Geocode Service API

The Geocode Service API consists of two parts. The first part, the GEOCODE REQUEST API, describes the protocol for making a geocode request. The second part, the GEOCODE RESPONSE API describes the format and content of the response that is returned.

GEOCODE REQUEST API

The geocoder is invoked by submitting a PARAMETER_STRING as an HTTP POST or GET request to:

HOST_URL/geocode_response.exe

The request, in the PARAMETER_STRING form described below, is sent via the HTTP POST method with content-type set to application/x-www-form-urlencoded. The characters are expected to be UTF-8 encoded and the entire request must be less than 4 kilobytes (4096 bytes) in length. The request may also be sent via the HTTP GET method in the following format:

HOST_URL/geocode_response.exe?PARAMETER_STRING

PARAMETER_STRING

The PARAMETER_STRING is composed of variable-value pairs concatenated together with ampersands (&). Each variable-value pair consists of a permissable variable name bound with an equal sign (=) to a urlencoded client-assigned value. The parameter string will be composed of general parameters which may appear in any request, and of request-specific parameters which will be present or absent, depending on the kind of request. Notwithstanding this distinction, variable-value pairs may appear in the string in any order. The values assigned may be submitted either in upper or lower case letters.

Urlencoded

A value is urlencoded by (a) substituting a plus for a space and (b) substituting a three-character code for any character not permissible in an http url query string context. This three-character code is composed of a percentage sign (%) followed by the 2 character hexadecimal representation of the character. For example, a forward slash (in a fraction) or ampersand (in a street name such as Joseph & Mary) will need to be urlencoded. Note: some urlencoders substitute %20 (the hexadecimal representation for the space character) for a plus. This should decode correctly. Even so, a plus that is not used as a substitution for a space must be urlencoded.

PARAMETER_STRING example

methodName=GeocodeRequest&Version=1.1&CompleteAddressNumber=1234&CompleteStreetName=W+Main+St&PlaceName=Anywhere

General Request Parameters

The General Request Parameters must or may appear in any request, regardless of the kind of request.

methodName

Required. All requests must include a value for the methodName variable. This value describes the type of request being made. Currently accepted values are:

methodName=GeocodeRequest

The method GeocodeRequest is a request to take an unnormalized address and produce a normalized address bound to standard coordinates. The methodName must be a valid query method that the responder can accept. In version 1.1 the only valid methodName is GeocodeRequest. This method is a request for the latitude and longitude of an address for either (a) A site address - the address of a site on a thoroughfare identified by a number, street name, place name and/or postal code - or (b) An intersection address - the intersection of two thoroughfares identified by two street names with place name and/or zip code.

Version

Required. All requests must include a value for the Version. This is a decimal value stating the method Version. This will allow the requester to expect a predictable response. Currently accepted values are:

Version=1.1

CountryCode

Required. All requests must include a value for the CountryCode variable.

A string of 2 characters that gives the CountryCode for which the request is applicable. It must be present but the value is ignored in this version.

An example is CountryCode=US

RequestID

Optional All requests may include a client-assigned value for RequestID. This value, if included, must be a string not less than 1 character and not greater than 255 characters in length. An example is RequestID=12345ABC

maximumResponses

Optional All requests may include a value for the variable maximumResponses. This value, if provided, must be a positive integer not less than 1 and not greater than 30. If not given, the default of 30 is used. It controls the number of candidates returned, in the event of an imperfect match. An example of its use is

maximumResponses=3

ResponseFormat

Optional. All requests may include a value for the parameter ResponseFormat. Currently accepted values:

ResponseFormat=XML
ResponseFormat=JSON
ResponseFormat=CSV

Request Specific Parameters

There are two types of GeocodeRequest supported by this responder:

Site Address
Intersection Address

Site Address
A site address is a location denoted by a locale-specific thoroughfare name and an identifier (usually numeric) that positions the location relative to the extent of the thoroughfare.

Intersection Address
An intersection address is the location of the intersection or junction of two thoroughfares and is denoted by the pairing of the locale-specific thoroughfare names.

The responder determines the nature of the request from the presence or absence of certain parameters. The presence of the address number, for example, should indicate that a request is for a site address, while the presence of a second street name should indicate that a request is for an intersection. Consequently two (intersecting) sets of parameters are specified: SITE_ADDRESS_PARAMETERS and INTERSECTION_ADDRESS_PARAMETERS.

SITE ADDRESS PARAMETERS
A Site Address GeocodeRequest must include CompleteAddressNumber.
A Site Address GeocodeRequest must include CompleteStreetName.
A Site Address GeocodeRequest must not include CompleteStreetName2.
A Site Address GeocodeRequest may include CompleteOccupancyIdentifier.
A Site Address GeocodeRequest may include Place State Zip Parameters.
A Site Address GeocodeRequest may include a value for the InterpolationOffset variable.
A Site Address GeocodeRequest may include a value for the RequestStrategy variable.

INTERSECTION ADDRESS PARAMETERS
A Intersection Address GeocodeRequest must not include CompleteAddressNumber.
A Site Address GeocodeRequest must include CompleteStreetName.
A Site Address GeocodeRequest must include CompleteStreetName2.
A Site Address GeocodeRequest must not include CompleteOccupancyIdentifier.
A Site Address GeocodeRequest may include Place State Zip Parameters.
A Site Address GeocodeRequest may include a value for the InterpolationRadius variable.

Complete Feature Address Parameters

CompleteAddressNumber
Required for Site Address, Forbidden for Intersection Address. This is a string that identifies an address identifier. It is sometimes called the house number or civic number. It should be a series of digits and may be preceded by a series of letters and/or followed by a series of letters. Rural route boxes (and other non-thoroughfare locators, such as latitude-longitude addresses) are not supported by this version. If no alphabetic characters are specified, it may be terminated by a fraction. It must not be present in an intersection request.

CompleteStreetName
Required for Site Address, Required for Intersection Address. This is an string that identifies the full name of the thoroughfare, including directionals, types and qualifiers.

CompleteStreetName2
Forbidden for Site Address, Required for Intersection Address. This is an string that identifies the full name of the intersecting thoroughfare, including directionals, types and qualifiers.

CompleteOccupancyIdentifier

Optional for Site Address, Forbidden for Intersection Address. This is a string that serves as a floor, unit or building identifier within the location identified by the CompleteAddressNumber. This version of the geocoder will accept the string but does not use it.

Place State Zip Parameters

PlaceName
Optional. This is a string that identifies the municipal, town or city name in which the address is located.

StateName
Optional. This is a string that identifies the state, province, or national subdivision in which the place name is located.

ZipCode
Optional. The value for this parameter should be the USPS postal zip code for the address.

ZipPlus4
Optional. This 4 digit number identifies the extension to the zip code and should not be present if the zip code is absent.

Additional Parameters

RequestStrategy
Optional. The default is RequestStrategy=Both - The responder first attempts to match with a precise address. If results are not satisfactory, it abandons the precise results and does an interpolated matching. If the value for this variable is RequestStrategy=Precise the responder returns only the precise results. If the value is RequestStrategy=Interpolated it returns only interpolated results.

InterpolationOffset
Optional. This value must be a decimal number not less than 0.00 and not greater than 100.00. It is interpreted as the number of meters to offset an interpolated address from the street. The default is 5.0. For example, to set the returned coordinates at 10 meters from the road, use InterpolationOffset=10.0.

IntersectionRadius
Optional. This value must be a decimal number not less than 0.00 and not greater than 100.00. It is interpreted as the maximum distance within which two points will snap together to form an intersection. It is interpreted as the radial distance from the center of an intersection such that all points. This parameter allows the user to configure for locales which have large intersections or have short distances between intersections. As a special usage, setting the variable to zero

will ensure that all points within the default in an intersection are returned (rather than a single representative point). The default is 30.00 meters.

Geocode Service API - The Response

Format of the Response

The format of the Response is governed by the value of the ResponseFormat variable in the client-submitted request. There are, therefore, three possible formats: XML (default), JSON and CSV.

XML
XML is the default format for the response. The content-type of the xml Response is text/xml. An xml schema, GeocodeResponse.xsd, specifies the form.

JSON
The content-type of the JSON response is application/json. The Response is a JSON object.

CSV
The content-type of the CSV Response is text. It will consist of newline-terminated lines of comma-delimited values. For each section that appears in the response the first line will give the element names and will be followed by one or more lines giving the corresponding values.

The Response
The Response is the response received from the GeocodeService. The XML Response structure will have two attributes, the RequestID, the Version, and an element, the GeocodeResponse. The JSON object will have three fields, the RequestID, the Version, and the GeocodeResponse. The The first line of the response is the header field list. The CSV header will have have the four field names "Version", "RequestID", "numberOfGeocodedAddresses", and "numberOfFaults". The values given for the numberOfGeocodedAddresses and numberOfFaults determines the structure of the rest of the response. If the numberOfGeocodedAddresses is non-zero there will be a list of geocoded addresses. If the numberOfFaults is non-zero there will be a list of error reports. If both are non-zero the list of geocoded addresses will precede the list of errors. For each list there will exist, in addition to the values for each item on the list, a header line giving the fieldnames. The final structure is the requested address, which will again consist of a headerline of field names followed by a single line consisting of the corresponding values.

Version
This is the interface version of the response. It should match the Version of the submitted request. The minimum value is 1.1.

RequestID
This returns verbatim the RequestID submitted by the sender. It will be blank if no RequestID was submitted.

GeocodeResponse

The value of the GeocodeResponse field is a GeocodeResponse object

GeocodeResponse

The GeocodeResponse object has three elements: The GeocodeResponseList, The ResponseFaultList, and the Requested Address.

GeocodeResponseList

This contains the list of geocoded match candidates. The GeocodeResponseList is empty if no addresses are returned and absent if an error occurs before it is generated. See the GeocodeResponseList object

ResponseFaultList

The ResponseFaultList is a list of error reports and is present only if an error occurs. See the ResponseFaultList object

RequestedAddress

The RequestedAddress is absent only if an error occurs before it is retrieved. See the RequestedAddress object

ResponseFaultList

The ResponseFaultList object is a sequence of one or more Faults. The number of items on the list will be given by the numberOfFaults.

In an XML response the ResponseFaultList is an element of the GeocodeResponse object. It will contain a sequence of Faults. The numberOfFaults is an attribute of the ResponseFaultList.

In a JSON response the ResponseFaults field will belong to the Response object and will possess the ResponseFaultList field and the numberOfFaults field.

The CSV response will contain a separate header-initiated section. It will contain a header following by a list, one line each of the corresponding reports. The header will read : "faultcode", "faultstring", "detail". There will be one comma-delimited value for each of these fields and thus three values per line.

Fault

If the ResponseFaultList is present in the response, then there will be one or more Faults. See the Fault object. In JSON this will be an array of faults. In XML it will be a sequence of fault objects

numberOfFaults

In a CSV response this value will be stated in the header section. If it is zero the ResponseFaultList will not be present.

Fault

Each fault object will contain three fields: a faultcode, faultstring and a detail field.

faultcode

The faultcode is one of either "Client" or "Server".

faultstring

The faultstring for "Client" is "Bad client content" and for "Server", "Server process error". It should be noted that the expression of these two fault types is not, as it would seem, an assignation of blame.

detail

The detail field will give a brief diagnostic of the fault that may assist either the client or server in correcting the problem encountered. This diagnostic may be an error message generated by the responder or by a software library linked to the responder.

GeocodeResponseList

The GeocodeResponseList is a list of geocoded addresses. The number of elements on the list is given by the numberOfGeocodedAddresses field.

numberOfGeocodedAddresses

This is the number of GeocodedAddresses that appear on the list. This is an integer value that can range from 0 to the maximum (30). In XML this is an attribute.

GeocodedAddress

See the GeocodedAddress object

GeocodedAddress

A GeocodedAddress consists of four parts.

- The normalized address;
- The position;
- The accuracy;
- Address source data;

In a JSON response the GeocodedAddress field has as its value an object consisting of the address object, a Point field which has as its value an object with the fields Latitude and Longitude, and a GeocodeMatchCode field. In a CSV response the Address values will be followed by the latitude, longitude, accuracy , matchType, note, dataSource and addressIdentifier fields, all on a single line. The CSV field names will thus be the Address field names followed by "Latitude", "Longitude", "accuracy" , "matchType" , "dataSource" and "addressIdentifier".

Address

See the Address object

gml:Point

This is the latitude and longitude of the position. In JSON and CSV Address objects the latitude and longitude are represented in separate fields. In XML the field is named "gml:Point".

GeocodeMatchCode

See the GeocodeMatchCode object

source

See the source object

Address

The Address element will contain either a SiteAddress or an IntersectionAddress. The Address is the normalized address of the candidate. It will be articulated in a fashion consistent with the Street Address Data Standard. It will be either a SiteAddress or IntersectionAddress, depending on the nature of the request.

SiteAddress

See the SiteAddress object

IntersectionAddress

See the IntersectionAddress object

GeocodeMatchCode

The GeocodeMatchCode field has as its value an object with an accuracy element and a matchType element.

accuracy

The accuracy field will be a decimal value not less than 0.00 and not more than 1.00 and will indicate the degree of correspondence between the requested address and the normalized reference address.

matchType

The matchType field will contain one of the values "Precise" or "Interpolated", indicating whether the position was determined by matching a record that specified that position or whether the position was determined by matching with an arc record and calculating the ratio of its address number with the range between the starting address number and its position and the ending address number and its position.

note
The note field will contain the value "P" if the returned address disagrees in parity with other addresses in its address range. This is used for "Interpolated" addresses and will be empty if the address is not interpolated or if the parity does not disagree.

source
The source field has as its value an object with a dataSource element and an AddressIdentifier element.

dataSource
The dataSource field will indicate the file name or other identifier of the dataset from which the address data is taken.

addressIdentifier
The addressIdentifier field will indicate the identifier for the specific record from which the address data is taken. This element may be empty for Intersection responses.

IntersectionAddress
An Intersection Address expresses the intersection of two thoroughfares.

Note: Only one set of PlaceStateZip elements are given, despite the fact that there could be more than one at intersections that fall upon a civic or postal boundary.

CompleteStreetName
This will be a sequence of precisely two normalized CompleteStreetNames

PlaceName
See PlaceName.

StateName
See StateName.

ZipCode
See ZipCode.

ZipPlus4
See ZipPlus4.

SiteAddress
This is an address identified by a numeric or quasi-numeric identifier and a streetname. The CompleteAddressNumber and CompleteStreetName fields will always be present.

CompleteAddressNumber
See CompleteAddressNumber

CompleteStreetName
See CompleteStreetName. This will be a normalized, parsed object in a SiteAddress response

CompleteOccupancyIdentifier
See CompleteOccupancyIdentifier. This will be a normalized, parsed object in a SiteAddress response

PlaceName
See PlaceName.

PlaceName_USPS
See PlaceName_USPS.

StateName
See StateName.

ZipCode
See ZipCode.

ZipPlus4
See ZipPlus4.

CompleteOccupancyIdentifier

Unit (This is generally an internal building sub-divider)
Building (This is a separate building identifier where a single CompleteAddressNumber identifies more than one building)

CompleteStreetName
The CompleteStreetName, in the RequestedAddress object, represents the unnormalized, unparsed street name as sent by the client. In the response, the name is normalized and parsed into the below fields. In the normalized CompleteStreetName any one of the fields may be present, but the StreetName is always present

PreModifier
A pre-positioned qualifier to the street name, such as Old in Old Highway 99

PreDirectional
A directional indicator that precedes the Street name, such as West in West 107th Street

PreType

This is a street type that precedes the StreetName. For example, Highway in Highway 17, or Rue in Rue Morgue.

StreetName

This field is always present. It is the base name for the street. This will be the official (unstandardized) name of the Street, as represented in the record.

PostType

The street type that follows the Street Name. For example, Street in Main Street

PostDirectional

A directional indicator that follows the street name, such as Northwest in 17th Avenue Northwest

PostModifier

A post-positioned qualifier to the street name

RequestedAddress

This returns the unnormalized address submitted by the client. The fields stated correspond to those included in the request and will differ, depending on the nature of the Request. There will be, for example, a CompleteStreetName and CompleteStreetName2 field if it is an intersection request.

Other Address Attributes

CompleteAddressNumber

This is the identifier for a SiteAddress.

PlaceName

This is the city, town or municipal name of the area in which the address is located. This may occur in a SiteAddress, IntersectionAddress or the RequestedAddress.

PlaceName_USPS

This is the post office name for this address. This may occur in a SiteAddress or IntersectionAddress.

StateName

This is the state in which the address is located. This may occur in a SiteAddress, IntersectionAddress or the RequestedAddress.

ZipCode

This is the 5 digit USPS postal code for the address. This may occur in a SiteAddress, IntersectionAddress or the RequestedAddress.

ZipPlus4

This is the 4 digit extension to the USPS postal code. This may occur in a SiteAddress, IntersectionAddress or the RequestedAddress.