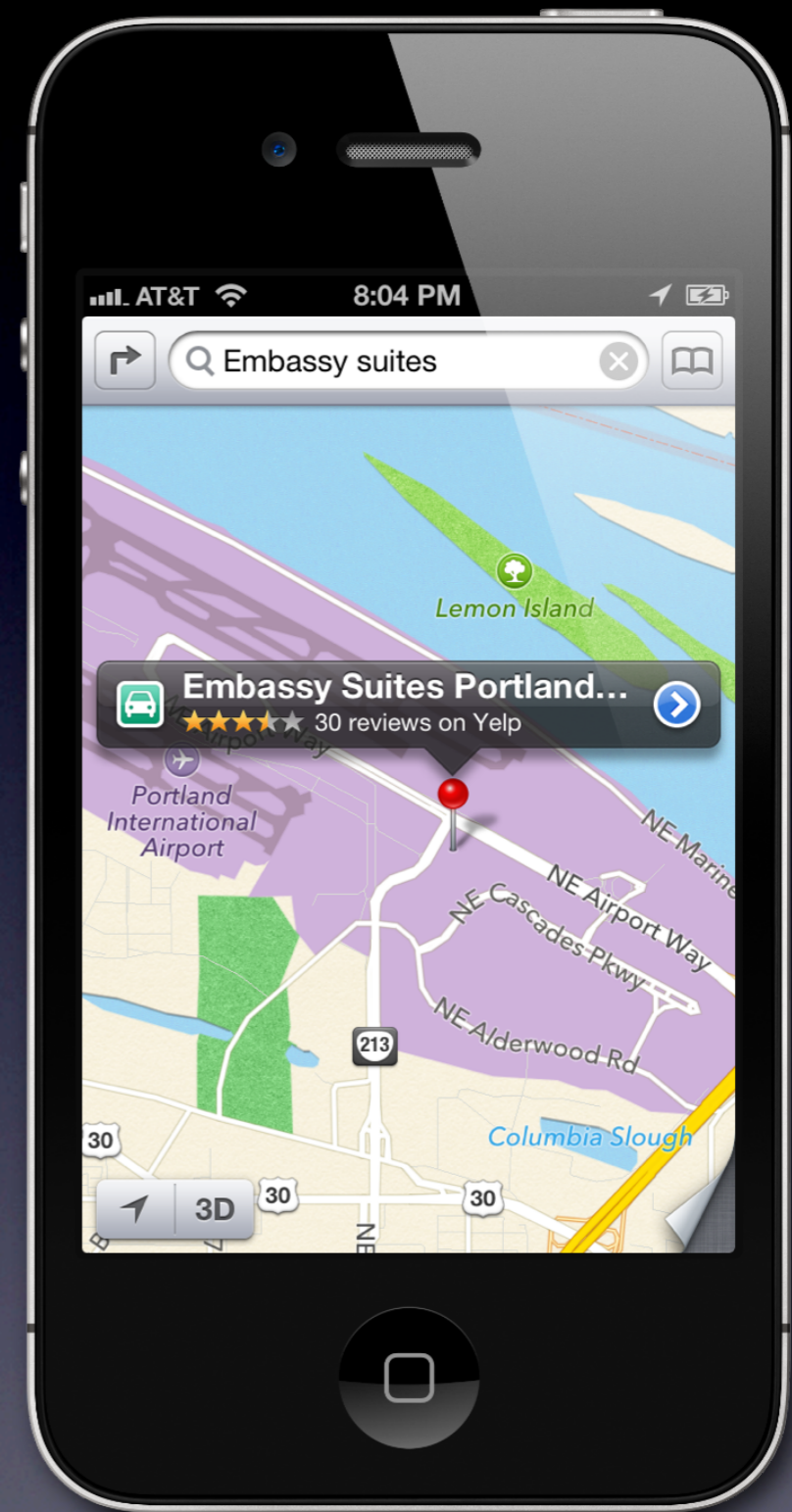


# Getting To The Point With MapKit

Justin Miller • MapBox  
CocoaConf PDX  
August 2013



# About Me

- Mac tech since 2002
- Cocoa since 2004
- iOS at MapBox since 2010
- Bit of Mac, too



# About MapBox

- Cloud service for custom maps at scale
- Tools for making & sharing maps
- *All the code we make is open source*
  - 126 public repos as of today



# MapKit Intro

- iOS 3: intro
- iOS 4: overlays
- iOS 5: user tracking
- iOS 6: vector
  - Implementation detail
- iOS 7: Good Stuff™



# MapKit Intro

- Platforms
  - iOS almost from the start
  - But also: soon, the Mac!

# MapKit Intro



## Maps

Now at a new destination. Your Mac.

Now you've got the whole world on your desktop. The Maps app lets you use every pixel of your display to explore new destinations, and it takes full advantage of the graphics power of your Mac. So zooming is incredibly smooth and responsive. Text and details are crisp and easy to read. And you get gorgeous views such as Flyover, a photo-realistic, interactive 3D experience that lets you soar high above select cities. Maps makes it simple to get information on local points of interest like restaurants and hotels, showing you phone numbers, photos, and even Yelp reviews. It's also easy to get there on time, thanks to point-to-point directions, real-time traffic conditions, and suggested alternate routes. When you're ready to go, send your map to your iPhone for voice navigation on the way.<sup>3</sup> With OS X Mavericks, maps are built into Mail, Contacts, and Calendar, too. So wherever you see an address, you can see it on a map, just like that.

Features

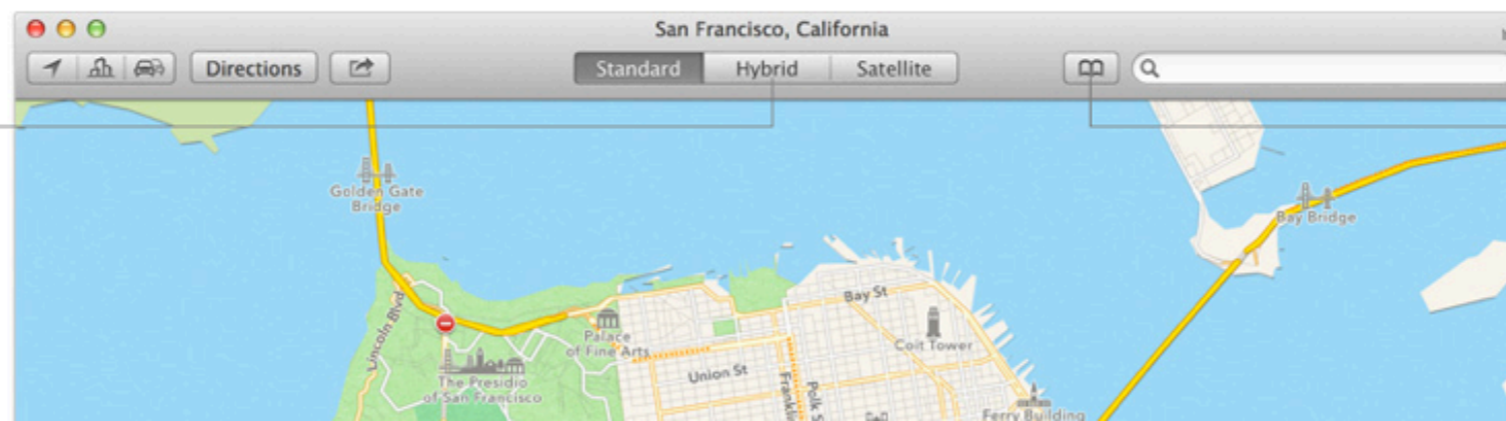
Flyover

Local Search

Send to iOS

### Your choice

Three ways to get the lay of the land: standard, hybrid, and satellite views.



### Bookmarks

Visit your favorite places with a click.

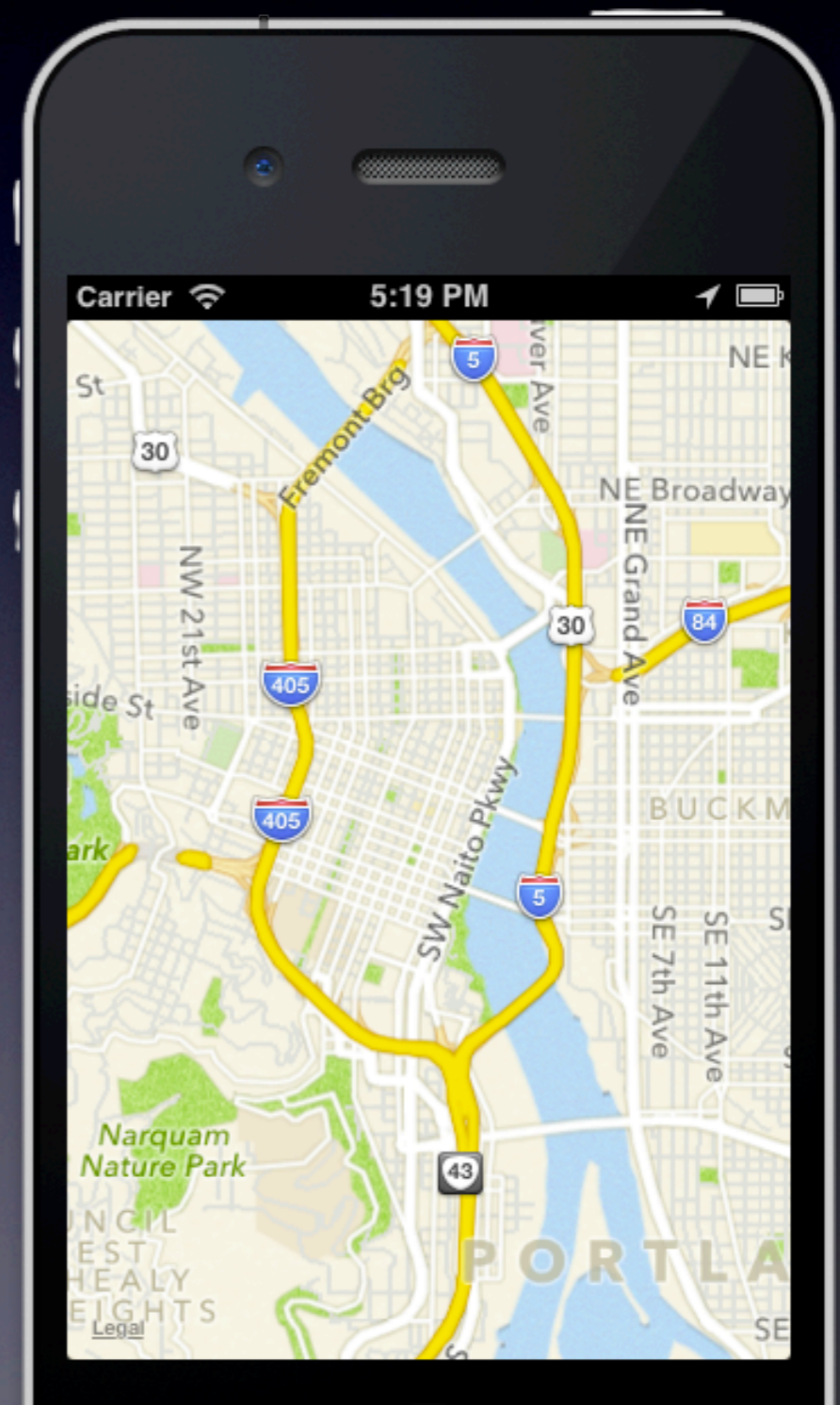
# MapKit Intro

- Dancing around the NDA
- Come talk to me afterwards
- And/or check the ADC site



# Basic UI Parts

- Map view
  - *“Show me a map!”*
- Annotations & overlays
  - *“Put stuff on my map!”*
- User location services
  - *“Put me on my map!”*

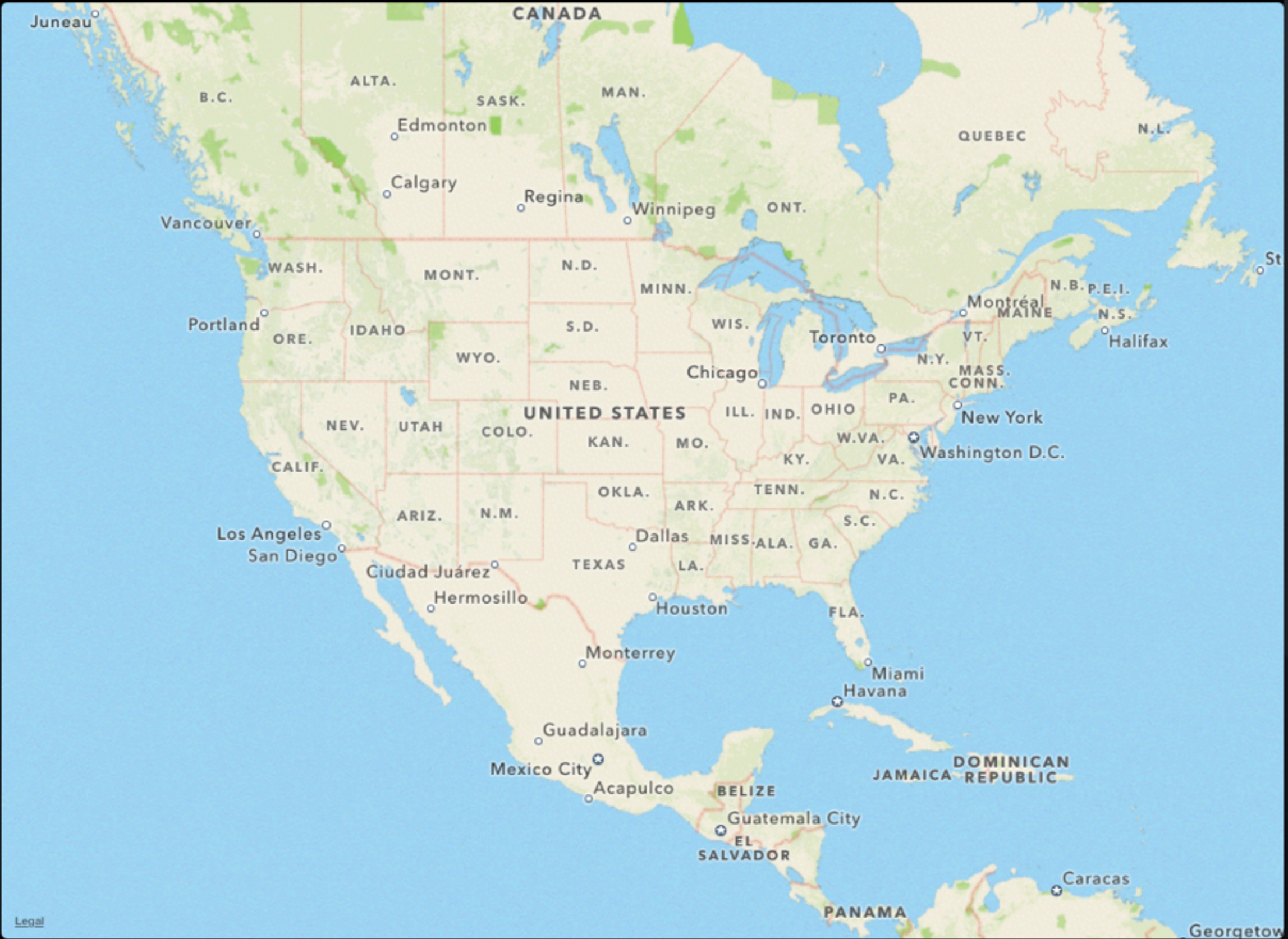




# Map Views

- **MKMapView**
- Scrolling, zooming content view
- Very basic styling
  - Regular, satellite, and hybrid modes
- Finicky offline support

# Map View Demo



# Annotations & Overlays

- Separation between model & view
  - Add annotation & overlay objects to map
  - Map delegate supplies views
    - Not always needed
    - Regardless, drawn when on screen
  - This allows for efficient display & reuse

# Annotations & Overlays

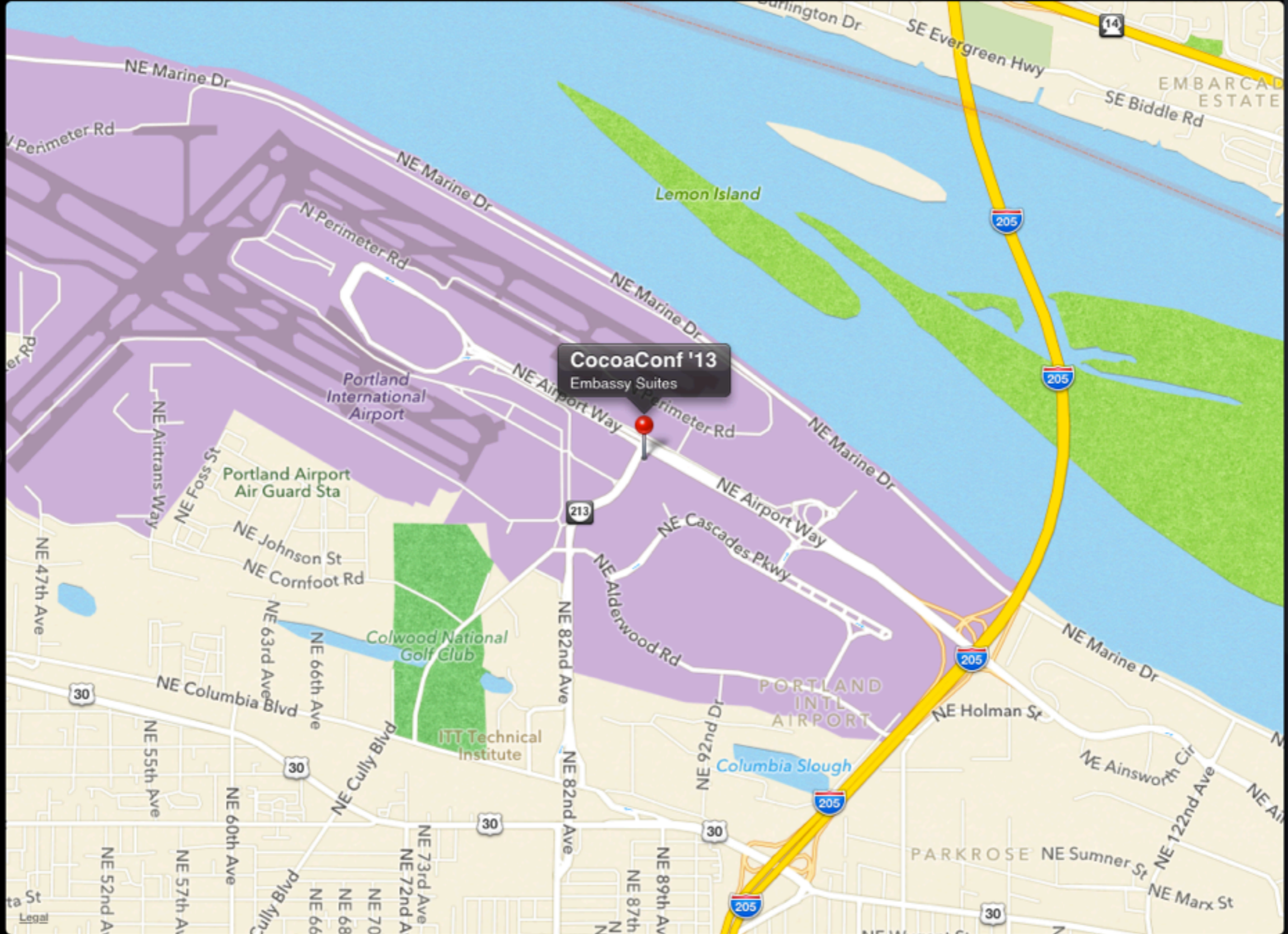
- `MKAnnotation` protocol
  - `coordinate` is required
  - `title` & `subtitle` are optional
- `MKOverlay` protocol
  - Conforms to `MKAnnotation`
  - Adds its own goodies

# Point Annotations

- `MKPointAnnotation`
- Defaults to a red `MKPinAnnotationView`
- Delegate can supply a custom `MKAnnotationView`



# Point Demo



**CocoaConf '13**  
Embassy Suites

Portland International Airport

Portland Airport Air Guard Sta

Colwood National Golf Club

ITT Technical Institute

PORTLAND INTL AIRPORT

EMBARCADA ESTATE

PARKROSE

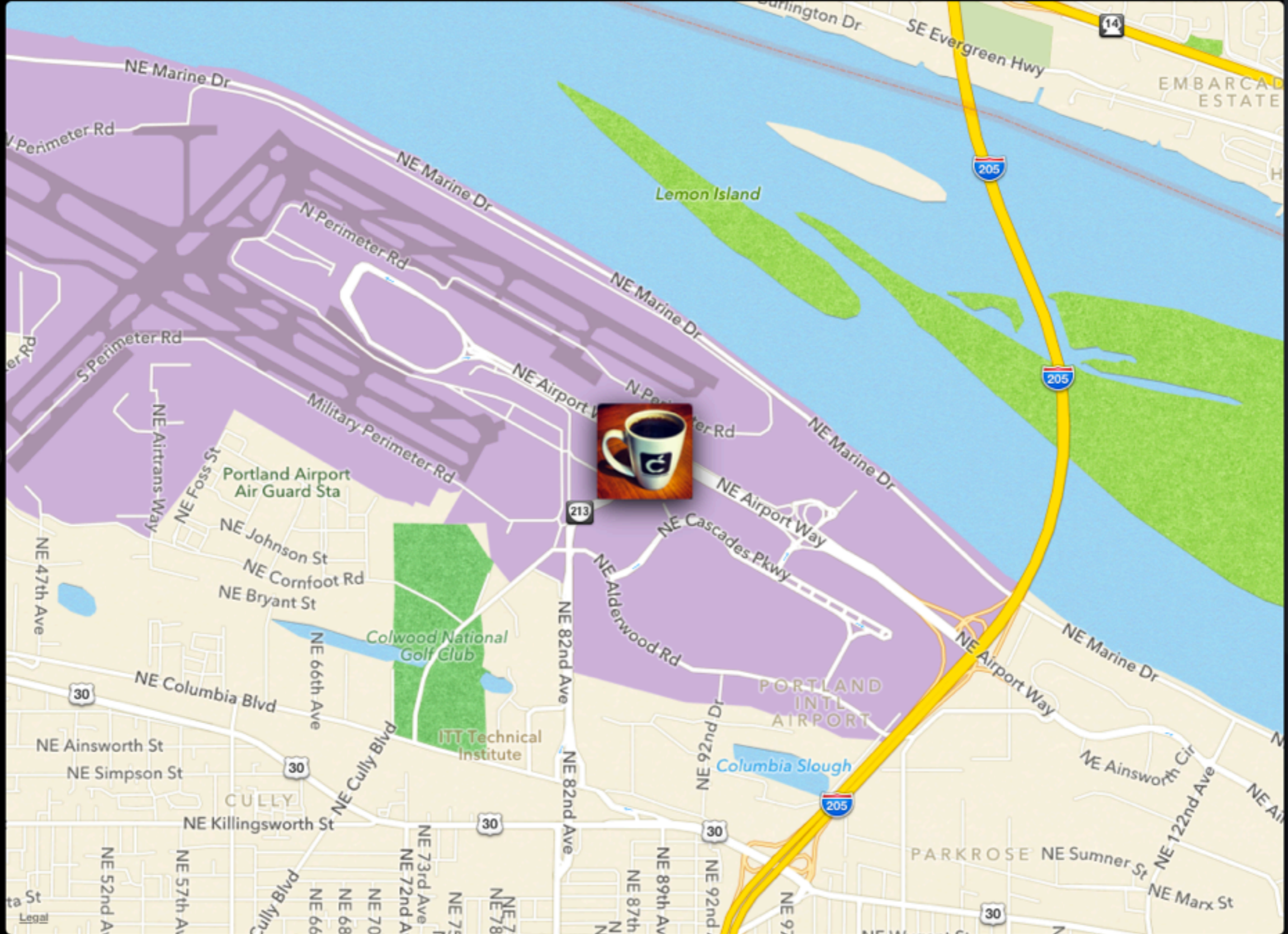


# Image Annotations

- `MKAnnotationView` has an `image` property
- But we're also a `UIView`
  - Usual `-drawRect:` fun
    - Careful when zooming (more later)
  - Animations!



# Image Demo



# Overlays

- They have area (i.e., shapes)
- Conform to `MKOverlay`
  - Which conforms to `MKAnnotation`
  - So, added to the map the same way
- Delegate must provide a view



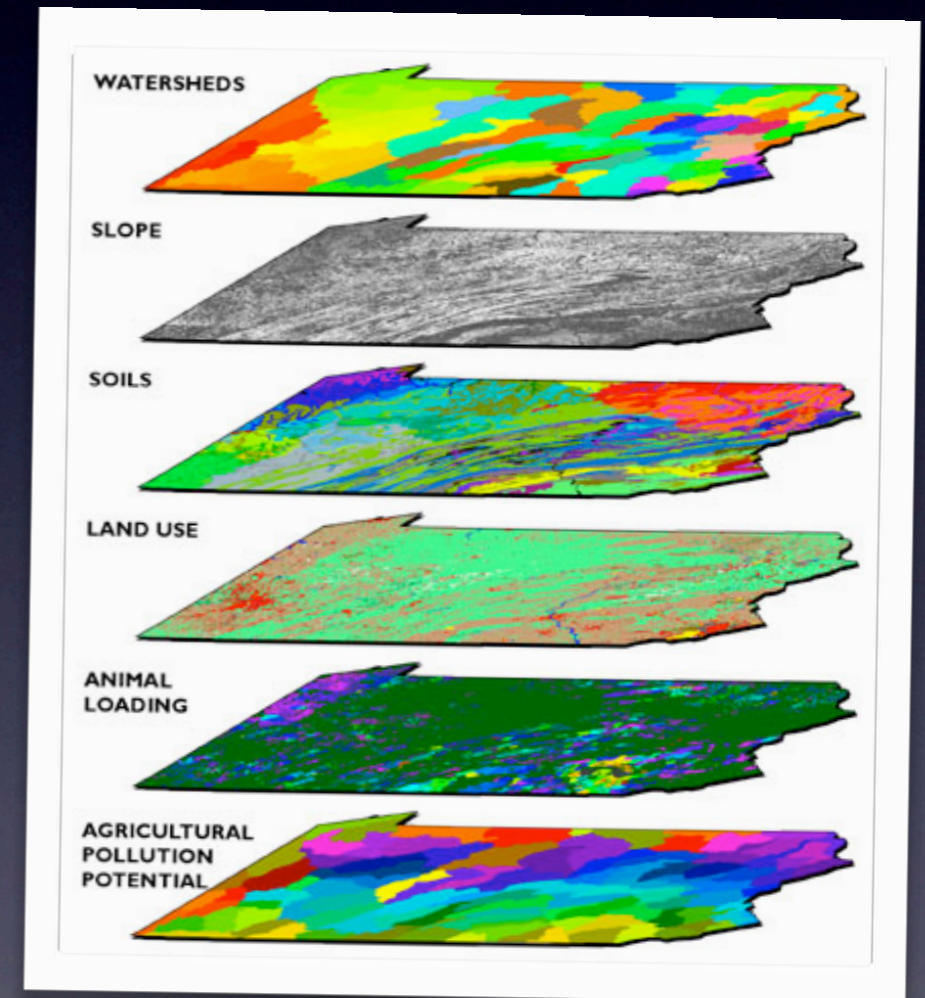
# Overlays

- Vector shapes (circles, arcs, paths)
- Handy subclasses of `MKShape`
  - e.g. `MKCircle` gets an `MKCircleView`

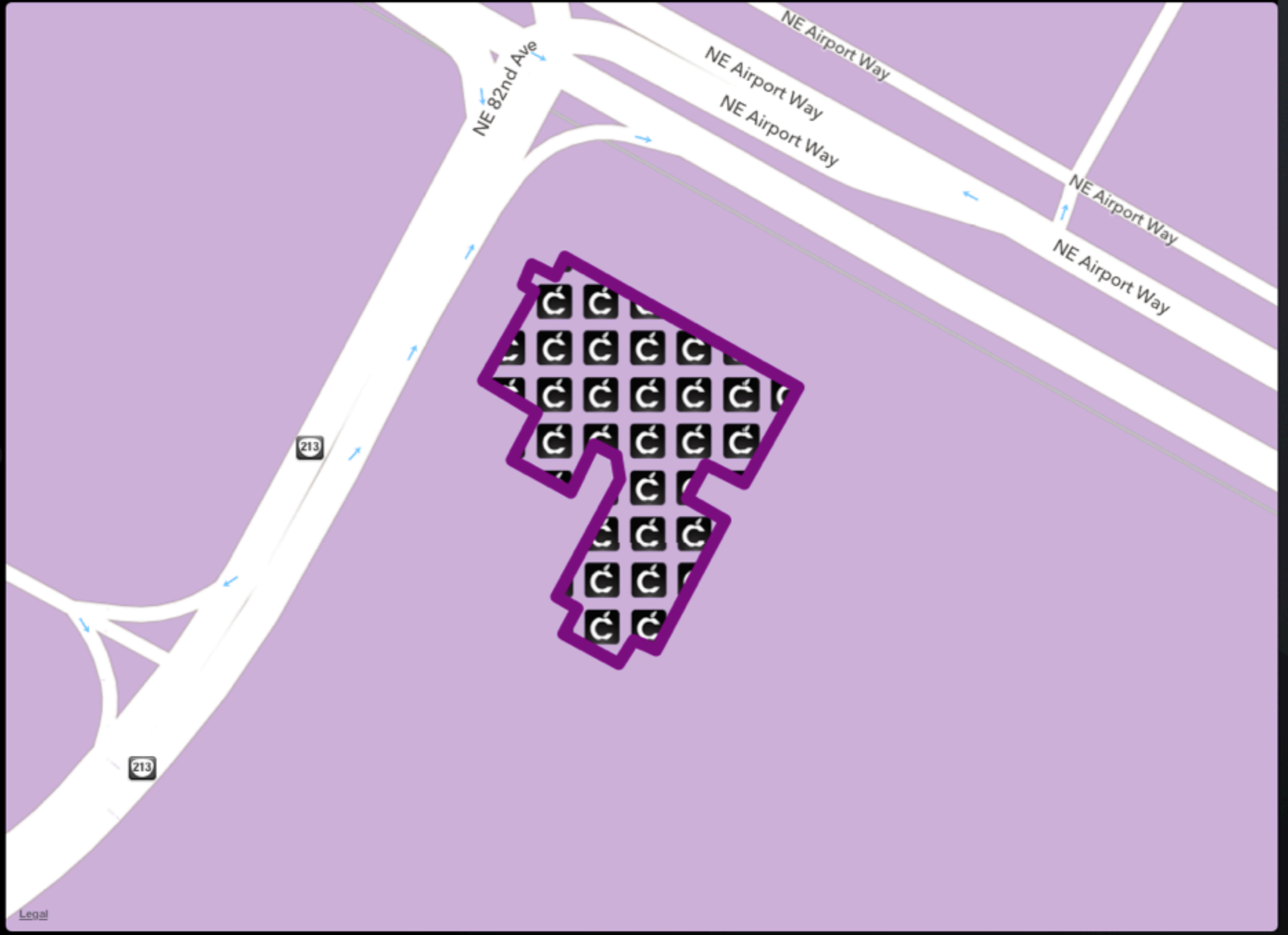


# Overlays

- Raster overlays
  - `MKOverlayView` is designed for zooming
  - Has `-drawMapRect:` at multiple zooms
  - This is ripe for improvement ;-)



# Overlay Demo

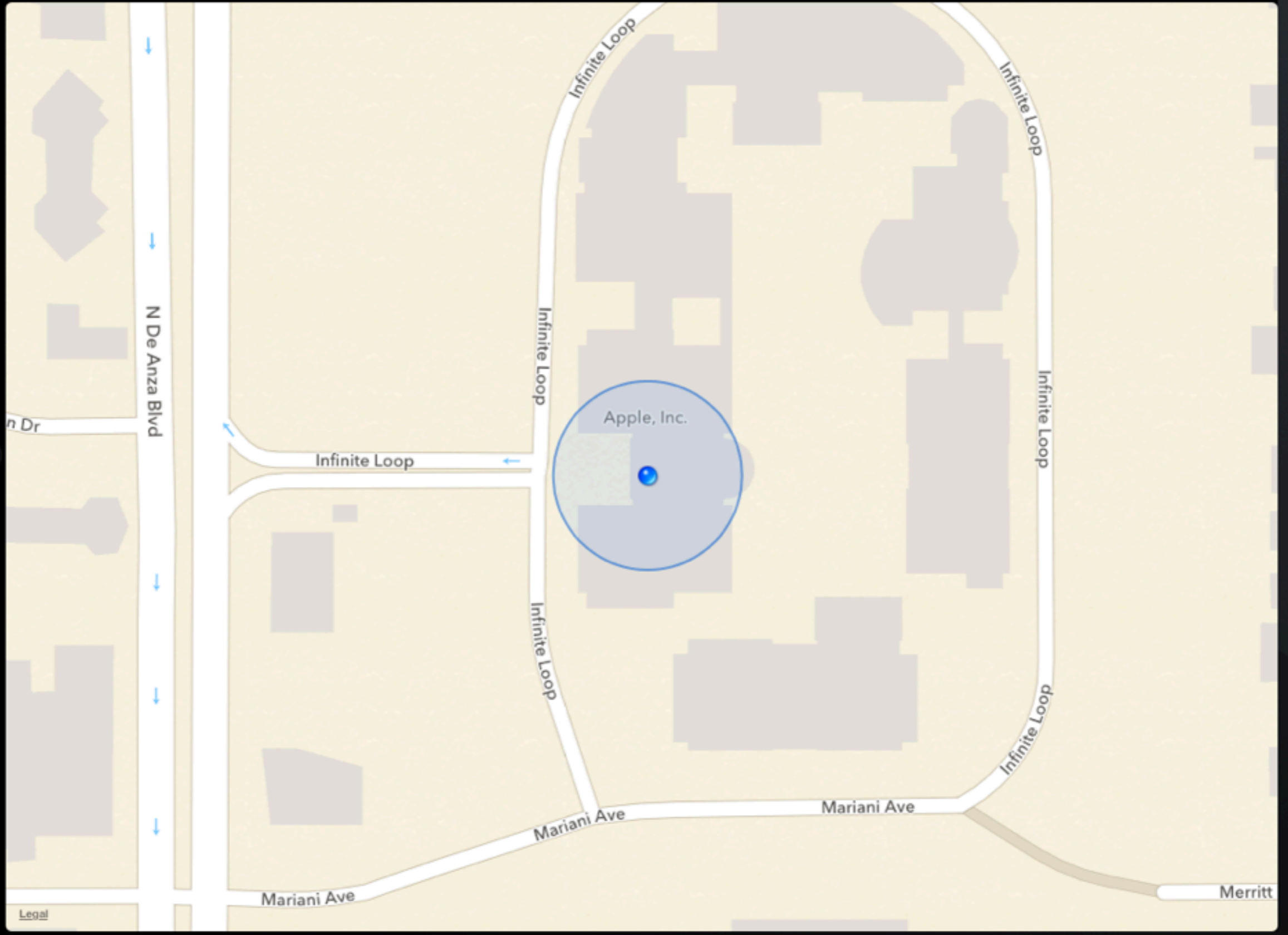




# User Location Services

- “Blue dot”
  - `mapView.showsUserLocation`
- User tracking
  - `mapView.userTrackingMode`
- Core Location-like updates
  - Keep me informed of what’s happening

# User Location Demo



# Under-The-Hood Parts

- Geocoder
- Local search
- Core Location

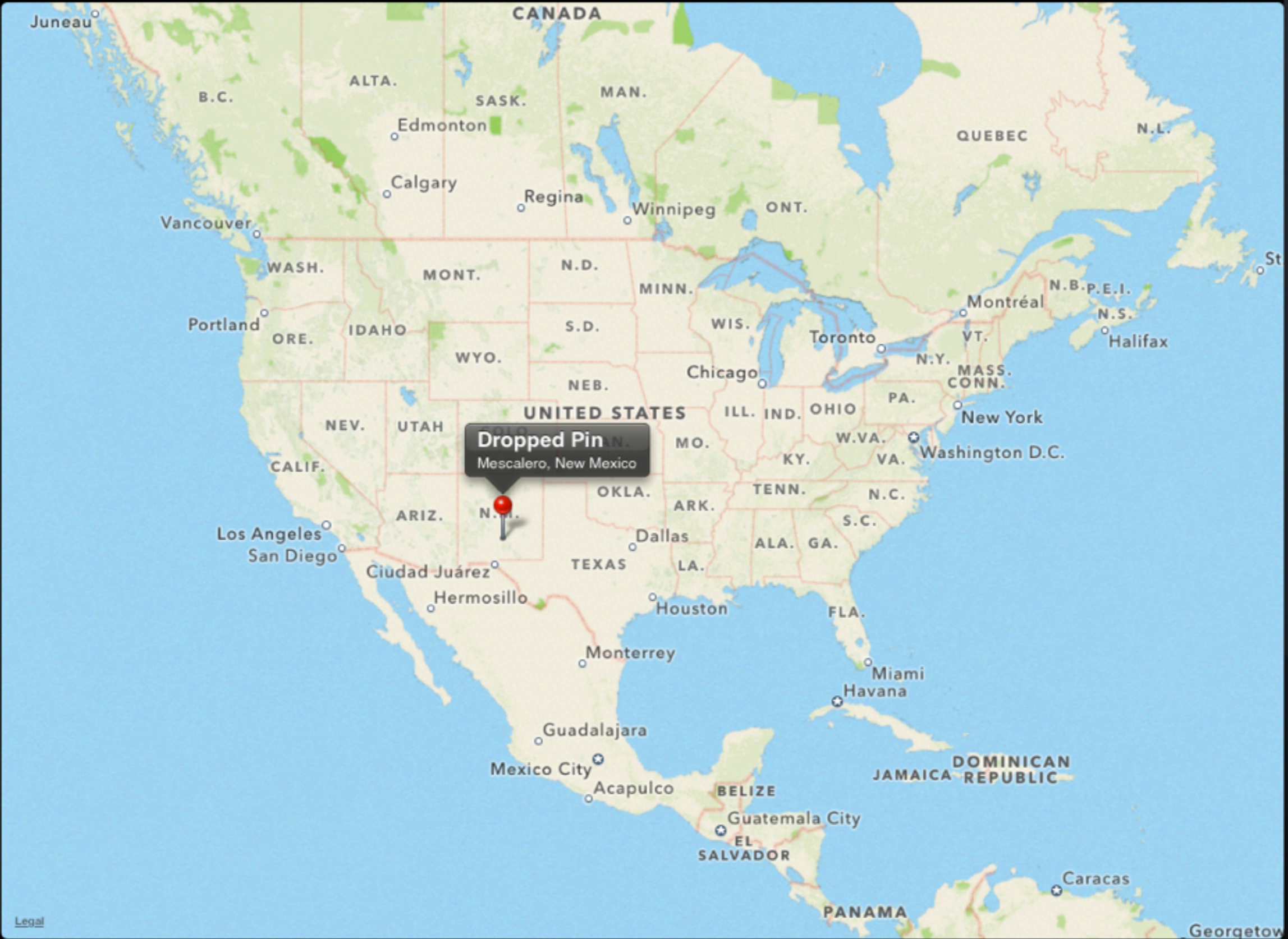


# Geocoder

- Convert points to addresses & back
  - Forward: *“Find me a coordinate!”*
  - Reverse: *“What’s this coordinate called?”*
- Async operation (network)
- **CLGeocoder**
  - Non-UI, so belongs in CL



# Geocoder Demo



**Dropped Pin**  
Mescalero, New Mexico

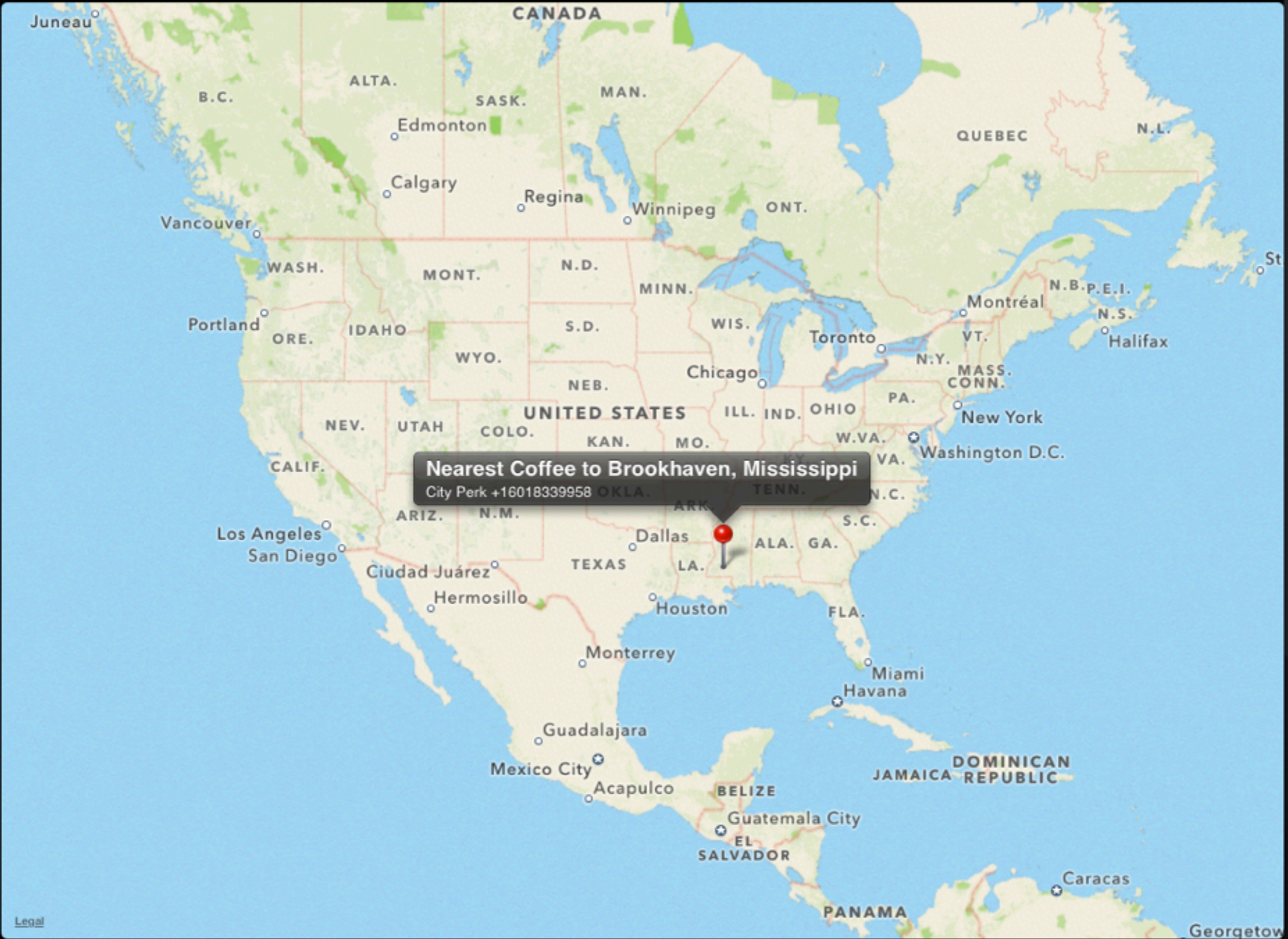
# Local Search

- New in iOS 6.1
- Consult Apple's database of places
- Again, async operation (network)
- *"I need coffee, stat!"*





# Local Search Demo



**Nearest Coffee to Brookhaven, Mississippi**  
City Perk +16018339958

# Core Location

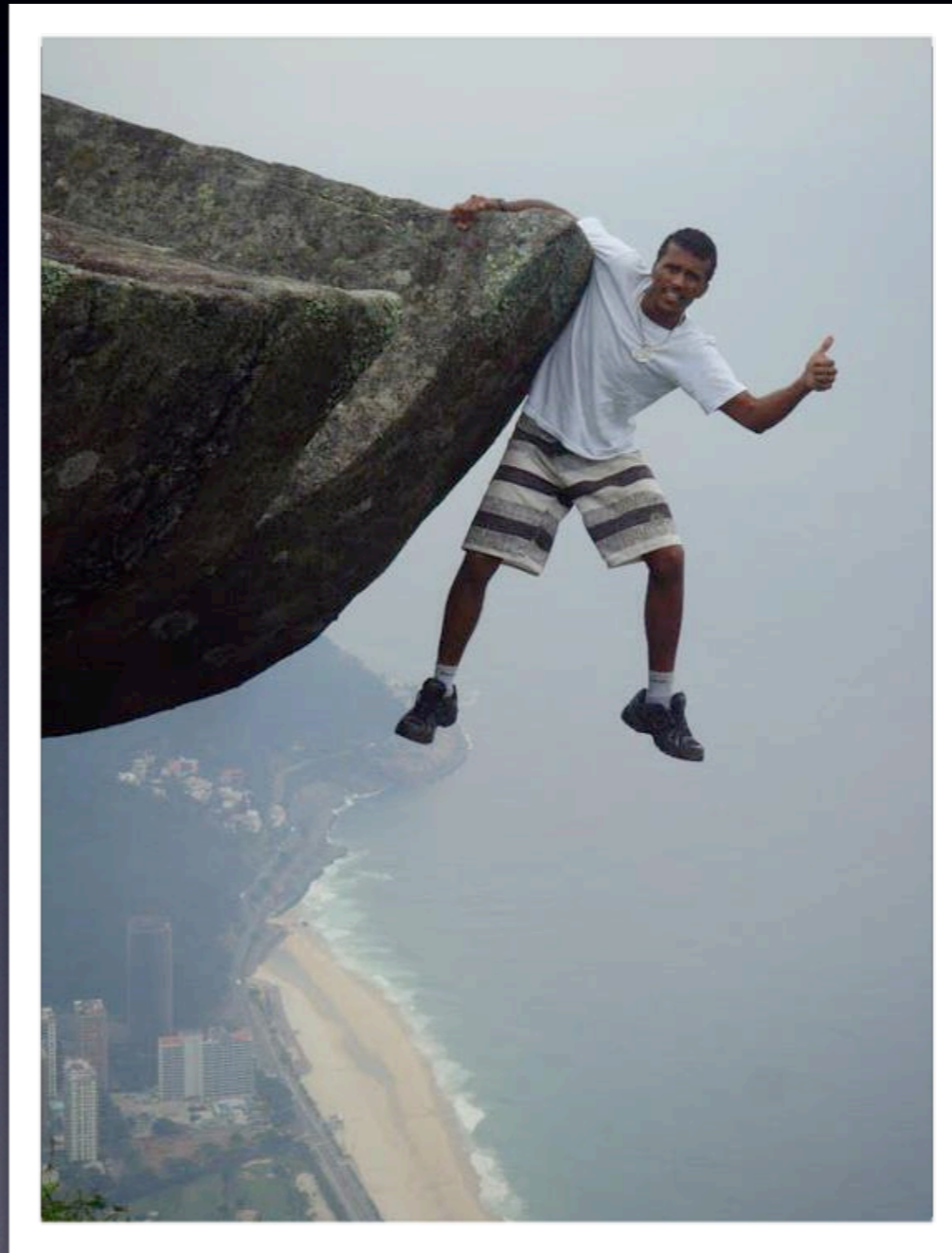
- Automatically linked by MapKit
- Visual equivalents already in MapKit
- You can do the same without a UI
  - Including background app mode



# Core Location API

- `CLLocationManager`
- `CLLocationManagerDelegate`
- `CLPlacemark`
- `CLLocation`

# Edge Cases



# Edge Cases

- Stylistic control
- Custom region interactivity
- Offline use

# Stylistic Control

- I built an SDK for that
  - MapBox iOS SDK
  - Open source rewrite of MapKit
  - Work with MapBox or host your own



Carrier

10:41 PM

100%




MapBox

Online Layer


Offline Layer

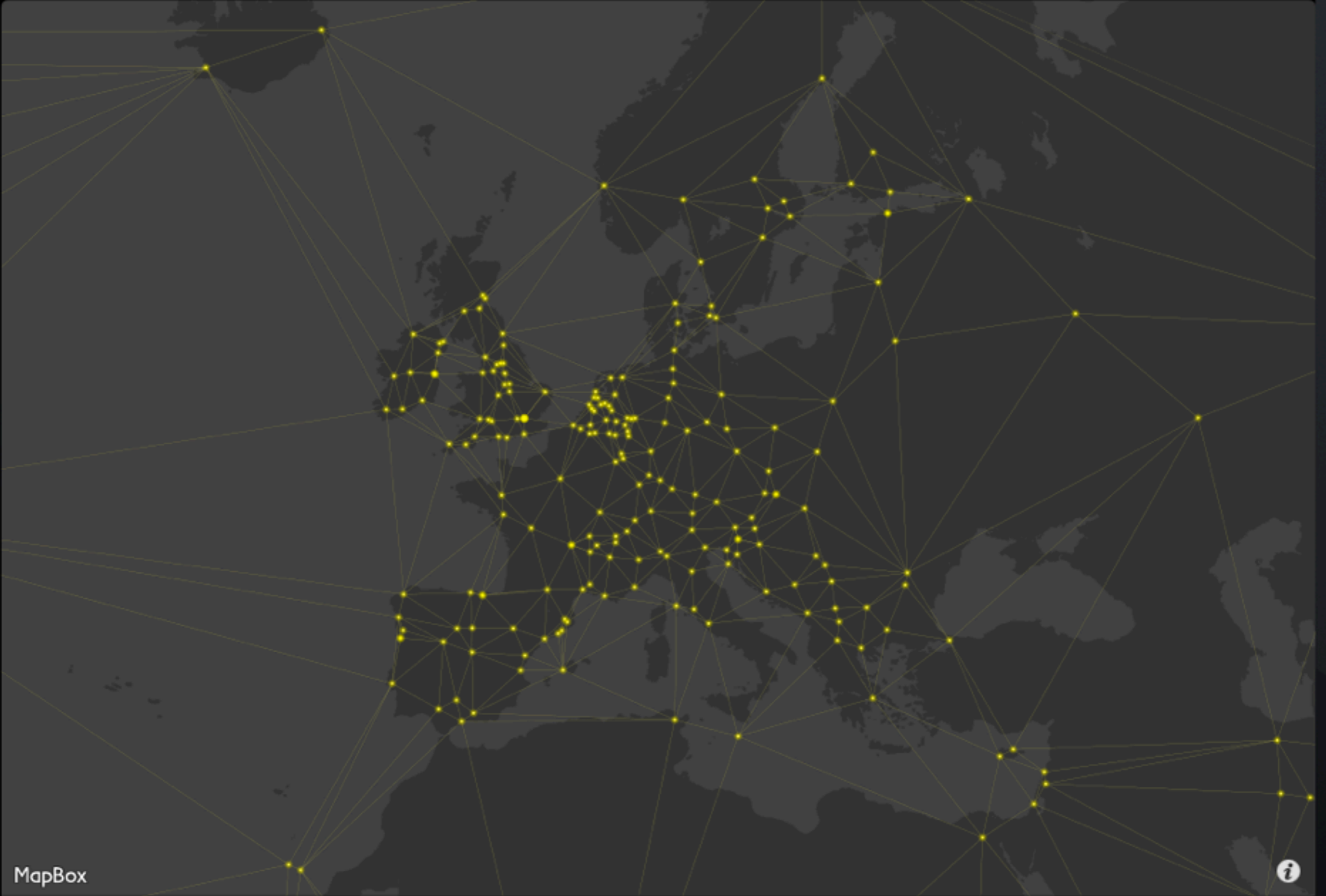
Interactive Layer



Carrier 

10:44 PM

100% 



MapBox



  
Online Layer

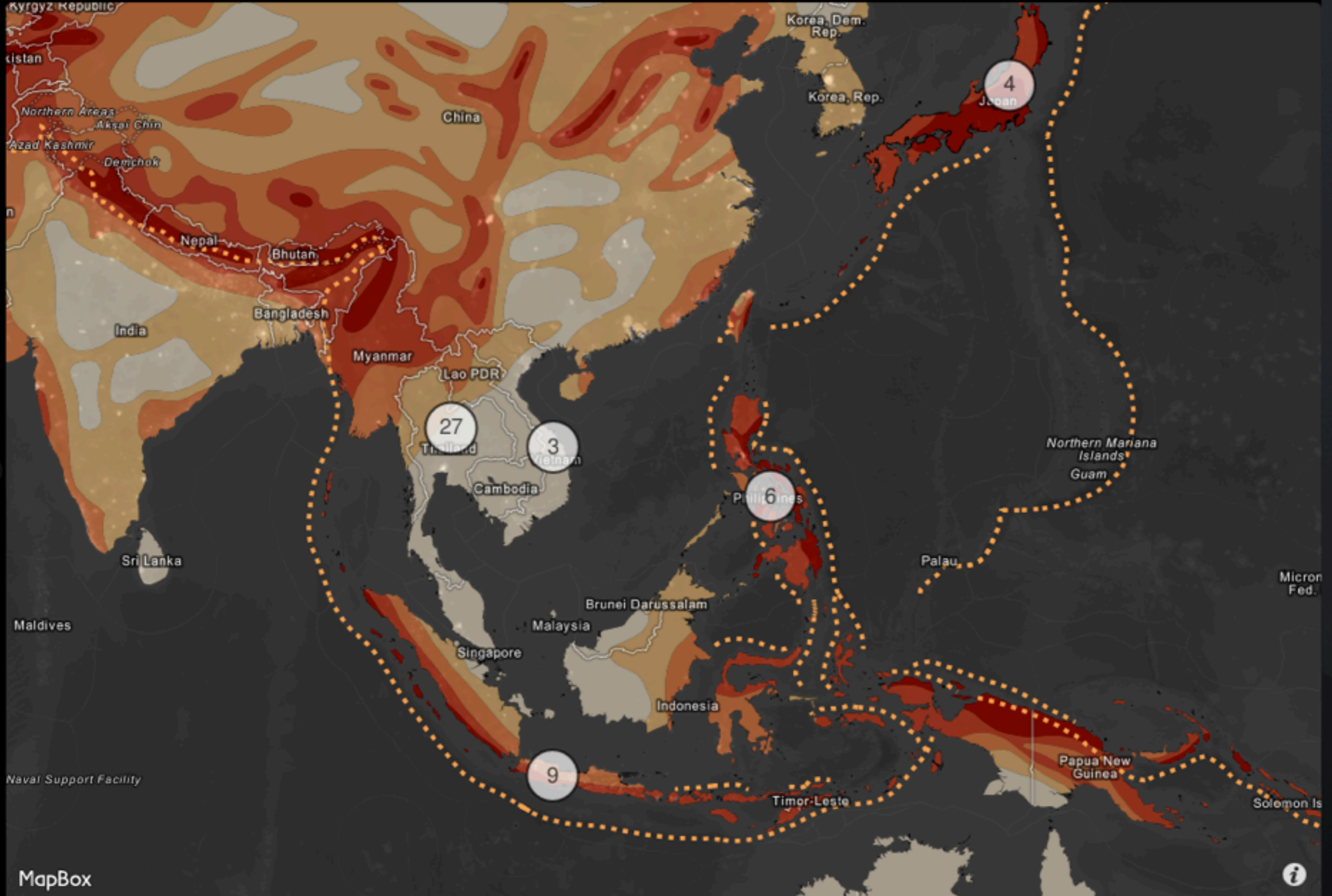
  
Offline Layer

  
Interactive Layer

Carrier

10:43 PM

100%



MapBox

Online Layer

Offline Layer

Interactive Layer

Carrier

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MapBox



Online Layer



Offline Layer



Interactive Layer



MapBox

 Online Layer

 Offline Layer

 Interactive Layer



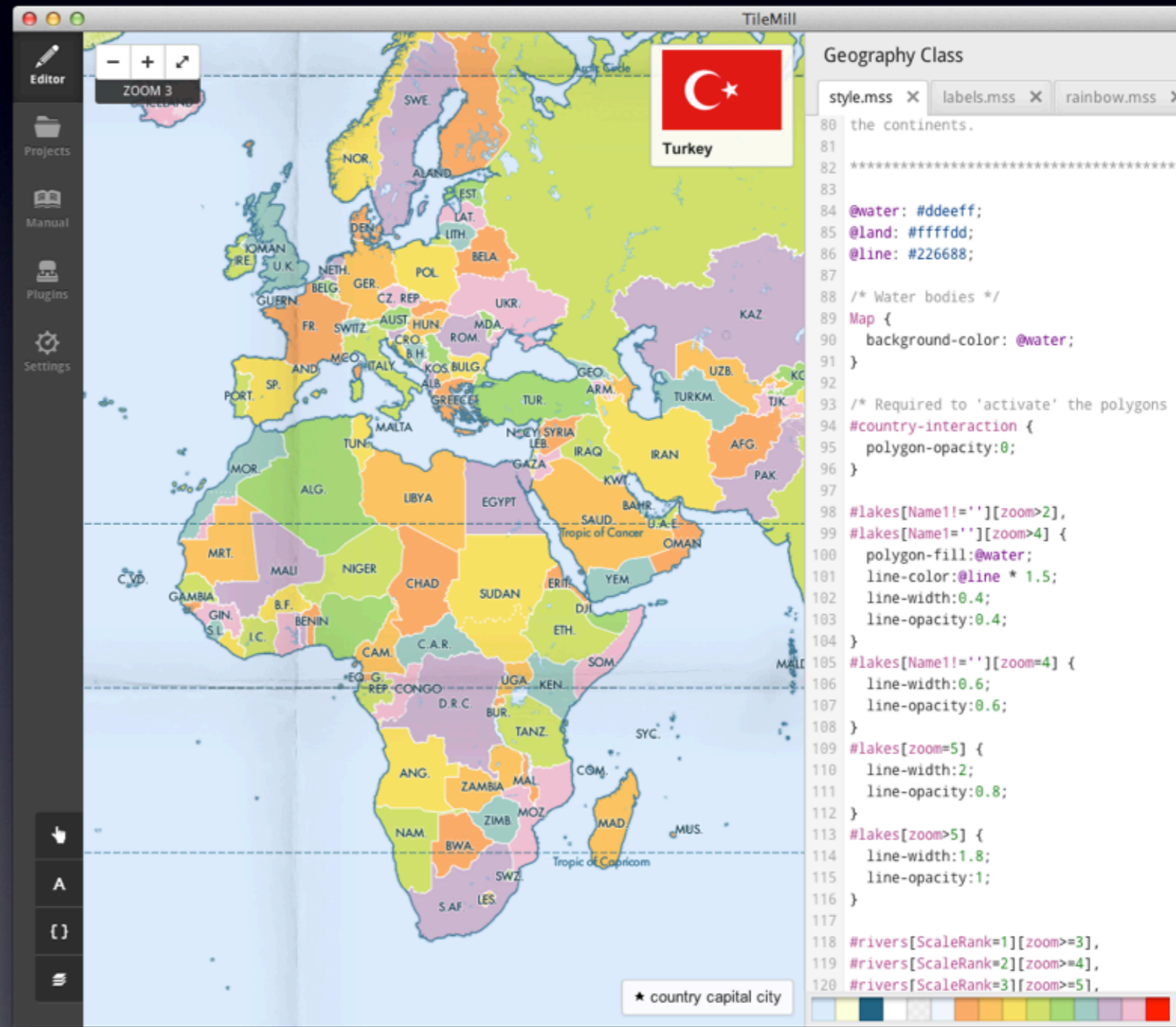
# TileMill

- Made for novice map makers
- But also for experts
- Eats geo data, spits map tiles
- Free & open source



# TileMill Workflow

- Add geo data layer
- Style like CSS in realtime
- Export/publish



# Region Interactivity

- For basics, geocoding & local search work
  - Convert coordinate into place info
- But what about custom data?





MapBox



MapBox

Online Layer

Offline Layer

Interactive Layer

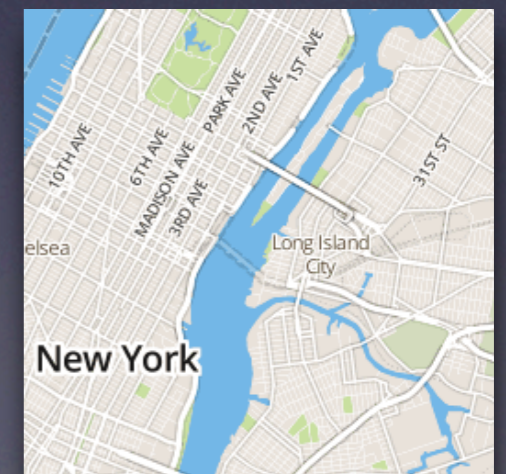
# Region Interactivity

- MapBox SDK does that, too
- Can encode within TileMill
- Simple key/value retrieval
  - `formattedOutputOfType:forPoint:`
- Returns HTML
- Works offline



# Offline Map Use

- The problem is tiles
  - $t_c = z^4$
  - e.g. street-level  $z=17 = 4^{17} = 17.1\text{B}$  tiles
- The solution is bundling
  - MBTiles format
  - Tiles stuffed into SQLite rows
- Can serve or include locally

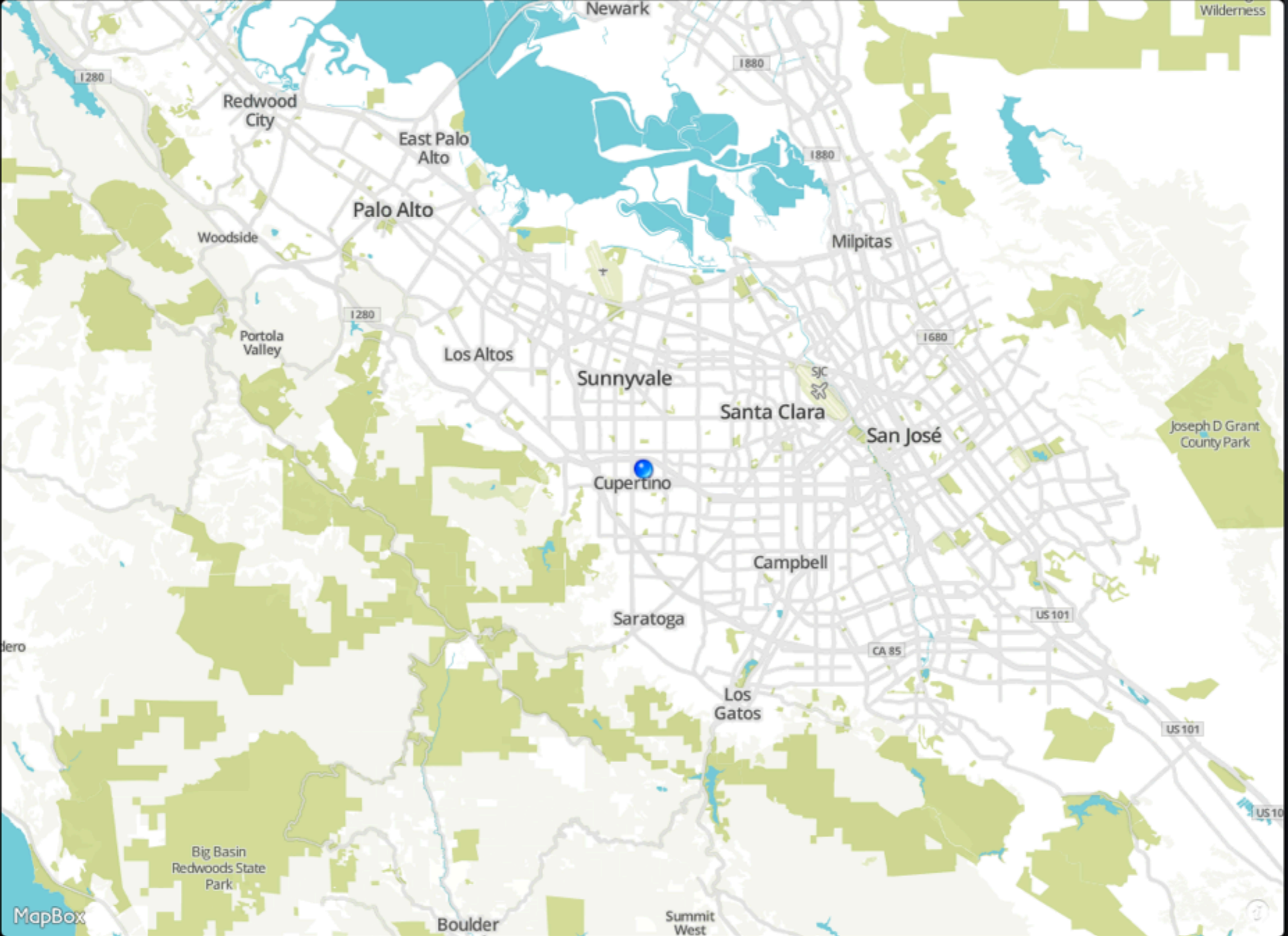


# MapBox SDK Demo

Carrier

4:28 PM

100%



MapBox

# Review

- MapKit is robust, mature, and portable
- Core Location is for non-UI
- Open source available for edge cases
- Maps are fun!

# Contact / Q&A

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- [\*github.com/incanus/CocoaConf2013\*](https://github.com/incanus/CocoaConf2013)
- [\*mapbox.com/mobile\*](https://mapbox.com/mobile)

