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# Introduction to the Migration Guide for Data Packs

As of July 31, 2023, SAS no longer supports or provides updates to the following data packs:

- US Address Verification (USPS)
- North America Postal Level Geocode (includes PhonePlus)
- Canada Address Verification (Canada Post SERP (Software Evaluation and Recognition System) version 2, release 2 (V2R2))
- US Street Level Geocode (except for Loqate geocode data)

Users who want to perform US/Canada address verification and geocode jobs, must migrate to the Loqate data packs listed below, prior to July 31, 2023.

- **Loqate US Data**
- **Loqate Data** (includes Canada)

After July 31, 2023, the DataFlux Data Management Studio jobs that rely on the discontinued data packs fail, and you will receive license errors. The nodes that are affected by these changes include the following:

**Data Job Nodes**

- Address Update Lookup
- Address Verification (US/Canada)
- US City/State/ZIP Lookup
- US City/State/ZIP Validation
- Geocoding
- Street-level Geocoding
- Canadian Postal Lookup

- Distributed Address Verification
- Distributed Geocoding

**Process Job Nodes**

- Address Update Audit Report
- Address Update Monthly Reports
- Address Update Process Summary Report

The *DataFlux Data Management Studio and Server 2.9: Migration Guide for Data Packs* provides information about how to migrate your US and Canada Address Verification jobs, along with Geocoding jobs to use the **Loqate** node.

# Before You Begin

The *DataFlux Data Management Studio and Server 2.10: Migration Guide for Data Packs* shows users how to complete the following tasks:

- Update system files to use the **Loqate** node for United States and Canada address verification and geocoding.
- Update existing data jobs to use the **Loqate** node instead of the **Address Verification (US/Canada)** node.

**NOTE:** Migration to Loqate for US/Canada address verification and geocoding is supported for DataFlux Data Management Studio and SAS Data Management Server 2.7 and later. If you have an earlier version of the software, contact your SAS account manager for a supported version of DataFlux Data Management Studio and SAS Data Management Server.

# Preparing Your System

## Obtain a License

Contact your SAS account manager to obtain new license files that include the required Loqate US/Canada data pack products.

## Required Patches

Next, you must apply patches to DataFlux Data Management Studio and SAS Data Management Server to enable the Loqate data for US and Canada.

Access the SAS Note at **http://support.sas.com/kb/69827** to access the hot fix for this step.

## Download Reference Data – United States

Before you begin, you must log in to the SAS Support website to download the Loqate US enrichment data.

> **NOTE:** American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and the US Virgin Islands are included in the Loqate US Data Pack.

Please follow these steps:

1. Navigate to the SAS Downloads site: **https://support.sas.com/downloads/browse.htm?fil=3&cat=16**.

2. Click **Loqate US Data**.

3. Download both the **Loqate US Data** and the **Loqate US Data Setup** files for your operating system.

4. Once the files are downloaded, run the **Loqate US Data Setup** file (`-xc.exe` or `-xc.tar.gz`). Setup creates a subdirectory for the data files just like a normal reference file installation (for example, `C:\Program Files\SAS\VerifyData\data\XXXX\world`).

5. Unzip the **Loqate US Data** file (`-usx.zip` or `-usx.tar.gz`) into the directory that was created as part of the **Loqate US Data Setup** file setup.

## Download Reference Data - Canada

Before you begin, you must log in to the SAS Support website to download the Loqate Canada enrichment data. Please follow these steps:

1. Navigate to the SAS Downloads site: **https://support.sas.com/downloads/browse.htm?fil=3&cat=16**.

2. Click **Loqate Data**.

3. Download the **Loqate Canada Data** files for your operating system.

4. Once the file is downloaded, run the **Loqate Canada Data** file (`-cc.exe` or `-cc.tar.gz`). Setup creates a subdirectory for the data files (for example, `C:\Program Files\SAS\VerifyData\data\XXXX\world`).

## Copy Loqate License Key into the Data Folder

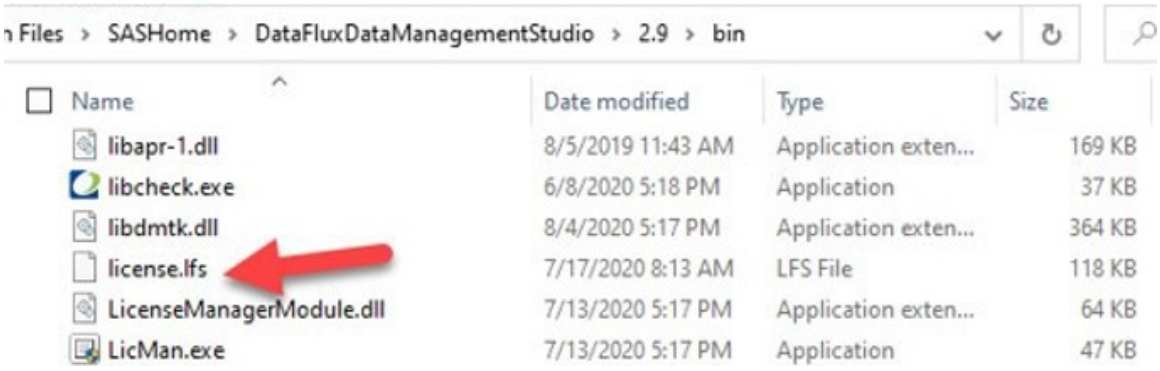
Once the Loqate reference data is downloaded and installed, copy a `license.lfs` file from the `SASDataManagementStudio/`*`version`*`/bin` folder to the **Loqate** data folder.

> **Note:** If you are using DataFlux Data Management Studio version 2.7 or if you do not get output after running the

job, your `license.lfs` is expired. Contact SAS Technical Support for an updated `license.lfs` file.

1. Navigate to the `bin` folder in your Data Management Studio directory. For example: `C:\Program Files\SASHome\SASDataManagementStudio\2.10\bin`.

2. Copy the `license.lfs` file.




3. Paste the `license.lfs` file into the Loqate data folder.

4. Navigate to the `app.cfg` file. For example, `C:\Program Files\SASHome\SASDataManagementStudio\2.10\folder-\app.cfg`.

5. Edit the `app.cfg` file to include the `VERLQT/LOQATE_DATA_PATH` entry. For example, the Windows path to the Loqate data, `VERLQT/LOQATE_DATA_PATH=C:\Program Files\SAS\VerifyData\data\XXXX\world`.

# Job Modifications

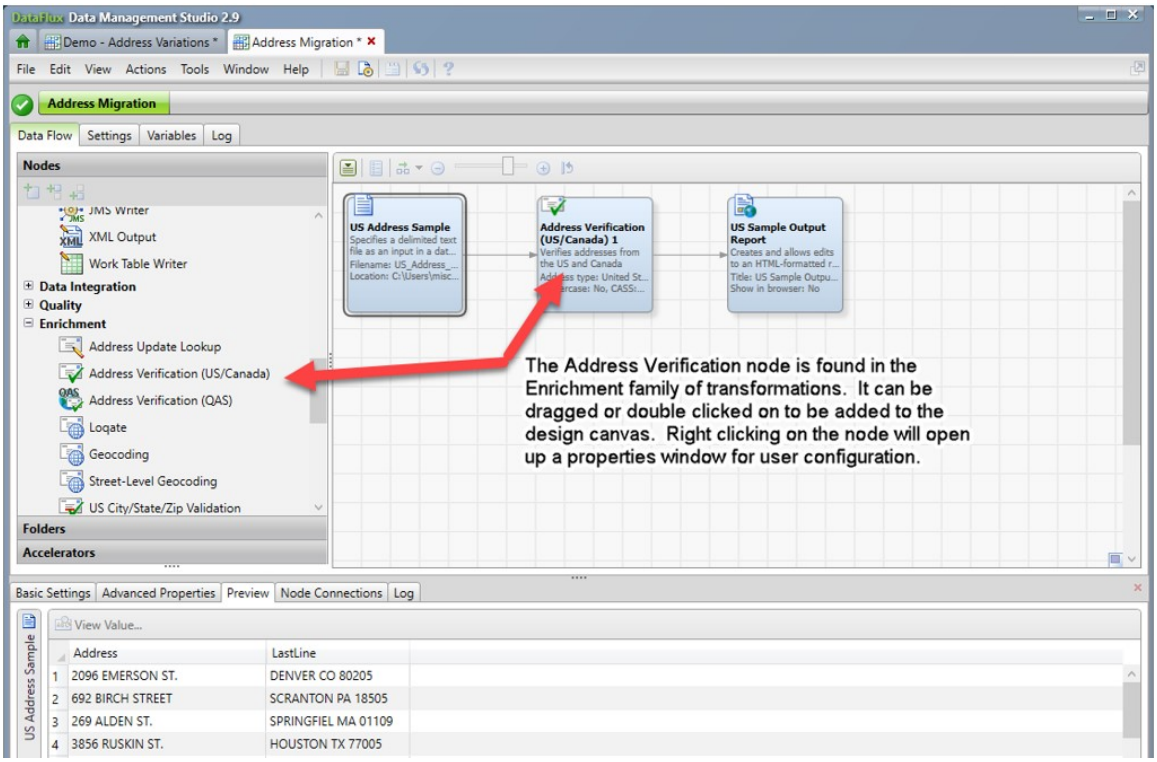
## United States

This section covers changes that are required for the United States data for address verification. Follow the steps below to modify your DataFlux Data Management Studio job to use a **Loqate** node instead of the **Address Verification (US/Canada)** node.

> **NOTE:** Refer to the section, **Introduction to the Migration Guide for Data Packs** for information about migrating your DataFlux Data Management Studio **Address Verification (US/Canada)** jobs to **Loqate**.

SAS Job Using the Address Verification (US/Canada) Node

1. In this screenshot, there is a text input file on the left side of the data flow and an HTML output on the right. The **Address Verification (US/Canada)** node, in the center of the flow, is set up to process US addresses.



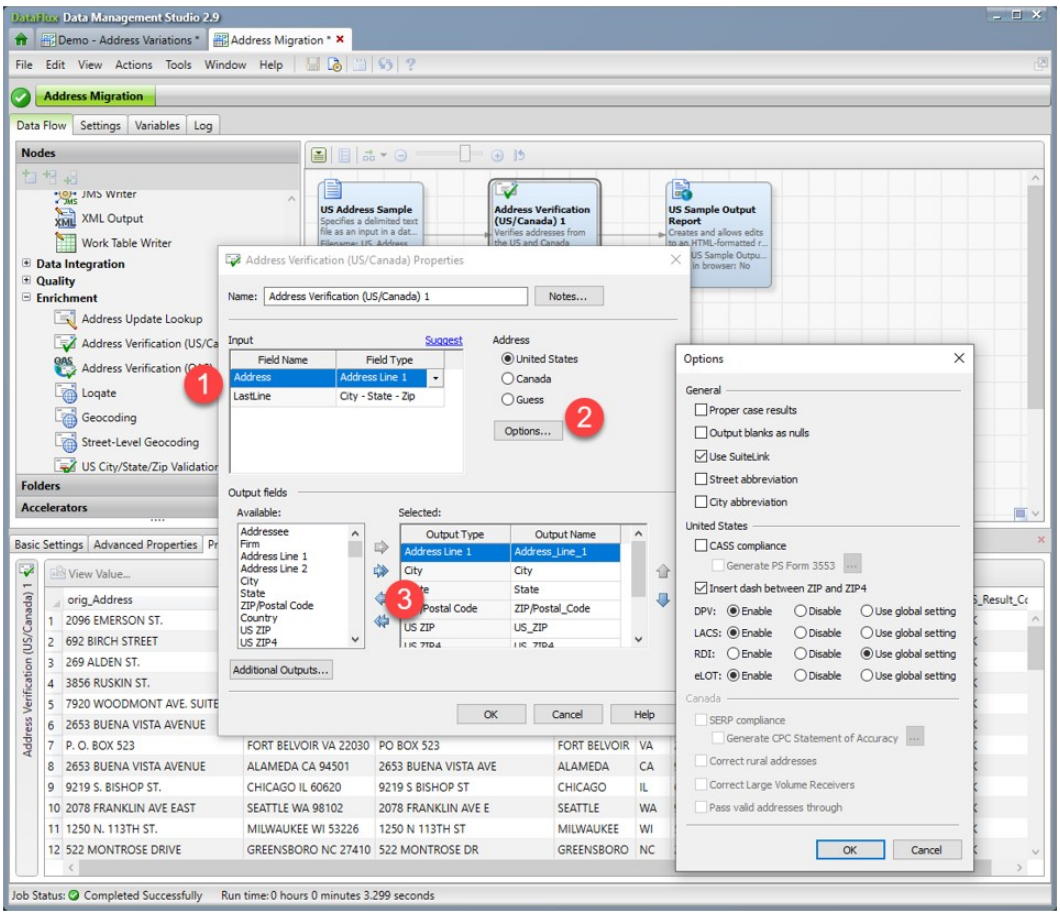

2. In the following screenshot, you can review the properties of the **Address Verification (US/Canada)** node for the United

States. In this example, there are three parts:

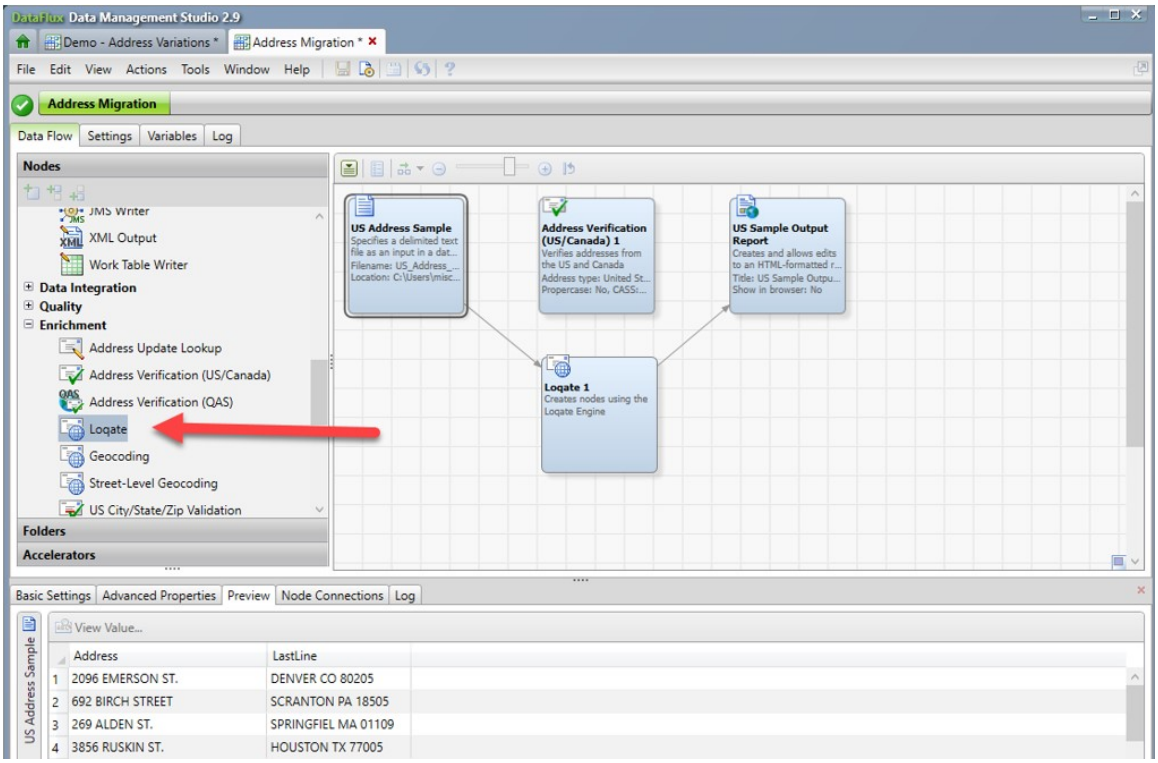
- Part 1 - These are the **Input** fields for the node. Please remember that you need at a minimum an address line and either a city and state or a ZIP code for the node to be able to verify an address.

- Part 2 - In the **Options** window, you can tell the node which parts and pieces of the reference data to use when verifying US addresses. It is recommended to use DPV, LACS, and eLOT. Please note that these options are different in the **Loqate Address Verification** node.

- Part 3 - Determine which output fields are needed and select those for output in the node.

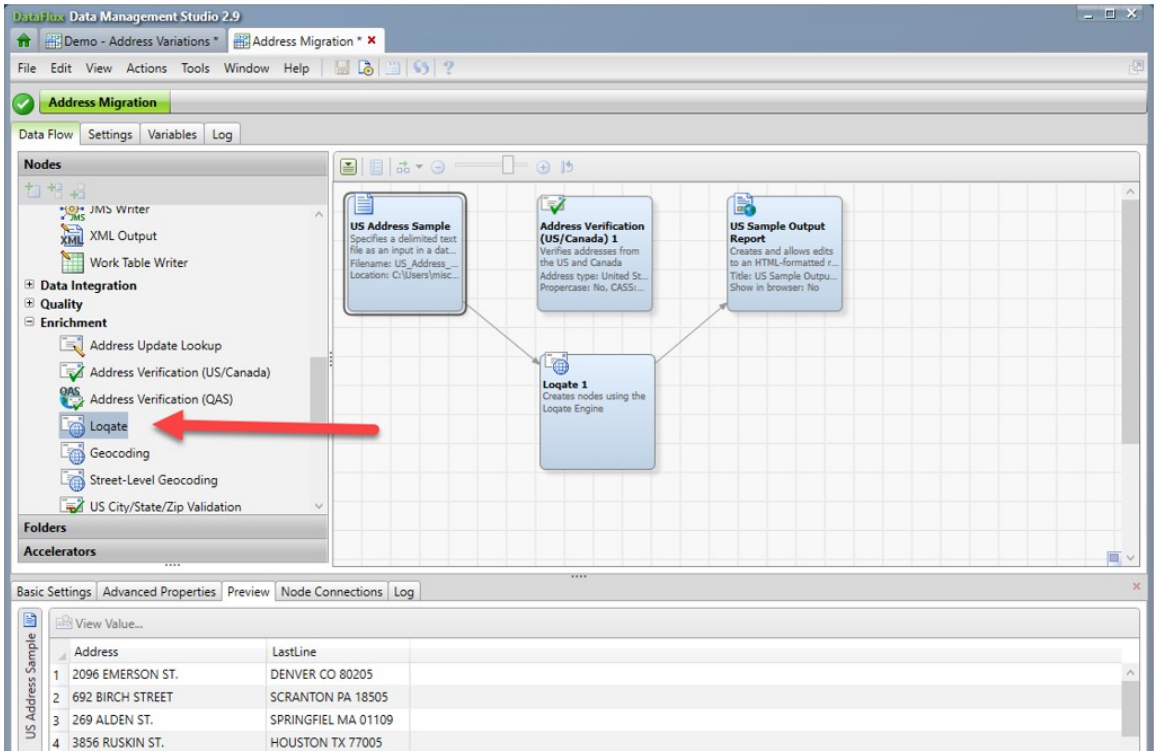



3. Next, a **Loqate** node is added to the design canvas and the source and targets are connected to the **Loqate** node.

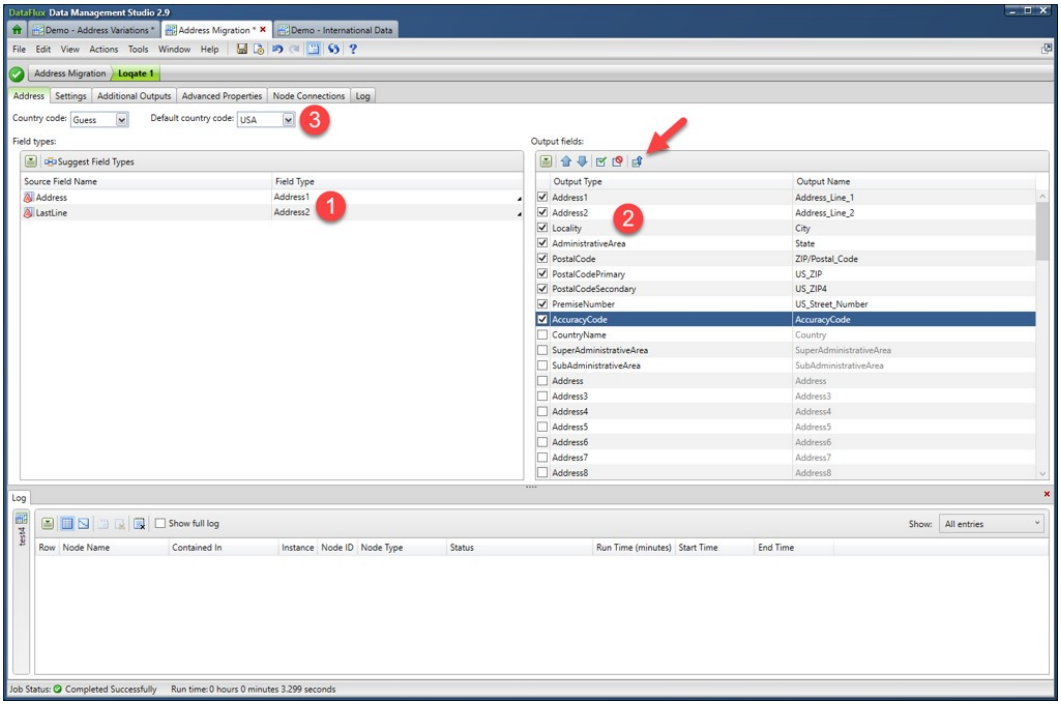



4. Once you have configured the **Loqate** node, you can delete the **Address Verification (US/Canada)** node.

5. The **Loqate** node is now added, and the source and targets are connected to the **Loqate** node.




6. Here is the **Properties** for the **Address** tab within the **Loqate** node.




- Part 1 - These are the **Input** fields for the node. Remember that you need, at a minimum, an address line and either a

city and state or a ZIP code for the node to be able to verify an address.

- Part 2 - Determine which output fields are needed and select those for output. See the Field Mappings document for a detailed explanation of the different field output tokens, as the names are different within the Loqate node.

  **NOTE:** To rename the **Output Names**, double-click the **Output Name** field and select **Rename**.

- Part 3 - Select **USA** as the default country code.

**Note:** In the **Output** field ribbon  , click the **Moved Checked to Top** icon to move all the selected output fields to the top of the list.

Configuring the Settings Tab within the Loqate Node

1. In the next screenshot, the **Properties** for the **Settings** tab, within the Loqate node, you see the following information:

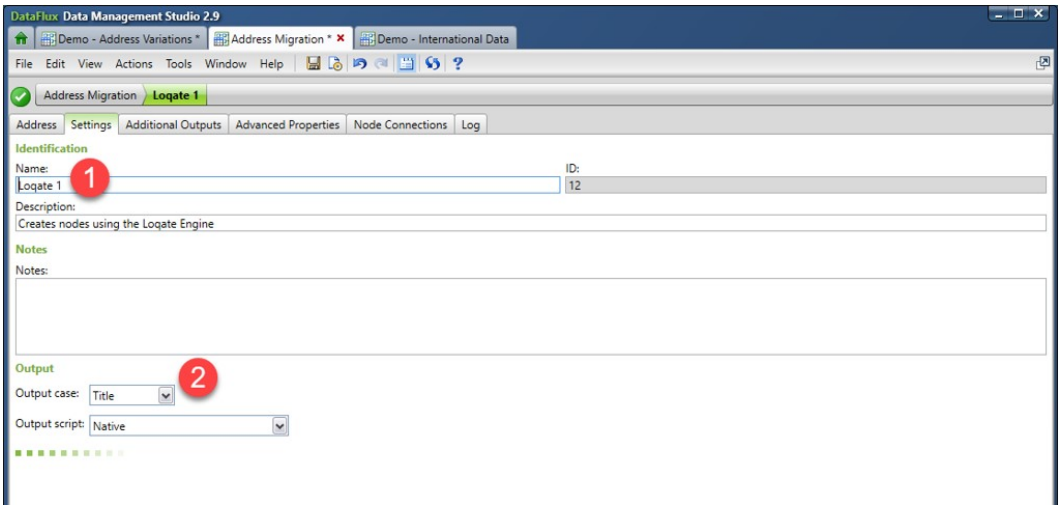
   - Part 1 - You can rename the node in the name field in case you are performing branching within a job and have multiple Loqate nodes.

   - Part 2 - Determine the output casing for the Loqate node. The options include the following:

     - Upper (SAN FRANCISCO)

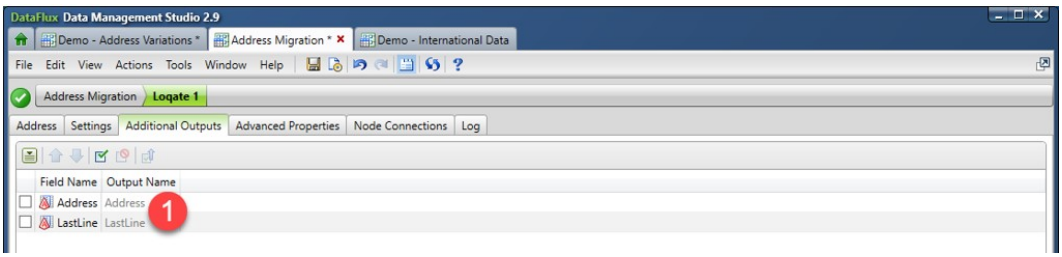
     - Title (San Francisco)

- Lower (san francisco)



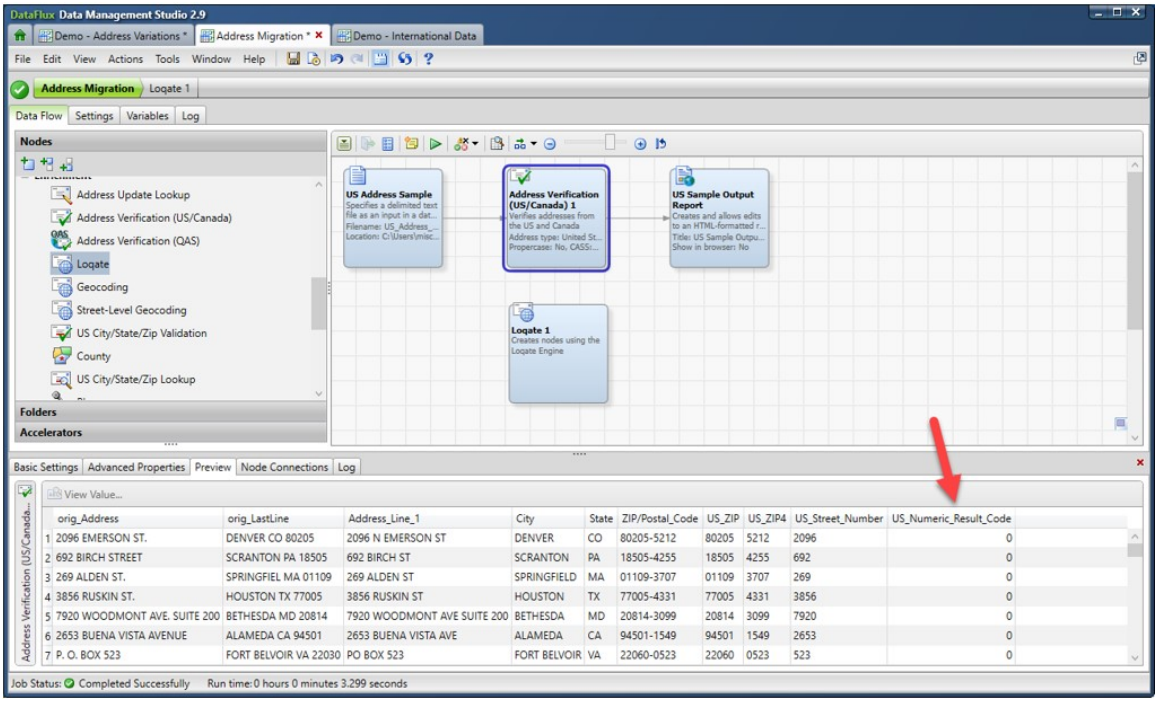

2. In the next screenshot, the **Properties** for the **Additional Outputs** tab is shown.

    - Part 1 - Select which input fields get passed along to the output file. Note that by default no input fields are passed along, they will need to be selected by the user and after selection they can be renamed.




Previewing Address Verification (US/Canada) Output

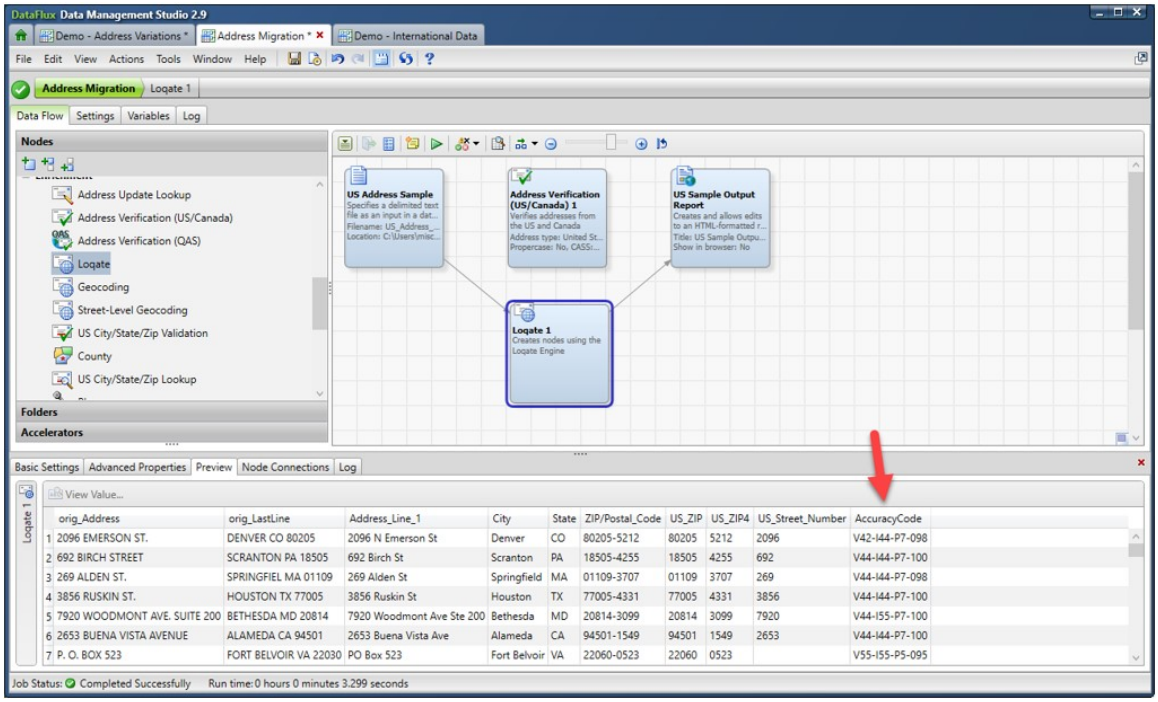
The following screenshot displays the preview of the configured **Address Verification (US/Canada)** node. This shows the original data and the validated address data. You can tell that this is validated and enriched data because the output now has a ZIP+4 field, as well as a parsed last line field. Please note the **Numeric Result Code** field, which shows you the level of verification achieved.




Previewing Loqate Output

Next, see the preview for the **Address Verification (US/Canada)** node. This shows the original data and the validated address data. You can tell this is validated and enriched data because the output now has a ZIP+4 field, as well as a parsed last line field. Please note the **AccuracyCode** field, which shows you the level of verification achieved.

> **NOTE:** By renaming columns, you can replicate all the output fields that were generated in the **Address Verification (US/Canada)** node preview. An **Expression** node can be added that converts the **Loqate Accuracy Code** over to a **US_Result_Code** field, if needed.




# Canada

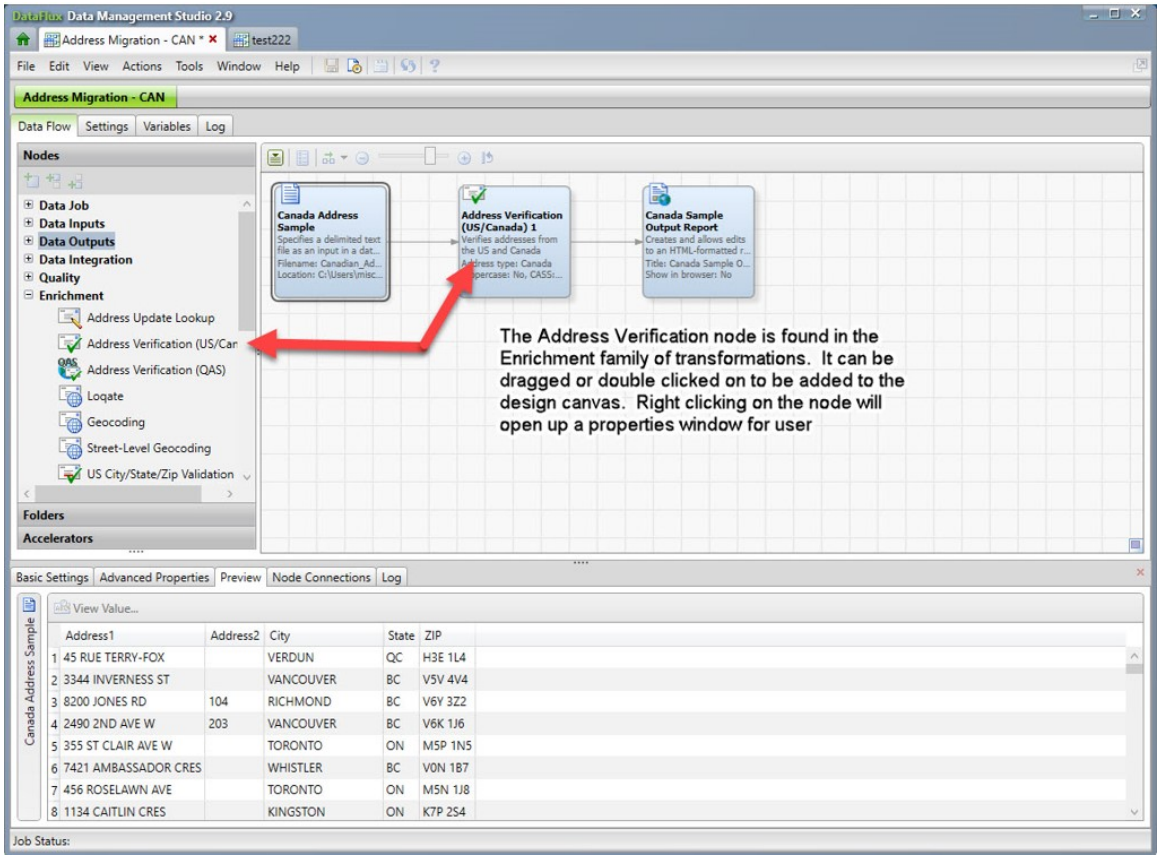
## Background

This section covers changes that are required for the Canada data for address verification. Follow the steps below to modify your DataFlux Data Management Studio job to use a **Loqate** node instead of the **Address Verification (US/Canada)** node.

> **NOTE:** Refer to the section, **Introduction to the Migration Guide for Data Packs** for information about migrating your DataFlux Data Management Studio **Address Verification (US/Canada)** jobs to **Loqate**.

Step 1 - SAS Job Using the Address Verification (US/Canada) Node

In this initial screenshot, there is a text input file on the left side of the data flow and an HTML output on the right. The **Address Verification** node in the center of the flow is set up to process Canadian addresses.



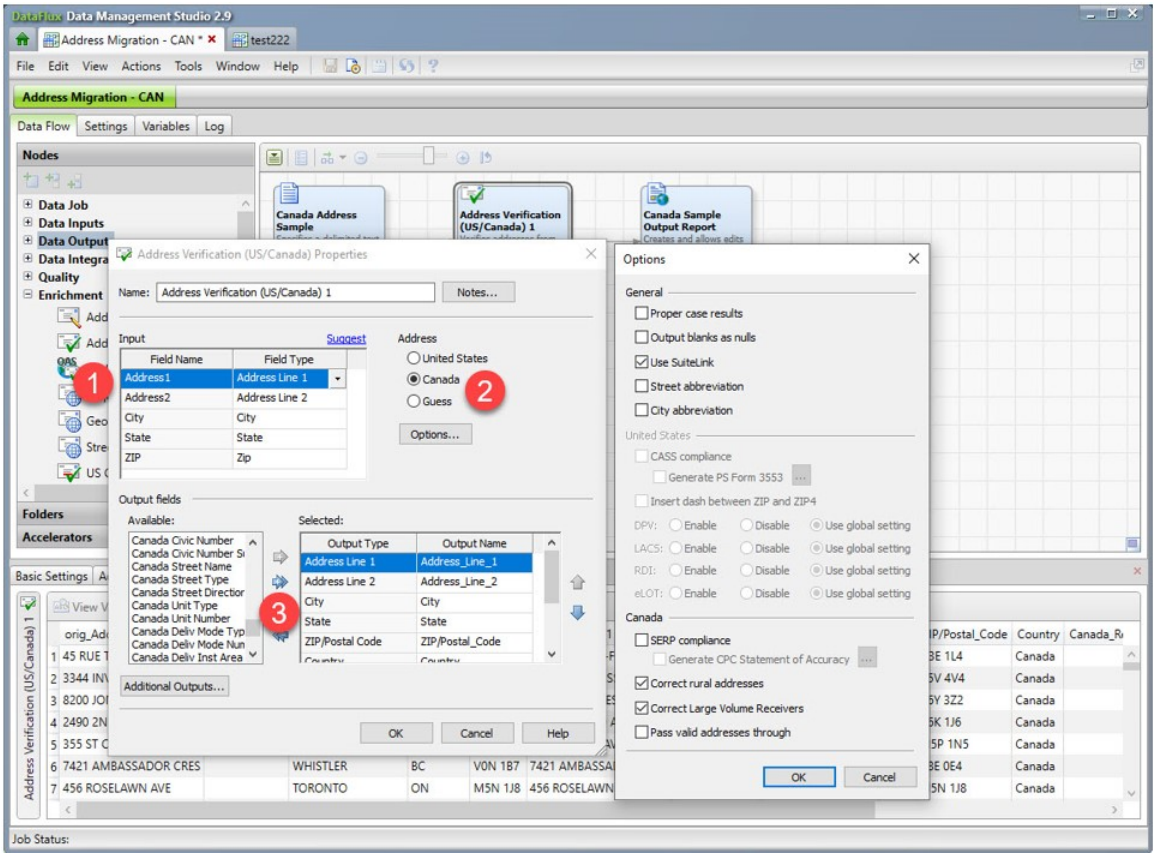

Step 2 – Reviewing the Properties of the Address Verification (US/Canada) Node

In the screenshot below, you see the properties of the **Address Verification (US/Canada)** node for Canada.

- Part 1 - These are the **Input** fields for the node. Remember that you need, at a minimum, an address line and either a city and state or a ZIP code for the node to be able to verify an address.

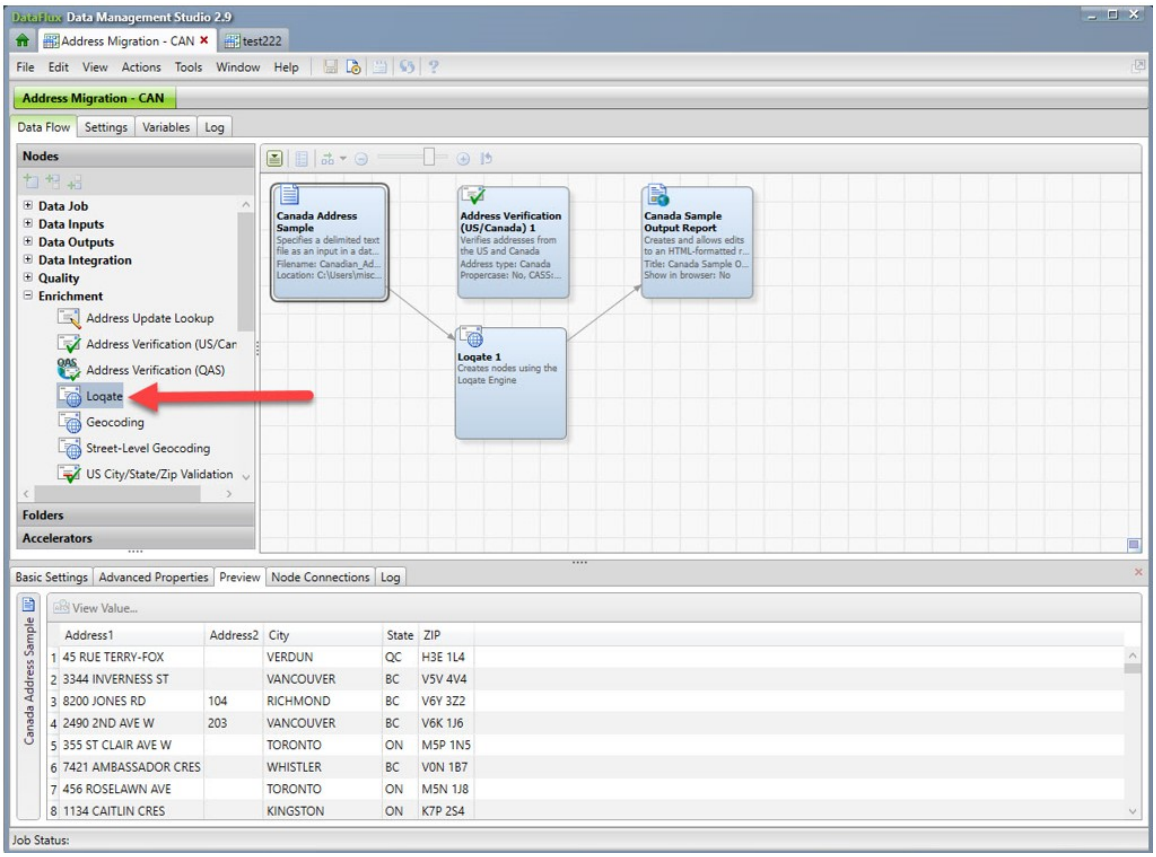
- Part 2 - In the **Options** window, you can tell the node which parts of the reference data to use when verifying Canadian addresses. Please note that these options are different in the **Loqate Address Verification** node.

- Part 3 - Determine which output fields you need and select those for output in the node.




Step 3 – Adding the Loqate Node to a SAS Job

In the screenshot below, a **Loqate** node is added to the design canvas and the source and targets are connected to the **Loqate** node. Once everything is configured, the **Address Verification (US/Canada)** node can be deleted.




Step 4 – Configuring the Address Tab within the Loqate Node

In the next screenshot, you see the **Properties** for the **Address** tab within the **Loqate** node.

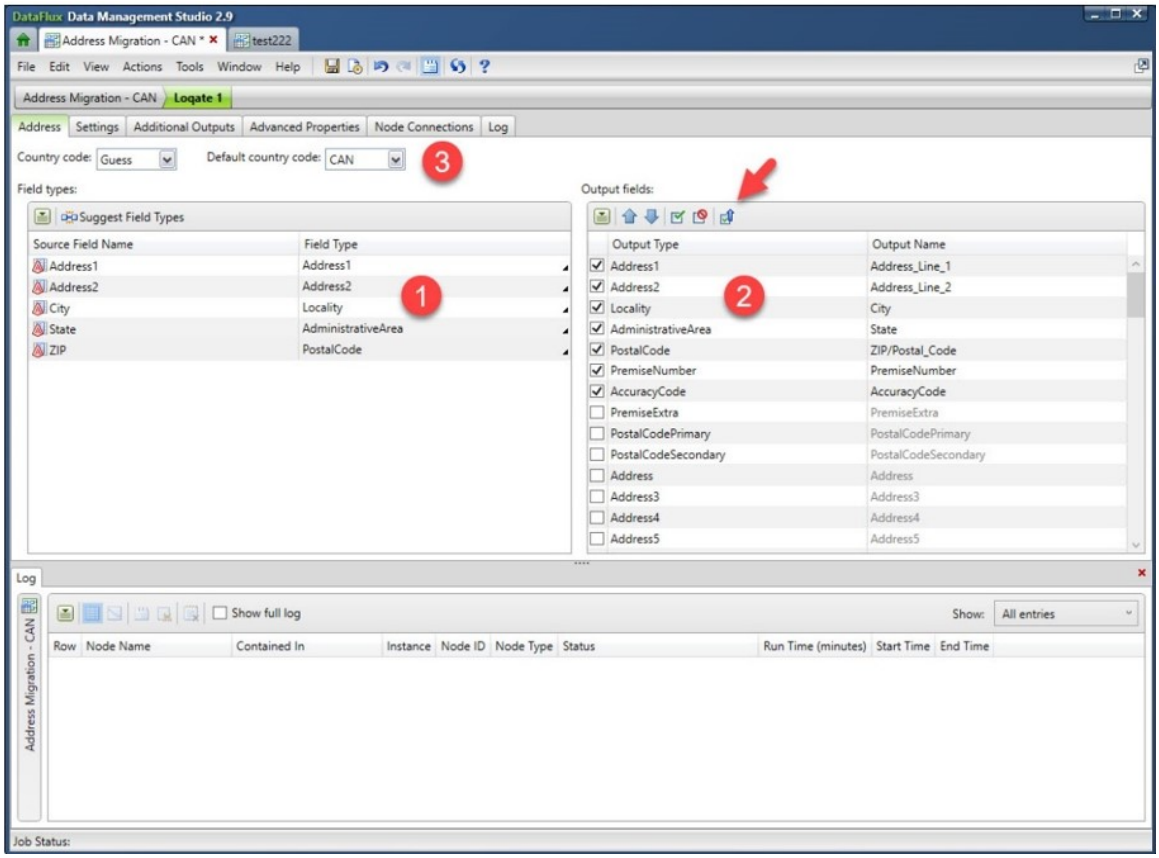
Part 1 - These are the **Input** fields for the node. Remember that you need, at a minimum, an address line and either a city and state or a ZIP code for the node to be able to verify an address.

Part 2 -Determine which output fields you need and then select them for output. Please review the **Field Mappings** document for a detailed explanation of the different field output tokens, as the names are different within the **Loqate** node.

> **NOTE:** You can rename Output Names by, double-clicking the **Output Name** field and rename.

Part 3 - Select `CAN` as the default country code.

In the **Output** field ribbon  , click the **Moved Checked to Top** icon to move all the selected output fields to the top of the list.

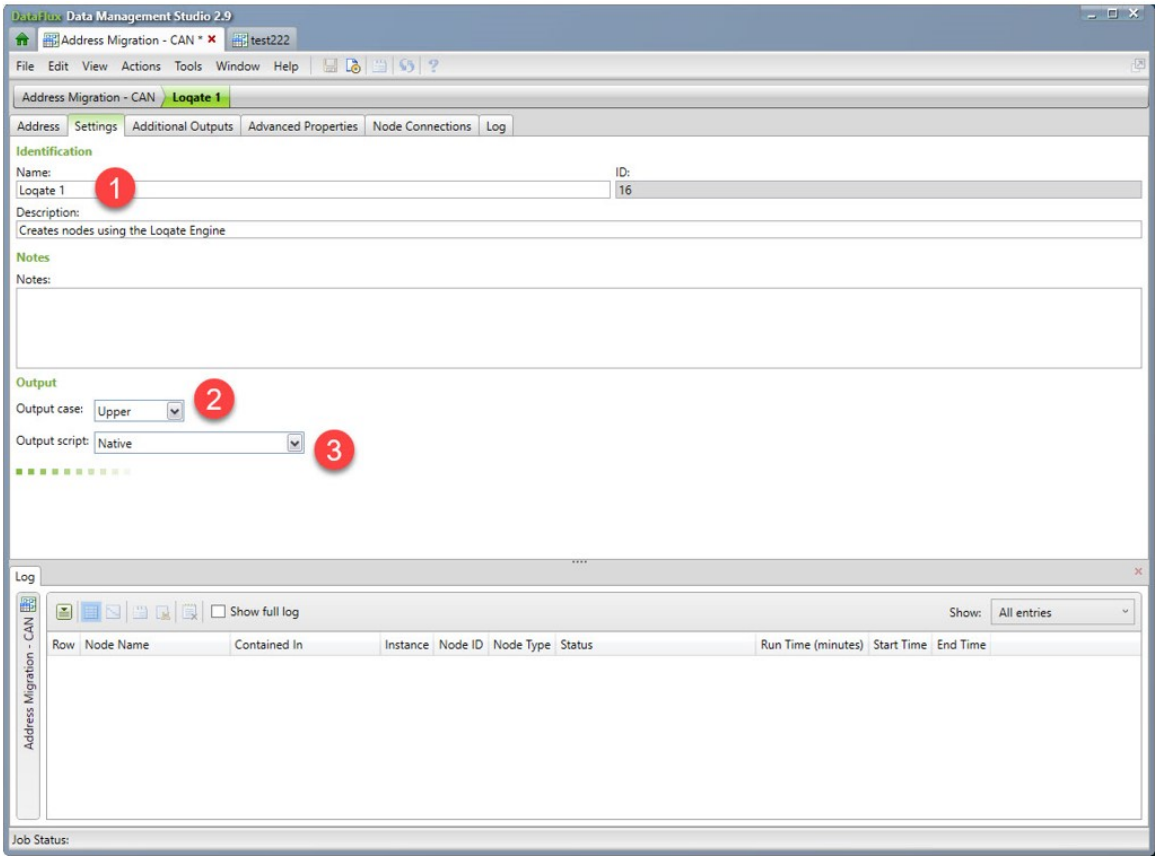



Configuring the Settings Tab within the Loqate Node

In the next screenshot, you can see the properties for the **Settings** tab within the **Loqate** node.

- Part 1 - You can choose to rename the node in the **Name** field in case you are performing branching within a job and have multiple **Loqate** nodes.
- Part 2 - Determine the output casing for the **Loqate** node. The options available include the following:
    - Upper (VANCOUVER)
    - Title (Vancouver)
    - Lower (vancouver)
- Part 3 - Determine the output script for the **Loqate** node. For example:

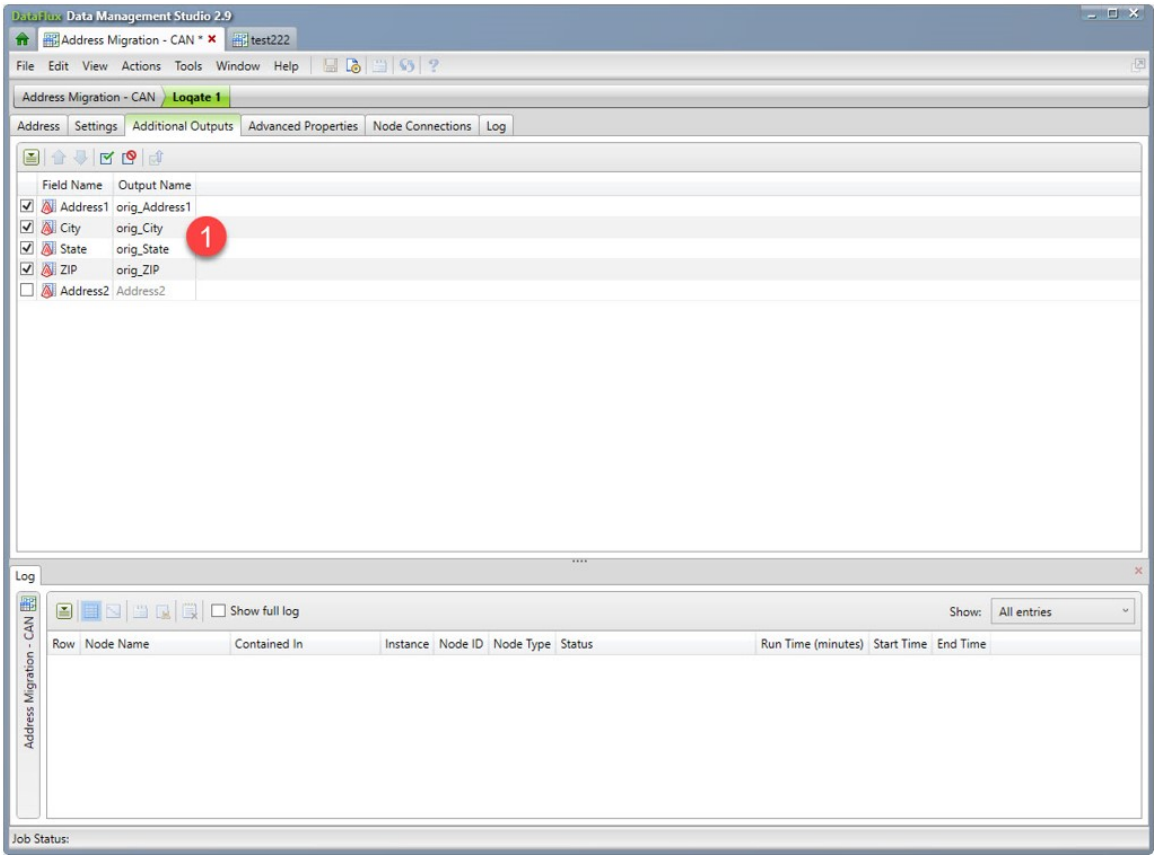
- Latn – Latin (Montreal)
- Native (Montréal)




Configuring the Additional Outputs Tab within the Loqate Node

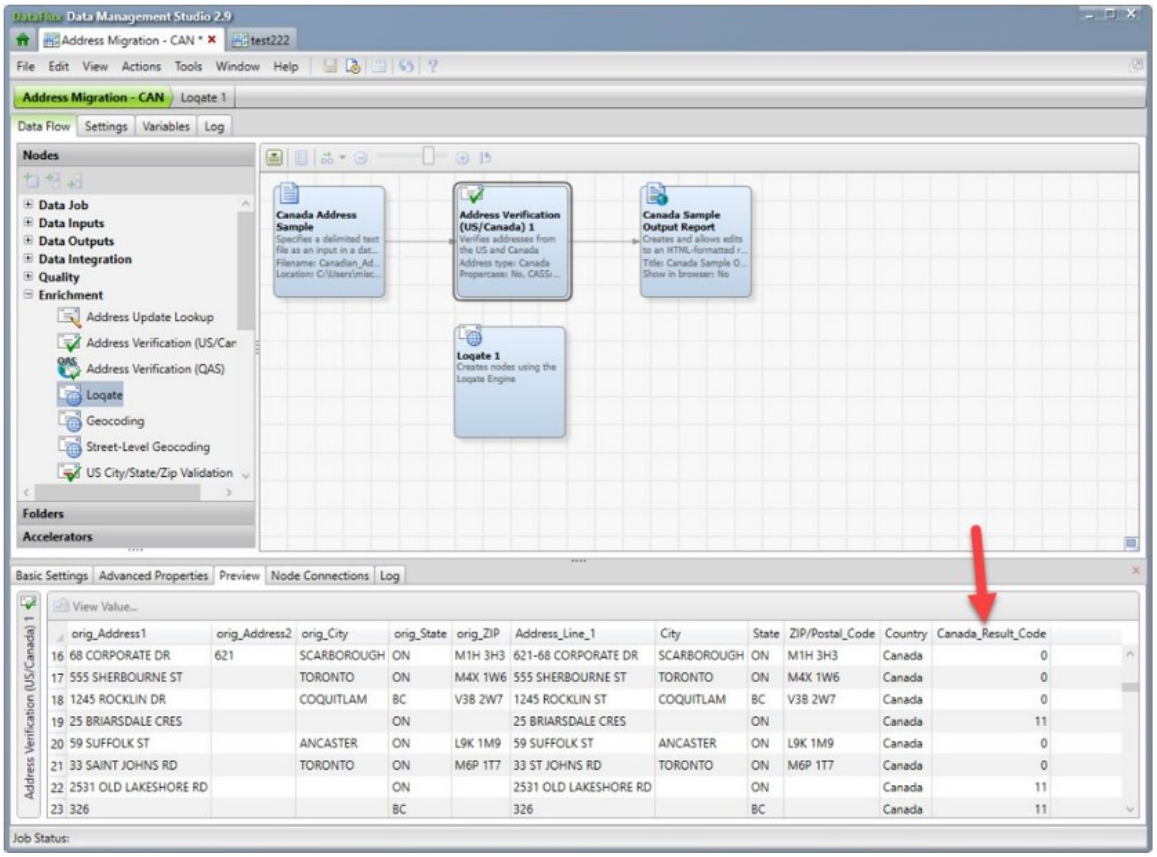
In the screenshot below, you see the **Properties** of the **Additional Outputs** tab within the **Loqate** node.

Part 1 - Select which input fields are passed to the output file. Please note that by default no input fields are passed. You must select the fields.




Previewing Address Verification (US/Canada) Output

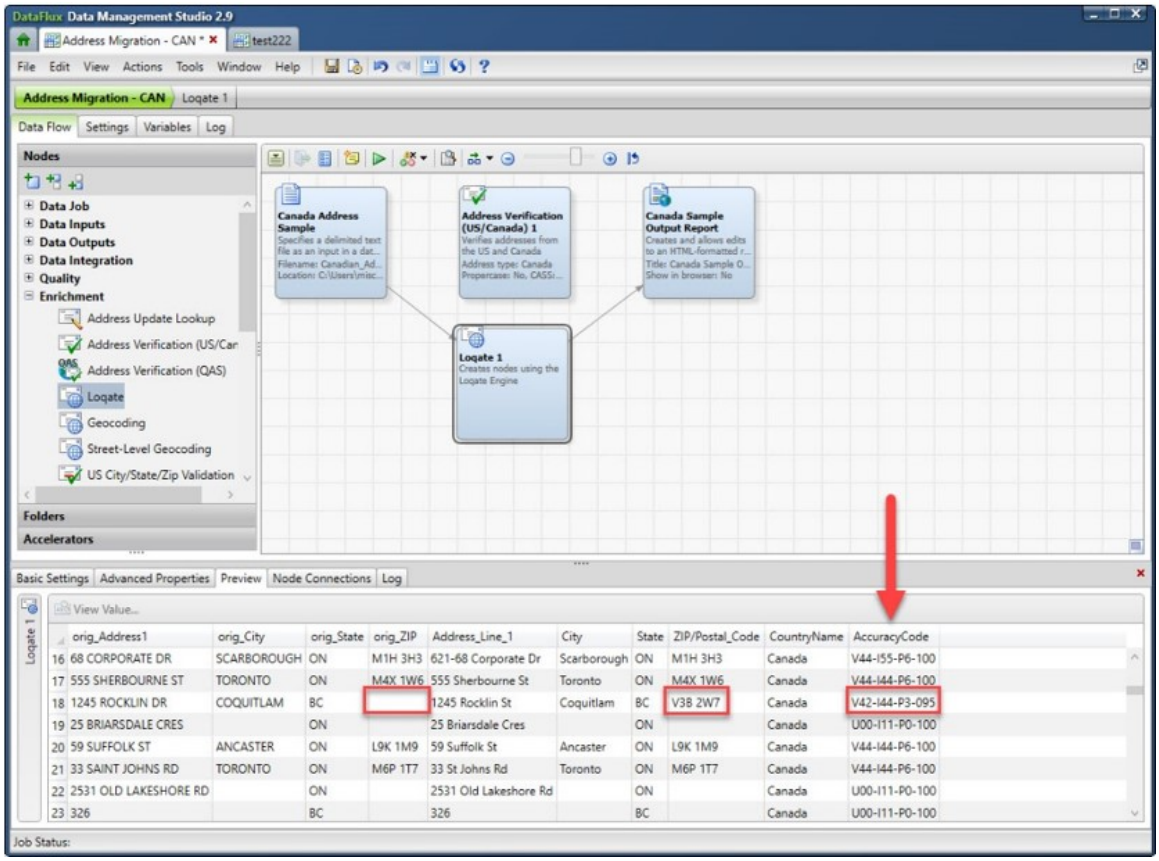
In the next screenshot, a configured **Address Verification (US/Canada)** node is being previewed to show the original data and the validated address data. You can tell that this is validated and enriched data because the output has a `ZIP/Postal_Code` and the `Canada_Result_Code` that contains a 0 indicating that it was successfully verified. The `Canada_Result_Code` can tell you why verification of the address failed.




Previewing Loqate Output

In the screenshot below, a configured **Loqate** node is previewed to show the original data and the validated address data. You know that this is validated and enriched data because the output now has a populated ZIP/Postal_Code. Note that the **AccuracyCode** field "V" shows you that a complete match was made between the input and the reference data.

**NOTE:** By renaming columns, you can replicate all the output fields that were generated in the **Address Verification (US/Canada)** node preview. An **Expression** node can be added that converts the **Loqate Accuracy Code** field over to a **Canada_Result_Code** field if that is the desired output.




# Geocode

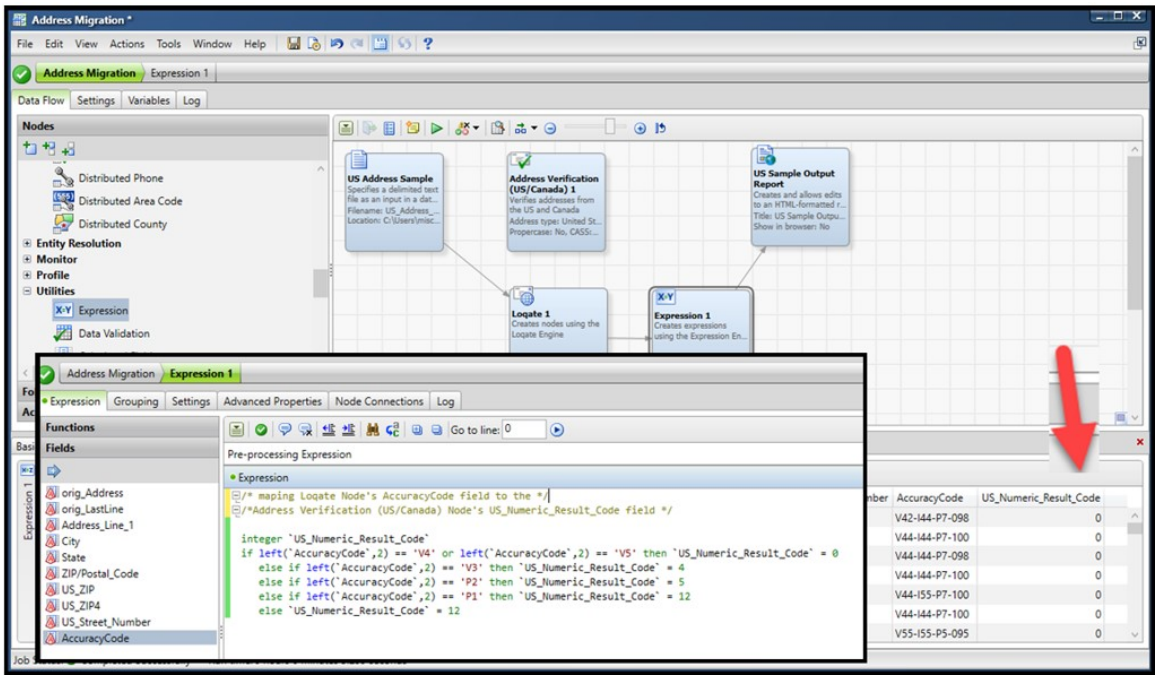
> **NOTE:** Refer to the section, **Introduction to the Migration Guide for Data Packs** for information about migrating your DataFlux Data Management Studio **Address Verification (US/Canada)** jobs to **Loqate**.

## Optional Address Verification Steps

Adding Expression Engine Language (EEL) Code for Loqate Accuracy Code Equivalency with the US Numeric Result Code

In the example below, an **Expression** node has been added to the job flow with an EEL to create a Result Code equivalency between the **Loqate Accuracy Code** and the `US_Numeric_Result_Code`.

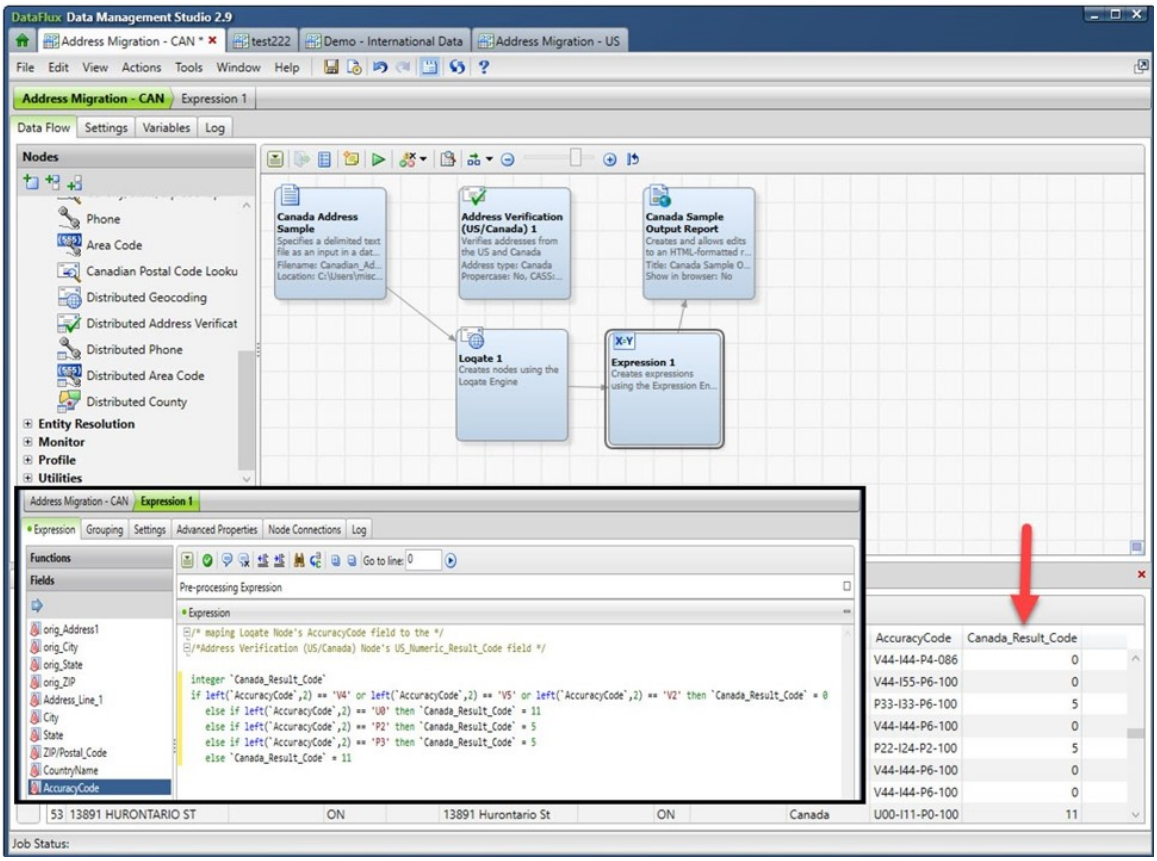
> **NOTE:** The EEL shown below is a sample and is not representing all potential `US_Numeric_Result_Codes`.




Adding EEL Code for Loqate Accuracy Code Equivalency with the Canada Result Code

The next example displays an **Expression** node that has been added to the job flow with an EEL to create a Result Code equivalency between the **Loqate Accuracy Code** and the `Canada_Result_Code`.

> **NOTE:** The EEL shown below is a sample and does not represent all potential `Canada_Result_Codes`.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Address Migration - CAN *
test222
Demo - International Data
Address Migration - US
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Address Migration - CAN
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Data Flow
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Variables
Log
Nodes
Phone
Area Code
Canadian Postal Code Looku
Distributed Geocoding
Distributed Address Verificat
Distributed Phone
Distributed Area Code
Distributed County
Entity Resolution
Monitor
Profile
Utilities
Canada Address Sample
Specifies a delimited text file as an input in a dat...
Address Verification (US/Canada) 1
Verifies addresses from the US and Canada
Canada Sample Output Report
Creates and allows edits to an HTML-formatted r...
Loqate 1
Creates nodes using the Loqate Engine
Expression 1
Creates expressions using the Expression En...
Address Migration - CAN
Expression 1
Expression
Grouping
Settings
Advanced Properties
Node Connections
Log
Functions
Fields
Go to line:
Pre-processing Expression
Expression
/* maping Loqate Node's AccuracyCode field to the */
/*Address Verification (US/Canada) Node's US_Numeric_Result_Code field */
integer `Canada_Result_Code`
if left(`AccuracyCode`,2) == 'V4' or left(`AccuracyCode`,2) == 'V5' or left(`AccuracyCode`,2) == 'V2' then `Canada_Result_Code` = 0
else if left(`AccuracyCode`,2) == 'U0' then `Canada_Result_Code` = 11
else if left(`AccuracyCode`,2) == 'P2' then `Canada_Result_Code` = 5
else if left(`AccuracyCode`,2) == 'P3' then `Canada_Result_Code` = 5
else `Canada_Result_Code` = 11
orig_Address1
orig_City
orig_State
orig_ZIP
Address_Line_1
City
State
ZIP/Postal_Code
CountryName
AccuracyCode
AccuracyCode
Canada_Result_Code
V44-I44-P4-086 0
V44-I55-P6-100 0
P33-I33-P6-100 5
V44-I44-P6-100 0
P22-I24-P2-100 5
V44-I44-P6-100 0
V44-I44-P6-100 0
53 13891 HURONTARIO ST ON 13891 Hurontario St ON Canada U00-I11-P0-100 11
Job Status:

# Reference Information

## Loqate Reference Data Source for DataFlux Data Management Server

Only after configuration is validated and jobs have been edited in DataFlux Data Management Studio can a similar configuration be set up for SAS Data Management Server. It is important that your Loqate jobs run successfully in DataFlux Data Management Studio before you proceed to this next step.

### Adding a Loqate Reference Data Source to SAS Data Management Server

Your SAS Data Management Server instance can be installed on several platforms. However, you need to modify the `app.cfg` file for your SAS Data Management Server instance. Here is an example for Windows:

1. Navigate to the **etc** folder in your SAS Data Management Server directory. For example: `C:\Program Files\SASHome\SASDataManagementServer\2.10\etc`.

2. Edit the `app.cfg` file and add a `VerLQT/Loqate_Date Path` entry for example, `VERLQT/LOQATE_DATA_PATH=C:\Program Files\SAS\VerifyData\data\XXXX\world`.

3. Confirm that your SAS Data Management Server points to the correct Loqate Data directory.

## Loqate Output Fields

For more information about Loqate and its address or geocoding output fields, see the following websites for additional information:

- Address Output Fields: **https://support.loqate.com/documentation/fielddescrip/addfields/**

- Geocode Output Fields: **https://support.loqate.com/documentation/fielddescrip/geocode-fields/**

- GeoAccuracy Code: **https://support.-loqate.com/documentation/reportcodes/geoaccuracy-code/**

- Address Verification Code: **https://support.loqate.com/documentation/reportcodes/address-verification-code/**

  **Note:** Environments and circumstances are different. This document does not document every scenario. Please contact SAS Technical Support if you need assistance.

## Canadian Result Codes

Indicates whether the address was successfully verified. In case the address was not successfully verified, the Canada Return Codes shown in the following table indicate the cause of address verification failure.

| RESULT CODE | DESCRIPTION |
|---|---|
| 0 | No Error Occurred |
| 1 | Internal Error |
| 2 | Cannot load database |
| 3 | Invalid - Unspecified reason |
| 4 | Invalid civic number |
| 5 | Invalid street |
| 6 | Invalid unit |
| 7 | Invalid delivery mode |
| 8 | Invalid delivery installation |
| 9 | Invalid city |
| 10 | Invalid province |
| 11 | Invalid postal code |
| 12 | Address is not Canadian |

Canadian Result Codes

## US Result Codes

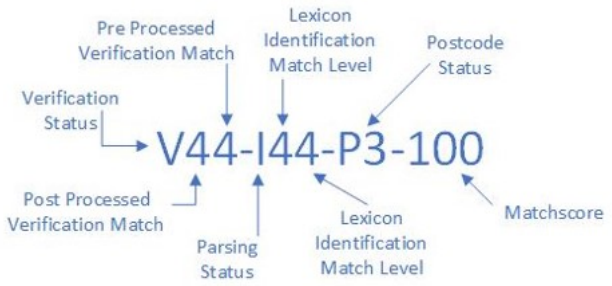
Indicates whether the address was successfully verified. In case the address was not successfully verified, a US Return Code indicates the cause of address verification failure, as shown in the following table:

| TEXT RESULT CODE | NUMERIC RESULT CODE | DESCRIPTION |
|---|---|---|
| OK | 0 | Address was verified successfully. |
| PARSE | 11 | Error parsing address. Components of the address might be missing. |
| CITY | 12 | Could not locate city/state or ZIP in the USPS database. At least (city and state) or ZIP must be present in the input. |
| MULTI | 13 | Ambiguous address. There were two or more possible matches for this address with different data. |
| NOMATCH | 14 | No matching address found in the USPS data. |
| OVER | 15 | One or more input strings is too long (maximum 100 characters). |

US Result Codes

## Loqate Address Verification Code

A Loqate Address Verification Code can be broken into the following parts:




See **https://support.loqate.com/documentation/reportcodes/address-verification-code/** for more information.

## Address Verification Code – Verification Status

| CODE | DESCRIPTION |
|---|---|
| V | Verified – A complete match was made between the input data and a single record from the available reference data |
| P | Partially Verified - A partial match was made between the input data and a single record from the available reference data |
| A | Ambiguous - More than one close reference data match |
| R | Reverted - Record could not be verified to the specified min-imum acceptable level. The output fields contain the input data |
| U | Unverified - Unable to verify. The output fields contain the input data |

Address Verification Code - Verification Status

## Post-Processed Verification Match Level

The post-processed verification match level gives the level to which the input data matches the available reference data once all changes and additions performed during the verification process have been taken into account.

| CODE | DESCRIPTION |
|---|---|
| 5 | Delivery Point (PostBox or SubBuilding) |
| 4 | Premise (Premise or Building) |
| 3 | Thoroughfare |
| 2 | Locality or PostalCode |
| 1 | AdministrativeArea |
| 0 | None |

Post-Processed Verification Match Level

## Pre-Processed Verification Match Level

The pre-processed verification match level gives the level to which the input data matches the available reference data prior to any changes or additions performed during the verification process.

| CODE | DESCRIPTION |
|---|---|
| 5 | Delivery Point (PostBox or SubBuilding) |
| 4 | Premise (Premise or Building) |
| 3 | Thoroughfare |
| 2 | Locality or PostalCode |
| 1 | AdministrativeArea |
| 0 | None |

Pre-Processed Verification Match Level

## Parsing Status

| CODE | DESCRIPTION |
|---|---|
| I | Identified and Parsed – All input data has been able to be identified and placed into components. |
| U | Unable to parse – Not all input data has been able to be identified and parsed. |

Parsing Status

## Lexicon Identification Match Level

The lexicon identification match level gives the level to which the output data has some recognized form, through the use of pattern matching. For example, a numeric value could be a premise number and lexicon matching 'rd' could be a ThoroughfareType, 'Road'; 'London' could be a Locality.

| CODE | DESCRIPTION |
|---|---|
| 5 | Delivery Point (PostBox or SubBuilding) |
| 4 | Premise (Premise or Building) |
| 3 | Thoroughfare |
| 2 | Locality or PostalCode |
| 1 | AdministrativeArea |
| 0 | None |

Lexicon Identification Match Level

## Context Identification Match Level

The context identification match level gives the level to which the output data can be recognized based on the context in which it appears. This is the least accurate form of matching and is based on identifying a word as for example, a Thoroughfare based on it being preceded by something that could be a Premise. Then followed by something that

could be a Locality, the latter items being identified through a match against the reference data or the lexicon.

| CODE | DESCRIPTION |
|---|---|
| 5 | Delivery Point (PostBox or SubBuilding) |
| 4 | Premise (Premise or Building) |
| 3 | Thoroughfare |
| 2 | Locality or Postal Code |
| 1 | AdministrativeArea |
| 0 | None |

Context Identification Match Level

## Postcode Status

| CODE | DESCRIPTION |
|---|---|
| P8 | PostalCodePrimary and PostalCodeSecondary verified |
| P7 | PostalCodePrimary verified, PostalCodeSecondary added or changed |
| P6 | PostalCodePrimary verified |
| P5 | PostalCodePrimary verified with small change |
| P4 | PostalCodePrimary verified with large change |
| P3 | PostalCodePrimary added |
| P2 | PostalCodePrimary identified by lexicon |
| P1 | PostalCodePrimary identified by context |
| P0 | PostalCodePrimary empty |

Postcode Status

## Matchscore

The matchscore indicates how much the input data has been changed during the verification process to achieve the post-processed verification match level. The result 100% means that no changes have been made. Data additions are not measured by the matchscore, only changes. Generally, a matchscore of 95 or above indicates that only a character or two have been changed during the process. If the input data is less clean, then a threshold of 80 might be considered, since significantly larger changes to the input data are then allowed. Note that this value gives no indication of the level of verification, that is given by the post-processed verification match level.

## Geocoding Status

| CODE | DESCRIPTION |
|---|---|
| P | A single geocode was found matching the input address. |
| I | A geocode was able to be interpolated from the input address's location in a range. |
| A | Multiple candidate geocodes were found to match the input address, and an average of these was returned. |
| U | A geocode was not able to be generated for the input address. |

Geocoding Status

## GeoAccuracy Code – Geocoding Level

| CODE | DESCRIPTION |
|---|---|
| 4 | Premise (Premise or Building) |
| 3 | Thoroughfare |
| 2 | Locality |
| 1 | AdministrativeArea |
| 0 | None |

GeoAccuracy Code - Geocoding Level

## GeoDistance Definition

This field holds the radius of accuracy in meters, giving an indication of the likely maximum distance between the given geocode and the physical location. Please note that this field is derived from and therefore dependent on the accuracy and coverage of the underlying reference data.