



Informatica® Address Verification
5.16.3

Developer Guide (On-Premises)

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Preface

Read the *Informatica Address Verification Developer (On-Premises) Guide* to learn how you can use Informatica Address Verification (On-Premises), also known as Informatica AddressDoctor®, to analyze, parse, validate, and enrich postal address data. This guide also describes the result output fields, process status codes, and the status and assessment codes that Address Verification (On-Premises) returns.

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CHAPTER 1

Getting Started with Informatica Address Verification (On-Premises)

This chapter includes the following topics:

- [Informatica Address Verification \(On-Premises\) Overview, 12](#)
- [Address Verification Process, 13](#)
- [Address Objects, 19](#)
- [Address Elements and Address Line Elements, 19](#)
- [Document Type Definition Files, 20](#)

Informatica Address Verification (On-Premises) Overview

Informatica Address Verification (On-Premises) verifies addresses from more than 240 countries and territories quickly, efficiently, and effectively.

The address verification workflow includes steps to transliterate, parse, format, validate, and enrich addresses. You can use the integrated transliteration capabilities to validate addresses that you capture in different writing systems and languages. Address Verification also standardizes and formats the address data to meet the requirements that the local postal authorities specify.

Postal certification improves the quality of addresses and ensures that Address Verification services meet postal authority requirements.

Address Verification complies with the following postal certifications:

- Address Matching Approval System (AMAS) certification for Australia Post
- Coding Accuracy Support System (CASS) certification for the United States Postal Services
- SendRight certification for New Zealand Post
- Service National de L'Adresse (SNA) certification for La Poste of France
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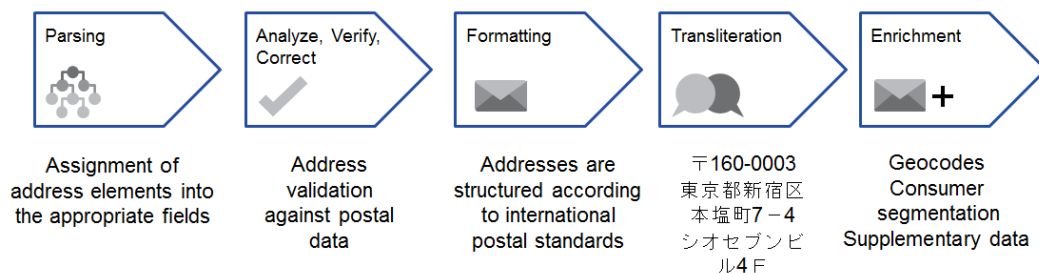
About This Document

Informatica offers Address Verification as an on-premises solution and as a cloud-based solution. Both solutions use a common engine. The current document describes the Informatica Address Verification (On-Premises) solution. References to Informatica Address Verification in the current document refer to Informatica Address Verification (On-Premises).

Address Verification Process

The address verification process includes multiple steps such as character set mapping, transliteration, parsing, validation, formatting, and enrichment. Based on the parameters you set, Informatica Address Verification completes the verification process and returns the result.

The following image shows the address verification process:



Character Set Mapping

The character set mapping provides a mapping between characters in source and destination character sets and thus enables conversion between character sets. Informatica Address Verification internally uses Unicode and externally supports multiple character sets including UTF-8, ISO 8859-1, GBK, BIG5, JIS, and EBCDIC.

Character sets use a numeric representation for each of the supported alphabets or characters. Typically, character sets use the same numeric representation for common alphabets or characters. However, some of the language-specific characters have different numeric representations across character sets.

For example, the letter A has the same numeric representation, 65, in both Unicode and Latin character sets. However, the letter Å has different representations in Unicode and Latin character sets. Å is represented by 143 in Unicode and 197 in Latin character sets. Characters that have different numeric representations across character sets fail to appear correctly when you use different character sets to render the data.

To render character sets, Address Verification first converts the input character strings to Unicode. Then it uses the corresponding mapping of the destination character set to render the data with near perfection. If no representation is available for a character in the destination character set, Address Verification maps that character to an underscore character.

Note: Submit addresses to Address Verification in a single character set.

Transliteration

Transliteration converts data between non-Roman characters and Latin characters. Transliteration also helps you replace diacritical and extended characters with plain text equivalents.

Transliteration helps nonnative speakers find an approximate pronunciation of a word based on the pronunciation rules of their own language. Transliterations of ISO character sets use invertible mapping so that the transliteration can be reversed without any information loss. However, for other character sets such as BGN, transliteration is not reversible.

Informatica Address Verification can transliterate to and from the following writing systems:

- Greek (BGN/PCGN 1962, ISO 843 – 1997)
- Cyrillic (BGN/PCGN 1947, ISO 9 – 1995)

You can perform Cyrillic transliteration for Belarus, Bulgaria, Kazakhstan, Macedonia, Russia, and Ukraine.

- Japanese Katakana, Hiragana, and Kanji
- Chinese Pinyin (Mandarin, Cantonese)

Transliteration goes beyond character set mapping, which is a mapping between different numeric representations of a character. A language such as Japanese with the Katakana, Hiragana, and Kanji characters has no direct representation in the English language. However, each Japanese character has a certain associated sound that can be approximated using phonetic Latin characters.

Multiple transliteration schemes are available for different languages. The following table shows transliteration of characters from different languages:

Source Character Set	Input	Destination Character Set	Output
Latin	Ä	ASCII	AE
Latin	ô	ASCII	g
Japanese	↑	Latin	ka
Cyrillic	Ж	Latin	ZH

Transliteration Limitations

If the source language has fewer syllables and does not have exact matches in other languages, transliteration becomes difficult. Japanese is an example for languages that are difficult to transliterate.

Most languages use a subset of the sounds a person could produce. Different languages use different subsets. If a sound used by one language cannot be represented correctly in a different script, then it needs to be approximated. This approximation might be inaccurate if the sounds in the source and destination languages are significantly different.

The following table shows how transliteration can be inaccurate when the words are transliterated from English to Kana and then back to English:

Original	Japanese	Transliterated
Philippines	フィリピン	Firipin
Düsseldorf	デュッセルドルフ	Dyusserudorufu
Beethoven	ベートーベン	Betoben

Some Kanji characters in the first name of the contact in Japan addresses are incorrectly transliterated into Arabic numerals instead of Latin alphabets.

The following table shows the Kanji numerals that Informatica Address Verification might incorrectly translate into Arabic numerals instead of Latin alphabets:

Kanji Numeral	Arabic Equivalent	Latin Transliteration
一	1	ichi
二	2	ni
三	3	san
四	4	yon
五	5	go
六	6	roku
七	7	nana
八	8	hachi
九	9	kyū
十	10	jū

Address Parsing

Informatica Address Verification can identify and categorize address elements and nonaddress elements.

Address Verification can parse fielded and unfielded addresses and return addresses that follow the address structure of the country to which the address belongs. A fielded address contains well-defined address element fields. An unfielded address contains lines of address data that include both address and nonaddress elements. An input address might also contain incorrectly assigned elements or elements that are incorrectly combined with unrelated elements.

Address parsing in Address Verification does not use the reference address databases. You can use the PARSE mode to parse addresses even if you do not have the corresponding reference address databases. When you run address verification in other process modes such as BATCH or CERTIFIED, Address Verification parses the address before the verification process begins. During the verification process, Address Verification might readjust the parsed results based on the reference address data.

Address Verification uses the `FormatDelimiter` attribute setting of the `Input` element in `Parameters.xml` to correctly identify address elements for parsing. If Address Verification fails to identify an element in a fielded address input, Address Verification returns the element in the same field in which it was input.

Address Validation

You can validate an address against a set of comprehensive reference address databases. Informatica Address Verification validates each element in the input address against the data available in the reference address databases and returns results that include corrected or added information to improve the address quality.

Address Verification returns the best possible matches to an input address and reduces the possibility of incorrect modifications to address elements. If Address Verification cannot fully validate an address, it classifies the address based on the deliverability assessment.

You can choose the address validation process modes based on your requirements.

- If you want to input one or more addresses for validation and receive one correct result for each input address, choose the batch (BATCH) mode.
- To validate addresses based on the guidelines specified by the postal authority of a country, choose the certified (CERTIFIED) mode. The certified mode functions similar to the batch mode except that Address Verification supports the certified mode only for countries that have postal certifications. The certified mode address processing requires additional certified reference address databases.
- To receive a list of address suggestions from which you can manually choose the best match, choose the interactive (INTERACTIVE) mode.
- To receive address suggestions as you enter an address, choose the fast completion (FASTCOMPLETION) mode. In the fast completion mode, Address Verification returns good quality suggestions even for incomplete addresses and truncated address elements.

Address Formatting and Standardization

After validating an address, Informatica Address Verification formats the address according to country-specific formatting rules and the formatting and standardization attributes you configure.

You can configure the formatting and standardization attributes of the `Result` element and the `AddressElementStandardize` element in `Parameters.xml` to specify the following options:

- Whether to include the country information in the `AddressComplete` output.
- The delimiter to separate address elements in the `AddressComplete` output.
- The level of address information in the `AddressComplete` output.
- The maximum number of lines in the `AddressComplete` output.
- The case of the output.
- The maximum length of strings in each element.
- Whether to use element abbreviations or not.

Address Verification transliterates the result to the script specified for the `PreferredScript` attribute of the `Result` element in `Parameters.xml`.

Address Enrichments

You can retrieve multiple address enrichments with the validated result output. Address enrichments provide additional information that helps you better understand and use the address data.

Address enrichments require additional databases and unlock codes. Note that you can retrieve address enrichments only for validated addresses in batch and interactive modes.

You can retrieve the following address enrichments for validated addresses:

CAMEO Social Profiling

CAMEO profiles from the TransUnion Information Group provide consumer classification systems that are developed to assess the socioeconomic and geo-demographic profiles of neighborhoods across the world. Informatica Address Verification returns CAMEO profiles as an address enrichment for many countries.

Country-Specific Enrichments

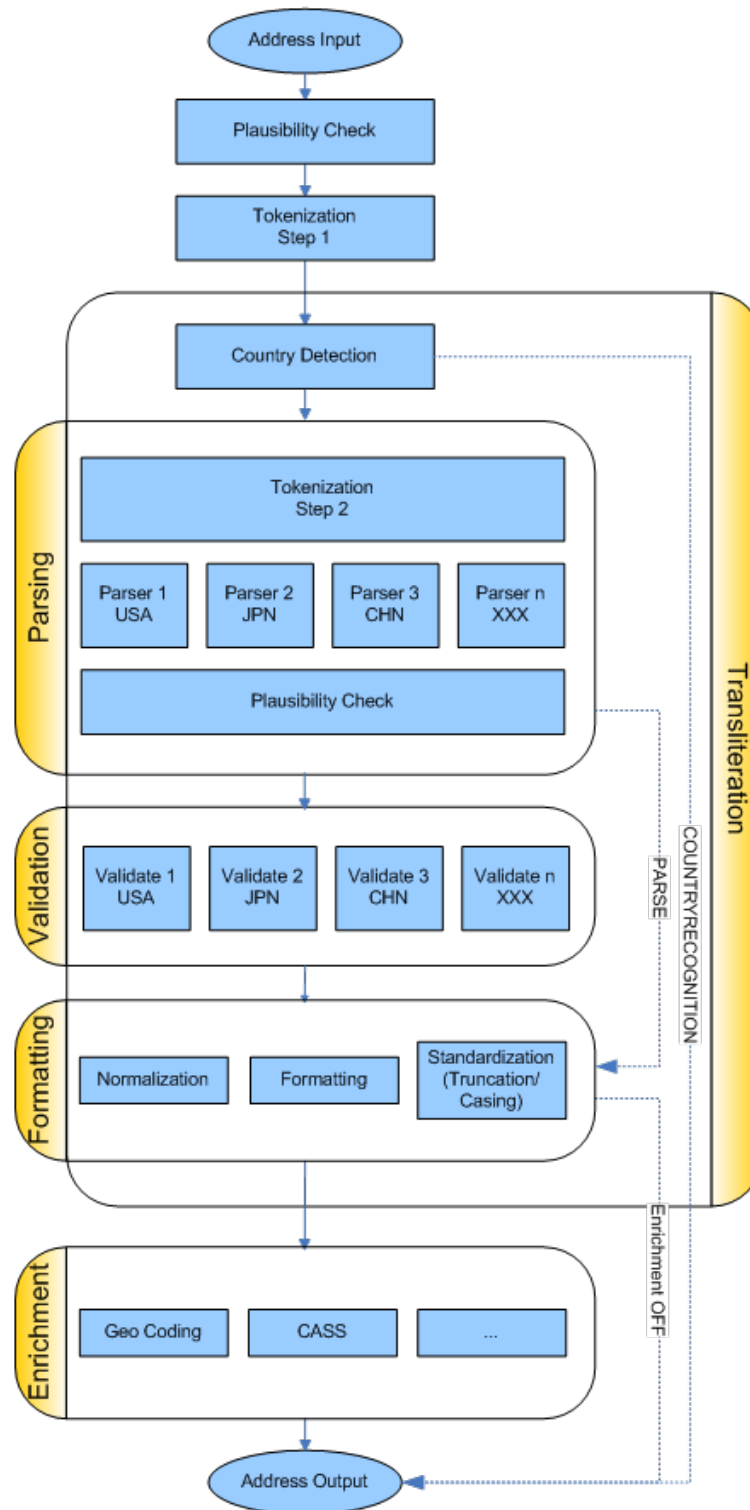
Country-specific enrichments provide information such as unique codes and identifiers that are specific to countries or territories. You can receive country-specific enrichments for select countries. Examples for country-specific enrichments include postal address codes for Austria addresses, INSEE codes for France addresses, and time zone codes for United States addresses.

Geocoding

Geocoding finds the physical location of an address. Geocodes are longitude and latitude coordinates. Address Verification returns standard geocodes and arrival point geocodes. To read a list of the countries for which Informatica provides geocode reference data, see [“Geocoding Country Support” on page 159](#).

Schematic Representation of the Address Verification Process

The following image shows the steps in the address verification process:



Address Objects

An `AddressObject` is a data structure that stores an input address, validation parameters, result addresses along with any supported enrichment, and the process status and address assessment codes.

An `AddressObject` contains the following information:

- The process, input, result, and address element standardization parameters set in `Parameters.xml`.
- An input address as specified in `InputData.xml`.
- A result as specified in `Result.xml`.
- The last process code that Informatica Address Verification returned.

Address Verification can process multiple address objects simultaneously. In the `SetConfig.xml` file, you can specify the maximum number of address objects that you want Address Verification to handle simultaneously. Note that if you configure a value less than one for the maximum address object count, Address Verification fails to initialize.

To avoid processing overheads and to ensure better performance of Address Verification, reuse the address objects instead of creating and destroying an `AddressObject` every time you want to parse or validate an address. Frequent changes to the processing parameters of an `AddressObject` might slow down the Address Verification performance.

Address Elements and Address Line Elements

You can enter and receive addresses as address elements and address line elements.

You can enter, or receive in the result, the following address elements:

- Building
- Contact
- Country
- Delivery service
- Locality
- Number
- Organization
- Postal Code
- Province
- Residue
- Street
- Subbuilding

Many of these elements can contain multiple levels of information. For example, the locality element supports up to six levels of information. The contact element supports three levels.

You can also enter or receive address information as address lines. Informatica Address Verification supports the following address line formats:

CountrySpecificLocalityLine (CSLLN)

Contains information such as locality, postal code, province, and country details. Address Verification supports up to six lines of country specific locality line information.

DeliveryAddressLine (DAL)

Contains the delivery information such as street, house number, building, and delivery service information. Address Verification supports up to six lines of delivery address line information.

FormattedAddressLine (FAL)

Contains unfielded data that includes, recipient information, delivery address information, and locality information. Address Verification supports up to 19 lines of formatted address line information.

RecipientLine

Contains the recipient information such as contact or organization name. Address Verification supports up to six lines of recipient information.

Address Verification also supports an `AddressComplete` element that contains the complete address in a single string. Address Verification uses delimiters to separate the address elements within the `AddressComplete` element.

Document Type Definition Files

You receive the following document type definition (DTD) files as part of the Informatica Address Verification package:

SetConfig.dtd

Defines the structure of the `SetConfig.xml` file that contains the general setting that you pass with the initialization function such as `AD_Initialize()`.

Parameters.dtd

Defines the structure of the `Parameters.xml` file that contains the input, process, and result parameters you pass with functions such as `AD_SetParametersXML()` or `AD_Initialize()`.

InputData.dtd

Defines the structure of XML input that you set with functions such as `AD_SetInputDataXML()`, and receive for functions such as `AD_GetInputDataXML()`.

Result.dtd

Defines the structure of Address Verification response that you receive for functions such as `AD_GetResultXML()`.

GetConfig.dtd

Defines the structure of XML response you receive for functions such as `AD_GetConfigSettingsXML()`.

Of the corresponding XML files, you can set values for `Parameters.xml`, `InputData.xml`, and `SetConfig.xml`. You cannot modify `Result.xml` and `GetConfig.xml` files that Address Verification generates.

CHAPTER 2

General Settings

This chapter includes the following topics:

- [General Settings Overview, 21](#)
- [XML Encoding, 21](#)
- [Unlock Codes and Database Attributes, 23](#)
- [Preloading of Reference Address Databases, 24](#)
- [Memory Management, 25](#)
- [Configuring General Settings for Informatica Address Verification, 26](#)
- [Configuring Unlock Codes and Database Settings, 28](#)

General Settings Overview

You can configure the general settings such as XML encoding, memory settings, and database and unlock code settings for Informatica Address Verification in the `SetConfig.xml` file.

XML Encoding

Character encoding defines unique binary codes for the different characters used in a document. In XML files, XML header tag `<?xml ...?>` contains the encoding information. Informatica Address Verification supports multiple encoding types for input and output.

In the `SetConfig.xml` file, you can specify the XML encoding type for the `GetConfig.xml` file that Address Verification generates.

When you use the XML API and you do not specify an encoding type in `SetConfig.xml`, Address Verification sets the encoding to UTF-8 or UTF-16 based on whether you use 8-bit or 16-bit API functions. For direct API implementations, the default value is ISO-8859-1.

For C-based APIs, you can use either 8-bit or 16-bit functions. A `W` suffix in the function name, such as `AD_SetInputDataElementW()`, identifies a 16-bit function. If you use 16-bit functions, you must set the encoding to a 16-bit encoding. If you use a 16-bit function when the encoding is set to 8-bit, Address Verification returns an encoding error. If you are using Java APIs, you must set the encoding to UTF-16 as Java supports only 16-bit input and output.

XML Encoding Types

You can configure Informatica Address Verification to use one of the following XML encoding types:

- DBCS_BIG5
- DBCS_GBK
- DBCS_JIS
- DBCS_JIS-2004
- DBCS_UHC
- EBCDIC
- IBM437
- IBM852
- IBM855
- IBM857
- IBM862
- ISO-8859-1
- ISO-8859-10
- ISO-8859-15
- ISO-8859-2
- ISO-8859-3
- ISO-8859-4
- ISO-8859-5
- ISO-8859-6
- ISO-8859-7
- ISO-8859-8
- ISO-8859-9
- UCS-2
- UCS-2BE
- UCS-2LE
- US-ASCII
- UTF-16
- UTF-16BE
- UTF-16LE
- UTF-8
- WINDOWS-1250
- WINDOWS-1251
- WINDOWS-1252
- WINDOWS-1253
- WINDOWS-1254
- WINDOWS-1255
- WINDOWS-1256

- WINDOWS-1257

Unlock Codes and Database Attributes

Informatica Address Verification requires valid unlock codes to access the reference address databases for address validation and enrichments.

Unlock codes are unique 36-character alphanumeric keys that map to specific reference address databases. The single-line address validation has a separate unlock code even though it uses the fast completion reference database. Unlock codes are valid for a specific period of time. Unlock codes have a valid-from date and an expiry date.

You can view the status of the unlock codes in the `GetConfig.xml`. You can retrieve the `GetConfig.xml` file from Address Verification even if you do not have a valid unlock code. If an unlock code that you entered is not yet valid, Address Verification marks it as `NOT_YET_VALID` in `GetConfig.xml`. If the unlock code you entered is past its expiry date, Address Verification marks it as `EXPIRED` in `GetConfig.xml`.

You can get unlock codes from an Address Verification sales representative or you can buy the unlock codes online from the Address Verification Data Quality Center.

You must specify at least one valid unlock code of validation type in the `SetConfig.xml` file before you can process addresses using Address Verification. You can specify multiple unlock code elements in the `SetConfig.xml` file.

To access the reference address databases, you must enter the details of databases that are associated with the unlock codes you specified. You can set the attributes of the `Database` element to specify database details. The database settings include the country to which the database maps, type of database, the path to the location, and the preloading type. You must specify the attributes for at least one `Database` element if you want to use any functionality other than address parsing.

Note: The order in which you list the reference database file names in `SetConfig.xml` influences the loading of the database data into memory and can affect the operation of the Address Verification engine. For more information, see ["Reference Database Order in SetConfig.xml" on page 24](#).

If you send process calls to Address Verification without a valid unlock code in `SetConfig.xml`, Address Verification goes into the expired state and returns the following critical error message:

```
AD_SC_CERR_EXPIRED = -1601 - "The engine usage period has expired or is not activated yet"
```

If you receive this error message, you must add a valid unlock code and reinitialize Address Verification before you can start processing addresses.

When there are conflicting database elements and attributes, Address Verification assigns precedence to the first one in the sequence of `Database` elements. If you have a `Database` element with the country attribute set to `ALL`, include that as the last of the `Database` elements you have in `SetConfig.xml`.

Reference Database Order in SetConfig.xml

At initialization time, Address Verification processes the reference databases in the order in which they appear in `SetConfig.xml`.

When you add database entries to `SetConfig.xml`, consider the following factors:

- Address Verification must have enough memory resources to load the files. The `MaxMemoryUsageMB` attribute specifies the amount of memory that Address Verification can request from the operating system.
- If you add multiple entries for the same database file to `SetConfig.xml`, Address Verification applies the first entry and disregards subsequent entries. Once Address Verification loads a file into memory, it does not load the file again in the current session.

For example, if `SetConfig.xml` contains an entry that specifies a preloading type of `NONE` for a database, and a subsequent entry specifies `FULL` for the same database, Address Verification does not load the database into memory.

- When you add database entries that specify different processing modes, the order of the entries can influence the engine performance. Add reference database entries to `SetConfig.xml` in the following order:
 - Any country-specific database that specifies certified mode.
 - Any country-specific database that specifies batch and interactive modes.
 - Any country-specific database that specifies fast completion mode.
 - Any country-specific database that specifies geocoding mode.
 - Any database entry that does not specify a country but rather uses `ALL` to indicate all countries.

Preloading of Reference Address Databases

To optimize performance, you can preload reference address databases to the device memory (RAM). You can specify the preloading method and type in the `SetConfig.xml` file.

The `PreloadingMethod` attribute of the `General` element specifies how Informatica Address Verification preloads the reference address databases to the memory. The default method is `MAP`. Address Verification continues to support `LOAD` method for backward compatibility and fallback. However, for new installations you might want to use the `MAP` method, which is faster and efficient than the `LOAD` method.

If you set `PreloadingMethod` to `MAP`, Address Verification uses the file mapping mechanism of the operating system and reads the reference address database only once when you initialize Address Verification. If you set `PreloadingMethod` to `LOAD`, Address Verification uses a memory allocation call and loads the data to the allotted memory block. The `MAP` method requires more virtual memory because of larger alignment requirements of the operating system. However, the `MAP` method has the following advantages over the `LOAD` method:

- In multiprocess conditions, where multiple processes running Address Verification use a common set of `.MD` files, the operating system loads the data into the main memory only once and shares the preloaded reference address databases between separate processes.
- The operating system never writes the reference data contents to the paging file when the memory is low. Note that, in such cases, the data might get dropped from the file system cache. If the data is required at a later point in time, Address Verification reads the data from the system storage.

The `PreloadingType` attribute specifies the preloading type for each of the reference address databases. You can set `PreloadingType` to FULL, PARTIAL, or NONE. The default is NONE, which means no preloading of the database.

If you set `PreloadingType` to FULL, Address Verification copies the entire reference address database to the memory. The system must have a significant amount of memory to support FULL preloading of reference address databases, especially for countries such as the United States and the United Kingdom. FULL preloading of reference address databases significantly improves the performance over the other two preloading types, PARTIAL and NONE.

If you set `PreloadingType` to PARTIAL, Address Verification loads only the metadata and indexing structures into the memory. The reference databases remain on the system storage. PARTIAL preloading is an alternative when adequate memory is not available to fully load the required databases. PARTIAL preloading improves the performance over the preloading type NONE.

Note: Address Verification skips redundant United States reference data files when you select a preloading type of PARTIAL or FULL. For more information, see [“Certified Mode Verification of United States Addresses” on page 40](#).

Memory Management

Informatica Address Verification stores different types of objects, such as address objects, pre-loaded reference address databases, and caches, in its memory. When you make memory allocations for Address Verification, you must consider the different objects that have specific memory requirements.

You can divide the memory requirements of Address Verification into the following blocks:

- General memory block. Allocated for general management functions. Typically, the general memory block size is 7 MB.
- Thread memory block. Allocated for address processing and verification routines. Address Verification creates as many thread memory blocks as the number of simultaneous threads you configure it to process.
The size of a thread memory block is about 48 MB for 64-bit systems.
- Address object memory block. Allocated for storing the address objects defined. Address Verification creates as many address object memory blocks as the number of address objects you configure it to process.
The size of an address object memory block is about 4.8 MB + (0.24 MB x the value set for `MaxResultCount`) in the case of 64-bit systems.
- Memory block reserved for caching. Address Verification reserves one cache memory block for each of the verification or processing threads.
- Memory blocks for preloading reference address databases. The value for preloading memory block depends on the number and size of the databases that you want to preload.
- Unallocated memory block.

You can configure the `MaxMemoryUsageMB` parameter to specify the maximum available memory for Address Verification. The values you set for the following parameters control the memory allocation for the memory blocks:

- `MaxThreadCount`. The maximum number of threads that Address Verification can process simultaneously. The value set for this parameter controls the number of thread memory blocks and the total memory allocation for the thread blocks.

- `MaxAddressObjectCount`. The maximum number of address objects that Address Verification can store. You can set a value that is two or three times the value you configured for `MaxThreadCount`. The value you set for `MaxAddressObjectCount` controls the number of address object memory blocks and the total memory allocation for the address objects.
- `CacheSize`. The memory reserved for caching purposes. If you set `CacheSize` to `None`, Address Verification does not allocate any memory for caching. If you set `CacheSize` to `Small`, Address Verification allocates 0.4 MB of cache memory block for each of the threads. If you set `CacheSize` to `Large`, Address Verification allocates 0.75 MB of cache memory block for each of the threads. For example, if `MaxThreadCount` is set to 4 and `CacheSize` to `Small`, Address Verification allocates 1.6 MB for cache memory block.

Calculating Memory Requirements

You can use the following formula to calculate the maximum memory requirements:

```
The general memory block size + MaxAddressObjectCount x
(size of an address object memory block + MaxResultCount x the size of a result object)
+
MaxThreadCount x (the size of the thread block + the size of the cache memory block)
```

For example, if the Address Verification configuration on a 64-bit system includes `MaxThreadCount=6`, `MaxAddressObjectCount=6`, `CacheSize=LARGE`, and `MaxResultCount=100`, you can calculate the dynamic memory requirement as follows:

$7 + 6 \times (4.8 + 100 \times 0.24) + 6 \times (48 + 0.75) = 472.3$ MB where 7 is the general memory block size; 4.8, the size of an address object memory block; 100, the value set for `MaxResultCount`; 0.24, the size of a result object; 6, the number of threads; 48, the size of the thread block; and 0.75, the cache memory block size when `CacheSize` is set to large.

To calculate the total memory requirement, add the total size of the reference address databases that you want to preload to the value you received based on the calculation in the previous paragraph.

Configuring General Settings for Informatica Address Verification

You can configure the general Informatica Address Verification settings in the `SetConfig.xml` file. The general settings include the XML encoding, the maximum number of address objects and threads, and the maximum memory allocation for Address Verification.

The General Element

Configure the following attributes of the `General` element:

WriteXMLBOM

Specifies when Informatica Address Verification should write a byte order mark (BOM) in the `GetConfig.xml` file. You can configure one of the following options:

- ALWAYS
- IF_NECESSARY
- NEVER

The default value is IF_NECESSARY.

WriteXMLEncoding

Specifies the encoding for the XML files that Address Verification creates. To view the list of encoding types, see [“XML Encoding Types” on page 22](#).

CacheSize

Specifies the size of memory cache to allocate for each of the address verification threads. You can configure one of the following options:

- NONE. Address Verification does not allocate any memory for caching.
- SMALL. Address Verification allocates 0.4 MB of memory for caching.
- LARGE. Address Verification allocates 0.75 MB of memory for caching.

The default value is LARGE.

If you set either SMALL or LARGE for the `CacheSize` attribute, Address Verification allocates one memory cache for each of the address processing threads. For example, if you set `MaxThreadCount` to 4, and `CacheSize` to SMALL, Address Verification allocates $4 \times 0.4 = 1.6$ MB of memory for caching.

MaxThreadCount

Specifies the maximum number of address processing threads that Address Verification can process simultaneously.

The default value is 1. You can set a minimum value of one, and a maximum value based on the system capabilities. There is no upper cap on the value that you can configure for this attribute. However, consider your system capabilities and number of cores available for Address Verification before you decide on a value for this attribute. For best results, you can consider a value that is one less than the total number of cores on the device.

For example, on a device that has four cores, you can set `MaxThreadCount` to 3.

Note: If you set a `MaxThreadCount` value higher than the `MaxAddressObjectCount` value, Address Verification reduces the `MaxThreadCount` value to the `MaxAddressObjectCount` value.

MaxAddressObjectCount

Specifies the maximum number of address objects that Address Verification can process simultaneously. The default value is 1.

Set a `MaxAddressObjectCount` value that is appropriate for the system capabilities. For example, you might set the value to once, twice, or three times the `MaxThreadCount` value, depending on whether the software uses double buffering or triple buffering. If you set `MaxThreadCount` to 2, you can set the `MaxAddressObjectCount` value can be 4 or 6.

Note: The engine does not specify an upper limit for the `MaxAddressObjectCount` value. For example, the AddressCheck application can use five AddressObjects on a single thread because AddressCheck prefills each AddressObject with a different mode setting.

If you set a `MaxAddressObjectCount` value lower than the `MaxThreadCount` value, Address Verification reduces the value of `MaxThreadCount` to the `MaxAddressObjectCount` value.

MaxMemoryUsageMB

Specifies the maximum amount of memory, in MB, that Address Verification can request from the operating system.

The default value is 512 MB. Consider different memory requirements such as general memory block, thread memory block, caching memory, preloading memory block, and so on when you calculate

`MaxMemoryUsageMB`. Address Verification fails to initialize if you set a value lower than the size of memory Address Verification requires.

MaxResultCount

Specifies the maximum number of suggestions Address Verification returns while verifying addresses in the Interactive mode. You can configure a value between 1 and 100. The default value is 20.

PreloadingMethod

Specifies the preloading method for reference address databases. You can configure one of the following options:

- MAP
- LOAD

MAP is the default value. The LOAD option is available for backward compatibility.

Configuring Unlock Codes and Database Settings

Before you initialize Informatica Address Verification, you must specify at least one database and its unlock code in the `SetConfig.xml` file. The `UnlockCode` element and all the attributes of the `Database` element are required. The database configuration includes the database name, database type, path to the location where the database is saved, and the preloading type.

The Unlock Code Element

Specifies an unlock code for accessing the reference address databases. An unlock code is a 36-character long alphanumeric string that you receive from Informatica Address Verification. You can repeat this element to specify multiple unlock codes.

The Database Element

Configure the following attributes of the `Database` element:

CountryISO3

Specifies the ISO3 codes of the countries for which you want to validate addresses. You can specify ALL if you want to validate addresses from all supported countries and territories. If you specify ALL along with ISO3 codes for countries, enter ALL as the last entry in the list. You must have valid unlock codes for the countries that you specify for this attribute. This attribute is required. For example, DEU for Germany and USA for the United States.

Type

Specifies the type of reference address databases that you have unlock codes for. You can configure one of the following values:

- BATCH_INTERACTIVE
- FASTCOMPLETION
- CERTIFIED
- GEOCODING
- GEOCODING_ARRIVAL_POINT

- CAMEO
- SUPPLEMENTARY
- ADDRESS_CODE_LOOKUP

This attribute is required.

Path

Specifies the location where you saved the reference address databases.

PreloadingType

Specifies the preloading type for the database file. You can configure one of the following values:

- FULL
- PARTIAL
- NONE

This attribute is required.

Full preloading of databases requires significant amount of memory as the entire database is preloaded to the system memory. For example, if you want to preload the entire Address Verification reference databases for all supported countries, you require a system memory of about 60 GB.

CHAPTER 3

Input Parameters

This chapter includes the following topics:

- [Input Parameters Overview, 30](#)
- [Input Formatting Options, 30](#)
- [Configuring the Format Settings for Input Addresses, 31](#)
- [Input Country Settings, 31](#)
- [Configuring Country Settings for Input Addresses, 32](#)

Input Parameters Overview

You can configure the attributes of the `Input` element in `Parameters.xml` to specify how Informatica Address Verification interprets input addresses.

Attributes of the `Input` element include the XML settings, formatting options, and country options.

You can configure the `WriteXMLBOM` attribute to specify whether and when Address Verification writes the byte order mark in the XML input.

You can set the `Encoding` attribute to specify the XML encoding to use in the input XML.

Input Formatting Options

You can configure the formatting attributes of the `Input` element in `Parameters.xml` to specify the formatting of the input address.

You can set the `FormatType` attribute to specify what level of details the input address contains. For example, you can configure the `FormatType` attribute to specify whether the input address contains the contact information or organization information.

You can set the `FormatDelimiter` attribute to specify the element separator to use in an input address. For example, if you set `FormatDelimiter` to `COMMA`, Informatica Address Verification treats information on either side of a comma as separate address elements.

You can configure the `FormatWithCountry` attribute to specify whether the input address contains country information.

Configuring the Format Settings for Input Addresses

You can configure the format attributes of the `Input` element in `Parameters.xml` to specify input address properties such as the level of details and the element delimiter.

In `Parameters.xml`, specify the following attributes of the `Input` element:

FormatType

Specifies the level of details the input address contains. You can configure one of the following values:

- ALL
- ADDRESS_ONLY
- WITH_ORGANIZATION
- WITH_CONTACT
- WITH_ORGANIZATION_CONTACT
- WITH_ORGANIZATION_DEPARTMENT

ALL is the default value.

FormatDelimiter

Specifies the element separator. You can configure one of the following options:

- COMMA
- CR
- LF
- CRLF
- PIPE
- SEMICOLON
- SPACE
- TAB

CRLF is the default value. CRLF denotes carriage return and line feed.

FormatWithCountry

Specifies whether the input address contains country information. You can configure one of the following values:

- ON
- OFF

OFF is the default value.

Input Country Settings

You can configure the country attributes of the `Input` element in `Parameters.xml` to specify country-related information that Informatica Address Verification can use to process the input address.

You can set the `FormatWithCountry` attribute to specify whether the input address contains country information.

You can set the `DefaultCountryISO3` attribute to specify a country name that Address Verification can apply to input addresses that do not contain country information. An element result status value of 4 at positions 19 through 20 indicates that Address Verification recognized the country from the `DefaultCountryISO3` setting. In the country recognition mode, a process status code of **R9** indicates that Address Verification assigned the country based on the `DefaultCountryISO3` setting.

You can set the `ForceCountryISO3` attribute if you want Address Verification to replace any country information in the input address with country information that you specify. If you configure `ForceCountryISO3`, Address Verification validates all input addresses as addresses originating from the country specified for `ForceCountryISO3`. An element result status value of F at positions 19 through 20 indicates that Address Verification recognized the country from the `ForceCountryISO3` setting. In the country recognition mode, a process status code of **RA** indicates that Address Verification assigned the country based on the `ForceCountryISO3` setting.

Use the ISO 3-character country codes to specify the countries in the `DefaultCountryISO3` and `ForceCountryISO3` attributes.

Configuring Country Settings for Input Addresses

You can configure the country attributes of the `Input` element in `Parameters.xml` to specify how Informatica Address Verification handles the country information in the input address.

Configure the following attributes of the `Input` element in `Parameters.xml`:

FormatWithCountry

Specifies whether the input address contains country information or not. You can configure one of the following values:

- ON
- OFF

OFF is the default value.

DefaultCountryISO3

Specifies the country to which the input address belongs. Set `DefaultCountryISO3` to the ISO3 code of the country to which the address belongs.

Address Verification uses this setting only in the following instances:

- The input address does not contain country information.
- The input address does not contain a city or locality name from which Address Verification can identify the country.

ForceCountryISO3

Overrides the country information in the input address and assigns the country that you specify for this attribute to the validated output. Set this attribute to the ISO3 code of the country that you want Address Verification to assign to the input address.

CHAPTER 4

Process Parameters

This chapter includes the following topics:

- [XML Encoding for Parameters, InputData, and Results XML Files, 33](#)
- [Configuring XML Encoding for Parameters, Input, and Result, 34](#)
- [Process Modes, 34](#)
- [Specifying the Process Mode, 46](#)
- [Configuring Address Code Lookup, 47](#)
- [Configuring Certified-Mode Address Verification, 48](#)
- [Disabling the Certified Mode, 49](#)
- [The MatchingExtendedArchive Attribute, 50](#)
- [The MatchingScope and MatchingAlternatives Attributes, 55](#)
- [Optimization Level, 56](#)

XML Encoding for Parameters, InputData, and Results XML Files

In `Parameters.xml`, you can specify the XML encoding for `Parameters.xml`, `InputData.xml`, `Result.xml`, and any data that you input into Informatica Address Verification and any result that Address Verification returns.

For C-based APIs, you can use 8-bit or 16-bit functions. A `w` suffix in the function name, such as `AD_SetInputDataElementW()`, identifies a 16-bit function. If you use 16-bit functions, set the encoding to a 16-bit encoding. If you use a 16-bit function when the encoding is set to an 8-bit encoding, Address Verification returns an encoding error. When you use Java APIs, set the encoding to UTF-16 because Java supports only 16-bit input and output.

Configuring XML Encoding for Parameters, Input, and Result

You can specify the XML encoding to use for parameters, input, and result in the `Parameters.xml` file.

To specify the XML encoding, you can configure the `WriteXMLEncoding` attribute of the following elements in `Parameters.xml`.

- **General.** To specify the XML encoding for the `Parameters.xml` file that Informatica Address Verification generates.
- **Input.** To specify the XML encoding for the `InputData.xml` file that Address Verification generates and any data that you input into Address Verification.
- **Result.** To specify the XML encoding for the `Result.xml` file that Address Verification generates and any result output that Address Verification returns.

For the list of encoding types that you can use in the `WriteXMLEncoding` attribute, see [“XML Encoding Types” on page 22](#).

If you use XML API and do not specify an encoding type, Address Verification sets the encoding to UTF-8 or UTF-16 based on whether you use 8-bit or 16-bit API functions. For direct API, the default is ISO-8859-1.

Process Modes

The process mode that you select defines the way that Informatica Address Verification processes the input data.

The `AD_Process()` function requires the process mode information to process addresses. You can specify the process mode information in the `Parameters.xml` file. You can choose a process mode that includes address verification or a process mode that does not include address verification.

Address Verification verifies addresses in the following process modes:

- Batch
- Certified
- Fast Completion
- Interactive

Address Verification does not verify addresses in the following process modes:

- Address Code Lookup
- Country Recognition
- Parse

Address Code Lookup

The Address Verification reference data includes unique values that represent part of an address or the complete address. To return the value for an address, or to retrieve the address information that a key value represents, configure Informatica Address Verification in address code lookup mode.

In address code lookup mode, you can retrieve address information for the following countries:

- Austria
- Germany
- Japan
- South Korea
- Serbia
- South Africa
- United Kingdom

To configure Informatica Address Verification in address code lookup mode, specify the address code for the information that you require in the `InputData.xml` file. When you submit the address code lookup values for processing, Address Verification returns the partial or complete addresses that correspond to the values. You must also install the corresponding address code lookup (AC) database and add the required unlock codes to `SetConfig.xml`.

Address Codes in InputData.xml

The following table lists the address codes that you can add to `InputData.xml`:

Country	Address Code	Description
Austria	AUT_PAC_ID	<p>An Austria address has a PAC_ID value when the address receives mail at another address at the same location. The PAC_ID value is the Postal Address Code (PAC) value of the corresponding address that receives the mail. For example, a PAC_ID value of 100004254 returns the following address:</p> <p>Neue-Welt-Gasse 2 8010 Graz AUT</p> <p>Note: The address that gives access to the mailbox is the Ident address.</p>
Germany	DEU_AGS	<p>The Amtliche Gemeindeschlüssel (AGS) is a variable length value that uniquely identifies a municipality in Germany. An AGS value might return more than one level of municipality information.</p> <p>See also DEU_STREET_ID.</p>
Germany	DEU_LOCALITY_ID	<p>The Locality ID is a variable length value that uniquely identifies a German locality.</p> <p>See also DEU_STREET_ID.</p>

Country	Address Code	Description
Germany	DEU_STREET_ID	<p>The Street ID is a variable length value that uniquely identifies a German street address.</p> <p>For example, when you validate the following address:</p> <pre>Röntgenstr. 9 67133 Maxdorf Germany</pre> <p>Address Verification returns the following additional information in the address output:</p> <pre>DEU_AGS: 07338018 DEU_LOCALITY_ID: 68015519 DEU_STREET_ID: 100560690</pre>
Japan	JPN_CHOUMEI_AZA_CODE	<p>The Choumei Aza code is an 11-digit value that corresponds to a delivery point address in Japan.</p> <p>For example, a JPN_CHOUMEI_AZA_CODE of 28201160001 fetches the following result:</p> <pre>〒 670-0081 兵庫県姫路市田寺東1丁目</pre> <p>or</p> <pre>01 Chome Taderahiga-shi Himeji-shi Hyogo-ken 670-0081 Japan</pre> <p>You can use the Choumei Aza code in address code lookup mode to find the current version or an historical version of an address. For more information, see “Extended Archives and Japan Addresses” on page 51.</p>
Japan	JPN_CHOUMEI_AZA_GAIKU_CODE	<p>The Choumei Aza code is an 11-digit value that defines a unique delivery point for Japan addresses. The Gaiku code is a four-digit value that identifies a city block in Japan. The combined Choumei Aza code and Gaiku code helps you to retrieve more accurate addresses from Address Verification.</p>
Serbia	SRB_PAK	<p>The Postal Address Code (PAK) is a six digit value that defines a unique Serbian address to the street level.</p> <p>For example, a SRB_PAK value of 251133 fetches the following result:</p> <pre>Majora Ilica 1 14000 Valjevo Serbia</pre>
South Africa	ZAF_NADID	<p>The National Address Database (NAD) ID is a unique numeric ID assigned to a South Africa street address.</p> <p>For example, a ZAF_NADID value of 2170232 fetches the following result:</p> <pre>4 Balmoral Road Vincent East London 5247 South Africa</pre>

Country	Address Code	Description
South Korea	KOR_ADDRESS_ID	<p>The address ID for South Korea addresses is a unique string that Address Verification assigns to a South Korea address. You can retrieve the address ID as an enrichment to archived South Korea addresses. You then use the address ID in the address code lookup mode to retrieve a different version of the address.</p> <p>For more information, see "Extended Archives and South Korea Addresses" on page 52.</p>
United Kingdom	GBR_UDPRN	<p>The Unique Delivery Point Reference Number (UDPRN) is an eight-character value that uniquely identifies a postal address in the Royal Mail PAF database.</p> <p>For example, a GBR_UDPRN value of 15511432 fetches the following result:</p> <pre>Flat 16 Haden Court Lennox Road London N4 3HS United Kingdom</pre>
United Kingdom	GBR_UPRN	<p>Unique Property Reference Number (UPRN) is a numeric value that uniquely identifies a land or property unit in the United Kingdom.</p> <p>For example, a GBR_UPRN value of 151117706 fetches the following result:</p> <pre>2 Drumforber Cottage Laurencekirk AB30 1RS United Kingdom</pre>

Transaction Key and Record ID Values in Address Code Lookup Mode

If the address records in your organization contain transaction keys or record ID values, you can use the values in address code lookup mode. When you include the values in the input addresses, Address Verification passes the values through to the output addresses. You can then enter a transaction key or record ID value in address code lookup mode to query the output addresses and to return the address that matches the value.

Use the Key element to enter the values. The Key element has the types TRANSACTION_KEY and RECORD_ID.

RELATED TOPICS:

- ["Configuring Address Code Lookup" on page 47](#)

Batch Mode

Use batch mode to verify one or more addresses without any user intervention. In batch mode, Informatica Address Verification processes and verifies the addresses that you enter and returns the results when the processing is complete.

Choose batch mode when you want to enter multiple addresses for verification and receive one result for each input address. If you have multiple addresses to verify, you can create a text file that contains the addresses and provide the file as the input.

In batch mode, Address Verification does not correct addresses that are ambiguous or difficult to correct without user intervention. However, Address Verification returns parsed results for such addresses.

If the reference address database for the country to which the input address belongs is not available, Address Verification does not verify the address. In such cases, Address Verification processes the address in parse mode and returns the parsed address instead of a verified and corrected address.

Certified Mode

You can use the certified (CERTIFIED) mode to verify addresses in accordance with the following postal certifications:

- Address Matching Approval System (AMAS) certification for Australia Post. Certified to AMAS Cycle 2021.
- Coding Accuracy Support System (CASS) certification for the United States Postal Service. Certified to CASS Cycle N.
Address Verification also supports several requirements that the United States Postal Service proposes for CASS Cycle O.
- SendRight certification for New Zealand Post. Certified to SendRight Cycle 2020.
- Service National de L'Adresse (SNA) certification for La Poste of France.
Address Verification certifies addresses in France to the following levels:
 - CEDEX A. Organization level.
 - Hexacle. House-number level.
 - Hexaligne 3. Building level.
 - Hexaposte. Post code level.
 - Hexavia. Street level.
- Software Evaluation and Recognition Program (SERP) certification for Canada Post. Certified to SERP Cycle 2020.

An address that you want to verify in the certified mode must meet the formatting requirements that the postal authority of the country specifies. For example, to verify a Canada address in the certified mode, the input address can include a maximum of two delivery address lines (DALs). To verify a France address in the certified mode, the input address can include a maximum of six formatted address lines (FALs). Of the six FALs in France addresses, three FALs must contain delivery elements other than the post box and locality information.

For certified mode, you must have the certified databases (Cx) installed and the corresponding unlock codes specified in the `SetConfig.xml` file.

The certified mode falls back to the batch mode if the address belongs to a country that Informatica Address Verification does not support for the certified mode.

If you enable the certified mode and do not have the corresponding certified (Cx) reference address database, Address Verification returns an N2 error status.

If you want to disable the certified mode for some of the countries for which the certified mode is available, you can configure `DisableCertifiedModeISO3`. You can set the `DisableCertifiedModeISO3` attribute of the `Process` element to the ISO3 codes of the countries for which you want to disable the certified mode. If you disable the certified mode for some countries, Address Verification uses the batch mode to verify addresses from those countries.

Certified Mode Verification of Australia Addresses

You can use the certified mode of Informatica Address Verification to verify Australia addresses in accordance with the AMAS guidelines. To verify Australia addresses in the certified mode, you must install the `AUS5C1.MD` and `AUS5C2.MD` databases and include the corresponding unlock codes in `SetConfig.xml`.

The `AUS5C1.MD` and `AUS5C2.MD` databases contain Postal Address File (PAF) data, which includes Australia Post's Delivery Point Identifiers (DPIDs).

Certified Mode Verification of Canada Addresses

You can use the certified mode of Informatica Address Verification to verify Canada addresses in accordance with the SERP guidelines of Canada Post. To verify Canada addresses in the certified mode, you must install the `CAN5C1.MD` database and include the corresponding unlock code in `SetConfig.xml`. The `CAN5C1.MD` database contains the PoCAD (Point of Call Address Data).

Address Verification is SERP 2017 compliant. SERP 2017 compliance ensures that Address Verification adheres to the following changes to the postal rules and regulations set by Canada Post:

- If the input suite number is outside the only range available for the address in PoCAD, Address Verification marks that address as not valid. When the input postal code maps to a Large Volume Receiver (LVR), Address Verification copies the suite number from the input address to the output address even if the suite number does not match any database entry that contains the correct single suite-civic number combination.
- When the range-based PoCAD has only one address associated with a civic street and if the input address does not match the address in the database, Address Verification marks that address as not valid or noncorrectable.
- When the range-based PoCAD contains a Type 2 record that does not have a route identifier or a delivery mode identifier for a rural address, Address Verification handles that address in the same way it handles Type 1 addresses. However, the following conditions apply to the handling of rural civic addresses:
 - If the input address does not have a match in the range-based PoCAD and the postal code of the input address has a corresponding Type 4 address in the range-based PoCAD, Address Verification marks the address as VQ (Valid but questionable) in the SERP category enrichment.
 - If the input address is a rural address with a street having no civic street number, Address Verification adds the civic street number when a unique correction is possible. If no unique civic street can be added to the input address, Address Verification rejects that address.

Note that Post Office Box numbers from 99900 through 99905 in Canada denote Deliver to Post Office (DTPO) addresses for retail outlet locations. Addresses with Post Office Box numbers from 99900 through 99905 are specifically meant for parcel delivery and should not be used for other mail items such as letters and publications.

For more information about SERP 2017 certification, contact Canada Post.

Certified Mode Verification of France Addresses

You can use the certified mode of Informatica Address Verification to verify the France addresses in accordance with the La Poste SNA guidelines. The integrators can use the certified mode validation type to develop SNA Application for certification by La Poste.

You do not require any special database files apart from `FRA5BI.md` for certified processing. For more information about the `FRA5BI.md` database, see [Chapter 4, "Process Parameters" on page 33](#).

You can query the `GetConfig.xml` file for the following `EnrichmentSupportInfo` element to check for correct initialization of all the required databases:

```
<EnrichmentSupportInfo CountryISO3="FRA" Type="CERTIFIED">FULL</EnrichmentSupportInfo>
```

For SNA certified processing, you must enter addresses in the six line `FormattedAddressLine` format, including empty lines wherever a part of the address is missing. The following table lists the values for the six line `FormattedAddressLine` format:

Formatted Address Line	Value
Line 1	ORGANIZATION IDENTIFICATION or IDENTITY OF THE ADDRESSEE
Line 2	INDIVIDUAL IDENTIFICATION (Company Contact) or DELIVERY POINT ACCESS INFORMATION (SubBuilding)
Line 3	DELIVERY POINT LOCATION (Building)
Line 4	STREET NUMBER or PLOT and THOROUGHFARE
Line 5	DELIVERY SERVICE or THOROUGHFARE COMPLEMENTARY IDENTIFICATION
Line 6	POSTCODE and LOCALITY or CEDEX POSTCODE and DISTRIBUTION AREA INDICATOR

Certified Mode Verification of United States Addresses

You can use certified mode to verify United States addresses in accordance with the CASS guidelines of the United States Postal Service.

Note: Certified mode verification of United States addresses is available only to customers in the United States.

To verify United States addresses in certified mode, you install the United States `Cx` databases. The `Cx` databases are numbered `USA5C101.MD` through `USA5C133.MD`. The databases enable the address verification process to analyze and update different aspects of the address according to the different USPS postal criteria. Add the unlock codes for the files to `SetConfig.xml`.

The following table summarizes the types of data in the databases:

Database File Name	Database Contents
USA5C101.MD	EWS (Early Warning System) data
USA5C102.MD	ZIPMOVE data
USA5C103-111.MD	LACSLink data
USA5C112.MD	Street Alias data
USA5C113.MD	DPV data - all delivery points
USA5C114.MD	DPV data - CMRA delivery points
USA5C115.MD	DPV data - false-positive delivery points
USA5C116.MD	DPV data to resolve ZIP Codes to a common base ZIP Code

Database File Name	Database Contents
USA5C117-119.MD	SuiteLink data
USA5C120.MD	DPV data - vacant delivery points
USA5C121.MD	DPV data - NoStat delivery points
USA5C122-123.MD	Residential Data Indicator data
USA5C124-125.MD	Enhanced Line of Travel data
USA5C126.MD	PBSA (Post Office Box Street Address) data
USA5C127.MD	DNA (Door Not Accessible) data
USA5C128.MD	NSL (No Secure Location) data
USA5C129-130.MD	NDD (Non-Delivery Days) data
USA5C131.MD	NoStat Reason data
USA5C132.MD	Throwback data
USA5C133.MD	Drop Indicator data

Note the following:

- Do not combine any CASS file numbered USA5C101.MD through USA5C133.MD with any CASS file numbered USA5C1.MD through USA5C26.MD. The file types are not compatible.
- The CASS certification files that the United States Postal Service provides comply with the SHA-256 standard.
- Address Verification does not currently read the following files:
 - USA5C105.MD
 - USA5C106.MD
 - USA5C107.MD
 - USA5C108.MD
 - USA5C109.MD
 - USA5C110.MD
 - USA5C119.MD

Informatica delivers the files for users who run older versions of Address Verification. Address Verification does not preload the files into memory.

- The DPV database has information that helps you check whether a ZIP+4 coded address is in the USPS delivery file as a known address record. You can use the DPV product to confirm known USPS addresses and to identify potential addressing issues that might affect delivery. If you do not install the certified databases, Informatica Address Verification adds ZIP+4 Codes to United States addresses if the USA5BI.MD database is available.

- Informatica Address Verification sends records with input suite data that does not match the ZIP+4 Code reference data through the SuiteLink process. If Address Verification finds a match for such addresses with SuiteLink, Address Verification retains the input suite data in the residue component and writes the correct suite data in DAL2. The USPS requires that the address verification operation retains the non-matching input data.

Country Recognition Mode

You can use the country recognition process mode to identify the country to which an address belongs. In the country recognition process mode, Informatica Address Verification returns the country information for addresses that do not contain the country information.

Address Verification identifies the country to which an address belongs based on one or more of the following criteria:

- An abbreviation in the input address. For example, the ISO3 code for a country, such as DEU for Germany, or a common abbreviation such as GER for Germany.
- The `DefaultCountryISO3` setting.
- The `ForceCountryISO3` setting.
- Country name in the input address.
- Major town, locality, or province information in the input address.
Note that this works only if you enter the address in the formatted address line format.
- The script used in the input address.

Note that country recognition works best with addresses that are unambiguous.

Fast Completion Mode

You can use fast completion (FASTCOMPLETION) mode to receive address suggestions as you type. Use fast completion mode to generate suggestions based on truncated input.

Fast completion mode is particularly useful when you need to enter address data in real time, for example as you receive it from customers. In fast completion mode, you can retrieve suggestions for partial address inputs. Because fast completion mode is optimized to verify truncated inputs, the initial letters of an address input are important in fetching the best results.

In fast completion mode, you can enter `AddressElement` items as fielded input. You cannot use `AddressLine` input formats such as `FormattedAddressLine` or `DeliveryAddressLine`. However, you can use the `AddressComplete` element to verify addresses from countries that support single-line address verification.

You can receive up to 100 suggestions for an input address in fast completion mode. The `MaxResultCount` parameter value determines the maximum number of address suggestions that Address Verification can return. The default value for `MaxResultCount` is 20. You can set the value in `SetConfig.xml` or in `Parameters.xml`.

Note: If you set `MaxResultCount` values in both `SetConfig.xml` and `Parameters.xml`, Address Verification uses the lower of the two values.

Interactive Mode

You can use the interactive (INTERACTIVE) mode to manually resolve ambiguities and select the best possible corrections. In the interactive mode, Informatica Address Verification returns multiple address suggestions from which you can choose the most appropriate result.

For each address that you enter for verification in the interactive mode, you can receive a maximum of 100 suggestions from Address Verification. You can configure the `MaxResultCount` parameter in `SetConfig.xml` and `Parameters.xml` to specify the maximum number of suggestions that you want to receive for each verification request. The default value for `MaxResultCount` is 20. If you set values for `MaxResultCount` in both `SetConfig.xml` and `Parameters.xml`, Address Verification uses the lower of the two values.

The interactive mode is particularly useful when you work with addresses that are ambiguous. You can view possible corrections for the address you entered and choose the correct address to ensure high-quality address data in your master database or CRM systems.

If the reference address database for the country to which the address belongs is not available, Address Verification uses the PARSE mode. In such cases, Address Verification returns the parsed address instead of suggestions or corrections.

Parse Mode

You can use the parse (PARSE) mode to separate out address information from fielded or unfielded address inputs. In the parse mode, Informatica Address Verification does not validate the address.

Address parsing in Address Verification functions independent of the reference address databases. You can use the PARSE mode to parse addresses even if you do not have the corresponding reference address databases. Address Verification does not use the reference address databases to process an address in the parse mode. So, the address element assignment in the parse mode might vary with the address element assignment in a validated output.

In the parse mode, Address Verification separates address input into tokens that can be used to process the address further. You can use the parse mode if the input is not correctly formatted or you need to segregate address items in an input address. Note that the parse mode does not work if Address Verification does not recognize the country to which the input address belongs.

Single-Line Address Verification

Use single-line address verification to verify addresses that you create with a single-line structure. You can perform single-line verification in batch, interactive, and fast completion modes.

To verify single-line addresses, enter the addresses in the `AddressComplete` element that the `InputData.xml` file specifies, and set the `FormatAddressComplete` parameter in the `Parameters.xml` file to `SINGLE_LINE`.

When you submit a single-line address in interactive mode or fast completion mode, Address Verification can return multiple address suggestions from the reference data. When you submit a single-line address in batch mode, Address Verification returns a single address.

You can perform single-line address verification on addresses from any country for which Informatica provides address reference data.

Single-Line Address Structure

Address Verification identifies the address elements in a single-line address based on their position in the address structure. You must enter the elements in the correct sequence even if you omit some of the elements. For optimum results, enter as many elements as possible in the input address. When you enter an address in a single line, do not mix Delivery Address Line (DAL) elements and Country-Specific Locality Line (CSLLN) elements.

The following table shows examples of the order of address elements that you need to follow for each country:

Country	Order of Address Elements
Argentina	[Street] [House Number] [Dependent Locality] [Post Code] [Locality]
Australia	[Sub-building] [House Number] [Street] [Locality] [Province] [Post Code]
Austria	[Street] [House Number] [Sub-building] [Post Code] [Locality]
Belgium	[Street] [House Number] [Post Code] [Locality]
Brazil	[Street] [House Number] [Locality] [State Code] [Post Code]
Canada	[Sub-building] [House Number] [Street] [Delivery Service] [Locality] [Province] [Post Code]
China	[Post Code] [Province] [Locality] [Street] [House Number]
Denmark	[Street] [House Number] [Post Code] [Locality]
Finland	[Street] [House Number] [Post Code] [Locality]
France	[House Number] [Street] [Post Code] [Locality]
Germany	[Street] [House Number] [Post Code] [Locality]
Hong Kong	[Province] [Locality] [Street] [House Number] [Building 1] [Building 2] [Sub-building]
India	[House Number] [Street] [Dependent Locality] [Double Dependent Locality] [Locality] [Post Code]
Ireland	[Sub-building] [House Number] [Street] [Dependent Locality] [Locality] [Province] [Post Code]
Italy	[Street] [House Number] [Post Code] [Locality] [Province]
Japan	[Post Code] [Province] [Main Locality] [Sub-locality] [Chome] [Ban] [Go]
Luxembourg	[House Number] [Street] [Post Code] [Locality]
Macau	[Locality] [Street] [House Number] [Building]
Mexico	[Street] [House Number] [Sub-locality] [Post Code] [Locality] [Province]
Netherlands	[Street] [House Number] [Post Code] [Locality]
New Zealand	[Sub-building] [House Number] [Street] [Delivery Service] [Locality] [Post Code]
Norway	[Street] [House Number] [Post Code] [Locality]
Spain	[Street] [House Number] [Sub-building] [Post Code] [Locality]
Sweden	[Street] [House Number] [Post Code] [Locality]
Switzerland	[Street] [House Number] [Post Code] [Locality]

Country	Order of Address Elements
United Kingdom	[Sub-building] [House Number] [Street] [Main Locality] [Sub-locality] [Post Code]
United States	[Sub-building] [House Number] [Street] [Locality] [Province] [Post Code] or [House Number] [Street] [Sub-building] [Locality] [Province] [Post Code]

Informatica maintains a list of the countries for which Address Verification can verify address data on the web. The country list includes the preferred structure of an address that you submit for verification. To view the list and the preferred structure for each country, click the following and scroll to Country List:

<https://www.informatica.com/products/data-quality/data-as-a-service/address-verification/interactive-country-map.html>

The data for each country includes the standard address format as it appears on mail item. The top-to-bottom structure of the elements in the address format map to the left-to-right structure of the elements in an address that you submit for single-line verification.

Rules and Guidelines for Single-Line Verification

Consider the following rules and guidelines when you submit addresses for single-line verification:

- Single-line address verification uses an unlock code of type `SINGLE_LINE_VALIDATION` in on-premises installations. Contact your sales representative for more information about obtaining the unlock code.
- Single-line address verification uses fast completion reference data in batch, interactive, and fast completion modes. When you perform single-line verification in batch mode or interactive mode, you must install the fast completion reference data for the destination country in addition to the batch or interactive data.
- If the default preferred script for a country is not a Latin or Western script, use the default `PreferredScript` setting with the address.
- Do not use a delivery address line or formatted address line element in the input XML when you submit an address for single-line verification. The `FormatAddressComplete` parameter value will fall back to `FORMATTED_ADDRESS_LINE` if you include a delivery address line or a formatted address line in the input.
- Although delimiters are not required in single-line address input, Address Verification processes a comma or a semicolon in the input as an element separator. An input address with delimiters in a Latin script might fetch better suggestions than an address without delimiters.
- Address Verification does not verify country, organization, department, building, contact, or contact function information in single-line address input.

Exceptions to this rule are native script addresses in China, Hong Kong, Japan, and Macau. Address Verification can verify building information in Macau and can verify building and sub-building information in Hong Kong. In all other cases, Address Verification copies the information from the input address to the output address.

- If the single-line address input contains only a numeric input, Address Verification considers it as the post code and returns suggestions accordingly. For countries where the house number appears on the left side of the street name or locality, if the single-line address input begins with a number that is followed by a string, Address Verification considers the number as a house number and the following string as the street name or locality. If Address Verification does not find a match for this combination, Address Verification tries to interpret the input as street name without house number or as a combination of post code and locality.

- Address Verification returns an N7 process status code if you do not provide the unlock key for single line address verification in the `SetConfig.xml` file.
- Address Verification returns multiple suggestions based on the value you configure for `MaxResultCount` in the `Parameters.xml` and `SetConfig.xml` files.
- Address Verification can return results for a partial input address in fast completion mode. To provide full address responses in batch or interactive mode, Address Verification requires a complete or almost-complete input address. For example, Address Verification can add a post code to an otherwise complete address in batch or interactive mode.

For more information on the differences between batch and interactive modes, see [“Key Differences Between Fast Completion and Interactive Modes” on page 46](#).

Key Differences Between Fast Completion and Interactive Modes

The fast completion and interactive modes differ in the following aspects:

Database

Fast completion mode uses the Fast Completion (FC) reference address databases.

Interactive mode uses the Batch and Interactive (BI) reference address databases.

Partial Input and Typeahead Support

Fast completion mode is optimized to work with truncated input data, and supports typeahead functionality. You receive suggestions as you enter an address. In the fast completion mode Informatica Address Verification returns quality results for partial address input. However, in the interactive mode, Address Verification requires almost complete address to validate.

Post Code Lookup

In the fast completion mode, you can search for address suggestions by entering minimum information such as post codes. For many countries, you can enter a post code and receive a list of addresses that belong to that post code. In the interactive mode, Address Verification requires almost complete address input to generate any suggestion.

Address Input Format

In the interactive mode, you can enter fielded, partially-fielded, or unfielded addresses. In the fast completion mode, Address Verification supports only fielded addresses.

Enrichments

In the interactive mode, you can configure Address Verification to return enrichments such as country-specific enrichments or CAMEO codes. Address Verification does not support enrichments in the fast completion mode.

Specifying the Process Mode

You can set the `Mode` attribute of the `Process` element in `Parameters.xml` to specify the process mode of Informatica Address Verification. By default, the `Mode` attribute is set to `BATCH`.

You must install the corresponding reference address databases and specify the unlock codes in the `SetConfig.xml` file. For example, if you want to validate the U.S. addresses in batch mode, you must install the batch and interactive (BI) reference address database for the U.S. addresses and include its unlock code

in `SetConfig.xml`. Similarly, to validate the U.S. addresses in the certified mode, you must install the certified reference address databases (Cx) for the U.S., and include the unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `Mode` attribute of the `Process` element to one of the following values based on your requirement.
 - ADDRESSCODELOOKUP
 - BATCH
 - CERTIFIED
 - COUNTRYRECOGNITION
 - FASTCOMPLETION
 - INTERACTIVE
 - PARSE

Configuring Address Code Lookup

You can use address code lookup mode to find address information in the reference data that matches an address identifier that you enter. You can retrieve part of an address or the complete address, based on the level of information in the reference data.

Before you configure Informatica Address Verification in address code lookup mode, install the address code lookup (AC) databases.

To configure Address Verification in address code lookup mode, perform the following steps:

1. In `Parameters.xml`, set the `Mode` attribute of the `Process` element to ADDRESSCODELOOKUP.
2. In `InputData.xml`, set the `Type` attribute of the `AddressCode` element to one of the following values:
 - AUT_PAC_ID
 - DEU_AGS
 - DEU_LOCALITY_ID
 - DEU_STREET_ID
 - GBR_UDPRN
 - GBR_UPRN
 - JPN_CHOUMEI_AZA_CODE
 - JPN_CHOUMEI_AZA_GAIKU_CODE
 - KOR_ADDRESS_ID
 - SRB_PAK
 - ZAF_NADID

Note: The values specify different levels of address information. Some values provide information for an address to locality or street level. Other values uniquely identify an address.

RELATED TOPICS:

- [“Address Code Lookup” on page 35](#)

Configuring Certified-Mode Address Verification

Address Verification supports certified-mode address verification for Australia, Canada, France, New Zealand, and the United States. You can configure Informatica Address Verification to verify addresses in certified mode for each country. Before you enable certified mode, install the certified (Cx) reference address databases and include the appropriate unlock codes in the `SetConfig.xml` file.

In `Parameters.xml`, configure the following attributes of the `Process` element:

1. To enable certified-mode address verification, set the `Mode` attribute to `CERTIFIED`.
2. To enable the certified mode verification of the United States addresses, set the `EnrichmentCASS` attribute to `ON`.
The default value is `OFF`.
3. To enable the certified mode verification of Canada addresses, set the `EnrichmentSERP` attribute to `ON`.
The default value is `OFF`.
4. To enable the certified mode verification of France addresses, set the `EnrichmentSNA` attribute to `ON`.
The default value is `OFF`.
5. To enable the certified mode verification of Australia addresses, set the `EnrichmentAMAS` attribute to `ON`.
The default value is `OFF`.
6. To enable the certified mode verification of New Zealand addresses, set the `EnrichmentSendRight` attribute to `ON`.
The default value is `OFF`.

For best results in the certified mode, set following attributes to the default values:

- The `PreferredLanguage` attribute of the `Result` element. The default value is `DATABASE`.
- The `MatchingAlternatives` attribute of the `Process` element. The default value is `ALL`.
- The `MatchingScope` attribute of the `Process` element. The default value is `ALL`.
- The `OptimizationLevel` attribute of the `Process` element. The default value is `STANDARD`.
- The `GlobalMaxLength` attribute of the `Result` element.
- The `GlobalCasing` attribute of the `Result` element. The default value is `NATIVE`.
- Attributes of the `AddressElementStandardize` element.

Note: To read about the process status values for addresses that Address Verification returns in certified mode, see [“Certified Mode Process Status Values” on page 142](#).

Reference Address Databases for Certified Mode

Informatica Address Verification supports the following reference address databases for the certified mode address verification:

Australia

AUS5C1.MD
AUS5C2.MD
AUS5CICF.MD

Canada

CAN5C1.MD

France

Address Verification does not provide a separate certified mode reference address database for France. Use the batch and interactive mode database `FRA5BI.MD` to process France addresses in the certified mode.

New Zealand

NZL5C1.MD

United States

USA5C101.MD through USA5C132.MD.

Disabling the Certified Mode

You can disable the certified (CERTIFIED) mode for one or more of the countries for which the mode is available. If you disable the certified mode for a country, Informatica Address Verification uses the BATCH mode to verify addresses from that country.

- In `Parameters.xml`, set the `DisableCertifiedModeISO3` attribute of the `Process` element to the ISO3 codes of the countries for which you want to disable the certified mode.

Note: Address Verification returns an N2 status message when all of the following conditions are true:

You set the process mode to CERTIFIED.

You do not have the `Cx` databases for one or more countries for which the certified mode verification is available.

You did not disable the certified mode for countries for which you do not have the `Cx` databases.

You enter an address from a country for which the certified mode is available but you do not have the `Cx` database.

The MatchingExtendedArchive Attribute

The reference databases for Japan and South Korea contain the current address of every delivery point in each country. The databases also contain any historical versions of the addresses that the postal carriers recognize.

You can configure Informatica Address Verification to verify historical addresses and to return a code value that represents the current or the historical version of each address. To configure Address Verification to read the historical addresses in the reference data, set the `MatchingExtendedArchive` attribute of the `Process` element to ON.

Older Addresses in Japan

When you verify a Japan address in batch or interactive mode, Address Verification can return one or more Choumei Aza codes that represent the delivery point. A delivery point can have current and historical Choumei Aza codes that correspond to the current and historical versions of the input address. To return Choumei Aza codes for different versions of the address, select the Japan enrichments in the `Parameters.xml` file.

The Choumei Aza code enrichments are `CHOUMEI_AZA_CODE`, `NEW_CHOUMEI_AZA_CODE`, and `CURRENT_CHOUMEI_AZA_CODE`.

The codes contain the following address information:

- `CHOUMEI_AZA_CODE` contains the code that Japan Post assigned to the input address.
- `NEW_CHOUMEI_AZA_CODE` contains the code that Japan Post assigned to any incremental update to the input address.
Note: Japan Post might record multiple updates for the address, and the `NEW_CHOUMEI_AZA_CODE` might not identify the current address.
- `CURRENT_CHOUMEI_AZA_CODE` contains the code for the current version of the input address.

You can submit the Choumei Aza code in address code lookup mode to find the address that the code represents. For information on how to retrieve the Choumei Aza code for an address that has multiple older versions, see [“Using the Extended Archives to Update an Older Japan Address” on page 52](#).

To receive Choumei Aza codes in the address output, you must enable Japan address enrichments and you must install the Japan archive address and enrichment databases. For more information about enabling the Japan enrichments, see [“Enabling Enrichments for Japan Addresses” on page 78](#).

Older Addresses in South Korea

In addition to the current version of a South Korea address, the reference data for South Korea stores any older, land lot-based version of the address. The reference data also stores any older, six-digit post code that applied to the address. Address Verification recognizes the older and newer versions of the address and can read and write any combination of new and old address and postcode data.

When you verify a South Korea address in batch or interactive mode, you retrieve a corresponding address ID value as an enrichment. If the address is not in the current format, you can enter the address ID in address code lookup mode to retrieve the current version of the address. The final character of the address ID indicates the format of the address. You can modify the address ID to retrieve a different combination of old and new address data.

The address ID identifies an address to house number level. If the address ID matches a single building at the current address, Address Verification returns the address with the building information in address code lookup mode. If the Address ID matches multiple buildings, Address Verification returns each address with the building information in address code lookup mode.

An older, land lot-based address might correspond to multiple current addresses. For example, the older address might identify a lot on which multiple buildings now stand. When you verify the older address in batch mode, Address Verification verifies the address and returns the address ID for the lot. When you enter the address ID in address code lookup mode and specify the current address data, Address Verification returns the address of every building on the lot. Each building-level address has a corresponding, unique address ID.

It follows that a land lot-based address can be valid with or without building information. When the address omits building information, Address Verification validates the address to house number level and returns the corresponding address ID. When the address includes building information, Address Verification validates the address to building level and returns the corresponding address ID.

Consider the following rules and guidelines when you verify older South Korea addresses:

- If you set MatchingExtendedArchive to OFF, Address Verification considers only the current, street-based address and the current post code as valid. When MatchingExtendedArchive is OFF, Address Verification rejects or corrects outdated lot-based addresses.
- If you set MatchingExtendedArchive to ON, Address Verification returns an Extended Element Result status of F for a lot-based address.
- To retrieve the address ID, you must enable South Korea address enrichments and you must install the South Korea enrichment database.
- For information on how to retrieve different versions of South Korea address data, see [“Extended Archives and South Korea Addresses” on page 52](#).

Extended Archives and Japan Addresses

The Japan archive and enrichment databases can contain multiple versions of an address. You can use the Choumei Aza code enrichments to obtain the Choumei Aza code for any version of an address that you enter.

The following table shows a Japan address with two older versions and the Choumei Aza codes for each version:

Address Version	Address	Choumei Aza Code
Oldest	〒 587-0002 大阪府南河内郡美原町黒山	27385006000
Intermediate	〒 5870002 大阪府堺市美原町黒山	27201334000
Current	〒 587-0002 大阪府堺市美原区黒山	27147007000

Consider the following rules and guidelines for Choumei Aza codes and extended archives:

- If you verify the oldest address, the CHOUMEI_AZA_CODE value is 27385006000.
- If you verify the oldest address, the NEW_CHOUMEI_AZA_CODE value is 27201334000.
- If you verify the oldest address, the CURRENT_CHOUMEI_AZA_CODE value is 27147007000.
- The CHOUMEI_AZA_CODE enrichment does not by default return the oldest version of the address in the reference data. If you verify the intermediate address and you specify the CHOUMEI_AZA_CODE enrichment, Address Verification returns 27201334000.

Using the Extended Archives to Update an Older Japan Address

To update an older Japan address, select the Japan enrichments and validate the address in batch or interactive mode. Address Verification returns the Choumei Aza codes for the address. Then, submit a Choumei Aza code in address code lookup mode.

To return the codes for an older address, your installation must include the Japan archive and enrichment databases. Set the `MatchingExtendedArchive` attribute of the `Process` element to ON. Also, ensure that the `SupplementaryJP` element is set to ON.

1. Enter an address to Address Verification in batch or interactive mode.
Address Verification returns the validated address and the corresponding Choumei Aza code values.
2. Configure Address Verification in address code lookup mode, and enter a Choumei Aza code that you received in the output from the previous step.
 - `CURRENT_CHOUMEI_AZA_CODE` returns the current version of the address in the reference database.
 - `NEW_CHOUMEI_AZA_CODE` returns the next iteration of the input address in the reference database.
You can rerun the current step to find additional iterations of the address.

Extended Archives and South Korea Addresses

A current South Korea address uses street-based information to identify the address location. An older South Korea address uses lot-based information to identify the address location. You can use Address Verification to obtain the current version of an older address.

Additionally, current post codes in South Korea contain five-digits. Older post codes in South Korea contain six-digits. You can use Address Verification to obtain the current version of an older post code.

To obtain the current address or post code for a non-current address, first verify the address in batch mode or interactive mode. Address Verification returns an address ID value that you can use in address code lookup mode to find the current address data. When you enter a lot-based address or a six-digit post code as the input, set the `MatchingExtendedArchive` attribute of the `Process` element to ON.

Combinations of Old and New Information in South Korea Addresses

A South Korea address can combine current and non-current post codes with street-based and lot-based address information. A lot-based address might use an older or newer post code, and a street-based address might use an older or newer post code. Additionally, a lot-based address might match multiple current addresses if multiple buildings stand on the lot. You can use Address Verification to obtain different combinations of the address and the post code. If the address corresponds to multiple current addresses, you can use Address Verification to return all of the current address. The steps that you take depend on the combination of address data values in the input address and the versions of the address data that you require.

The following table shows the different types of address that you can verify:

Address Type	Address Example
Lot-based, old post code	경기도 의왕시 삼동 559 437-848
Lot-based, current post code	경기도 의왕시 삼동 559 16100

Address Type	Address Example
Street-based, old post code	경기도 의왕시 까치골1길 36 437-848
Street-based, current post code	경기도 의왕시 까치골1길 36 16100

Note: If a lot-based or a street-based input address is fully correct but lacks a post code, Address Verification adds the five-digit post code to the address in batch or interactive mode.

Final Characters in the Address ID Value

When you verify an address in batch or interactive mode, Address Verification returns an address ID with the final character A, B, C, or D. The final character identifies the types of information that the address contains.

The final character identifies the following combinations:

- A: Current post code, current street-based address
- B: Current post code, lot-based address
- C: Old post code, current street-based address
- D: Old post code, lot-based address

To obtain a different combination of address data, replace the final character in the address ID value with the character that represents the combination that you require. Then enter the modified address ID in address code lookup mode.

When you specify B or D as the final character, Address Verification returns the address of the lot on which the building is located. A lot-based address does not contain building information, and Address Verification can validate a lot-based address without building information.

When you specify A or C as the final character, Address Verification returns the current version of the address, including any applicable building information. If you update the final character in the address ID of a lot-based address to A or C, Address Verification returns multiple addresses if multiple buildings stand on the lot. You can submit each address with building information to retrieve a unique address ID for the address.

Lot Number and Sub-Number Identifiers in Hangul Addresses

In a Hangul address, Address Verification parses lot number identifiers and lot sub-number identifiers to the fields that include the lot number and lot sub-number data.

For example, the following address element includes the 번지 or *bunji* lot number identifier:

```
<AddressComplete>서울시 영등포구 여의도동 20번지</AddressComplete>
```

Address Verification parses 20번지 to the house number field.

Using the Extended Archives to Update a South Korea Address

To update the information for a South Korea address, first verify the address in batch or interactive mode. The verified output address includes an address ID value. Enter the address ID value in address code lookup mode to obtain the address information that you need.

Before you update lot-based information or a six-digit post code, set the `MatchingExtendedArchive` attribute of the `Process` element to ON.

To retrieve the street address data or the five-digit post code for an address, perform the following steps:

1. Enter a South Korea address in batch or interactive mode. You can enter a street address or a lot-based address.

Address Verification returns the validated address data and an address ID value.

2. Review the address ID value in the output from step 1.

The final character of the address ID value indicates the type of information in the output address. Replace the final character in the ID value with the character that represents the type of address data that you need.

Use one of the following characters:

- A. Returns the current post code and the current street-based address.
- B. Returns the current post code and the lot-based address.
- C. Returns the old post code and the current street-based address.
- D. Returns the old post code and the lot-based address.

3. Configure Address Verification in address code lookup mode.

4. Enter the address ID value that you modified.

Address Verification returns the address information that corresponds to the address ID value. If the reference data stores multiple addresses for the address ID, Address Verification returns all of the addresses.

Consider the following rules and guidelines when you process an address in address code lookup mode:

- Step 1 does not update a lot-based address to a street address or a six-digit post code to a five-digit post code. A lot-based address is a valid address in South Korea.
- If a lot-based or a street-based address matches a reference data address but does not include a post code, Address Verification adds a five-digit post code to the address.
- The `MaxResultCount` property determines the maximum amount of addresses that Address Verification can return in step 4. The default `MaxResultCount` value is 20. To find out if the reference data contains additional addresses, consult the `CountOverflow` value.

Example: Old Address to Current Address

The following address contains lot-based information and a non-current, six-digit post code:

247 Dangjeong-dong
Gunpo, Gyeonggi 435-713
Korea

Address Verification returns the following address ID value for the address:

9899900BE6A56708D9D663275D

To obtain the current, street-based information and the current post code for the address, change the D in the address ID value to A.

The following table shows the output address in the Hangul and Latin scripts when you change the address ID character to A:

Output Address in the Hangul Script	Output Address in the Latin Script
경기도 군포시 농심로 35 15842	35 Nongsim-ro Gunpo, Gyeonggi 15842

By default, Address Verification returns the address in the Hangul script.

The `PreferredScript` attribute determines the script for the output address. To return the address in the Latin script, set the `PreferredScript` attribute to `ASCII`. Find the `PreferredScript` attribute in the `Result` element of the `Parameters.xml` file.

The MatchingScope and MatchingAlternatives Attributes

You can configure the level of address matching that you want Informatica Address Verification to perform while it verifies an address. The `MatchingScope` attribute defines the level of granularity to which Address Verification verifies an address. The `MatchingAlternatives` attribute specifies whether to consider alternative names while verifying an address.

You can set the `MatchingScope` attribute of the `Process` element in `Parameters.xml` to specify the address elements that you want Address Verification to verify. You can set the matching scope to locality, street, or delivery-point level. The default value of `MatchingScope` is `ALL` so that Address Verification verifies all possible elements including locality, street, and delivery-point elements in the input address. You receive the best results if you set the `MatchingScope` attribute to `ALL` as Address Verification verifies all possible elements. If you do not want Address Verification to consider some of the address elements for verification, you can set `MatchingScope` to a value other than `ALL`.

If the reference address database does not contain the specified level of information for an address, Address Verification verifies only those elements that the database contains.

You can configure Address Verification to verify address elements based on synonyms or alternative names in the reference address database. Synonyms of an address element include alternative names of a place or a street, such as vanity names in United States addresses. The archival name of an address element refers to an outdated name of a place or street.

To match input address elements with synonyms or archival names in the reference address database, set the `MatchingAlternatives` attribute to `SYNONYMS_ONLY`, `ARCHIVES_ONLY`, or `ALL`. The default value of `MatchingAlternatives` is `ALL`. You can set the `MatchingAlternatives` attribute to `NONE` if you do not want Address Verification to consider synonyms or archival names when it verifies an address.

Configuring the Verification Scope

You can specify the address elements that you want Informatica Address Verification to verify in an input address. Address Verification verifies only the elements that meet the specified scope.

- In `Parameters.xml`, set the `MatchingScope` attribute of the `Process` element to one of the following values:
 - **LOCALITY_LEVEL.** To ignore information other than the Locality and Postal Code information while verifying the address.
 - **STREET_LEVEL.** To verify up to the street information including the street name along with the `LOCALITY_LEVEL` elements. If you set `MatchingScope` to `STREET_LEVEL`, Address Verification ignores information such as house number and subbuilding.
 - **DELIVERYPOINT_LEVEL.** To verify up to the delivery point information including house number and post box number and ignore further elements such as building, subbuilding, and organization.
 - **ALL.** To verify all elements, including street, locality, and delivery point information, that Address Verification can verify.

Configuring the MatchingAlternatives Attribute

To specify whether Informatica Address Verification should match input address elements with synonyms or archived names in the reference address database, configure the `MatchingAlternatives` attribute of the `Process` element in `Parameters.xml`.

- In `Parameters.xml`, set one of the following values for the `MatchingAlternatives` attribute of the `Process` element.
 - ALL
 - ARCHIVES_ONLY
 - NONE
 - SYNONYMS_ONLY

The default value is ALL.

Optimization Level

You can configure the `OptimizationLevel` attribute of the `Process` element in `Parameters.xml` to choose between processing speed and quality of verified output. You can set `OptimizationLevel` to one of the following values:

NARROW

Informatica Address Verification honors input assignment strictly, with the exception of separation of House Number from Street information.

STANDARD

Address Verification makes the following element separations.

- Province from Locality information
- Postal Code from Locality information
- House Number from Street information
- SubBuilding from Street information
- DeliveryService from Street information
- SubBuilding from Building information
- Locality from PostalCode information

WIDE

Address Verification performs element separation to the STANDARD level. Additionally, Address Verification verifies six parsing candidates to increase the scope of verification and takes additional reference data entries into account for matching.

Consider the following factors when you set the optimization level:

- If you set the optimization level to WIDE, Address Verification might return addresses with extensive corrections. Extensive corrections to an address might adversely affect the result quality.
- If you set the optimization level to NARROW, Address Verification requires the minimum processing resources. If you set the optimization level to WIDE, Address Verification requires the maximum processing resources.

- AMAS certification does not support addresses that you verify with the WIDE optimization level. If you plan to submit an address set to the Australian postal service as certified to the AMAS standard, use the STANDARD optimization level.
- The `OptimizationLevel` setting does not have any impact if the required reference data is not available for the country to which the input address belongs.

Configuring the Optimization Level

You can specify the level of optimization that you want Informatica Address Verification to apply while parsing address elements for verification. The wider the level of optimization, the more matches and results Address Verification returns.

- In `Parameters.xml`, set the `OptimizationLevel` attribute of the `Process` element to one of the following values.
 - **NARROW.** To strictly follow the input assignment of address elements. The only change is to separate house number from the street information.
 - **STANDARD.** To parse and independently verify address elements including postal code, locality, province, subbuilding, and house number information. This is the default value for the `OptimizationLevel` attribute.
 - **WIDE.** To parse and independently verify all possible elements.

CHAPTER 5

Address Enrichments

This chapter includes the following topics:

- [CAMEO Consumer Segmentation, 58](#)
- [GeoCoding Types, 63](#)
- [Country-Specific Address Enrichments, 65](#)
- [Enrichments for Australia Addresses, 66](#)
- [Enrichments for Austria Addresses, 69](#)
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CAMEO Consumer Segmentation

CAMEO profiles from the TransUnion Information Group provide consumer classification systems that indicate the socio-economic and geo-demographic profiles of neighborhoods across the world. You can retrieve CAMEO profiles as an address enrichment for many countries.

To receive CAMEO information in the validated addresses, you must install the CAMEO reference address databases and include the corresponding unlock codes in `SetConfig.xml`.

Note: Informatica Address Verification adds CAMEO information only to validated addresses. To enable CAMEO enrichment, you must install the Batch and Interactive reference address databases along with the CAMEO databases. You cannot retrieve enrichments in the fast completion mode.

The CAMEO profiles contain the latest socio-demographic and lifestyle data at microcell level based on parameters such as age, education, income, and general interests.

The following list shows some of the use cases for CAMEO profiles.

- Enhance and segment consumer databases
- Improve your understanding about customers and responders
- Find more prospects by finding look-alikes
- Perform area and location analysis
- Understand market potential
- Perform advanced statistical analysis and modeling

You can configure Address Verification to include CAMEO information in the validated output for the following countries:

- Australia
- Austria
- Belgium
- Brazil
- Canada
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Hong Kong
- Hungary
- Indonesia
- Ireland
- Italy
- Japan
- Mexico
- Netherlands
- New Zealand
- Norway
- Poland
- Portugal
- Romania
- Russian Federation
- Singapore

- Slovakia
- South Africa
- Spain
- Sweden
- Switzerland
- United Kingdom
- United States

Enabling CAMEO Demographic Profiles

You can configure Informatica Address Verification to include CAMEO demographic profile information as an enrichment to addresses. Before you enable CAMEO enrichment, you must install CAMEO databases and include their unlock codes in the `SetConfig.xml` file.

- In `Parameters.xml`, set the `EnrichmentCAMEO` attribute of the `Process` element to ON.

The default value of this attribute is OFF.

CAMEO Reference Address Databases

Install one or more of the following reference address databases to retrieve CAMEO data as an address enrichment:

Australia

`AUS5CA.MD`

Austria

`AUT5CA.MD`

Belgium

`BEL5CA.MD`

Brazil

`BRA5CA.MD`

Canada

`CAN5CA.MD`

Czech Republic

`CZE5CA.MD`

Denmark

`DNK5CA.MD`

Estonia

`EST5CA.MD`

Finland

`FIN5CA.MD`

France

`FRA5CA.MD`

Germany

DEU5CA.MD

Hong Kong

HKG5CA.MD

Hungary

HUN5CA.MD

Indonesia

IDN5CA.MD

Ireland

IRL5CA.MD

Italy

ITA5CA.MD

Japan

JPN5CA.MD

Mexico

MEX5CA.MD

Netherlands

NLD5CA.MD

New Zealand

NZL5CA.MD

Norway

NOR5CA.MD

Poland

POL5CA.MD

Portugal

PRT5CA.MD

Romania

ROU5CA.MD

Russian Federation

RUS5CA.MD

Singapore

SGP5CA.MD

Slovakia

SVK5CA.MD

South Africa

ZAF5CA.MD

Spain

ESP5CA.MD

Sweden

SWE5CA.MD

Switzerland

CHE5CA.MD

United Kingdom

GBR5CA.MD

United States

USA5CA.MD

CAMEO Output Fields

When you validate an address with CAMEO enrichment enabled, you receive the following information in the validated output.

CATEGORY

A code for the age and affluence of the address residents at the country level.

CATEGORY_DESCRIPTION

A description for the age and affluence of the address residents at the country level.

GROUP

A code for the neighborhood of the address at the country level.

GROUP_DESCRIPTION

A description for the neighborhood of the address at the country level.

INTERNATIONAL

A code for the age and affluence of the address residents at an international level.

INTERNATIONAL_DESCRIPTION

A description for the age and affluence of the address residents at an international level.

MVID

A match key that you can use to link your CAMEO-encoded addresses to CAMEO Analysis, a TransUnion Information Group product. CAMEO Analysis is a separate product that you can license directly from TransUnion Information Group.

CAMEO Status

If you enable CAMEO enrichment, Informatica Address Verification returns the following status codes in the validated output to help you interpret or analyze the CAMEO information.

ECON

The validated address does not contain any CAMEO code because the CAMEO database is not available for the selected country

ECOI

The validated address does not contain any CAMEO code because no CAMEO lookup was done for the address because Address Verification could not correct the address and returned an Ix process status.

EC00

The validated address does not contain any CAMEO code because Address Verification could not find a CAMEO code for the input address.

EC01

The validated address contains CAMEO code.

GeoCoding Types

You can configure Informatica Address Verification to add geocoordinates as an enrichment to a verified address. Geocoordinates indicate the longitude and latitude of an address. Address Verification follows the World Geodetic System standards (WGS 84) for geocoding.

You can enable geocoding at the global level and specify the type of geocoding that you want to receive in the output. To enable geocoding, install one or more geocoding databases.

You can configure Address Verification to return the following types of geocoordinates in the verified output:

Arrival Point GeoCoding

Arrival point geocoordinates map to a point in the center of the street segment in front of a house or a building. Arrival point is the default geocoding type.

To retrieve arrival point geocoding, install the Arrival Point database (GCAP) for the country in question. If the arrival point geocoordinates do not exist, Address Verification returns the standard geocoordinates. To fall back to the standard geocoordinates, you must install the standard geocoding (GC) database. Otherwise, Address Verification returns the EGC0 (no geocode available) status code for the address.

Standard GeoCoding

Standard geocoordinates are interpolated geocoordinates. Standard geocoding interpolates a point close to an address based on the geocoordinates of nearby addresses. For example, if the geocoordinates for the first and last houses on a street are available, Address Verification uses the known geocoordinates to interpolate the geocoordinates for a house that is situated in between. To retrieve standard geocoordinates, install the GC database for the country in question. The geocoding status codes EGC4 through EGC8 indicate the level of accuracy for the interpolated geocoordinates.

If you enable geocoding and you do not specify a geocoding type, Address Verification returns one of the following geocoding types:

- Arrival point geocoordinates for countries that support arrival point geocoding.
- Standard geocoordinates for countries that do not support arrival point geocoding.

RELATED TOPICS:

- [“Geocoding Country Support” on page 159](#)

Configuring GeoCoding

You can configure Informatica Address Verification to return geocoding information in the result output. For certain countries, you can also specify the type of geocoding to include in the output. Before you enable

geocoding, you must install the geocoding reference address databases and specify the corresponding unlock codes in the `SetConfig.xml` file.

1. In `Parameters.xml`, set the `EnrichmentGeocoding` attribute of the `Process` element to ON.
The default value for `EnrichmentGeocoding` is OFF.
2. To specify the type of geocoding, set the `EnrichmentGeocodingType` attribute of the `Process` element to one of the following values:
 - `ARRIVAL_POINT`. To enable arrival point geocoding. This is the default value for the `EnrichmentGeocodingType` attribute.
 - `NONE`. To enable the standard geocoding.

Geocoding Status

Informatica Address Verification returns the following geocoding status values to help you understand the status of a geocoding request.

EGCN

Address Verification cannot find the geocoding database.

EGCU

The geocoding database is not unlocked.

EGCC

The geocoding database is corrupted.

EGC0

Address Verification cannot append geocoordinates to the input address because no geocoordinates are available for the address.

EGC4

Geocoordinates are only partially accurate to the postal code level. For example, 795xx.

EGC5

Geocoordinates are accurate to the postal code level.

EGC6

Geocoordinates are accurate to the locality level.

EGC7

Geocoordinates are accurate to the street level.

EGC8

Geocoordinates are accurate to the house number level. (Estimated location of the parcel of land with street-side offset.)

EGC9

High-precision arrival point geocoordinates. (Measured entryway to the parcel of land.)

EGCA

High-precision parcel centroid geocoordinates. (Measured center of the parcel of land.)

EGCB

High-precision rooftop geocoordinates.

Note: Informatica has ceased support for Parcel Centroid and Rooftop geocoding databases.

Country-Specific Address Enrichments

Informatica Address Verification can provide additional information as enrichments to addresses from several countries. If you request country-specific information as an enrichment to an address set, Informatica Address Verification returns the information in the output address.

Address Verification returns status codes that describe the status of the enrichment data in the output address.

The status codes contain four characters in the following format:

- E. Indicates enrichment.
- The two-letter country code for the country.
- A single character that indicates whether Address Verification returns the supplementary data that you requested.

For example, the value EAT1 indicates that Address Verification returns enrichment data for Austria.

Note: The status code does not indicate that the result contains all available enrichments for the country.

The following table lists the countries that support supplementary information, the databases to install, the enrichment and return values for each country, and the status code prefixes:

Country	Database	Enrichment	Possible Return Values	Status
Australia	AUS5E1.MD	SUPPLEMENTARY_AU	CCD06 GCC_CODE GCC_NAME GNAF_ID MESH_BLOCK11 MESH_BLOCK16 SA1_7_DIGT_NO SA1_MAIN_NO SA2_5_DIGT_NO SA2_MAIN_NO SA2_NAME SA3_CODE SA3_NAME SA4_CODE SA4_NAME STE_CODE STE_NAME	EAUx
Austria	AUT5E1.MD	SUPPLEMENTARY_AT	POSTAL_ADDRESS_CODE PAC_ID	EATx
Belgium	BEL5E1.MD	SUPPLEMENTARY_BE	NIS_CODE	EBEx
Brazil	BRA5E1.MD	SUPPLEMENTARY_BR	IBGE_CODE	EBRx
Czech Republic	CZE5E1.MD	SUPPLEMENTARY_CZ	RUIANAM_ID RUIANSO_ID RUIANTEA_ID	ECZx
France	FRA5E1.MD	SUPPLEMENTARY_FR	INSEE_CODE INSEE_9_CODE	EFRx
Germany	DEU5E1.MD	SUPPLEMENTARY_DE	LOCALITY_ID STREET_ID AGS STREET_CODE	EDEx
Italy	ITA5E1.MD	SUPPLEMENTARY_IT	ISTAT_CODE	EITx
Japan	JPN5E1.MD	SUPPLEMENTARY_JP	CHOUMEI_AZA_CODE NEW_CHOUMEI_AZA_CODE CURRENT_CHOUMEI_AZA_CODE GAIKU_CODE	EJPx
Poland	POL5E1.MD	SUPPLEMENTARY_PL	GMINA_CODE LOCALITY_TERYT_ID STREET_TERYT_ID	EPLx
Russia	RUS5E1.MD	SUPPLEMENTARY_RU	FIAS_ID	ERUx
Serbia	SRB5E1.MD	SUPPLEMENTARY_RS	POSTAL_ADDRESS_CODE	ERSx

Country	Database	Enrichment	Possible Return Values	Status
South Africa	ZAF5E1.MD	SUPPLEMENTARY_ZA	NAD_ID	EZAx
South Korea	KOR5E1.MD	SUPPLEMENTARY_KR	ADDRESS_ID	EKRx
Spain	ESP5E1.MD	SUPPLEMENTARY_ES	INE_PROVINCE_CODE INE_MUNICIPALITY_CODE INE_STREET_CODE	EESx
Switzerland	CHE5E1.MD	SUPPLEMENTARY_CH	POSTAL_CODE_EXTENSION	ECHx
United Kingdom	GBR5E1.MD	SUPPLEMENTARY_GB	DELIVERY_POINT_SUFFIXES UDPRN UPRN ADDRESS_KEY DELIVERY_POINT_TYPE ORGANIZATION_KEY	EGBx
United States	USA5E1.MD	SUPPLEMENTARY_US	COUNTY_FIPS_CODE STATE_FIPS_CODE MSA_ID CBSA_ID FINANCE_NUMBER RECORD_TYPE CMSA_ID TIME_ZONE_CODE TIME_ZONE_NAME CENSUS_TRACT_NO CENSUS_BLOCK_GROUP CENSUS_BLOCK_NO PMSA_ID MCD_ID PLACE_FIPS_CODE	EUSx

Enrichments for Australia Addresses

You can configure Informatica Address Verification to include address enrichments in the validated Australia addresses. Address Verification bases the enrichments on geographical areas that the Australian Bureau of Statistics defines.

Address Verification provides enrichment data for the following statistical elements:

CCD06

A seven-digit code that represents a census collection district that the Australia Bureau of Statistics defined for the 2006 census. A census collection district is an area that a census data collector might cover in a ten-day period. In urban areas, the district might comprise 220 homes. In rural areas, the district might comprise fewer homes and the geographical area might increase.

GCC_CODE

A five-character alphanumeric code that identifies the greater capital city (GCCSA) statistical area to which an address belongs. A greater capital city statistical area comprises multiple level-4 statistical areas.

There are 16 spatial GCCSA regions, including eight regions that represent the Australian state and territory capital cities and eight regions that cover the rest of each state and the Northern Territory. In addition, there are 18 non-spatial greater capital city statistical areas.

The five character code includes a single-digit state and territory identifier and a four-character GCCSA identifier.

GCC_NAME

The name of the greater capital city statistical area to which an address belongs.

Greater capital city statistical areas are named for the cities they represent or, if they do not identify a city, for the rest of the state or territory that they represent.

GNAF_ID

A 14-digit code that identifies an address in the Geocoded National Address File (GNAF). Australian government departments and organizations recognize the code as a persistent, unique identifier for the address.

MESH_BLOCK11

An 11-digit code that identifies the mesh block to which an address belongs. MESH_BLOCK11 represents the areas that the Australian Bureau of Statistics defined for the 2011 census. A mesh block represents the smallest geographical area that the Australian Bureau of Statistics uses to generate statistical information.

Mesh blocks are building blocks for statistical information rather than areas for which the Australian Bureau of Statistics releases information. The Australian Bureau of Statistics builds statistical areas and regions from mesh blocks. Mesh blocks broadly align with land use, such as residential use, commercial use, or parkland. A mesh block might contain thirty to sixty dwellings, although some mesh blocks are designed to contain no dwellings.

MESH_BLOCK16

An 11-digit code that identifies the mesh block to which an address belongs. MESH_BLOCK16 represents the areas that the Australian Bureau of Statistics defined for the 2016 census.

Note: The Australian Bureau of Statistics might maintain statistical information for some mesh blocks that it defined for the 2016 census.

See also *MESH_BLOCK11*.

SA1_7_DIGT_NO

A seven-digit code that identifies the level-1 statistical area that an address belongs to but that does not provide the full hierarchy of geographical information that SA1_MAIN_NO provides. The seven-digit code comprises the state and territory identifier, SA2 identifier, and SA1 identifier.

A level-1 statistical area is typically the smallest area for which the Australian Bureau of Statistics releases statistical data.

SA1_MAIN_NO

An 11-digit code that identifies the level-1 statistical area to which an address belongs. A level-1 statistical area is typically the smallest area for which the Australian Bureau of Statistics releases statistical data.

The 11 digits of the SA1_MAIN_NO code include the values of the larger areas in the statistical area hierarchy. That is, the SA1_MAIN_NO includes a state and territory identifier, SA4 identifier, SA3 identifier, and SA2 identifier in addition to the SA1 identifier. The final two digits in the code identify the level-1 statistical area. In this way, the SA1_MAIN_NO uniquely identifies the area to which the address belongs.

SA2_5_DIGT_NO

A five-digit code that identifies the level-2 statistical area that an address belongs to but that does not provide the full hierarchy of geographical information that SA2_MAIN_NO provides. The five-digit code comprises the state and territory identifier and the four-digit SA2 identifier.

A level-2 statistical area is a physical area that broadly defines a single social or economic community. A level-2 statistical area comprises multiple level-1 statistical areas.

SA2_MAIN_NO

A nine-digit code that identifies the level-2 statistical area to which an address belongs. A level-2 statistical area is a physical area that broadly defines a single social or economic community. A level-2 statistical area comprises multiple level-1 statistical areas.

The nine digits of the SA2_MAIN_NO code include the values of the larger areas in the statistical area hierarchy. That is, the SA2_MAIN_NO includes a state and territory identifier, SA4 identifier, and SA3 identifier in addition to the SA2 identifier. The final four digits in the code identify the level-2 statistical area.

SA2_NAME

The name of the level-2 statistical area to which the address belongs. Each level-2 name is unique, and each name contains no more than forty characters. In an urban area, the name is based on the suburb or suburbs that the area covers. In rural areas, the name is based on the locality that the area covers.

SA3_CODE

A five-digit code that identifies the level-3 statistical area to which an address belongs. A level-3 statistical area comprises multiple level-2 statistical areas.

The five digits of the level-3 statistical areas include the values of larger geographical regions. That is, the SA3_CODE includes a state and territory identifier and SA4 code in addition to the SA3 identifier. The final two digits in the code identify the level-3 statistical area.

A level-3 statistical area generally covers a population of between 30,000 and 130,000 people.

SA3_NAME

The name of the level-3 statistical area to which the address belongs. Each level-3 name is unique, and each name contains no more than forty characters. SA3 names reflect the names of the cities, towns, or rural areas that they cover.

SA4_CODE

A three-digit code that identifies the level-4 statistical area to which an address belongs. A level-4 statistical area comprises multiple level-3 statistical areas.

The three digits of the level-4 statistical areas include the values of the largest sub-state regions in the main structure of the Australian Statistical Geography Standard (ASGS). That is, the SA4_CODE includes a state and territory identifier and SA4 identifier. The final two digits in the code identify the level-4 statistical area.

A level-4 statistical area contain at least 100,000 people. In regional areas, a level-4 statistical area might include between 100,000 and 300,000 people. In urban areas, a level-4 statistical area might include between 300,000 and 500,000 people.

SA4_NAME

The name of the level-4 statistical area to which the address belongs. Each level-4 name is unique, and each name contains no more than forty characters. SA4 names reflect the names of the cities, towns, or rural areas that they cover.

STE_CODE

An unique one-digit code that represents a state or territory.

STE_NAME

Represents the name of a state or territory.

Enabling Enrichments for Australia Addresses

You can configure Address Verification to enable enrichments to valid Australia addresses. Before you enable address enrichments for Australia, install the relevant reference address databases and include the corresponding unlock codes in the `SetConfig.xml` file.

- In `Parameters.xml`, set the `EnrichmentSupplementaryAU` attribute of the `Process` element to `ON`.
The default value of the attribute is `OFF`.

Status Codes for Australia Address Enrichments

When you validate Australia addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EAU0

Country-specific enrichment is not available for the input address.

EAU1

The output address contains country-specific enrichment data.

EAUC

The country-specific database is corrupted.

EAUN

Address Verification cannot find the country-specific database.

EAUU

The country-specific database is locked.

Enrichments for Austria Addresses

You can configure Informatica Address Verification to include unique identification codes in the output for valid Austria addresses. To enable address enrichments for Austria, install the latest supplementary address database for Austria and include the corresponding unlock code in the `SetConfig.xml` file.

Address Verification can return the following code values:

POSTAL_ADDRESS_CODE

The Postal Address Code, or PAC, is a unique identifier for a current Austria address.

PAC_ID

The `PAC_ID` is the PAC of the address at which a building receives mail if the building has more than one address.

Address Verification reads the address from the `AUT5AC.MD` database.

POSTAL_ADDRESS_CODE Enrichment

The Postal Address Code is a unique identifier for the current version of an address in Austria. For example, the following address returns a Postal Address Code value of 105176447:

```
Plättenstraße 7  
2380 Perchtoldsdorf
```

Niederösterreich
AUT

PAC_ID Enrichment

An Austria address has a PAC_ID value when the address identifies a mailbox that receives mail at another address. For example, a building at an intersection of two streets might have an address on both streets and might specify one of the addresses as the mailbox address.

Note: The address that gives access to the mailbox is called the Ident address.

A street address that does not receive mail has a Postal Address Code value and a PAC_ID value. The PAC_ID value is the Postal Address Code of the Ident address that receives the mail. The postal carrier delivers mail to the address that the PAC_ID identifies.

The following table lists street addresses that identify a single mail destination:

Address	POSTAL_ADDRESS_CODE	PAC_ID
Hauptplatz 4 8010 Graz AUT	100001915	100004254
Neue-Welt-Gasse 2 8010 Graz AUT	100004254	Not applicable

The address "Hauptplatz 4" does not receive mail because the mailbox is at another address at the same location. The building receives mail at "Neue-Welt-Gasse 2" and therefore "Neue-Welt-Gasse 2" is the Ident address. The PAC_ID is the PAC of the address that receives the mail. The Postal Address Code value for the Ident address is 100004254.

Enabling Enrichments for Austria Addresses

You can configure Informatica Address Verification to include address enrichments such as Postal Address Code in validated Austria addresses. Before you enable address enrichments for Austria, install the relevant databases and include the corresponding unlock codes in the `SetConfig.xml` file.

- In `Parameters.xml`, set the `EnrichmentSupplementaryAT` attribute of the `Process` element to `ON`.

The default value of this attribute is `OFF`.

Status Codes for Austria Address Enrichments

When you validate Austria addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EAT0

Country-specific enrichment is not available for the input address.

EAT1

The output address contains country-specific enrichment data.

EATC

The country-specific database is corrupted.

EATN

Address Verification cannot find the country-specific database.

EATU

The country-specific database is locked.

Enrichment for Belgium Addresses

You can configure Informatica Address Verification to add the National Institute of Statistics (StatBel) or NIS codes as an enrichment to validated Belgium addresses.

Before you enable the enrichment for Belgium addresses, you must license and install the relevant databases and include the corresponding unlock codes in `SetConfig.xml`.

NIS codes are five-digit codes that uniquely identify geographic areas in Belgium. If you enable enrichment for Belgium, Address Verification returns a nine-digit code that contains the five-digit NIS code and a four-digit Neighborhood ID.

For example, Address Verification returns `21004A001` as an enrichment to the following address:

```
Rue au Beurre 1  
1000 Bruxelles  
BEL
```

In this example, `21004` is the NIS code and `A001` is the Neighborhood ID.

Enabling Enrichments for Belgium Addresses

You can configure Informatica Address Verification to include NIS codes in the validated address for Belgium. To enable address enrichments for Belgium, you must license and install the relevant reference address databases and include the corresponding unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `EnrichmentSupplementaryBE` attribute of the `Process` element to ON.

The default value of this attribute is OFF.

Status Codes for Belgium Address Enrichments

When you validate Belgium addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output.

EBE0

Country-specific enrichment is not available for the input address.

EBE1

The output address contains country-specific enrichment data.

EBEC

The country-specific database is corrupted.

EBEN

Address Verification cannot find the country-specific database.

EBEU

The country-specific database is locked.

Enrichments for Brazil Addresses

You can configure Informatica Address Verification to include the Brazilian Institute of Geography and Statistics (IBGE) code as enrichment to validated Brazil addresses. To enable the address enrichment, you must license and install the supplementary address database for Brazil, and you must include the corresponding unlock code in the `SetConfig.xml` file.

The IBGE code is a seven-digit numeric code that identifies cities and states in Brazil. The IBGE code is useful for e-commerce operations as you can use this code for taxation and audit purposes.

Example: IBGE Code in Address Output

When you validate the following address with the address enrichment enabled, Address Verification returns an IBGE code of `IBGE_CODE: 2606101` as an enrichment to the validated output.

```
Rua da Matriz 9  
Centro  
Glória do Goitá-pe  
55620-000  
Brazil
```

Enabling Enrichments for Brazil Addresses

You can configure Informatica Address Verification to include the IBGE code in validated output for Brazil addresses. Before you enable address enrichments for Brazil, license and install the relevant reference address databases and include the corresponding unlock codes in the `SetConfig.xml` file.

- In `Parameters.xml`, set the `EnrichmentSupplementaryBR` attribute of the `Process` element to `ON`.
By default, this attribute is set to `OFF`.

Status Codes for Brazil Address Enrichments

When you validate Brazil addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EBR0

Country-specific enrichment is not available for the input address.

EBR1

The output address contains country-specific enrichment data.

EBRC

The country-specific database is corrupted.

EBRN

Address Verification cannot find the country-specific database.

EBRU

The country-specific database is locked.

Enrichment for Czech Republic Addresses

You can configure Informatica Address Verification to add RUIAN ID codes as an enrichment to a valid Czech Republic address. The Czech Office for Surveying, Mapping and Cadastre (ČÚZK) maintains the RUIAN code data.

The RUIAN ID enrichment comprises the following codes:

- RUIANAM_ID. Uniquely identifies the address delivery point.
- RUIANSO_ID. Identifies the address to building level.
- RUIANTEA_ID. Identifies the building entrance.

The supplementary database for the Czech Republic includes RUIANAM_ID and RUIANSO_ID values for ninety-nine percent of Czech Republic addresses. The database includes RUIANTEA_ID values for a small percentage of addresses.

Before you enable the enrichment for Czech Republic addresses, license and install the supplementary database and include the corresponding unlock code in SetConfig.xml.

Example: RUIAN ID Codes in Address Output

The supplementary database stores all types of RUIAN ID data for the following address:

```
Musorgského 320/2  
Kohoutovice  
623 00 Brno 23  
CZE
```

Address Verification returns the following RUIAN ID codes for the address from the database:

```
<SupplementaryCZ Type="RUIANAM_ID">19382481</SupplementaryCZ>  
<SupplementaryCZ Type="RUIANSO_ID">19204035</SupplementaryCZ>  
<SupplementaryCZ Type="RUIANTEA_ID">76838</SupplementaryCZ>
```

Enabling Enrichments for Czech Republic Addresses

To enable address enrichments for the Czech Republic, install the relevant reference address databases and include the corresponding unlock code in the SetConfig.xml file.

- In `Parameters.xml`, set the `EnrichmentSupplementaryCZ` attribute of the `Process` element to `ON`.

The default value for this attribute is `OFF`.

Status Codes for Czech Republic Address Enrichments

When you validate Czech Republic addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

ECZ0

Country-specific enrichment is not available for the input address.

ECZ1

The output address contains country-specific enrichment data.

ECZC

The country-specific database is corrupted.

ECZN

Address Verification cannot find the country-specific database.

ECZU

The country-specific database is locked.

Enrichments for France Addresses

You can configure Informatica Address Verification to include the INSEE code and the INSEE-9 code in the validated output for France addresses. To enable address enrichments for France, you must install the latest supplementary database for France and include the corresponding unlock code in the `SetConfig.xml`.

The INSEE code is a numeric indexing code that the French National Institute for Statistics and Economic Studies (INSEE) use to identify entities such as French communes and departments. INSEE codes are particularly helpful in uniquely identifying French communes that share the same name, spelling, and pronunciation. Of a five-digit INSEE code for a commune, the first two digits represent the department and the last three denote the commune. INSEE codes are also used as National Identification Numbers for French citizens.

The INSEE-9 code is also known as the IRIS code. IRIS stands for aggregated units for statistical information in French, and represents a demographic group that contains a maximum of 2000 people. France is composed of around 16,100 IRIS units including 650 units in overseas departments.

For example, you receive INSEE code 47001 and INSEE 9 code 470010115 when you validate the following France address:

```
<InputData>
  <AddressElements>
    <Country Item="1" Type="NAME">FRA</Country>
    <Locality Item="1" Type="COMPLETE">AGEN</Locality>
    <PostalCode Item="1" Type="UNFORMATTED">47000</PostalCode>
    <Street Item="1" Type="COMPLETE">RUE DU PUIITS DU SAUMON</Street>
    <Number Item="1" Type="COMPLETE">6</Number>
  </AddressElements>
</InputData>
```

Enabling Enrichments for France Addresses

You can configure Informatica Address Verification to include enrichments such as INSEE code and INSEE 9 code in the validated output for France addresses. Before you enable address enrichments for France, install the relevant reference address databases and include the corresponding unlock codes in the `SetConfig.xml` file.

- In `Parameters.xml`, set the `EnrichmentSupplementaryFR` attribute of the `Process` element to `ON`.

The default value for this attribute is `OFF`.

Status Codes for France Address Enrichments

When you validate France addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EFRO

Country-specific enrichment is not available for the input address.

EFR1

The output address contains country-specific enrichment data.

EFRC

The country-specific database is corrupted.

EFRN

Address Verification cannot find the country-specific database.

EFRU

The country-specific database is locked.

Enrichments for Germany Addresses

You can configure Informatica Address Verification to include multiple address enrichments in validated Germany addresses. To enable address enrichments for Germany, you must license and install the latest supplementary address database for Germany and included the corresponding unlock codes in

`SetConfig.xml`.

You can configure Address Verification to include the following enrichments in validated Germany addresses.

AGS

The Amtliche Gemeindeschlüssel (AGS) is a variable-length code that uniquely identifies a locality in Germany.

LOCALITY_ID

The Locality ID is a variable length code that uniquely identifies a locality in Germany.

STREET_ID

The Street ID is a variable length code that uniquely identifies a street address in Germany.

STREET_CODE

The Street Code is a three-digit code that identifies a street in Germany. Positions 6,7, and 8 of the Frachtleitcode or Freight code form the street code. A street code value of 994 indicates that the address points to a packstation.

For example, when you validate

```
Röntgenstr. 9  
67133 Maxdorf  
Germany
```

Address Verification returns the following additional information in the validated output:

```
DEU_AGS: 07338018  
DEU_LOCALITY_ID: 68015519  
DEU_STREET_ID: 100560690  
DEU_STREET_CODE: 057
```

Enabling Enrichments for Germany Addresses

You can configure Address Verification to include address enrichments such as DEU_AGS, DEU_LOCALITY_ID, DEU_STREET_CODE, and DEU_STREET_ID in validated output of Germany addresses.

Before you enable address enrichment for Germany addresses, install the relevant reference address databases and include the corresponding unlock codes in the `SetConfig.xml` file.

- To enable address enrichments for Germany addresses, set the `EnrichmentSupplementaryDE` attribute of the `Process` element in `Parameters.xml` to ON.

The default value of this attribute is OFF.

Status Codes for Germany Address Enrichments

When you validate Germany addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EDE0

Country-specific enrichment is not available for the input address.

EDE1

The output address contains country-specific enrichment data.

EDEC

The country-specific database is corrupted.

EDEN

Address Verification cannot find the country-specific database.

EDEU

The country-specific database is locked.

Enrichments for Italy Addresses

You can configure Informatica Address Verification to add ISTAT code data as an enrichment to a valid Italy address. The ISTAT code contains a series of values that provide geographic and demographic information about the address locale, including the province, municipality, and region to which the address belongs. The Italian National Institute of Statistics (ISTAT) maintains the ISTAT codes.

Configuring Enrichments for Italy Addresses

You can configure Informatica Address Verification to include the ISTAT code in the validated output for Italy addresses. To enable address enrichments for Italy, you must license and install the relevant reference address databases and include the corresponding unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `EnrichmentSupplementaryIT` attribute of the `Process` element to ON.

The default value of the attribute is OFF.

Status Codes for Italy Address Enrichments

When you validate Italy addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EIT0

Country-specific enrichment is not available for the input address.

EIT1

The output address contains country-specific enrichment data.

EITC

The country-specific database is corrupted.

EITN

Address Verification cannot find the country-specific database.

EITU

The country-specific database is locked.

Enrichments for Japan Addresses

You can configure Informatica Address Verification to add enrichments to valid Japan addresses. To enable address enrichments for Japan, you must license and install the relevant address databases for Japan and include the corresponding unlock code in `SetConfig.xml`.

Address Verification offers the following enrichments for Japan:

- **CHOUMEI_AZA_CODE**
- **NEW_CHOUMEI_AZA_CODE**
- **CURRENT_CHOUMEI_AZA_CODE**
- **GAIKU_CODE**

Choumei Aza Codes

A Choumei Aza code is an 11-digit string that represents an address to delivery-point level in Japan. When Japan Post updates the address information for a delivery point, Japan Post also issues a new Choumei Aza code for the delivery point. Therefore, a delivery point might have a current address and one or more legacy addresses and a corresponding set of current and legacy Choumei Aza codes.

You can submit a Japan address in batch or interactive mode and return one or more Choumei Aza codes that represent different versions of the address. You can submit a Choumei Aza code in address code lookup mode to obtain the version of the address that the code identifies.

Address Verification returns the following types of Choumei Aza code:

CHOUMEI_AZA_CODE

The code that corresponds directly to the validated version of the address that you submit.

NEW_CHOUMEI_AZA_CODE

The code that corresponds to the next iteration of the input address that you submit. For example, if you enter the first or oldest version of the address, the **NEW_CHOUMEI_AZA_CODE** value that Address Verification returns represents the second version of the address.

CURRENT_CHOUMEI_AZA_CODE

The code that corresponds to the current version of the address that you submit.

Example

The Japan reference data contains the current version of an address and two older versions. You have the first or oldest version of the address. You select the Japan enrichments, and you submit the address in batch mode. Address Verification verifies the address and returns the Choumei Aza code enrichments.

You submit the `CURRENT_CHOUMEI_AZA_CODE` value in address code lookup mode. Address Verification returns the current version of the address.

Note: The `NEW_CHOUMEI_AZA_CODE` returns the Choumei Aza code for the update that directly followed the address that you submitted. You can rerun the steps with the `NEW_CHOUMEI_AZA_CODE` value to find each version of the address in the reference data.

To read or write the Choumei Aza codes for earlier versions of an address, enable the `MatchingExtendedArchive` attribute of the `Process` element in `Parameters.xml` in addition to the address enrichment settings. For more information about Choumei Aza codes and legacy Japan addresses, see [“Using the Extended Archives to Update an Older Japan Address” on page 52](#).

Gaiku Codes

A Gaiku code is a four-digit code that identifies a city block in Japan.

Append the Gaiku code to a current Choumei Aza code to create a 15-digit string that you can submit in address code lookup mode to find an address.

Enabling Enrichments for Japan Addresses

You can configure Informatica Address Verification to include address enrichments such as the Choumei Aza code and the Gaiku code in Japan addresses. Before you enable address enrichments for Japan, install the relevant reference address databases and include the corresponding unlock codes in the `SetConfig.xml` file.

- In `Parameters.xml`, set the `EnrichmentSupplementaryJP` attribute of the `Process` element to `ON`.
The default value of this attribute is `OFF`.

Status Codes for Japan Address Enrichments

When you validate Japan addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EJP0

Country-specific enrichment is not available for the input address.

EJP1

The output address contains country-specific enrichment data.

EJPC

The country-specific database is corrupted.

EJPN

Address Verification cannot find the country-specific database.

EJPU

The country-specific database is locked.

Enrichments for Poland Addresses

You can configure Informatica Address Verification to include the Gmina code, Locality TerytIDs, and Street TerytID as enrichments for validated Poland addresses. To enable enrichments for Poland addresses, you

must install the supplementary database for Poland and include the corresponding unlock code in the `SetConfig.xml` file.

Official Register of the Territorial Division of the Country (TERYT) is the agency responsible for identifiers and names of territories, localities, roads, and buildings in Poland. Gmina is the Polish equivalent of communes or municipalities. TERYT assigns and manages Gmina code and TerytIDs.

For example, when you validate

```
<InputData>
  <AddressElements>
    <Country Item="1" Type="NAME">POL</Country>
    <Locality Item="1" Type="COMPLETE">Wrocław</Locality>
    <PostalCode Item="1" Type="UNFORMATTED">50510</PostalCode>
    <Province Item="1" Type="COUNTRY_STANDARD">dolnośląskie</Province>
    <Street Item="1" Type="COMPLETE">ul. Laskowa</Street>
    <Number Item="1" Type="COMPLETE">1</Number>
  </AddressElements>
</InputData>
```

Address Verification returns the following enrichment values:

```
GMINA_CODE: 2183
LOCALITY_TERYT_ID: 0986544
STREET_TERYT_ID: 10666
```

Enabling Enrichments for Poland Addresses

You can configure Informatica Address Verification to include address enrichments such as `GMINA_CODE`, `LOCALITY_TERYT_ID`, and `STREET_TERYT_ID` in validated address output for Poland addresses. Before you enable address enrichments for Poland addresses, install the relevant databases and include the corresponding unlock codes in the `SetConfig.xml` file.

- In `Parameters.xml`, set the `EnrichmentSupplementaryPL` attribute of the `Process` element to `ON`.

By default, this attribute is set to `OFF`.

Status Codes for Poland Address Enrichments

When you validate Poland addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EPL0

Country-specific enrichment is not available for the input address.

EPL1

The output address contains country-specific enrichment data.

EPLC

The country-specific database is corrupted.

EPLN

Address Verification cannot find the country-specific database.

EPLU

The country-specific database is locked.

Enrichments for Russia Addresses

You can configure Informatica Address Verification to include the Federal Information Addressing System (FIAS) ID in the validated output for Russia addresses.

The FIAS ID is an alphanumeric string.

Enabling Enrichments for Russia Addresses

You can enable Informatica Address Verification to include the FIAS ID in the validated output for Russia addresses. To enable address enrichments for Russia, you must license and install the relevant reference address databases and include the corresponding unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `EnrichmentSupplementaryRU` attribute of the `Process` parameter to ON. The default value of this attribute is OFF.

Status Codes for Russia Address Enrichments

When you validate Russia addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

ERU0

Country-specific enrichment is not available for the input address.

ERU1

The output address contains country-specific enrichment data.

ERUC

The country-specific database is corrupted.

ERUN

Address Verification cannot find the country-specific database.

ERUU

The country-specific database is locked.

Enrichments for Serbia Addresses

You can configure Informatica Address Verification to include the Postal Address Code (PAK) as an enrichment to the validated output for Serbia addresses.

The PAK is a six-digit code that maps to the street level. Including the PAK in an address ensures correct and prompt delivery to recipients in Serbia. You do not need the PAK for items that you address to a P.O. Box, *poste restante*, or to a military address.

Enabling Enrichments for Serbia Addresses

You can configure Informatica Address Verification to include Postal Address Code (PAK) in validated output for Serbia addresses. Before you enable address enrichments for Serbia addresses, license and install the relevant databases and include the corresponding unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `EnrichmentSupplementaryRS` attribute of the `Process` element to `ON`.
The default value of this attribute is `OFF`.

Status Codes for Serbia Address Enrichments

When you validate Serbia addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

ERS0

Country-specific enrichment is not available for the input address.

ERS1

The output address contains country-specific enrichment data.

ERSC

The country-specific database is corrupted.

ERSN

Address Verification cannot find the country-specific database.

ERSU

The country-specific database is locked.

Enrichments for South Africa Addresses

You can configure Informatica Address Verification to include the National Address Database (NAD) ID in the validated output for South Africa addresses. The NAD ID is a unique numeric ID that is assigned to street addresses in South Africa. Before you enable enrichment, you must license and install the relevant reference address database and include the corresponding unlock codes in `SetConfig.xml`.

For example, Address Verification returns the NAD ID value of 2170232 in the output when you validate the following address:

```
4 Balmoral Road  
Vincent  
East London  
5247  
South Africa
```

Enabling Enrichments for South Africa Addresses

You can configure Informatica Address Verification to include address enrichments such as the NAD ID in validated output of South Africa addresses. Before you enable address enrichments for South Africa

addresses, license and install the relevant databases and include the corresponding unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `EnrichmentSupplementaryZA` attribute of the `Process` element to `ON`.
The default value of this attribute is `OFF`.

Status Codes for South Africa Address Enrichments

When you validate South Africa addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EZA0

Country-specific enrichment is not available for the input address.

EZA1

The output address contains country-specific enrichment data.

EZAC

The country-specific database is corrupted.

EZAN

Address Verification cannot find the country-specific database.

EZAU

The country-specific database is locked.

Enrichments for South Korea Addresses

You can configure Address Verification to return different types of information for a South Korea address. When you verify a South Korea address, Address Verification returns an address ID value that you can use in address code lookup mode to obtain the address information that you need.

The address ID value is composed of eight digits followed by a single letter. The eight digits uniquely identify the address. The final character indicates the combination of new and old information that the address contains.

Enter the address ID value in address code lookup mode to update the address information. When you verify the address in address code lookup mode, you can return the address in the older, land lot-based format or the current, street-based format. You can also return the six-digit post code or the current five-digit post code for the address.

When you enter the address ID value in address code lookup mode, you must update the final character to specify the types of information that you need. For more information, see [“Extended Archives and South Korea Addresses” on page 52](#).

Enabling Address Enrichments for South Korea

You can enable Address Verification to return different types of information for a South Korea address. A South Korea address can store information in the current, street-based format or the older, land lot-based format. A South Korea address can also contain post code information in the current, six-digit post code or

the older, five-digit format. You can use the address ID value to retrieve each type of information from the reference data.

To enable the address ID enrichment for South Korea, install the supplementary reference address database for South Korea and set the `EnrichmentSupplementaryKR` attribute of the `Process` element in `Parameters.xml` to **ON**.

To verify addresses that use the older, land lot-based address format or the older, six-digit post code, set the `MatchingExtendedArchive` attribute of the `Process` element in `Parameters.xml` to **ON**.

For more information on verifying the different types of South Korea address information, see [“Extended Archives and South Korea Addresses” on page 52](#).

Status Codes for South Korea Address Enrichments

When you validate South Korea addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EKRO

Country-specific enrichment is not available for the input address.

EKR1

The output address contains country-specific enrichment data.

EKRC

The country-specific database is corrupted.

EKRN

Address Verification cannot find the country-specific database.

EKRU

The country-specific database is locked.

Enrichments for Spain Addresses

You can configure Informatica Address Verification to add INE code data as an enrichment to a valid Spain address. The INE code contains a series of values that identify the province, municipality, and street to which the address belongs. The National Statistics Institute of Spain (INE) maintains the INE codes.

Enabling Enrichments for Spain Addresses

You can configure Informatica Address Verification to include INE code data in the validated output for Spain addresses. To enable address enrichments for Spain, you must license and install the relevant reference address databases and include the corresponding unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `EnrichmentSupplementaryES` attribute of the `Process` element to **ON**.
The default value of this attribute is **OFF**.

Status Codes for Spain Address Enrichments

When you validate Spain addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EES0

Country-specific enrichment is not available for the input address.

EES1

The output address contains country-specific enrichment data.

EESC

The country-specific database is corrupted.

EESN

Address Verification cannot find the country-specific database.

EESU

The country-specific database is locked.

Enrichments for Switzerland Addresses

You can configure Informatica Address Verification to include the additional postal code characters in the validated output for Switzerland addresses. To enable address enrichments for Switzerland, you must license and install the relevant reference address databases for Switzerland and include the corresponding unlock codes in `SetConfig.xml`.

Address Verification returns the additional postal code characters in an enrichment field called `POSTAL_CODE_EXTENSION`.

For example, when you validate the following Switzerland address with the address enrichment enabled, Address Verification returns a `POSTAL_CODE_EXTENSION` value of 05.

```
Hohlen 1  
3800 Sundlaenen  
Switzerland
```

Enabling Enrichment for Switzerland Addresses

You can configure Informatica Address Verification to include `POSTAL_CODE_EXTENSION` code as enrichment to validated Switzerland addresses. Before you enable address enrichments for Switzerland, license and install the relevant databases and include the corresponding unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `EnrichmentSupplementaryCH` attribute of the `Process` element to `ON`.

The default value of this attribute is `OFF`.

Status Codes for Switzerland Address Enrichments

When you validate Switzerland addresses with the country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

ECH0

Country-specific enrichment is not available for the input address.

ECH1

The output address contains country-specific enrichment data.

ECHC

The country-specific database is corrupted.

ECHN

Address Verification cannot find the country-specific database.

ECHU

The country-specific database is locked.

Enrichments for United Kingdom Addresses

You can configure Informatica Address Verification to include address enrichments in validated United Kingdom addresses. To enable address enrichments for United Kingdom addresses, you must license and install the relevant reference address databases and include the corresponding unlock codes in

`SetConfig.xml`.

ADDRESS_KEY

An eight-digit numeric code that maps to an address in the Postcode Address File (PAF) from the Royal Mail. An Address Key in conjunction with Organization Key and the Post Code Type uniquely identifies an address.

DELIVERY_POINT_SUFFIXES

A two-character suffix that the Royal Mail assigns to a mailbox in a United Kingdom post code area. The first character in a delivery point suffix is a number and the second character is a letter. A combination of a post code and the delivery point suffix identifies a mailbox.

DELIVERY_POINT_TYPE

A single-character code that indicates whether the address points to a residence (R), a small organization (O), or a large organization (L).

ORGANISATION_KEY

A unique 8-digit numeric code that Royal Mail assigns to small organizations.

UDPRN

An eight-character code that uniquely identifies each postal address in the Royal Mail PAF database. The Unique Delivery Point Reference Number (UDPRN) remains uniquely tied to the physical delivery point regardless of changes in the address.

UPRN

A numeric code that uniquely identifies a land or property unit in the United Kingdom. The Unique Property Reference Number (UPRN) is a code that the United Kingdom government assigns and can contain a maximum of 12 digits.

Examples

The following examples show enrichment values for different delivery point type addresses.

Delivery Point Type	Input Address	Enrichment Values
Residence	FLAT 17 GROVE HOUSE WAVERLEY GROVE LONDON N3 3PU UNITED KINGDOM	ADDRESS_KEY: 18161676 DELIVERY_POINT_SUFFIXES: 1H DELIVERY_POINT_TYPE: R ORGANIZATION_KEY: 00000000 UDPRN: 15498195 UPRN: 200123099
Large Organization	PO BOX 43078 LONDON NW1 1SF UNITED KINGDOM	ADDRESS_KEY: 02356470 DELIVERY_POINT_SUFFIXES: 1A DELIVERY_POINT_TYPE: L ORGANIZATION_KEY: 00000000 UDPRN: 17635833 UPRN: 10015054387
Small Organization	17A THE GROVE LONDON N3 1QN UNITED KINGDOM	ADDRESS_KEY: 28470295 DELIVERY_POINT_SUFFIXES: 1H DELIVERY_POINT_TYPE: O ORGANIZATION_KEY: 01464593 UDPRN: 15491057 UPRN: 200210632

Enabling Enrichments for United Kingdom Addresses

You can enable Address Verification to add enrichments to valid United Kingdom addresses. Address Verification can add address keys, delivery point suffixes, Unique Property Reference Numbers (UPRN), and Unique Delivery Point Reference Numbers (UDPRN) to the addresses. Before you enable the address enrichments, license and install the relevant reference address databases and include the corresponding unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `EnrichmentSupplementaryGB` attribute of the `Process` element to `ON`.

The default value of the attribute is `OFF`.

Status Codes for United Kingdom Enrichments

When you validate United Kingdom addresses with country-specific enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EGB0

Country-specific enrichment is not available for the input address.

EGB1

The output address contains country-specific enrichment data.

EGBC

The country-specific database is corrupted.

EGBN

Address Verification cannot find the country-specific database.

EGBU

The country-specific database is locked.

Enrichments for United States Addresses

You can configure Informatica Address Verification to add multiple address enrichments when you verify United States addresses.

Before you enable enrichments for United States addresses, license and install the relevant databases and include the corresponding unlock codes in `SetConfig.xml`. To enable the enrichments, set the `EnrichmentSupplementaryUS` attribute of the `Process` element in `Parameters.xml` to ON.

CBSA_ID

A Core-Based Statistical Area (CBSA) identification number is a five-digit number that identifies an urban area with a population greater than 10,000. A CBSA can be a Metropolitan Statistical Area or Micropolitan Statistical Area. A Metropolitan Statistical Area has over 50,000 inhabitants. A Micropolitan Statistical Area has between 10,000 and 50,000 inhabitants.

CENSUS_BLOCK_GROUP

A 12-digit number that identifies a Census Block Group. A Census Block Group is a group of Census Blocks that share the same first digit. The first digit in the Census Block number is the last digit in the 12-digit Census Block Group number.

CENSUS_BLOCK_NO

A four-digit number that identifies a Census Block. A Census Block is the smallest entity for which the Census Bureau collects census information.

CENSUS_TRACT_NO

A six-digit number that identifies a Census Tract. A Census Tract is a statistical subdivision of a county.

Note: If the engine cannot return a census tract number for an address to house number-level precision, it returns the census tract number to street-level precision.

CMSA_ID

A Consolidated Metropolitan Statistical Area (CMSA) identification number is a four-digit number. A PMSA becomes a CMSA if local opinion favors the designation.

COUNTY_FIPS_CODE

A three-digit number that identifies a county in the United States.

Note: The Federal Information Processing Standards (FIPS) include a set of numbers that identify states, counties, and other territorial possessions in the United States. A two-digit state code identifies each state. A three-digit county code identifies a county within a state. Together, the five digits of the state and county codes uniquely identify a county.

FINANCE_NUMBER

A finance number is a six-digit number that the United States Postal Service (USPS) assigns to post offices and other postal facilities to support the collection of cost and statistical data. The first two digits of the finance number identify the state. The final four digits identify the post office or postal facility.

MCD_ID

A Minor Civil Division (MCD) identification number is a five-digit number. An MCD is a primary legal subdivision of a county.

MSA_ID

The Metropolitan Statistical Area (MSA) identification number is a five-digit number that identifies an urban area that has a population of 50,000 or more.

PLACE_FIPS_CODE

A five-digit number that identifies a locality in the United States.

PMSA_ID

A Primary Metropolitan Statistical Area (PMSA) identification number is a four-digit number. If a Metropolitan Statistical Area (MSA) reaches a size of one million inhabitants, the United States Office of Management and Budget specifies two or more PMSAs for the area.

RECORD_TYPE

A single-character code that describes the type of mailbox or delivery. For example, the code can indicate if the address is in a high-rise building (H) or a post office box (P).

STATE_FIPS_CODE

A two-digit number that identifies a state in the United States.

TIME_ZONE_CODE

A one- to three-character numeric value that indicates the offset between the address time zone and Greenwich Mean Time. For example, the time zone code for Eastern Standard Time is -5.

TIME_ZONE_NAME

A three-character code that identifies the time zone to which the address belongs. For example, EST identifies Eastern Standard Time.

Enabling Enrichments for United States Addresses

You can configure Informatica Address Verification to include multiple address enrichments in validated United States addresses. Before you enable address enrichments for United States addresses, license and install the relevant databases and include the corresponding unlock codes in `SetConfig.xml`.

- In `Parameters.xml`, set the `EnrichmentSupplementaryUS` attribute of the `Process` element to `ON`.
The default value of this attribute is `OFF`.

Status Codes for United States Address Enrichments

When you validate United States addresses with the address enrichments enabled, Informatica Address Verification returns the following status codes along with the address output:

EUS0

Country-specific enrichment is not available for the input address.

EUS1

The output address contains country-specific enrichment data.

EUSC

The country-specific database is corrupted.

EUSN

Address Verification cannot find the country-specific database.

EUSU

The country-specific database is locked.

CHAPTER 6

Result Parameters

This chapter includes the following topics:

- [Result Formatting Options, 90](#)
- [Configuring the Result Formatting Options, 91](#)
- [Result Country Settings, 92](#)
- [Configuring Country Settings for the Result Output, 92](#)
- [Configuring the Maximum Number for Results in Interactive and Fast Completion Modes, 94](#)
- [The AliasLocality and AliasStreet Attributes, 94](#)
- [The DualAddressPriority Attribute, 95](#)
- [The ElementAbbreviation Attribute, 96](#)
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- [The StandardizeInvalidAddresses Attribute, 117](#)
- [Output Standardization, 118](#)

Result Formatting Options

You can configure the formatting-related attributes of the `Result` element in `Parameters.xml` to specify the formatting of the validated output. The formatting-related attributes of the `Result` element include `FormatType`, `FormatDelimiter`, `FormatMaxLine`, `GlobalCasing`, and `GlobalMaxLength`.

You can configure the `FormatType` attribute to specify the address elements that you want Informatica Address Verification to include in `FormattedAddressLine` and `AddressComplete` output.

You can configure the `FormatDelimiter` attribute to specify the delimiter that you want Address Verification to use in the output address.

You can configure the `FormatMaxLine` attribute to specify the maximum number of lines that you want Address Verification to include the output. You can specify a number from one through 19. The default is 19.

You can configure the `GlobalCasing` attribute to specify the casing that you want Address Verification to apply for the output. Note that the casing setting at the address element level takes precedence over the global setting. The global setting takes effect only when the address element-level `Casing` attribute is set to `GLOBAL`.

You can configure the `GlobalMaxLength` attribute to specify the maximum number of characters that you want in the output string. The address element-level `MaxLength` attribute setting takes precedence over the global setting. The global setting takes effect only when the address element-level `MaxLength` attribute is set to GLOBAL or to a value of zero, 0. The default value for the `GlobalMaxLength` attribute is 1024.

Configuring the Result Formatting Options

You can configure the formatting-related attributes of the `Result` element in `Parameters.xml` to specify the formatting to apply on the verified output. The formatting-related attributes that you can configure include `FormatType`, `FormatDelimiter`, `FormatMaxLines`, `GlobalCasing`, and `GlobalMaxLength`.

Set the following attributes of the `Result` element in `Parameters.xml`.

FormatType

Specifies the elements that you want to include in results. Set one of the following values:

- ALL
- ADDRESS_ONLY
- WITH_ORGANIZATION
- WITH_CONTACT
- WITH_ORGANIZATION_CONTACT
- WITH_ORGANIZATION_DEPARTMENT

The default value is ALL.

FormatDelimiter

Specifies the element descriptor for the address complete output. Set one of the following values:

- CRLF
- LF
- CR
- SEMICOLON
- COMMA
- TAB
- PIPE
- SPACE

The default value is CRLF which denotes carriage return and line feed.

Note: If you set `FormatDelimiter` to COMMA or SPACE, you cannot use the result output for further verification using Informatica Address Verification.

FormatMaxLines

Specifies the maximum number of address lines you want Address Verification to include in a result. Set a value between 1 and 19 for the attribute.

The default value is 19.

GlobalCasing

Specifies the casing of the address output. Set one of the following values.

- LOWER
- MIXED
- NATIVE
- NOCHANGE
- UPPER

The default value is NATIVE. The casing setting at the address-element level takes precedence over the global setting. The global setting takes effect only when the address element-level `Casing` attribute is set to GLOBAL.

For more information about the GlobalCasing setting, see [“Output Standardization” on page 118](#).

GlobalMaxLength

Specifies the maximum length of output strings. Set the `GlobalMaxLength` attribute to the maximum number of characters you want in the output string.

The default value for `GlobalMaxLength` is 1024. The address element-level `MaxLength` attribute setting takes precedence over the global setting. The global setting takes effect only when the address element-level `MaxLength` attribute is set to GLOBAL.

Result Country Settings

You can configure the country information-related attributes of the `Result` element in `Parameters.xml` to specify the handling of country information in the Informatica Address Verification result output.

The country information-related attributes of the `Result` element include `CountryType`, `CountryOfOriginISO3`, and `FormatWithCountry`.

If you want Address Verification to include the country information in formatted address line (FAL) output, you can set the `FormatWithCountry` attribute to ON. The default value of `FormatWithCountry` is OFF.

You can configure the `CountryType` attribute to specify how you want Address Verification to include the country information in the result output. Based on the value you set for `CountryType`, Address Verification returns the ISO3 code, ISO2 code, or name of the country in one of the supported languages. The default is NAME_EN, which denotes the name of the country in English.

If the ISO3 code you set for `CountryOfOriginISO3` points to same the country that the address belongs to, Address Verification does not include the country information in the FAL output.

For example, if you have set `FormatWithCountry` to ON, and `CountryOfOriginISO3` to USA, the FAL output includes the country information only for addresses from countries other than the United States.

Configuring Country Settings for the Result Output

You can configure the `FormatWithCountry`, `CountryType`, and `CountryOfOrigin` attributes of the `Result` element in `Parameters.xml` to specify the handling of country-related information in the result output.

Configure the following attributes of the `Result` element in `Parameters.xml`:

FormatWithCountry

Specifies whether or not to include the country name in the output. Set this attribute to ON or OFF.

The default value is OFF.

CountryType

Specifies the format in which you want to provide the country information in the output. Set this attribute to one of the following values:

- ABBREVIATION
- ISO2
- ISO3
- ISO_NUMBER
- NAME_CN
- NAME_DA
- NAME_DE
- NAME_EN
- NAME_ES
- NAME_FI
- NAME_FR
- NAME_GR
- NAME_HU
- NAME_IT
- NAME_JP
- NAME_KR
- NAME_NL
- NAME_PL
- NAME_PT
- NAME_RU
- NAME_SA
- NAME_SE

The default value is Name_EN.

CountryOfOriginISO3

Specifies the country to which an address belongs. Set this attribute to the ISO3 code of the country to which the address belongs.

If the address belongs to the same country that you specified for `CountryOfOriginISO3`, Informatica Address Verification does not include the country name in the result.

Configuring the Maximum Number for Results in Interactive and Fast Completion Modes

You can specify the maximum number of address suggestions that you receive in the interactive and fast completion modes. Use the `MaxResultCount` attribute to set the maximum number of address suggestions. You can configure a `MaxResultCount` attribute in the `Global` element in `SetConfig.xml` or in the `Result` element in `Parameters.xml`.

The default value is 20. If you set `MaxResultCount` in both `SetConfig.xml` and `Parameters.xml`, Informatica Address Verification uses the lower of the two values.

- In `SetConfig.xml`, set a value from 1 through 100 for the `MaxResultCount` attribute of the `Global` element.
- In `Parameters.xml`, set a value from 1 through 100 for the `MaxResultCount` attribute of the `Result` element.

The AliasLocality and AliasStreet Attributes

You can configure the `AliasLocality` and `AliasStreet` attributes of the `Result` element in `Parameters.xml` to specify how you want Informatica Address Verification to handle aliases for locality and street names.

You can configure the `AliasLocality` and `AliasStreet` attributes to one of the following values:

PRESERVE

Retains the alias for the street or locality in the output.

OFFICIAL

Returns the street or locality name as mandated by the postal regulations of the country in the output. This is the default value. Based on the postal regulations for the country to which the address belongs, Address Verification returns the postal name or the street or locality alias or vanity name.

OFF

Returns the postal name for the street or locality in the output.

When you validate addresses in the certified mode, set the `AliasStreet` and `AliasLocality` attributes to **OFFICIAL**.

If you want Address Verification to preserve the vanity name or the alias in the validated output, you must set the respective parameters to **PRESERVE**. If you want Address Verification to return the postal name of the locality or street in the validated output, set the respective parameters to **OFF**.

Configuring AliasStreet and AliasLocality

You can configure Informatica Address Verification to return the postal name or alias or vanity name of a street or locality in the result output.

In `Parameters.xml`, configure the following attributes of the `Result` element:

AliasStreet

Specifies the output for the street information. Set one of the following values:

- PRESERVE. Retains the alias name of the street.
- OFFICIAL. Returns either the postal name or the alias name based on the postal regulations of the country.
- OFF. Returns the postal name of the street.

The default value is OFFICIAL.

AliasLocality

Specifies the output for the locality information. Set one of the following values:

- PRESERVE. Retains the alias name of the locality.
- OFFICIAL. Returns either the postal name or the alias name based on the postal regulations of the country.
- OFF. Returns the postal name of the locality.

The default value is OFFICIAL.

The DualAddressPriority Attribute

Dual addresses are addresses that contain both street address data and delivery service address data. You can configure the `DualAddressPriority` attribute of the `Result` element to specify which address type you want Informatica Address Verification to validate an input address against if the address contains both types of address data.

You can set the `DualAddressPriority` attribute to `DELIVERY_SERVICE` if you want Address Verification to validate the delivery service part of the input address. If you set `DualAddressPriority` to `STREET`, Address Verification validates the street address part of the input address.

The default value for `DualAddressPriority` is `POSTAL_ADMIN`, which denotes that Address Verification validates addresses based on the postal department's preference for the address type. When you validate addresses in the certified mode, set `DualAddressPriority` to `POSTAL_ADMIN`.

Configuring the Type of Address to Validate

You can specify the type of address that Address Verification validates when the input address contains both street address data and delivery service address data.

- In `Parameters.xml`, set the `DualAddressPriority` attribute of the `Result` element to one of the following values.
 - `DELIVERY_SERVICE`. Validates the address as a delivery service address.
 - `POSTAL_ADMIN`. Validates the address based on the postal regulations of the country to which the address belongs.
 - `STREET`. Validates the address as a street address.

When you validate addresses in the certified mode, set the `DualAddressPriority` attribute to `POSTAL_ADMIN`.

The ElementAbbreviation Attribute

You can configure the `ElementAbbreviation` attribute of the `Result` element in `Parameters.xml` to specify whether to use abbreviations for element names in result output.

When you set the `ElementAbbreviation` attribute to ON, Address Verification abbreviates an element in an input address if the reference address database contains the abbreviated form of the element. The reference data contains abbreviations for street information, such as street names, descriptors, and directional values, and for locality information in several countries.

Note: You cannot use the `ElementAbbreviation` attribute to abbreviate individual address elements.

The default value of `ElementAbbreviation` is OFF.

ElementAbbreviation and GlobalPreferredDescriptor Interaction

The values that you set on the `ElementAbbreviation` attribute and `GlobalPreferredDescriptor` attribute properties can affect each other. If you set the `GlobalPreferredDescriptor` attribute to a value other than DATABASE, `GlobalPreferredDescriptor` takes precedence over `ElementAbbreviation` for the corresponding descriptors in the countries that `GlobalPreferredDescriptor` can control.

`GlobalPreferredDescriptor` does not affect street names or locality names.

The following table shows an input address in Canada and the output address when `ElementAbbreviation` is set to ON and `GlobalPreferredDescriptor` is set to LONG:

Input Address	Output Address
AVENUE DU MOULIN SAINT-THOMAS-DIDYME QUÉBEC G0W 1P0	AVENUE DU MOULIN ST-TH-DIDYME QC G0W 1P0

The `ElementAbbreviation` setting of ON abbreviates the street name and the locality name. The `GlobalPreferredDescriptor` setting of LONG specifies that the AVENUE descriptor is not abbreviated, even though the `ElementAbbreviation` setting is ON.

ElementAbbreviation Attribute Use in Japan Addresses

When you set `ElementAbbreviation` to ON for Japan addresses, Address Verification can combine Street 1, Street 2, and House Number values in a single field. Address Verification can return an element result status for each value in the appropriate position in the status code, although the field that the position represents might not contain any data in the output address.

ElementAbbreviation Attribute Use in United States Addresses

When you set `ElementAbbreviation` to ON for United States addresses, Address Verification abbreviates any element that exceeds the character limit that the United States Postal Service specifies. For example, the United States Postal Service specifies that the Locality element can contain a maximum of thirteen characters. If a locality element exceeds thirteen characters, Address Verification abbreviates the data values in the element.

Note: Address Verification might not abbreviate every data value in a locality element. For example, Address Verification abbreviates the locality name WEST SAINT PAUL in the following United States address to WEST ST PAUL:

```
1156 BELLOWS ST  
WEST SAINT PAUL  
MN 55118
```

Address Verification does not abbreviate WEST SAINT PAUL to W ST PAUL because WEST ST PAUL contains fewer than thirteen characters.

The GlobalPreferredDescriptor Attribute

You can configure Informatica Address Verification to specify the output format for street, building, and sub-building element descriptors in several countries. To specify the output format for the element descriptors, configure the `GlobalPreferredDescriptor` attribute of the `Result` parameter in `Parameters.xml`.

The `GlobalPreferredDescriptor` attribute applies to element descriptors in Australia, Canada, Ireland, United States, and New Zealand addresses. The attribute also applies to the `Strasse` element descriptor in Austria, Germany, and Switzerland addresses.

You can set the `GlobalPreferredDescriptor` attribute in batch, interactive, certified, and fast completion modes. Certified mode requires the default setting for the attribute.

Specify one of the following values for the `GlobalPreferredDescriptor` attribute:

DATABASE

Returns the element descriptor available in the reference address database. This is the default value. If there is no matching entry in the database, Address Verification copies the input to the output.

LONG

Returns the expanded form of the element descriptor.

For example, Address Verification returns STREET for the input element ST.

SHORT

Returns the abbreviated form of the element descriptor.

For example, Address Verification returns AVE for the input element AVENUE.

PRESERVE_INPUT

Copies the element descriptor in the input to the output. If the input element descriptor is not an official name, Address Verification returns the corresponding value from the database in the output. For example, when you validate an Australia address that contains BD for boulevard, Address Verification corrects the descriptor to BVD. BVD is the standard short form for boulevard in Australia.

GlobalPreferredDescriptor Behavior in Multi-Language Countries

Address Verification returns descriptors in the language that the `PreferredLanguage` attribute specifies and in the form that the `GlobalPreferredDescriptor` attribute specifies.

The following table shows how Address Verification applies a global preferred descriptor of `PRESERVE_INPUT` to a French-language address when you specify English as the preferred language:

Input Address	Output Address
800 BOUL RENE-LEVESQUE O MONTREAL QC H3B 1Y8	800 RENE-LEVESQUE BVD W MONTREAL QC H3B 1Y8

If the reference database for the preferred language does not contain the descriptor in the form that the global preferred descriptor specifies, Address Verification falls back to the default format for the descriptor in the preferred language.

If you set the global preferred descriptor to `PRESERVE_INPUT` and you specify a preferred language that differs from the input language, the `PreferredLanguage` attribute takes precedence.

The PreferredLanguage Attribute

Informatica Address Verification can return address elements in more than one language for addresses in multiple countries. To determine the languages that Address Verification uses for the address elements, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

When the reference data includes elements in multiple languages, Address Verification can return address data in the following languages:

- The main spoken language of the region to which each address belongs. This is the default language for the address in the reference data.
- Any other language that Address Verification supports for an address. For example, the Belgium reference data contains address elements in Flemish, French, and German.

The reference data might contain data for a single address element or for a complete address in multiple languages. For example, Address Verification can return all address elements for Ireland in the English language and can return street names, locality names, and province names in the Irish language. Additionally, the reference data might specify different default languages for different parts of a country. For example, in the Switzerland reference data, the default language for addresses from Zurich is German, from Geneva is French, and from Ticino is Italian.

To define a preferred language policy, set one of the following values for the `PreferredLanguage` attribute:

DATABASE

Returns all available address elements in the default language of the address in the reference data.

DATABASE is the default value for the `PreferredLanguage` attribute.

ALTERNATIVE_1, ALTERNATIVE_2, or ALTERNATIVE_3

Returns address elements in one of the alternative languages in the reference data. The alternative languages depend on the country to which the address belongs.

ENGLISH

Returns province and locality information in English if the reference data contains the information. For example, Address Verification can replace München with Munich and Bayern with Bavaria in Germany addresses.

PRESERVE_INPUT

Returns the address information in the input language. Address Verification preserves the language if the reference data contains the address information in the input language.

If Address Verification cannot return an element in the input language, it returns the element in the database language. If Address Verification detects more than one supported language in the input address, it returns the address in the database language.

Rules and Guidelines for the PreferredLanguage Attribute

Consider the following rules and guidelines when you configure a preferred language:

- When you set the `PreferredLanguage` attribute, verify that the `PreferredScript` attribute specifies a character set that can deliver the address data in the characters that you expect.

For example, to return a Hong Kong address in the English language, set the `PreferredLanguage` attribute to English or Alternative_2 and set the `PreferredScript` attribute to a Latin-1 or ASCII script. To return address data in the default local language and character set, set the `PreferredLanguage` and set the `PreferredScript` attributes to DATABASE.

For more information, see [“Countries and PreferredScript Options” on page 113](#).

- If you set the `PreferredLanguage` attribute to a language that is not available in the reference data, Address Verification returns the address in the default database language. In such cases, Address Verification returns an extended element result status (EERS) value of E. The value indicates that the output uses the default language because the reference database does not contain the information in the language that you specified.
- The language or the format in which Address Verification returns the country name depends on the value that you configure for the `CountryType` attribute of the `Result` element.
- If the input address contains an address element that the reference database does not contain, Address Verification copies the element to the result output. For such elements, Address Verification returns the information in the same language as the address input.

An element input status (EIS) value of 1 indicates that the reference data does not contain the element.

An element result status (ERS) value of 1 indicates that Address Verification copied the information from the input because the reference database does not contain the information.

- If the database contains some but not all address elements in the language you specified, Address Verification returns the address partially in the language that you specified and partially in the default language.
- If you use Address Verification in the Informatica Cloud®, you can set a `PreferredLanguage` value under the `ValidationParameters` in the SOAP request.

Multilanguage Country Support

Informatica Address Verification can return address elements in multiple languages for addresses in several countries.

The following table lists the countries and summarizes the languages and address information that Address Verification can return:

Country	Supported Languages	Notes
Belgium	English, Flemish, French, German	Returns all address information in Flemish, French, or German based on the main language in the region. Can return the province, locality, and street address information in English.
Canada	English, French	Returns all address information in English. Can return all address data in a Quebec address in French. In provinces other than Quebec, can return street descriptors, directional information, and province names in French and other address elements in English.
China	Chinese, English	Returns all address information in Chinese. Can return the street descriptor and street directional address information in English.
Finland	Finnish, Swedish	Returns all address information in Finnish. Can return the street, locality, and province address information in Swedish.
Hong Kong	Chinese, English	Returns all address information in Chinese or in English.
Ireland	English, Irish	Returns all address information in English. Can return the street, locality, and county address information in Irish.
Israel	English, Hebrew	Returns all address information in English or in Hebrew.

Country	Supported Languages	Notes
Macau	Portuguese, Traditional Chinese	Returns all address information in Portuguese or in Traditional Chinese.
Switzerland	English, French, German, Italian	Returns all address information in French, German, or Italian based on the main language in the region. Can return locality and province information in French, German, or Italian in all regions. Can return locality and province information in English in several localities.
Taiwan	Chinese, English	Returns all address information in Chinese or in English.

For more detailed information about each country, see the sections below.

Multilanguage Support for Belgium Addresses

You can configure Address Verification to return the province, locality, and street information in valid Belgium addresses in English, Flemish, French, or German.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the `PreferredLanguage` values that you can set for Belgium address data:

Option	Description
DATABASE	Default value. Returns addresses in the main language of the region to which the address belongs. The address might be Flemish, French, or German based on the region.
ENGLISH	Returns the province, locality, and street information in English if the reference address database contains the information in English. Returns the other address elements in the main language of the region to which the address belongs.
ALTERNATIVE_1	Returns the province, locality, and street information in Flemish.
ALTERNATIVE_2	Returns the province, locality, and street information in French.
ALTERNATIVE_3	Returns the province, locality, and street information in German.
PRESERVE_INPUT	Returns addresses in the language that the input address uses. Address Verification preserves the language if the reference database contains the address data in the input language. If the input address contains more than one language, Address Verification returns the output in the database language.

Example: PreferredLanguage Settings and Results for Belgium

You enter the following Belgium address for verification:

```
Rue Royale 4
Bruxelles 1000
Belgium
```

The following table shows the validated results for different `PreferredLanguage` settings when you enter the address:

DATABASE	ENGLISH	ALTERNATIVE_1 (Flemish)	ALTERNATIVE_2 (French)	ALTERNATIVE_3 (German)	PRESERVE_INPUT
Output address Rue Royale 4 1000 Bruxelles Belgium	Output address Rue Royale 4 1000 Brussels Belgium	Output address Koningsstraa t 4 1000 Brussel Belgium	Output address Rue Royale 4 1000 Bruxelles Belgium	Output address Rue Royale 4 1000 Brüssel Belgium	Output address Rue Royale 4 Bruxelles 1000 Belgium
EERS: 00505050000 000000000	EERS: 005000E00000 00000000	EERS: 005000000000 000000	EERS: 005000000000 00000000	EERS: 005000E000000 0000000	EERS: 00500000000000 000000

The tagble also includes the EERS codes for each address.

The table indicates that the input address and the results for `DATABASE`, `ALTERNATIVE_2`, and `PRESERVE_INPUT` are in French. The result for `ALTERNATIVE_1` is Flemish. The table indicates that the street information is available only in Flemish and French.

Note: An EERS value of 5 at position seven (Street) for the `DATABASE` setting indicates that the database contains alternatives: Flemish in this case. For `ENGLISH` and for `ALTERNATIVE_3`, the EERS value for position seven is E. An EERS value of E indicates that the output is in the default database language, French, because the information is not available in the specified language.

Multilanguage Support for Canada Addresses

You can configure Address Verification to return valid Canada addresses in English or in French.

The Canada reference address data uses the English language for addresses from all provinces except Quebec. The reference data uses the French language for Quebec addresses.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the `PreferredLanguage` values that you can set for Canada address data:

Option	Description
DATABASE	Default value. Returns addresses in English for all provinces except Quebec. Returns Quebec addresses in French.
ENGLISH	Returns all address elements in English.
ALTERNATIVE_1	Returns all addresses in English.
ALTERNATIVE_2	Returns Quebec addresses in French. In provinces other than Quebec, returns the street descriptors, directional information, and province names in French. Returns other address elements in English.
PRESERVE_INPUT	Returns the address in the input language.

Example: PreferredLanguage Settings and Results for Canada Addresses

The following table shows two Canada addresses and the validated results for different preferred language settings:

Input Address	DATABASE	ALTERNATIVE_1 (English)	ALTERNATIVE_2 (French)	PRESERVE_INPUT
Bankers Hall West Tower 888 - 3rd St SW 10th Floor Calgary, AB T2P 5C5 Canada	Bankers Hall West Tower 888 - 3rd St SW 10th Floor Calgary, AB T2P 5C5 Canada	Bankers Hall West Tower 888 - 3rd St SW 10th Floor Calgary, AB T2P 5C5 Canada	Bankers Hall West Tower 888 Rue 3 So 10th Floor Calgary, AB T2P 5C5 Canada	Bankers Hall West Tower 888 - 3rd St SW 10th Floor Calgary, AB T2P 5C5 Canada
615 Av Monique Québec QC G1B 2A8 Canada	615 Av Monique Québec QC G1B 2A8 Canada	615 Monique Ave Québec QC G1B 2A8 Canada	615 Av Monique Québec QC G1B 2A8 Canada	615 Av Monique Québec QC G1B 2A8 Canada

For the first example in the table, the input address and the results for DATABASE, ALTERNATIVE_1, and PRESERVE_INPUT are in English. The result for the ALTERNATIVE_2 setting is in French.

For the second example, which is an address from Quebec, the input address and the results for DATABASE, ALTERNATIVE_2, and PRESERVE_INPUT are in French. The result for the ALTERNATIVE_1 setting is in English.

Multilanguage Support for China Addresses

You can configure Address Verification to return the street descriptor and street directional information in a valid China address in Chinese or in English. The default database language is Chinese.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the `PreferredLanguage` values that you can set for China address data:

Option	Description
DATABASE	Default value. Returns all address information in Chinese.
ENGLISH	Returns the English-language versions of street descriptor and street directional values. Returns all other address information in the Chinese language. The English elements omit transliteration elements such as "shi."
ALTERNATIVE_1	Returns all address information in the database language.

Option	Description
ALTERNATIVE_2	Returns all address information in the database language.
ALTERNATIVE_3	Returns all address information in the database language.
PRESERVE_INPUT	Returns the address in the input language. If Address Verification cannot return an element in the input language, it returns the element in the database language.

Consider the following rules and guidelines when you select the preferred language:

- To return the address in the Chinese language, select DATABASE, ALTERNATIVE_1, ALTERNATIVE_2, or ALTERNATIVE_3.
To return the address in a Chinese character set, set the PreferredScript parameter to DATABASE.
- To return street descriptor and street directional information in the English language, select ENGLISH.
To return the address in a Latin or ASCII character set, set the PreferredScript parameter to a LATIN or ASCII value.
- If you select a LATIN or ASCII value as the preferred script and DATABASE as the preferred language, Address Verification returns the address data in Pinyin.

Example: PreferredLanguage Settings and Results for China Addresses

You enter the following China address for verification:

15 YANANLU SANDUAN
JĪNZHŌUSHĪ LIÁONÍNGSHĚNG 121099
CHINA

The input address is the Pinyin transliteration of the Chinese-language address.

The following table shows the validated output for the address in different preferred language settings:

DATABASE	ALTERNATIVE_1 (Chinese)	ENGLISH	PRESERVE_INPUT (Chinese)
121099辽宁省锦州市 延安路三段15	121099辽宁省锦州市 延安路三段15	15 YÁNAN ROAD THIRD SECTION JĪNZHŌUSHĪ LIÁONÍNGSHĚNG 121099 CHINA	15 YANANLU SANDUAN JĪNZHŌUSHĪ LIÁONÍNGSHĚNG 121099 CHINA

The default character set for the reference data is Hanzi. The DATABASE, ALTERNATIVE_1, ALTERNATIVE_2, and ALTERNATIVE_3 settings return the Chinese-language version of any valid input address.

The ENGLISH setting returns the street descriptor and street directional information in English and the rest of the address in Chinese.

The PRESERVE_INPUT setting returns the output elements in the same language as the input elements.

In the examples above, the DATABASE and ALTERNATIVE_1 addresses use the default script. The ENGLISH and PRESERVE_INPUT addresses use a LATIN or ASCII script.

Multilanguage Support for Finland Addresses

You can configure Address Verification to return the street, locality, and province information in valid Finland addresses in Swedish. The default language is Finnish.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the `PreferredLanguage` values that you can set for Finland addresses:

Option	Description
DATABASE	Default value. Returns all address information in Finnish.
ALTERNATIVE_1	Returns all address information in Finnish.
ALTERNATIVE_2	Returns the street, locality, and province information in Swedish. Returns all other information in Finnish.
PRESERVE_INPUT	Returns the address information in the input language. If Address Verification cannot return an element in the input language, it returns the element in the database language.

Example: PreferredLanguage Settings and Results for Finland Addresses

You enter the following Finland address for verification:

```
Kuusikkotie 1-3  
00630 HELSINKI  
FINLAND
```

The following table shows a Finland address and the validated results for different preferred language settings:

DATABASE	ALTERNATIVE_1 (Finnish)	ALTERNATIVE_2 (Swedish)	PRESERVE_INPUT
Kuusikkotie 1-3 00630 HELSINKI FINLAND	Kuusikkotie 1-3 00630 HELSINKI FINLAND	Grandungevägen 1-3 FI-00630 HELSINGFORS	Kuusikkotie 1-3 00630 HELSINKI FINLAND

The table indicates that the results for DATABASE and ALTERNATIVE_1 are in Finnish and the result for ALTERNATIVE_2 is in Swedish.

The ALTERNATIVE_2 setting returns the street, locality, and province information in Swedish.

Multilanguage Support for Hong Kong Addresses

You can configure Address Verification to return valid Hong Kong addresses in Chinese or in English. The default language is Chinese.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the PreferredLanguage values that you can set for Hong Kong address data:

Option	Description
DATABASE	Default value. Returns all address information in Chinese.
ENGLISH	Returns all address information in English.
ALTERNATIVE_1	Returns all address information in the database language.
ALTERNATIVE_2	Returns all address information in English.
ALTERNATIVE_3	Returns all address information in the database language.
PRESERVE_INPUT	Returns the address information in the input language. If Address Verification cannot return an element in the input language, it returns the element in the database language.

Consider the following rules and guidelines when you select the preferred language:

- To return the address in the Chinese language, select DATABASE, ALTERNATIVE_1, or ALTERNATIVE_3.
To return the address in a Chinese character set, set the PreferredScript parameter to DATABASE.
- To return the address in the English language, select ALTERNATIVE_2 or ENGLISH.
To return the address in a Latin or ASCII character set, set the PreferredScript parameter to a LATIN or ASCII value.
- The language of the input data can affect the operation of the PRESERVE_INPUT option on a Hong Kong address. Address Verification identifies the input language as English when the input data uses 7-bit ASCII characters and includes an English-language descriptor.

Example: PreferredLanguage Settings and Results for Hong Kong Addresses

You enter the following Hong Kong address for verification:

Hong Kong
新界
元朗
元朗安興街 2

The following table shows the address that you enter and the validated results for different preferred language settings:

DATABASE	ENGLISH	ALTERNATIVE_1 (Chinese)	ALTERNATIVE_3 (Chinese)	PRESERVE_INPUT
Hong Kong 新界 元朗 元朗安興街 2	2 Yuen Long On Hing St. Yuen Long New Territories Hong Kong	Hong Kong 新界 元朗 元朗安興街 2	2 Jyùn Long Ngon Hing Gaai Jyùn Long San'Gaai Hong Kong	Hong Kong 新界 元朗 元朗安興街 2

In the examples above, Address Verification uses a PreferredScript setting of DATABASE to return the DATABASE, ALTERNATIVE_1, and PRESERVE_INPUT addresses. Address Verification uses a PreferredScript setting of LATIN_1 to return the ENGLISH and ALTERNATIVE_3 addresses.

Multilanguage Support for Ireland Addresses

You can configure Address Verification to return the street, locality, and county information in a valid Ireland address in Irish or in English. The default language is English.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the `PreferredLanguage` values that you can set for Ireland addresses:

Option	Description
DATABASE	Default value. Returns all address information in English.
ENGLISH	Returns all address information in English.
ALTERNATIVE_1	Returns all address information in English.
ALTERNATIVE_2	Returns the street, locality, and county information in Irish. Returns all other address information in English.
PRESERVE_INPUT	Returns the address in the input language.

Example: PreferredLanguage Settings and Results for Ireland Addresses

You enter the following Ireland addresses for verification:

```
Informatica Ireland Limited
Georges Quay House
43 Townsend Street
Dublin 2
D02 VK65

Portmarnock Hotel & Golf Links
Strand Road
Portmarnock
Co. Dublin
D13 V2X7
```

The following table shows the output for Ireland addresses with different preferred language settings:

DATABASE	ALTERNATIVE_1 (English)	ALTERNATIVE_2 (Irish)	ENGLISH	PRESERVE_INPUT
Informatica Ireland Limited Georges Quay House 43 Townsend Street Dublin 2 D02 VK65	Informatica Ireland Limited Georges Quay House 43 Townsend Street Dublin 2 D02 VK65	Informatica Ireland Limited Georges Quay House 43 Sráid Chnoc Na Lobhar Baile Átha Cliath 2 D02 VK65	Informatica Ireland Limited. Georges Quay House 43 Townsend Street Dublin 2 D02 VK65	Informatica Ireland Limited Georges Quay House 43 Townsend Street Dublin 2 D02 VK65
Portmarnock Hotel & Golf Links Strand Road Portmarnock Co. Dublin D13 V2X7	Portmarnock Hotel & Golf Links Strand Road Portmarnock Co. Dublin D13 V2X7	Portmarnock Hotel & Golf Links Bóthar Na Trá Port Mearnóg Co. Bhaile Átha Cliath D13 V2X7	Portmarnock Hotel & Golf Links Strand Road Portmarnock Co. Dublin D13 V2X7	Portmarnock Hotel & Golf Links Strand Road Portmarnock Co. Dublin D13 V2X7

In each example, the input address is in English. The default language for the reference data is English, and the DATABASE, ALTERNATIVE_1, and ENGLISH settings return the English version of any valid input address. The ALTERNATIVE_2 setting returns the street, locality, and county information in Irish and the rest of the address in the database language. The PRESERVE_INPUT setting returns the output elements in the same language as the input elements.

Note: Ireland addresses in large cities might add a one-digit or two-digit sorting code to the city name. If the address includes a sorting code, do not include the county name in the address. Address Verification writes the town or city name and the sorting code to a locality field. Address Verification writes the county name to a province field.

You can add an eircode as last-line data to a valid Ireland address. An eircode is a seven-character code that uniquely identifies the address. Address Verification writes the eircode to a post code field.

Multilanguage Support for Israel Addresses

You can configure Informatica Address Verification to return valid Israel addresses in English or in Hebrew. The default language is Hebrew.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the `PreferredLanguage` values that you can set for Israel address data:

Option	Description
DATABASE	Default value. Returns all address information in Hebrew.
ENGLISH	Returns all address information in English.
ALTERNATIVE_1	Returns all address information in Hebrew.

Option	Description
ALTERNATIVE_2	Returns all address information in English.
PRESERVE_INPUT	Returns the address information in the input language.

Consider the following rules and guidelines when you select the preferred language:

- To return the address in the Hebrew language, set the `PreferredLanguage` parameter to `DATABASE` or `ALTERNATIVE_1`.
To return the address in a Hebrew character set, set the `PreferredScript` parameter to `DATABASE`.
To return the address in a Latin or ASCII character set, set the `PreferredScript` parameter to a `LATIN` or `ASCII` value.
- To return the address in the English language, set the `PreferredLanguage` parameter to `ENGLISH` or `ALTERNATIVE_2`.
- If you select a Latin character set as the preferred script and you select Hebrew as the preferred language, Address Verification transliterates the Hebrew address into Latin characters. For optimal results in a Latin character set, consider selecting English as the preferred language.

Example: PreferredLanguage Settings and Results for Israel

You enter the following Israel address for verification:

רב אלוף דוד אלעזר, 23
תל אביב יפו 6107000

The following table shows the validated results for different `PreferredLanguage` settings:

DATABASE	ENGLISH	ALTERNATIVE_1	ALTERNATIVE_2
רב אלוף דוד אלעזר, 23 תל אביב יפו 6107000	23, RAV ALUF DAVID EL'AZAR 6107000 TEL AVIV- YAFO	רב אלוף דוד אלעזר, 23 תל אביב יפו 6107000	23, RAV ALUF DAVID EL'AZAR 6107000 TEL AVIV- YAFO

In the examples, Address Verification uses a `PreferredScript` setting of *Latin* to return the English and `Alternative_2` output.

Note: When you select a Latin script with the default preferred language option, Address Verification transliterates the Hebrew address data into Latin.

Multilanguage Support for Macau Addresses

You can configure Address Verification to return valid Macau addresses in traditional Chinese or in Portuguese. The default language is traditional Chinese.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the `PreferredLanguage` values that you can set for Macau address data:

Option	Description
DATABASE	Default value. Returns all address information in traditional Chinese.
ALTERNATIVE_1	Returns all address information in the database language.
ALTERNATIVE_2	Returns all address information in Portuguese.
PRESERVE_INPUT	Returns the address information in the input language. Address Verification preserves the language if the reference address database contains the address in the input language.

Note: The language of the input data can affect the operation of the `PRESERVE_INPUT` option on a Macau address. Address Verification identifies the input language as Portuguese when the input data uses 7-bit ASCII characters and includes a Portuguese-language descriptor.

Example: PreferredLanguage Settings and Results for Macau Addresses

You enter the following Macau address for verification:

RUA DE PEQUIM 159
EDF. MARINA PLAZA
MACAU

The following table shows the validated results for different `PreferredLanguage` settings when you enter the address:

DATABASE	ALTERNATIVE_1 (Traditional Chinese)	ALTERNATIVE_2 (Portuguese)	PRESERVE_INPUT
北京街 159 海冠中心 澳門	北京街 159 海冠中心 澳門	RUA DE PEQUIM 159 EDF. MARINA PLAZA MACAU	RUA DE PEQUIM 159 EDF. MARINA PLAZA MACAU

The table indicates that the results for `DATABASE` and `ALTERNATIVE_1` are in traditional Chinese and the result for `ALTERNATIVE_2` is in Portuguese.

Note: When you set the preferred language to `DATABASE` or `ALTERNATIVE_1` and you set the preferred script to `LATIN`, `LATIN_1`, or `ASCII`, Address Verification returns the output in Cantonese. When you set the preferred language to `DATABASE` or `ALTERNATIVE_1` and you set the preferred script to `LATIN_ALT`, Address Verification returns the output in Pinyin.

Multilanguage Support for Switzerland Addresses

You can configure Address Verification to return locality information and province (Canton) information in valid Switzerland addresses in French, German, or Italian.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the `PreferredLanguage` values that you can set for Switzerland address data:

Option	Description
DATABASE	Default value. Returns addresses in the main language of the region to which the address belongs. For example, Address Verification returns a Zurich address in German and a Geneva address in French.
ENGLISH	Returns the locality and province information in English if the reference address database contains the information in English. Returns the other address elements in the main language of the region to which the address belongs. Address Verification returns the locality information in English for select localities such as Geneva and Zurich.
ALTERNATIVE_1	Returns the province and locality information in German.
ALTERNATIVE_2	Returns the province and locality information in French.
ALTERNATIVE_3	Returns the province and locality information in Italian.
PRESERVE_INPUT	Returns addresses in the language that the input address uses. Address Verification preserves the language if the reference address database contains the address in the input language. If the input address contains more than one language, Address Verification returns the output in the database language.

Note: Address Verification also returns street information for addresses in Biel/Bienne in the alternative language that you configure.

Example: PreferredLanguage Settings and Results for Switzerland Addresses

You enter the following Switzerland address for verification:

Beundenweg 36

2503 Biel/Bienne

The following table shows the validated results for different `PreferredLanguage` settings when you enter the address:

DATABASE	ENGLISH	ALTERNATIVE_1 (German)	ALTERNATIVE_2 (French)	ALTERNATIVE_3 (Italian)	PRESERVE_INPUT
Beundenweg 36 2503 Biel/ Bienne	Beundenweg 36 2503 Biel/ Bienne	Beundenweg 36 2503 Biel/ Bienne	Chemin des Oeuches 36 2503 Bienne	Beundenweg 36 2503 Bienna	Beundenweg 36 2503 Biel/ Bienne

The table indicates that the results for DATABASE, ENGLISH, ALTERNATIVE_1, and PRESERVE_INPUT are in German. The result for ALTERNATIVE_2 is in French.

In the ALTERNATIVE_3 result, you receive the locality information in Italian. The Switzerland reference address database contains only the locality information for the address in Italian. Informatica Address Verification returns the street information in German, which is the database language for the address. In this case, Address Verification returns an extended element result status (EERS) value of E for the street element.

An EERS value of E indicates that the output is in the database language because the reference database does not contain the information in the language that you specified.

Multilanguage Support for Taiwan Addresses

You can configure Address Verification to return valid Taiwan addresses in Chinese or in English. The default language is Chinese.

To set the preferred language, configure the `PreferredLanguage` attribute of the `Result` element in `Parameters.xml`.

The following table describes the `PreferredLanguage` values that you can set for Taiwan address data:

Option	Description
DATABASE	Default value. Returns all address information in Chinese.
ENGLISH	Returns all address information in English.
PRESERVE_INPUT	Returns the address information in the input language. If Address Verification cannot return an element in the input language, it returns the element in the database language.

Consider the following rules and guidelines when you select the preferred language:

- To return the address in the Chinese language, set the `PreferredLanguage` parameter to `DATABASE`.
To return the address in a Chinese character set, set the `PreferredScript` parameter to `DATABASE`.
- To return the address in the English language, set the `PreferredLanguage` parameter to `ENGLISH`.
To return the address in a Latin or ASCII character set, set the `PreferredScript` parameter to a `LATIN` or `ASCII` value.
- The language of the input data can affect the operation of the `PRESERVE_INPUT` option on a Taiwan address. Address Verification identifies the input language as English when the input data uses 7-bit ASCII characters and includes an English-language descriptor.

Example: PreferredLanguage Settings and Results for Taiwan

You enter the following Taiwan address for verification:

```
55 Jinshan S. Rd., Sec. 2  
Da'an Dist.  
Taipei City 10603  
TAIWAN
```

The following table shows the validated results for different `PreferredLanguage` settings:

DATABASE	ENGLISH	PRESERVE_INPUT
10603 臺北市大安區金山南路2段55號	55 Jinshan S. Rd., Sec. 2 Da'an Dist. Taipei City 10603 TAIWAN	55 Jinshan S. Rd., Sec. 2 Da'an Dist. Taipei City 10603 TAIWAN

In the examples above, Address Verification uses a `PreferredScript` setting of `DATABASE` to return the address in Mandarin Traditional Chinese. Address Verification uses a `PreferredScript` setting of `LATIN_1` to return the `ENGLISH` and `PRESERVE_INPUT` addresses.

Note: A Taiwan address in the native script lists all address elements on a single line. You can validate a Taiwan address in the traditional Chinese script as a single string in a Formatted Address Line element.

When you format an input address, enter the elements in the address in the following order:

Postal Code, Locality, Dependent Locality, Street, Dependent Street, House or Building Number, Building Name, Sub-Building Name

The PreferredScript Attribute

The PreferredScript attribute defines the policy that Informatica Address Verification uses to select a character script for an output address. Informatica Address Verification can return addresses from different countries in different scripts. To specify the preferred script set for an output address, set the PreferredScript attribute of the Result element in Parameters.xml. For most countries, Informatica Address Verification returns addresses in Latin-1 or ASCII regardless of the script that you specify.

You can set one of the following values for the PreferredScript attribute:

DATABASE

Returns the address in the script in which the reference address database stores the address.
DATABASE is the default value.

POSTAL_ADMIN_PREF

Returns the address in the script that the postal service local to the address prefers.

POSTAL_ADMIN_ALT

Returns the address in the script that the postal service local to the address approves as an alternative script.

ASCII_SIMPLIFIED

Returns the address in the ASCII simplified script.

ASCII_EXTENDED

Returns the address in the ASCII-extended script. The script supports the expansion of special characters, for example Ö to OE.

LATIN

Returns the address in the Latin script.

LATIN_1

Returns the address in the Latin-1 script.

LATIN_ALT

Returns the address in an alternative Latin script.

For example, you can specify LATIN and LATIN-1 to return a South Korea address in the Revised Romanization transliteration. To return a South Korea address in the older, ISO/TR 11941 transliteration, specify LATIN_ALT.

PRESERVE_INPUT

Returns the address in the same script as the input address.

If the input address contains elements in more than one script, Address Verification overrides the PRESERVE_INPUT setting and returns the address in the default script in the reference address

database. For example, if you specify PRESERVE_INPUT and you enter a Japan address that contains both Kanji and Latin elements, Address Verification returns all address elements in Kanji. Kanji is the default script for the Japan reference address database.

Note: Setting a PreferredScript value does not guarantee that the output address will contain characters exclusively in the script that you specify. If the preferred script that you specify does not support an input character, the engine copies the input character to the output. This can result in the output address containing data in more than one script. If the input contains address elements that are not in the corresponding database, Address Verification attempts to transliterate the input according to the PreferredScript setting.

Countries and PreferredScript Options

The following table lists the preferred scripts that Address Verification can specify for different countries:

Country	DATABASE	POSTAL_ADMIN_PREF	POSTAL_ADMIN_ALT	LATIN	LATIN_ALT	LATIN_1
BLR	Belarusian Cyrillic	Belarusian Cyrillic	Belarusian Cyrillic	ASCII, transliterated to the Belarusian database standard	ASCII, transliterated to the Belarusian BGN standard	ASCII, transliterated to the Belarusian BGN standard
BGR	Bulgarian Cyrillic	Bulgarian Cyrillic	Bulgarian Cyrillic	ASCII, transliterated to the Bulgarian BGN standard	ASCII, transliterated to the Bulgarian BGN standard	ASCII, transliterated to the Bulgarian BGN standard
CHN	Hanzi	Hanzi	Hanzi	Latin, Mandarin transliteration	Latin, Cantonese transliteration	Latin-1
CZE	Latin-2	Latin-2	Latin-2	ASCII	Latin-2	Latin-1
FIN	Latin-1	Latin-1	Latin-1	ASCII	Latin-1	Latin-1
GRC	Greek	Greek	Greek	Latin-1, transliterated to the ISO standard	ASCII, transliterated to the BGN standard	ASCII
HKG	Hanzi	Hanzi	Hanzi	Latin, Cantonese transliteration	Latin, Mandarin transliteration	Latin, Cantonese transliteration
HUN	Latin-2	Latin-2	Latin-2	ASCII	Latin-2	Latin-1
ISR	Hebrew	Latin	Latin	Latin	Latin	Latin-1
JPN	Kanji	Kanji	Kana	Latin	Latin	Latin-1
KAZ	Cyrillic	Cyrillic	Cyrillic	Latin-2, transliterated to the ISO standard	ASCII, transliterated to the BGN standard	ASCII, transliterated to the BGN standard

Country	DATABASE	POSTAL_ADMIN_PREF	POSTAL_ADMIN_ALT	LATIN	LATIN_ALT	LATIN_1
KOR	Hangul	Hangul	Hangul	ASCII, transliterated using Revised Romanization	ASCII, transliterated using ISO/TR 11941 Romanization	ASCII, transliterated using Revised Romanization
LVA	Latin-7	Latin-7	Latin-7	ASCII	Latin-7	ASCII
MAC	Hanzi	Hanzi	Hanzi	Latin, Cantonese transliteration	Latin, Mandarin transliteration	Latin, Cantonese transliteration
MDA	Latin-2	Latin-2	Latin-2	ASCII	Latin-2	Latin-1
MKD	Cyrillic	Cyrillic	Cyrillic	ASCII	ASCII, transliterated to the Macedonian BGN standard	ASCII, transliterated to the Macedonian BGN standard
POL	Latin-2	Latin-2	Latin-2	ASCII	Latin-2	Latin-1
ROU	Latin-3	Latin-3	Latin-3	ASCII	Latin-3	Latin-1
RUS	Cyrillic	Cyrillic	Cyrillic	Latin-2, transliterated to the ISO standard	ASCII, transliterated to the BGN standard	ASCII, transliterated to the BGN standard
SVK	Latin-2	Latin-2	Latin-2	ASCII	Latin-2	Latin-1
TWN	Hanzi	Hanzi	Hanzi	Latin, Cantonese transliteration	Latin, Mandarin transliteration	Latin, Cantonese transliteration
UKR	Cyrillic	Cyrillic	Cyrillic	ASCII	ASCII, transliterated to the Ukrainian BGN standard	ASCII, transliterated to the Ukrainian BGN standard
VNM	Vietnamese	Vietnamese	Vietnamese	ASCII	Vietnamese	Latin-1

Note: Address Verification can return addresses in ASCII-simplified and ASCII-extended characters for each country.

PreferredScript Examples

The following examples show how the `PreferredScript` attribute functions in different scenarios.

Japan address input in Kanji script

The following Japan address is in Kanji script. The `PreferredScript` attribute is set to `PRESERVE_INPUT`.

```
<InputData>
  <AddressElements>
```

```

        <Country Item="1" Type="NAME">JAPAN</Country>
        <Locality Item="1" Type="COMPLETE">大阪市</Locality>
        <Locality Item="2" Type="COMPLETE">都島区</Locality>
        <Locality Item="3" Type="COMPLETE">内代町</Locality>
        <PostalCode Item="1" Type="UNFORMATTED">〒 534-0013</PostalCode>
        <Province Item="1" Type="COUNTRY_STANDARD">大阪府</Province>
        <Street Item="1" Type="COMPLETE">2丁目</Street>
    </AddressElements>
</InputData>

```

The output is in Kanji script:

```

<FormattedAddressLine Line="1">JAPAN 〒 534-0013 大阪府大阪市都島区内代町 2 丁目</FormattedAddressLine>

```

Japan address input in mixed script

The following input address contains both Latin and Kanji scripts.

```

<InputData>
  <AddressElements>
    <Country Item="1" Type="NAME">JAPAN</Country>
    <Locality Item="1" Type="COMPLETE">ŌSAKA-SHI</Locality>
    <Locality Item="2" Type="COMPLETE">MIYAKOJIMA-KU</Locality>
    <Locality Item="3" Type="COMPLETE">UCHINDAI-CHŌ</Locality>
    <PostalCode Item="1" Type="UNFORMATTED">534-0013</PostalCode>
    <Province Item="1" Type="COUNTRY_STANDARD">ŌSAKA-FU</Province>
    <Street Item="1" Type="COMPLETE">2 CHŌME</Street>
    <Organization Item="1" Type="COMPLETE">才</Organization>
  </AddressElements>
</InputData>

```

The output in this case, where the input contains both Latin and Kanji scripts, is in Kanji script, which is the default script of the Japanese address database.

```

<FormattedAddressLine Line="1">〒 534-0013 大阪府大阪市都島区内代町 2 丁目才</FormattedAddressLine>

```

Russia address input in Latin script

The following input address contains Latin script.

```

<InputData>
  <AddressElements>
    <Country Item="1" Type="NAME">RUSSIAN FEDERATION</Country>
    <Locality Item="1" Type="COMPLETE">Majma</Locality>
    <PostalCode Item="1" Type="UNFORMATTED">649100</PostalCode>
    <Province Item="1" Type="COUNTRY_STANDARD">Altaj</Province>
    <Street Item="1" Type="COMPLETE">ul. Celinnaâ</Street>
    <Number Item="1" Type="COMPLETE">1</Number>
  </AddressElements>
</InputData>

```

The output in this case is in Latin script because of the PRESERVE_INPUT setting.

```

<FormattedAddressLine Line="1">ul. Celinnaâ 1</FormattedAddressLine>
<FormattedAddressLine Line="2">Majma</FormattedAddressLine>
<FormattedAddressLine Line="3">Altaj</FormattedAddressLine>
<FormattedAddressLine Line="4">649100</FormattedAddressLine>

```

Russia address in mixed input that contains Cyrillic and Latin scripts:

The following input address contains both Cyrillic and Latin scripts.

```

<InputData>
  <AddressElements>
    <Country Item="1" Type="NAME">RUSSIAN FEDERATION</Country>
    <Locality Item="1" Type="COMPLETE">Majma</Locality>
    <PostalCode Item="1" Type="UNFORMATTED">649100</PostalCode>
    <Province Item="1" Type="COUNTRY_STANDARD">Altaj</Province>
    <Street Item="1" Type="COMPLETE">ul. Celinnaâ</Street>
    <Number Item="1" Type="COMPLETE">1</Number>
  </AddressElements>
</InputData>

```

```

    <Organization Item="1" Type="COMPLETE">Й</Organization>
  </AddressElements>
</InputData>

```

If you set `PreferredScript` to `PRESERVE_INPUT`, the output contains only Cyrillic because that is the default script of the Russia reference address database.

```

<FormattedAddressLine Line="1">Й</FormattedAddressLine>
<FormattedAddressLine Line="2">ул. Целинная 1</FormattedAddressLine>
<FormattedAddressLine Line="3">Майма</FormattedAddressLine>
<FormattedAddressLine Line="4">Алтай</FormattedAddressLine>
<FormattedAddressLine Line="5">649100</FormattedAddressLine>

```

The `RangesToExpand` and `FlexibleRangeExpansion` Attributes

You can use the *RangesToExpand* attribute to specify whether to expand house or building number ranges into individual address suggestions when individual numbers are available in the reference data. The *FlexibleRangeExpansion* attribute specifies the scope of the range expansion and determines whether the output addresses can include a combination of number ranges and individual numbers.

The attributes apply in fast completion and interactive modes. Find both attributes in the `Result` element in `Parameters.xml`.

RangesToExpand

The options on the *RangesToExpand* attribute are `ALL`, `ONLY_WITH_VALID_ITEMS`, and `NONE`.

If you set *RangesToExpand* to `ALL`, Address Verification expands the house number ranges whenever any building or house number is available for the street in the suggested address.

If you set *RangesToExpand* to `ONLY_WITH_VALID_ITEMS`, Address Verification expands the ranges only if the reference data contains the complete list of house numbers within the range for the street.

You can turn off the range expansion by setting the *RangesToExpand* attribute to `NONE`. The default value is `NONE`.

When a complete list of house numbers is available in the reference address database, the `ONLY_WITH_VALID_ITEMS` option behaves in the same way as `ALL`. When a complete list of house numbers is not available in the reference address database, the `ONLY_WITH_VALID_ITEMS` setting behaves in the same way as `NONE`.

FlexibleRangeExpansion

You can configure the *RangesToExpand* attribute in conjunction with the *FlexibleRangeExpansion* attribute to enable address suggestions that include both number ranges and individual numbers. The *FlexibleRangeExpansion* attribute is set to `ON` by default.

When the *FlexibleRangeExpansion* attribute is `ON`, Address Verification uses internal logic to determine how many results to expand and how many to keep as ranges so that the results do not exceed the *MaxResultCount* value. For example, Address Verification might expand only the initial items in the suggestion list and return number ranges for the remaining addresses.

Therefore, the numbers of results and the nature of the suggestion list can depend on the value that you specify for *MaxResultCount* in addition to the *RangesToExpand* and *FlexibleRangeExpansion* values.

Configuring the Range Attributes

You can configure the following attributes of the `Result` element in `Parameters.xml` to specify how you want Informatica Address Verification to handle number ranges in addresses.

- To specify whether or not to expand the ranges, set the `RangesToExpand` attribute to one of the following values.
 - ALL. Expands the ranges always.
 - ONLY_WITH_VALID_ITEMS. Expands the ranges only when the reference address database contains full list of numbers for the specified range.
 - NONE. Does not expand a range.
- To configure flexible expansion of ranges, set the `FlexibleRangeExpansion` to ON.

`FlexibleRangeExpansion` is set to ON by default. To disable flexible expansion of ranges, set `FlexibleRangeExpansion` to OFF.

The StandardizeInvalidAddresses Attribute

You can configure Informatica Address Verification to standardize invalid address elements. Standardizing invalid address elements can improve downstream business processes, such as matching and deduplication.

When the `StandardizeInvalidAddresses` attribute is set to ON, Address Verification standardizes address elements, such as the elements listed below, in invalid addresses or addresses that have an Ix process status.

- Street types
- Pre and post directionals
- Delivery service items
- Subbuilding descriptors
- State/province/regions

For example, Address Verification can standardize California to CA.

The default value for `StandardizeInvalidAddresses` is OFF.

Standardizing Nonvalid Addresses

You can configure Informatica Address Verification to standardize addresses even though the addresses fail to validate.

- In `Parameters.xml`, set the `StandardizeInvalidAddresses` attribute of the `Result` element to ON.

The default value for this attribute is OFF.

Output Standardization

When you validate an address, Address Verification returns the output that meets the specifications from the local postal authorities and the Universal Postal Union (UPU). You can modify the output by configuring the address element standardization options in the `Parameters.xml` file.

The address element-level standardizations include options for casing, maximum item count, and maximum string length. If you do not want to configure the attributes at the address element level, you can set global values for the attributes. If you configure global and address-element level values for `MaxLines`, `MaxLength`, and `GlobalCasing` attributes, the address element-level values override the global settings.

The following table describes the `MaxLines`, `MaxLength`, and `GlobalCasing` attributes and supported values for different address elements:

Address Element	Default Value for GlobalCasing	Minimum Recommended value for MaxLength	Value Range Supported for MaxItemCount	Default Value for MaxItemCount
RecipientLine	NOCHANGE	25	1 through 6	6
DeliveryAddressLine	NOCHANGE	25	1 though 6	6
CountrySpecificLocalityLine	NOCHANGE	25	1 through 6	6
FormattedAddressLine	NOCHANGE	25	1 through 19	19
AddressComplete	GLOBAL	25	Not Applicable	Not Applicable
Country	GLOBAL	2	1 through 3	3
Locality	GLOBAL	20	1 through 6	6
PostalCode	GLOBAL	5	1 through 3	3
Province	GLOBAL	2	1 through 6	6
Street	GLOBAL	20	1 through 6	6
Number	GLOBAL	5	1 through 6	6
Building	GLOBAL	25	1 through 6	6
SubBuilding	GLOBAL	25	1 through 6	6
DeliveryService	GLOBAL	25	1 through 3	3
Organization	GLOBAL	25	1 through 3	3
Department	GLOBAL	25	1 through 3	3
Contact	GLOBAL	25	1 through 3	3
FirstName	GLOBAL	20	1 through 3	3

Address Element	Default Value for GlobalCasing	Minimum Recommended value for MaxLength	Value Range Supported for MaxItemCount	Default Value for MaxItemCount
MiddleName	GLOBAL	20	1 through 3	3
LastName	GLOBAL	20	1 through 3	3
Title	GLOBAL	20	1 through 3	3
Function	GLOBAL	20	1 through 3	3
Salutation	GLOBAL	20	1 through 3	3
Gender	GLOBAL	1	1 through 3	3
Residue	GLOBAL	25	1 through 6	6

GlobalCasing Values

At the address element level, you can set one of the following values for the `GlobalCasing` attribute:

NATIVE

Returns the result output in the same casing that the data in the reference address database uses.

UPPER

Returns the result output in uppercase letters.

LOWER

Returns the result output in lowercase letters.

MIXED

Returns the result output in mixed case and according to any country-specific casing guidelines.

NOCHANGE

Returns the output address without any case standardization.

The NOCHANGE setting does not specify that the output address preserves the casing of the input address. Rather, the NOCHANGE setting specifies that the Address Verification engine does not alter the casing style. If Address Verification corrects the address from the reference data, the output address uses the casing style that the reference data uses.

Configuring Output Standardization at Address Element Level

You can configure output standardization attributes at the address element level.

1. In `Parameters.xml`, specify one of the following subelements of the `AddressElementStandardize` element:
 - `RecipientLine`
 - `DeliveryAddressLine`
 - `CountrySpecificLocalityLine`
 - `FormattedAddressLine`

- AddressComplete
 - Country
 - Locality
 - PostalCode
 - Province
 - Street
 - Number
 - Building
 - SubBuilding
 - DeliveryService
 - Organization
 - Department
 - Contact
 - FirstName
 - MiddleName
 - LastName
 - Title
 - Function
 - Salutation
 - Gender
 - Residue
2. To specify casing, set the `Casing` attribute to one of the following values:
 - NATIVE
 - UPPER
 - LOWER
 - MIXED
 - NOCHANGE
 - GLOBAL
 3. Set the `MaxLength` attribute to a value that is not less than the minimum recommended value specified in the table in the preceding section.
 4. Set the `MaxItemCount` attribute to a value in the range supported for the address element specified in the first step. For value ranges supported for each of the address elements, see the table in the preceding section.

CHAPTER 7

Output Fields

This chapter includes the following topics:

- [Output Fields Overview, 121](#)
- [The Result Element, 121](#)
- [The ResultData Element, 122](#)

Output Fields Overview

When you process an address, you receive a result output that contains a number of fields such as address elements, address line elements, and enrichment values. The result output also contains process-related information and status and assessment codes.

The `Result.dtd` file defines the output formats and fields. The result output you receive depends on the process parameters and result settings that you configure.

The Result Element

The `Result` element in `Result.xml` contains the following attributes:

ProcessStatus

Indicates status of the process call. For more information see [“Address Verification Process Status” on page 128](#).

ModeUsed

Indicates the process mode that you specified. The possible values are:

- ADDRESSCODELOOKUP
- BATCH
- CERTIFIED
- COUNTRYRECOGNITION
- FASTCOMPLETION
- INTERACTIVE
- PARSE

Count

Indicates the number of results. The value range is between 0 through 100. The default value is 0.

CountOverflow

Indicates whether there are more results available when you verify addresses in the interactive or fast completion mode. The possible values are YES and NO. The default value is NO.

CountryISO3

Contains the country ISO3 code.

PreferredScript

Contains the preferred language you configured. The possible values are:

- ASCII_EXTENDED
- ASCII_SIMPLIFIED
- DATABASE
- LATIN
- LATIN_1
- LATIN_ALT
- POSTAL_ADMIN_PREF
- POSTAL_ADMIN_ALT
- PRESERVE_INPUT

PreferredLanguage

Contains the preferred language you configured. The possible values are:

- ALTERNATIVE_1
- ALTERNATIVE_2
- ALTERNATIVE_3
- DATABASE
- ENGLISH
- PRESERVE_INPUT

The ResultData Element

The `ResultData` element contains multiple subelements and attributes. The attributes of `ResultData` contain various assessment codes that help you analyze results.

AddressElements

The `AddressElements` subelement of `ResultData` contains the following elements:

Key

Contains the record ID or transaction key. The attributes include:

Type. The possible values are `RECORD_ID` and `TRANSACTION_KEY`. The default value is `RECORD_ID`.

Item. Number of items. The range is 1 through 3. The default value is 1.

Country

Contains the country name or the country code based on the configuration for the `CountryType` attribute in `Parameters.xml`. The attributes include:

Type. Type of country information. The possible values are ABBREVIATION, ISO2, ISO3, ISO_NUMBER, NAME_CN, NAME_DA, NAME_DE, NAME_EN, NAME_ES, NAME_FI, NAME_FR, NAME_GR, NAME_HU, NAME_IT, NAME_JP, NAME_KR, NAME_NL, NAME_PL, NAME_PT, NAME_RU, NAME_SA, and NAME_SE. The default value is NAME_EN.

Item. Number of items. The range is 1 through 3. The default value is 1.

Locality

Contains the locality information. The attributes include:

- Type. The type of locality information. The possible values are COMPLETE, NAME, PREFERRED_NAME, SORTING_CODE, and ADD_INFO. The default value is COMPLETE.
- Item. The number of items. The range is 1 through 6. The default value is 1.

PostalCode

Contains the postal code. The attributes include:

- Type. The type of postal code information. The possible values are FORMATTED, UNFORMATTED, BASE, and ADD_ON. The default value is FORMATTED.
- Item. The number of items. The range is 1 through 3. The default value is 1.

Province

Contains the province information. The attributes include:

- Type. The type of province information. The possible values are COUNTRY_STANDARD, ABBREVIATION, EXTENDED, and ISO. The default value is COUNTRY_STANDARD.
- Item. The number of items. The range is 1 through 6. The default value is 1.

Street

Contains the street information. The attributes include:

- Type. The type of street information. The possible values are COMPLETE, COMPLETE_WITH_NUMBER, NAME, PRE_DESCRIPTOR, POST_DESCRIPTOR, PRE_DIRECTIONAL, POST_DIRECTIONAL, and ADD_INFO. The default value is COMPLETE.
- Item. The number of items. The range is 1 through 6. The default value is 1.

Number

Contains the information such as house or building number. The attributes include:

- Type. The type of number information. The possible values are COMPLETE, NUMBER, DESCRIPTOR, and ADD_INFO. The default value is COMPLETE.
- Item. The number of items. The range is 1 through 6. The default value is 1.

Building

Contains the building information. The attributes include:

- Type. The type of building information. The possible values are COMPLETE, COMPLETE_WITH_SUBBUILDING, NAME, NUMBER, and DESCRIPTOR. The default value is COMPLETE.

- Item. The number of items. The range is 1 through 6. The default value is 1.

SubBuilding

Contains the subbuilding information. The attributes include:

- Type. The type of building information. The possible values are COMPLETE, NAME, NUMBER, and DESCRIPTOR. The default value is COMPLETE.
- Item. The number of items. The range is 1 through 6. The default value is 1.

DeliveryService

Contains the delivery service information. The attributes include:

- Type. The type of delivery service information. The possible values are COMPLETE, DESCRIPTOR, NUMBER, and ADD_INFO. The default value is COMPLETE.
- Item. The number of items. The range is 1 through 3. The default value is 1.

Organization

Contains the organization information. The attributes include:

- Type. The type of organization information. The possible values are COMPLETE, NAME, DESCRIPTOR, and DEPARTMENT. The default value is COMPLETE.
- Item. The number of items. The range is 1 through 3. The default value is 1.

Contact

Contains the contact information. The attributes include:

- Type. The type of contact information. The possible values are COMPLETE, FIRST_NAME, MIDDLE_NAME, LAST_NAME, NAME, TITLE, FUNCTION, SALUTATION, and GENDER. The default value is COMPLETE.
- Item. The number of items. The range is 1 through 3. The default value is 1.

Residue

Contains superfluous or additional information. The attributes include:

- Type. The type of contact information. The possible values are NECESSARY, SUPERFLUOUS, and UNRECOGNIZED. The default value is UNRECOGNIZED.
- Item. The number of items. The range is 1 through 6. The default value is 1.

Province ISO Codes

You can receive the province ISO code in batch, interactive, and fast completion results. The province ISO code is the first three characters of the ISO 3166-2 code of the country. To return the province code, set the **Type** attribute of the Province element to ISO. Address Verification returns the province ISO code in the Item 1 field of the element.

You receive province ISO codes in the validated output for the following countries:

Andorra	Australia	Austria
Belarus	Belgium	Brazil
Bulgaria	Canada	China
Finland	France	Germany

Greenland	Haiti	Hungary
Indonesia	Ireland	Italy
Jamaica	Japan	Kazakhstan
Madagascar	Mexico	Moldova
Mozambique	Netherlands	Oman
Pakistan	Paraguay	Philippines
Poland	Portugal	Romania
Russia	Saudi Arabia	Slovakia
South Africa	South Korea	Sweden
Switzerland	Ukraine	United Kingdom
United States	Zambia	

Province Information in the United Kingdom

Address Verification returns the province ISO code in the Item 2 field of the Province element in a United Kingdom address.

The following table describes the province hierarchy in the United Kingdom:

Province	Type
Province_1	Postal Province
Province_2	Administrative Province
Province_3	Traditional Province

Within the Royal Mail Database, province ISO codes are available for the Administrative Province. Therefore, Address Verification delivers the province ISO code in the Province_2 field.

Similarly, when you set the **Type** attribute to COUNTRY_STANDARD, Address Verification returns the administrative province or county name in the Item 2 field in a United Kingdom address.

AddressLines

The `AddressLines` element contains the following subelements:

RecipientLine

Contains the recipient information such as contact or organization name. Informatica Address Verification supports up to six lines of recipient information. The `Line` attribute indicates the number of address lines in `RecipientLine`. The range is from 1 through 6. The default value is 1.

DeliveryAddressLine (DAL)

Contains the delivery information such as street, house number, building, and delivery service information. Address Verification supports up to six lines of delivery address line information. The Line attribute indicates the number of address lines in `DeliveryAddressLine`. The range is from 1 through 6. The default value is 1.

CountrySpecificLocalityLine (CSLLN)

Contains information such as locality, postal code, province, and country details. Address Verification supports up to six lines of country specific locality line information. The Line attribute indicates the number of address lines in `CountrySpecificLocalityLine`. The range is from 1 through 6. The default value is 1.

FormattedAddressLine (FAL)

Contains unfielded data that includes recipient information, delivery address information, and locality information. Address Verification typically returns the FAL output in the address format of the country to which the address belongs. Even if an address is not valid, Address Verification returns the parsed address output in the FAL. You can use the FAL output to print the address on envelopes or to generate address labels. Address Verification supports up to 19 lines of formatted address line information. The Line attribute indicates the number of address lines in `FormattedAddressLine`. The range is from 1 through 19. The default value is 1.

AddressComplete

The `AddressComplete` element contains the complete address as one string. Informatica Address Verification separates the address elements with delimiters such as comma or semicolon.

CHAPTER 8

Assessment Codes and Return Codes

This chapter includes the following topics:

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- [Address Verification Process Status, 128](#)
- [Element Positions, 130](#)
- [Element Input Status, 131](#)
- [Element Relevance, 132](#)
- [Element Result Status, 132](#)
- [Address Resolution Code, 133](#)
- [Extended Element Result Status, 134](#)
- [Result Percentage, 134](#)
- [LanguageISO3 Code, 134](#)
- [Mailability Score, 135](#)
- [Address Types, 138](#)
- [Certified Mode Process Status Values, 142](#)
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Status Codes, Assessment Codes, and API Return Codes

Informatica Address Verification returns status and assessment codes to help you understand and analyze the result output better.

The process status codes provide a high-level summary of the address verification process. The assessment codes that Address Verification returns include element input status, element result status, extended element result status, and element relevance values.

The assessment codes provide granular, element-level details. You can use the assessment codes to assess the following values:

- Quality of the input address and result.

- Probability of successful delivery to the address.
- Postal relevance of address elements.
- Reasons for rejection in case of address that are not valid.
- Level of similarities between the input address and the result.

Apart from the status codes and assessment codes in the result, you also receive return codes that indicate the status of API functions. API function calls provide information about the status of an API call.

Address Verification Process Status

The process status values that `AD_GetResultXML()` or `AD_GetResultParameter()` returns describe the result output quality of a process call to Informatica Address Verification. The process status values provide a high-level description of the status. You can use additional assessment codes such as Element Input Status, Element Result Status, and Extended Element Result Status for specific information on address elements.

Status Code	Description
V4	Verified. The input data is correct. Address Verification checked all postally relevant elements, and inputs matched perfectly.
V3	Verified. The input data is correct, but Address Verification standardized some or all elements, or the input contains outdated names or exonyms.
V2	Verified. The input data is correct, but Address Verification could not verify some elements because of incomplete reference data.
V1	Verified. The input data is correct, but user standardization has adversely affected deliverability. For example, the post code length is too short.
C4	Corrected. Address Verification has checked all postally relevant elements.
C3	Corrected. Address Verification could not check some elements.
C2	Corrected, but the delivery status is unclear because of absent reference data.
C1	Corrected, but the delivery status is unclear because user standardization introduced errors.
I4	Address Verification could not correct the data completely, but there is a single match with an address in the reference data.
I3	Address Verification could not correct the data completely, and there are multiple matches with addresses in the reference data.
I2	Address Verification could not correct the data. Interactive mode returns partial suggested addresses.
I1	Address Verification could not correct the data completely. Batch mode cannot suggest an address.
N7	Verification error. Verification did not take place because single-line verification is not unlocked.
N6	Verification error. Verification did not take place because single-line verification is not supported for the destination country.

Status Code	Description
N5	Verification error. Verification did not take place because the reference database is out of date.
N4	Verification error. Verification did not take place because the reference data is corrupt or badly formatted.
N3	Verification error. Verification did not take place because the country data cannot be unlocked.
N2	Verification error. Verification did not take place because the required reference database is not available.
N1	Verification error. Verification did not take place because the country is not recognized or not supported.
Q3	Fast Completion mode. Address Verification can retrieve one or more complete addresses from the address reference data that correspond to the input address.
Q2	Fast Completion mode. Address Verification can combine the input address elements and elements from the address reference data to create a complete address.
Q1	Fast Completion mode. Address Verification cannot suggest a complete address. To generate a complete address suggestion, add data to the input address.
Q0	Fast Completion mode. There is insufficient input data to generate a suggestion.
S4	Parse mode. The address was parsed perfectly.
S3	Parse mode. The address was parsed with multiple results.
S2	Parse mode. Address Verification parsed the address with errors because of the changed element positions.
S1	Parse mode. There was a parsing error due to an input format mismatch.
RB	Country recognized from abbreviation. Recognizes ISO two-character and ISO three-character country codes. Can also recognize common abbreviations such as "GER" for Germany.
RA	Country assigned by the ForceCountryISO3 setting.
R9	Country recognized from the Default CountryISO3 setting.
R8	Country recognized from the country name.
R7	Country recognized from the country name, but Address Verification identified errors in the country data.
R6	Country recognized from territory data.
R5	Country recognized from province data.
R4	Country recognized from major town data.
R3	Country recognized from the address format.
R2	Country recognized from the script.
R1	Country not recognized because multiple matches are available.

Status Code	Description
R0	Country not recognized.
A1	Address code lookup found a partial address or a complete address for the input code.
A0	Address code lookup found no address for the input code.

Address Verification returns the Vx, Cx, and Ix process status codes for BATCH, INTERACTIVE, or CERTIFIED process calls. Address Verification returns Qx for FASTCOMPLETION mode requests, Sx for PARSE mode requests, Rx for COUNTRYRECOGNITION, and Ax for ADDRESSCODELOOKUP.

Address Verification returns Nx process status codes in the case of an error. Typically, batch and interactive modes return the same process status for the same input address. However, in case of an incorrect numeric entry, Address Verification returns different codes in batch (I4) and interactive (I3).

In batch, interactive, and certified modes, Address Verification returns parsed output for Ix records. However, ensure that you manually review the Ix results before using the results for any database update.

In Country Recognition mode, Address Verification returns a process status code of R0 when an address specifies a country that is not supported or recognized. Address Verification returns a process status code of N1 for such addresses during validation. For example, the Soviet Union (SUN) and the Netherlands Antilles (ANT) are no longer supported or recognized.

The CountryISO3 field remains empty if Address Verification does not recognize a country in any mode.

Element Positions

The following fields return a 20-character code in which each character refers to a different address data element:

- Address Resolution Code
- Element Input Status
- Element Relevance
- Element Result Status
- Extended Element Result Status

When you read the output codes on one of the fields, you must know the element that each character refers to. The 20 characters represent the status of ten elements. Each element has two code values.

For each element, level 1 indicates the status of the first item and level 2 summarizes the status of any additional item. For example, if the input address contains 3 levels of locality, the value at position 3 points to locality 1, whereas the value at position 4 summarizes the assessment of locality 2 and locality 3.

1. PostalCode level 1
2. PostalCode level n (for example, ZIP+4 – Plus 4 addition)
3. Locality level 1
4. Locality level n (for example, Urbanisation, Dependent Locality)
5. Province level 1

6. Province level n (for example, Sub Province)
7. Street level 1
8. Street level n (for example, Dependent Street)
9. Number level 1
10. Number level n
11. Delivery service level 1 (for example, PO Box, GPO, Packstation, Private Bags)
12. Delivery service level n
13. Building level 1
14. Building level n
15. SubBuilding level 1
16. SubBuilding level n
17. Organization level 1
18. Organization level n
19. Country level 1 (Mother country)
20. Country level n (for example, Territory)

Element Input Status

The following values are possible for Element Input Status (`ElementInputStatus`, EIS):

0. The input address contains no data at this position.
1. The data at this position is not available in the reference data.
2. The data at this position cannot be checked because reference data is missing.
3. The data is incorrect. The reference database suggests that the Number or DeliveryService value is outside the range expected by the reference data. In batch and certified modes, Informatica Address Verification returns the input data at this position without making any correction. In the suggestion list modes such as fast completion and interactive, Address Verification returns suggestions to choose from.
4. The data at this position matches the reference data, but with errors.
5. The data at this position matches the reference data, but the data element was corrected or standardized. For example:
 - Parsing: Splitting of house number for “MainSt 1”
 - Verification: Replacing an input that is an exonym, or dropping superfluous fielded input that is not valid according to the country reference database
6. The data at this position matches the reference data without any error.

In the Parse mode, Address Verification returns the following values:

0. The input address contains no data at this position.
1. The element at this location was moved to another position.
2. The element at this position matched the reference data value but needed to be normalized.
3. The data at this position has not been changed.

Element Relevance

You can use the Element Relevance value to understand which of the address elements are relevant for an address according to the local postal guidelines. Informatica Address Verification returns a value of 1 for address elements that are relevant, and 0 for elements that are not relevant.

All address elements with an Element Relevance value of 1 must be present for the local postal authority to consider an address valid. Element Relevance might vary from address to address for countries with different address types, such as rural address and metropolitan addressing. Furthermore, address elements that have actually been validated against reference data might override the default Element Relevance value defined for that address element.

Note: Element Relevance values are available only for addresses with a process status value of Cx or Vx in batch and interactive modes or I3 or I4 values in the interactive mode. Other assessment codes such as Element Input Status, Element Result Status, Extended Element Result Status, and Address Resolution Code always return a value regardless of the process status.

Element Result Status

Informatica Address Verification sets the Element Result Status (`ElementResultStatus`, ERS) value after verification to indicate whether verification ("verified") or correction ("changed") was possible.

The following values are possible for the address elements in positions 1 through 18:

0. The output address contains no data at this position.
1. The data at this position cannot be found in the reference data. The input data is copied to the output data.
2. Data at this position is not checked but is standardized.
3. Data at this position is checked but does not match the expected reference data. The reference data suggests that the number data is not in the valid range. The input data is copied to the output. The status value applies in batch mode only.
4. Data at this position is copied from the input because the corresponding reference data is not available.
5. Data at this position is valid but not changed because multiple matches exist in the reference data. The status value applies in batch mode only.
6. Verification deleted the input value at this position.
7. Data at this position is valid but contained a spelling error. Verification corrected the error by copying the value from the reference data.
8. Data at this position is valid and updated by adding a value from the reference data. It can also mean that the reference database contains additional data for the input element. For example, verification can add a building or sub-building number if a perfect match is found for the street name or building name.
9. Data at this position is valid but not changed, and the delivery status is not clear. For example, the DPV value is wrong.
- C. Data at this position is valid and verified, but the name data is out of date. Verification changed the name data.
- D. Data at this position is valid and verified but changed from an exonym to an official name.

E. Data at this position is valid and verified. However, verification standardized the character case or the language. Verification can change the language if the value fully matches a language alternative. For example, verification can change "Brussels" to "Bruxelles" in a Belgium address.

F. Data at this position is valid, verified, and not changed, due to a perfect match against the reference data

Positions 19 and 20 in the output string relate to country data. The country data values apply to the COUNTRYRECOGNITION process mode also.

The following values are possible for the address elements in positions 19 through 20:

- 0. The output address contains no data at this position.
- 1. The country is not recognized.
- 4. The country is recognized from the DefaultCountryISO3 setting.
- 5. The country is not recognized because multiple matches are available.
- 6. The country is recognized from a script.
- 7. The country is recognized from the address format.
- 8. The country is recognized from major town data.
- 9. The country is recognized from province data.
- C. The country is recognized from territory data.
- D. The country is recognized from the country name, but the name contains errors.
- E. The country is recognized from the country name without errors.
- F. The country is recognized from the ForceCountryISO3 setting.

Address Resolution Code

Address resolution code (`AddressResolutionCode`, ARC) is a 20-character output string similar to the element status fields. Informatica Address Verification returns ARC values for nonvalid addresses with Ix process status code. ARC describes why Address Verification rejected an address and directs you to possible resolutions. Address Verification generates the following ARC values:

- 2. Missing element in address.
- 3. Numeric provided inside element is outside permissible range – for example, wrong numeric inside street name or house number; 100 Main St when house numbers range from 400-800 on Main St.
- 4. Multiple inputs for the element.
- 5. Input element ambiguous / multiple matches.
- 6. Element contradicts other elements. For example, the postal code information and locality information do not match.
- 7. Address is rejected because Address Verification corrected multiple elements or copied multiple elements from the input address to the output address.
- 8. General Postal Authority Rule.

In all other scenarios, Address Verification returns the default ARC value, 0.

Extended Element Result Status

You can use the Extended element result status (`ExtElementStatus`, EERS) code to understand a result and to see whether more information is available in the database. The EERS code is a 20-character output string similar to the Element Status fields for valid or corrected addresses.

Informatica Address Verification returns the following values for EERS:

1. Data available for the element in the database, but not used in the output.
2. Element unchecked, but changed because of wrong syntax/format.
3. Numeric in element correct, but element changed because of wrong syntax/descriptor.
4. Element correct or unchecked, but moved because of wrong format.
5. Alternative available in database – for example, language, preferred locality name, alias name.
6. Unvalidated parts inside element like additional information.
7. Level change like moving HNO1 to HNO2 or swapping Locality2 with Locality1.
8. Type changed for fielded input only; for example, moving SubBuilding to Building Level 2.
9. General Postal Authority Rule.
 - A. Dominant match for dual address processing.
 - B. Relevance is only a country-wide default and cannot be trusted.
 - C. Fast Completion Overflow.
 - D. Numeric for range expansion (interpolated).
 - E. Language not available for the country, database language returned.
 - F. Output address is outdated.

In all other scenarios, Address Verification returns the default EERS value, 0.

Result Percentage

Informatica Address Verification returns a result percentage (`ResultPercentage`) value that represents the degree to which the input address matches the information in the reference data. A value close to 100% indicates a high degree of similarity.

If your data requirements are stringent, you can use the result percentage values to filter out results with extensive corrections. Similarly, you can use the result percentage values to identify Interactive mode suggestions that have the least deviation from the input address.

Informatica discourages using the result percentage values for other use case scenarios.

LanguageISO3 Code

When a result output contains data from the reference address database, Informatica Address Verification specifies the language in the ISO 639 3-letter code in the output. For example, `DEU` for German.

For transliterated output, Address Verification specifies the original language in the output. For example, `JPN` in case of romanized Japanese output.

If the reference address database does not contain language information, Address Verification returns a value of xxx in the LanguageISO3 code field.

Mailability Score

The Mailability Score is a general indicator of the likelihood that a mail carrier can deliver mail to an address. Use the mailability score to obtain a high-level summary of the deliverability of the addresses in an address set.

Note: Do not rely on the mailability score alone for business decisions. The Process Status code and the more granular Element Input Status, Element Result Status, and Extended Element Result Status codes are collectively more reliable sources for informed decision-making about address quality and deliverability.

The following table describes the Mailability Score values:

Value	Summary	Description
5	Completely Confident	Indicates that address validation checked and verified all relevant elements of the input address.
4	Almost Certain	Indicates either of the following scenarios: <ul style="list-style-type: none">- One or more relevant address elements cannot be checked due to absent reference data. Other address elements are verified.- Address validation corrected one or more relevant elements with a very high degree of confidence. This occurs when address validation finds a single match between the input address and the reference data and the degree of variation is very low.
3	Should Be Fine	Indicates that address validation corrected one or more relevant elements in the input address. Address validation found a single match between the input address and the reference data, and the degree of variation is acceptable.
2	Fair Chance	Indicates that address validation cannot correct or verify the address for one of the following reasons: <ul style="list-style-type: none">- Address validation cannot identify a candidate match in the reference data with sufficient confidence.- Address validation found multiple candidate matches with similar confidence levels. The mail carrier might be able to deliver to the address.
1	Risky	Indicates that address validation can find partial reference data matches only for the input address.
0	Undeliverable	Indicates that address validation cannot find a match for the address in the reference data. The input address is missing too many elements, or address validation cannot verify a majority of the elements in the address.

Calculating Mailability Scores

Address Verification considers multiple factors when it calculates the mailability score. Address Verification bases the calculations principally on the Process Status Code value and the Element Result Status value for the address. Other factors that influence the mailability score include the granularity of the reference data for the country and the postal relevance of the address values.

For example, if Address Verification cannot verify input elements such as street and house number because the data is absent from the reference database, Address Verification reduces the mailability score value.

Additionally, country-specific factors influence the mailability score. For example, when you verify United States addresses, the mailability score calculations consider deliverability factors such as the R777 or R779 status of each address. An R777 or R779 (phantom route) address is an address in a location that is served by P.O. Box delivery although the mailing address contains valid street information. In such cases, Address Verification might assign an address a Process Status value of V4 or C4 and a Mailability Score value of 1, because the USPS does not deliver to the street address.

Mailability Scores in India

The following table describes the relationship between Process Status values and Mailability Score values in India addresses:

Process Status	Mailability Score
I1	0 If the address cannot be found in the reference database.
I2	1 If the address cannot be corrected satisfactorily from the reference database.
I3, I4	2 If the input address matches more than one address in the reference data.
C2	2 If street delivery information is expected but absent from the input address.
C3	3 If some parts of the address validate against the reference database, but corrections are necessary. Also, some input elements, such as an organization name, are not found in the reference database.
C4	4 If every part of the address validates against the reference database, but some corrections are necessary.
V2	4 If the address contains street delivery information that cannot be validated against the reference database. 2 If street delivery information is expected but absent from the input address.
V3, V4	5 If every part of the input address validates against the reference database. 4 If the input address does not contain street delivery information, and street delivery information is not required. This can be adequate for rural addresses.

Mailability Scores in Japan

The following table describes the relationship between Process Status values and Mailability Score values in Japan addresses:

Process Status	Mailability Score
I1	0
V2	1 For example, the reference database does not contain street delivery information but contains Chome and Ban information for an address.
I3, I4	2

Process Status	Mailability Score
C2	3 For example, the input address contains Chome and Ban information, but comparable Chome and Ban information is absent from the reference database.
C4	4
V3, V4	5

Mailability Scores in the United States

The following table describes the relationship between Process Status values and Mailability Score values in United States addresses:

Process Status	Mailability Score
I1, I2	0
I3, I4	1
C1, C2	2
C3	3 or 4 For example, the input address contains sub-building data, but comparable sub-building data is absent from the reference database.
V1, V2	4
V3, V4, C4	3 For example, neither the input nor the reference data includes a house number for the address. 4 For example, default high-rise match. 5

Note: Address Verification can downgrade the mailability score for a United States to 1 in certified mode if the input house number is not found in the Delivery Point Validation reference data.

Mailability Scores in the Rest of the World

The following table describes the general relationship between Process Status values and Mailability Score values in many other countries:

Process Status	Mailability Score
I1	0
I2	1
I3, I4, C2	2
C3 (and sometimes C4)	3
C4, V2	4
V3, V4	5

Mailability Scores in Certified Modes

Processing in certified mode may result in different mailability scores than batch or interactive mode, because certified databases can contain additional data points against which to verify the input.

Local Factors in Mailability

The mailability score is a general estimate of deliverability. Local factors can influence the likelihood of successful delivery. An incorrect address due to missing sub-building data might have a good chance of correct delivery in many countries. Conversely, a United States address might find a fully valid match in the reference database, but the address might also appear on a non-delivery table from the USPS. In such a case, the United States address returns a mailability score of 0.

Address Types

You can use the `AddressType` information in the result output to identify the type of mail box an address points to.

For United States addresses, Informatica Address Verification returns the address type values that the United States Postal Service specifies. The United States Postal Service includes a `Record Type` value in the reference data for domestic addresses.

New Zealand Posts provides a rural address identifier. Canada Post provides a large volume receiver identifier.

If the reference data does not contain a formal address type designator, Address Verification uses different data elements to assign address types to addresses. Address Verification assigns address type values to addresses from countries that do not define address types based on criteria that Address Verification defined.

Address Verification employs a range of criteria to decide the address type for the following countries:

- Australia
- Canada
- France
- New Zealand

Address Verification has a separate set of criteria for identifying the address type when verifying the United States addresses in the Fast Completion mode.

Address Types from the United States Postal Service

Informatica Address Verification returns the United States Postal Service address type for a United States address when you perform verification in Batch, Certified, or Interactive mode.

The United States Postal Service provides the following address types for United States addresses:

- F. The address identifies an organization.
- G. The address is a general delivery address. In a general delivery address, the postal code and the recipient data identify the address.
- H. The address identifies a high-rise building. The address contains subbuilding elements such as apartment or suite.
- P. The address identifies a Post Office Box or a delivery service.

- R. The address is a rural route/highway contract address.
- S. The address identifies a street.
- U. Unidentified. The address is not valid, and Address Verification does not assign an address type.

Address Type Indicators for United States Addresses in Fast Completion Mode

When verifying addresses in the fast completion mode, Informatica Address Verification returns the following address type values:

- B. The address identifies a building.
- F. The address identifies an organization.
- L. The address post code identifies the organization as a large volume receiver. The reference data adds or verifies the organization name.
Address Verification can determine that the address is a large volume receiver in one of the following ways:
 - The address post code identifies the organization as a large volume receiver.
 - The reference data does not contain street or building information.
- P. The address identifies a Post Office Box or a delivery service.
- S. The address identifies a street. S is the default address type. If Address Verification cannot determine the address type from the address data, it returns the default value.
- U. Unidentified. The address is not valid, and Address Verification does not assign an address type.

If an address meets the criteria for more than one address type, Address Verification assigns the first applicable address type from the following list:

L, F, P, B, S

Address Type Indicators for Australia Addresses

Informatica Address Verification returns the following address type values for Australia addresses:

- B. The address identifies a building.
- F. The address identifies an organization.
- L. The address post code identifies the organization as a large volume receiver. The reference data adds or validates the organization name.
Address Verification can determine that the address is a large volume receiver in one of the following ways:
 - The address post code identifies the organization as a large volume receiver.
 - The reference data does not contain street or building information.
- P. The address identifies a Post Office Box or a delivery service.
- S. The address identifies a street. S is the default address type. If Address Verification cannot determine the address type from the address data, it returns the default value.
- U. Unidentified. The address is not valid, and Address Verification does not assign an address type.

If an address meets the criteria for more than one address type, Address Verification assigns the first applicable address type from the following list:

L, F, P, B, S

Address Type Indicators for Canada Addresses

Informatica Address Verification returns the following address types for Canada addresses:

- B. The address identifies a building.
- F. The address identifies an organization. In Canada addresses, the type F addresses are a subset of the type L addresses. Therefore, the address type F also indicates a large volume receiver.
- G. The address is a general delivery address. In a general delivery address, the postal code and the recipient data identify the address. Address Verification uses the delivery record in the reference data to identify the address type.
- L. The address post code identifies the organization as a large volume receiver. The address might or might not contain an organization name.
- P. The address identifies a Post Office Box or a delivery service.
- R. The address identifies a rural route. Address Verification uses the delivery record in the reference data to identify the address type.
- S. The address identifies a street. S is the default address type. If Address Verification cannot determine the address type from the address data, it returns the default value.
- U. Unidentified. The address is not valid, and Address Verification does not assign an address type.

If an address meets the criteria for more than one address type, Address Verification assigns the first applicable address type from the following list:

F, L, P, B, R, S, G.

Address Type Indicators for France Addresses

Informatica Address Verification returns the following address type values for France addresses:

- B. The address identifies a building.
- F. The address identifies an organization. The address does not include a CEDEX post code.
- G. The address is a general delivery address. The reference data does not contain a match for the street information. However, the reference data contains a match for the CEDEX postal code in the address.
- L. The postal code identifies the organization as a large volume receiver. The address might or might not contain an organization name. The reference data uses the CEDEX postal code to add or validate the organization name.
- P. The address identifies a Post Office Box or a delivery service.
- S. The address identifies a street address. S is the default address type. Address Verification returns the default value if it cannot determine the address type from the address data.
- U. Unidentified. The address is not valid, and Address Verification does not assign an address type.

If an address meets the criteria for more than one address type, Address Verification assigns the first applicable address type from the following list:

L, F, P, B, S, G.

Address Type Indicators for New Zealand Addresses

Informatica Address Verification returns the following address type values for New Zealand addresses:

- B. The address identifies a building.
- F. The address identifies an organization.

- L. The address post code identifies the organization as a large volume receiver. The reference data adds or validates the organization name.

Address Verification can determine that the address is a large volume receiver in one of the following ways:

- The address post code identifies the organization as a large volume receiver.
- The reference data does not contain street or building information.
- P. The address identifies a Post Office Box or a delivery service.
- R. The address identifies a rural route. Address Verification uses the delivery record in the reference data to identify the address type.
- S. The address identifies a street. S is the default address type. If Address Verification cannot determine the address type from the address data, it returns the default value.
- U. Unidentified. The address is not valid, and Address Verification does not assign an address type.

If an address meets the criteria for more than one address type, Address Verification assigns the first applicable address type from the following list:

L, F, P, B, R, S

Address Type Indicators for Addresses from the Rest of the World

Informatica Address Verification returns the following address type values for addresses from countries other than Australia, Canada, France, New Zealand, and the United States:

- B. The address identifies a building.
- F. The address identifies an organization.
- L. The address post code identifies the organization as a large volume receiver. The reference data adds or validates the organization name.

Address Verification can determine that the address is a large volume receiver in one of the following ways:

- The address post code identifies the organization as a large volume receiver.
- The reference data does not contain street or building information.
- P. The address identifies a Post Office Box or a delivery service.
- S. The address identifies a street. S is the default address type. If Address Verification cannot determine the address type from the address data, it returns the default value.
- U. Unidentified. The address is not valid, and Address Verification does not assign an address type.

If an address meets the criteria for more than one address type, Address Verification assigns the first applicable address type from the following list:

L, F, P, B, S

Note: Address Verification can return information relevant to the address type on other output elements. Consult the Process Status, Element Input Status, and Element Result Status values.

Certified Mode Process Status Values

When you validate addresses in the certified mode, Informatica Address Verification returns process status values that are specific for the certified mode you selected. The certified mode status values help you understand and analyze the results you receive in the certified mode.

AMAS Status Codes

When you validate Australia addresses in the certified mode, Informatica Address Verification returns the following status codes along with the address output.

EAM0

AMAS output is not available for the input address.

EAM1

AMAS output for the input address is provided. The address is corrected or validated and DPID for the address is provided.

EMA2

AMAS output is not provided. The input address could not be corrected or validated, and so no DPID is provided.

CASS Status Values

When you verify United States addresses in certified mode, Informatica Address Verification can return the following status values to help you interpret and analyze the verification results:

ECA0

CASS output is not available for the input address.

ECA1

CASS output is not complete for the input address.

ECA2

This code is reserved for future use.

ECA5

CASS output provided for the input address.

SendRight Status Codes

When you validate New Zealand addresses in the certified mode, Informatica Address Verification returns the following status values along with the address output.

ESR0

SendRight output is not available for the input address.

ESR1

SendRight output is provided for the input address.

SERP Status Codes

When you validate Canada addresses in the certified mode, Informatica Address Verification returns the following status codes to help you interpret and analyze the SERP results.

ESE0

SERP output is not available for the input address.

ESE1

SERP output is provided.

If you set the process mode to certified and the SERP enrichment to on, Address Verification provides two enrichments: Category and Excluded Flag.

SNA Status Codes

When you validate France addresses in the certified mode, Informatica Address Verification returns the following status values along with the address output.

ESN0

SNA output not available for the input address.

ESN1

SNA output for the input address is provided.

API Return Codes

Informatica Address Verification returns numeric codes to indicate the status of API function calls. All API function calls to Address Verification receive an AD_I32 (32 bit signed integer) return code value.

- A value of 0 (zero) indicates success.
- A negative value of -10000 or below indicates a very critical error, and further processing is usually impossible. Immediately shut down the whole process as it might be in an instable state.
- Negative values between -1 and -9999 indicate critical errors, and further processing might be impossible.
- A positive value of 1000 and above indicates non-critical errors, and further processing is possible. Return code values between 1 and 999 indicate warnings including possible issues with configuration settings, address input, or output.

The return value must always be checked for by the calling logic. While the return values inform about fundamental errors, the actual verification results are returned through separate API functions.

Success

On successful completion of an API call, Informatica Address Verification returns a return code of 0 (zero).

Warnings

Informatica Address Verification returns one of the following return codes when an API call receives an unexpected result:

Code	Description
1	The SetConfig.xml contains at least one corrupt unlock code.
2	The SetConfig.xml contains at least one expired or not yet valid unlock code.
3	The SetConfig.xml lists at least one database file which was not found.
4	The SetConfig.xml lists at least one corrupt database file.
5	The SetConfig.xml lists at least one database with a not supported version.
6	The SetConfig.xml lists at least one database which is not supported.
7	No valid unlock code for a database file.
8	The SetConfig.xml lists at least one database more than once.
9	The MaxMemoryUsageMB setting in SetConfig.xml is too small to fulfill all preloading settings and/or the CacheSize setting.
10	The environmental settings (for example, Operating System) in at least one Unlock Code is incompatible to the current machine.
11	The SetConfig.xml contains at least one none supported type of unlock code.
100	An input element or line which already had content was overwritten.
101	The AddressComplete input has too many lines. Extra lines to be ignored for further processing.
102	At least one character sequence of a string is not valid. For example, it contains control codes or does violate some constraint. These sequences are replaced by spaces.
200	The output buffer is too small. The output was written, but truncated.
201	At least one character of the output could not be encoded in the chosen encoding. Such characters are replaced by an underscore ('_').
300	The engine usage period has expired or is not activated yet.
301	The unlock code for a database file has expired or is not activated yet.
400	Address lines and/or Address Complete was given in input. This part of the input was ignored.
401	More than 19 lines were given through FormattedAddressLines or AddressComplete as input. The lines beyond 11 were ignored.
500	The MaxResultCount in Parameters.xml was larger than the value in SetConfig.xml, and was reduced to the value in SetConfig.xml.
900	No database was found, probably because the path was wrong.

Code	Description
901	No database was opened, probably because the path was wrong and/or no valid unlock code was given.
902	Error while attempting to open at least one of the extra CASS databases.

Errors

Informatica Address Verification returns the following return codes if an API call failed to run because of an error condition:

Code	Description
1000	A pointer parameter was NULL.
1001	A function parameter was 0.
1002	A NULL pointer to an object was used (not relevant for C API).
1003	Two XMLs, one as a string and the other in a file, were entered though only one was required.
1004	The output buffer size is not valid.
1005	Buffer misalignment; an AD_WCHAR* points to an odd address.
1100	A parameter is out of range or is not valid.
1101	An XML string is not valid.
1200	The character sequence of a string is not valid. For example, the string contains control codes or violates some constraint.
1201	The encoding parameter did not match the character size of the API call; for example: UCS2 (16 bit) vs. char (8 bit)
1300	No SetConfig.xml was entered as parameter for AD_Initialize.
1301	The engine has already been initialized.
1302	AD_DeInitialize() failed because not all AddressObjects have been released.
1400	No AddressObject is available (all AddressObject handles have already been obtained via AD_GetAddressObject()).
1401	The passed AddressObject handle is not valid.
1500	A database file has not been found.
1501	A database file is invalid/corrupt.
1502	No valid unlock code for a database file.
1503	A database file has a non-supported version.

Code	Description
1600	A feature has not been unlocked.
1700	The country could not be identified or is not supported.
1701	The country is not supported for this processing mode and type of input
1800	Results are available, for this reason no AddressObject modification is allowed.
1801	XML and direct API calls were used intermixed when setting the input data of an AddressObject.
1802	AD_Process() has not been called successfully, no result is available.
1803	The attempted operation was invalid, i.e. trying to set incompatible address elements.
1900	The result index parameter is out of range (must be ≥ 1).
1901	The output buffer is too small to hold the result, no output was written.

Critical Errors

If any critical error occurs, Informatica Address Verification returns one of the following return codes:

Code	Description
-1300	The engine has not yet been initialized, need to call AD_Initialize().
-1600	No valid unlock code was given
-1601	The engine usage period has expired or is not activated yet
-1602	A clock inconsistency has been detected
-9900	A memory allocation request failed
-9901	A file operation failed

Address Verification does not allow any function calls other than `AD_Initialize()` and `AD_DeInitialize()` after it returns a critical error code.

Very Critical Errors

When a very critical error occurs, Informatica Address Verification does not allow any API calls other than `AD_DeInitialize()`. The following return calls indicate very critical errors:

Code	Description
-10000	An unknown exception has occurred; this event should never occur
-10001	An internal assertion has failed; this event should never occur
-10002	An internal error has occurred; this event should never occur

CHAPTER 9

Frequently Asked Questions

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How Do I Manage Unlock Codes?

You need valid unlock codes to access reference address databases for address validation and address enrichments. Each unlock code can unlock multiple databases that Informatica Address Verification assigns to the unlock code. Address Verification passes the unlock code to the initialization function. The initialization fails if you do not specify any unlock code or if the unlock code you specified is not valid or incorrect.

You can specify multiple unlock codes and pass them one after the other to the initialization function. If there are multiple unlock codes for one country among the unlock codes you specified, Address Verification uses the longest-valid unlock code for that country. For example, you have the following unlock codes:

Code A unlocks DEU and USA validation until 31.12.2014

Code B unlocks CHE and USA validation until 31.12.2015

Code C unlocks CHE and USA geocoding until 31.12.2015

In this case, DEU validation expires on 31.12.2014. For CHE and USA, the validation remains active until 31.12.2015. Note that unlock codes also have valid-from date before which the code remains not valid.

The following code sample shows assigning of unlock codes using C API.

```
AD_Initialize(
    "<?xml version='1.0' encoding='iso-8859-1' ?>\n"
    "<SetConfig>\n"
    "<General /\n"
    "<UnlockCode>(Enter Code A here)</UnlockCode>\n"
    "<UnlockCode>(Enter Code B here)</UnlockCode>\n"
    "<UnlockCode>(Enter Code C here)</UnlockCode>\n"
    "<DataBase CountryISO3='USA' Type='GEOCODING' Path='/ADDB' PreloadingType='NONE' /\n"
    "<DataBase CountryISO3='CHE' Type='GEOCODING' Path='/ADDB' PreloadingType='NONE' /\n"
    "<DataBase CountryISO3='ALL' Type='BATCH_INTERACTIVE' Path='/ADDB'
    PreloadingType='NONE' /\n" "</SetConfig>\n",
    NULL,
    NULL,
    NULL
);
```

The following code sample shows assigning of unlock codes using Java API.

```
AddressDoctor.initialize(
    "<?xml version='1.0' encoding='UTF-16LE' ?>\n" +
    "<!DOCTYPE SetConfig SYSTEM 'SetConfig.dtd'>\n" +
    "<SetConfig>\n" +
    "<General WriteXMLEncoding='UTF-16LE' /\n" +
    "// Engine & DB Unlock Code
    "<UnlockCode>(Enter Code A here)</UnlockCode>\n" +
    "<UnlockCode>(Enter Code B here)</UnlockCode>\n" +
    "<UnlockCode>(Enter Code C here)</UnlockCode>\n" +
    "<DataBase CountryISO3='USA' Type='GEOCODING' Path='/ADDB' PreloadingType='NONE' /\n" +
    "<DataBase CountryISO3='CHE' Type='GEOCODING' Path='/ADDB' PreloadingType='NONE' /\n" +
    "<DataBase CountryISO3='ALL' Type='BATCH_INTERACTIVE' Path='/ADDB'
    PreloadingType='NONE' /\n" +
    "</SetConfig>",
    null, null, null);
```

How Do I Initialize Informatica Address Verification?

If you are using a C language APIs, you must call `AD_Initialize()` or `AD_InitializeW()` functions to initialize Informatica Address Verification. If you are using Java APIs, call the `AddressDoctor.initialize` function. The initialization function evaluates the settings and configures the engine accordingly.

You can call other functions such as `AD_GetAddressObject()` only after the initialization function is successful. If the initialization failed, Address Verification returns an error code of -1300.

The following example shows a sample code for C API.

```
AD_Initialize(
    "<?xml version='1.0' encoding='iso-8859-1' ?>\n"
    "<!DOCTYPE SetConfig SYSTEM 'SetConfig.dtd'>\n"
    "<SetConfig>\n"
    "<General /\n"
    "<UnlockCode>(Enter Code here)</UnlockCode>\n"
    "<DataBase CountryISO3='ALL' Type='BATCH_INTERACTIVE' Path='/ADDB'
    PreloadingType='NONE' /\n"
    "</SetConfig>\n",
    NULL,
    NULL,
    NULL
);
```

Alternatively, you can store the `SetConfig.xml` in an external file. In such cases, you can use the following initialization call.

```
AD_Initialize( NULL,
    "SetConfig.xml",
    NULL,
    NULL
);
```

The following example shows a sample code Java API.

```
// Initialize the Engine using the 'Direct' API
AddressDoctor.initialize(
    "<?xml version='1.0' encoding='UTF-16LE'?>\n" +
    "<!DOCTYPE SetConfig SYSTEM 'SetConfig.dtd'>\n" +
    "<SetConfig>\n" +
    "<General WriteXMLEncoding='UTF-16LE' />\n" +
    "<UnlockCode>(Enter Code here)</UnlockCode>\n" +
    "<DataBase CountryISO3='ALL' Type='BATCH_INTERACTIVE' Path='/ADDB'
PreloadingType='NONE'/>\n" +
    "</SetConfig>",
    null,
    null,
    null
);
```

Alternatively, you can store the `SetConfig.xml` in an external file. In such cases, you can use the following initialization call.

```
// Initialize the Engine using the 'XML' API
AddressDoctor.initialize(
    null,
    "SetConfig.xml",
    null,
    null
);
```

How Do I Produce Valid Address Verification XML?

Ensure that any XML input to Informatica Address Verification is well-formed and validated against the DTDs provided by Informatica. Note that the sequence of elements in Address Verification XML files is important and you need to validate the structure against the corresponding DTD. However, it is not important that you maintain the sequence for element attributes.

If you are working with XML files created on different platforms, note that the End-of-Line (EoL) character differs between Windows (CRLF) and Unix (LF). For more information, see the Wikipedia page on Linebreak at <http://wikipedia.org/wiki/Linebreak>.

You can find more information about XML from multiple sources on the Web. <http://wikipedia.org/wiki/XML> contains an introduction to XML. XML functionality is available in most of the Integrated Development Environments (IDEs). You can also find a wide variety of free XML editors with XML validation.

How Do I Manage Reference Address Databases?

Along with the unlock codes, you must also specify the details of reference address databases including the country name, database type, and file path in `SetConfig.xml`. You can use a virtual ISO code, ALL, to denote

all databases that you have access to. However, you still need to specify details of the databases including the file path in `SetConfig.xml`.

The following snippet from `SetConfig.xml` provides an example of database settings.

```
<SetConfig>
<General WriteXMLEncoding="UTF-16" MaxMemoryUsageMB="2048" MaxAddressObjectCount="10"
MaxThreadCount="2">
</General>
<UnlockCode>Address Validation Unlock Code</UnlockCode>
<UnlockCode>Geocoding Unlock Code</UnlockCode>
<DataBase CountryISO3="USA" Type="CERTIFIED" Path="C:/AddressDoctor/DB/CASS"
PreloadingType="FULL"></DataBase>
<DataBase CountryISO3="CAN" Type="CERTIFIED" Path="C:/AddressDoctor/DB/SERP"
PreloadingType="FULL"></DataBase>
<DataBase CountryISO3="ALL" Type="BATCH_INTERACTIVE" Path="C:/AddressDoctor/DB"
PreloadingType="NONE"></DataBase>
<DataBase CountryISO3="USA" Type="SUPPLEMENTARY" Path="C:/AddressDoctor/DB/Enrichment"
PreloadingType="PARTIAL"></DataBase>
<DataBase CountryISO3="GBR" Type="SUPPLEMENTARY" Path="C:/AddressDoctor/DB/Enrichment"
PreloadingType="PARTIAL"></DataBase>
<DataBase CountryISO3="ALL" Type="GEOCODING" Path="C:/AddressDoctor/DB/Geocoding"
PreloadingType="NONE"></DataBase>
<DataBase CountryISO3="ALL" Type="CAMEO" Path="C:/AddressDoctor/DB/CAMEO"
PreloadingType="NONE"></DataBase>
<DataBase CountryISO3="ALL" Type="FASTCOMPLETION" Path="C:/AddressDoctor/DB"
PreloadingType="NONE"></DataBase>
</SetConfig>
```

The order in which you list the reference database file names in `SetConfig.xml` influences the loading of the database data into memory and can affect the operation of the Address Verification engine. For more information, see ["Reference Database Order in SetConfig.xml" on page 24](#).

In case of conflicting database settings, Informatica Address Verification gives precedence to the first occurrence of that element. When you enter database details in `SetConfig.xml`, enter the Database element with the CountryISO3 attribute set to ALL at the end of the list. If you enter the Database element with the CountryISO3 attribute set to ALL before other Database elements, Address Verification overrides all other database settings with the settings for the database element with the country ISO code set to ALL.

How Do I Assign an Address to an AddressObject?

You must choose an appropriate address format before you assign an address to an `AddressObject`. The quality of result you receive depends on the address format that you use to assign the address to the `AddressObject`.

The address formats can be broadly classified into three: fielded data, partially-fielded data, and unfielded data. Informatica Address Verification returns the most accurate results for fielded data and the least accurate for unfielded data.

The following examples show the API calls for assigning a fielded address to the `AddressObject`.

Note: Before you assign an address to the `AddressObject`, call the `AD_ClearData()` function to clear any data that is present.

Assigning a fielded address using the C direct API

```
AD_SetInputAddressElement( hAOHandle, "Country", 1, NULL, "Canada" );
AD_SetInputAddressElement( hAOHandle, "PostalCode", 1, NULL, "G1R 3X2" );
AD_SetInputAddressElement( hAOHandle, "Locality", 1, NULL, "Toronto" );
AD_SetInputAddressElement( hAOHandle, "DeliveryService", 1, NULL, "PO Box 1827" );
```

Assigning a fielded address using the Java direct API

```
m_oAO.setInputAddressElement("Country", 1, null, "Canada");
m_oAO.setInputAddressElement("PostalCode", 1, null, "G1R 3X2");
m_oAO.setInputAddressElement("Locality", 1, null, "Toronto");
m_oAO.setInputAddressElement("DeliveryService", 1, null, "PO Box 1827");
```

Assigning a fielded address using the C XML API

```
AD_SetInputDataXML( hAOHandle,
    "<?xml version='1.0' encoding='ISO-8859-1'?>\n"
    "<!DOCTYPE InputData SYSTEM 'InputData.dtd'\n"
    "<InputData>\n"
    "<AddressElements>\n"
    "<Country Item='1' Type='NAME'>SGP</Country>\n"
    "<Locality Item='1' Type='COMPLETE'>Singapore</Locality>\n"
    "<PostalCode Item='1' Type='FORMATTED'>048624</PostalCode>\n"
    "<Street Item='1' Type='COMPLETE'>Raffles Place</Street>\n"
    "<Number Item='1' Type='COMPLETE'>80</Number>\n"
    "<Building Item='1' Type='COMPLETE'>#50-01 UOB Plaza 1</Building>\n"
    "<Organization Item='1' Type='NAME'>AddressDoctor GmbH</Organization>\n"
    "</AddressElements>\n"
    "</InputData>\n"
);
```

Assigning a fielded address using the Java XML API

```
m_oAO.setInputDataXML(
    "<?xml version='1.0' encoding='UTF-16'?>"+
    "<!DOCTYPE InputData SYSTEM InputData.dtd>"+
    "<InputData>"+
    "<AddressElements>"+
    "    <Key>4711</Key>"+
    "    <Country Item='1' Type='NAME'>SGP</Country>"+
    "    <Locality Item='1' Type='COMPLETE'>Singapore</Locality>"+
    "    <PostalCode Item='1' Type='FORMATTED'>048624</PostalCode>"+
    "    <Street Item='1' Type='COMPLETE'>Raffles Place</Street>"+
    "    <Number Item='1' Type='COMPLETE'>80</Number>"+
    "    <Building Item='1' Type='COMPLETE'>#50-01 UOB Plaza 1</Building>"+
    "    <Organization Item='1' Type='NAME'>AddressDoctor GmbH</Organization>"+
    "</AddressElements>"+
    "</InputData>");
```

How Do I Validate an Address?

If you are using C language API, you can validate an address by calling `AD_Process()`. If you are using Java API, call `AddressDoctor.process()` to validate addresses.

Before you can validate an address, you must create an `AddressObject` and add an input address to the object. If you do not specify a process mode, Informatica Address Verification validates addresses in the Batch mode.

The following example shows the function call for C API.

```
AD_Process( hAOHandle );
```

The following example shows the function call for Java API.

```
AddressDoctor.process(m_oAO);
```


How Do I Check the Process Mode?

You can check the ModeUsed attribute of the Result element to verify the process mode Informatica Address Verification uses to process addresses.

The following example shows a sample code for C API.

```
char sResultParameters[32];
AD_GetResultParameter(hAOHandle, "ModeUsed", sResultParameters, sizeof(sResultParameter));
```

The following example shows a sample code for Java API.

```
System.out.println(m_oAO.getResultParameter("ModeUsed"));
```

How Do I Retrieve a Suggested Correction?

You can retrieve a suggested correction by calling the AD_GetResultAddressElement() in the C direct API or m_oAO.getResultAddressElement() in Java direct API.

You must first run the AD_Process() function or its equivalent in Java to process an address.

Retrieving an address suggestion through the C direct API

```
AD_U32 ulNumResults;
size_t stCurResult;
AD_GetResultCount( hAOHandle, &ulNumResults );
for( stCurResult = 1; stCurResult <= ulNumResults; stCurResult++ )
{
    char sStreet[ 256 ];
    AD_U32 ulNumItems;
    size_t stCurItem;
    AD_GetResultAddressElementItemCount( hAOHandle, 1, "Street", &ulNumItems );
    for( stCurItem = 1; stCurItem <= ulNumItems; stCurItem++ )
    {
        AD_GetResultAddressElement( hAOHandle, stCurResult, "Street", stCurItem, "COMPLETE",
        sStreet, sizeof( sStreet ) );
        printf( "Result %u: Street item %u: %s\n", stCurResult, stCurItem, sStreet );
    }
}
```

Retrieving an address suggestion through the Java direct API

```
int NumResults = m_oAO.getResultCount();
int CurResult;
for (CurResult = 1; CurResult <= NumResults; CurResult++) {
    int NumItems = m_oAO.getResultAddressElementItemCount(CurResult, "Street");
    int CurItem;
    for (CurItem = 1; CurItem <= NumItems; CurItem++) {
        System.out.println(m_oAO.getResultAddressElement(CurResult, "Street", CurItem,
        "COMPLETE"));
    }
}
```

Retrieving an address suggestion through the C XML API

```
char sResultXML[ 16 * 1024 ];
AD_GetResultXML( hAOHandle, sResultXML, sizeof( sResultXML ) );
```

Retrieving an address suggestion through the Java XML API

```
String sResultXML = "";
sResultXML = m_oAO.getResultXML();
```

How Do I Retrieve the Result Status and Additional Information?

If you are using the C direct API, you can call the `AD_GetResultParameter()` function with the `ProcessStatus` value to retrieve the result status. If you are using the Java direct API, you can call the `m_oAO.getResultParameter("ProcessStatus")` function to retrieve the result status.

Retrieving the result status through the C direct API

```
char sResultParameters[32];
AD_GetResultParameter(hAOHandle, "ProcessStatus", sResultParameters,
sizeof(sResultParameter));
```

To receive specific status of any address element result, call `AD_GetResultDataParameter()` with the required parameters. To receive details of address enrichments, call `AD_GetResultEnrichmentDataParameter()`.

Retrieving the result status through the Java direct API

```
System.out.println(m_oAO.getResultParameter("ProcessStatus"));
```

In C XML API, the `AD_GetResultXML()` function returns the entire result information without you specifying any parameter. However, some of the settings for the `Result` element in `Parameters.xml` might influence the details in the result output.

How Do I Use the Quick Address Entry Feature of Informatica Address Verification?

You can use the fast completion process mode of Informatica Address Verification to receive suggestions as you enter an address. You can use the fast completion mode to implement address quality checks and improvements at Point-of-Sales (PoS) systems, Customer Relationship Systems (CRM), Property and Reservation Management (PMS) systems and such.

In the fast completion mode, you can assign incomplete input addresses to an `AddressObject` and receive address suggestions based on partial inputs. Address Verification corrects the input to the extent possible and returns a list of suggestion from which you can choose an address.

When you design an application that uses the Address Verification fast completion mode, you can design the system to call the `AD_Process()` function after each keystroke. For best results, keep the reference databases are easily accessible so that the pick lists appear in real time.

When you enter an address in the fast completion mode, Address Verification returns the first 100 suggestions and indicates an overflow if there are more matches. If there is an overflow indicator, call the `AD_Process()` function again with additional input.

How Do I Use Informatica Address Verification with Multiple Processor Cores?

On a device that has n number of processor cores, you can configure Informatica Address Verification to have as many as n address processing threads. In general use, Address Verification recommends a value of $n-1$ so that one core is available for other tasks.

For example, if the device has four cores, you can configure Address Verification with a `MaxThreadCount` of 3 and `MaxObjectCount` of 3.

When you call the initialization function with a maximum thread count of 3, the main thread of the software creates three worker threads and assigns them to Address Verification. Each worker thread then acquires one `AddressObject` handle through `AD_GetAddressObject(&hAOHandle);` and subsequently keeps repeating the following sequence:

```
AD_SetInputDataXML( hAOHandle, <XML string> );
AD_Process( hAOHandle );
AD_GetResultXML( hAOHandle, sResultXML, sizeof( sResultXML ) );
AD_ClearData( hAOHandle );
```

When you shut down Address Verification, the main thread ends all worker threads and deinitializes Address Verification through the following function calls:

```
AD_ReleaseAllAddressObjects();
AD_DeInitialize();
```

How Do I Use Address Verification for Master Data Management?

You can use Informatica Address Verification in batch mode to validate bulk addresses as part of Master Data Management (MDM) or other data integration systems. Batch mode in Address Verification is designed for mass data address quality and enables you to assign addresses to `AddressObject` irrespective of the quality of input address. When you process addresses in batch mode, Address Verification automatically corrects the addresses and returns the single most-likely candidate in the result.

When you design an application for batch processing, call the `AD_Process()` function with the `Mode` attribute of the `Process` element set to `BATCH`. Wherever possible, Address Verification returns a single corrected address with a process code of `Cx` or `Vx`.

To tackle severe address quality challenges, you can also use the `OptimizationLevel` attribute of the `Process` element.

How Do I Use Informatica Address Verification in an eBusiness Environment?

You can use the interactive processing mode of Informatica Address Verification when you want to integrate Address Verification in an eBusiness environment. You can use the interactive mode of Address Verification

to ensure address quality at point-of-data entry. You can use this mode for online input forms, web-based transactions, and customer-feedback systems.

When you design an application for interactive entry, call the `AD_Process()` function with the `Mode` attribute of the `Process` element set to `INTERACTIVE`.

In the interactive mode, you can assign addresses to an `AddressObject` irrespective of the data quality. Address Verification corrects the input address to the extent possible and returns a list of suggestions from which you can select the most relevant address. If Address Verification identifies one definite match for the input address, Address Verification returns only that address to you.

When you design your system to use the interactive mode, you can design your system to allow users to edit the selected, validated result to make any necessary change before they submit the address to your system.

How Do I Specify Processing Parameters and Input and Result Formats?

You can specify the processing parameters and input and results formats either at the global level or at address object level. If you are using C API, you can use `AD_SetParametersXML()` or `AD_SetParametersXMLW()` to set parameters at the address-object level. In Java API, use the `m_oAO.setParametersXML` function, where `m_oAO` denotes the address object to which you want to apply the parameters.

The following examples shows C and Java API examples for assigning process parameters and input and results formats at address object level and global level.

Specifying Parameters at the AddressObject Level Using C API

```
AD_SetParametersXML(hAOHandle,
    "<?xml version='1.0' encoding='iso-8859-1' ?>\n"
    "<!DOCTYPE Parameters SYSTEM 'Parameters.dtd'>\n"
    "<Parameters>\n"
    "<Process Mode='BATCH' />\n"
    "<AddressElementStandardize>\n"
    "<Country Casing='UPPER' />\n"
    "</AddressElementStandardize>\n"
    "</Parameters>\n",
    NULL,
    NULL
);
```

Alternatively, you can call parameters from an external file as shown in the following example.

```
AD_SetParametersXML(hAOHandle,
    NULL,
    NULL,
    "Parameters.xml"
);
```

Specifying Parameters at the AddressObject Level Using Java API

```
// This code assumes that you have already acquired m_oAO as the active AddressObject
m_oAO.setParametersXML(
    "<?xml version='1.0' encoding='UTF-16LE' ?>\n" +
    "<Parameters>\n" +
    "<Process Mode='BATCH'/>\n" +
    // Java uses UTF-16LE as default encoding for its String method
    "<Input Encoding='UTF-16LE'/>" +
    "<Result Encoding='UTF-16LE'/>" +
    "<AddressElementStandardize> \n" +
    "<Country Casing='UPPER' />\n" +
    "
```

```

    "</AddressElementStandardize> \n" +
    "</Paramaters>",
    null
);

```

Alternatively, you can call parameters from an external file as shown in the following example.

```

// This code assumes that you have already acquired m_oAO as the active AddressObject
m_oAO.setParametersXML(
    null,
    "Parameters.xml"
);

```

Instead of setting attributes for each AddressObject individually, you can specify the parameters at the global level by assigning the values to the initialization function. Assigning parameters at the global level applies global defaults to all AddressObjects that do not have individual parameters set as shown in the preceding examples. The following examples show the global level parameter settings.

Specifying Parameters at the Global Level Using C API

```

AD_Initialize(
    "<?xml version='1.0' encoding='iso-8859-1' ?>\n"
    "<!DOCTYPE SetConfig SYSTEM 'SetConfig.dtd'\n"
    "<SetConfig>\n"
    "<General /\n"
    "<UnlockCode>(Enter Code here)</UnlockCode>\n"
    "<DataBase CountryISO3='ALL' Type='BATCH_INTERACTIVE' Path='/ADDB'
    PreloadingType='NONE' /\n"
    "</SetConfig>\n",
    NULL,
    "<?xml version='1.0' encoding='iso-8859-1' ?>\n"
    "<!DOCTYPE Parameters SYSTEM 'Parameters.dtd'\n"
    "<Parameters>\n"
    "<Process Mode='BATCH' /\n"
    "<AddressElementStandardize>\n"
    "<Country Casing='UPPER' /\n"
    "</AddressElementStandardize>\n"
    "</Parameters>\n",
    NULL
);

```

Alternatively, you can call the parameters from an external file as shown in the following example:

```

AD_Initialize(
    NULL,
    "SetConfig.xml",
    NULL,
    "Parameters.xml"
);

```

Specifying Parameters at the Global Level Using Java API

```

AddressDoctor.initialize(
    "<?xml version='1.0' encoding='UTF-16' ?>" +
    "<!DOCTYPE SetConfig SYSTEM 'SetConfig.dtd'" +
    "<SetConfig><General WriteXMLEncoding='UTF-16' /\n" +
    "    <UnlockCode>(Enter Code here)</UnlockCode>" +
    "    <DataBase CountryISO3='ALL' Type='BATCH_INTERACTIVE'" +
    "    Path='/ADDB' PreloadingType='NONE' /\n" +
    "</SetConfig>", null,
    "<?xml version='1.0' encoding='UTF-16' ?>" +
    "<!DOCTYPE SetConfig SYSTEM 'Parameters.dtd'" +
    "<Parameters WriteXMLEncoding='UTF-16'" +
    "    <Input Encoding='UTF-16' /\n" +
    "    <Result Encoding='UTF-16' /\n" +
    "</Parameters>", null);

```

How Do I Find the Current Post Code for a South Korea Address?

You can use Informatica Address Verification to find the current, five-digit post code for a South Korea address. Korea Post changed the post code structure from six digits to five digits in 2015.

To obtain the current post code, first verify the address in batch or interactive mode. Address Verification returns an address ID value that you can use in address code lookup mode to retrieve the current post code. If you enter a lot-based address or a six-digit post code as the input, set the `MatchingExtendedArchive` attribute of the `Process` element to ON.

For more information on the steps to find the current, street-based address or the five-digit post code for a South Korea address, see [“Extended Archives and South Korea Addresses” on page 52](#).

How Do I Retrieve the Current Informatica Address Verification Settings?

If you are using C language API, call `AD_GetConfigSettingsXML()` at the Informatica Address Verification global level to generate `GetConfig.xml` that contains the current configuration that `AD_Initialize()` or `AD_InitializeW()` specifies.

To retrieve the default set of parameters at the Address Verification global level, call `AD_GetParametersSettingsXML()` to generate `Parameters.XML` that contains the default set of parameters that `AD_Initialize()` or `AD_InitializeW()` specifies.

Alternatively, you can call `AD_GetParametersXML()` to retrieve the parameters that `AD_SetParametersXML()` or `AD_SetParametersXMLW()` set.

How Do I Determine the Informatica Address Verification Version?

If you are using C APIs, you can call `AD_GetVersion()` to retrieve the zero-terminated Informatica Address Verification version string in the x.x.x.x format, for example, 5.0.0.251. You can call these functions even before you call `AD_Initialize()` to initialize Address Verification.

APPENDIX A

Geocode Countries

This appendix includes the following topic:

- [Geocoding Country Support, 159](#)

Geocoding Country Support

This appendix identifies the countries for which you can retrieve geocodes, the geocoding databases that you can install, and the type of geocodes that you receive.

The appendix also indicates the maximum level of accuracy to which Address Verification can provide geocodes in each country. The maximum precision levels refer to standard geocode data except for Arrival Point precision, which you can obtain from Arrival Point data.

Note: Informatica has ceased support for Parcel Centroid and Rooftop geocoding databases.

The following table describes the geocode capabilities that Address Verification currently supports:

Country	Database Filename	Geocoding Type	Maximum Precision
Afghanistan	AFG5GC.MD	Standard (Interpolated)	Locality
Albania	ALB5GC.MD	Standard (Interpolated)	Locality
Algeria	DZA5GC.MD	Standard (Interpolated)	Locality
Andorra	AND5GC.MD	Standard (Interpolated)	Interpolated house number
Angola	AGO5GC.MD	Standard (Interpolated)	Locality
Anguilla	AIA5GC.MD	Standard (Interpolated)	Locality
Antarctica	ATA5GC.MD	Standard (Interpolated)	Locality
Antigua and Barbuda	ATG5GC.MD	Standard (Interpolated)	Locality
Argentina	ARG5GC.MD	Standard (Interpolated)	Arrival Point
Argentina	ARG5GCAP.MD	Arrival Point	Arrival Point
Armenia	ARM5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Aruba	ABW5GC.MD	Standard (Interpolated)	Locality
Australia	AUS5GC.MD	Standard (Interpolated)	Arrival Point
Australia	AUS5GCAP.MD	Arrival Point	Arrival Point
Austria	AUT5GC.MD	Standard (Interpolated)	Arrival Point
Austria	AUT5GCAP.MD	Arrival Point	Arrival Point
Azerbaijan	AZE5GC.MD	Standard (Interpolated)	Locality
Bahamas	BHS5GC.MD	Standard (Interpolated)	Locality
Bahrain	BHR5GC.MD	Standard (Interpolated)	Locality
Bangladesh	BGD5GC.MD	Standard (Interpolated)	Locality
Barbados	BRB5GC.MD	Standard (Interpolated)	Locality
Belarus	BLR5GC.MD	Standard (Interpolated)	Locality
Belgium	BEL5GC.MD	Standard (Interpolated)	Arrival Point
Belgium	BEL5GCAP.MD	Arrival Point	Arrival Point
Belize	BLZ5GC.MD	Standard (Interpolated)	Locality
Benin	BEN5GC.MD	Standard (Interpolated)	Locality
Bermuda	BMU5GC.MD	Standard (Interpolated)	Locality
Bhutan	BTN5GC.MD	Standard (Interpolated)	Locality
Bolivia	BOL5GC.MD	Standard (Interpolated)	Center of street
Bosnia and Herzegovina	BIH5GC.MD	Standard (Interpolated)	Locality
Botswana	BWA5GC.MD	Standard (Interpolated)	Locality
Brazil	BRA5GC.MD	Standard (Interpolated)	Center of street
British Indian Ocean Territory	IOT5GC.MD	Standard (Interpolated)	Locality
Brunei Darussalam	BRN5GC.MD	Standard (Interpolated)	Locality
Bulgaria	BGR5GC.MD	Standard (Interpolated)	Post code Level
Burkina Faso	BFA5GC.MD	Standard (Interpolated)	Locality
Burundi	BDI5GC.MD	Standard (Interpolated)	Locality
Cambodia	KHM5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Cameroon	CMR5GC.MD	Standard (Interpolated)	Locality
Canada	CAN5GC.MD	Standard (Interpolated)	Arrival Point
Canada	CAN5GCAP.MD	Arrival Point	Arrival Point
Cayman Islands	CYM5GC.MD	Standard (Interpolated)	Locality
Central African Republic	CAF5GC.MD	Standard (Interpolated)	Locality
Chad	TCD5GC.MD	Standard (Interpolated)	Locality
Chile	CHL5GC.MD	Standard (Interpolated)	Arrival Point
Chile	CHL5GCAP.MD	Arrival Point	Arrival Point
China	CHN5GC.MD	Standard (Interpolated)	Locality
Colombia	COL5GC.MD	Standard (Interpolated)	Unknown
Comoros	COM5GC.MD	Standard (Interpolated)	Locality
Congo	COG5GC.MD	Standard (Interpolated)	Locality
Congo, The Democratic Republic of the	COD5GC.MD	Standard (Interpolated)	Locality
Cook Islands	COK5GC.MD	Standard (Interpolated)	Locality
Costa Rica	CRI5GC.MD	Standard (Interpolated)	Unknown
Croatia	HRV5GC.MD	Standard (Interpolated)	Arrival Point
Croatia	HRV5GCAP.MD	Arrival Point	Arrival Point
Cuba	CUB5GC.MD	Standard (Interpolated)	Locality
Cyprus	CYP5GC.MD	Standard (Interpolated)	Locality
Czech Republic	CZE5GC.MD	Standard (Interpolated)	Arrival Point
Czech Republic	CZE5GCAP.MD	Arrival Point	Arrival Point
Denmark	DNK5GC.MD	Standard (Interpolated)	Arrival Point
Denmark	DNK5GCAP.MD	Arrival Point	Arrival Point
Djibouti	DJI5GC.MD	Standard (Interpolated)	Locality
Dominica	DMA5GC.MD	Standard (Interpolated)	Locality
Dominican Republic	DOM5GC.MD	Standard (Interpolated)	Center of street
Ecuador	ECU5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Egypt	EGY5GC.MD	Standard (Interpolated)	Locality
El Salvador	SLV5GC.MD	Standard (Interpolated)	Locality
Equatorial Guinea	GNQ5GC.MD	Standard (Interpolated)	Locality
Eritrea	ERI5GC.MD	Standard (Interpolated)	Locality
Estonia	EST5GC.MD	Standard (Interpolated)	Arrival Point
Estonia	EST5GCAP.MD	Arrival Point	Arrival Point
Ethiopia	ETH5GC.MD	Standard (Interpolated)	Locality
Falkland Islands	FLK5GC.MD	Standard (Interpolated)	Locality
Fiji	FJI5GC.MD	Standard (Interpolated)	Locality
Finland	FIN5GC.MD	Standard (Interpolated)	Arrival Point
Finland	FIN5GCAP.MD	Arrival Point	Arrival Point
France	FRA5GC.MD	Standard (Interpolated)	Arrival Point
France	FRA5GCAP.MD	Arrival Point	Arrival Point
Gabon	GAB5GC.MD	Standard (Interpolated)	Locality
Gambia	GMB5GC.MD	Standard (Interpolated)	Locality
Georgia	GEO5GC.MD	Standard (Interpolated)	Locality
Germany	DEU5GC.MD	Standard (Interpolated)	Arrival Point
Germany	DEU5GCAP.MD	Arrival Point	Arrival Point
Ghana	GHA5GC.MD	Standard (Interpolated)	Locality
Gibraltar	GIB5GC.MD	Standard (Interpolated)	Arrival Point
Gibraltar	GIB5GCAP.MD	Arrival Point	Arrival Point
Greece	GRC5GC.MD	Standard (Interpolated)	Arrival Point
Greece	GRC5GCAP.MD	Arrival Point	Arrival Point
Grenada	GRD5GC.MD	Standard (Interpolated)	Locality
Guatemala	GTM5GC.MD	Standard (Interpolated)	Locality
Guinea	GIN5GC.MD	Standard (Interpolated)	Locality
Guinea-Bissau	GNB5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Guyana	GUY5GC.MD	Standard (Interpolated)	Locality
Haiti	HTI5GC.MD	Standard (Interpolated)	Locality
Holy See	VAT5GC.MD	Standard (Interpolated)	Center of street
Honduras	HND5GC.MD	Standard (Interpolated)	Locality
Hong Kong	HKG5GC.MD	Standard (Interpolated)	Arrival Point
Hong Kong	HKG5GCAP.MD	Arrival Point	Arrival Point
Hungary	HUN5GC.MD	Standard (Interpolated)	Arrival Point
Hungary	HUN5GCAP.MD	Arrival Point	Arrival Point
Iceland	ISL5GC.MD	Standard (Interpolated)	Arrival Point
Iceland	ISL5GCAP.MD	Arrival Point	Arrival Point
India	IND5GC.MD	Standard (Interpolated)	Unknown
Indonesia	IDN5GC.MD	Standard (Interpolated)	Locality
Iran, Islamic Republic of	IRN5GC.MD	Standard (Interpolated)	Locality
Iraq	IRQ5GC.MD	Standard (Interpolated)	Locality
Ireland	IRL5GC.MD	Standard (Interpolated)	Arrival Point
Ireland	IRL5GCAP.MD	Arrival Point	Arrival Point
Israel	ISR5GC.MD	Standard (Interpolated)	Locality
Italy	ITA5GC.MD	Standard (Interpolated)	Arrival Point
Italy	ITA5GCAP.MD	Arrival Point	Arrival Point
Ivory Coast	CIV5GC.MD	Standard (Interpolated)	Locality
Jamaica	JAM5GC.MD	Standard (Interpolated)	Center of street
Japan	JPN5GC.MD	Standard (Interpolated)	Interpolated house number
Jordan	JOR5GC.MD	Standard (Interpolated)	Locality
Kazakhstan	KAZ5GC.MD	Standard (Interpolated)	Locality
Kenya	KEN5GC.MD	Standard (Interpolated)	Locality
Kiribati	KIR5GC.MD	Standard (Interpolated)	Locality
Korea, Democratic People's Republic of	PRK5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Korea, Republic of	KOR5GC.MD	Standard (Interpolated)	Locality
Kuwait	KWT5GC.MD	Standard (Interpolated)	Locality
Kyrgyzstan	KGZ5GC.MD	Standard (Interpolated)	Locality
Lao, People's Democratic Republic	LAO5GC.MD	Standard (Interpolated)	Locality
Latvia	LVA5GC.MD	Standard (Interpolated)	Arrival Point
Latvia	LVA5GCAP.MD	Arrival Point	Arrival Point
Lebanon	LBN5GC.MD	Standard (Interpolated)	Locality
Liberia	LBR5GC.MD	Standard (Interpolated)	Locality
Libyan Arab Jamahiriya	LBY5GC.MD	Standard (Interpolated)	Locality
Liechtenstein	LIE5GC.MD	Standard (Interpolated)	Arrival Point
Liechtenstein	LIE5GCAP.MD	Arrival Point	Arrival Point
Lithuania	LTU5GC.MD	Standard (Interpolated)	Arrival Point
Lithuania	LTU5GCAP.MD	Arrival Point	Arrival Point
Luxembourg	LUX5GC.MD	Standard (Interpolated)	Arrival Point
Luxembourg	LUX5GCAP.MD	Arrival Point	Arrival Point
Macau	MAC5GC.MD	Standard (Interpolated)	Arrival Point
Macau	MAC5GCAP.MD	Arrival Point	Arrival Point
Macedonia, The Former Yugoslav Republic of	MKD5GC.MD	Standard (Interpolated)	Locality
Madagascar	MDG5GC.MD	Standard (Interpolated)	Locality
Malawi	MWI5GC.MD	Standard (Interpolated)	Locality
Malaysia	MYS5GC.MD	Standard (Interpolated)	Arrival Point
Malaysia	MYS5GCAP.MD	Arrival Point	Arrival Point
Maldives	MDV5GC.MD	Standard (Interpolated)	Locality
Mali	MLI5GC.MD	Standard (Interpolated)	Locality
Malta	MLT5GC.MD	Standard (Interpolated)	Interpolated house number
Mauritania	MRT5GC.MD	Standard (Interpolated)	Locality
Mauritius	MUS5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Mexico	MEX5GC.MD	Standard (Interpolated)	Arrival Point
Mexico	MEX5GCAP.MD	Arrival Point	Arrival Point
Moldova	MDA5GC.MD	Standard (Interpolated)	Locality
Monaco	MCO5GC.MD	Standard (Interpolated)	Arrival Point
Monaco	MCO5GCAP.MD	Arrival Point	Arrival Point
Mongolia	MNG5GC.MD	Standard (Interpolated)	Locality
Montenegro	MNE5GC.MD	Standard (Interpolated)	Locality
Montserrat	MSR5GC.MD	Standard (Interpolated)	Locality
Morocco	MAR5GC.MD	Standard (Interpolated)	Locality
Mozambique	MOZ5GC.MD	Standard (Interpolated)	Locality
Myanmar	MMR5GC.MD	Standard (Interpolated)	Locality
Namibia	NAM5GC.MD	Standard (Interpolated)	Locality
Nauru	NRU5GC.MD	Standard (Interpolated)	Locality
Nepal	NPL5GC.MD	Standard (Interpolated)	Locality
Netherlands	NLD5GC.MD	Standard (Interpolated)	Arrival Point
Netherlands	NLD5GCAP.MD	Arrival Point	Arrival Point
New Zealand	NZL5GC.MD	Standard (Interpolated)	Arrival Point
New Zealand	NZL5GCAP.MD	Arrival Point	Arrival Point
Nicaragua	NIC5GC.MD	Standard (Interpolated)	Locality
Niger	NER5GC.MD	Standard (Interpolated)	Locality
Nigeria	NGA5GC.MD	Standard (Interpolated)	Locality
Niue	NIU5GC.MD	Standard (Interpolated)	Locality
Norfolk Island	NFK5GC.MD	Standard (Interpolated)	Locality
Norway	NOR5GC.MD	Standard (Interpolated)	Arrival Point
Norway	NOR5GCAP.MD	Arrival Point	Arrival Point
Oman	OMN5GC.MD	Standard (Interpolated)	Locality
Pakistan	PAK5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Panama	PAN5GC.MD	Standard (Interpolated)	Locality
Papua New Guinea	PNG5GC.MD	Standard (Interpolated)	Locality
Paraguay	PRY5GC.MD	Standard (Interpolated)	Locality
Peru	PER5GC.MD	Standard (Interpolated)	Arrival Point
Peru	PER5GCAP.MD	Arrival Point	Arrival Point
Philippines	PHL5GC.MD	Standard (Interpolated)	Locality
Pitcairn	PCN5GC.MD	Standard (Interpolated)	Locality
Poland	POL5GC.MD	Standard (Interpolated)	Arrival Point
Poland	POL5GCAP.MD	Arrival Point	Arrival Point
Portugal	PRT5GC.MD	Standard (Interpolated)	Arrival Point
Portugal	PRT5GCAP.MD	Arrival Point	Arrival Point
Qatar	QAT5GC.MD	Standard (Interpolated)	Locality
Romania	ROU5GC.MD	Standard (Interpolated)	Locality
Russian Federation	RUS5GC.MD	Standard (Interpolated)	Arrival Point
Russian Federation	RUS5GCAP.MD	Arrival Point	Arrival Point
Rwanda	RWA5GC.MD	Standard (Interpolated)	Locality
Saint Helena	SHN5GC.MD	Standard (Interpolated)	Locality
Saint Kitts and Nevis	KNA5GC.MD	Standard (Interpolated)	Locality
Saint Lucia	LCA5GC.MD	Standard (Interpolated)	Locality
Saint Vincent and the Grenadines	VCT5GC.MD	Standard (Interpolated)	Locality
Samoa	WSM5GC.MD	Standard (Interpolated)	Locality
San Marino	SMR5GC.MD	Standard (Interpolated)	Arrival Point
San Marino	SMR5GCAP.MD	Arrival Point	Arrival Point
Sao Tome and Principe	STP5GC.MD	Standard (Interpolated)	Locality
Saudi Arabia	SAU5GC.MD	Standard (Interpolated)	Locality
Senegal	SEN5GC.MD	Standard (Interpolated)	Locality
Serbia	SRB5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Seychelles	SYC5GC.MD	Standard (Interpolated)	Locality
Sierra Leone	SLE5GC.MD	Standard (Interpolated)	Locality
Singapore	SGP5GC.MD	Standard (Interpolated)	Interpolated house number
Slovakia	SVK5GC.MD	Standard (Interpolated)	Arrival Point
Slovakia	SVK5GCAP.MD	Arrival Point	Arrival Point
Slovenia	SVN5GC.MD	Standard (Interpolated)	Arrival Point
Slovenia	SVN5GCAP.MD	Arrival Point	Arrival Point
Solomon Islands	SLB5GC.MD	Standard (Interpolated)	Locality
Somalia	SOM5GC.MD	Standard (Interpolated)	Locality
South Africa	ZAF5GC.MD	Standard (Interpolated)	Interpolated house number
South Georgia and the South Sandwich Islands	SGS5GC.MD	Standard (Interpolated)	Locality
Spain	ESP5GC.MD	Standard (Interpolated)	Arrival Point
Spain	ESP5GCAP.MD	Arrival Point	Arrival Point
Sri Lanka	LKA5GC.MD	Standard (Interpolated)	Locality
Sudan	SDN5GC.MD	Standard (Interpolated)	Locality
Suriname	SUR5GC.MD	Standard (Interpolated)	Locality
Swaziland	SWZ5GC.MD	Standard (Interpolated)	Locality
Sweden	SWE5GC.MD	Standard (Interpolated)	Arrival Point
Sweden	SWE5GCAP.MD	Arrival Point	Arrival Point
Switzerland	CHE5GC.MD	Standard (Interpolated)	Arrival Point
Switzerland	CHE5GCAP.MD	Arrival Point	Arrival Point
Syrian Arab Republic	SYR5GC.MD	Standard (Interpolated)	Locality
Taiwan	TWN5GC.MD	Standard (Interpolated)	Arrival Point
Taiwan	TWN5GCAP.MD	Arrival Point	Arrival Point
Tajikistan	TJK5GC.MD	Standard (Interpolated)	Locality
Tanzania, United Rep.	TZA5GC.MD	Standard (Interpolated)	Locality
Thailand	THA5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Timor-Leste	TLS5GC.MD	Standard (Interpolated)	Locality
Togo	TGO5GC.MD	Standard (Interpolated)	Locality
Tokelau	TKL5GC.MD	Standard (Interpolated)	Locality
Tonga	TON5GC.MD	Standard (Interpolated)	Locality
Trinidad and Tobago	TTO5GC.MD	Standard (Interpolated)	Locality
Tunisia	TUN5GC.MD	Standard (Interpolated)	Locality
Turkey	TUR5GC.MD	Standard (Interpolated)	Interpolated house number
Turkmenistan	TKM5GC.MD	Standard (Interpolated)	Locality
Turks and Caicos Islands	TCA5GC.MD	Standard (Interpolated)	Locality
Tuvalu	TUV5GC.MD	Standard (Interpolated)	Locality
Uganda	UGA5GC.MD	Standard (Interpolated)	Locality
Ukraine	UKR5GC.MD	Standard (Interpolated)	Arrival Point
Ukraine	UKR5GCAP.MD	Arrival Point	Arrival Point
United Arab Emirates	ARE5GC.MD	Standard (Interpolated)	Locality
United Kingdom	GBR5GC.MD	Standard (Interpolated)	Arrival Point
United Kingdom	GBR5GCAP.MD	Arrival Point	Arrival Point
United States	USA5GC.MD	Standard (Interpolated)	Arrival Point
United States	USA5GCAP.MD	Arrival Point	Arrival Point
Uruguay	URY5GC.MD	Standard (Interpolated)	Arrival Point
Uruguay	URY5GCAP.MD	Arrival Point	Arrival Point
Uzbekistan	UZB5GC.MD	Standard (Interpolated)	Locality
Vanuatu	VUT5GC.MD	Standard (Interpolated)	Locality
Venezuela	VEN5GC.MD	Standard (Interpolated)	Unknown
Viet Nam	VNM5GC.MD	Standard (Interpolated)	Locality
Virgin Islands, British	VGB5GC.MD	Standard (Interpolated)	Locality
Western Sahara	ESH5GC.MD	Standard (Interpolated)	Locality
Yemen	YEM5GC.MD	Standard (Interpolated)	Locality

Country	Database Filename	Geocoding Type	Maximum Precision
Zambia	ZMB5GC.MD	Standard (Interpolated)	Locality
Zimbabwe	ZWE5GC.MD	Standard (Interpolated)	Locality

RELATED TOPICS:

- [“GeoCoding Types” on page 63](#)

APPENDIX B

CASS Return Codes

This appendix includes the following topic:

- [CASS Enrichment Data, 170](#)

CASS Enrichment Data

Address Verification returns a range of enrichment data with certified addresses as `Type` attributes on the CASS element. You can find the CASS element under the `EnrichmentData` element in the `Result.xml` file.

The following table describes the data values:

Value	Description
Barcode	An 11-digit number that represents the delivery point for the record. It consists of the nine-digit ZIP+4 code and the two-digit Delivery Point Answer.
Carrier Route Answer	A four-character code assigned to a mail delivery or collection route within a 5-digit ZIP Code. The first character of the code is alphabetical and the last three are numeric: <ul style="list-style-type: none">- Bnnn = PO box- Hnnn = Highway contract- Rnnn = Rural route- Cnnn = City delivery- Gnnn = General delivery
Concatenation of DPV Footnotes*	All data values from the populated DPV Footnote fields in a single string.
Congressional District	A standard value that identifies a geographic area served by a member of the United States House of Representatives or Senate. If the address is an Army/Air Force (APO) address or a fleet post office (FPO) address, the field is blank. If there is only one member of congress within the state, the value is AL (At Large).
Default Flag	Indicates that the record matched to a high-rise, rural route, or street default record in the ZIP + 4 data. The flag has the value Y for a matching record.
Delivery Point Answer	The final two digits of the house/box number, or if a High-rise record is matched, the secondary unit number that represents the delivery point information. The Delivery Point Answer contributes to the 11-digit delivery point barcode (DPBC).

Value	Description
Delivery Point Check Digit Answer	<p>A number that you can add to the sum of the other digits in the delivery point barcode (DPBC) to yield a number that is a multiple of ten. For example:</p> <p>ZIP+4 code = 123456789</p> <p>Delivery Point Answer = 01</p> <p>Sum of digits (1+2+3+4+5+6+7+8+9+0+1) = 46</p> <p>Check digit = 4 (46+4 = 50)</p>
DPV 3553 Confirmation*	<p>Indicates whether to add the address to the total number of addresses recorded in the ZIP + 4/DPV Confirmed column on form 3553:</p> <ul style="list-style-type: none"> - Increment the total number of addresses. - Do not increment the total number of addresses.
DPV CMRA Indicator*	<p>Indicates the result of the call to the DPV CMRA (Commercial Mail Receiving Agent) hash table:</p> <ul style="list-style-type: none"> - Y =Address was found in the CMRA table. - N =Address was not found in the CMRA table. - Blank = Address was not presented to the hash table.
DPV Confirmation Enhanced	<p>Provides additional information on the reasons for the DPV Status assignment:</p> <ul style="list-style-type: none"> - Y= Address was DPV confirmed for both primary and secondary numbers to determine a valid delivery point. - D= Address was DPV confirmed for the primary number only, and secondary number information was missing. - S= Address was DPV confirmed for the primary number only, and the secondary number information was present but not confirmed. Or, a single trailing alpha character on a primary number was dropped to make a DPV match, and secondary information is required. - N= The primary number information failed to DPV confirm. - R= Address was DPV confirmed but assigned to phantom route R777 or R779. The USPS does not provide delivery. - Blank= Address was not presented to the hash table.
DPV Confirmation Indicator*	<p>Indicates the result of the call to the Delivery Point Value (DPV) Confirmation hash table:</p> <ul style="list-style-type: none"> - Y =Address was DPV confirmed for both primary and (if present) secondary numbers. - D =Address was DPV confirmed for the primary number only, and secondary number information was missing. - S = Address was DPV confirmed for the primary number only, and the secondary number information was present but invalid. Or, a single trailing alpha on a primary number was dropped to make a DPV match. - N =Address failed to DPV confirm. The primary number was missing or was not confirmed. - Blank = Address was not presented to the hash table.
DPV Door Not Available*	<p>Identifies addresses that do not provide a door or entry point that the postal carrier can access. A Door Not Available (DNA) address might not provide a door for mail delivery, or the mailbox might reside behind a locked gate.</p> <p>The DPV DNA indicator can contain the values of Y or N:</p> <ul style="list-style-type: none"> - Y = Address does not have a door available for postal delivery. - N = Address has a door available for postal delivery. - Blank = Address was not presented to the hash table.
DPV Drop Indicator*	<p>Indicates the status of the address in the DSF2 Drop Indicator table. The Drop Indicator table identifies mailbox addresses that serve multiple households or businesses.</p> <p>The DPV Drop indicator can contain the values of Y or N:</p> <ul style="list-style-type: none"> - Y= Address was found in the table. - N= Address was not found in the table. - Blank = Address was not presented to the hash table.

Value	Description
DPV False Positive Indicator*	Indicates the results of the call to the DPV False Positive hash table: <ul style="list-style-type: none"> - Y = Address was found in the False Positive table. - N = Address was not found in the False Positive table. - Blank = Address was not presented to the hash table.
DPV Footnote 1* DPV Footnote 2* DPV Footnote 3* DPV Footnote 4* DPV Footnote 5*	The footnote(s) returned for an address from DPV processing: <ul style="list-style-type: none"> - AA - Input address matched to the ZIP + 4 file. - A1 - Input address did not match to the ZIP + 4 file. - BB - Input address primary and secondary numbers match DPV requirements. - CC - Input address primary number matched to DPV, but secondary number does not match (secondary number is not required). - C1 - Input address primary number matched to DPV, but secondary number does not match (secondary number is required). - F1 - Input address matched to a military address. - G1 - Input address matched to a general delivery address. - IA- Input address is part of the USPS Informed Address program. - M1 - Input address primary number is missing. - M3 - Input address primary number is not valid. - N1 - Input address primary number matched to DPV, but the address is missing a secondary number (secondary number is required). - P1 - Input address Post Office, Rural Route, or Highway Contract Box number is missing - P3 - Input address Post Office, Rural Route, or Highway Contract Box number is not valid. - PB - Input address matched to a PO Box Street Address (PBSA). - RR - Input address matched to CMRA and Private Mailbox (PMB) designator is present. - R1 - Input address matched to CMRA, but PMB designator is not present. - R7 - Input address matched to a physical address that does not receive delivery from the USPS (phantom route R777 or R779). - TA - Input address primary number matched to DPV by dropping a trailing alpha character.. - U1 - Input address matched to a unique ZIP code.
DPV No Secure Location*	Identifies an address that does not provide a reliable mailbox or reception point for mail: <ul style="list-style-type: none"> - Y = Location is not secure. - N = Location is secure. - Blank = Address was not presented to the hash table.
DPV PBSA*	Indicates that the address is a Post Office Box Street address (PBSA): <ul style="list-style-type: none"> - Y =Address was found in the PBSA table. - N =Address was not found in the PBSA table. - Blank = Address was not presented to the hash table. Address Verification also returns the footnote PB for a PBSA address.
DPV Throwback Indicator*	An alphabetic value that identifies a valid street address for which the USPS forwards mail to a Post Office Box: <ul style="list-style-type: none"> - Y = The address is a Throwback address. - N = The address is not a Throwback address. - Blank = Address was not presented to the hash table.
DSF2 No Stats Indicator*	Indicates the results of the call to the DPV NOSTATS table: <ul style="list-style-type: none"> - Y = Address was found in the NO STATS table. - N = Address was not found in the NO STATS table. - Blank = Address was not presented to the hash table.

Value	Description
DSF2 No Stats Reason*	<p>A two-digit code that identifies the reason why an address returned a Y in the <i>DPV No Stats Indicator</i> field.</p> <p>The USPS does not deliver to an address with a DPV No Stats Indicator value of Y.</p> <p>The code can have the following values:</p> <ul style="list-style-type: none"> - <i>01 - IDA</i> Internal Drop Address. The verified address does not physically receive mail. Instead, the USPS delivers mail to a 'drop' address associated with the verified address. - <i>02 - CDS</i> The address identifies a new construction that cannot yet accept delivery. Or, the address lies on a Rural Route, Highway Contract Route, or Contract Delivery Service route and the delivery point is unoccupied for more than 90 days. - <i>03 - Collision</i> The address does not DPV confirm. In this case, the 'Y' should be set to an 'N' on the DPV 'A' table and all other table values should be blank. - <i>04 - CMZ</i> The address is in a college, military, or other zone. A CMZ address is a ZIP+4 address that the USPS has added to the reference data. - <i>05 - Regular No-Stat</i> The address is no longer deliverable or lies on a phantom R777 or R779 route, or the address includes a Post Office Box that has never been rented or is not available to rent, or the No Stat reason is not one of the other reasons. - <i>06 - Secondary Required</i> The address has incorrect secondary or missing secondary information, and the secondary information is required.
DSF2 Vacant Indicator*	<p>Indicates the results of the call to the DPV VACANT table:</p> <ul style="list-style-type: none"> - Y = Address was found in the VACANT table. - N = Address was not found in the VACANT table. - Blank = Address was not presented to the hash table.
Early Warning System (EWS) Return Code*	<p>Indicates whether the address was found in the EWS data:</p> <p>Y = Address was found in the EWS data, thus resulting in a ZIP + 4 No Match.</p> <p>Blank = Address was not found in the EWS data.</p>
eLOT Ascending/Descending	<p>The Enhanced Line of Travel (eLOT) order in which delivery points are delivered within a given add-on code.</p> <p>For example, if the code is A (Ascending) and the house numbers are 1, 3, and 5, the carrier delivers 1, 3, and 5, in that order (low to high). If the code is D (Descending), the carrier delivers first to 5, then 3, and then 1 (high to low).</p>
eLOT Sequence Number	<p>A number that indicates the order in which add-on codes are arranged within a given carrier route.</p>
High-rise Default	<p>A flag that indicates that the record is assigned to a default high-rise record.</p>
High-rise Exact	<p>Identifies high-rise addresses that contain unit identifiers.</p>

Value	Description
LACS Indicator*	<p>Identifies an address that matched to a LACS address in the ZIP + 4 file. A LACS address is an address that was converted to the city-style address format so that emergency vehicles can more easily find the address location.</p> <p>Return values:</p> <ul style="list-style-type: none"> - L = Address matched to a LACS address in the ZIP + 4 file. - Blank = Address was not compared to the ZIP + 4 file.
LACSLink Indicator*	<p>An indicator returned when the LACSLink hash tables are queried:</p> <ul style="list-style-type: none"> - <i>Y= LACS record match</i> A new address can be furnished. The input record matched to a record in the master file. An indicator value of Y has the meaning described when the LACSLink Return Code value is A. - <i>Y= Found LACS record, but new address did not convert at run time</i> The new address cannot be converted to a deliverable address. The input record matched a record in the master file. An indicator value of Y has the meaning described when the LACSLink Return Code value is 14. - <i>S= LACS record, secondary number dropped from input address</i> The record is a ZIP + 4 street-level or high-rise match. The input record matched to a master file record, but the input address had a secondary number and the master file record did not. - <i>N= No match</i> A new address cannot be furnished. The input record cannot be matched to a record in the master file. - <i>F= False Positive</i> A false-positive record was detected. - <i>Blank</i> Address was not presented to the hash table
LACSLink Return Code*	<p>A return value from LACSLink processing:</p> <ul style="list-style-type: none"> - <i>A = LACS record match</i> A new address can be furnished. The input record matched to a record in the master file. - <i>00 = No match</i> A new address cannot be furnished. The input record cannot be matched to a record in the master file. - <i>14 = Found LACS record, but new address did not convert at run time</i> The new address cannot be converted to a deliverable address. The input record matched to a record in the master file. - <i>92 = LACS record, secondary number dropped from input address</i> The record is a ZIP + 4 street-level or high-rise match. The input record matched to a master file record, but the input address had a secondary number and the master file record did not. - <i>Blank</i> The record was not queried.
Non-Delivery Days*	<p>A seven-character string that identifies the day or days of the week on which an address cannot receive mail. The seven characters in the string represent the days of the week from Sunday through Saturday.</p> <p>Address Verification returns Y in the corresponding position in the string for any day on which the address cannot receive mail. Address Verification returns N in the corresponding position for any other day.</p> <p>The Non-Delivery Days field can contain the values of Y or N:</p> <ul style="list-style-type: none"> - Y= Address cannot receive mail. - N= Address can receive mail.

Value	Description
Non-Delivery Days Flag*	<p>Returns Y if the address is not deliverable on one or more days of the week. Otherwise, returns N.</p> <p>Address Verification populates the Non-Delivery Days field for every address that returns Y in the Non-Delivery Days Flag field.</p> <p>The Non-Delivery Days Flag can contain the values of Y or N:</p> <ul style="list-style-type: none"> - Y= Address was found in the table. - N= Address was not found in the table. - Blank = Address was not presented to the hash table.
P. O. Box Only	<p>Indicates if the address is located in a ZIP code that contains post office box addresses only.</p> <p>Y = Address is in a PO Box only Delivery Zone.</p>
Record Type Code	<p>An alphabetic value that identifies the type of data in the record. Record type codes include the following:</p> <ul style="list-style-type: none"> - F = Firm (ZIP+4) - G = General delivery (5-Digit ZIP, ZIP+4, and Carrier Route) - H = High-rise (ZIP+4) - P = PO box (5-Digit ZIP, ZIP+4, and Carrier Route) - R = Rural route/highway contract (5-Digit ZIP, ZIP+4, and Carrier Route) - S = Street (5-Digit ZIP, ZIP+4, and Carrier Route)
Residential Delivery Indicator *	<p>Indicates if the delivery point is residential:</p> <ul style="list-style-type: none"> - Y = Indicates residential delivery. - N = Not residential delivery. - Blank = Did not query the Residential Delivery Indicator (RDI) data.
Rural route Default	<p>A flag that indicates that the record is assigned to a default rural route record. This occurs when the input house number does not match to the primary numbers in the reference data and there is a corresponding rural route record with no primary numbers.</p>
Rural route Exact	<p>Indicates if the address matches a rural route address in the USPS address reference data set.</p>
SuiteLink Return Code*	<p>A return value of SuiteLink Processing:</p> <ul style="list-style-type: none"> - A = <i>SuiteLink Record Match</i> <p>The input record matched to a record in the master file. An improved business address can be furnished.</p> <ul style="list-style-type: none"> - 00 = <i>No Match</i> <p>Business address not improved. The input record cannot be matched to a record in the master file. An improved business address can not be furnished.</p>
ZIPMove Return Code*	<p>A return value of ZIPMove processing:</p> <ul style="list-style-type: none"> - Y = ZIPMove match was made. - N = ZIPMove match was not made.
ZIP5 Valid	<p>Indicates whether the address record can be added to Form 3553. Five-digit validation requires that the last line values of city, state, and ZIP Code correspond to each other.</p> <p>When CASS Software makes a ZIP+4 match, the five-digit ZIP Code is valid.</p> <p>Note: Five-digit validation applies to No Match ZIP+4 records.</p>

Note: Attributes marked with * will only be populated for United States customers, as per USPS licensing restrictions.