Location Services in iOS

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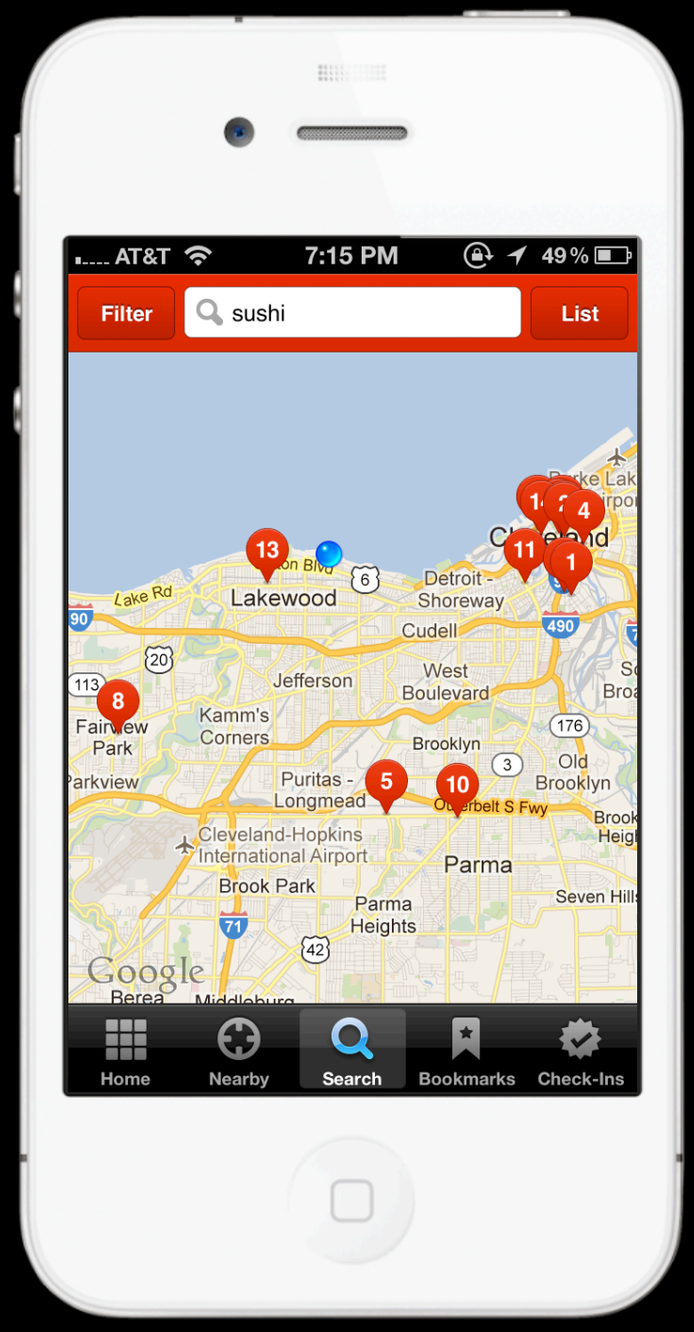
Agenda

- Intro to Location Services
  - How does it work?
- Battery optimization
- Error handling
- Testing location enabled features

What is Location Services?

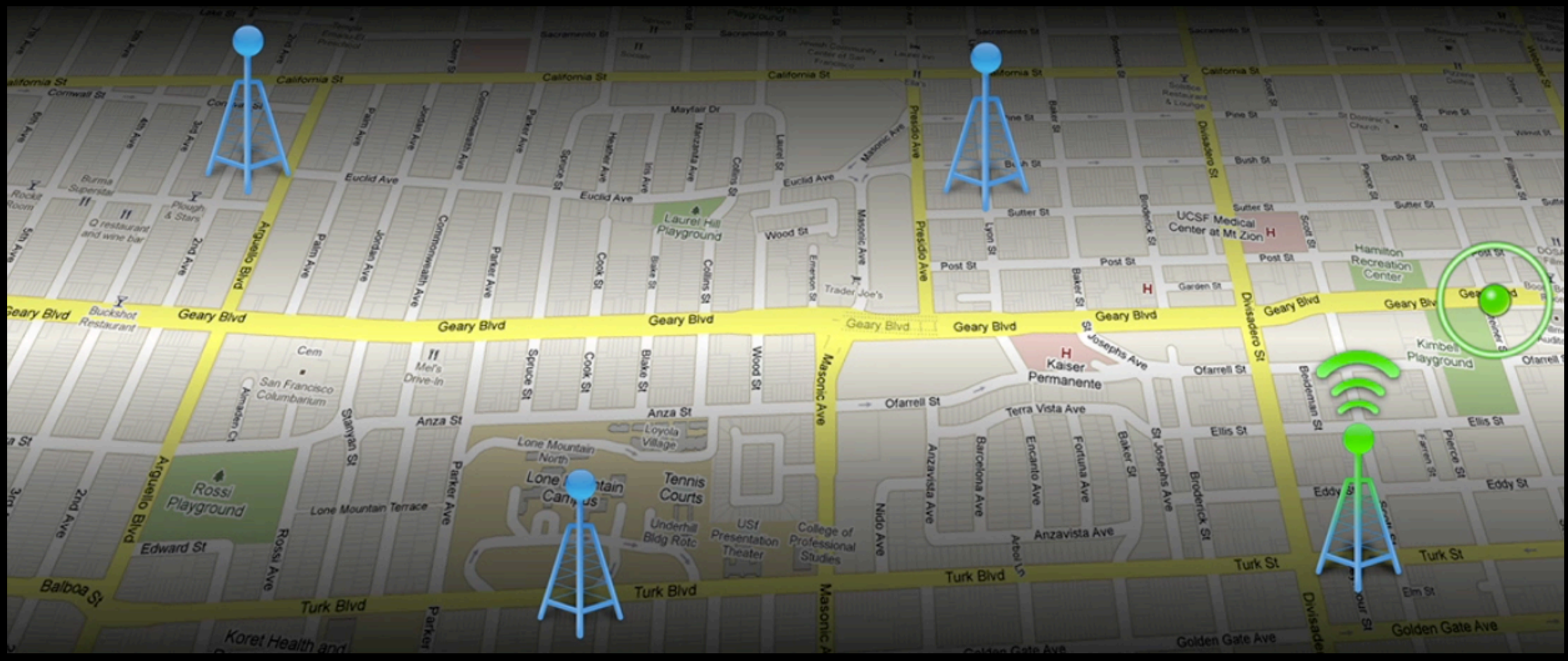
- Allows location based apps to determine your approximate location



Positioning Methods

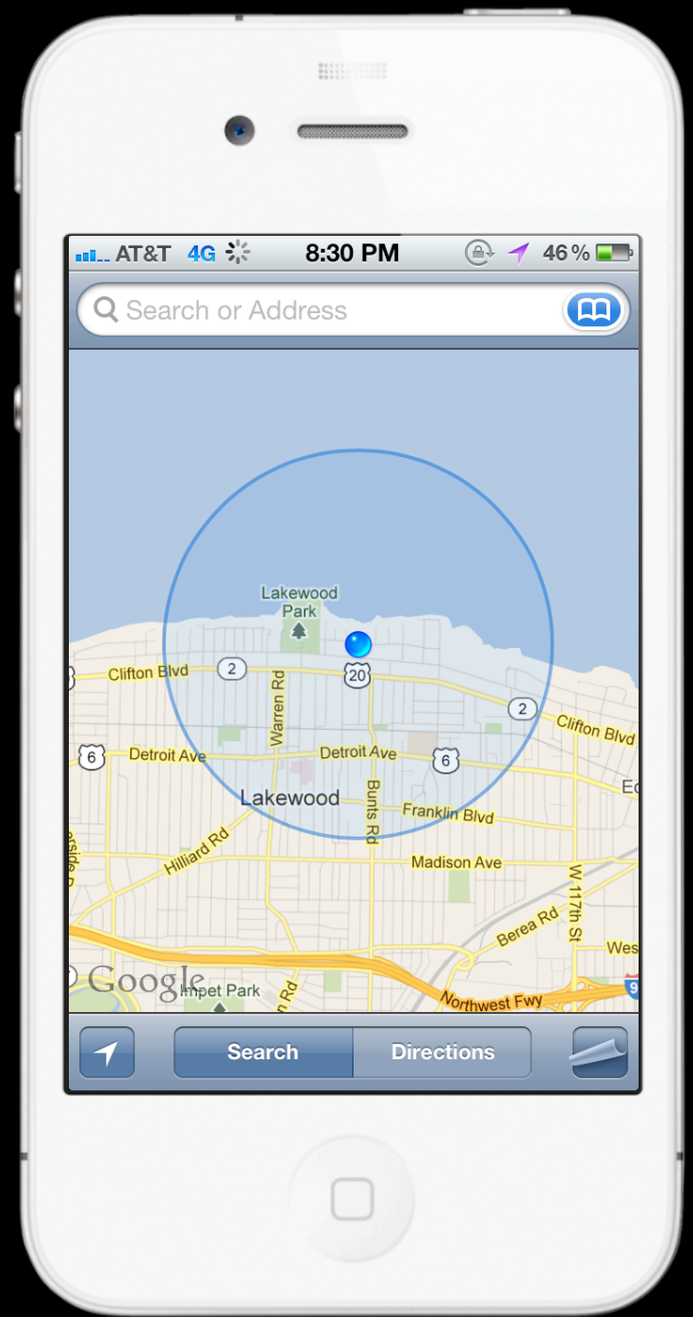
- Cell Positioning
- Wi-Fi Positioning
- GPS Positioning

Cell Positioning

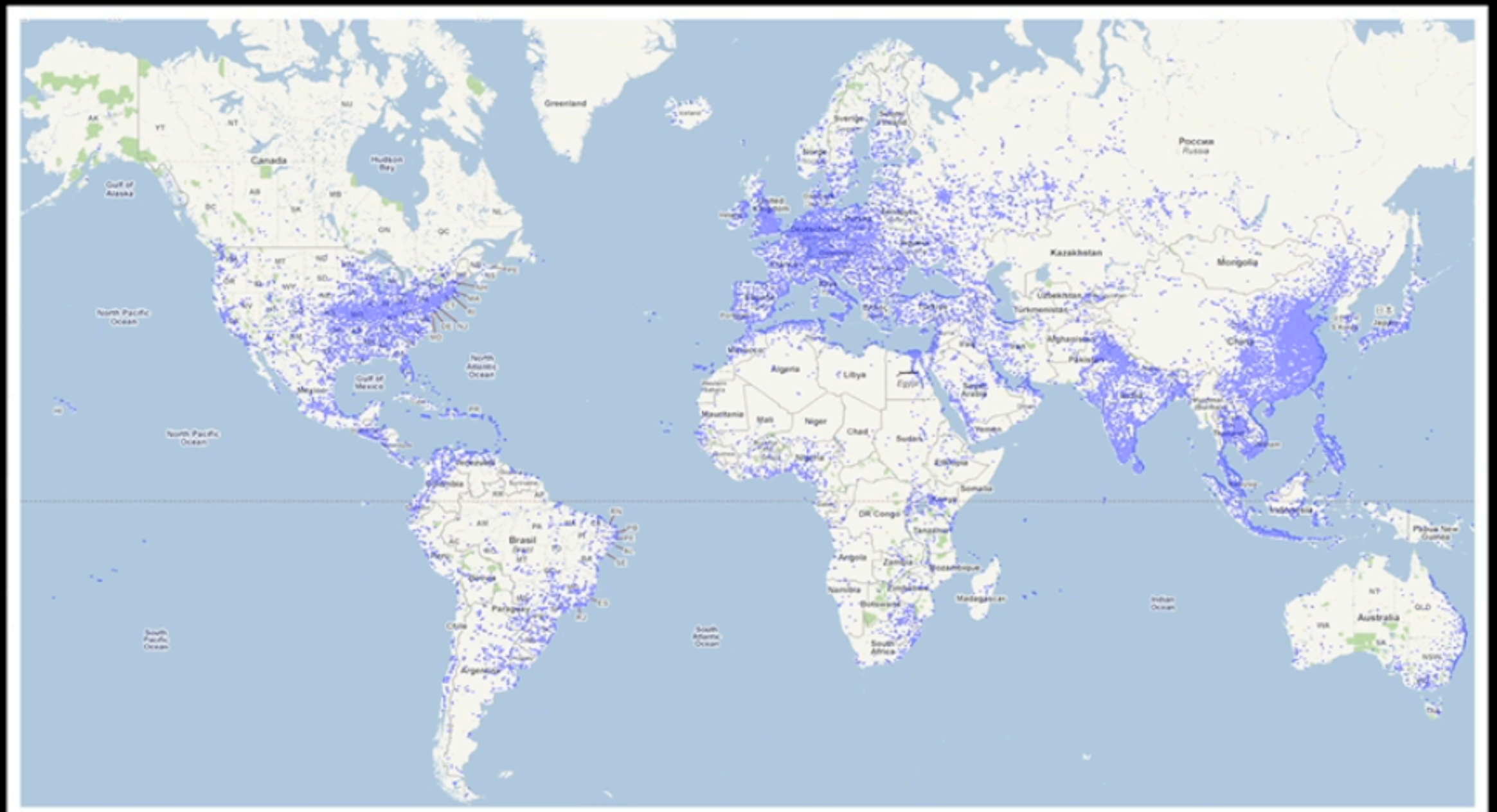


Cell Positioning

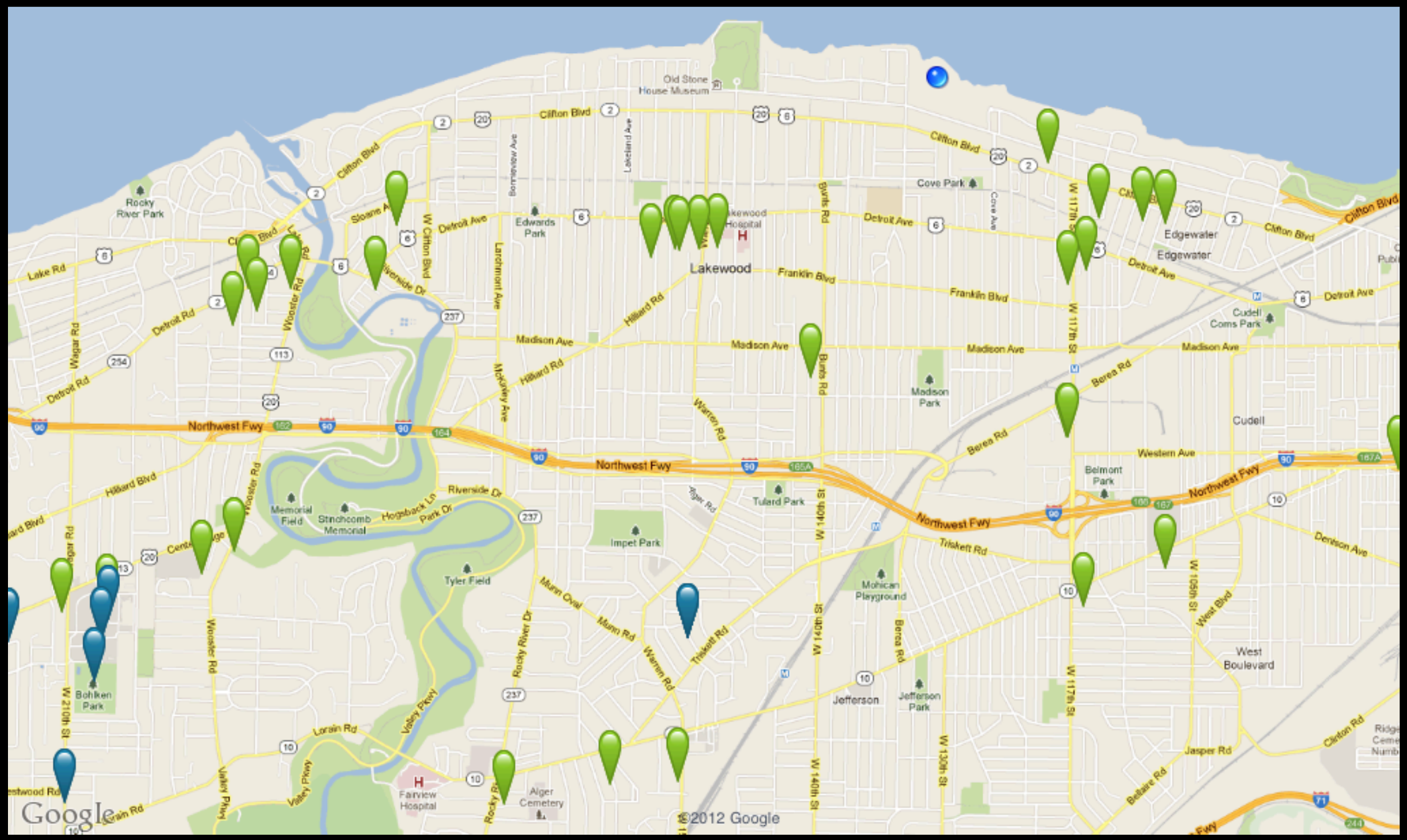
- Lowest accuracy
- Needs cell radio
- Ubiquitous



Coarse Cell Positioning



Wi-Fi Positioning

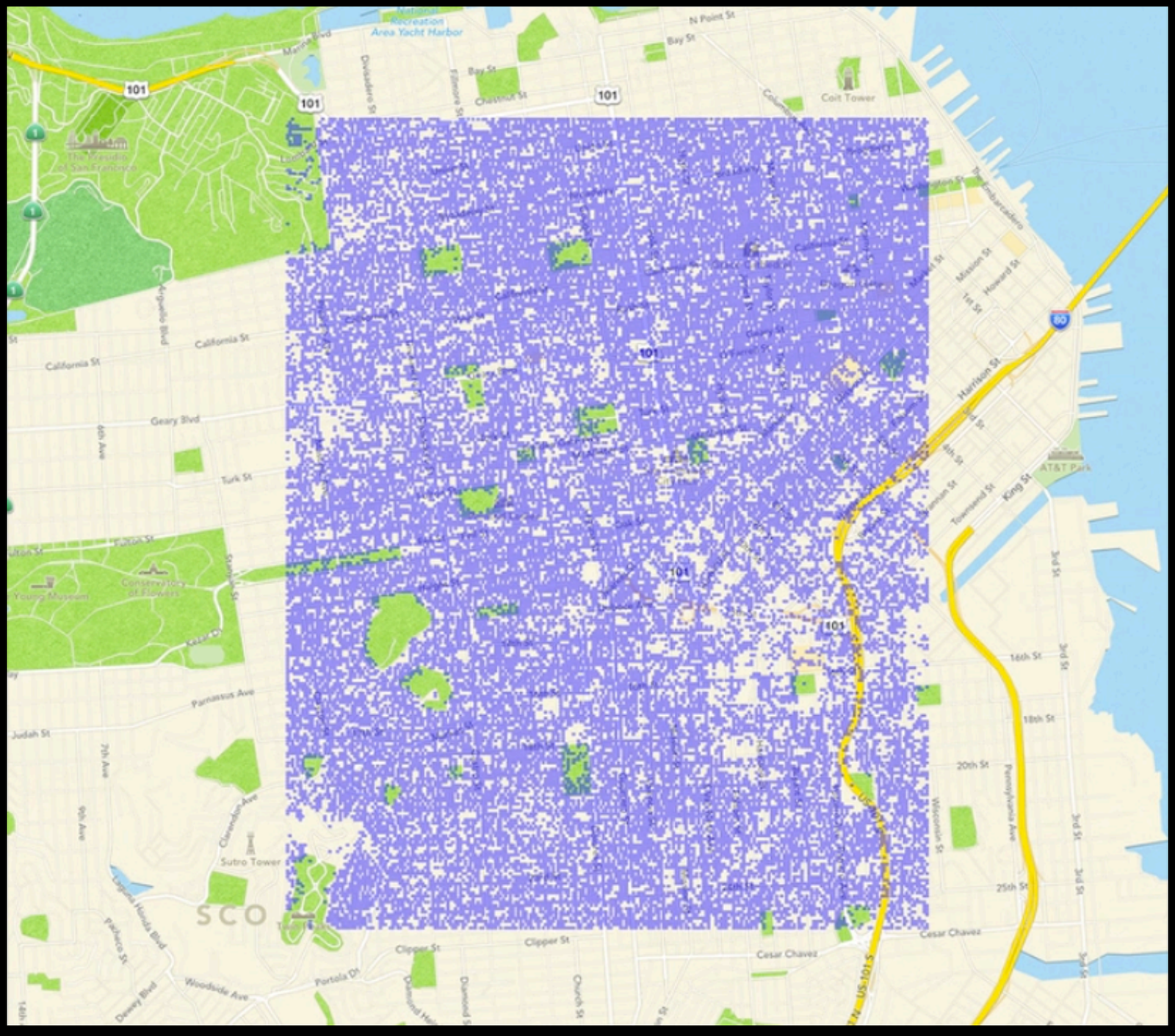


Wi-Fi Positioning

- Needs Wi-Fi radio
- Better accuracy than cell
- Crowd sourcing + Wi-Fi router data provider

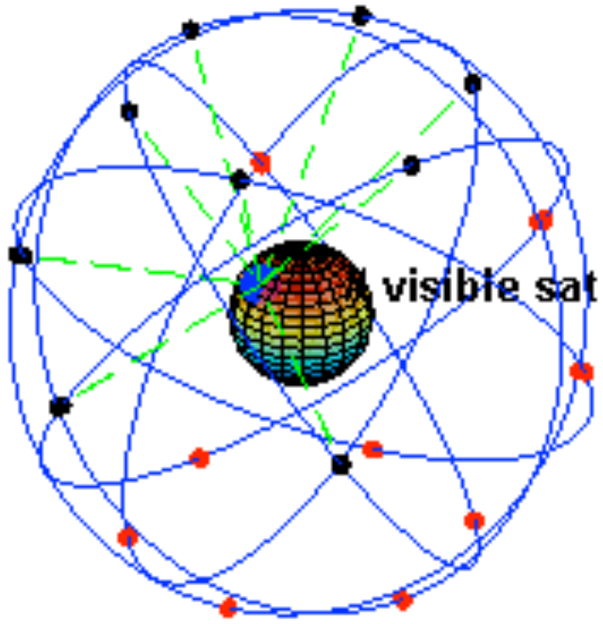
Coarse Wi-Fi Positioning

Coarse Wi-Fi Positioning



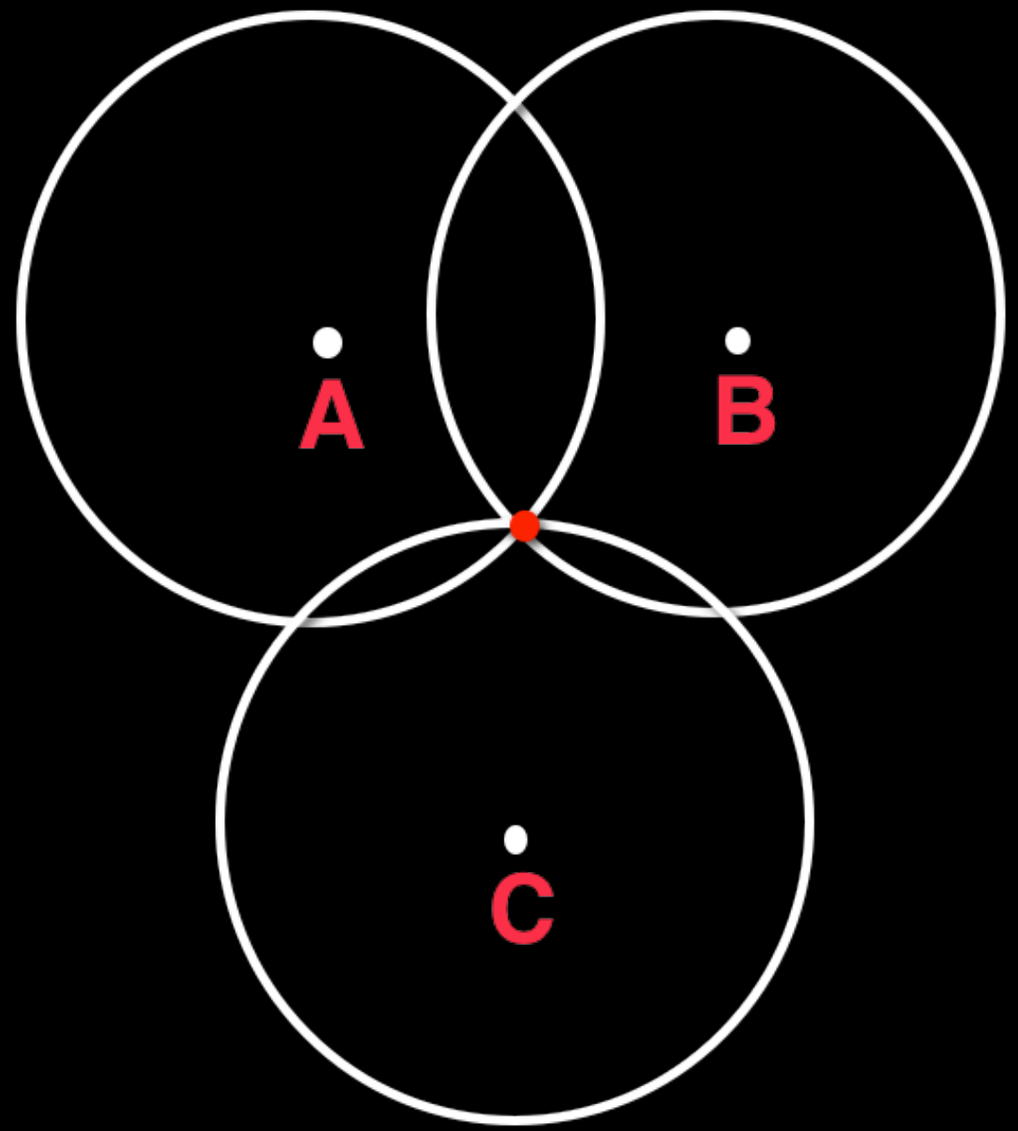
GPS Positioning

- Needs GPS receiver
- Highest accuracy
- Supports GLONASS
  - iPhone 4S & 5
  - iPad Retina



GPS Constellation in motion with Earth rotating

2D-Trilateration



3D-Trilateration

Assisted GPS

- Download satellites' position in orbit
- Narrow down the list of satellites

Internet Provider Positioning

- Uses an Internet provider location
- Lowest accuracy (several miles off)
- Last resort
- Most often used by Web apps

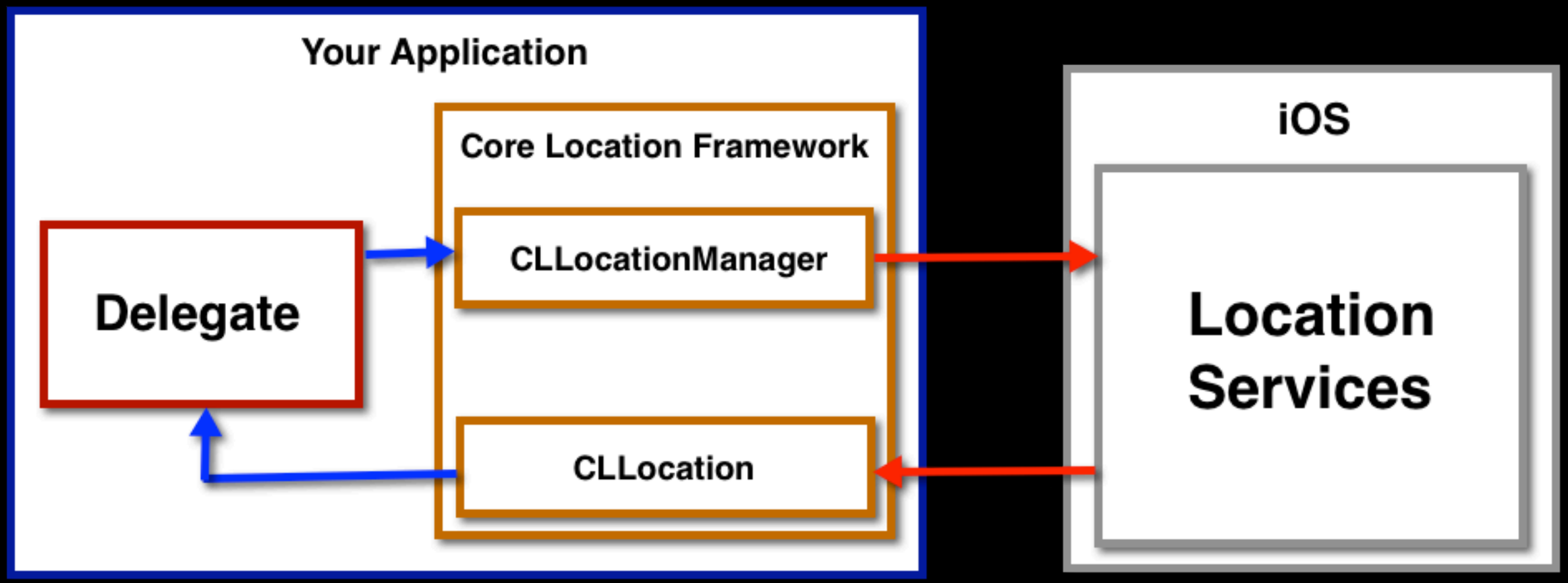
Accuracy Comparison

Cell Positioning	Starts with 12 KM Reduces to 2-3 KM		
Wi-Fi Positioning	Within 100 Meters		
GPS Positioning	iPhone 3GS	iPhone 4	iPhone 4S
	40 Meters	10 Meters	5 Meters

Availability

	iPhone	iPad (mini)	iPod Touch
Cell Positioning	All models	Wi-Fi + Cellular model	✕
Wi-Fi Positioning	All models	All models	All models
GPS Positioning	All models (except first gen)	Wi-Fi + Cellular model	✕

Core Location



CLLocationManager

Initiating Standard Location Updates

- `startUpdatingLocation`
- `stopUpdatingLocation`

`distanceFilter` *property*

`desiredAccuracy` *property*

Initiating Significant Location Updates

- `startMonitoringSignificantLocationChanges`
- `stopMonitoringSignificantLocationChanges`

Initiating Region Monitoring

- `startMonitoringForRegion:`
- `startMonitoringForRegion:desiredAccuracy:`
- `stopMonitoringForRegion:`

`monitoredRegions` *property*

`maximumRegionMonitoringDistance` *property*

Desired Accuracy

Desired Accuracy	Battery Usage	Duration	Primary Hardware
Best for Nav	High	High	GPS
Best	↑	↑	GPS
10 M	|	|	GPS
100 M	|	|	Wi-Fi
1KM	|	|	Cell
3 KM	Low	Low	Cell

Demo

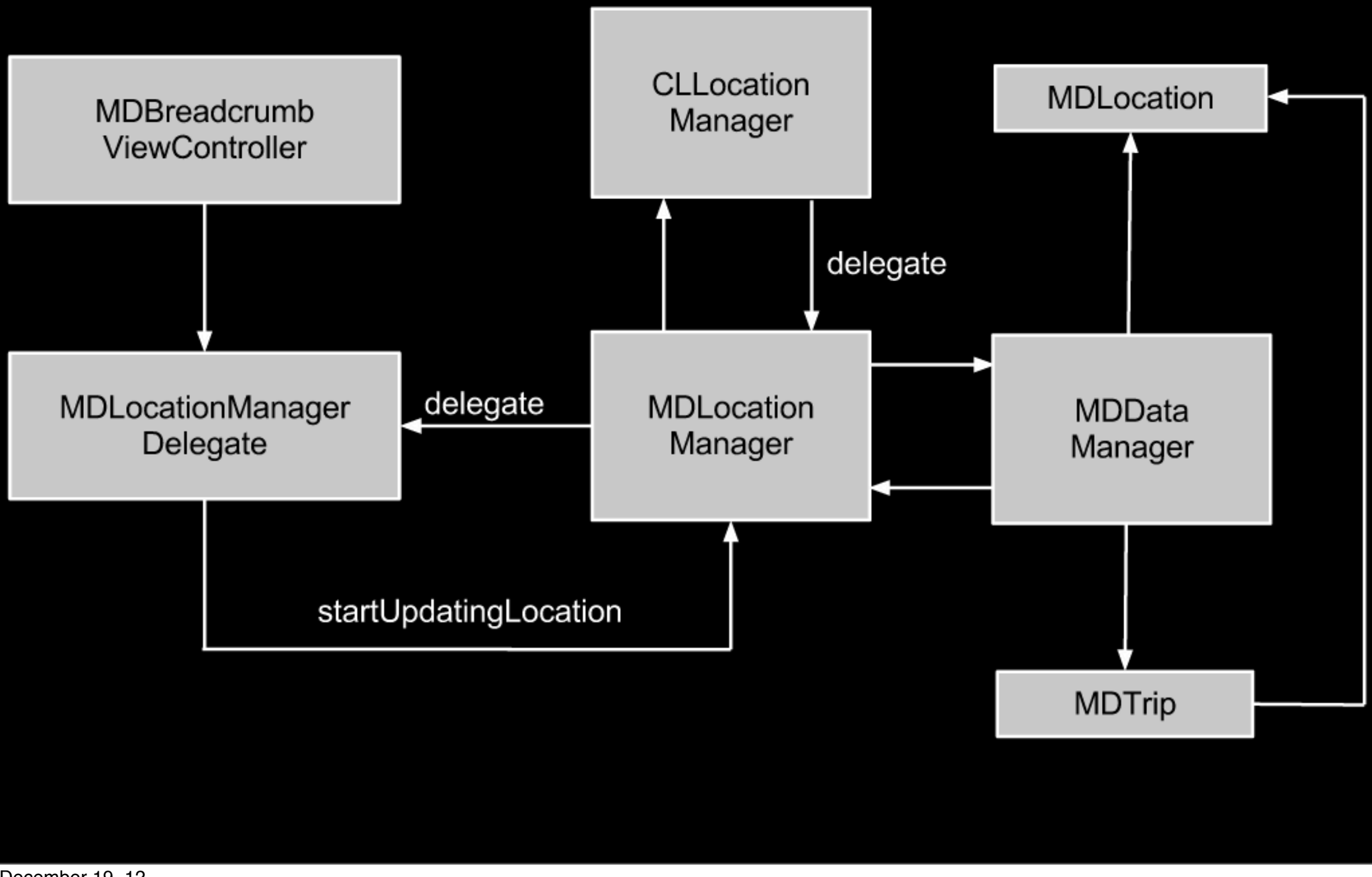
Battery Optimization

- Right level of accuracy
- Don’t rely on distance filter
- Accept low accuracy after few attempts
- Set a timer to stop location update
- Stop updating when you get an error. Set a timer and ask for location again
- Don’t forget background mode
  - Auto Pause (iOS 6.0)
    - CLActivityType
    - pausesLocationUpdatesAutomatically

Testing

- iOS simulator
- Xcode scheme
- Xcode debugger
- UIAutomation
- Record & Replay
- WWDC 2011 - Testing your location aware app without leaving your chair

Record & Re-Play



Questions?

- Contact Info

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