pitney bowes

Spectrum Technology Platform

Version 12.0

Geocode Address World - REST

Table of Contents

1 - GeocodeAddressWorld

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The GeocodeAddressWorld takes an address located in any of the supported countries and returns the city centroid or, for some countries, postal centroid. GeocodeAddressWorld cannot geocode to the street address level. If you require address-level geocoding, use GeocodeAddressGlobal.

GeocodeAddressWorld is typically used as a fallback geocoder to cover countries for which a Geocode Address Global country is not available. For example, you may have licensed the Australia geocoder because you are primarily interested in geocoding Australian addresses. However, your data may have some records with locations outside Australia. In this case you could use GeocodeAddressWorld to provide centroid geocodes for locations outside Australia, while using the Australia geocoders to provide more precise geocodes for Australian addresses. In other dataflows, you may choose to use GeocodeAddressWorld as a first pass geocoder and then route the results to country-specific geocoders. The best strategy depends on your business case and the nature of your address data.

GeocodeAddressWorld is an optional part of the Enterprise Geocoding Module. For more information about Enterprise Geocoding Module, see **Enterprise Geocoding Module**.

In this section

Adding an Enterprise Geocoding Module Database Resource for World Geocoder

Whenever you install a new database resource or modify an existing database resource you must define it in the Management Console in order for it to become available on your system. This procedure describes how to add or modify a database resource for the Enterprise Geocoding Module for the World geocoder.

To create a Geocode Address World database resource:

1. If you haven't already done so, install the database files on your system. For instructions on installing databases, see the *Spectrum™ Technology Platform Installation Guide*.
2. In Management Console, under **Resources**, choose **Spectrum Databases**.
3. Click the Add button to create a new database or select an existing database resource then click the Edit button to change it. You can also create a new database resource by copying an existing one, by clicking the Copy button.
4. If you are creating a new database, enter a name for the database resource in the **Name** field. The name can be anything you choose. If you are creating a new database by copying an existing one, rename the default name as needed. You cannot modify the name of an existing database resource, because any services or jobs that reference the database resource by its original name would fail.
5. In the **Pool size** field, specify the maximum number of concurrent requests you want this database to handle.

   The optimal pool size varies by module. You will generally see the best results by setting the pool size between one-half to twice the number of CPUs on the server, with the optimal pool size for most modules being the same as the number of CPUs. For example, if your server has four CPUs you may want to experiment with a pool size between 2 (one-half the number of CPUs) and 8 (twice the number of CPUs) with the optimal size possibly being 4 (the number of CPUs).

   When modifying the pool size you must also consider the number of runtime instances specified in the dataflow for the stages accessing the database. Consider for example a dataflow that has a Geocode US Address stage that is configured to use one runtime instance. If you set the pool size for the US geocoding database to four, you will not see a performance improvement because there would be only one runtime instance and therefore there would only be one request at a time to the database. However, if you were to increase the number of runtime instances of Geocode US Address to four, you might then see an improvement in performance since there would be four instances of Geocode US Address accessing the database simultaneously, therefore using the full pool.

   Tip: You should conduct performance tests with various settings to identify the optimal pool size and runtime instance settings for your environment.

6. In the **Module** field, select InternationalGeocoder World.
7. In the **Type** field, select Geocode Address World.
8. Click the Add button to install a new dataset. In the **Name** field, specify a name for this dataset. In the **Path** field specify the folder that contains the files. You can type in a partial path and click the Browse button to drill down into the file structure to locate the datasets you need.

   The datasets are typically found in: `<InstallLocation>\IGEO-<CountryCode>\data`, where <InstallLocation> is the directory you specified when you installed the files, <CountryCode> is the two-letter country code. Some countries may have multiple datasets in the data directory, some of which you may have licensed and some you may have not. Only specify the location of the data you have licensed.

   Note: You must enter the datasets in the order you want them. Reordering datasets is currently not supported in Management Console. You can reorder them in Enterprise Designer or from the command line. Management Console will honor the new order.

   Note: If you are specifying a path for a user-defined dataset you must specify a path to a Pitney Bowes provided dataset first. The first path in all database resources must be a path for a Pitney Bowes provided dataset.

9. If you have additional datasets to add, click the Add button, otherwise click **Save**.
10. Click **OK** to leave the Add Database page.

Geocode Precision

GeocodeAddressWorld automatically provides the best geocode possible based on the data you provide on input. If you provide a city and valid postal code, you will receive a postal code centroid. If you provide a city and an invalid postal code, or a city and no postal code, GeocodeAddressWorld will return the geographic centroid of the city.

See **Geographic Geocoding** on page 7 and **Postal Geocoding** on page 6.

From Management Console, you can select Geographic or Postal geocoding. You can also select Best Match. In both geographic and postal geocoding are possible, the Best Match selection will return a close match geographic candidate if the geographic result is to a city level or better (that is, a G3 or G4 result code). If the geographic result is less accurate than a city level (that is, a G1 or G2 result code), then Best Match may return a postal (Z1 result). If a postal result is not available, then the best available geographic candidate is returned.

See **Geographic Geocoding Result Codes** and **Postal Geocoding Result Codes**.

Postal Geocoding

Geocode Address World can geocode to a postal centroid if postcode information is available from the country. Postcode information can come from any of the data sources (TomTom, GeoNames, or Pitney Bowes). See **Country Postal Data Coverage** on page 29 for a summary of Geocode Address World postal data coverage. Depending on the country, postal geocoding may provide more accurate results that geographic geocoding.

Postal level geocoding is possible if these conditions are met:

- Your input address consists of a valid postcode.
- The data source contains postcode information for the country. Not every country has postcode data.

Geocode Address World may return multiple close matches for postal geocoding. For example, a postcode of 12180 matches Troy NY but the identical postcode occurs in several other countries. If the input is the postcode only, then all those candidates are returned as close matches.

If the input includes geographic address elements (such as country, state, region, or city name), Geocode Address World may be able to use that information to return a more accurate single close match. If you want to use geographic address content to refine your postal geocoding results, consider the following:

> **Note:** Different countries derive their postal data from either the TomTom, GeoNames, or Pitney Bowes sources. Therefore, the available geographic content in the postal data source varies by country. For example, city name (City) is a close match weighting factor for countries that use the GeoNames postal data source, but city name is ignored for countries that use the TomTom postal data source. See **Data Sources and Coverage** on page 9 for information about the geographic content of the TomTom, GeoNames, and Pitney Bowes data sources.

Postal Geocoding with Geographic Information

In this postal geocoding example, the input address includes a valid postcode of 41012 and the province (StateProvince) of Emilia Romagna. A street address is provided, but this is ignored for postal geocoding.

Fornaci 40
Emilia Romagna
41012

Because the TomTom postal data source for Italy includes StateProvince, the province of Emilia Romagna is considered when evaluating close matches. Therefore, Emilia Romagna, Italy with the matching 41012 postal code is returned as the single close match with a Z1 result code. Candidates with a 41012 postcode from other countries may be returned as non-close candidates. If StateProvince or Country information was not provided on input, then Geocode Address World would return multiple close matches because the five-digit 41012 postcode can be found in a number of countries.

Note: The geographic content must be present in the postal data source in order refine postal geocoding results. For example, the Italy TomTom postal data source does not include city/town (City). So if you input the city of Carpi with the 41012 postal code, Geocode Address World ignores the city name and returns multiple close matches for the 41012 postal code (unless you also specified the ITA country name). See **Data Sources and Coverage** on page 9 for information about the geographic content of the TomTom, GeoNames, and Pitney Bowes data sources.

Geographic Geocoding

World can geocode to the centroid of an administrative division (such as town or village). These administrative divisions are described in **Geographic Areas** on page 9.

World can geocode to the geographic level if these conditions are met:

- Your input addresses contains accurate geographic information without valid postcode address content in the input. If the address in question includes valid postcode input, then World will attempt postal geocoding.
- The data source contains geographic level information for the country. Geographic information can come from any of the data sources (TomTom, GeoNames, or Pitney Bowes).
- Country name or ISO country codes are not required, but if included, they must be matched. Including the country name may produce better close matches.

Geographic Geocoding to City

In this example, the input address includes the city (City) of Vaihingen an der Enz. The country is not specified in this example. The street address information (street name and number) is ignored for the purposed of geographic geocoding.

Muldenweg 2
Vaihingen an der Enz

World returns a G3 close match candidate. Even though the country was not specified, World identifies one close match in Germany (DEU).

StateProvince: Baden-Württemberg
County: Ludwigsburg
City: Vaihingen an der Enz
Country: DEU
Result Code: G3
X: 8.95948
Y: 48.930059

Geographic Geocoding with Common City Name

In this example, the input address includes the city (City) of Venice. This city name occurs in a number of countries, but the country is not specified on input.

St Marks Plaza
Venice

World selects Venice, Italy as the close match candidate because of its large population (approximately 270,000) and because Venice is the administrative capital of the Veneto region of Italy. A number of non-close matches may also be returned for cities of Venice in other countries. The close match candidate for Venice, ITA is:

StateProvince: Veneto
County: Venezia
City: Venice
Country: ITA
Result Code: G3
X: 12.33878
Y: 45.43434

Geographic Geocoding with State/Province Abbreviation

In this example the input address includes the city name of Rome and GA, which is the abbreviation for the state of Georgia in the USA. See **State or Province Abbreviations** on page 45 to see the countries for which state/province abbreviations are recognized. Because the state abbreviation is used, it is not necessary to specify the country name.

Rome, GA

World considers the StateProvince and returns a close match for Rome, Georgia USA. Even though Rome, Italy is a much larger city and is the capital of Italy, that is returned as a non-close candidate because the StateProvince (GA) that was specified on input

StateProvince: Georgia
County: Floyd
City: Rome
Country: USA
Result Code: G3
X: -85.16467
Y: 34.25704

Geographic Geocoding to Locality

In this example, the input address includes the locality of Altamira and province abbreviation of GRO World recognizes the state abbreviation of GRO, so the country name is not necessary.

City: Altamira
StateProvince: GRO

In this example, World returns a close match to Locality) of Altamira even if Altamira was input as City. The (StateProvince) of GRO is also returned. If Guerrero is entered as StateProvince then Guerrero is returned.

StateProvince: GRO
City: ACAPULCO DE JUÁREZ
Locality: ALTAMIRA
Country: MEX
Result Code: G4
X: 99.87984
Y: 16.87637

Address input can be formatted into separate input fields or input can be unformatted (single line input). Geocoding of unformatted input is shown in **Single Line Input** on page 46.

Geographic Areas

Every country has administrative divisions and many of these administrative areas are used in addresses. World identifies four AreaNames, each one corresponding to an administrative division. Administrative division naming and hierarchy vary by country.

- locality
- city
- county
- state/province

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Data Sources and Coverage

Geocode Address World relies on several data sources to build its comprehensive worldwide address databases. If an input address cannot be located using one of these data sources, then Geocode Address World World uses one of the other data sources. The best available candidate is returned.

These data sources (for both geographic and postal data) are used in the listed order:

- TomTom data
- GeoNames data

- Pitney Bowes World data

Geocode Address World is partitioned into six databases based on continent. The geographic and postal data is integrated into each address dictionary to support both geographic geocoding and postal geocoding.

- Africa
- Asia
- Europe
- NorthAmerica
- Oceana
- SouthAmerica

See **Geographic Geocoding** on page 7 for a description and examples of geographic geocoding. See **Postal Geocoding** on page 6 for a description and examples of postal geocoding.

The postal source data can access the geographic content, which can be used to refine postal results. That is, geographic information (country name and administrative divisions) can be used to help evaluate close matches when the same postal code can be found in different countries.

Depending on the source of the postal data, the following geographic information is available to help refine postal results:

- TomTom source: Country, StateProvince
- GeoNames source: Country, StateProvince and City
- Pitney Bowes World source: Country, StateProvince, County, City, and Locality

> **Note:** The Geocode Address World data set contains data licensed from the GeoNames Project (**http://www.geonames.org**) provided under the Creative Commons Attribution License ("Attribution License") located at **http://creativecommons.org/licenses/by/3.0/legalcode**. Your use of the GeoNames data (described in the Spectrum User Manual) is governed by the terms of the Attribution License, and any conflict between your agreement with PBSI and the Attribution License will be resolved in favor of the Attribution License solely as it relates to your use of the GeoNames data.

Country Coverage

Geocode Address World includes coverage for almost every country in the world. The accuracy and scope of coverage varies depending on the quality of the available data source. Some countries include postcode data, while other countries have geographic coverage only.

See **Data Sources and Coverage** on page 9 for more information about the TomTom, GeoNames, and Pitney Bowes geographic and postal data sources.

For a complete list of Geographic coverage by country, see **Country Geographic Data Coverage** on page 11. For Postal coverage by country, see **Country Postal Data Coverage** on page 29.

Country Geographic Data Coverage

Table 1: Country Names and Geographic Data Coverage

Country Name	ISO 3166 Country Code	Data Source	Vintage
AFGHANISTAN	AFG	GeoNames	2011.07
ALAND ISLANDS	ALA	GeoNames	2011.07
ALBANIA	ALB	TomTom	2011.06
ALGERIA	DZA	GeoNames	2011.07
AMERICAN SAMOA	ASM	GeoNames	2011.07
ANDORRA	AND	TomTom	2011.06
ANGOLA	AGO	TomTom	2011.06
ANGUILLA	AIA	GeoNames	2011.07
ANTARCTICA	ATA	GeoNames	2011.07
ANTIGUA AND BARBUDA	ATG	GeoNames	2011.07
ARGENTINA	ARG	TomTom	2011.06
ARMENIA	ARM	GeoNames	2011.07
ARUBA	ABW	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
AUSTRALIA	AUS	GeoNames	2011.07
AUSTRIA	AUT	TomTom	2011.06
AZERBAIJAN	AZE	GeoNames	2011.07
BAHAMAS	BHS	GeoNames	2011.07
BAHRAIN	BHR	TomTom	2011.06
BANGLADESH	BGD	GeoNames	2011.07
BARBADOS	BRB	GeoNames	2011.07
BELARUS	BLR	TomTom	2011.06
BELGIUM	BEL	TomTom	2011.06
BELIZE	BLZ	GeoNames	2011.07
BENIN	BEN	TomTom	2011.06
BERMUDA	BMU	GeoNames	2011.07
BHUTAN	BTN	GeoNames	2011.07
BOLIVIA	BOL	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
BONAIRE, SINT EUSTATIUS AND SABA	BES	GeoNames	2011.07
BOSNIA AND HERZEGOWINA	BIH	TomTom	2011.06
BOTSWANA	BWA	TomTom	2011.06
BOUVET ISLAND	BVT	GeoNames	2011.07
BRAZIL	BRA	TomTom	2011.06
BRITISH INDIAN OCEAN TERRITORY	IOT	GeoNames	2011.07
BRUNEI DARUSSALAM	BRN	TomTom	2011.06
BULGARIA	BGR	TomTom	2011.06
BURKINA FASO	BFA	TomTom	2011.06
BURUNDI	BDI	GeoNames	2011.07
CAMBODIA	KHM	GeoNames	2011.07
CAMEROON	CMR	TomTom	2011.06
CANADA	CAN	TomTom	2011.06
CAPE VERDE	CPV	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
CAYMAN ISLANDS	CYM	GeoNames	2011.07
CENTRAL AFRICAN REPUBLIC	CAF	GeoNames	2011.07
CHAD	TCD	GeoNames	2011.07
CHILE	CHL	TomTom	2011.06
CHINA	CHN	GeoNames	2011.07
CHRISTMAS ISLAND	CXR	GeoNames	2011.07
COCOS (KEELING) ISLANDS	CCK	GeoNames	2011.07
COLOMBIA	COL	GeoNames	2011.07
COMOROS	COM	GeoNames	2011.07
CONGO	COG	TomTom	2011.06
CONGO, DEMOCRATIC REPUBLIC OF THE	COD	TomTom	2011.06
COOK ISLANDS	COK	GeoNames	2011.07
COSTA RICA	CRI	GeoNames	2011.07
COTE D'IVOIRE	CIV	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
CROATIA (LOCAL NAME: HRVATSKA)	HRV	TomTom	2011.06
CUBA	CUB	GeoNames	2011.07
CURAÇAO	CUW	GeoNames	2011.07
CYPRUS	CYP	GeoNames	2011.07
CZECH REPUBLIC	CZE	TomTom	2011.06
DENMARK	DNK	GeoNames	2011.07
DJIBOUTI	DJI	GeoNames	2011.07
DOMINICA	DMA	GeoNames	2011.07
DOMINICAN REPUBLIC	DOM	GeoNames	2011.07
ECUADOR	ECU	GeoNames	2011.07
EGYPT	EGY	TomTom	2011.06
EL SALVADOR	SLV	GeoNames	2011.07
EQUATORIAL GUINEA	GNQ	GeoNames	2011.07
ERITREA	ERI	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
ESTONIA	EST	TomTom	2011.06
ETHIOPIA	ETH	GeoNames	2011.07
FALKLAND ISLANDS (MALVINAS)	FLK	GeoNames	2011.07
FAROE ISLANDS	FRO	GeoNames	2011.07
FIJI	FJI	GeoNames	2011.07
FINLAND	FIN	TomTom	2011.06
FRANCE	FRA	TomTom	2011.06
FRENCH GUIANA	GUF	TomTom	2011.06
FRENCH POLYNESIA	PYF	GeoNames	2011.07
FRENCH SOUTHERN TERRITORIES	ATF	GeoNames	2011.07
GABON	GAB	TomTom	2011.06
GAMBIA	GMB	GeoNames	2011.07
GEORGIA	GEO	GeoNames	2011.07
GERMANY	DEU	TomTom	2011.06

Country Name	ISO 3166 Country Code	Data Source	Vintage
GHANA	GHA	TomTom	2011.06
GIBRALTAR	GIB	GeoNames	2011.07
GREECE	GRC	TomTom	2011.06
GREENLAND	GRL	GeoNames	2011.07
GRENADA	GRD	GeoNames	2011.07
GUADELOUPE	GLP	TomTom	2011.06
GUAM	GUM	GeoNames	2011.07
GUATEMALA	GTM	GeoNames	2011.07
GUERNSEY	GGY	GeoNames	2011.07
GUINEA	GIN	GeoNames	2011.07
GUINEA-BISSAU	GNB	GeoNames	2011.07
GUYANA	GUY	GeoNames	2011.07
HAITI	HTI	GeoNames	2011.07
HEARD AND MCDONALD ISLANDS	HMD	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
HONDURAS	HND	GeoNames	2011.07
HONG KONG	HKG	TomTom	2011.06
HUNGARY	HUN	TomTom	2011.06
ICELAND	ISL	GeoNames	2011.07
INDIA	IND	GeoNames	2011.07
INDONESIA	IDN	TomTom	2011.06
IRAN (ISLAMIC REPUBLIC OF)	IRN	GeoNames	2011.07
IRAQ	IRQ	GeoNames	2011.07
IRELAND	IRL	TomTom	2011.06
ISLE OF MAN	IMN	GeoNames	2011.07
ISRAEL	ISR	GeoNames	2011.07
ITALY	ITA	TomTom	2011.06
JAMAICA	JAM	GeoNames	2011.07
JAPAN	JPN	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
JERSEY	JEY	GeoNames	2011.07
JORDAN	JOR	GeoNames	2011.07
KAZAKHSTAN	KAZ	GeoNames	2011.07
KENYA	KEN	TomTom	2011.06
KIRIBATI	KIR	GeoNames	2011.07
KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF	PRK	GeoNames	2011.07
KOREA, REPUBLIC OF	KOR	GeoNames	2011.07
KUWAIT	KWT	TomTom	2011.06
KYRGYZSTAN	KGZ	GeoNames	2011.07
LAO PEOPLE'S DEMOCRATIC REPUBLIC	LAO	GeoNames	2011.07
LATVIA	LVA	TomTom	2011.06
LEBANON	LBN	GeoNames	2011.07
LESOTHO	LSO	TomTom	2011.06
LIBERIA	LBR	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
LIBYAN ARAB JAMAHIRIYA	LBY	GeoNames	2011.07
LIECHTENSTEIN	LIE	GeoNames	2011.07
LITHUANIA	LTU	TomTom	2011.06
LUXEMBOURG	LUX	TomTom	2011.06
MACAO	MAC	TomTom	2011.06
MACEDONIA, THE FORMER YUGOSLAV REPUBLIC OF	MKD	TomTom	2011.06
MADAGASCAR	MDG	GeoNames	2011.07
MALAWI	MWI	TomTom	2011.06
MALAYSIA	MYS	TomTom	2011.06
MALDIVES	MDV	GeoNames	2011.07
MALI	MLI	TomTom	2011.06
MALTA	MLT	TomTom	2011.06
MARSHALL ISLANDS	MHL	GeoNames	2011.07
MARTINIQUE	MTQ	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
MAURITANIA	MRT	TomTom	2011.06
MAURITIUS	MUS	TomTom	2011.06
MAYOTTE	MYT	GeoNames	2011.07
MEXICO	MEX	TomTom	2011.06
MICRONESIA, FEDERATED STATES OF	FSM	GeoNames	2011.07
MOLDOVA, REPUBLIC OF	MDA	TomTom	2011.06
MONACO	MCO	GeoNames	2011.07
MONGOLIA	MNG	GeoNames	2011.07
MONTENEGRO	MNE	TomTom	2011.06
MONTSERRAT	MSR	GeoNames	2011.07
MOROCCO	MAR	TomTom	2011.06
MOZAMBIQUE	MOZ	TomTom	2011.06
MYANMAR	MMR	GeoNames	2011.07
NAMIBIA	NAM	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
NAURU	NRU	GeoNames	2011.07
NEPAL	NPL	GeoNames	2011.07
NETHERLANDS	NLD	TomTom	2011.06
NETHERLANDS ANTILLES	ANT	Pitney Bowes	C. 2006
NEW CALEDONIA	NCL	GeoNames	2011.07
NEW ZEALAND	NZL	GeoNames	2011.07
NICARAGUA	NIC	GeoNames	2011.07
NIGER	NER	TomTom	2011.06
NIGERIA	NGA	TomTom	2011.06
NIUE	NIU	GeoNames	2011.07
NORFOLK ISLAND	NFK	GeoNames	2011.07
NORTHERN MARIANA ISLANDS	MNP	GeoNames	2011.07
NORWAY	NOR	TomTom	2011.06
OMAN	OMN	TomTom	2011.06

Country Name	ISO 3166 Country Code	Data Source	Vintage
PAKISTAN	PAK	GeoNames	2011.07
PALAU	PLW	GeoNames	2011.07
PALESTINIAN TERRITORY, OCCUPIED	PSE	GeoNames	2011.07
PANAMA	PAN	GeoNames	2011.07
PAPUA NEW GUINEA	PNG	GeoNames	2011.07
PARAGUAY	PRY	GeoNames	2011.07
PERU	PER	GeoNames	2011.07
PHILIPPINES	PHL	TomTom	2011.06
PITCAIRN	PCN	GeoNames	2011.07
POLAND	POL	TomTom	2011.06
PORTUGAL	PRT	TomTom	2011.06
PUERTO RICO	PRI	GeoNames	2011.07
QATAR	QAT	TomTom	2011.06
REUNION	REU	TomTom	2011.06

Country Name	ISO 3166 Country Code	Data Source	Vintage
ROMANIA	ROU	TomTom	2011.06
RUSSIAN FEDERATION	RUS	TomTom	2011.06
RWANDA	RWA	GeoNames	2011.07
SAINT BARTHÉLEMY	BLM	GeoNames	2011.07
SAINT HELENA, ASCENSION AND TRISTAN DA CUNHA	SHN	GeoNames	2011.07
SAINT KITTS AND NEVIS	KNA	GeoNames	2011.07
SAINT LUCIA	LCA	GeoNames	2011.07
SAINT MARTIN (FRENCH PART	MAF	GeoNames	2011.07
SAINT PIERRE AND MIQUELON	SPM	GeoNames	2011.07
SAINT VINCENT AND THE GRENADINES	VCT	GeoNames	2011.07
SAMOA	WSM	GeoNames	2011.07
SAN MARINO	SMR	TomTom	2011.06
SAO TOME AND PRINCIPE	STP	GeoNames	2011.07
SAUDI ARABIA	SAU	TomTom	2011.06

Country Name	ISO 3166 Country Code	Data Source	Vintage
SENEGAL	SEN	TomTom	2011.06
SERBIA	SRB	TomTom	2011.06
SEYCHELLES	SYC	GeoNames	2011.07
SIERRA LEONE	SLE	GeoNames	2011.07
SINGAPORE	SGP	TomTom	2011.06
SINT MAARTEN (DUTCH PART)	SXM	GeoNames	2011.07
SLOVAKIA (SLOVAK REPUBLIC)	SVK	TomTom	2011.06
SLOVENIA	SVN	TomTom	2011.06
SOLOMON ISLANDS	SLB	GeoNames	2011.07
SOMALIA	SOM	GeoNames	2011.07
SOUTH AFRICA	ZAF	GeoNames	2011.07
SOUTH GEORGIA AND THE SOUTH SANDWICH ISLANDS	SGS	GeoNames	2011.07
SPAIN	ESP	TomTom	2011.06
SRI LANKA	LKA	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
SUDAN	SDN	GeoNames	2011.07
SURINAME	SUR	GeoNames	2011.07
SVALBARD AND JAN MAYEN ISLANDS	SJM	GeoNames	2011.07
SWAZILAND	SWZ	TomTom	2011.06
SWEDEN	SWE	TomTom	2011.06
SWITZERLAND	CHE	TomTom	2011.06
SYRIAN ARAB REPUBLIC	SYR	GeoNames	2011.07
TAIWAN	TWN	TomTom	2011.06
TAJIKISTAN	TJK	GeoNames	2011.07
TANZANIA, UNITED REPUBLIC OF	TZA	TomTom	2011.06
THAILAND	THA	TomTom	2011.06
TIMOR-LESTE	TLS	GeoNames	2011.07
TOGO	TGO	TomTom	2011.06
TOKELAU	TKL	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
TONGA	TON	GeoNames	2011.07
TRINIDAD AND TOBAGO	TTO	GeoNames	2011.07
TUNISIA	TUN	GeoNames	2011.07
TURKEY	TUR	TomTom	2011.06
TURKMENISTAN	TKM	GeoNames	2011.07
TURKS AND CAICOS ISLANDS	TCA	GeoNames	2011.07
TUVALU	TUV	GeoNames	2011.07
UGANDA	UGA	TomTom	2011.06
UKRAINE	UKR	TomTom	2011.06
UNITED ARAB EMIRATES	ARE	TomTom	2011.06
UNITED KINGDOM	GBR	TomTom	2011.06
UNITED STATES	USA	GeoNames	2011.07
UNITED STATES MINOR OUTLYING ISLANDS	UMI	GeoNames	2011.07
URUGUAY	URY	TomTom	2011.06

Country Name	ISO 3166 Country Code	Data Source	Vintage
UZBEKISTAN	UZB	GeoNames	2011.07
VANUATU	VUT	GeoNames	2011.07
VATICAN CITY STATE (HOLY SEE)	VAT	GeoNames	2011.07
VENEZUELA	VEN	GeoNames	2011.07
VIET NAM	VNM	GeoNames	2011.07
VIRGIN ISLANDS (BRITISH)	VGB	GeoNames	2011.07
VIRGIN ISLANDS (U.S.)	VIR	GeoNames	2011.07
WALLIS AND FUTUNA ISLANDS	WLF	GeoNames	2011.07
WESTERN SAHARA	ESH	GeoNames	2011.07
YEMEN	YEM	GeoNames	2011.07
ZAMBIA	ZMB	TomTom	2011.06
ZIMBABWE	ZWE	GeoNames	2011.07

Country Postal Data Coverage

Table 2: Country Names and Postal Data Coverage

Country Name	ISO 3166 Country Code	Data Source	Vintage
ALGERIA	DZA	Pitney Bowes	C. 2006
AMERICAN SAMOA	ASM	GeoNames	2011.07
ANDORRA	AND	TomTom	2011.06
ARGENTINA	ARG	GeoNames	2011.07
ARMENIA	ARM	Pitney Bowes	C. 2006
AUSTRALIA	AUS	GeoNames	2011.07
AUSTRIA	AUT	TomTom	2011.06
AZERBAIJAN	AZE	Pitney Bowes	C. 2006
BAHRAIN	BHR	Pitney Bowes	C. 2006
BANGLADESH	BGD	GeoNames	2011.07
BELARUS	BLR	Pitney Bowes	C. 2006
BELGIUM	BEL	TomTom	2011.06
BERMUDA	BMU	Pitney Bowes	C. 2006

Country Name	ISO 3166 Country Code	Data Source	Vintage
BOSNIA AND HERZEGOWINA	BIH	Pitney Bowes	C. 2006
BRAZIL	BRA	TomTom	2011.09
BRITISH INDIAN OCEAN TERRITORY	IOT	Pitney Bowes	C. 2006
BRUNEI DARUSSALAM	BRN	Pitney Bowes	C. 2006
BULGARIA	BGR	GeoNames	2011.07
CAMBODIA	KHM	Pitney Bowes	C. 2006
CANADA	CAN	TomTom	2011.09
CAPE VERDE	CPV	Pitney Bowes	C. 2006
CHILE	CHL	Pitney Bowes	C. 2006
CHINA	CHN	Pitney Bowes	C. 2006
CHRISTMAS ISLAND	CXR	Pitney Bowes	C. 2006
COCOS (KEELING) ISLANDS	CCK	Pitney Bowes	C. 2006
COSTA RICA	CRI	Pitney Bowes	C. 2006
CROATIA (LOCAL NAME: HRVATSKA)	HRV	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
CUBA	CUB	Pitney Bowes	C. 2006
CYPRUS	CYP	Pitney Bowes	C. 2006
CZECH REPUBLIC	CZE	TomTom	2011.06
DENMARK	DNK	GeoNames	2011.07
DOMINICAN REPUBLIC	DOM	GeoNames	2011.07
ECUADOR	ECU	Pitney Bowes	C. 2006
EGYPT	EGY	Pitney Bowes	C. 2006
EL SALVADOR	SLV	Pitney Bowes	C. 2006
ESTONIA	EST	TomTom	2011.06
ETHIOPIA	ETH	Pitney Bowes	C. 2006
FALKLAND ISLANDS (MALVINAS)	FLK	Pitney Bowes	C. 2006
FAROE ISLANDS	FRO	GeoNames	2011.07
FINLAND	FIN	TomTom	2011.06
FRANCE	FRA	TomTom	2011.06

Country Name	ISO 3166 Country Code	Data Source	Vintage
FRENCH GUIANA	GUF	GeoNames	2011.07
FRENCH POLYNESIA	PYF	Pitney Bowes	C. 2006
GEORGIA	GEO	Pitney Bowes	C. 2006
GERMANY	DEU	TomTom	2011.06
GREECE	GRC	TomTom	2011.06
GREENLAND	GRL	GeoNames	2011.07
GUADELOUPE	GLP	GeoNames	2011.07
GUAM	GUM	GeoNames	2011.07
GUATEMALA	GTM	GeoNames	2011.07
GUERNSEY	GGY	GeoNames	2011.07
GUINEA	GIN	Pitney Bowes	C. 2006
GUINEA-BISSAU	GNB	Pitney Bowes	C. 2006
HAITI	HTI	Pitney Bowes	C. 2006
HONDURAS	HND	Pitney Bowes	C. 2006

Country Name	ISO 3166 Country Code	Data Source	Vintage
HUNGARY	HUN	GeoNames	2011.07
ICELAND	ISL	GeoNames	2011.07
INDIA	IND	GeoNames	2011.07
INDONESIA	IDN	TomTom	2011.06
IRAN (ISLAMIC REPUBLIC OF)	IRN	Pitney Bowes	C. 2006
IRAQ	IRQ	Pitney Bowes	C. 2006
IRELAND	IRL	Pitney Bowes	C. 2006
ISLE OF MAN	IMN	GeoNames	2011.07
ISRAEL	ISR	Pitney Bowes	C. 2006
ITALY	ITA	TomTom	2011.06
JAMAICA	JAM	Pitney Bowes	C. 2006
JAPAN	JPN	GeoNames	2011.07
JERSEY	JEY	GeoNames	2011.07
JORDAN	JOR	Pitney Bowes	C. 2006

Country Name	ISO 3166 Country Code	Data Source	Vintage
KAZAKHSTAN	KAZ	Pitney Bowes	C. 2006
KENYA	KEN	Pitney Bowes	C. 2006
KOREA, REPUBLIC OF	KOR	Pitney Bowes	C. 2006
KUWAIT	KWT	Pitney Bowes	C. 2006
KYRGYZSTAN	KGZ	Pitney Bowes	C. 2006
LAO PEOPLE'S DEMOCRATIC REPUBLIC	LAO	Pitney Bowes	C. 2006
LATVIA	LVA	TomTom	2011.06
LEBANON	LBN	Pitney Bowes	C. 2006
LESOTHO	LSO	Pitney Bowes	C. 2006
LIBERIA	LBR	Pitney Bowes	C. 2006
LIECHTENSTEIN	LIE	GeoNames	2011.07
LITHUANIA	LTU	TomTom	2011.06
LUXEMBOURG	LUX	GeoNames	2011.07
MACEDONIA, THE FORMER YUGOSLAV REPUBLIC OF	MKD	GeoNames	2011.07

Country Name	ISO 3166 Country Code	Data Source	Vintage
MADAGASCAR	MDG	Pitney Bowes	C. 2006
MALAYSIA	MYS	GeoNames	2011.07
MALDIVES	MDV	Pitney Bowes	C. 2006
MALTA	MLT	Pitney Bowes	C. 2006
MARSHALL ISLANDS	MHL	GeoNames	2011.07
MARTINIQUE	MTQ	GeoNames	2011.07
MAYOTTE	MYT	GeoNames	2011.07
MEXICO	MEX	TomTom	2011.06
MICRONESIA, FEDERATED STATES OF	FSM	Pitney Bowes	C. 2006
MOLDOVA, REPUBLIC OF	MDA	GeoNames	2011.07
MONACO	MCO	GeoNames	2011.07
MONGOLIA	MNG	Pitney Bowes	C. 2006
MOROCCO	MAR	TomTom	2011.06
MOZAMBIQUE	MOZ	Pitney Bowes	C. 2006

Country Name	ISO 3166 Country Code	Data Source	Vintage
MYANMAR	MMR	Pitney Bowes	C. 2006
NEPAL	NPL	Pitney Bowes	C. 2006
NETHERLANDS	NLD	TomTom	2011.06
NEW CALEDONIA	NCL	Pitney Bowes	C. 2006
NEW ZEALAND	NZL	GeoNames	2011.07
NICARAGUA	NIC	Pitney Bowes	C. 2006
NIGER	NER	Pitney Bowes	C. 2006
NIGERIA	NGA	Pitney Bowes	C. 2006
NORFOLK ISLAND	NFK	Pitney Bowes	C. 2006
NORTHERN MARIANA ISLANDS	MNP	GeoNames	2011.07
NORWAY	NOR	TomTom	2011.06
OMAN	OMN	Pitney Bowes	C. 2006
PAKISTAN	PAK	GeoNames	2011.07
PALAU	PLW	Pitney Bowes	C. 2006

Country Name	ISO 3166 Country Code	Data Source	Vintage
PAPUA NEW GUINEA	PNG	Pitney Bowes	C. 2006
PARAGUAY	PRY	Pitney Bowes	C. 2006
PHILIPPINES	PHL	GeoNames	2011.07
PITCAIRN	PCN	Pitney Bowes	C. 2006
POLAND	POL	TomTom	2011.06
PORTUGAL	PRT	TomTom	2011.06
PUERTO RICO	PRI	GeoNames	2011.07
REUNION	REU	GeoNames	2011.07
ROMANIA	ROU	Pitney Bowes	C. 2006
RUSSIAN FEDERATION	RUS	TomTom	2011.06
SAINT HELENA, ASCENSION AND TRISTAN DA CUNHA	SHN	Pitney Bowes	C. 2006
SAINT PIERRE AND MIQUELON	SPM	GeoNames	2011.07
SAN MARINO	SMR	TomTom	2011.06
SAUDI ARABIA	SAU	Pitney Bowes	C. 2006

Country Name	ISO 3166 Country Code	Data Source	Vintage
SENEGAL	SEN	Pitney Bowes	C. 2006
SINGAPORE	SGP	TomTom	2011.06
SLOVAKIA (SLOVAK REPUBLIC)	SVK	TomTom	2011.06
SLOVENIA	SVN	TomTom	2011.06
SOUTH AFRICA	ZAF	GeoNames	2011.07
SOUTH GEORGIA AND THE SOUTH SANDWICH ISLANDS	SGS	Pitney Bowes	C. 2006
SPAIN	ESP	TomTom	2011.06
SRI LANKA	LKA	GeoNames	2011.07
SUDAN	SDN	Pitney Bowes	C. 2006
SWAZILAND	SWZ	Pitney Bowes	C. 2006
SWEDEN	SWE	GeoNames	2011.07
SWITZERLAND	CHE	TomTom	2011.06
TAIWAN	TWN	TomTom	2011.06
TAJIKISTAN	TJK	Pitney Bowes	C. 2006

Country Name	ISO 3166 Country Code	Data Source	Vintage
THAILAND	THA	TomTom	2011.06
TIMOR-LESTE	TLS	Pitney Bowes	C. 2006
TUNISIA	TUN	Pitney Bowes	C. 2006
TURKEY	TUR	TomTom	2011.06
TURKMENISTAN	TKM	Pitney Bowes	C. 2006
TURKS AND CAICOS ISLANDS	TCA	Pitney Bowes	C. 2006
UKRAINE	UKR	Pitney Bowes	C. 2006
UNITED ARAB EMIRATES	ARE	Pitney Bowes	C. 2006
UNITED KINGDOM	GBR	TomTom	2011.06
UNITED STATES	USA	TomTom	2011.06
URUGUAY	URY	Pitney Bowes	C. 2006
UZBEKISTAN	UZB	Pitney Bowes	C. 2006
VATICAN CITY STATE (HOLY SEE)	VAT	TomTom	2011.06
VENEZUELA	VEN	Pitney Bowes	C. 2006

Country Name	ISO 3166 Country Code	Data Source	Vintage
VIET NAM	VNM	Pitney Bowes	C. 2006
VIRGIN ISLANDS (U.S.)	VIR	GeoNames	2011.07
WALLIS AND FUTUNA ISLANDS	WLF	Pitney Bowes	C. 2006
WESTERN SAHARA	ESH	Pitney Bowes	C. 2006
ZAMBIA	ZMB	Pitney Bowes	C. 2006

Geocoding Scenarios

You can use Enterprise Manager to create dataflows that are appropriate for your business requirements and for the nature and quality of your data.

Multiple Country Stage with Geocode Address World as Last Geocoding Pass

You may be able to optimize your results by geocoding your input in several passes. In general, you can use more strict matching criteria in the first pass. In subsequent geocoding passes, you can apply less restrictive matching criteria to any addresses that previously failed to return a close match candidate. This strategy can produce accurate matches for your high-quality addresses and still give you the best possible matches for less accurate addresses, or for addresses in countries that do not have a comprehensive level of coverage.

Let's assume the following scenario:

- Your input file includes addresses for six countries: Argentina (ARG), Brazil (BRA), Mexico (MEX), Chile (CHL), Venezuela (VEN), and Panama (PAN).
- You have geocoders for three of these countries (ARG, BRA, and MEX) are deployed in a multiple country stage.
- Geocode Address World is deployed in a separate stage to geocode addresses that could not be identified by the country-specific geocoders.

- Your stage uses conditional routers (and optionally stream combiner) to manage the geocoding flow.

1. Read input into the multiple-country stage. Geocoded addresses can be written out to a file or optionally sent to the stream combiner.
2. Some Addresses that could not be geocoded in step 1. This may be because they were addresses from CHL, VEN, or PAN, and you do not have geocoders for these countries in the first stage. Or they may have failed to return a close match candidate in the first stage because of input errors or ambiguities in the addresses. These ungeocoded addresses are sent to the Geocode Address World stage.
3. Addresses can be geocoded to postal or geographic accuracy by Geocode Address World. Successfully geocoded addresses can be written out to a file or optionally sent to the stream combiner.

   Postal geocoded candidates will have a Z1 result code. Postal geocoded results may be very accurate in countries with robust postcode systems. See **Postal Geocoding** on page 6. Geographic candidates will have a G result code (for example G3 for a town/city match). See **Geographic Geocoding** on page 7.

4. The stream combiner (if used in your dataflow) can combine all geocoded addresses and write them to a file or direct them for further processing.

This is one scenario. You could use Enterprise Manager to design more complex dataflows that are suitable for your needs.

Using Geocode Address World as First Geocoding Pass

You could also use a strategy with Geocode Address World as the first geocoding pass.

Assume the following:

- Your addresses typically do not specify a country (although some may).
- Some addresses contain only street and city address information.
- You have country-specific geocoders for some countries, but not all.
- You use a main dataflow with subflows to manage the geocoding process.

Use a dataflow (possibly with subflows) that perform the following actions. Note that these steps illustrate a simplified view of a sample dataflow.

1. Read input into the mulitple-country stage that also includes Geocode Address World. Based on city name (and possibly state name for USA addresses), each address can produce one or more potential close match candidates for several different countries. Each candidate will now be associated with a country, even though the input address may not have included a country.
2. If a country-specific geocoder is available, the candidate is sent to that geocoder. This processing involves conditional routing, stream combiners, and other Spectrum™ Technology Platform control stages. Depending on the completeness

of the input address and capabilities of the country-specific geocoder, candidates may be geocoded to a street (S result code), geographic (G result code), or postal (Z result code) level.

3. If no country-specific geocoder is available, the candidate is routed to Geocode Address World, where candidates can be geocoded to a geographic or postal level.
4. Candidates from all subflows are combined and ranked using a number of criteria. Ranking could be based on population of the city (city rank), accuracy of the match (street, geographic, postal), proximity to a user's locality, or other criteria.

Input

GeocodeAddressWorld takes an address as input. To obtain the best performance and the most possible matches, your input address lists should be as complete as possible, free of misspellings and incomplete addresses, and as close to postal authority standards as possible. Most postal authorities have websites that contain information about address standards for their particular country.

Note: The country name or two- or three- character country ISO code is optional. If you omit the country, GeocodeAddressWorld returns the best available candidates based on the other input provided.

Input Fields

The following table provides information on the format and layout of GeocodeAddressWorld input.

Table 3: GeocodeAddressWorld Input Data

Parameter	Format	Description
Data.AddressLine1	String	The first address line. For example, 4360 DUKES RD: **4360 DUKES RD** KALGOORLIE WA 6430

Parameter	Format	Description
Data.AddressLine2	String	The second address line of a two-line address. For example, Level 6 51 Jacobson St: 26 WELLINGTON ST E **SUITE 500** TORONTO ON M5E 1S2 This field is not used in Australia, Austria, Belgium, Brazil, Denmark, Finland, France, Germany, Ireland, Italy, Liechtenstein, Luxembourg, Malaysia, The Netherlands, Poland, Portugal, Spain, Sweden, Switzerland, and Thailand.
Data.City	String	The city or town name. Your input address should use the official city name. This will produce the best geocoding results. For Thailand, this field contains the subdistrict (tambon).
Data.County	String	The name of one of the following depending on the country: • **Not used**—AUT, BRA, CAN, FIN, GBR, MYS, PRT, SGP. • **Department**—FRA • **District (amphoe)**—THA • **District (fylke/counties)**—NOR • **District (poviat)**—POL • **Kommun**—SWE • **Kreis**—DEU • **Local Government Authority (LGA)**—AUS • **Province**—BEL, CHE, DNK, ESP, IRL, ITA, LIE, LUX, NLD • **Region**—NZL
Data.FirmName	String	Company or name or place name. For example, PITNEY BOWES. **PITNEY BOWES** 4360 DUKES RD KALGOORLIE WA 6430
Data.LastLine	String	The last line of the address. For example, KALGOORLIE WA 6430: 4360 DUKES RD **KALGOORLIE WA 6430**
Data.Locality	String	The name of one of the following depending on the country: • **Not used**—AUS, AUT, BEL, CHE, DEU, DNK, FIN, FRA, IRL, LIE, LUX, MYS, NLD, NOR, POL, SGP, SWE, THA • **Dissemination Area and Enumeration Area (DA and EA)**—CAN • **Locality**—BRA, GBR, ITA, PRT • **Suburb**—NZL

Parameter	Format	Description
Data.PostalCode	String	The postal code in the appropriate format for the country.
Data.StateProvince	String	The name of one of the following depending on the country: • **Not used**—BEL, CHE, DNK, IRL, LIE, LUX, NLD, NOR, SGP • **Bundesland**—DEU • **Province**—CAN • **Province (changwat)**—THA • **Province (voivodship)**—POL • **Region**—AUT, ESP, FRA, GBR, NZL, PRT • **Region (län)**—FIN • **Region (lan)**—SWE • **State**—AUS, BRA • **State (negeri)**—MYS
Data.Country	String	The two- or three-character ISO country code. This field is optional. If you omit the country, GeocodeAddressWorld returns the best available candidates based on the other input provided For a list of ISO codes, see **ISO Country Codes and Module Support**.

Address Aliases

Some countries have alternative administrative names. For example, there may be an official name for a city or town, but there may also be common but unofficial alternative name for the same city or town. If alias information is available in the source data, World includes this alias in the database. This enables World to geocode successfully when alternative names are used in input addresses.

Language Aliases on page 44 are also supported.

Language Aliases

Some countries have more than one official or prominent language. For example, the same town may be commonly known by both German and Italian names. If language alias information is available in the source data, World uses this in the database. This enables World to geocode successfully when alternative language names are used in input addresses.

Aliases can exist for all administrative levels, from StateProvince state/province to Locality locality. See **Administrative Divisions and Postal Codes** on page 45 for a description of administrative levels associated with the geographic data.

Address Aliases on page 44 are also supported for commonly used, alternative administrative areas.

State or Province Abbreviations

In some countries, the state or province is an important part of the address and often this address element is abbreviated. For selected countries, these state/province abbreviations are recognized by World. For example, in the United States each state has a two-letter abbreviation (such as CA for California). Similarly, Netherlands, state abbreviations (such as GLD for Gelderland) are recognized.

World accepts state/province abbreviations for the following countries:

Table 4: Country State/Province Abbreviation Support

Country Name	State Or Province Division	Example
Australia (AUS)	StateProvince (State)	NSW (abbreviation for New South Wales
Canada (CAN)	StateProvince (Province)	AB (abbreviation for Alberta)
Italy (ITA)	County (Province)	MO (abbreviation for Modena)
Mexico (MEX)	StateProvince (State)	JA (abbreviation for Jalisco)
Netherlands (NLD	County (State)	FR (abbreviation for Friesland)
United States (USA)	StateProvince (State)	CA (abbreviation for California)

World evaluates these state or province abbreviations to better identify close matches. See **Geographic Geocoding with State/Province Abbreviation** on page 8 for an example that illustrates this feature.

Administrative Divisions and Postal Codes

Typical input addresses consist of street address, administrative division, and postal code information. World uses the administrative divisions and postal codes for geographic or postal geocoding.

- StateProvince (state or province)
- County (county, region, or district)
- City (town or city)
- Locality (locality suburb, or village)
- postal code

Specific administrative divisions vary by country. For example, Locality may contain locality, suburb, or barrio, depending on the country. StateProvince may contain state, province, region, or some

other name depending on the country. See **State or Province Abbreviations** on page 45 for more information about how state/province abbreviations are interpreted by World.

Not all administrative divisions are used in addressing conventions for all countries. For example, in the USA, County (county) is not typically used in addresses. But for some countries, County is an important part of the address.

If your input data includes postal codes, Worldcan use this for postal geocoding, assuming that the source data includes postal data for the specific country.

Input Recommendations

You can optimize World results if you prepare and understand your input records. Follow these guidelines :

- Ensure that your input addresses are as complete and accurate as possible. If there are errors in your input addresses, World may still be able to geocode those addresses, but there may be more than one possible match or you may get non-close matches. If you can verify and correct any incomplete or inaccurate input addresses, you can get better results.
- Include postcodes in your input addresses if you have them. This is not required, but it allows World to perform postal geocoding. This may give you more accurate results for some addresses, depending on the country and on the completeness and accuracy of other address elements
- Include the country name or official three-character or two-character country ISO code in your input addresses. This is not required, but it may help World distinguish between similar addresses and city names that may occur in different countries.
- Format your input addresses consistently. World can handle input addresses in a wide variety of input formats, or can handle unformatted (single line) input. But you can get more accurate and faster results if your input addresses are consistently formatted and conform to country-specific address conventions. Even if your input address are single line (unformatted), you may get better results and performance if the address elements are ordered consistently. Use the AddressLine1 input area for unformatted addresses. See **Single Line Input** on page 46

Single Line Input

Address input can be formatted into separate input fields or input can as single line input. Use AddressLine1 to enter single line input.

Single Line Geographic Geocoding

In this example, unformatted (single line) input is used. World analyzes single line input to identify the geographic address elements (Graz in this example), and then geocodes to a geographic centroid. The MainAddress (street information) is not used.

Sackstraße 10 Graz

World returns a geographic close match candidate based on an City match. Even though the country was not specified, World identifies the close match in Austria (AUT).

StateProvince: Steirmark
County: Graz (Stadt)
City: Graz
Country: AUT
Result Code: G3
X: 15.44172
Y: 47.06792

If your input addresses are accurate, unformatted input can produce a match rate comparable to that of formatted input. However, geocoding unformatted addresses typically has slower performance than geocoding formatted addresses.

Single Line Postal Geocoding with Country Specified

In this example, single line input is used and a postcode is provided. The country Austria (AUT) is also specified. The street address is also input, but this is ignored by Austria.

Alpenstraße 117 5020 AUT

Austria returns a postal centroid close match candidate (Z1 result code). Because the country (AUT) is specified in the input, the country must be matched and a single close match for that postal code in Austria is returned. Non-close matches with the 5020 postal code from other countries are also returned.

StateProvince: Salzburg
Country: AUT
Postcode: 5020
Result Code: Z1
X: 13.04685
Y: 47.80262

Options

Geocoding Options

The following table lists the options that control how a location's coordinates are determined.

Table 5: Geocoding Options

Parameter	Description
Option.CoordinateSystem	A coordinate system is a reference system for the unique location of a point in space. Cartesian (planar) and Geodetic (geographical) coordinates are examples of reference systems based on Euclidean geometry. Spectrum™ Technology Platform supports systems recognized by the European Petroleum Survey Group (EPSG). One the following: **EPSG:4283** Also known as the GDA94 coordinate system. **EPSG:4326** Also known as the WGS84 coordinate system. Default.

Matching Options

Table 6: Matching Options

Parameter	Description
Option.KeepMultimatch	Specifies whether to return results when the address matches to multiple candidates in the database. If this option is not selected, an address that results in multiple candidates will fail to geocode. If you select this option, specify the maximum number of candidates to return. **Y** Yes, return candidates when multiple candidates are found. Default. **N** No, do not return candidates. Addresses that result in multiple candidates will fail to geocode.

Parameter	Description
Option.MaxCandidates	If you specify Option.KeepMultimatch=Y, this option specifies the maximum number of results to return. The default is 1.
Option.CloseMatchesOnly	Specifies whether to return only those geocoded results that are close match candidates. For example, if there are 10 candidates and two of them are close candidates, and you enable this option, only the two close matching candidates would be returned instead of all 10. **Y** Yes, return only close matches. **N** No, do not return only close matches. Default.

Data Options

The Data tab allows you to specify which databases to use in geocoding. Databases contain the address and geocode data necessary to determine the geocode for a given address. The data is based on address and geocoding data from postal authorities and suppliers of geographical data.

> **Note:** As the EGM Module transitions its administrative tasks to a web-based Management Console, labels for the options may use different wording than what you see in Enterprise Designer. There is no difference in behavior.

Table 7: Data Options

Parameter	Description
Option.DatabaseSearchOrder	The name of one or more database resources to use in the search process. Use the database name specified in the Management Console's Spectrum Databases page. tool. For more information, see the *Spectrum™ Technology Platform Administration Guide*. You can specify multiple database resources. If you specify more than one database, list them in order of preference. The order of the databases has an effect when there are close match candidates from different databases. The close matches that are returned come from the database that is first in the search list. Close matches from lower ranked databases are demoted to non-close matches.

Output

GeocodeAddressWorld returns the latitude/longitude, city, county, and result indicators. Result indicators describe how well the geocoder matched the input to a known location and assigned a latitude/longitude; they also describe the overall status of a match attempt. The information is returned in upper case.

If you are using the API, the output returned is in the `DataTable` class. For more information, see the Spectrum™ Technology Platform API Guide.

Address Output

Table 8: Address Output

Response Element	Description
City	Municipality name.
CityRank	CityRank is a numeric value ranging from 1 (high) to 10 (low) based on total and relative population, importance, and other criteria.
Country	The three-letter ISO 3166-1 Alpha 3 country code. The two-letter code can also be used. See **Country Geographic Data Coverage** on page 11 for a list of countries and data sources for geographic geocoding. See **Country Postal Data Coverage** on page 29 for a list of postal geocoding countries and data sources.

Response Element	Description
County	This field contains an area that is smaller than a state/province but larger than a city. The specific area varies by country: • AUS—Local Government Authority (LGA) • AUT—Province • BEL—Province • BHS—Not used • BRA—Not used • CAN—Not used • CHE—Province • DEU—Kreis • DNK—Province • FIN—Province (kommune) • FRA—Department • GBR—County • ITA—Province • LIE—Province • LUX—Province • MYS—District (daerah) • NLD—Province • NZL—Not used • POL—District (poviat) • PRT—Not used • SGP—District • SWE—Region (kommun) • THA—District (amphoe)
PostalCode	The postal code for the address. The format of the postcode varies by country.

Response Element	Description
StateProvince	The meaning of StateProvince varies by country: • AUS—State • AUT—Region • BEL—Not used • BRA—State • CAN—Province • CHE—State • DEU—Bundesland • DNK—Not used • ESP—Region • FIN—Region (län) • FRA—Region • GBR—Region • IRL—Not used • ITA—Region • LIE—State • LUX—Not used • MYS—State (negeri) • NLD—Not used • NOR—Not used • NZL—Region • POL—Province (voivodship) • PRT—Region • SGP—Not used • SWE—Region (lan) • THA—Province (changwat)

Geocode Output

Table 9: Geocode Output

Response Element	Description
CoordinateSystem	The coordinate system used to determine the latitude and longitude coordinates. A coordinate system specifies a map projection, coordinate units and more. An example is EPSG:4326. EPSG stands for European Petroleum Survey Group.

Response Element	Description
Latitude	Seven-digit number in degrees and calculated to four decimal places (in the format specified).
Longitude	Seven-digit number in degrees and calculated to four decimal places (in the format specified).

Result Codes

Result codes contain information about the success or failure of the geocoding attempt, as well as information about the accuracy of the geocode.

Table 10: Result Code Output for World

Response Element	Description
Geocoder.MatchCode	Indicates how closely the input address matches the candidate address.
IsCloseMatch	Indicates whether or not the address is considered a close match. An address is considered close based on the "Close match criteria" options on the Matching tab. **Y** Yes, the address is a close match. **N** No, the address is not a close match.
MultiMatchCount	For street address geocoding, the number of matching address positions found for the specified address. For intersection geocoding, the number of matching street intersection positions found for the specified addresses.
Status	Reports the success or failure of the match attempt **null** Success **F** Failure

Response Element	Description
Status.Code	If the geocoder could not process the address, this field will show the reason. • Internal System Error • No Geocode Found • Insufficient Input Data • Multiple Matches Found • Exception occurred • Unable to initialize Geocoder • No Match Found
Status.Description	If the geocoder could not process the address, this field will show a description of the failure. **Problem + explanation** — Returned when Status.Code = Internal System Error. **Geocoding Failed** — Returned when Status.Code = No Geocode Found. **No location returned** — Returned when Status.Code = No Geocode Found. **No Candidates Returned** — The geocoder could not identify any candidate matches for the address. **Multiple Candidates Returned and Keep Multiple Matches not selected** — The address resulted in multiple candidates. In order for the candidate address to be returned, you must specify `KeepMultimatch=Y`.

Response Element	Description
LocationPrecision	A code describing the precision of the geocode. One of the following: **0** No coordinate information is available for this candidate address. **1** Interpolated street address. **2** Street segment midpoint. **3** Postal code 1 centroid. **4** Partial postal code 2 centroid. **5** Postal code 2 centroid. **6** Intersection. **7** Point of interest. This is a placeholder value. Spectrum databases do not have POI data, so it is not possible to get this return. **8** State/province centroid. **9** County centroid. **10** City centroid. **11** Locality centroid. **12 - 15 (LocationPrecision codes)** For most countries, LocationPrecision codes 12 through 15 are reserved for unspecified custom items. **13** Additional point precision for unspecified custom item. **14** Additional point precision for unspecified custom item. **15** Additional point precision for unspecified custom item. **16** The result is an address point. **17** The result was generated by using address point data to modify the candidates segment data. **18** The result is an address point that was projected using the centerline offset feature. You must have both a point and a street range database to use the centerline offset feature, and thereby return LocationPrecision 18.
StreetDataType	The default search order rank of the database used to geocode the address. A value of "1" indicates that the database is first in the default search order, "2" indicates that the database is second in the default search order, and so on. The default database search order is specified in the Management Console.

Geographic Candidate Ranking

Identical geographic area names can be found in many countries. When this occurs, World uses a ranking system to determine which of potential candidates is the most likely close match.

The specific details of this weighted ranking depend somewhat on the data source (TomTom, GeoNames, or Pitney Bowes source), but the following criteria are weighted to determine the most likely close match candidate.

- country capital
- administrative area (state/province, regional, county) capital
- population range

Country capital status outweighs any other geographic ranking criteria. For example, San Juan entered as City returns San Juan, Puerto Rico (PRI) as the close match because it is the capital of PRI. Other San Juan cities in the world (including Spain, Costa Rica, Dominican Republic and Philippines) can be returned as non-close matches regardless of their population. To return matches, you must check the Keep multiple matches check box in Matching Options of the Management Console, and specify the number of matches you want to return.

Similarly, World returns Roma, ITA as a close match since that is the capital of Italy, but Roma in Romania, Honduras, and Panama are returned as non-close matches.

State/province administrative capitals are highly weighted even if their populations are not very large. For example, Springfield returns a close geographic match to Springfield, Illinois USA because this is the state capital of Illinois. Springfield, Massachusetts has a somewhat larger population, but this is outweighed by the state capital status of Springfield Illinois. Other less populous Springfield communities in the USA and other countries are also returned as close matches, but are listed below the Springfield Illinois candidate. It is possible for a large city to rate as an equal close match along with a smaller, identically named state/province capital. However, the state/province capital will not be demoted, even if it has a relatively small population.

Similarly, if your input is Albany in City with no country specified, World returns Albany, NY, USA as the close match candidate. This is because Albany is the capital of New York State, and therefore gets a high ranking as administrative area capital. The population is also a contributing ranking factor. If you specify the city of Albany with a different country, such as New Zealand, then the country is used and Albany, NZL is returned as the close match candidate.

If a candidate includes a city, a CityRank value is also returned, if available. CityRank is a numeric value ranging from 1 (high) to 10 (low) that indicates the relative ranking of the city. This ranking is based on relative population, administrative status, and other criteria. If multiple geographic candidates are returned, they are listed in city rank order.

Match Codes

Matches in the G category indicate that the candidate is located at the geographic centroid with the following possible accuracy levels. Not all levels of accuracy are possible for all countries.

- **G0**—Country centroid. This is not returned for GeocodeAddressWorld.

- **G1**—State or province centroid. For Japan, this indicates a prefecture (ken) match.
- **G2**—County centroid. For Japan, this indicates a city (shi) match.
- **G3**—City centroid. For Japan, this indicates a municipality subdivision or sub-city (oaza) match. For Australia, Local Government Authority (LGA) information can be returned from the Street Range Address Database only (not the G-NAF database).
- **G4**—Locality centroid. For Japan, this indicates a city district (chome) match.

Matches in the Z category indicate that no street match was made for one of the following reasons:

- You specified to match to postal code centroids. The resulting point is located at the postal code centroid with four possible accuracy levels.
- There is no close match and you specified to fall back to postal code centroid

The Z category contains the following accuracy levels:

- **Z0**—Postal Code match, no coordinates available (rare occurrence).
- **Z1**—Postal Code centroid match.
- **Z3**—Full postal code centroid match. For Canada, this is an FSALDU centroid.
- **Z6**—Postal Code centroid match for point ZIP.

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