



# DOTS Address GeoCode – US

Developer's Guide

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## Introduction

DOTS Address Geocode – US is a publicly available XML web service that provides latitude/longitude and metadata information about a physical US address. The service provides geocoding information, such as the latitude and longitude location of a US address, along with demographic information, such as the census tract, block and other metadata.

DOTS Address Geocode – US can provide instant address locations to websites or enhancement to contact lists.

## Web Service Structure

Web services are methods that integrate with other applications via the web, and encapsulate complex business logic. Web services are too large a topic to cover in this document, but ServiceObjects has developed its web services to be as easy to integrate and as accessible as possible.

DOTS Address Geocode – US is a public XML web service that supports SOAP, POST and GET operations. Note that SOAP is done via POST, only with special XML markup in the post-body.

The host path, or physical location of the web service is here:

<http://ws.serviceobjects.com/gcr/GeoCoder.asmx>

The location of the WSDL, or Web Service Definition Language document, is here:

<http://ws.serviceobjects.com/gcr/GeoCoder.asmx?WSDL>

(This is also accessible via the “Service Definition” link.)

This XML is the definition of the web service, meaning its inputs, outputs, operations, and the like. Most likely, you will have another tool read this WSDL and make the operations available to you in your application. Whenever your utilities or IDE asks for a WSDL path to DOTS Address Geocode – US, you can provide this one.

Every web service has *operations* that it offers to subscribers – methods that do different work and return different output. Examining the link above, you will notice several of these operations available, which are described in detail later on.

**GetGeoLocation** – **Deprecated: use GetBestMatch\_V3.**

**GetBestMatch** – **Deprecated: use GetBestMatch\_V3.**

**GetBestMatch\_V2** – **Deprecated: use GetBestMatch\_V3.**

**GetBestMatch\_V3** – Returns latitude, longitude, tract, block, state FIPS, county FIPS, and ZIP+4 if available. Will attempt to geocode at the property level, zip+4 level, zip+3, zip+2, zip+1, zip, and city/state.

**GetGeoLocationByZipPlusFour** – Returns latitude/longitude location information for a given zip plus four (99999-9999)

**GetGeoLocationByZipPlusThree** – Returns latitude/longitude location information for a given zip plus three (99999-999)

**GetGeoLocationByZipPlusTwo** – Returns latitude/longitude location information for a given zip plus two (99999-99)

**GetGeoLocationByZipPlusOne** – Returns latitude/longitude location information for a given zip plus one (99999-9)

**GetGeoLocationByCityState** – Returns latitude/longitude location information for a given city and state. Returns data as close to the city centroid as possible.

**GetZipInfo** – Returns extensive and various information about a given zip code, including census information and centroid latitude/longitude coordinates.

Each of these operations will be described in detail later in this document.

## Operation Definitions

This document defines the input, output and behavior of the web service operations in DOTS Address Geocode – US. Each operation has its own unique behavior and output, though some of the operations are very similar.

### Important Note!

Every geocoding system is different, and some even use different standards for gathering and calculating coordinates. Because of this, using coordinates from one system may not look to be at the exact location on a different system.

For example, Google Maps is a great tool for plotting geocoding coordinates on a viewable map. However, the data used for generating these maps is different than the data that ServiceObjects uses for generating geocoding coordinates. Thus, some points plotted on Google Maps may not look to be in the precise location; they may look exactly right or look to be several hundred feet away.

You should examine your own business needs first before exploring what DOTS Address Geocode – US can provide. Different operations may be necessary based on the information you have, and the granularity of data you need.

## GetGeoLocation

This is the basic operation for finding the latitude/longitude coordinates of an address. This operation takes a standard US address (Address, City, State, Zip) and will try to find the exact street location's coordinates. It cannot always find the location, especially when it comes to empty lots or new construction areas.

This operation will also return census tract and block, if available, for the given address. This data is valuable for tracking demographics and statistical analysis. If a valid zip code is found for the given address, it will be returned as well.

First, DOTS Address Geocode – US will attempt to correct and normalize the address to make it more likely to geocode properly. You don't need to worry about fixing the address before sending it to DOTS Address Geocode – US, unless you want to filter out invalid or non-existent addresses beforehand.

This operation requires the Address value, and either City and State, or the Zip code. Providing all inputs is recommended.

### GetGeoLocation Inputs

Name	Type	Description
Address	String	Address line of the address to geocode. For example, "123 Main Street".
City	String	The city of the address to geocode. For example, "New York". The city isn't required, but if one is not provided, the Zip code is required.
State	String	The state of the address to geocode. For example, "NY". This does not need to be contracted, full state names will work as well. The state isn't required, but if one is not provided, the Zip code is required.
Zip	String	The zip code of the address to geocode. A zip code isn't required, but if one is not provided, the City and State are required.
LicenseKey	String	Your license key to use the service. Sign up for a free trial key at <a href="http://www.serviceobjects.com">www.serviceobjects.com</a> .

### GetGeoLocation Outputs

Name	Type	Values	Description
Latitude	String	Number	The latitude of the given address.

Longitude	String	Number	The longitude of the given address.
Tract	String	Number	The census tract of the given address
Block	String	Number	The census block of the given address
Zip	String	Varies	The corrected zip plus four of the given address
Error – Desc	String	Varies	If there was an internal web service error, the description will be displayed here.
Error – Number	String	“1”, “2”, “4”	See “Error Codes” below.
Error -- Location	String	Always null	Deprecated, no longer used.

### GetGeoLocationByZipPlusFour

This operation is almost exactly like GetGeoLocation, but rather than geocoding given a specific address, DOTS Address Geocode – US will geocode given a zip plus four. The coordinates given are an average centroid of a given zip plus four region and oftentimes match precisely to the street location.

### GetGeoLocationByZipPlusFour Inputs

Name	Type	Description
Zip	String	The zip plus four to geocode.
LicenseKey	String	Your license key to use the service. Sign up for a free trial key at <a href="http://www.serviceobjects.com">www.serviceobjects.com</a> .

### GetGeoLocationByZipPlusFour Outputs

Name	Type	Values	Description
Latitude	String	Number	The latitude of the given zip plus four.
Longitude	String	Number	The longitude of the given zip plus four.
Error – Desc	String	Varies	If there was an internal web service error, the description will be displayed here.
Error – Number	String	“1”, “2”, “4”	See “Error Codes” below.
Error -- Location	String	Always null	Deprecated, no longer used.

## GetGeoLocationByZipPlusTwo

This operation is almost exactly like GetGeoLocationByZipPlusFour, but instead uses only a Zip plus two. If a zip plus four is provided, this operation will geocode only using the subset zip plus two.

### GetGeoLocationByZipPlusTwo Inputs

Name	Type	Description
Zip	String	The zip plus two to geocode.
LicenseKey	String	Your license key to use the service. Sign up for a free trial key at <a href="http://www.serviceobjects.com">www.serviceobjects.com</a> .

### GetGeoLocationByZipPlusTwo Outputs

Name	Type	Values	Description
Latitude	String	Number	The latitude of the given zip plus four.
Longitude	String	Number	The longitude of the given zip plus four.
Error – Desc	String	Varies	If there was an internal web service error, the description will be displayed here.
Error – Number	String	“1”, “2”, “4”	See “Error Codes” below.
Error -- Location	String	Always null	Deprecated, no longer used.

## GetBestMatch

Often, users want to geocode as best we can – if we can't match an address exactly at the street level, they'd like it at the zip plus four level, and if not at zip plus four, then at zip plus two, and so on.

The GetBestMatch operation does exactly that; it tries to find a match at the most granular level that it can:

1. Street Level Match (most accurate; property-level match)
2. Zip + 4 Match
3. Zip + 2 Match
4. Zip Match
5. City/State Match (least accurate)

This operation will also return the level at which it matched. The codes are:

- S – Street/exact match (property-level match)
- P – Zip plus four match
- T – Zip plus two match
- Z – Zip level match (zip plus zero)
- C – City/state match

### GetBestMatch Inputs

Name	Type	Description
Address	String	Address line of the address to geocode. For example, "123 Main Street".
City	String	The city of the address to geocode. For example, "New York". The city isn't required, but if one is not provided, the Zip code is required.
State	String	The state of the address to geocode. For example, "NY". This does not need to be contracted, full state names will work as well. The state isn't required, but if one is not provided, the Zip code is required.
Zip	String	The zip code of the address to geocode. A zip code isn't required, but if one is not provided, the City and State are required.
LicenseKey	String	Your license key to use the service. Sign up for a free trial key at <a href="http://www.serviceobjects.com">www.serviceobjects.com</a> .

### GetBestMatch Outputs

Name	Type	Values	Description
Latitude	String	Number	The latitude of the given address.
Longitude	String	Number	The longitude of the given address.
Tract	String	Number	The census tract of the given address
Block	String	Number	The census block of the given address
Zip	String	Varies	The corrected zip plus four of the given address
Level	String	Varies, see above	The level code at which the address matched. See above

			for a listing of possible outputs.
LevelDescription	String	Varies	An explicit description of the level code, described above.
Error – Desc	String	Varies	If there was an internal web service error, the description will be displayed here.
Error – Number	String	“1”, “2”, “4”	See “Error Codes” below.
Error -- Location	String	Always null	Deprecated, no longer used.

## GetBestMatch\_V2

This operation is identical to GetBestMatch, but additionally will attempt to match at the Zip + 3 and Zip + 1 levels.

GetBestMatch\_V2 tries to find a match at the most granular level that it can:

1. Street Level Match (most accurate; property-level match)
2. Zip + 4 Match
3. Zip + 3 Match
4. Zip + 2 Match
5. Zip + 1 Match
6. Zip Match
7. City/State Match (least accurate)

This operation will also return the level at which it matched. The codes are:

- S – Street/exact match (property-level match)
- P – Zip plus four match
- R – Zip plus three match
- T – Zip plus two match
- N – Zip plus one match
- Z – Zip level match (zip plus zero)
- C – City/state match

### GetBestMatch\_V2 Inputs

Name	Type	Description
Address	String	Address line of the address to geocode. For example, “123 Main Street”.
City	String	The city of the address to geocode. For example, “New York”. The city isn’t required, but if one is not provided, the Zip code is required.

State	String	The state of the address to geocode. For example, "NY". This does not need to be contracted, full state names will work as well. The state isn't required, but if one is not provided, the Zip code is required.
Zip	String	The zip code of the address to geocode. A zip code isn't required, but if one is not provided, the City and State are required.
LicenseKey	String	Your license key to use the service. Sign up for a free trial key at <a href="http://www.serviceobjects.com">www.serviceobjects.com</a> .

### GetBestMatch\_V2 Outputs

Name	Type	Values	Description
Latitude	String	Number	The latitude of the given address.
Longitude	String	Number	The longitude of the given address.
Tract	String	Number	The census tract of the given address
Block	String	Number	The census block of the given address
Zip	String	Varies	The corrected zip plus four of the given address
Level	String	Varies, see above	The level code at which the address matched. See above

			for a listing of possible outputs.
LevelDescription	String	Varies	An explicit description of the level code, described above.
Error – Desc	String	Varies	If there was an internal web service error, the description will be displayed here.
Error – Number	String	“1”, “2”, “4”	See “Error Codes” below.
Error -- Location	String	Always null	Deprecated, no longer used.

## GetBestMatch\_V3

This operation is identical to GetBestMatch\_V2, but additionally returns state and county FIPS codes.

GetBestMatch\_V3 tries to find a match at the most granular level that it can:

1. Property Level Match (most accurate)
2. Zip + 4 Match
3. Zip + 3 Match
4. Zip + 2 Match
5. Zip + 1 Match
6. Zip Match
7. City/State Match (least accurate)

This operation will also return a code indicating the level at which it matched. The codes are:

- S – Property-level match
- P – Zip plus four match
- R – Zip plus three match
- T – Zip plus two match
- N – Zip plus one match
- Z – Zip level match (zip plus zero)
- C – City/state match

### GetBestMatch\_V3 Inputs

Name	Type	Description
Address	String	Address line of the address to geocode. For example, “123 Main Street”.
City	String	The city of the address to geocode. For example, “New York”. The city isn’t required, but if one is not provided, the Zip code is required.

State	String	The state of the address to geocode. For example, "NY". This does not need to be contracted, full state names will work as well. The state isn't required, but if one is not provided, the Zip code is required.
Zip	String	The zip code of the address to geocode. A zip code isn't required, but if one is not provided, the City and State are required.
LicenseKey	String	Your license key to use the service. Sign up for a free trial key at <a href="http://www.serviceobjects.com">www.serviceobjects.com</a> .

### GetBestMatch\_V3 Outputs

Name	Type	Values	Description
Latitude	String	Number	The latitude of the given address.
Longitude	String	Number	The longitude of the given address.
Tract	String	Number	The census tract of the given address
Block	String	Number	The census block of the given address
Zip	String	Varies	The corrected zip plus four of the given address
Level	String	Varies, see above	The level code at which the address matched. See above

			for a listing of possible outputs.
LevelDescription	String	Varies	An explicit description of the level code, described above.
StateFIPS	String	Two digits	State FIPS code
CountyFIPS	String	Three digits	County FIPS code
Error – Desc	String	Varies	If there was an internal web service error, the description will be displayed here.
Error – Number	String	“1”, “2”, “4”	See “Error Codes” below.
Error -- Location	String	Always null	Deprecated, no longer used.

## GetZipInfo

This operation provides valuable information about a specific zip code. Included are many demographics codes that many users find valuable for tracking customers and statistical analysis.

### GetZipInfo Inputs

Name	Type	Description
Zip	String	The zip for which to find demographic data.
LicenseKey	String	Your license key to use the service. Sign up for a free trial key at <a href="http://www.serviceobjects.com">www.serviceobjects.com</a> .

### GetZipInfo Outputs

Name	Type	Values	Description
City	String	Varies	The city of the given zip code. Alternate city names are given below.
State	String	Varies	The state of the given zip code.
County	String	Varies	The county of the given zip code.
AreaCode	String	Varies	The area code of the given zip code.
CityAbbreviation	String	Varies	A common abbreviation of the city name of the given zip code.
CityType	String	N, P, U, B, A, C, S, K	The city type of the given zip code.

CountyFIPS	String	Number	The county (FIPS) code of the given zip code.
StateFIPS	String	Number	The state (FIPS) code of the given zip code.
TimeZone	String	Number	The number of hours offset from GMT. 5 = Eastern time zone
DayLightSavings	String	Y or N	Whether the given zip code observes DayLight Savings time.
MSA	String	Varies	The metropolitan statistical area code.
MD	String	Varies	The metropolitan district code.
CBSA	String	Varies	Core Based Statistical Area code.
PMSA	String	Varies	The Primary Metropolitan Statistical Area code.
DMA	String	Varies	The Designated Market Area code.
Latitude	String	Number	The latitude centroid of the given zip code.
Longitude	String	Number	The longitude centroid of the given zip code.
Zip	String	Varies	The zip code input.
CityAlternativeName	ArrayOfString	Varies	A list of strings that contain alternate names for the city of the given zip code.
Error – Desc	String	Varies	If there was an internal web service error, the description will be displayed here.
Error – Number	String	“1”, “2”, “4”	See “Error Codes” below.
Error -- Location	String	Always null	Deprecated, no longer used.

## GetGeoLocationByCityState

This operation is almost exactly like GetGeoLocationByZipPlusFour, but rather than geocoding given a zip plus four, DOTS Address Geocode – US will geocode given a city and state. The coordinates given are an average centroid of the entire city.

### GetGeoLocationByCityState Inputs

Name	Type	Description
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City	String	The city to geocode.
State	String	The state to geocode.
LicenseKey	String	Your license key to use the service.

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Sign up for a free trial key at  
[www.serviceobjects.com](http://www.serviceobjects.com).

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## GetGeoLocationByCityState Outputs

Name	Type	Values	Description
Latitude	String	Number	The latitude of the given zip plus four.
Longitude	String	Number	The longitude of the given zip plus four.
Error – Desc	String	Varies	If there was an internal web service error, the description will be displayed here.
Error – Number	String	“1”, “2”, “4”	See “Error Codes” below.
Error -- Location	String	Always null	Deprecated, no longer used.

## Error Codes

Error codes in DOTS Address Geocode – US are the same for all operations.

They are as follows: Error Code 1 – “Input cannot be less than zero length”

This error means the web service did not get any input. The connection to the service was made, and data was transferred, but no parameters were passed that the service could understand.

This error often happens when input is passed to the service with namespaces that the service does not understand. Applying a namespace to any of the parameters (Email or LicenseKey, in this service) will cause this error. Additionally, requests made in the “rpc/encoded” format will cause this error. The only namespace that should appear in any element is the “<http://www.serviceobjects.com>” namespace on the root ValidateEmail element as so:

```
<GetGeoLocation xmlns="http://www.serviceobjects.com/">
```

**Note, however, that the namespace is not applied to the GetGeoLocation element, it is only present.**

Error Code 2 – Various descriptions

This error code appears when various errors occur, but are of the expected nature. Oftentimes, malformed or incomplete input will cause an error 2.

## Error Code 4 – Various descriptions

An error code 4 is a fatal error and it means something has seriously gone wrong. You will never see an error code 4 in a live production environment.

## Integration

Integrating DOTS Address Geocode – US into your application should be easy and straightforward. If you are using a common platform, ServiceObjects may already have sample code built that you can use:

[http://www.serviceobjects.com/support/dots\\_example\\_code.asp](http://www.serviceobjects.com/support/dots_example_code.asp)

However, if you are using a common platform that does not already have sample code, you can ask ServiceObjects to build you an example. Email [support@serviceobjects.com](mailto:support@serviceobjects.com) for more details.

## Which Operation Should You Use? GetGeoLocation or GetBestMatch?

Picking which operation you want to use should be decided carefully. Depending on your environment and needs, you will need to use different operations for their corresponding strengths.

If you always need precise location coordinates, then stick with GetGeoLocation. The other operations won't give you the detail you're looking for.

If your application does not require precise coordinate location, but will work with general-area mapping, GetBestMatch will give you a much higher match count than GetGeoLocation alone.

The best suggestion is to try out each of the operations to find the data you need.

## The Sample Code is Giving Strange Errors or is Crashing!

Most likely, the sample code cannot connect to ServiceObjects. Many environments will not allow you to connect out on port 80, or will clip out XML data from these requests/responses.

The easiest way to check for this is to open a browser on the machine running the sample code. In your browser, navigate to:

<http://trial.serviceobjects.com/gcr/GeoCoder.asmx>

Then try to run one of the operations with your trial key. If you get a browser error, or get no data back, then the sample code isn't able to connect either.

Contact your systems administrator to resolve why you are not able to connect to ServiceObjects.

### **DOTS Address Geocode – US says it can't find my address!**

DOTS Address Geocode – US doesn't know about every address, especially empty lots or new streets. Often, it won't be able to find coordinates to these locations. We do our best to try to improve the data as often as possible.

However, it will often be able to match a zip plus four or zip plus two. If it cannot match the exact street location, try the GetBestMatch operation to find how close it can find your data.

We are constantly striving to improve our data! DOTS Address Geocode – US may not be able to find your location now, but may in the future as we improve our databases.

### **DOTS Address Geocode – US is giving coordinates that aren't anywhere near my address!**

If you are using the GetBestMatch operation, most likely the service is matching at Zip+4, Zip+2, or Zip level, which return an averaged centroid. The service isn't saying your address is at that location, it is saying the centroid of the zip/+4/+2 is at that location.

If DOTS Address Geocode – US is giving what it says is a street-level match that doesn't look like it's at the right location plotted on a map, the issue is most often a stylistic difference between your mapping solution and our data. Because geocoding information is gathered in very different ways, your mapping solution is probably using a very different method than ServiceObjects does.

If the location given is a street-level match, and it's very far away from the target location, please let us know at [support@serviceobjects.com](mailto:support@serviceobjects.com).

### **I'm Not a Programmer. How Do I Use DOTS Address Geocode – US?**

ServiceObjects runs batches for you! A free batch trial is available at <http://www.serviceobjects.com/batch/upload>.

## **Conclusion**

ServiceObjects is proud to offer you a free trial of DOTS Address

Geocode – US. Sign up today for a free trial at:

<http://www.serviceobjects.com/products/address/address-geocode-us>

Other technical questions or concerns can be directed to [support@serviceobjects.com](mailto:support@serviceobjects.com).

If you are interested in purchasing DOTS Address Geocode – US, please contact [sales@serviceobjects.com](mailto:sales@serviceobjects.com).

We welcome your feedback! Please do not hesitate to let us know what you think of our web services, documentation, or customer support.

[www.serviceobjects.com](http://www.serviceobjects.com)