Federal GIS Conference
February 9–10, 2015 | Washington, DC

Geocoding Techniques and Options for US and International Locations

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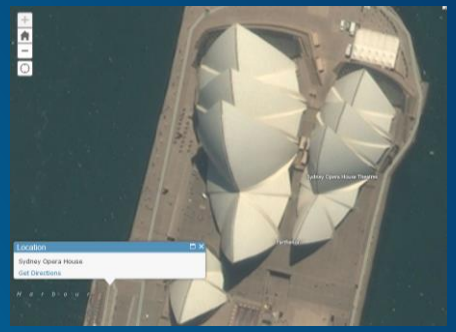
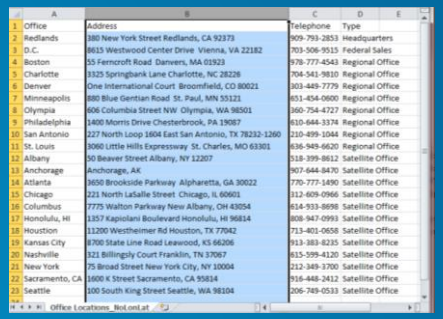
Chris Sheldrick – what3words

Types of Geocoding

- **GeoSearch** → Sydney Opera House →

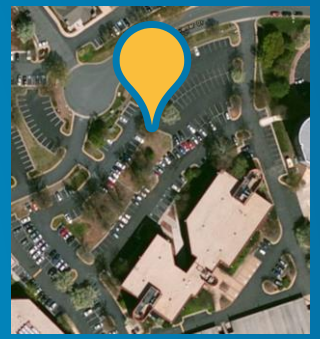


- **Batch Geocoding** →



and

- **Reverse Geocoding** →



?

Address: 8615 Westwood Center Dr
City: Tysons Corner
Region: Virginia
Postal: 22182
Country: USA

Loc_name: USA.PointAddress

On premises vs Online

- **On premises**
  - Need to geocode behind a firewall for security/privacy reasons
  - need to maintain your own reference data

- **Online**
  - When you want to consume a ready-to-use geocoding service

Geocoding On-Premises

- Users that need to geocode behind a firewall for security/privacy reasons
- Users that maintain their own reference data

What you need:

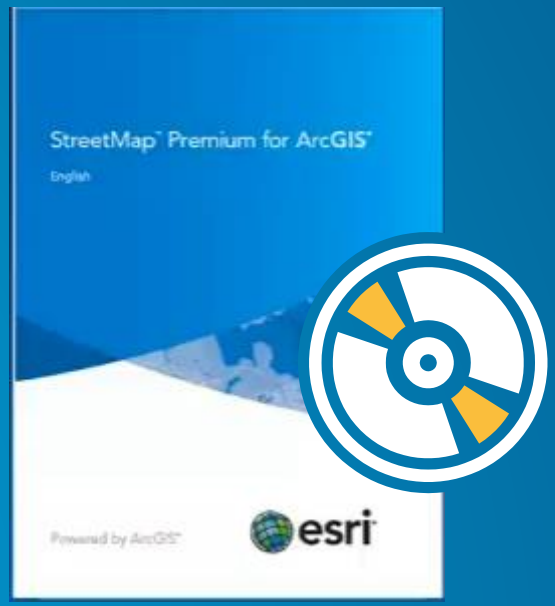
- Hardware/Device to host data and locators
- ArcGIS Software (Desktop, Server if you want to create a service)
- Locator Files and Reference Data or a Private Geocoding Service

Options

- Obtain or create reference data, build your own locator
- Use locators in Esri's ready to use street data product, StreetMap Premium
  - North America
  - Latin America
  - Europe
  - Middle East and Africa
  - Australia/New Zealand
  - Japan

License by:

Continent
Country
State/Province
(US/Canada)



http://www.esri.com/data/streetmap/comparison

	HERE North America	TomTom North America	HERE Latin America	HERE Europe	TomTom Europe	HERE Middle East and Africa	HERE Australia/ New Zealand	iPC
Coverage	North America	North America	Latin America	Europe	Europe	Middle East and Africa	Australia/ New Zealand	Japan
Vintage	2013	2013	2013	2013	2013	2013	2013 Q1	2012
Current Release	2014 Release 3	2014 Release 2	2013 Release 1	2014 Release 1	2014 Release 1	2014 Release 1	2014 Release 1	2013 Release 1
Update Schedule	3 Updates/year	3 Updates/year	1 Update/year	2 Updates/year	2 Updates/year	1 Update/year	1 Update/year	1 Update/year
Delivery	DVD	DVD	DVD	DVD	DVD	DVD	DVD	DVD
Format	FGDB	FGDB	FGDB	FGDB	FGDB	FGDB	FGDB	FGDB
Geocoding	Down to Address Point Level for US, Canada, Mexico	Down to Address Point Level for US, Canada, Mexico	Coverage Varies; Down to Address Point for many LatAm countries	Coverage Varies; Down to Address Point Level for many European Countries	Coverage Varies; Down to Street Address Level for many European Countries	Coverage Varies; Down to Address Point Level for Egypt, Israel, Saudi Arabia, and South Africa	Down to Address Point Level	Down to Address Point Level
Routing	Historic Traffic Data; Trucking Restrictions; Driving Directions	Historic Traffic Data; Trucking Restrictions; Driving Directions	Historic Traffic Data; Trucking Restrictions; Driving Directions	Historic Traffic Data; Trucking Restrictions; Driving Directions	Historic Traffic Data; Trucking Restrictions; Driving Directions	Historic Traffic Data; Trucking Restrictions; Driving Directions	Historic Traffic Data; Trucking Restrictions; Driving Directions	Basic Routing, Driving Directions

Geocoding On-Line – the ArcGIS Online World Geocoding Service

- **Ready-to-use world geocoding service**
- **Covers:**
  - **the planet at Admin/Populated places level**
  - **Over 100 countries supported at address precision**
  - **Over 50 countries down to address point**

Numbers to remember for batch geocoding:

40 credits for every **1,000** geocodes

2.4 credits per

10 MB of stored feature services/month

Which option is for me?

I am a user based in the US that needs to geocode tens of millions of US addresses per year, which option is right for me?

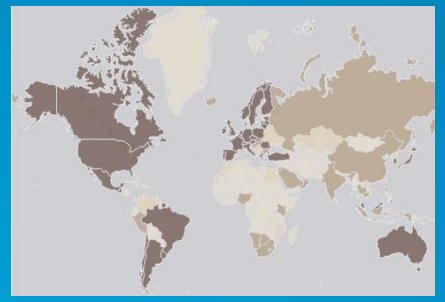
On premises option may be best **IF**

Volume of geocodes expected

Cost of credits consumed using the ArcGIS Online World Geocoding Service

Which option is for me?

I am a global, enterprise organization that needs to geocode addresses worldwide, what should I use?

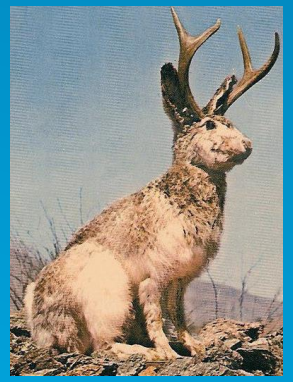


World Geocoding Service **IF**

your geocoding region extends beyond **StreetMap Premium availability**

Which option is for me?

I need to geocode millions of North American addresses per month, yet I have a hundred records for other countries I need geocoded as well, what should I use?

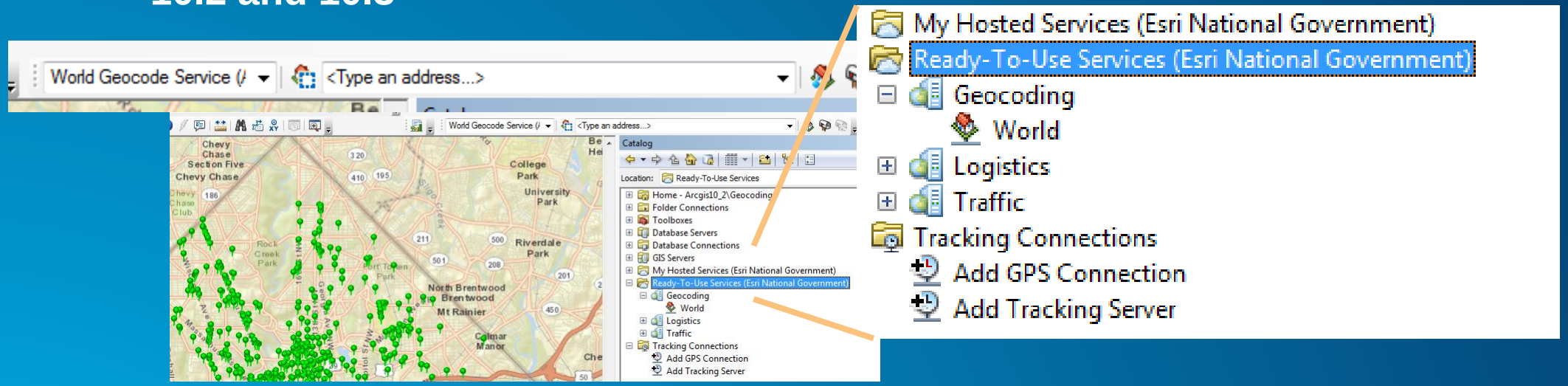


Hybrid!

StreetMap Premium + World Geocoding Service

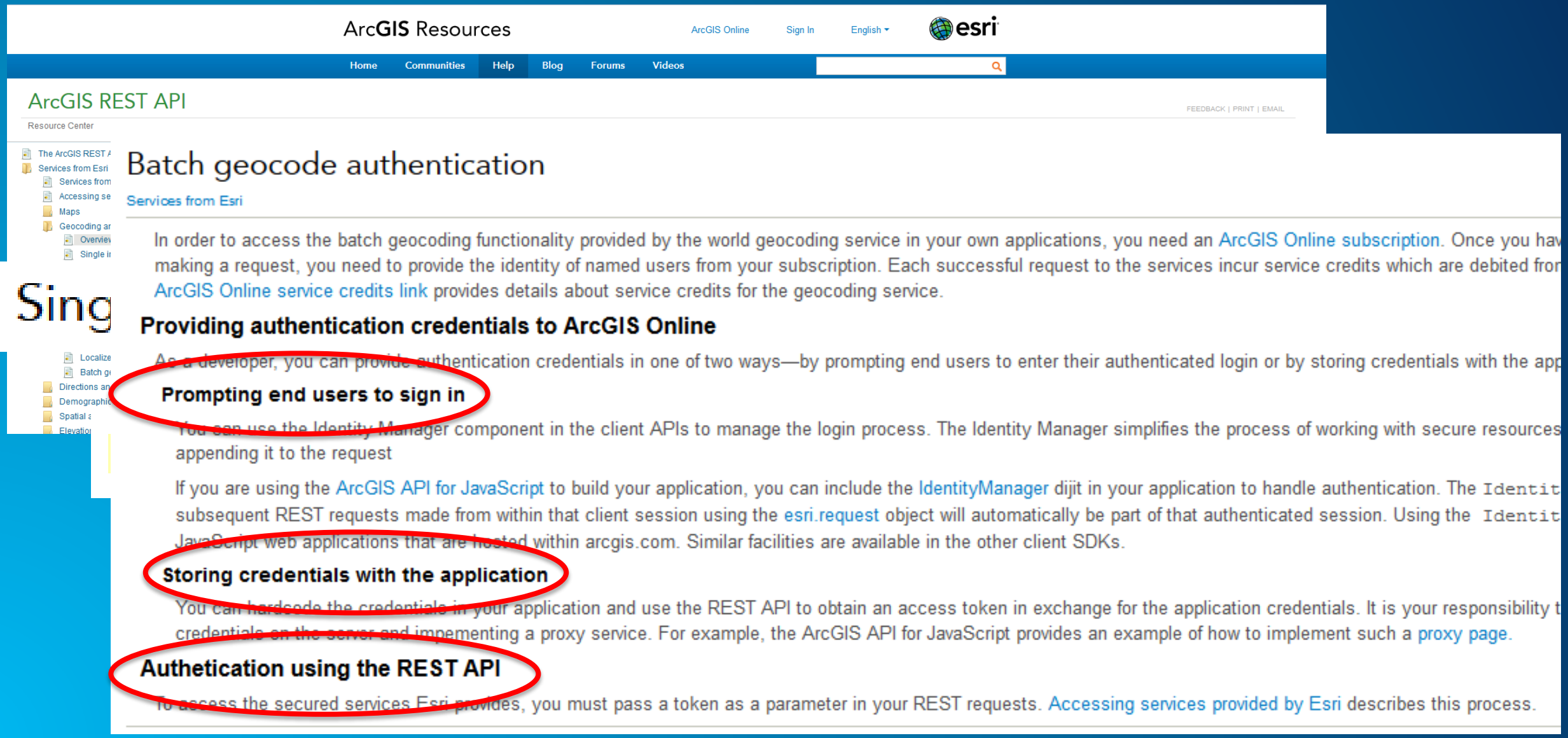
Accessing the World Geocoding Service - Desktop

- 10.2 and 10.3

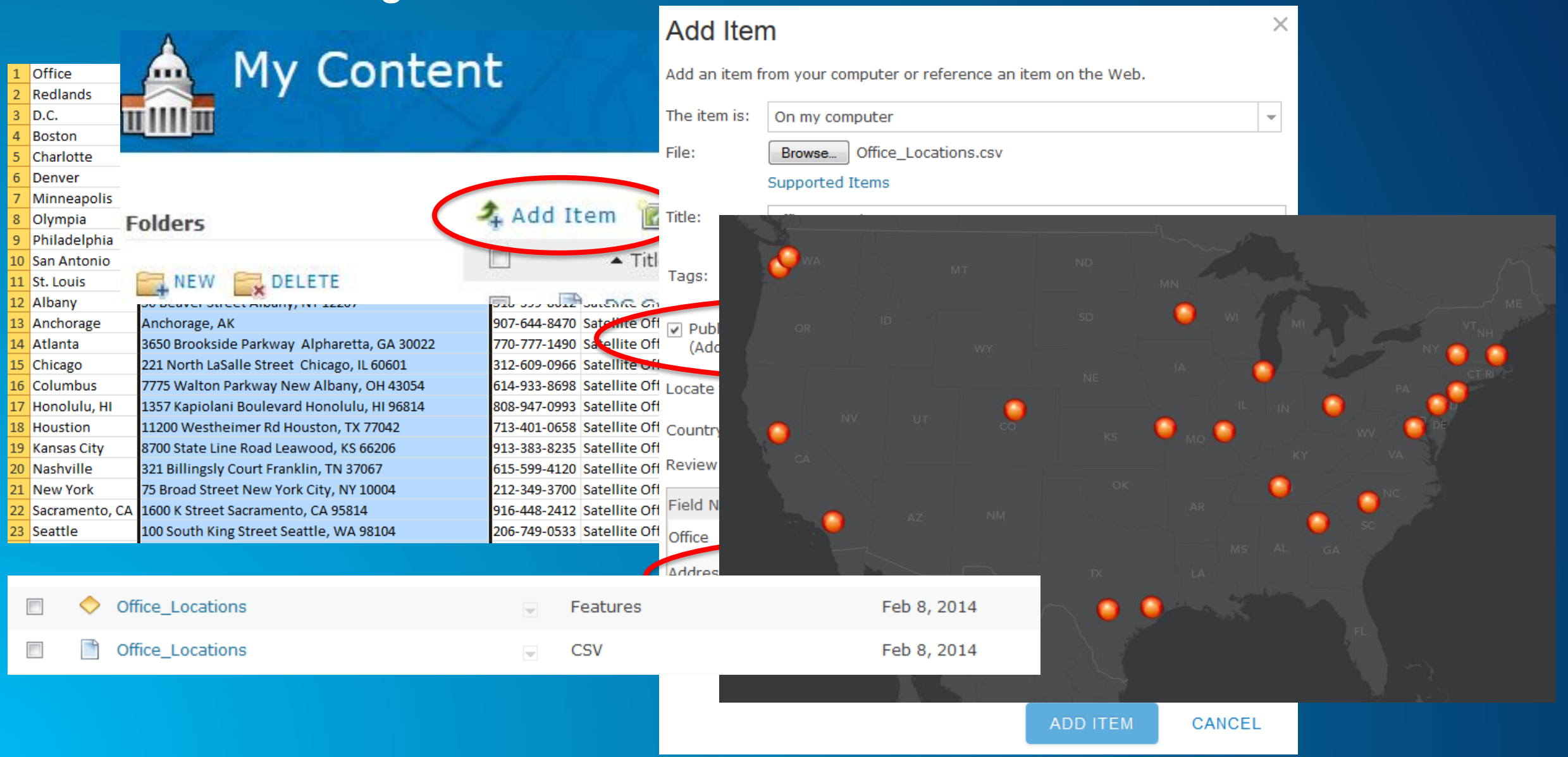


- 10.1

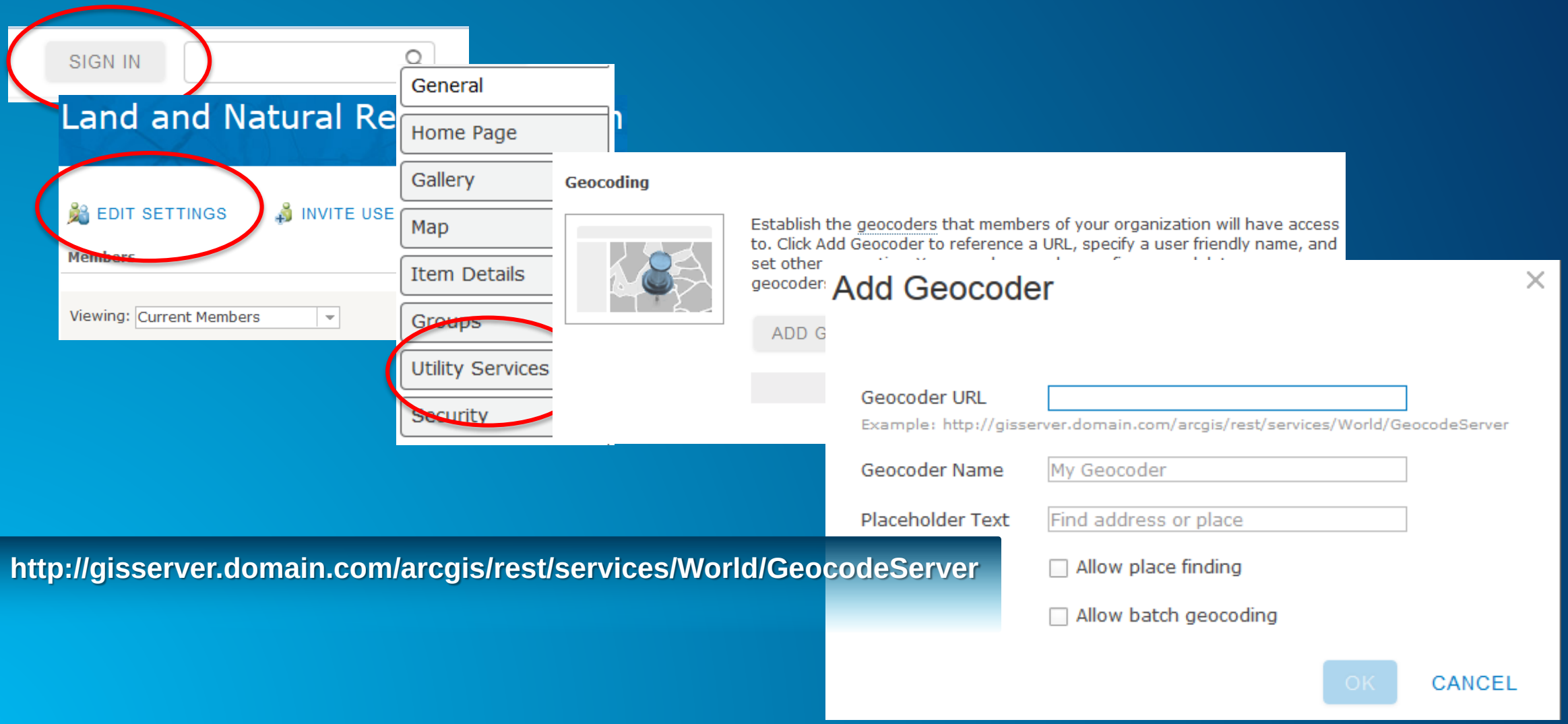
Accessing the World Geocoding Service – Web Apps



Batch Geocoding in ArcGIS Online



Registering your own Geocoding Service in ArcGIS Online



http://gisserver.domain.com/arcgis/rest/services/World/GeocodeServer

Does Esri store the addresses I submit to the World Geocoding Service?

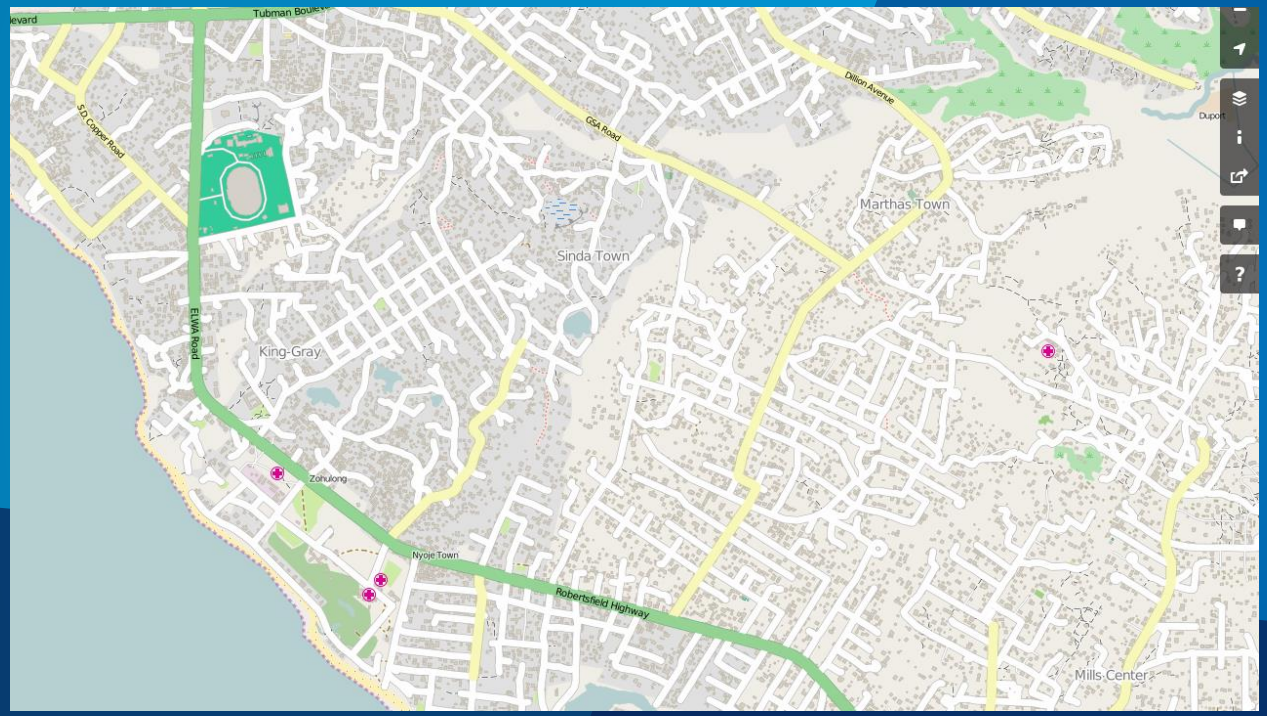
Batch Geocoding

- Esri does NOT save the addresses customers batch geocode - they are NOT persisted on our servers or in our logs
- If an organization implements their *own* geocoding application or process on top of our world geocoding service leveraging our GeocodeAddresses function in the ArcGIS Online API, that is batch geocoding and we WON'T log or persist addresses.

Interactive GeoSearch (one at a time)

- Esri does persist the addresses and uses them for testing and improvement of our system. This pattern is integrated into ArcGIS apps as well.
- If an organization implements custom batch geocoding using our Find or FindAddressCandidates function in the ArcGIS Online API (interactive geosearch) we do log the inputs
- The IP address, orgID, appID, and the Username who made the request is stored and secured, accessible only by DevOps Personnel. Access managed by PKI certificates assigned to each individual who requires access

GeoSearch and Batch Geocoding Demos



Geocoding in West Africa

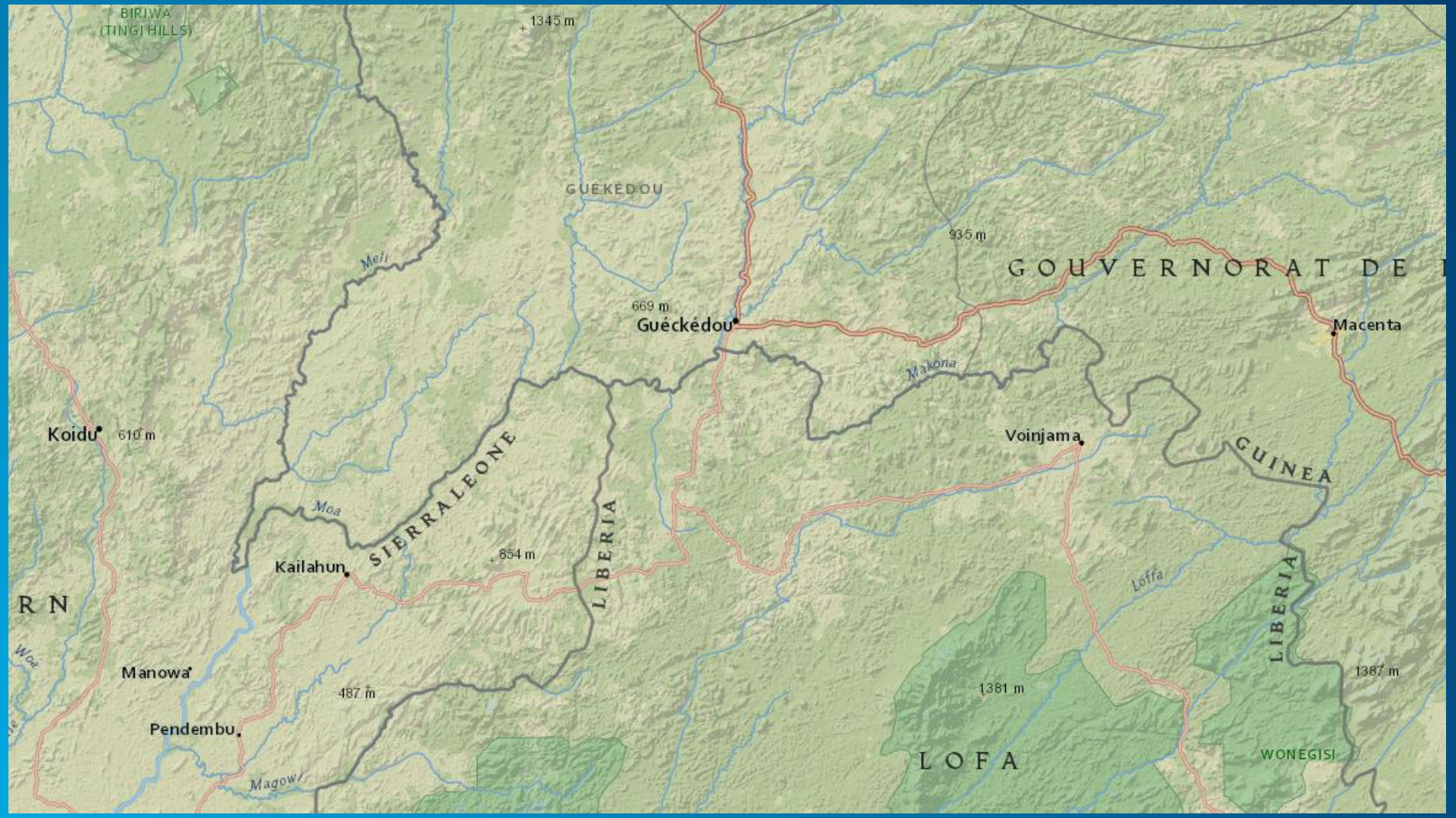
James Tedrick

The Need: Ebola Cases

- Hospitals & Treatment Centers created patient records
- Country Health offices centralized, forwarded to the international community
- Multiple Locations
  - Residence
  - Infection
  - Hospitalization
  - Death/Burial

- To most effectively target response, need to know where to go!

Big Challenge – 3 countries, 2 ‘official’ languages, little data



Approach

- Separate geocoding process per country
  - English/French
  - Reduce mismatch of close place names in different countries (Lofa/Labé)
- 2 geocoding processes for business purposes
  - Simple Soundex processing in Python on Admin2 with manually curated lookup table to get guaranteed Admin2
  - Geocoding using OSM POI & other historical survey data to attempt to get populated place
- Several different techniques involved (DB lookup, compound geocoding)
- Never underestimate the need for manual reprocessing!

2015

UNDERLYING TECHNOLOGY

UNDERLYING TECHNOLOGY

UNDERLYING TECHNOLOGY

Humanitarian Aid

Navigation

Delivery

Sport & Exploration

Mapping

E-commerce

USE CASES

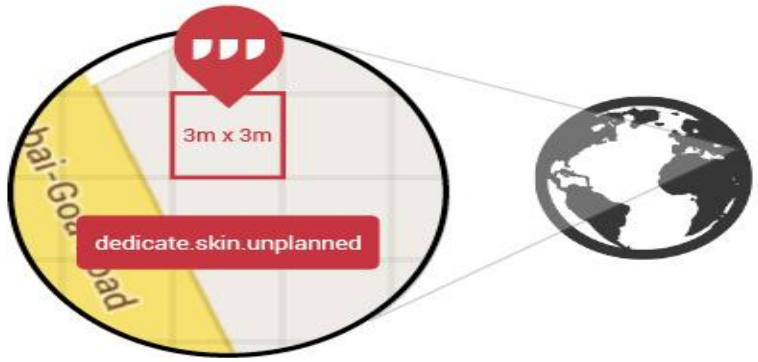
what3words is a global **grid of 57 trillion** 3mx3m squares.

Each square has a **3 word address** that can be **communicated quickly**, **easily** and with **no ambiguity**.

The **geocoder** turns latitude,longitude **coordinates** into 3 word addresses & vice-versa.

Everyone and **everywhere** now has an **address**.

18.5575014,
73.1289396 =



Questions

Understanding our world.