Spectrum™ Technology Platform

Version 10.0 SP1

GeoComplete Guide

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1 - Enterprise GeoComplete

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GeoComplete Module

The GeoComplete module for Spectrum™ Technology Platform automatically suggests addresses as you type and immediately returns candidates based on your input. You can then select your candidate to see the pinpoint location on a map. This "as you type" recognition of addresses and points of interest is particularly valuable for mobile applications and can be incorporated into many business applications.

Note: POI data is provided in separate data bundles and must be separately purchased. POI and category/subcategory features are available only if you have licensed and installed POI data.

The GeoComplete component is delivered as a Spectrum module and can be built into Spectrum stages just like any other component. Spectrum™ Technology Platform 10.0 must already be installed.

GeoComplete Stage

The Enterprise GeoComplete Module consists of the following stage.

• **GeoComplete** —- Automatically suggests addresses as you type and immediately returns candidates based on your input. The GeoComplete Module can also return Points of Interest (POIs), but POI data must be separately purchased.

GeoComplete Database Resources

The GeoComplete Module databases are installed on the Spectrum™ Technology Platform server. The databases are available by subscription from Pitney Bowes and are updated regularly.

The GeoComplete databases are delivered in several zip files according to region. Installing one zip file installs all the included country databases. However, each country is separately licensed. See updated Release Notes for changes and information on newly supported countries.

GeoComplete Coverage

The GeoComplete Module covers street addresses for the following countries.

Note: As of the Spectrum™ Technology Platform 10.1 release, POI data must be separately purchased. POI and category/subcategory features are available only if you have licensed and installed POI data. Street address data is packaged with the GeoComplete module.

Andorra (AND)

Australia (AUS)

Austria (AUT)

Bahrain (BHR)

Belgium (BEL)

Brazil (BRA)

Canada (CAN)

Czech Republic (CZE)

Denmark (DNK)

Finland (FIN)

France (FRA)

Germany (DEU)

Great Britain (GBR)

Hungary (HUN)

Ireland (IRL)

Italy (ITA)

Japan (JPN)

Kuwait (KWT)

Liechtenstein (LIE)

Luxembourg (LUX)

Mexico (MEX)

Netherlands (NLD)

Norway (NOR)

Oman (OMN)

Poland (POL)

Portugal (PRT)

Qatar (QAT)

Russia (RUS)

Saudi Arabia (SAU)

Singapore (SGP)

Slovakia (SVK)

Slovenia (SVN)

South Africa (ZAF)

Spain (ESP)

Sweden (SWE)

Switzerland (CHE)

Thailand (THA)

Turkey (TUR)

United Arab Emirates (ARE)

United States (USA)

Note: See your current Spectrum™ Technology Platform Database Release Notes for more details of country coverage and data vintages.

GeoComplete Module Features

The GeoComplete Module provides the following capabilities when built into your Spectrum™ Technology Platform application. The following capabilities are supported.

- Select country (optional). See **GeoComplete Coverage** on page 5 for a list of available countries.
- Single line input search for street addresses
- Candidates returned in order based on distance from X/Y origin
- Search Points of Interest (POI)
- Search All to include both street addresses and POI

- Search POI categories and subcategories
- Localized categories and subcategories for selected countries
- Search for brand (such as a specific hotel chain) in categories and subcategories
- Fuzzy Match capabilities
- Matched Fields reported with returned candidates

Note: POI and category/subcategory features are available only if you have licensed and installed POI data.

For both address searches and POI searches, candidates are displayed as you type. As you type more specific information, the results are refined to display more relevant candidates. Candidates include the full address, POI category and subcategory (if the candidate is a Point of Interest), and indicate the distance from the origin.

The GeoComplete Module is packaged with a sample application that demonstrates many capabilities. This sample application includes a mapping feature, but it does not represent all the capabilities of GeoComplete. This is for sample and demonstration purposes only and is not a supported application. To use the sample application, run:

```
http://<serverIP>:8080/geocomplete
```

After installing and deploying the GeoComplete Module, you can use the Management Console to explore all the capabilities and see candidate results.

You can expose additional features and preferences through the REST and SOAP APIs. See **Using the APIs** on page 25.

Point of Interest Features

With Point of Interest (POI) searching, you can enter a specific name (such as a hotel name), a category (such as Restaurant), or subcategory (such as Thai Restaurant).

Note: POI and category/subcategory features are available only if you have licensed and installed POI data.

The entry format is either of the following:

```
<brand name, category, or subcategory> <optional area>
```

```
<optional area>> <brand name, category, or subcategory>
```

where:

`<brand name, category, or subcategory>` is a point of interest, such as the name of a specific bank, restaurant, or hospital, or a category (such as parking lot, or petrol station), or subcategory (such as Thai Restaurant).

`<optional area>` can be a street name, city, state/province, postcode or any combination of searchable address fields. This area information is optional, but if provided, it will limit the candidates to the specified area.

As you type more specific information, the results are refined to display more relevant candidates. Candidates include the full address, POI category and subcategory, and indicate the distance from the origin. See **Returned Candidate Fields** on page 17 for a list of additional fields returned with POIs.

Instead of providing an area for POI search, you can constrain results by the search extent from the origin or by a bounding box.

For examples that illustrate POI , see **Typical Application Examples** on page 18.

Point of Interest Categories and Subcategories

Category and Subcategory Classification

Points of Interest (POI) are classified into categories and subcategories. These categories/subcategories are returned with POI candidates and you can also use these categories/subcategories for searching.

This two-level classification is simple and allows you to search and identify POIs including, but not limited to, restaurants, hotels, entertainment sites, hospital/medical facilities, shopping and retail establishments, and other businesses. The category and subcategory names are appropriate for terminology variations. For example, Cash Point, Cash Dispenser, Cash, and ATM are all terms that identify cash dispensing devices. You can search any of these terms with the GeoComplete Module to identify cash dispensing devices.

Categories are broad in nature, such as Restaurants. Subcategories are more specific, such as Barbeque Restaurants, Barbeque, or BBQ. Any other type of ethnic or specialty restaurant could also be a subcategory. Similarly, Automotive is a category with many subcategories, including Car Service, Car Repair, Car Sales, Tire Services/Tyre Services (American and British spelling variations of tire and tyre).

Note: POI and category/subcategory features are available only if you have licensed and installed POI data.

Localization of Categories and Subcategories

For many countries, you can search on categories and subcategories in one or more supported languages in addition to English. This can return categories and subcategories in the same language as the input. For most countries, the behavior is as follows:

• If the category is searched in the localized language, the candidate is returned with localized category name and English language subcategory name.

- If the subcategory is searched in the localized language, the candidate is returned with localized subcategory name and English language category name.

For example, Italian is a supported language in both Italy (ITA) and Switzerland (CHE). If you search for subcategory "ristorante de pesce", suggestions for seafood restaurants will be returned with the localized subcategory name.

For countries in which the data is fully localized (Russia, United Arab Emirates, Kuwait), both the category and subcategory can be returned in the localized input language; that is, Russian for RUS or Arabic for ARE and KWT.

The GeoComplete module supports localized categories and subcategories for the following countries. English is supported for all countries.

Table 1: Localized Categories and Subcategories

Country	Supported Languages for Categories and Subcategories (English Supported for All Countries)
Andorra	Catalan
Australia	English only
Austria	German
Bahrain	Arabic and English supported for GeoComplete input/output
Brazil	Portuguese
Belgium	Dutch, French, German
Czech Republic	Czech
Canada	French
Denmark	Danish
Finland	Finnish, Swedish
France	French
Germany	German
Great Britain	English only

Country	Supported Languages for Categories and Subcategories (English Supported for All Countries)
Hungary	Hungarian
Ireland	English only
Italy	Italian
Japan	Japanese
Kuwait	Arabic and English supported for GeoComplete input/output
Liechtenstein	German
Luxembourg	Dutch, French, German
Mexico	Spanish
Netherlands	Dutch
Norway	Norwegian
Oman	Arabic and English supported for GeoComplete input/output
Poland	Polish
Portugal	Portuguese
Qatar	Arabic and English supported for GeoComplete input/output
Russia	Russian and English supported for GeoComplete input/output
Saudi Arabia	Arabic and English supported for GeoComplete input/output
Singapore	Malaysian
Slovakia	Slovak
Slovenia	Slovenian

Country	Supported Languages for Categories and Subcategories (English Supported for All Countries)
South Africa	Afrikaans
Spain	Spanish
Sweden	Swedish
Switzerland	German, French, Italian
Turkey	Turkish
United Arab Emirates	Arabic and English supported for GeoComplete input/output
United States	English only

New countries and localized category/subcategory support will be described in regularly updated release notes.

POI Name Searching

Points of Interest can also be searched by using the name of a business, brand, institution, or other specifically named site. These names are also are returned with POI candidates, if available.

For example, you can search for a specific coffee shop, sports stadium, hospital, hotel, park, shop, restaurant, tourist attraction, or any other site. This may be important if you are looking for a specific brand name hotel/motel chain or cafe in your location.

Note: POI and category/subcategory features are available only if you have licensed and installed POI data.

See **Typical Application Examples** on page 18 for examples of POI searching with the GeoComplete Module.

Street Searching Features

With Street searching you can search on all address elements including street name, city, locality, state/province, postcode.

The entry format can include any combination of the following address elements. Consider listing the street name before the area names for more efficient searching.

```
street_name, area_name_4,area_name_3,area_name_2,area_name_1,post_code
```

where:

```
street_name,
area_name_4,area_name_3,area_name_2,area_name_1,post_code,street_name
```
are street name, locality, city/town, county/region, state/province, and postal code, or equivalent address elements.

Fuzzy Matching Features

GeoComplete implements algorithms that optimize the retrieval of addresses and POIs, even when the input spelling is incorrect or incomplete. These capabilities are referred to as Fuzzy Match, and are implemented through match setting constraints and are exposed through the API.

Note: POI input is supported only if you have licensed and installed POI data.

The entry format is:

```
<name, category, or brand name> <optional area>
```

```
<optional area> <name, category, or brand name>
```

where:

`<name, category, or brand name>` is a point of interest, such as bank, parking lot, or petrol (gas) station.

`<optional area>` can be a city, state/province, postcode or any combination of these. Area is optional, but if provided, it will limit the candidates to the specified area.

Table 2: Fuzzy Matching Methods and Descriptions

Fuzzy Matching Method	Description	API Method	Management Console Preference
Edit Distance	This is a calculation of the minimum number of character substitutions, insertions, deletions, or transpositions required to change one word into another. This is a mathematical means of determining the similarity of words.	FuzzyMatchMode	Hard - allows for one character substitution, insertion, deletion or transposition.

Fuzzy Matching Method	Description	API Method	Management Console Preference
	Edit Distance is the only algorithm supported in the initial implementation of fuzzy matching, and therefore the only technique described in this document.		Soft - allows for two character substitutions, insertions, deletions or transpositions.

Fuzzy Matching by Edit Distance

Edit Distance Algorithm

The Edit Distance algorithm allows for a certain number character substitutions, insertions, deletions or transpositions per address field when attempting to match input with intended strings.

Edit Distance API

GeoComplete provides API methods to implement and control the Edit Distance fuzzy matching capabilities.

Table 3: Edit Distance API Methods

Name of API Method	Description
`FuzzyMatchMode.None`	Enable or disable Edit Distance fuzzy matching. Fuzzy Match is disabled by default.
`FuzzyMatchMode.Hard_Match`	The Hard distance match allows 1 edit per address field. At least 2 characters must match and the first character of both strings must be the same.
`FuzzyMatchMode.Soft_Match`	The Soft distance match allows 2 edits per address field. At least 2 characters must match. The first character of both strings can be different.

Fuzzy Match is disabled by default (FuzzyMatchMode.None). You can enable Hard Match, Soft Match, or disable Fuzzy Match through the Management Console Search Preferences.

Fuzzy Match Options in the Management Console

GeoComplete provides preferences in the Spectrum™ Technology Platform Management Console to implement the fuzzy matching capabilities.

When you select Search Type of GeoComplete Address, GeoComplete Category, GeoComplete POI, or GeoComplete All, the Fuzzy Match Settings are enabled. From this selection box you can choose None (to disable Fuzzy Match), Soft Match, or Hard Match.

FindNearest Point of Interest

The Find Nearest Points of Interest feature finds the Points of Interests (POIs) nearest to a given location. The FindNearestPOIs method is in the AutoSuggestAPI class:

`com.mapinfo.mapmarker.autosuggest.api.AutoSuggestAPI.findNearestPOIs`

Note: POI features (including FindNearest Point of Interest) are available only if you have licensed and installed POI data. FindNearestPOI will not return any candidates unless you have licensed and installed POI data.

The FindNearestPOIs method accepts the following parameters and constraints.

Table 4: FindNearestPOIs Parameters and Constraints

Parameter or Constraint	Values	Required or Optional and Usage
Country	`CTY` The 3-character country ISO code	Optional. If not specified, all available countries are searched.
Origin	The latitude/longitude of the origin. This defines the center of the search area.	Required.
Maximum number of candidates	`MaxCandidates` The maximum number of POI candidates returned. The maximum is 100. The default is 5.	Optional. If maximum number of candidates is not specified, all the POIs within the Search Distance are returned. If not specified, the default of 5 candidates are returned.
Search Distance	`SearchDistance`: The maximum distance from the origin to search.	Optional. If search distance is not specified, the search distance is 5.
Search Distance Units	`Units`: The search distance measurement unit. This can be kilometers, miles, meters, or feet. The default is kilometers.	Optional. If not specified, the default distance unit is kilometers
Locale	Locale is enabled only for FindNearest POI. English is always available and that is the default locale. You can also select Native if the POI categories and subcategories have	Optional. If the locale is specified and that locale is available, then POIs are returned in that language. If the locale is specified but that locale is not available, then POIs are

Parameter or Constraint	Values	Required or Optional and Usage
	been localized. Native refers to the local language for that country.	returned in English. If the locale is **not** specified, POIs are returned in the native (non-English) language, if available; otherwise POIs are returned in English.

Find Nearest POI in Management Console

To use this feature from the Management Console:

1. From the Management Console **Options** > **GeoComplete** group, select the The **FindNearest POI** button. The enables the Locale selection.
2. From the Locale box, select the preferred locale. English is the default but you can select Native for localized categories/subcategories. Localized content is available for selected countries only.
3. Select Max Candidates (default is 5) and Distance Unit (default is kilometers).
4. From the Management Console **Options** > **Search Restrictions** group, select the Search Distance (default is 0). Zero means that there is no search distance restriction.

   Note: FindNearestPOI will not return any candidates unless you have licensed and installed POI data.

Multiple Countries and Dictionaries

If you use GeoComplete with more than one country selected, rules are used to determine which country has search priority. You can also have more than one dictionary per country to support standard and custom user dictionaries. For some countries, multiple dictionaries can support more than one language.

Multiple Country Support and Search Priority

If multiple countries are available to GeoComplete, countries are searched based on default rules and user input. The priority rules are applied in the following order:

1. If a country code is provided then search is done within this country.
2. If a country code is absent but the point location is provided, the location is used to determine the country. You can also use a bounding box instead of a point location to define a search area. If the bounding box overlaps more than one country, you can potentially get candidates from more than one country. If one of these is the default country, candidates will come from that country. If none of the countries intercepted by the bounding box is the default country, then all of the intercepted countries are searched in the order/priority in which the country data was installed, until the requested number of candidates are found.

Note: The default country or countries can be set in the GeoComplete module during database resource setup. Select the country that you want to designate as the default and check **Click to Enter Country Code**. You can also define a default country (or countries) at the Spectrum Management Console level. You can use this to control the number of countries searched, even if the GeoComplete module allows all loaded countries to be searched.

3. If the country code is not specified and neither the location or bounding box are given, then the default country is used.
4. If the country code is not specified and neither the location or bounding box are given and no default country is provided, then all available countries are searched in the order/priority in which the country data was installed until the requested number of candidates are found.

When GeoComplete searches all loaded countries, significant performance issues may be encountered. If your application calls for searching all loaded GeoComplete countries, it is advisable to constrain the results using Management Console.

Language Support

Some countries can include multiple dictionaries to support more than one language. When you install databases for the following countries, you can select more than one language dictionary:

Table 5: Countries with Multiple Language Support

Country	Language Databases
Japan (JPN)	English and Japanese
Kuwait (KWT)	English and Arabic
Russia (RUS)	English and Russian
United Arab Emirates (ARE)	English and Arabic

Candidates are ordered by how close they are to the origin regardless of language. However, if candidates are equidistant from the origin, then candidates matching the input language are listed first.

Standard and User Dictionary

The GeoComplete Module can use both standard dictionaries and custom user dictionaries. The Management Console and API allow you to choose which dictionary (if any) has preference.

Note: If you have a user dictionary for a country, it must be located in the same folder as the standard dictionary.

Returned Candidate Fields

Additional Returned Fields

Returned candidates can be previewed in the Management Console. Candidates include the complete address elements that you expect to see in Spectrum™ Technology Platform candidates, such as AddressLine, City, County, State, and Country.

GeoComplete candidates can return the following fields.

The GeoComplete module also returns match fields, indicating the input fields that were matched in the returned suggested candidates. See **Returned Candidate Fields** on page 17 for

Table 6: GeoComplete Additional Returned Fields

Field Name	Description
AddressLine1	Complete first line of address, typically including street and house number.
AddressNumberMatch	Returns true to indicate that the input address number matched the candidate. If address number is not matched, this field is not returned.
AreaName3Match	Returns true to indicate that the input city/town matched the candidate. If city/town is not matched, this field is not returned.
City	City or town name
Country	Country 3-letter ISO code.
Distance	Distance from origin in kilometers or miles. A distance of -0.0 means that an origin was not used.
DistanceUnit	Distance unit (kilometers or miles)
featureID	unique FeatureID
FormattedString	

Field Name	Description
isUserDictionary	True if candidate comes from a user dictionary, false if not from user dictionary.
Latitude	Latitude coordinate of candidate. For POI candidates, these are exact coordinates. POI and category/subcategory features are available only if you have licensed and installed POI data. For street candidates, these coordinates are approximate. To get a more exact coordinates, you must perform a geocode operation on the street candidate.
Longitude	Longitude coordinates of candidate. Coordinates are exact or approximate, as described for Latitude field.
Name	
PlaceNameMatch	Returns true to indicate that the input place name matched the candidate. If place name is not matched, this field is not returned.
PostalCode	Postal code
StateProvince	State or province name
StreetNameMatch	Returns true to indicate that the input street name matched the candidate. If street name is not matched, this field is not returned.
Type	Returns 1 for a POI match. Returns 2 for a street address match. POI and category/subcategory features are available only if you have licensed and installed POI data.

Typical Application Examples

In a typical mobile application, you would allow the application to identify your geographic location. Your location will also determine the default country. For the purposes of these examples, we will assume that the default is USA, but you can change this to any supported country. See **GeoComplete Coverage** on page 5for a list of available countries.

See **Using the APIs** on page 25 for a description of all the options than can be controlled through the API.

Note: The GeoComplete Module is packaged with a sample application. See **GeoComplete Module Features** on page 6 for a instructions on how to run the sample application. The sample application has limited capabilities and is for demonstration purposed only. It is not a supported application.

Numbered Street Examples

The following example describes a GeoComplete example with a New York City numbered street.

• Start with focus in USA, New York City, midtown Manhattan. Type: `60 east 4 s`

This returns:

```
60 E 4th St, New York, NY 10003

60 E 4th St, Brooklyn, NY 11218
```

The New York (Manhattan) address is returned first, because this is closest to the origin. An identical address exists in Brooklyn, NY, several miles further from the origin. Others addresses are returned in increasingly further distance from the X/Y origin.

The following example describes a GeoComplete example with a numbered street in Italy.

• Start with focus in Italy (ITA) in the city of Palermo. Type: `via 4`

This returns:

```
Via 4 Aprile, 90133 Palermo
```

A total of ten "via 4" and "via Quarto" street addresses are returned in increasing distance from origin. The word Quarto is recognized as the number 4 in street name.

Street and Directional Abbreviation Examples

• Start with focus in Canada (CAN). Type: `990 north ma`

This returns:

```
990 N Mary Lake Rd, Huntsville, ON, P1H
```

Notice that you entered "North" but the address is returned correctly as 990 "N" Mary Lake Rd, as the address appears in the data source.

• Start with focus in USA, in Nashua, NH. Type: `923 St`

This returns:

```
923 Saint James Pl, Nashua, NH 03062
```

In this example, St is recognized as street abbreviation for Saint.

GeoComplete Preferences in Management Console

You can use several GeoComplete options to control various preferences, including country and language selection, the number of candidates, and maximum distance of candidates from the point of origin. These preferences can be controlled through the Spectrum Management Console or through equivalent API methods. See **REST API Features** on page 25 for the information on the API methods.

Note: The GeoComplete component is delivered as a module and can be built into Spectrum stages just like any other component.

GeoComplete Options

From **Management Console Modules Services** select **GeoComplete**. In the Options tab select **GeoComplete** and choose from the following search types and other options:

- **GeoComplete Address**

  GeoComplete based on a street address.

- **GeoComplete Category**

  GeoComplete based on a category or subcategory search.

  Note: No candidates are returned unless you have licensed and installed POI data.

- **GeoComplete POI**

  GeoComplete based on a Point of Interest.

  Note: No candidates are returned unless you have licensed and installed POI data.

- **GeoComplete All**

  GeoComplete based on any address criteria.

  Note: POI candidates are returned only if you have licensed and installed POI data. Otherwise, only street candidates are returned.

- **FindNearest POI**

  Find the Points of Interest nearest to a given location. This is the only search type that cannot use Fuzzy Match.

  Note: No candidates are returned unless you have licensed and installed POI data.

- **Coordinate System**

EPSG 4326 is currently the only supported coordinate system.

- **Max Candidates**

Select 1 - 100 to specify the maximum number of candidates returned. If Max Candidates is not specified the default is 5. If you search multiple countries, GeoComplete will consider candidates from each country, sort them internally, and then present the maximum number of candidates based on the combined countries. So whether the default country is set to USA, CAN or CAN,USA, GeoComplete returns the same list of candidates (tied candidates would use country order as a tiebreaker).

Searching multiple countries using GeoComplete will impact performance.

Distance Unit

Specify the distance units in kilometers, miles, meters, or feet. This is associated with the Distance from Origin in the Search Preferences. The default is kilometers.

- **Locale**

Locale is enabled only for FindNearest POI. English is always available and that is the default locale. You can also select Native if the POI categories and subcategories have been localized. Native refers to the local language for that country.

Note: This option is available only if you have licensed and installed POI data.

Search Preferences

From **Management Console Modules Services** select **GeoComplete**. On the Options tab, select **Search Restrictions** and choose from the following options:

- **No Restrictions**

This selection allows unlimited distance or bounding box restrictions with GeoComplete searches.

- **Distance from Origin**

Select this to specify the search extent as the maximum distance from the X/Y origin. This search distance is unlimited by default. The search Distance Unit (kilometers, miles, meters, or feet) is specified on the **GeoComplete** Options tab.

The distance from origin and the distance units (kilometers or miles) can also be controlled through the API. See **REST API Features** on page 25.

- **Within Bounding Box**

Select this to specify the X/Y coordinates of a polygon that defines the area in which to search for candidates. The polygon is delimited by four sets of X/Y coordinates defining the corners of the polygon. The corners are defined as:

  - **BBoxEast**

  The coordinate defining the eastern boundary of the bounding box. For example, `-97.149410`.

- **BBoxWest**

  The coordinate defining the western boundary of the bounding box. For example, `-97.615642`.

- **BBoxNorth**

  The coordinate defining the northern boundary of the bounding box. For example, `30.351415`.

- **BBoxSouth**

  The coordinate defining the southern boundary of the bounding box. For example, `30.115302`.

  From these coordinates, GeoComplete constructs a rectangle that defines the boundaries that will be searched. For example, the coordinates specified above constructs a bounded area centered around Elgin, Texas.

  This extent of the search polygon can also be controlled through the API. See

- **Fuzzy Match Settings**

  You can specify Hard_Match of Soft_Match for Fuzzy Match, or None if you do not want to use Fuzzy Match. This selection is not available if you use the FindNearest POI Search Type.

- **Must Match Address Number**

  You can specify Must Match Address Number to determine if a house number match is required to get a match. If this match restriction is checked, then returned candidates must match the input house number. By default, the Must Match Address Number box is unchecked, which means that returned candidates do not have to match the input house number.

  If the input does not contain a house number, the Must Match Address Number restriction has no effect.

Data Preferences

From **Management Console Modules Services**. In the Options tab select Data and choose from the following options:

- **Database**

  Select the country from the drop down.

- **Database Preference**

  Select a single dictionary to use or a preferred dictionary. The default is Use Both Dictionaries, which means that both standard and user dictionaries are used with the best close match returned from either a standard or user dictionary. The choices are:

  - Use Both Dictionaries (Default)
  - Use User Dictionary Only
  - Use Standard Dictionary Only
  - Prefer User Dictionary

- Prefer Standard Dictionary

- **Order Installed Data Resources**

  If you have multiple database resources installed, you can select the order in which they are searched. For example, if you had both the USA and CAN databases installed, you could order CAN first and USA second. Use the **Move Up** and **Move Down** buttons to change the order the database resources.

2 - API

In this section

Using the APIs

This section describes the GeoComplete REST and SOAP APIs.

REST API Features

The module includes REST API methods to control and customize defaults and preferences.

Table 7: REST API

REST Method	Description
Data.AddressLine1	Single Line input
Data.Country	Specifies the country to search (3-character country ISO code).
Data.OriginLatitude	Y Coordinate of origin.
Data.OriginLongitude	X Coordinate of origin.
Option.Database	Specifies the name of the data base configured in Management Console. This is required if more than one database is available.
Option.Path	Option path.
Option.DatabaseSearchOrder	Specifies the order in which to search the databases if more than one database is available. Normally, the databases are searched in the loaded order. For example, the order could be entered as 2, 1, 3, 4 to override the default order.
Option.DefaultCountryCode	Default country if Data.Country is not specified (3-character country ISO code).
Option.SearchDistance	Specifies the distance (radius) to search for candidates from the given origin. Distance units are defined by the SearchRadiusUnits method. This distance is also used as a search distance restriction.
Option.BBoxWest	The coordinate defining the western boundary of the bounding box.

REST Method	Description
Option.BBoxSouth	The coordinate defining the southern boundary of the bounding box.
Option.BBoxNorth	The coordinate defining the northern boundary of the bounding box.
Option.BBoxEast	The coordinate defining the eastern boundary of the bounding box.
Option.GeoCompleteLevel	The GeoComplete search level. This can be GeoCompleteAddress, GeoCompletePOI, GeoCompleteCategory, GeoCompleteALL, or FindNearestPOI. The default is GeoCompleteALL. Unless you have licensed and installed POI data, GeoCompletePOI, GeoCompleteCategory, and FindNearestPOI will not return any candidates and only street candidates will be returned for GeoCompleteAll.
Option.GeoCompleteDictionaryPreference	Specifies the dictionary preference for address dictionary or user dictionary (if you have a custom user dictionary for the country). Values are AD_ONLY (address dictionary only), UD_ONLY (user dictionary only), PREFER_AD, (prefer address dictionary), PREFER_UD, (prefer user dictionary), or BOTH_AD_UD (use both with no preference). The default is BOTH_AD_UD.
Option.SearchRadiusUnit	Units used for Option.SearchDistance. Values can be (KILOMETERS, MILES, METERS, or FEET). The default is KILOMETERS, unless you changed that preference in Management Console.
Option.FuzzyMatch	Hard_Match, Soft_Match, or None to specify the type of fuzzy match. The default is None.
Option.CoordinateSystem	Coordinate system to use. Currently only EPSG:4326 is supported.
Option.MaxCandidates	Maximum number of candidates to return (1 - 100). Or specify -1 to return the maximum allowable number of candidates (100).
Options.Locale	Locale is enabled only for FindNearest POI. English is always available and that is the default locale. You can also select Native if the POI categories and subcategories have been localized. Native refers to the local language for that country.< **Note:** This option is available only if you have licensed and installed POI data. note>
Options.MatchOnAddressNumber	Specifies whether an address number match is required. By default, an address number match is not required.

REST API Example

This example illustrates a REST API call and JSON return .

See **REST API Features** on page 25 for a description of all the options than can be controlled through the API.

When you choose a candidate, the address can be placed on a map.

Street Address Example

The following example identifies the address 44 Wolf Rd. from an origin in Albany, NY. In this example, maximum returned candidates is set to 5 and the distance units is set to kilometers.

```
http://<servername>:8080/rest/GeoComplete/results.json?Data.AddressLine1=44%20Wolf%20Rd
&Data.Country=USA&Option.Database=<DBName>&Option.MaxCandidates=5&Option.SearchDistance=10&
Option.SearchRadiusUnit=km&Data.OriginLatitude=42.657756&Data.OriginLongitude=-73.745343
```

This returns the nearest address candidates, with the address candidate (Type 2). This is not the complete JSON output. It has been edited for brevity.

```
{"output_port":[{"AddressLine1":"44 Wolf
Rd","City":"Albany","Country":"USA",
"LastLine":"Albany, NY
12205","Latitude":"42.717715","Longitude":"-73.8091",
"PostalCode":"12205","StateProvince":"NY","Type":"2",
"Distance":"8.431813","DistanceUnit":"KILOMETERS",
"FormattedString":"44 Wolf Rd, Albany, NY 12205",
"IsUserDictionary":"false","featureID":"368400000076592","StreetNameMatch":"true",
"AddressNumberMatch":"true","user_fields":[]}]}
```

Sample SOAP Request and Response

This topic shows sample SOAP requests and responses.

Note: Since the service name, option name, and field name ultimately become XML elements, they may not contain characters that are invalid in XML element names (for example, spaces are not valid). Please consult the xml specification for clarification (**XML Markup Language**). Services not meeting this requirement will still function but will not be exposed as a web services.

Sample SOAP Request

Following is a sample SOAP request used to call the ValidateAddress component as well as a sample SOAP response. The sections for options and rows are all dependent on the metadata for that particular web service; therefore, different components will have different metadata entries. Additionally, there is a user_fields section that allows you to pass in field values that will be returned, unmodified, in the response.

```
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:val="http://www.g1.com/services/ValidateAddress">
>
    <soapenv:Header/>
    <soapenv:Body>
        <val:ValidateAddressRequest>
            <val:context>
                <val:account.id>admin</val:account.id>
                <val:account.password>admin</val:account.password>
            </val:context>
            <val:options>
                <val:OutputFormattedOnFail>Y</val:OutputFormattedOnFail>
            </val:options>
            <val:rows>
                <val:row>
                    <val:AddressLine1>1525B Kramer Lane</val:AddressLine1>
                    <val:AddressLine2>Suite 100</val:AddressLine2>
                    <val:AddressLine3></val:AddressLine3>
                    <val:AddressLine4></val:AddressLine4>
                    <val:City></val:City>
                    <val:StateProvince></val:StateProvince>
                    <val:PostalCode>78758</val:PostalCode>
                    <val:Country></val:Country>
                    <val:FirmName></val:FirmName>
                    <val:USUrbanName></val:USUrbanName>
                    <val:user_fields>
                        <val:user_field>
                            <val:name>myuser</val:name>
                            <val:value>yes</val:value>
                        </val:user_field>
                    </val:user_fields>
                </val:row>
            </val:rows>
        </val:ValidateAddressRequest>
    </soapenv:Body>
</soapenv:Envelope>
```

Sample SOAP Response

Below is a sample SOAP response.

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
    <soap:Body>
```

```
      <ValidateAddressResponse
xmlns="http://www.g1.com/services/ValidateAddress">
        <rows>
          <row>
            <Confidence>88</Confidence>
            <RecordType>Normal</RecordType>
            <CountryLevel>A</CountryLevel>
            <ProcessedBy>USA</ProcessedBy>
            <MatchScore>0</MatchScore>
            <AddressLine1>1073 Maple Ln</AddressLine1>
            <City>Batavia</City>
            <StateProvince>IL</StateProvince>
            <PostalCode>60510-1135</PostalCode>
            <PostalCode.Base>60510</PostalCode.Base>
            <PostalCode.AddOn>1135</PostalCode.AddOn>
            <Country>United States Of America</Country>
            <user_fields>
      <user_field>
       <name>myuser</val:name>
       <value>yes</val:value>
      </user_field>
    </user_fields>
            </row>
        </rows>
      </ValidateAddressResponse>
   </soap:Body>
</soap:Envelope>
```

Appendix

In this section

A - Point of Interest Codes (micodes)

In this section

miCodes

Point of Interest candidates return the miCode. These miCodes are eight-digit numeric codes that provide feature identification by general category, subcategory, and subfeature. Point of Interest miCodes are organized with the following numeric pattern:

Note: POI and category/subcategory features are available only if you have licensed and installed POI data.

POI miCode Numeric Patterns	10 - all Point of Interest miCodes begin with the digits 10
	Digits 3 and 4 identify the POI subcategory (such as Shopping - Retail and Wholesale; Health
	Digits 5 through 8 identify the subfeature codes (such as Food Stores; Hospital/Polyclinic)

Point of Interest miCodes are assigned universally across all countries.

Note: POI data is a separate data bundle that must be purchased.

Table 8: POI miCodes

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
00 Unclassified	00 Unclassified	10000000
01 Shopping - Retail and Wholesale	0000 Unclassified	10010000
	0000 Unclassified	10010000
	0100 General Merchandise Stores/Shops	10010100
	0101 Department Stores	10010101
	0102 Variety Stores	10010102
	0103 Warehouse Club Stores	10010103
	0200 Food Stores	10010200
	0201 Food Stores - Supermarket	10010201

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
	0203 Food Stores -Fish/Seafood Market	10010203
	0204 Food Stores -Fruits/Vegetable Market	10010204
	0205 Beverage / Bottle Store	10010205
	0300 Apparel and Accessory	10010300
	0400 Auto Sales and Service Stations	10010400
	0401 Car Dealership - Sales	10010401
	0402 Car Dealership - Service	10010402
	0403 Car Dealership - Sales and Service	10010403
	0404 Car Repair Facilities	10010404
	0405 Car Rental Office	10010405
	0410 Motorcycle Sales and Service	10010410
	0500 Gas / Petrol Stations	10010500
	0600 Furniture and Home Furnishings	10010600
	0700 Building Materials AND Garden Supplies	10010700
	0800 Wholesale Trade Durable AND Non-durables	10010800
	0900 Shopping Malls/ Shopping Centers	10010900
02 Eating and Drinking Places	0000 Unclassified	10020000

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
	0101 Restaurants - Ethnic - American	10020101
	0102 Restaurants - Ethnic - Chinese	10020102
	0103 Restaurants - Ethnic - Italian	10020103
	0104 Restaurants - Ethnic - German	10020104
	1050 Restaurants - Ethnic - French	10020105
	0106 Restaurants - Ethnic - Japanese	10020106
	0107 Restaurants - Ethnic - Indian	10020107
	0108 Restaurants - Ethnic - Thai	10020108
	0109 Restaurants - Ethnic - Vietnamese	10020109
	0110 Restaurants - Ethnic - Middle East	10020110
	0111 Restaurants - Ethnic - Greek	10020111
	0112 Restaurants - Ethnic - Mexican	10020112
	0200 Restaurants - Ice Cream/Soda	10020200
	0300 Restaurants - Fast Food	10020300
	0400 Restaurants - Family	10020400
	0500 Restaurants - Pizza	10020500
	0600 Restaurants - Seafood	10020600
	0700 Restaurants - Drinking/Alcoholic	10020700
	0800 High Concentration of Restaurants	10020800

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
03 Business and Personal Services	0000 Unclassified	10030000
	0100 Hotels/Motels	10030100
	0200 Personal Service Business	10030200
	0201 Laundromat	10030201
	0202 Salons	10030202
	0300 Financial Services	10030300
	0301 Banks	10030301
	0302 ATM Machine / Cash Dispenser	10030302
	0400 Broadcasting Service	10030400
	0500 Automobile Club	10030500
04 Other Business	0000 Office / Company / Industry	10040000
	0100 Agriculture and Mining	10040100
	0101 Mine/Quarry	10040101
	0200 Manufacturing	10040200
11 Tourism	0000 Unclassified	10110000
	0100 Tourist Attraction	10110100
	0200 Tourist Attraction - Building	10110200
	0201 Museum	10110201
	0202 Art Gallery / Art Center	10110202

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
	0203 Aquarium	10110203
	0300 Tourist Attraction - Monument	10110300
	0301 Memorial	10110301
	0400 Tourist Attraction - Natural	10110400
	0401 Scenic/Panoramic View	10110401
	0402 Beach, Represented by a Point	10110402
	0403 Mountain peak	10110403
	0405 Mountain pass	10110405
	0500 Tourist Attraction - Historic Site	10110500
	0600 Tourist Attraction - Other	10110600
	0601 Winery	10110601
	0700 Tourist Information Center	10110700
	0800 Rest Area (Public)	10110800
12 Sports	0000 Sports - Unclassified	10120000
	0100 Sport Center / Stadium	10120100
	0101 Tennis Court	10120101
	0102 Cricket	10120102
	0103 Football/Soccer	10120103
	0104 Baseball	10120104

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
	0105 Ice Skating Rink	10120105
	0106 Hockey	10120106
	0107 Basketball/Netball	10120107
	0108 Golf Course	10120108
	0109 Race Course	10120109
	0110 Rifle Range	10120110
	0111 Bowling Center	10120111
	0300 Water Sport	10120300
	0301 Swimming Pool	10120301
	0302 Yacht Basin	10120302
	0400 Sports Club	10120400
	0500 Health Club	10120500
	0600 Ski Resort	10120600
13 Recreation/Entertainment	0000 Unclassified	10130000
	0100 Cultural /Civic/ Community Center	10130100
	0101 Theater	10130101
	0102 Opera	10130102
	0103 Concert Hall	10130103
	0104 Music Center	10130104

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
	0105 Cinema	10130105
	0200 Leisure Center	10130200
	0201 Park	10130201
	0202 Zoo	10130202
	0203 Amusement Park	10130203
	0204 Camping Ground/Caravan park	10130204
	0205 Fairgrounds	10130205
	0206 Night Life /Clubs	10130206
	0207 Casino	10130207
	0208 Recreational Clubs	10130208
	0300 Convention Center	10130300
	0301 Exhibition Center	10130301
21 Educational	0000 Educational	10210000
	0100 Kindergarten/Nursery School	10210100
	0200 Elementary/Middle/High School	10210200
	0201 Elementary/Middle/High School - Catholic	10210201
	0202 Elementary/Middle/High School - Private	10210202
	0203 Elementary/Middle/High School - Public	10210203

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
	0300 Colleges/Universities	10210300
	0400 Vocational/Trade	10210400
	0500 Special Schools	10210500
	0600 Library	10210600
	0700 Child Care Center	10210700
22 Places of Worship	0100 Church	10220100
	0101 Baptist Church	10220101
	0102 Catholic Church	10220102
	0103 Methodist Church	10220103
	0200 Mosque	10220200
	0300 Synagogue	10220300
	0400 Buddhist Temple	10220400
	0500 Hindu Temple	10220500
	0600 Other	10220600
23 Health	0000 Health Facilities, Undefined	10230000
	0010 Pharmacy	10230010
	0100 Hospital/Polyclinic	10230100
	0200 Nursing and Personal Care	10230200
	0300 Office/Clinic of Medical Doctors	10230300

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
	0400 Office/Clinic of Dentist	10230400
	0500 Medical/Dental Laboratories/Services	10230500
	0600 Ambulance Station	10230600
	0700 Veterinarian Clinic/Hospital	10230700
24 Public	0000 All	10240000
	0100 Government Facilities	10240100
	0101 City/Municipal/Local Facility	10240101
	0102 Courts	10240102
	0103 Embassy /Foreign Government Representation	10240103
	0104 Frontier Crossing	10240104
	0300 Police Station/Facility	10240300
	0400 Fire Stations	10240400
	0500 Post Office	10240500
	0501 Post Office - Main	10240501
	0502 Post Office - Minor	10240502
	0600 Prisons	10240600
	0700 Military base /Defense	10240700
	0800 Cemetery/Crematorium	10240800

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
	0900 Waste Disposal /Sewerage	10240900
31 Airports	0000 Unclassified	10310000
	0010 Check-in Facility at Airport	10310010
	0011 Check-in Facility at Airport Departures	10310011
	0012 Check-in Facility at Airport Arrivals	10310012
	0010 Check-in Facility at Airport Departure/Arrivals	10310013
	0100 Airport - Civil	10310100
	0101 Airport - Public	10310101
	0102 Airport- Private	10310102
	0200 Airport - Military	10310200
	0300 Helipad	10310300
32 Stations	0000 Unclassified	10320000
	0100 Ferry terminal /Wharf/Jetty/Pontoon	10320100
	0101 Ferry Terminal Ship/Hovercraft	10320101
	0102 Ferry Terminal Train	10320102
	0200 Railway Station, Undefined	10320200
	0201 Railway Station, Underground/Metro	10320201
	0202 Railway Station, International	10320202

10 Points Of Interest Subcategories	Subfeature Codes	miCodes
	0203 Railway Station, National	10320203
	0204 Railway Station, (Sub) Urban	10320204
	0300 Bus Terminal /Depot	10320300
33 Parking	0000 Parking - Unclassified	10330000
	0100 Parking Garage	10330100
	0200 Open Parking Area	10330200
	0300 Rent-a-Car Parking	10330300
	0210 Park and Ride Lot	10330210
34 Interchanges	0000 Intersection	10340000
	0100 Freeway Exit/Entrance	10340100
	0200 Freeway to Freeway Interchange	10340200
	0300 Non Freeway Intersection	10340300

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