



Office of the Chief Information Officer



# Washington Master Address Services: Project Overview

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March 18<sup>th</sup> 2013

[http://www.youtube.com/watch?v=u009SK\\_mid](http://www.youtube.com/watch?v=u009SK_mid)  
M&feature=youtu.be

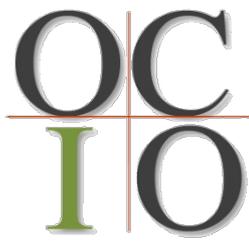




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# Master Address Services Prototype

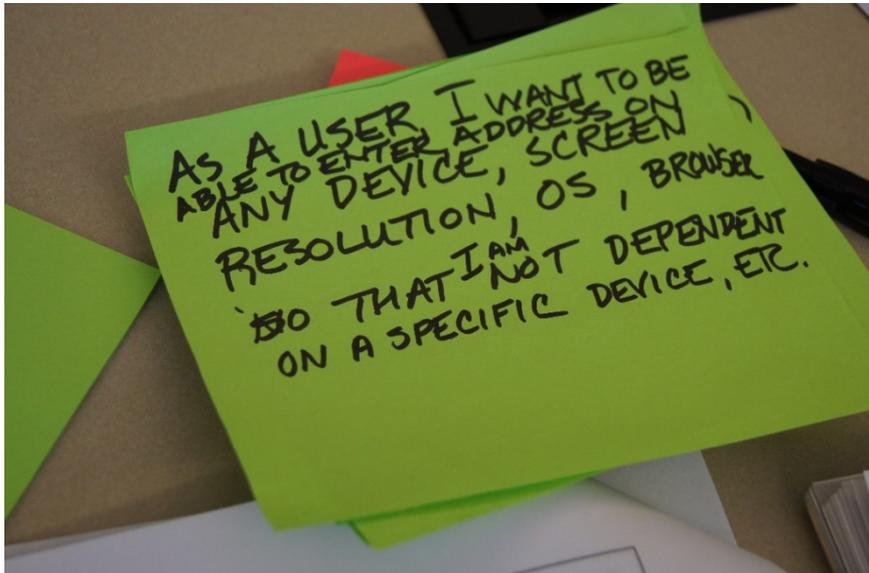
- Problem
  - Lack of consistent addressing approach for GIS leads to redundant, uncoordinated, and error-prone work across agencies
- Solution
  - Create one master address file and approach to:
    - Save money
    - Solve customer problem
- OCIO Innovation Labs role
  - Bring 11+ agencies together
  - Seed funding for development

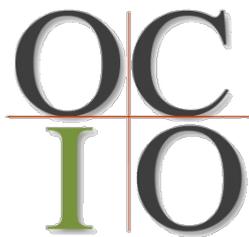


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# GIS Community Addressing Project Prototype

- Demonstrate business value
- Cross-agency collaborative effort
- \$1M+ in cost avoidance
- Reduce taxing errors

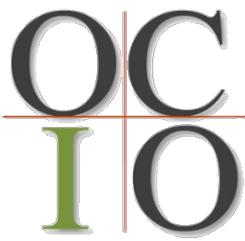




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# WAMAS Overview

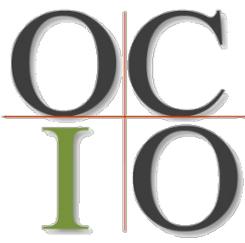
- Enterprise class system
- Key components:
  - Master address file (database & workflow)
  - Services
    - Address standardization
      - Standardize and correct address strings
    - Geocoding
      - Convert textual addresses to geographic locations
    - Location finder
      - Access attributes based on the address's geographic location



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# WAMAS Overview, Cont'd

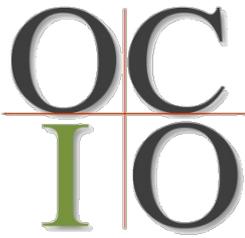
- Most of the core functionality is not new
  - Address Correction & Geocoding Services (DOH: 2007)
  - Washington Location Finder (ECY: 2008)
- Moving these to the enterprise is new
  - Design of a common data structure for use in services
  - Expand existing processes to populate & support the additional data elements
  - Expand existing services to utilize the new data
  - Build the ability to continue to expand and refine data



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# How Many Addresses?

- Impossible to tell, but...
  - If each address is stored in multiple data silos *and* each address has more than one permutation...
  - Then we are getting into some very big numbers
- Most likely, there are somewhere between 3-5 million unique addresses in WA
- Always growing - land/parcel splits, new construction
- Ever changing - USPS redistricting & optimizing routes

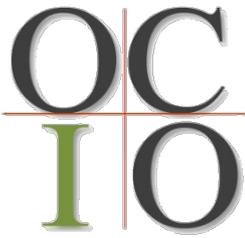


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# What About Standards?

- Address standardization
  - FGDC- United States Thoroughfare, Landmark, and Postal Address Data Standard
  - Melissa Data Systems address clean-up
  - Custom designed logic to handle WA specific issues with complex/non-standard addressing
    - Examples: Street Place, Street Court, Street Fl, Place Al

Input Address	Standardized Address
4450 Blakeley Ave	4450 Blakely Ave NE
1663 Killarney Way SE	1663 Killarney Way
1215 F Street	1215 F St
140 S Marion Ave	140 Marion Ave S
917 Scheuber Rd S	917 S Scheuber Rd
311 NE Third St	311 NE 3rd St
10 Nichols St	10 Nicholls St
200 Vancouver Ave	200 NW Vancouver Ave



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# Geography Matters

- Much of the state's business has a geographic component

Entity	Purpose
DOL, DOR	Assignment/collection of taxes/fees
EMD, City, County	Public safety, emergency response
DSHS, LNI, ESD	Provision of social/health services
DOL, ECY	Licensing/permitting
DOH, DSHS	Fraud analysis/siting facilities
All agencies	Reporting by location

- Addresses are key to locating households, firms, and facilities in geographic space



# Precise Locations Matter

## Ranged Street/Cross-Street Addresses

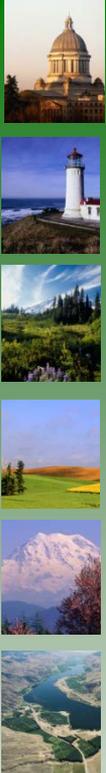


Vs.

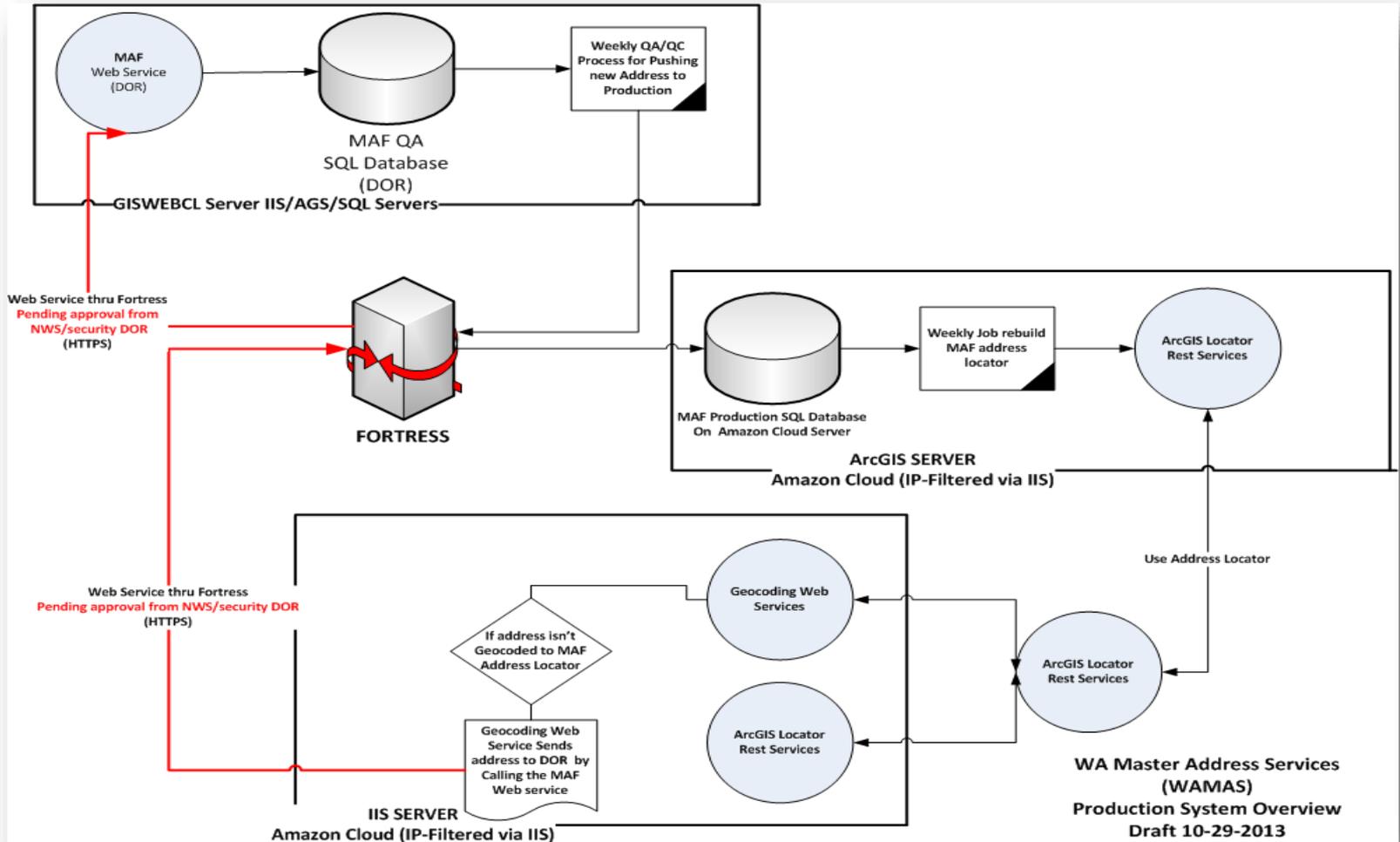
## Structure Points

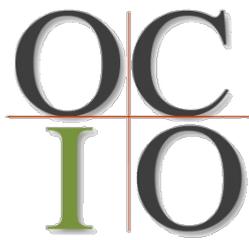
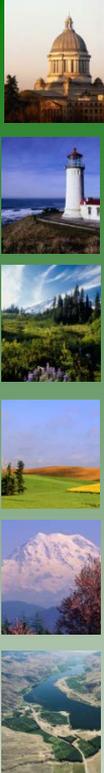


- Methods used by Google/Bing less accurate
- Lack of data currency knowledge
- Feedback/correction ability limited
- License/contractual constraints for many uses
- Calculated locations can lead to "Get Jesse" events



# System Architecture





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# Master Address File (MAF)

- Automated services
  - Microsoft SQL 2012 Database Services
  - Batch services to schedule consistent tasks
  - Correct in one location, changes propagate through



Home About Strategies Initiatives Policies Blog Communities

## Initiatives

Agile Development

▼ Enterprise GIS

Governance & Standards

▼ Data & Services

**Washington Master Address Services (WAMAS)**

► Enterprise Portfolio Management (EPM)

Innovation Labs

Open Data

## Washington Master Address Services (WAMAS)

[Home](#) » [Initiatives](#) » [Enterprise GIS](#) » [Data & Services](#) » Washington Master Address Services (WAMAS)

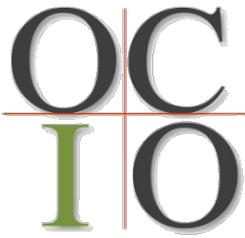
### Washington Master Address Services (WAMAS)

This Web page is designed to test WAMAS shared web services. These services can be consumed from a Web page or from within a desktop or server application.

Tools that...

- correct an address to USPS standard format
- add coordinates to an address so it can be displayed and viewed on a map
- locate an address in the correct boundary area like voting and taxing districts and many other important jurisdictions

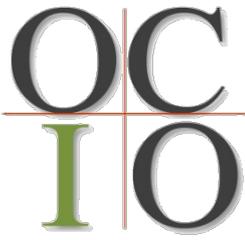




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# WAMAS Toolkit

- Excel Add-in utility
- Online batch address standardization utility
- Scripting
  - Python, JavaScript, R, SAS, etc.
- SQL stored procedure, CLR
- ArcGIS address locators
- Web services from a variety of IDEs



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# Web Services



## Washington Master Address Services (WAMAS)

This web page is designed to test WAMAS shared web services. These services can be consumed by web or desktop applications that collect or process address data.

Enter a street address and it can be corrected against a USPS database, geocoded (given a location), automatically assigned values from other geographic layers and displayed on a map.

Address	Address2	Company	City	ZIP	ZIP4	State	
PO Box 47904	101 Is reel		Tumwat			WA	<input type="button" value="Call Web Services"/>

### Results from the Address Correction service

101 Israel Rd SE	PO Box 47904		Tumwater	98501	5570	WA
------------------	--------------	--	----------	-------	------	----

```

Corrected the Address
Corrected the Address2
Corrected the City
Corrected the Zip Code
Corrected the Zip4
Corrected the Suffix
Corrected Directional

Address      101 Israel Rd SE
Address2    PO Box 47904
Company
City         Tumwater
Zip         98501
State       WA
County      Thurston
Prefix      SE
Number      101
Street      Israel
PreType
PostSuffix   Rd
PostDir     SE
Unit
UnitType
Garbage
AddressType Street
Quality     Address found in USPS database
Results     AC01,AC03,AC06,AC10,AC11,AC12,AS01
Status
Candidate1
Candidate2
Candidate3
Candidate4
Candidate5

```

- Validates address against USPS database
- Adds missing address elements
- Returns address in standardized format
- Savings on returned mail

[Learn More](#)

### Results from the Location Finder service

```

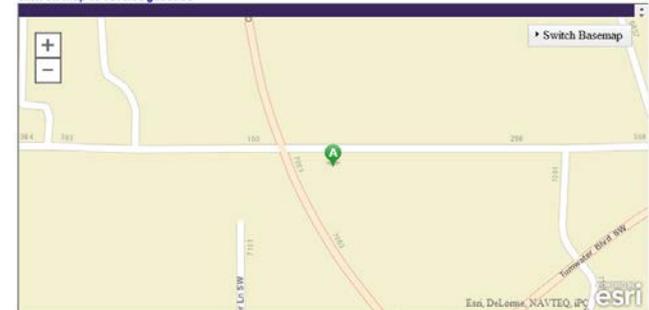
Legislative District      22
Congressional District    10
County                    Thurston
City Limits               Tumwater
Urban Growth Area         Tumwater UGA
ZIP Code (2012)          98501
Major Public Lands       Not Inside
Tribal Lands              Not Inside
Township/Range/Section   170N0300E02
Census Block              530670300005035
Water Resource Inventory Area Deschutes
Watershed Admin Unit     Lower Deschutes
Wellhead Protection (6 Month) Not Inside
Wellhead Protection (1 Year) Not Inside
Wellhead Protection (3 Year) Not Inside
Wellhead Protection (10 Year) Not Inside
HMD Water Body           Not Inside
Puget Sound Action Area  South Puget Sound

```

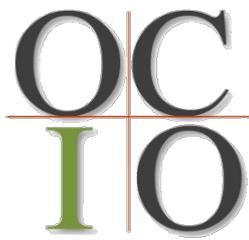
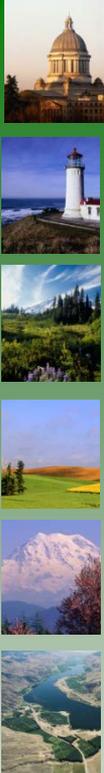
- Assigns attributes based on the address's point location
- Allows addresses to be grouped by geography
- Can be used to assign service providers
- Additional attributes can be added

[Learn More](#)

### Click on map to reverse geocode



<http://198.238.214.59/testwebservices/default.aspx>



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# Web Services, Cont'd

## MapServices/LocationFinder\_GPService (MapServer)

**View In:** [ArcMap](#) [ArcGIS Explorer](#) [ArcGIS JavaScript](#) [Google Earth](#) [ArcGIS.com Map](#)

**View Footprint In:** [Google Earth](#)

**Service Description:**

**Map Name:** Layers

[Legend](#)

[All Layers and Tables](#)

**Layers:**

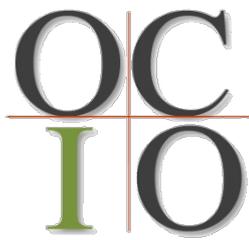
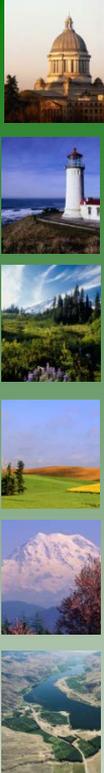
- [NHD Flowlines](#) (0)
- [2010 Census Blocks](#) (1)
- [2010 Census Block Groups](#) (2)
- [2010 Census Tracts](#) (3)
- [Cities/Urban Growth Areas \(UGA\)](#) (4)
- [2012 Congressional Districts](#) (5)
- [Counties](#) (6)
- [2012 Legislative Districts](#) (7)
- [Major Public Lands](#) (8)
- [NHD Waterbodies](#) (9)
- [Puget Sound Action Areas](#) (10)
- [Township/Range/Sections](#) (11)
- [Tribal Lands](#) (12)
- [Water Resource Inventory Areas \(WRIA\)](#) (13)
- [Watershed Admin Units](#) (14)
- [Wellhead Protection Zones \(6 month\)](#) (15)
- [Wellhead Protection Zones \(1 year\)](#) (16)
- [Wellhead Protection Zones \(5 year\)](#) (17)
- [Wellhead Protection Zones \(10 year\)](#) (18)
- [Zip Codes](#) (19)

## Identify (MapServices/LocationFinder\_GPService)

Geometry:	<input type="text" value="-122.963, 47.142"/>
Geometry Type:	Point
Spatial Reference:	4326
Layers:	all
Layer Definitions:	
Time:	
Layer Time Options:	
Tolerance:	0
Map Extent:	-125,7,45.3,-116,8,49.1
Image Display:	600,400,96
Return Geometry:	<input checked="" type="radio"/> True <input type="radio"/> False
Max Allowable Offset:	
Geometry Precision:	
Dynamic Layers:	
ReturnZ:	<input type="radio"/> True <input checked="" type="radio"/> False
ReturnM:	<input type="radio"/> True <input checked="" type="radio"/> False
Geodatabase Version Name:	
Format:	HTML
<input type="button" value="Identify (GET)"/> <input type="button" value="Identify (POST)"/>	

**Supported Operations:** [Export Map](#) [Identify](#) [Find](#) [Return Updates](#) [Generate KML](#)

[http://198.238.214.59/arcgis/rest/services/MapServices/LocationFinder\\_GPService/MapServer](http://198.238.214.59/arcgis/rest/services/MapServices/LocationFinder_GPService/MapServer)



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# ExcelGeo Add-in

Sample\_Addresses.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Developer Addressing Acrobat Design

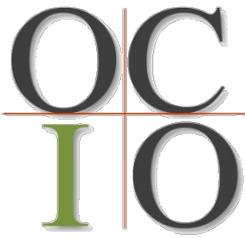
Correct Addresses Address A Company State Start 2  
Geocode Address2 Zip C Unique ID End 2001 Results Run Help  
GeoProcess City B Zip4 D

Select Services to Use Select Input Columns Row ... Output Work Sheet ...

A42 4517 78TH AVENUE CT W

	A	B	C	D	E	F	G	H
1	STREET	CITY	ZIPCODE	ZIP_4				
2	1328 18TH AVE. 305	LONGVIEW	98632					
3	1328 BRADLEY ST	BREMERTON	98310					
4	1328 LOGAN ST	CENTRALIA	98531	5422				
5	1328 LOGAN ST	CENTRALIA	98531	5424				
6	1328 LOGAN STREET	CENTRALIA	98531					
7	1328 NIPSIC AVE	BREMERTON	98312					
8	1328 SOUTH 251ST CT	DES MOINES	98198					
9	1328 W. GORDON AVENUE	SPOKANE	99205					
10	1329 E 56TH ST	TACOMA	98404	2514				
11	1329 E PRINCETON	SPOKANE	99207					
12	1329 E. 26TH. AVENUE	SPOKANE	99203					
13	1329 LINCOLN AVE.	SUNNYSIDE	98944					
14	1329 N. 121ST ST.	SEATTLE	98103					
15	1329 WOODGLEN STREET NORTHEAST	OLYMPIA	98516					
16	13291 SIGNE PLACE	MOUNT VERNON	98273					

Ready 100 Bad Addresses 2000 Normal Addresses 100%

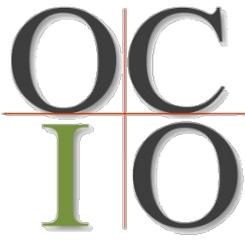


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# Online Batch Address Standardization

The screenshot shows a web browser window with the following elements:

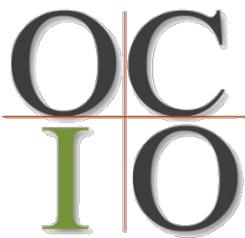
- Browser Tab:** Simple Map
- Address Bar:** `nwdemo3.esri.com/js/batchmelissa/`
- Bookmarks Bar:** Home, Google, Clear, Data.wa.gov, JSONLint, JSONFormatter, pyscripter, IDRE, Other bookmarks
- Page Title:** Melissa Data Batch Standardizer
- File Selection:** A button labeled "Choose File" followed by the text "No file chosen".
- Upload Button:** A button labeled "Upload".



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# Scripting - SAS

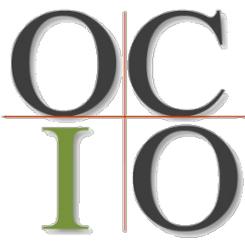
- Proc HTTP or Proc SOAP can be used to call web services
  - URL parameter query
- Response returned as file
  - Address standardization/geocoding: XML
  - Location finder: JSON



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# Proc HTTP Service Call

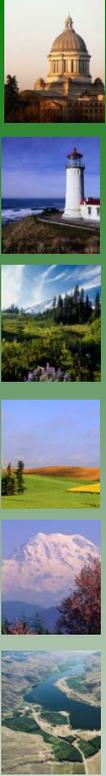
```
GetStandardizedAddress.sas
126 proc sql noprint;
127   select 'address=' || address || '&address2=' || address2 || '&company=' || company || '&city=' || city ||
128     into :post1 - :post10000
129     from &infn.
130   ;
131 quit;
132
133 %do i = 1 %to &sqlobs.;
134
135   data _null_;
136     file xmlin;
137     put "%superq(post&i.)";
138   run;
139
140   proc http
141     in=xmlin
142     out=xmlout
143     url="http://198.238.214.59/addresscorrection_v2/service.asmx/Getstandardizedaddress"
144     method="post"
145     ct="application/x-www-form-urlencoded"
146     proxyhost="198.238.214.59"
147     proxyport=80
148   ;
149   run;
150
```



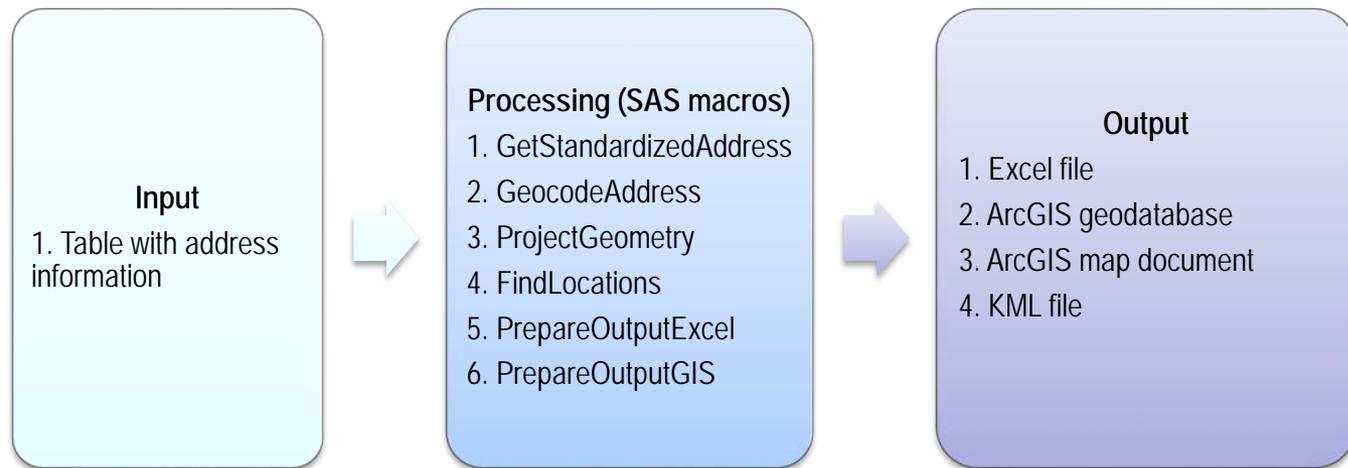
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# SAS Example

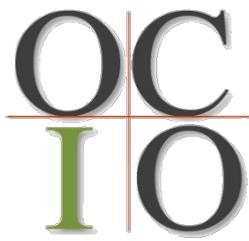
- OFM needs a way to evaluate new and existing address points: building permits, group quarters, health care facilities, etc.
  - Want to leverage the 3 main addressing services
  - Want to make it easy to evaluate returned results
    - Via Excel
    - Via Google and Bing Maps
    - Via KML file and Google Earth
    - Via ArcGIS geodatabase and map document



# SAS Example, Cont'd

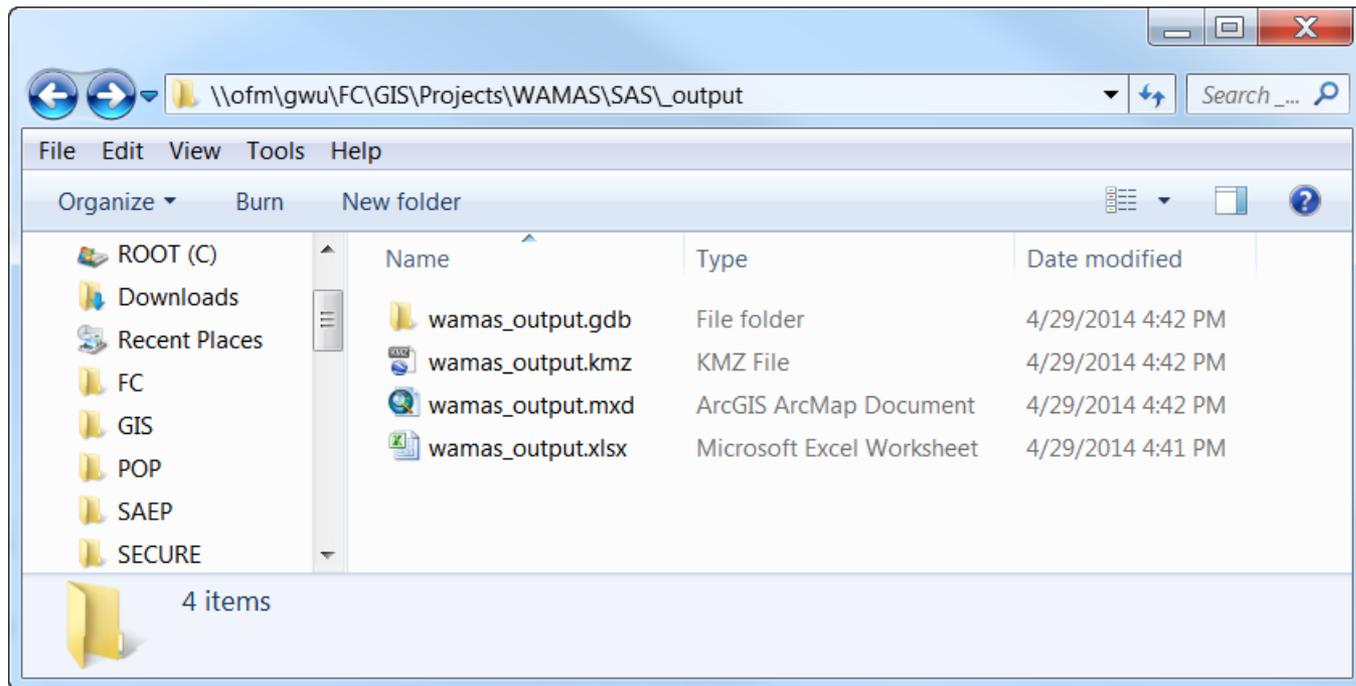


- Process is fully automated, start to finish
  - SAS + WAMAS services + ArcGIS geoprocessing (Python)

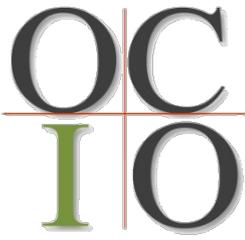


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# Output Files

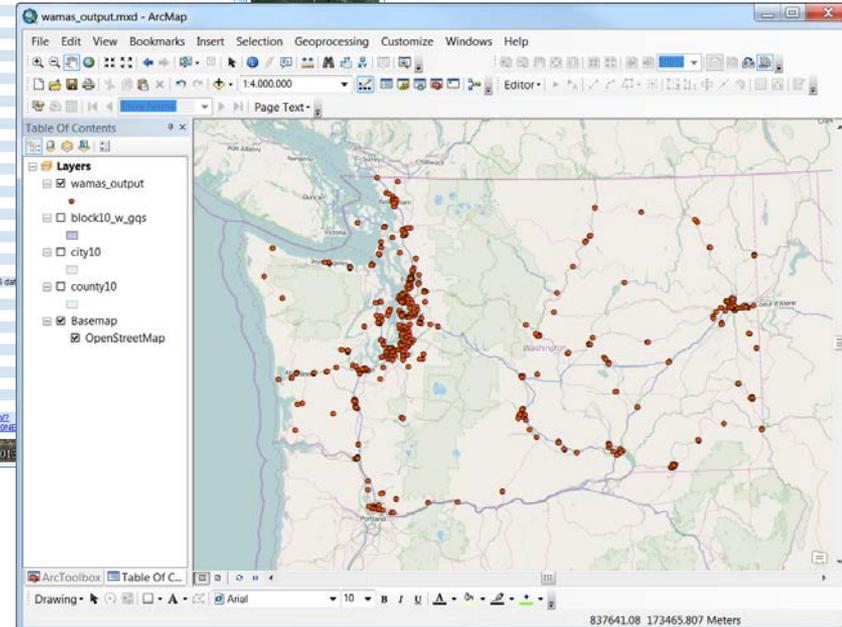
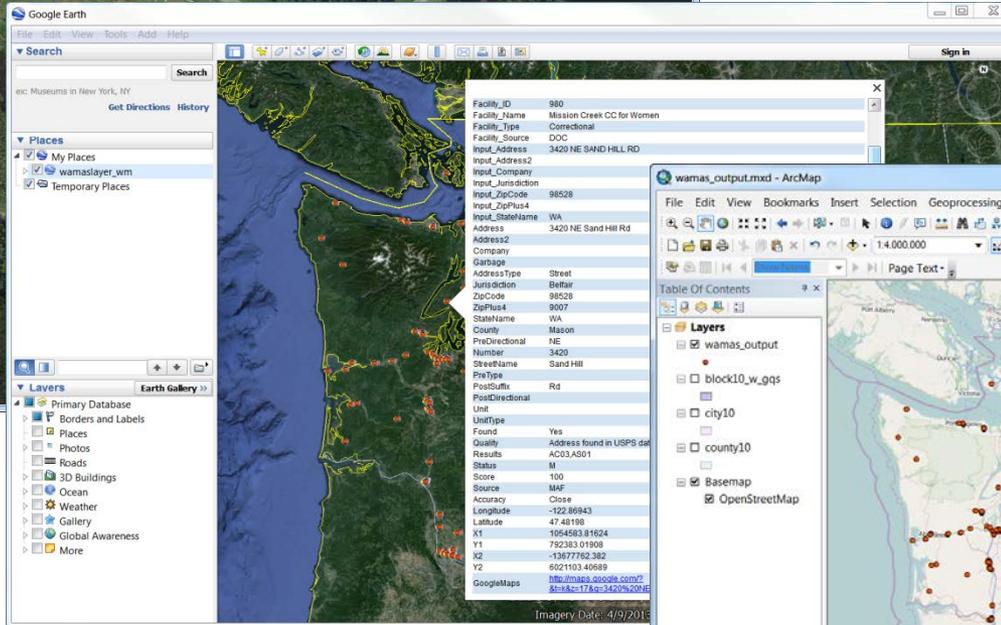
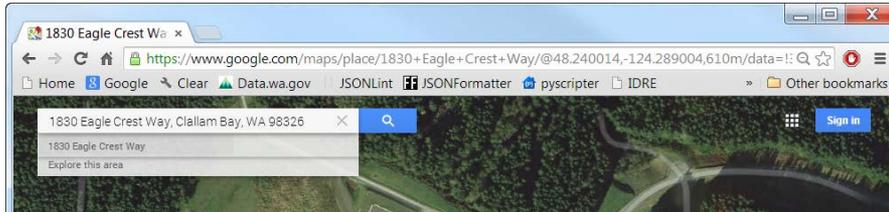


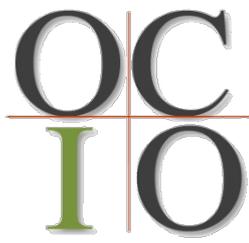
- Sample Excel output



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# Sample Map Output





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# Pilot Development Summary

- WAMAS services are available today
  - Multiple ways to access the services
    - Simple, pre-built tools for non-technical users
    - Scripting and IDEs for more advanced users
- Development continues

Doing ▾



Done ▾



udget and send to DES

Done Jun 19

imum infrastructure needs on

Done Jun 19

Location Finder Attributes - Dan

Done Jun 19

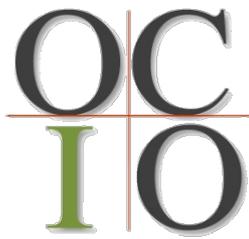
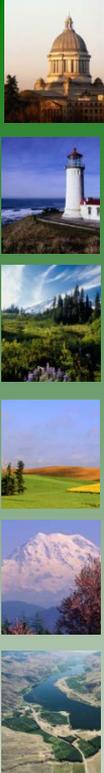
Results From Location\_Finder GPService - Service Documentation - Dan Saul



Due Jul 31



Store the geocoded address if it not found in the MAF



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# Production Development Phase

## July 1, 2014 to June 30, 2015

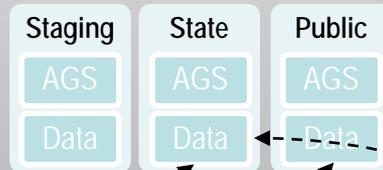
### Geospatial Data Portal (*The Portal*)

Purpose: **Data Storage** and hosting of imagery and vector data and their associated services.

This includes:

- data open to cross-agency use; and
- local government data that can be shared across state agencies.

Maintenance Funding: \$327K/bi



### WA Master Addressing Services (*WAMAS*)

Purpose: **Business Application & Geo-processing** Shared server environment for SQL Server database, web server applications/tools and geo-processing function.

**Initial Funding:** Development funding allocated \$189K for Yr. 1

*Business Application & Geoprocessing Environments*

### Concept: Shared Government Geospatial Data Processing & Analysis Environment

**Purpose:** This shared GIS environment allows organizations to have their own GIS work environment while sharing the expenses of licenses and infrastructure costs. Access to shared data and services on the Portal are provided at no additional



### Concept: Shared External Internet/Mobil Application Hosting Environment

**Purpose:** For hosting individual organizations internet web services and geo-processing services.

Standard environment and acceptance rules would need to be established and agreed to by the service users.

Better batch processing tools

On-line editing and update tools

Bulk loading and processing of local data





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## Announcement

### Making government data work better for the citizens of Washington

#### New State Initiative: Geospatial Coordination between State and Local Government

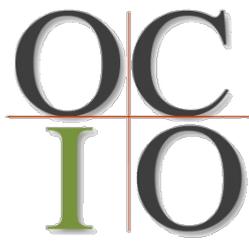
Citizens of Washington are entitled to see government run efficiently and effectively. In order to do this, all governmental entities need to work together to ensure that taxes are leveraged correctly, voters are assigned to the right districts and business permits are processed correctly the first time.

Legal responsibility for the collection and maintenance of valuable data resides with city, county and state government. Local government data are often collected by various state agencies and a significant amount of data consolidation and enhancements for state business purposes are being expended. This results in unnecessary duplication of effort for all levels of government.

Many state and local entities have indicated that they have reach capacity and are unable to take on new cross agency data work, but a solution to this problem is to coordinate efforts between all levels of government.

#### **BECAUSE:**

- Accurate state, county and municipal boundary data are required when consolidating data from multiple government entities into single, statewide data products of all sorts efforts; and
- City and urban growth boundary data are important to local and state agency business functions like commute trip reduction and setting population estimates; and
- Real property parcels data creation and maintenance happens at the local level and are need by local and state agency for multiple business purposes like aviation navigation; and
- Road data is needed for local and state business reporting and analysis requirements to meet the federal All-Roads LRS system for Washington; and
- Addressing officials reside at the local level, but a statewide master addressing system is needed by state agencies that are involved in permitting, voting, taxing and emergency services; and
- The national next generation 911 system requires states to have compiled administrative boundary (county, municipal and addressed street) layers. It also recommends that address points, cell tower and antenna, parcel and imagery layers exist ; and
- Benefits and cost savings to cities, counties and state agencies will result from closer coordination and the sharing and compilation these data sets.



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# Contact Information

<b>Project Contact:</b>		
Joy Paulus, State GIS Coordinator	(360) 902-3447	joy.paulus@ocio.wa.gov
<b>Technical Contacts:</b>		
David Wright, GIS Lead	(360) 596-3650	davidwr@dor.wa.gov
Craig Erickson, GIS Analyst	(360) 236-4271	craig.erickson@doh.wa.gov
Tom Kimpel, Senior Analyst	(360) 902-2596	thomas.kimpel@ofm.wa.gov