

Federal GIS Conference

February 9–10, 2015 | Washington, DC



Geocoding Techniques and Options for US and International Locations

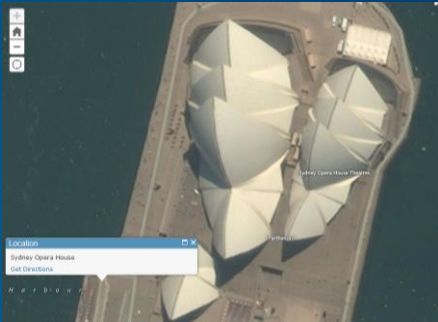
Tosia Shall – Esri, Washington, DC

James Tedrick – Esri, Washington, DC

Chris Sheldrick – what3words

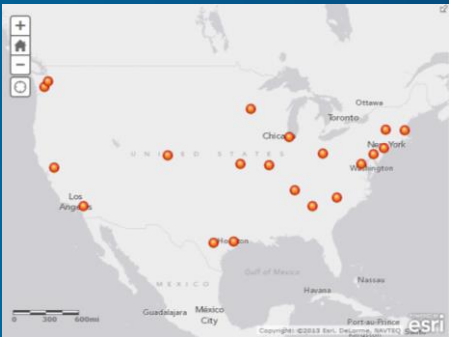
Types of Geocoding

• GeoSearch → Sydney Opera House

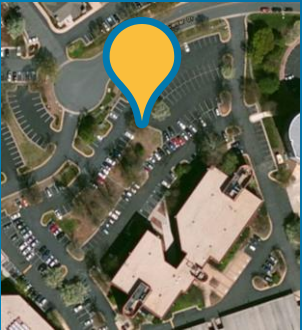


• Batch Geocoding →

	A	B	C	D	E
1	Office	Address	Telephone	Type	
2	Redlands	180 New York Street Redlands, CA 92373	909-793-2853	Headquarters	
3	D.C.	8615 Westwood Center Drive Vienna, VA 22182	703-506-9515	Federal Sales	
4	Boston	35 Fenmore Road Danvers, MA 01923	978-777-4543	Regional Office	
5	Charlotte	3125 Springbank Lane Charlotte, NC 28226	704-341-7810	Regional Office	
6	Denver	One International Court Broomfield, CO 80021	303-449-7779	Regional Office	
7	Minneapolis	890 Blue Gertian Road St. Paul, MN 55121	651-454-0600	Regional Office	
8	Olympia	806 Columbia Street NW Olympia, WA 98501	360-754-4727	Regional Office	
9	Philadelphia	1400 Morris Drive Chesterbrook, PA 19087	610-644-3376	Regional Office	
10	San Antonio	227 North Loop 1804 East San Antonio, TX 78212-1200	210-499-1044	Regional Office	
11	St. Louis	3060 Little Hills Expressway St. Charles, MO 63301	636-949-6620	Regional Office	
12	Albany	30 Beaver Street Albany, NY 12267	518-399-8612	Satellite Office	
13	Anchorage	Anchorage, AK	907-644-3470	Satellite Office	
14	Atlanta	3650 Brookside Parkway Alpharetta, GA 30022	770-777-1490	Satellite Office	
15	Chicago	221 North LaSalle Street Chicago, IL 60601	312-609-0960	Satellite Office	
16	Columbus	7775 Walton Parkway New Albany, OH 43054	614-933-8698	Satellite Office	
17	Honolulu, HI	1333 Kapiolani Boulevard Honolulu, HI 96814	808-947-0991	Satellite Office	
18	Houston	11200 Westheimer Rd Houston, TX 77042	713-401-0650	Satellite Office	
19	Kansas City	8700 State Line Road Leawood, KS 66206	913-383-8235	Satellite Office	
20	Nashville	321 Billingsly Court Franklin, TN 37067	615-599-4120	Satellite Office	
21	New York	75 Broad Street New York City, NY 10004	212-349-3700	Satellite Office	
22	Sacramento, CA	1600 K Street Sacramento, CA 95814	916-446-2412	Satellite Office	
23	Seattle	100 South King Street Seattle, WA 98104	206-749-0531	Satellite Office	



• 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



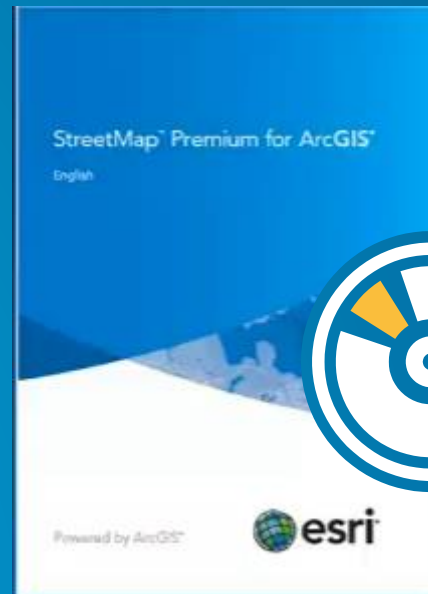
Options

- 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**

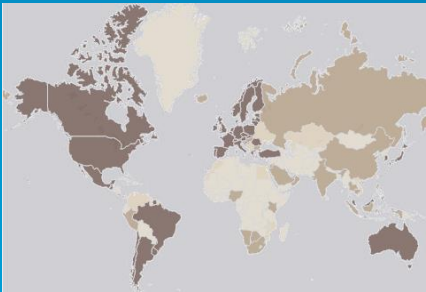
Volume of geocodes expected



Cost of credits consumed using the ArcGIS Online World Geocoding Service

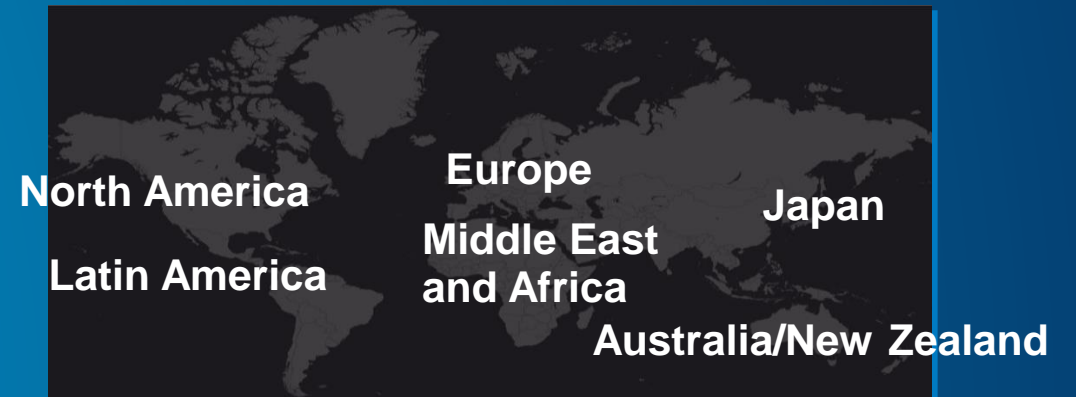
Which option is for me?

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?



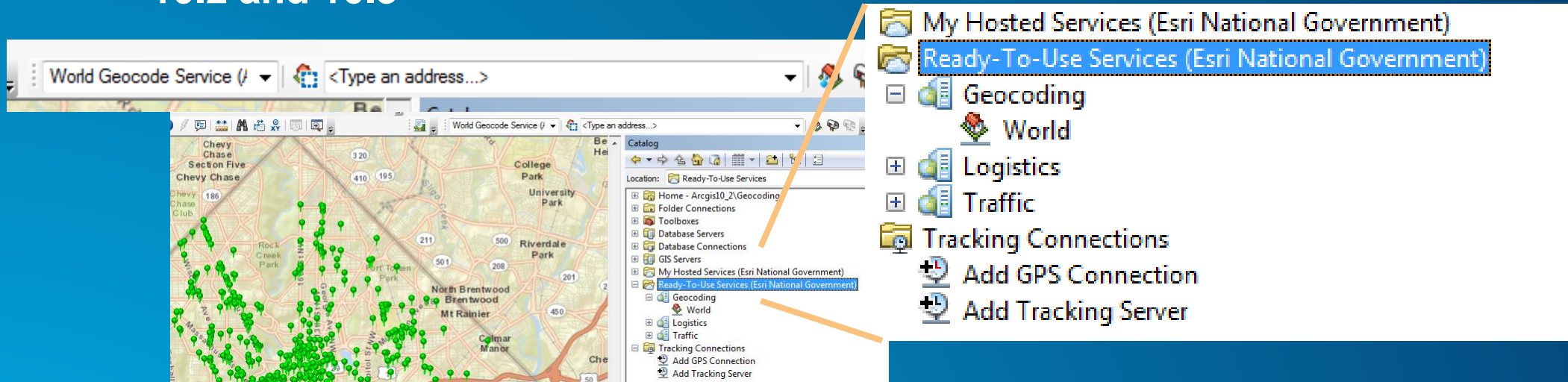
Hybrid!

StreetMap Premium + World Geocoding Service

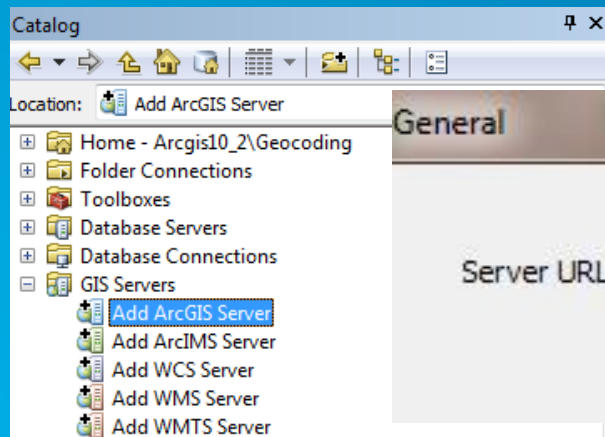


Accessing the World Geocoding Service - Desktop

- 10.2 and 10.3



- 10.1



Authentication

User Name: **Organization username**

Password: **Password**

☒ Save Username/Password

Server URL: **http://geocode.arcgis.com/arcgis/services**

ArcGIS Server: **http://myserver:6080/arcgis**

Spatial Data Server: **http://myserver:8080/arcgis**

Accessing the World Geocoding Service – Web Apps



ArcGIS REST API

Resource Center

- The ArcGIS REST API
- Services from Esri
- Services from Esri
- Accessing services
- Maps
- Geocoding and
- Overview
- Single item

Sing

- Localize
- Batch geocoding
- Directions and
- Demographic
- Spatial analysis
- Elevation

Batch geocode authentication

Services from Esri

In order to access the batch geocoding functionality provided by the world geocoding service in your own applications, you need an [ArcGIS Online subscription](#). Once you have made a request, you need to provide the identity of named users from your subscription. Each successful request to the services incur service credits which are debited from your [ArcGIS Online service credits link](#) provides details about service credits for the geocoding service.

Providing authentication credentials to ArcGIS Online

As a developer, you can provide authentication credentials in one of two ways—by prompting end users to enter their authenticated login or by storing credentials with the application.

Prompting end users to sign in

You can use the Identity Manager component in the client APIs to manage the login process. The Identity Manager simplifies the process of working with secure resources by appending it to the request.

If you are using the [ArcGIS API for JavaScript](#) to build your application, you can include the [IdentityManager](#) dijit in your application to handle authentication. The IdentityManager dijit handles the authentication process for subsequent REST requests made from within that client session using the [esri.request](#) object will automatically be part of that authenticated session. Using the IdentityManager dijit in JavaScript web applications that are hosted within [arcgis.com](#). Similar facilities are available in the other client SDKs.

Storing credentials with the application

You can ~~hardcode the credentials in your application~~ and use the REST API to obtain an access token in exchange for the application credentials. It is your responsibility to ~~credentials on the server and implementing a proxy service~~. For example, the ArcGIS API for JavaScript provides an example of how to implement such a [proxy page](#).

Authentication using the REST API

To access the secured services Esri provides, you must pass a token as a parameter in your REST requests. [Accessing services provided by Esri](#) describes this process.

Batch Geocoding in ArcGIS Online

My Content

Folders

- Office
- Redlands
- D.C.
- Boston
- Charlotte
- Denver
- Minneapolis
- Olympia
- Philadelphia
- San Antonio
- St. Louis
- Albany
- Anchorage
- Atlanta
- Chicago
- Columbus
- Honolulu, HI
- Houston
- Kansas City
- Nashville
- New York
- Sacramento, CA
- Seattle

Add Item

Title	Description	Type	Location
Anchorage, AK	3650 Brookside Parkway Alpharetta, GA 30022	Satellite Office	907-644-8470
Atlanta	221 North LaSalle Street Chicago, IL 60601	Satellite Office	770-777-1490
Chicago	7775 Walton Parkway New Albany, OH 43054	Satellite Office	312-609-0966
Columbus	1357 Kapiolani Boulevard Honolulu, HI 96814	Satellite Office	614-933-8698
Honolulu, HI	11200 Westheimer Rd Houston, TX 77042	Satellite Office	808-947-0993
Houston	8700 State Line Road Leawood, KS 66206	Satellite Office	713-401-0658
Kansas City	321 Billingsly Court Franklin, TN 37067	Satellite Office	913-383-8235
Nashville	75 Broad Street New York City, NY 10004	Satellite Office	615-599-4120
New York	1600 K Street Sacramento, CA 95814	Satellite Office	212-349-3700
Sacramento, CA	100 South King Street Seattle, WA 98104	Satellite Office	916-448-2412
Seattle		Satellite Office	206-749-0533

Add Item

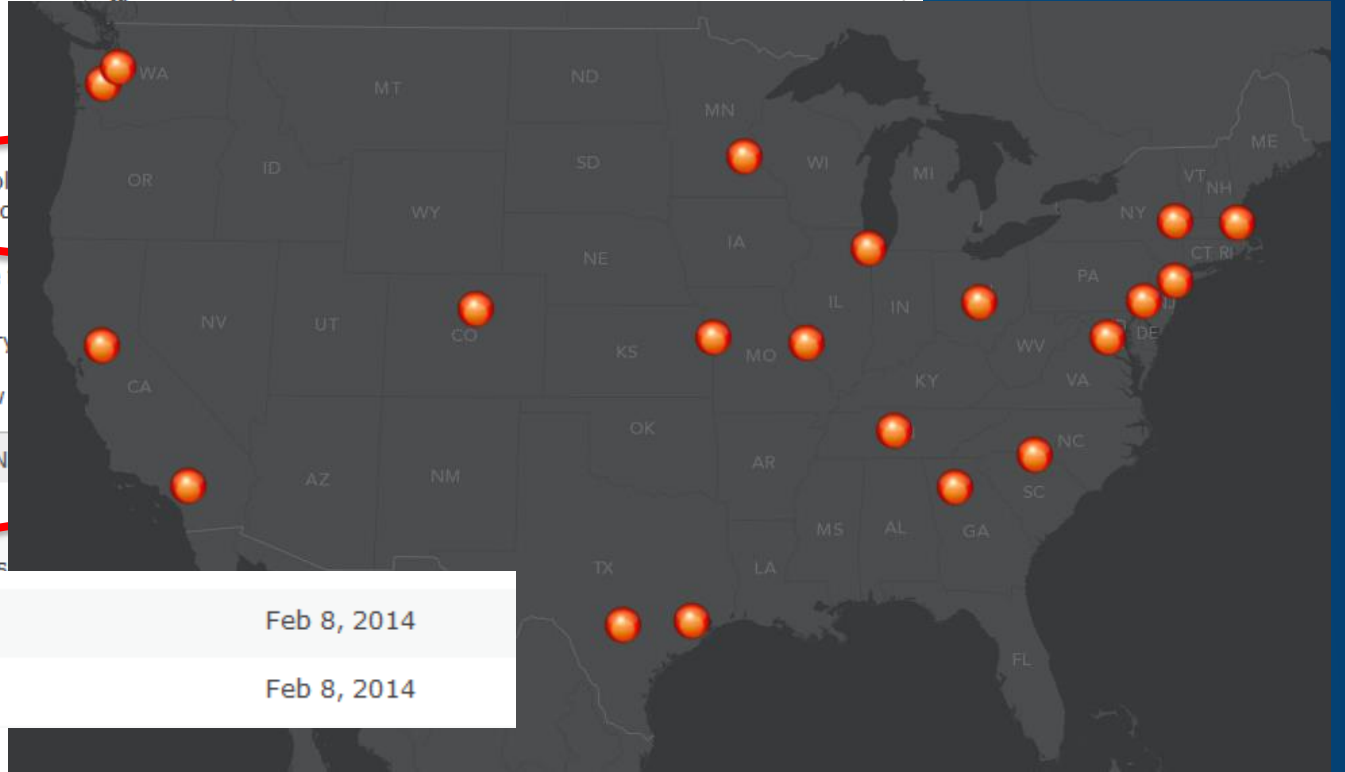
Add an item from your computer or reference an item on the Web.







The item is:

File: Office_Locations.csv

Supported Items

Title:

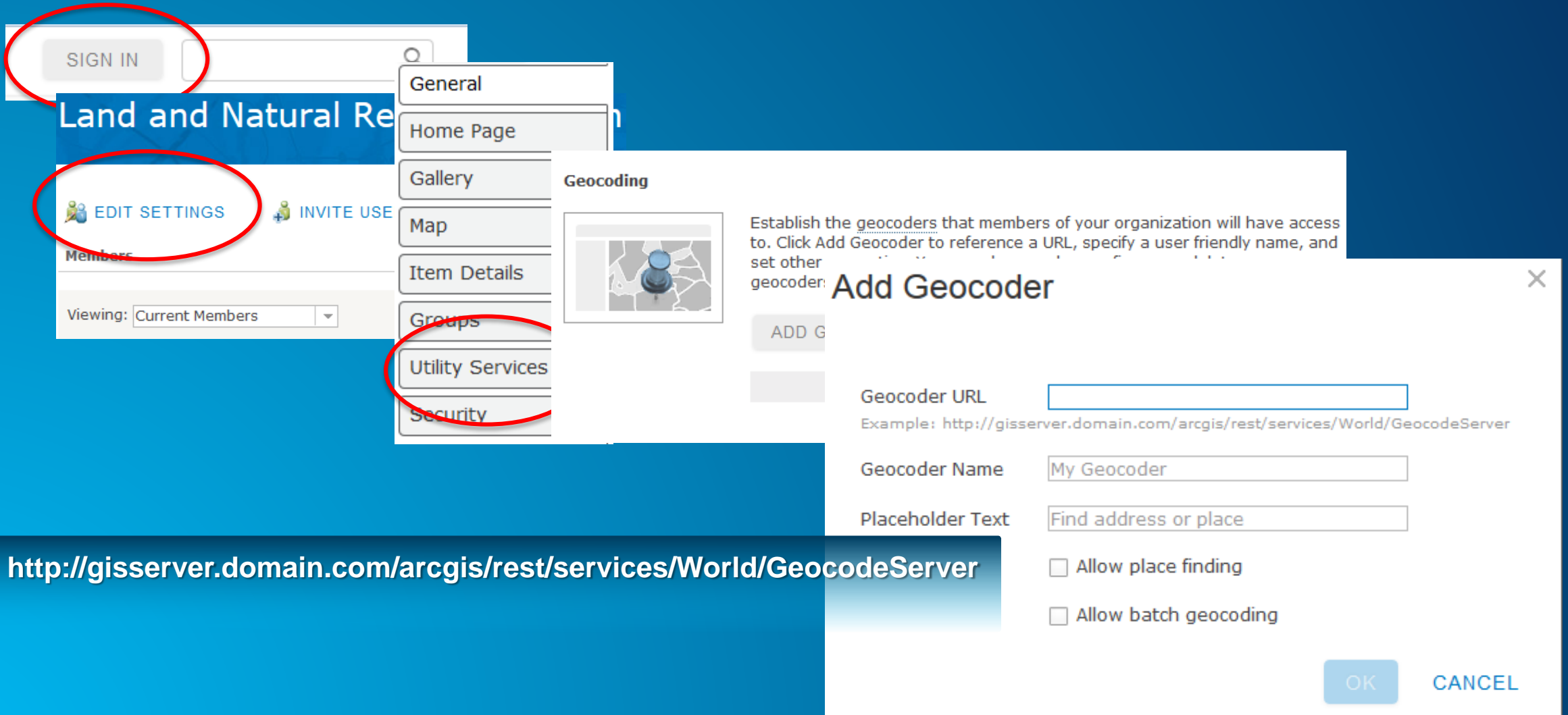


		Office_Locations		Features	Feb 8, 2014
		Office_Locations		CSV	Feb 8, 2014

ADD ITEM

CANCEL

Registering your own Geocoding Service in ArcGIS Online



The screenshot shows the ArcGIS Online interface. The 'SIGN IN' button is circled in red. The 'Land and Natural Resources' organization name is visible. The 'EDIT SETTINGS' button is circled in red. The 'Geocoding' tab is selected in the left sidebar, and the 'Groups' tab is also circled in red. The 'Add Geocoder' dialog box is open, showing the following fields:

- Geocoder URL:** Example: `http://gisserver.domain.com/arcgis/rest/services/World/GeocodeServer`
- Geocoder Name:** My Geocoder
- Placeholder Text:** Find address or place
- ☐ Allow place finding
- ☐ Allow batch geocoding

The 'OK' and 'CANCEL' buttons are at the bottom right of the dialog box.

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

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

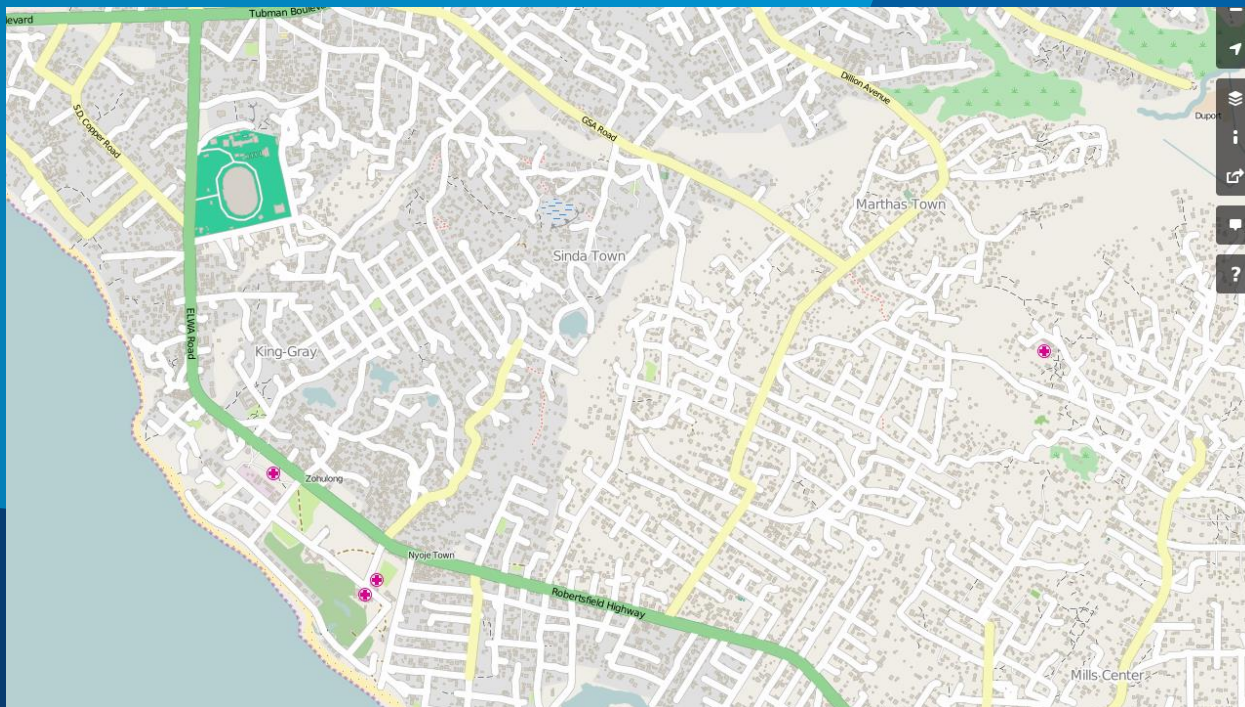
Batch Geocoding

- 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, applID, 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!**



what3words
addressing the world

2015







UNDERLYING TECHNOLOGY



UNDERLYING TECHNOLOGY



UNDERLYING TECHNOLOGY



Humanitarian Aid



Navigation



Delivery



Sport & Exploration



Mapping



E-commerce

USE CASES



what3words
addressing the world



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

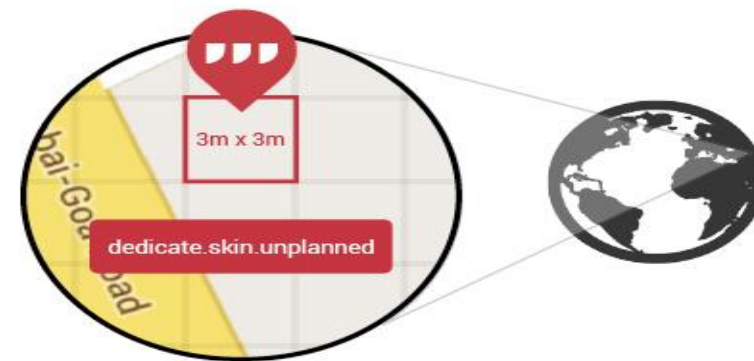
Each square has a **3 word address** that can be communicated **quickly, easily** and with **no ambiguity**.

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.