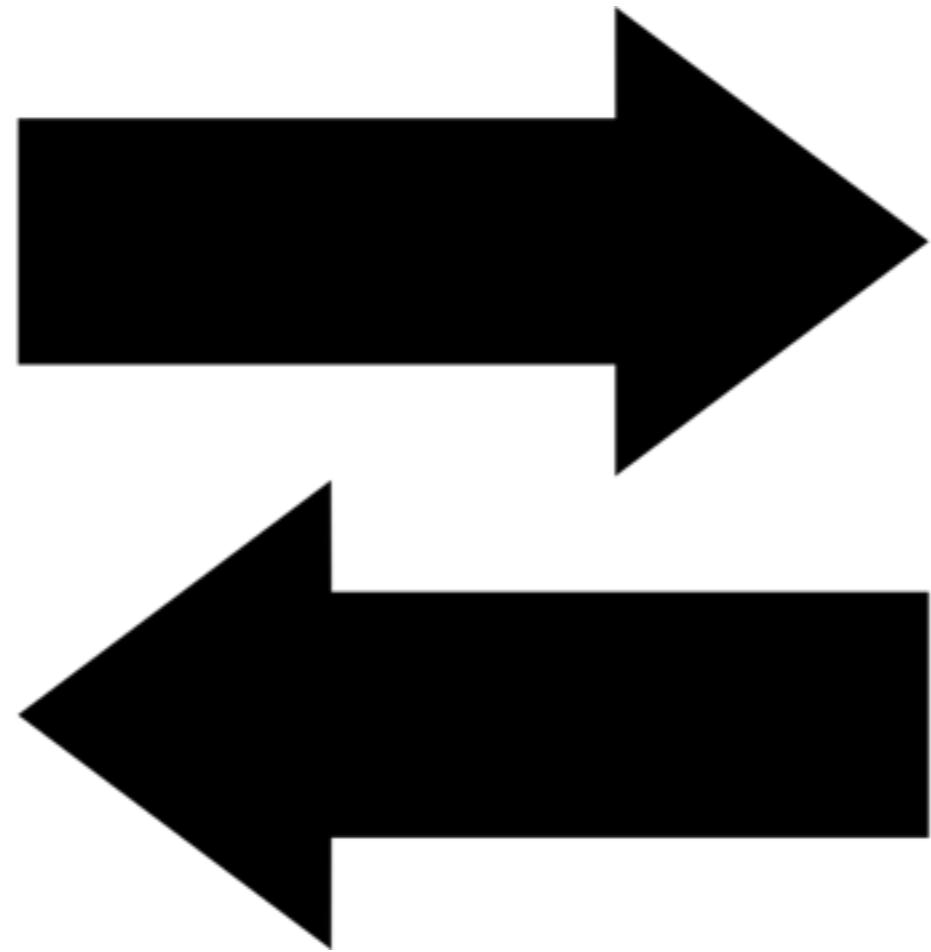
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# Building Open Source Projects in Government Esri Ecosystems

Lyzi Diamond  
FOSS4G 2014 | Portland, OR | September 10, 2014

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



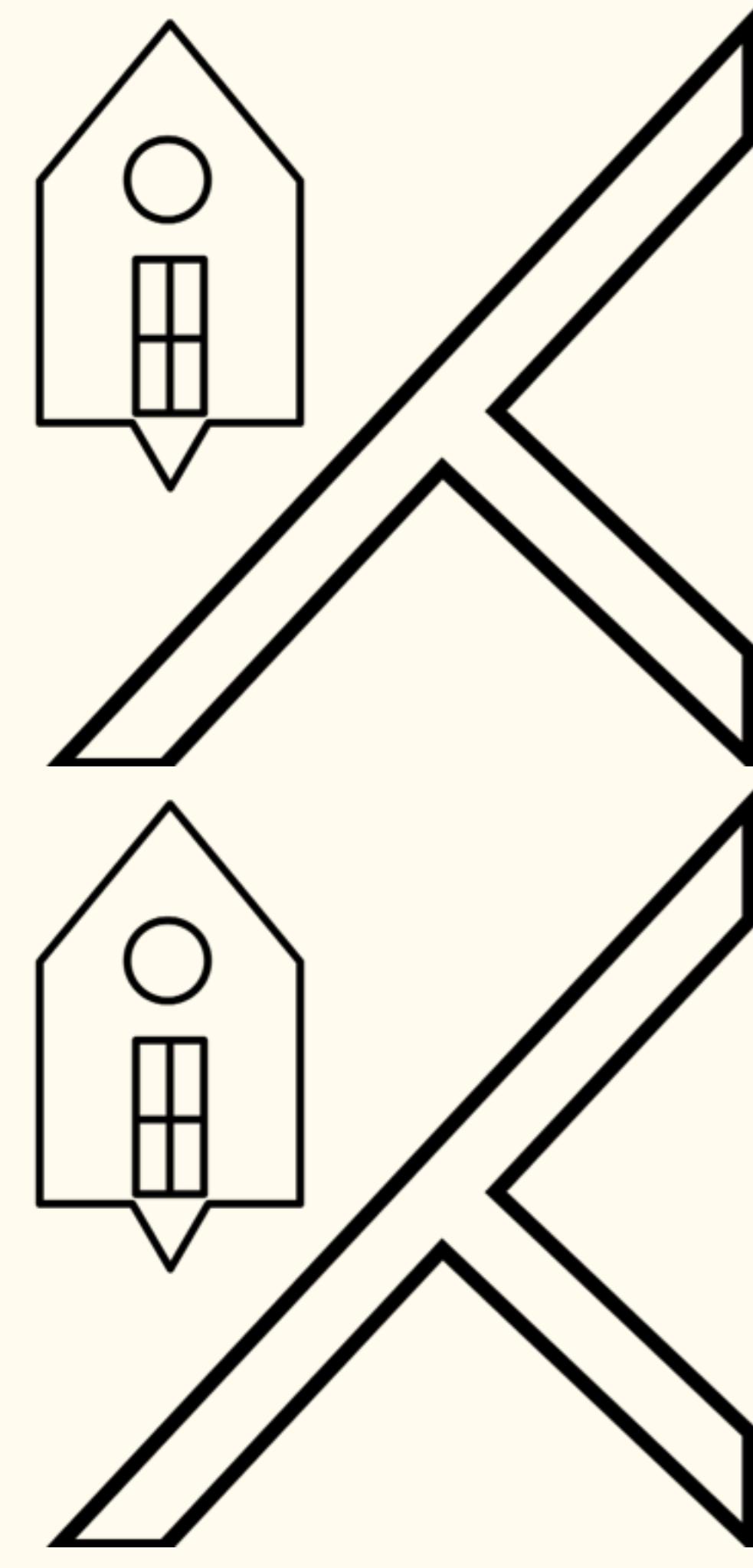


This is a two-way street.

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

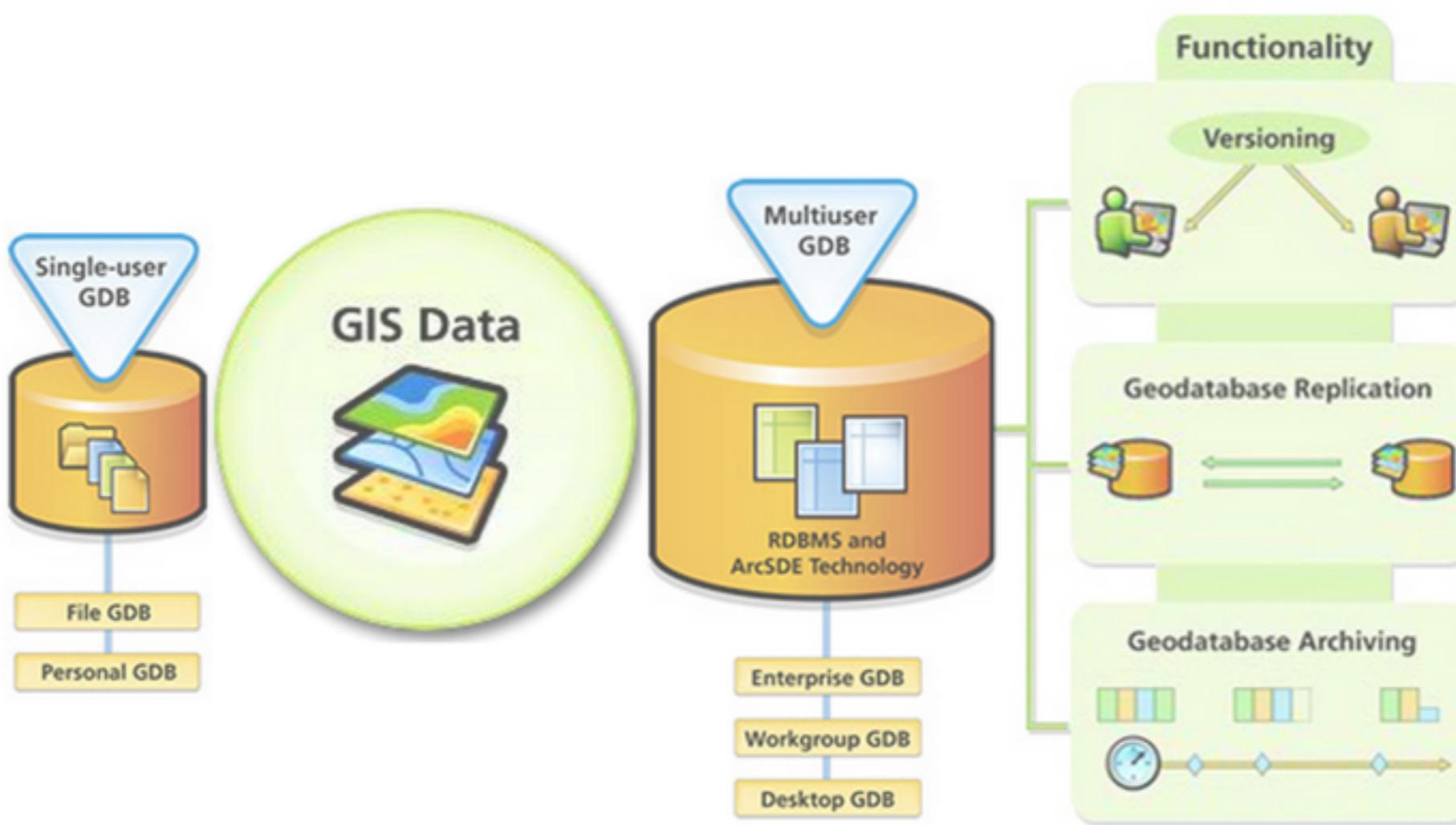
- use [open data](#) from a variety of sources;
- are typically [constituent-facing web applications](#);
- are [manageable](#) by the city;
- [attack](#) government problems with small, technological solutions;
- encourage the civic technology community to stay [active](#); and
- are designed to stay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



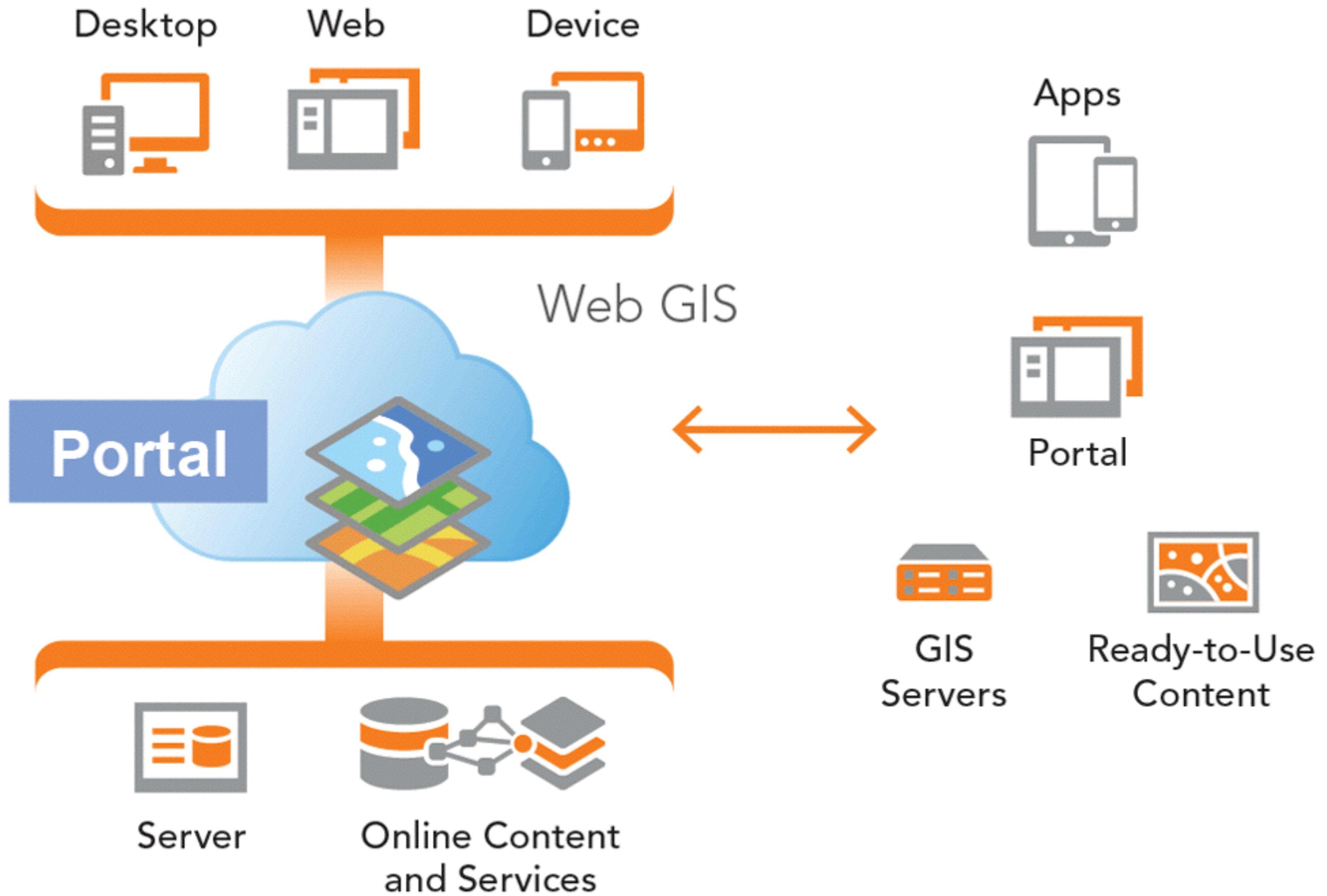
ArcGIS for Server  
or  
ArcGIS Online

# 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

**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.

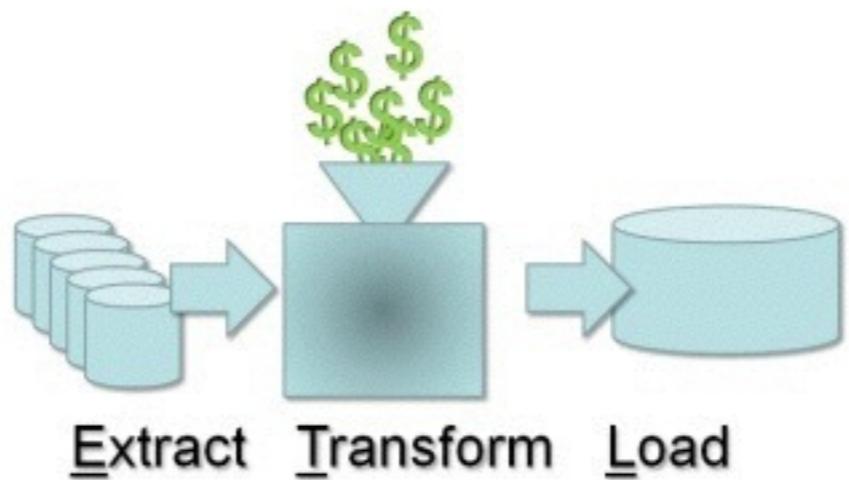
# GeoServices REST Specification

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`.

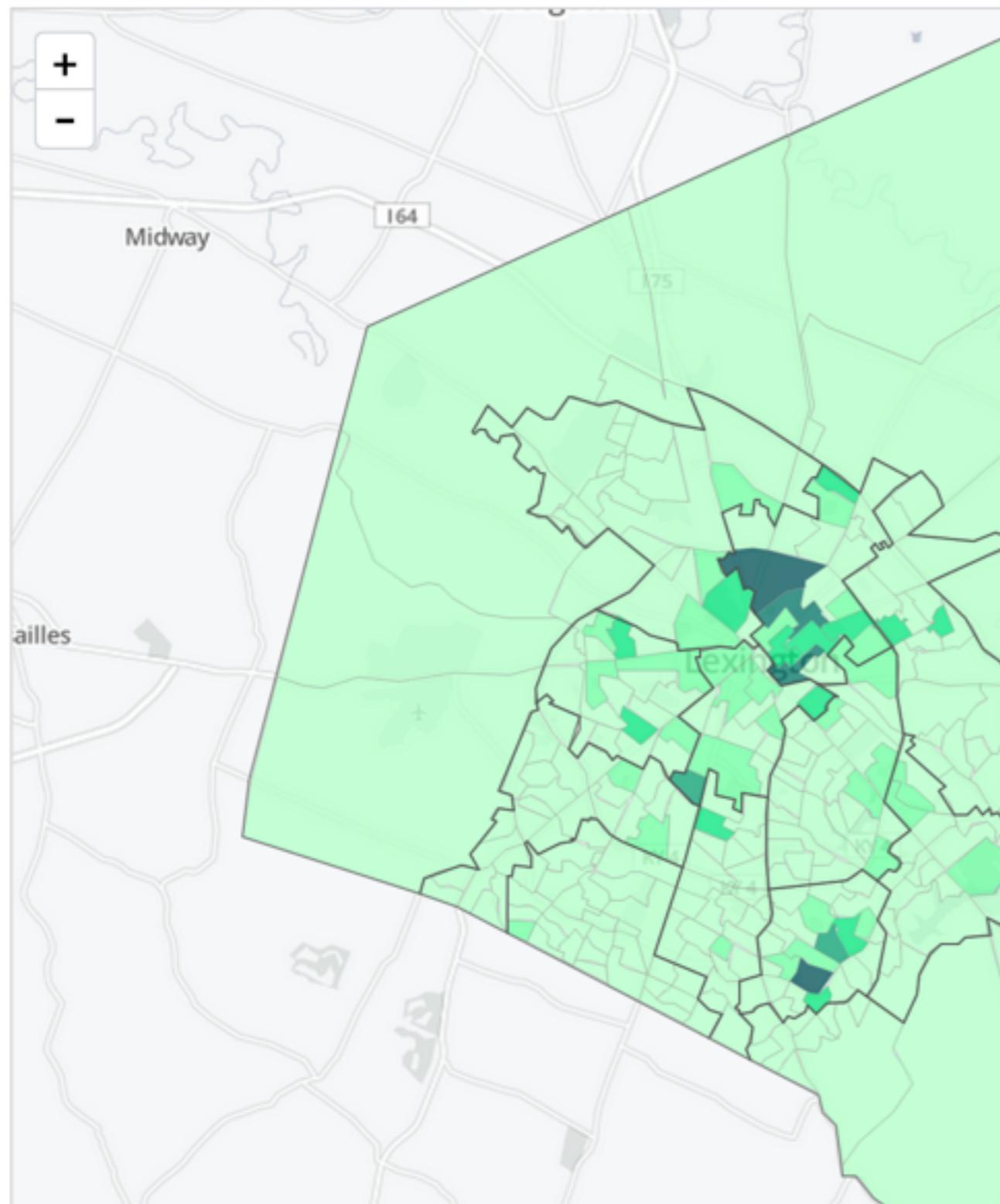
## Learn More

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

# Transform.

# Lexington Housing Dashboard

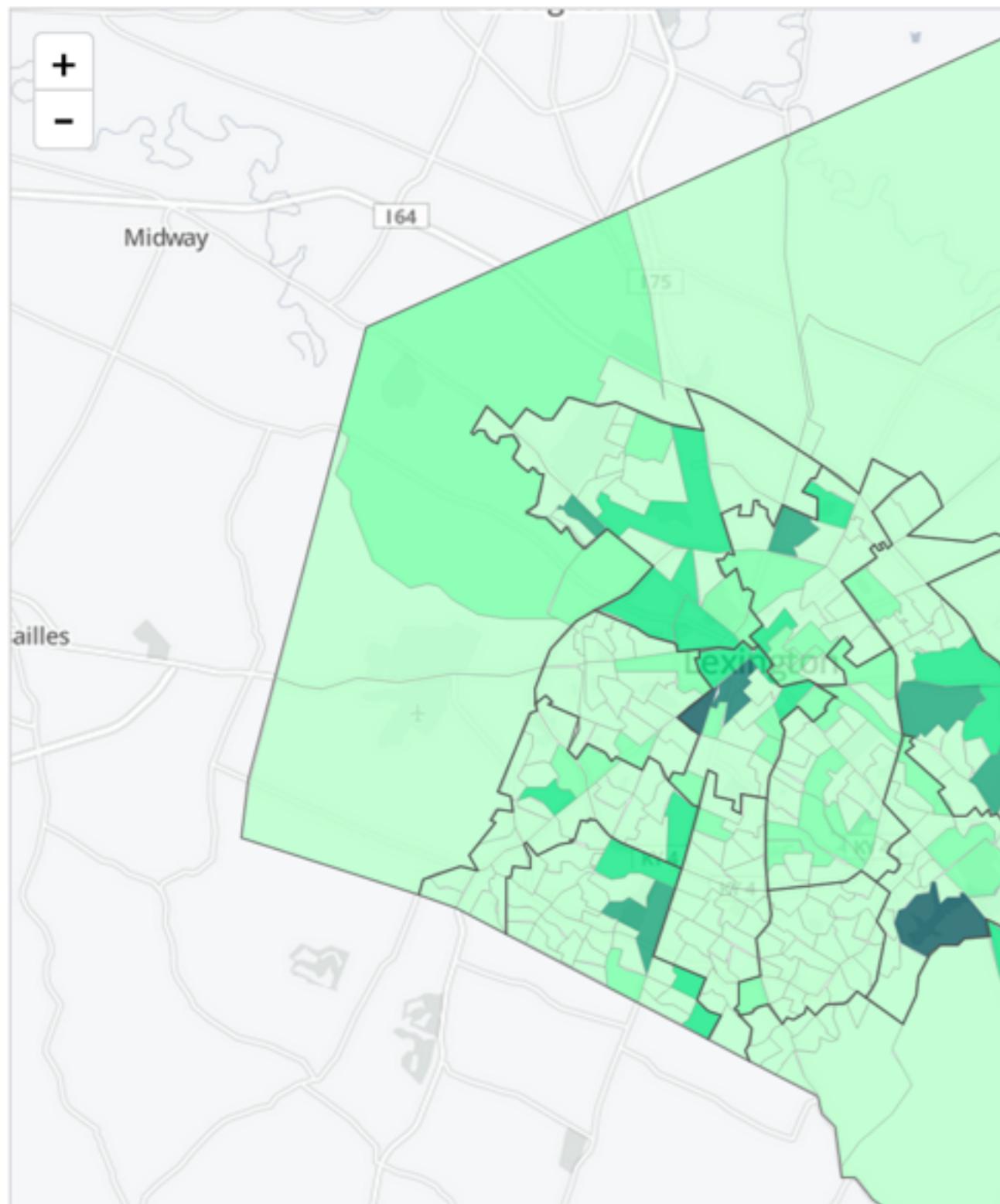
Explore neighborhood housing trends in your area.



**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

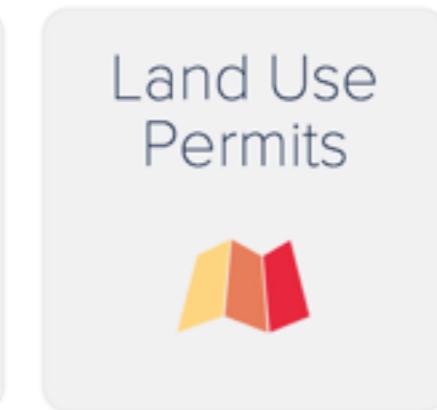
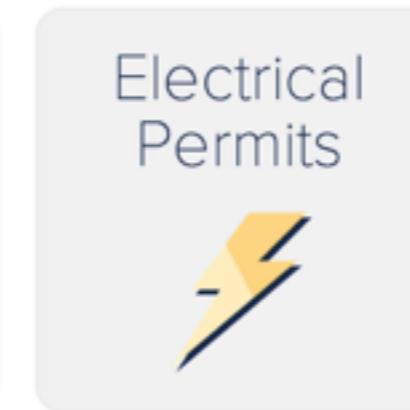
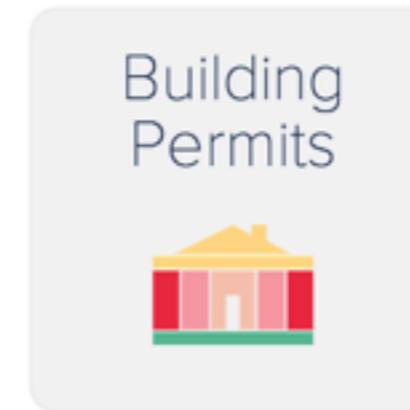
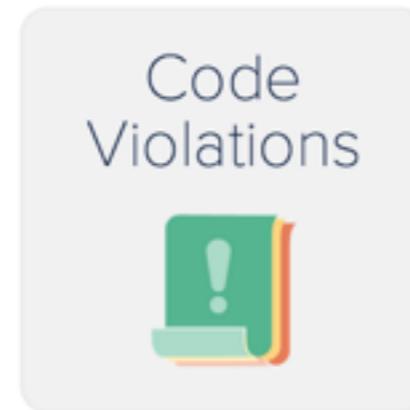
Electrical  
Permits

Land Use  
Permits

**EXAMPLE #1:** Citygram and Spyglass

## **1. Select a topic.**

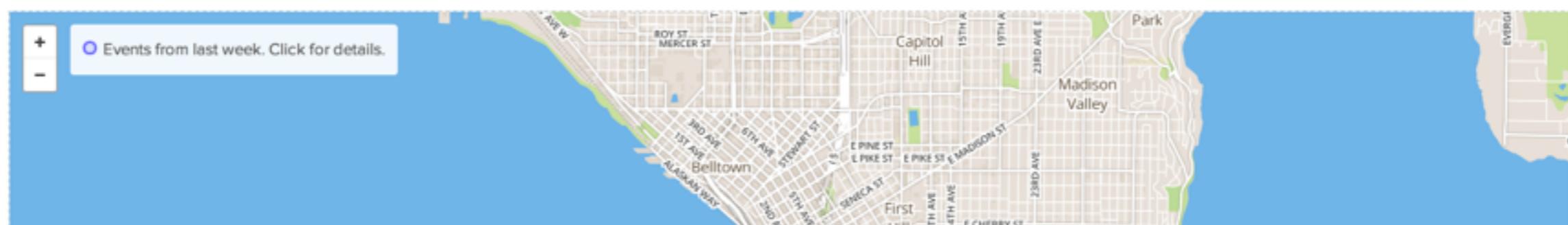
Choose one to start, and you can add more later.



## 2. What's your address?

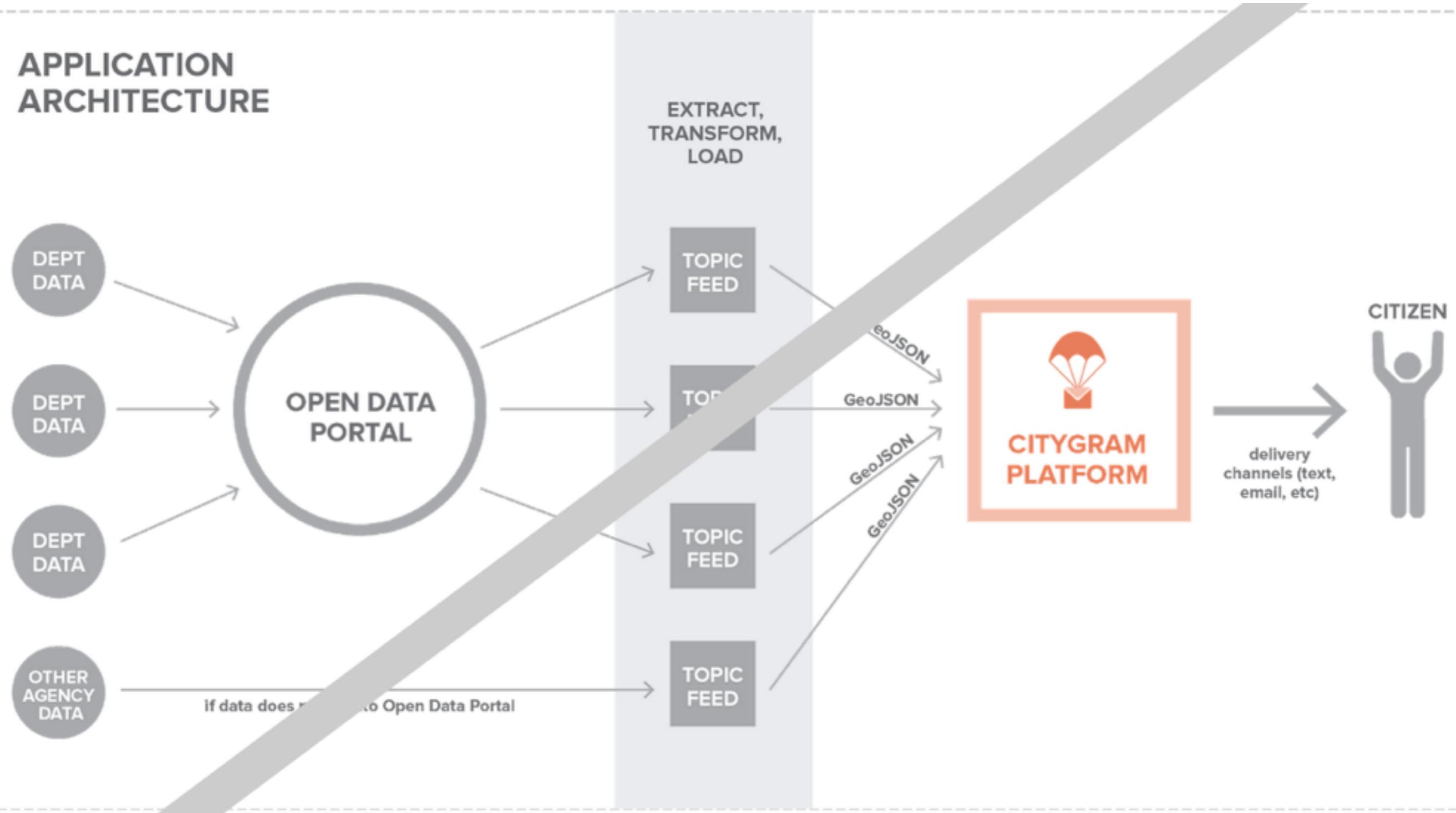
Your home, your work, or wherever's important to you.

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 by [Pages](#) using the Architecture by [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  
open source web  
applications  
with government  
GIS data.



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.**





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# Thanks!

**Lyzi Diamond** | [@lyzidiamond](https://twitter.com/lyzidiamond) | [lyzi@codeforamerica.org](mailto:lyzi@codeforamerica.org)  
Slides: <http://bit.ly/lyzi-foss4g>

Come to the **Maptime** party tonight!