Informatica®
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Reference Data Guide

Informatica Reference Data Guide
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Table of Contents

Preface

The *Informatica Reference Data Guide* includes information about the reference data objects and files that you can use in Informatica Developer and Informatica Analyst. It is written for data analysts, data stewards, and others who use reference data to verify and enhance the accuracy and usability of organization data.

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CHAPTER 1

Introduction to Reference Data

This chapter includes the following topics:

Reference Data Overview

Informatica transformations can use reference data to analyze and update data. You can create reference data objects in the Developer tool and the Analyst tool. You can also import reference data objects and files to the Model repository and to the file system. You can use the Data Quality Content installer to import reference data objects and to install reference data files.

You can create and edit the following types of reference data:

Reference tables

A reference table contains the standard version and alternative versions of a set of data values. You add a reference table to a transformation in the Developer tool to verify that source data values are accurate and correctly formatted.

Most reference tables contain at least two columns. One column contains the standard or preferred version of a value, and other columns contain alternative versions. When you add a reference table to a transformation, the transformation searches the input port data for values that also appear in the table. You can create tables with any data that is useful to the data project that you work on.

Content sets

A content set is a Model repository object that specifies reference data values in the repository or in a file. When you add a content set to a transformation, the transformation searches the input data for values that match the data patterns in the content set.

The Data Quality Content installer can install the following types of reference data:

Informatica reference tables

Repository objects and data files that Informatica develops. You import Informatica reference tables when you import accelerator objects to the Model repository. The types of reference information include

telephone area codes, postcode formats, first names, occupations, and acronyms. You can edit Informatica reference tables.

Informatica content sets

Repository objects and data files that Informatica develops. You import content sets when you import accelerator objects to the Model repository. A content set contains different types of reference data that you can use to perform search operations with data quality transformations.

Address reference data files

Reference data files that contain data for the deliverable addresses in a country. The Address Validator transformation reads the reference data. You cannot create or edit address reference data files.

Address reference data is current for a defined period and you must refresh your data regularly, for example every quarter.

Identity population files

Reference data files that contain information on personal, household, and corporate identities. The Match transformation and the Comparison transformation use population files to find potential identities in input data. You cannot create or edit identity population files.

Informatica Reference Data

You can purchase and download address reference data and identity population data from Informatica.

You can purchase an annual subscription to address data for a country, and you can download the latest address data from Informatica at any time during the subscription period.

A Content Installer user downloads and installs reference data separately from the applications. Contact your administrator for user for information about the reference data installed on your system

User-Defined Reference Data

You can use the values in a data object to create a reference data object.

For example, you can select a data object or profile column that contains values that are specific to a project or organization. Create custom reference data objects from the column values.

You can build a reference data object from a data column to verify the following:

- The data rows in the column contain the same type of information.
- A source value is valid. The reference object might contains a list of the valid values, or the reference object might contain a list of values that are not valid.

The following table lists common examples of project data columns that can contain reference data:

Information	Reference Data Example
Stock Keeping Unit (SKU) codes	Use an SKU column to create a reference table of valid SKU code for an organization. Use the reference table to find correct or incorrect SKU codes in a data set.
Employee codes	Use an employee code or employee ID column to create a reference table of valid employee codes. Use the reference table to find errors in employee data.
Customer account numbers	Run a profile on a customer account column to identify account number patterns. Use the profile to create a token set of incorrect data patterns. Use the token set to find account numbers that do not conform to the correct account number structure.
Customer names	When a customer name column contains first, middle, and last names, you can create a probabilistic model that defines the expected structure of the strings in the column. Use the probabilistic model to find data strings that do not belong in the column.

Reference Tables

Create and update reference tables in the Analyst tool and the Developer tool.

Reference tables store metadata in the Model repository. Reference tables can store column data in the reference data warehouse or in another database. When the reference data warehouse stores the column data, the Informatica services identify the table as a managed reference table. When another database stores the column data, the Informatica services identify the table as an unmanaged reference table.

The Content Management Service stores the reference data warehouse database connection. You can specify an IBM DB2 database, a Microsoft SQL Server database, or an Oracle database as a reference data warehouse.

When you import data to the reference data warehouse from another database, use a native connection or an ODBC connection to import the data. When you specify an unmanaged database as the data source for a reference table, use a native connection to connect to the database.

Reference Table Structure

Most reference tables contain at least two columns. One column contains the correct or required versions of the data values. Other columns contain different versions of the values, including alternative versions that may appear in the source data.

The column that contains the correct or required values is called the valid column. When a transformation reads a reference table in a mapping, the transformation looks for values in the non-valid columns. When the transformation finds a non-valid value, it returns the corresponding value from the valid column. You can also configure a transformation to return a single common value instead of the valid values.

The valid column can contain data that is formally correct, such as ZIP codes. It can contain data that is relevant to a project, such as stock keeping unit (SKU) numbers that are unique to an organization. You can also create a valid column from bad data, such as values that contain known data errors that you want to search for.

For example, you create a reference table that contains a list of valid SKU numbers in a retail organization. You add the reference table to a Labeler transformation and create a mapping with the transformation. You

run the mapping with a product database table. When the mapping runs, the Labeler creates a column that identifies the product records that do not contain valid SKU numbers.

Reference Tables and the Parser Transformation

Create a reference table with a single column to use the table data in a pattern-based parsing operation. You configure the Parser transformation to perform pattern-based parsing, and you import the reference data to the transformation configuration.

Reference Data Warehouse Privileges

The Content Management Service uses privileges to restrict user actions on reference tables. Use the Security options in the Administrator tool to review or update the service privileges.

To work with reference tables, you must have the following privileges in the Content Management Service:

- Create Reference Tables
- Edit Reference Table Data
- Edit Reference Table Metadata

To edit data in an unmanaged reference table, verify also that you configured the reference table object to permit edits.

Note: If you edit the metadata for an unmanaged reference table in a database application, use the Analyst tool to synchronize the Model repository with the table. You must synchronize the Model repository and the table before you use the unmanaged reference table in the Developer tool.

Parameters and Reference Tables

You can use parameters to identify reference tables in the Model repository. You can create a parameter in the Developer tool that identifies the reference table. Or, you can add the reference table location to a parameter file.

When you create a parameter in the Developer tool, you add it to a transformation in a mapping. When you add the reference table location to a parameter file, you specify the file when you run a mapping at the command prompt. In each case, the Data Integration Service reads the reference table that parameter identifies when you run the mapping.

You can add a parameter that identifies a reference table to the following transformations:

- Case Converter transformation
- Labeler transformation
- Parser transformation in token parsing mode
- Standardizer transformation

Note: Use the *infacmd ms runMapping* command to run a mapping at the command prompt.

Reference Data Objects and Version Control

If the Model repository that stores the reference data objects integrates with a version control application, you can apply version control to the objects. You can apply version control to reference tables and content sets.

You can check in and check out reference data objects from a Model repository that supports version control. You can undo a checkout, retrieve an earlier version of an object, and restore an object to an earlier version. When the reference data objects are not under version control, the Model repository locks a reference data object that you edit. Other users cannot edit a locked object that you work on. When you close the object, the Model repository releases the lock and other users can edit the object.

Note: Version control applies to the metadata that the Model repository stores for an unmanaged reference table object. Version control does not apply to the data in an unmanaged reference table. You cannot view or restore the reference data from an earlier version of an unmanaged reference table.

CHAPTER 2

Reference Tables in the Analyst Tool

This chapter includes the following topics:

Analyst Tool Reference Tables Overview

Create reference tables in the Design workspace of the Analyst tool.

You can create a reference table from a flat file, from a data source in the Model repository, and from a table in another database.

You can create a reference table from a profile column or a subset of the data in a profile column. You can also create a reference table from the column patterns that you choose from a profile.

When you create or update a reference table, you configure the properties on the table and the data columns that it contains.

Reference Table Properties

You can view and update reference table properties in the Analyst tool. A reference table displays general properties and column properties. The general properties include the reference table name, creation date,

database connection name, and valid column name. The column properties include the column names, precision values, and scale values.

You can view the properties in read-only mode. To update the properties, edit or check out the reference table.

Reference Table General Properties

The general properties contain information about the reference table object.

The following table describes the general properties:

Property	Description
Name	The reference table name.
Description	Any description that a user entered for the reference table.
Location	The location of the reference table object in the Model repository.
Valid Column	The name of the valid column in the reference table.
Created On	The creation date and time for the reference table name.
Created By	The login name of the user who created the reference table.
Last Modified	The date and time of the most recent update to the reference table.
Last Modified By	The login name of the user who made the most recent update.
Connection Name	The connection name for the database that stores the reference data values.
Type	The reference table type. The reference table can be managed or unmanaged.

Reference Table Column Properties

The column properties contain information about the column metadata.

The following table describes the column properties:

Property	Description
Name	The column name.
Datatype	The data type for the data in each column. You can select one of the following data types: - bigint - date/time - decimal - double - integer - string You cannot select a double data type when you create an empty reference table or create a reference table from a flat file.

Property	Description
Precision	The precision for each column. Precision is the maximum number of digits or the maximum number of characters that the column can accommodate. The precision values you configure depend on the data type.
Scale	The scale for each column. Scale is the maximum number of digits that a column can accommodate to the right of the decimal point. Applies to decimal columns. The scale values you configure depend on the data type.
Description	An optional description for each column.
Nullable	Indicates if the column can contain null values.
Key	Identifies a key column. The Analyst tool can identify a key column if you import the reference data from a table that specifies a key column.

Creating a Reference Table in the Reference Table Editor

Define the table structure and add data to a reference table in the reference table editor.

1. Click **New** > **Reference Table**.

   The **New Reference Table** wizard opens.
2. Select the option to **Use the reference table editor**, and click **Next**.
3. Use the **Add New Column** option to add columns to the table.
4. Configure the properties for each column.

   The properties include the column name, data type, precision, and scale.

   If the column contains data that a transformation can return in a reference data search, select the Valid option.
5. Optionally, add a column to include low-level descriptions as metadata in the reference table.
6. Optionally, enter an audit note for the table.

   The audit note appears in the audit trail log.
7. Click **Next**.
8. Enter a name for the reference table, and select a location for the reference table object in the Model repository.
9. Click **Finish**.

Create a Reference Table from Profile Data

You can use profile data to create reference tables that relate to the source data in the profile. Use the reference tables to find different types of information in the source data.

You can use a profile to create or update a reference table in the following ways:

- Select a column in the profile and add it to a reference table.
- Browse a profile column and add a subset of the column data to a reference table.
- Select a column in the profile and add the pattern values for that column to a reference table.

Creating a Reference Table from Profile Column Data

You can create a reference table from one or more values in a profile data column. Select a column in a profile, and select the column values to add to the reference table.

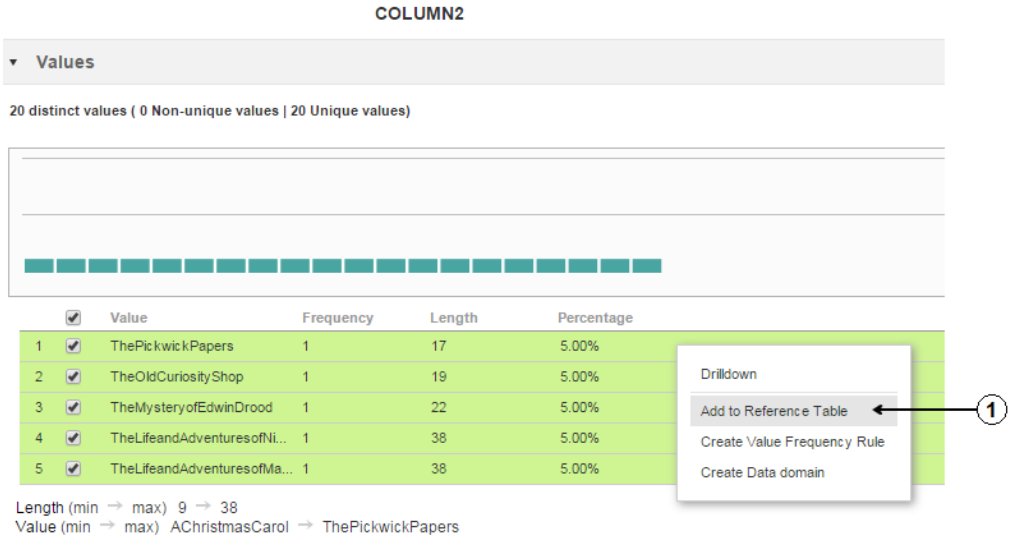
1. Open the **Library** workspace in the Analyst tool.
2. Select the **Profiles** asset category.

   The library displays a list of the profiles in the Model repository.
3. Open the profile that contains the column to add to a reference table.

   The profile overview lists the profile column names.
4. Review the column data.

   To view the column data, click the column name.
5. In the detailed profile view, select the data values to add to the reference table. You can select values one by one, or you can select all.
6. Right-click the column name and select **Add to Reference Table**.

   The following image shows a data column in the detailed profile view:



   The number 1 identifies the **Add to Reference Table** option in the image.
7. The **Add to Reference Table** wizard opens.

   Select the option to **Create a reference table**.

Note: You can also select an option to add the data to a current reference table.

8. Click **Next**.

   The column name appears by default as the reference table name. Optionally, update the name.
9. Optionally, enter a description and default value.

   The Analyst tool uses the default value for any table record that does not contain a value.
10. Click **Next**.
11. Verify the column properties.

    Optionally, choose to create a column for low-level descriptive metadata.
12. Click **Next**.
13. Review the reference table name and description.

    Optionally, enter an audit note.
14. Select a Model repository location for the reference table object.
15. Click **Finish**.

Creating a Reference Table from Value Patterns

You can create a reference table from the column patterns in a profile column. The patterns represent the composition of the data values in one or more column fields. Select a column in the profile, and select the patterns to add to the reference table that you create.

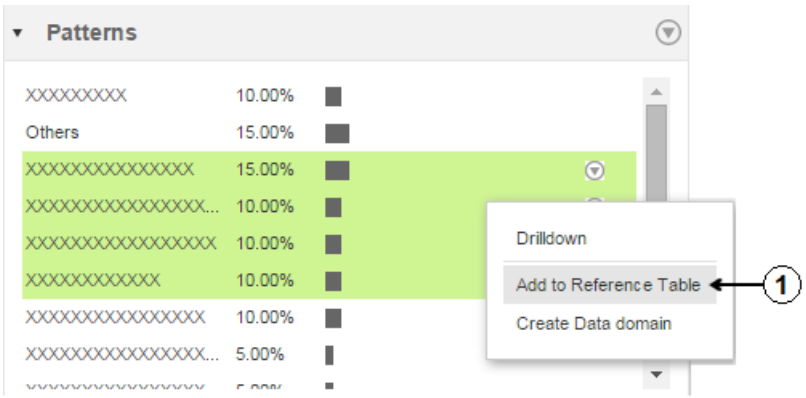
1. Open the **Library** workspace in the Analyst tool.
2. Select the **Profiles** asset category.

   The library displays a list of the profiles in the Model repository.
3. Open the profile that contains the value patterns to add to the reference table.

   The profile overview lists the profile column names.
4. Select the column that defines the pattern data that you want to add to the reference table.
5. Review the column data patterns.

   To view the column data, click the column name.
6. In the detailed profile view, select the column patterns that you want to add.
7. Right-click the patterns that you selected, and select **Add to Reference Table.**

   The following image shows the data patterns for a column in the detailed profile view:



The number 1 identifies the **Add to Reference Table** option in the image.

8. The **Add to Reference Table** Wizard opens.

   Select the option to **Create a reference table**.

   Note: You can also select an option to add the data to a current reference table.
9. Click **Next**.

   The column name appears by default as the reference table name. Optionally, update the name.
10. Optionally, enter a description and default value.

    The Analyst tool uses the default value for any table record that does not contain a value.
11. Click **Next**.
12. Verify the column properties.

    Optionally, choose to create a column for low-level descriptive metadata.
13. Click **Next**.
14. Review the reference table name and description.

    Optionally, enter an audit note.
15. Select a Model repository location for the reference table object.
16. Click **Finish**.

Create a Reference Table From a Flat File

You can import reference data from a CSV file. Use the **New Reference Table** wizard to import the file data.

You must configure the properties for each flat file that you use to create a reference table.

Analyst Tool Flat File Properties

When you import a flat file as a reference table, you must configure the properties for each column in the file. The options that you configure determine how the Analyst tool reads the data from the file.

The following table describes the properties you can configure when you import file data for a reference table:

Properties	Description
Delimiters	Character used to separate columns of data. Use the Other field to enter a different delimiter. Delimiters must be printable characters and must be different from the escape character and the quote character if selected. You cannot select non-printing multibyte characters as delimiters.
Text Qualifier	Quote character that defines the boundaries of text strings. Choose No Quote, Single Quote, or Double Quotes. If you select a quote character, the wizard ignores delimiters within pairs of quotes.

Properties	Description
Column Names	Imports column names from the first line. Select this option if column names appear in the first row. The wizard uses data in the first row in the preview for column names. Default is not enabled.
Values	Option to start value import from a line. Indicates the row number in the preview at which the wizard starts reading when it imports the file.

Creating a Reference Table from a Flat File

When you create a reference table data from a flat file, the table uses the column structure of the file and imports the file data.

1. Click **New** > **Reference Table**.

   The **New Reference Table** Wizard appears.
2. Select the option to **Import a flat file**.
3. Click **Next**.
4. Click **Choose File** to select the flat file.
5. Select a code page that matches the data in the flat file.
6. Click **Upload** to upload the file data.
7. Click **Next**.
8. Configure the flat file properties.

   The properties identify the delimiter that the file uses and whether the first line of the file contains column names.
9. To preview the properties that you configured, refresh the **Preview** pane.
10. Click **Next**.
11. Configure the properties for each column.

    The properties include the column name, data type, precision, and scale.

    If the column contains data that a transformation can return in a reference data search, select the Valid option.
12. Optionally, add a column to include low-level descriptions as metadata in the reference table.
13. Optionally, enter an audit note for the table.

    The audit note appears in the audit trail log.
14. Click **Next**.
15. Enter a name for the reference table, and select a location for the reference table object in the Model repository.
16. Optionally, enter a description of the table.
17. Click **Finish**.

Create a Reference Table from a Database Table

When you create a reference table from a database table, you create a metadata object in the Model repository. You optionally import the table data to the reference data warehouse.

When you create a managed reference table, you import the column data to the reference data warehouse. When you create an unmanaged reference table, you identify the database table that stores the column data. You can create a managed reference table from an OBDC connection or a native connection. You can create an unmanaged reference table from a native connection.

Before you create the reference table, verify that the Informatica domain contains a connection to the database that contains the reference data. If the domain does not contain a connection to the database, you can define one in the Analyst tool.

To define a database connection, click **Manage** > **Connections**.

Creating a Reference Table from a Database Table

To create the reference table, connect to a database and select the table that contains the reference data.

1. Select **New** > **Reference Table**.

   The **New Reference Table** wizard appears.
2. Select the option to **Connect to a relational table**.

   To create a reference table that does not store data in the reference data warehouse, select **Unmanaged table**.

   To enable users to edit an unmanaged reference table, select the **Editable** option.

   Click **Next**.
3. Select the database connection from the list of connections.

   Click **Next**.
4. On the **Tables** panel, select a table.
5. Review the table properties in the **Properties** panel.

   Optionally, click **Data Preview** to view the table data.

   Click **Next**.
6. On the **Column Attributes** panel, select the Valid column.

   If you create a managed reference table, you can perform the following actions on the **Column Attributes** panel:

   - Edit the reference table column names.
   - Add a metadata column for row-level descriptions.
7. Optionally, add a column to include low-level descriptions as metadata in the reference table.
8. Optionally, enter an audit note for the table.

   The audit note appears in the audit trail log.
9. Click **Next**.
10. Enter a name for the reference table, and select a location for the reference table object in the Model repository.
11. Optionally, enter a description for the reference table.
12. Click **Finish**.

Working with Reference Tables in a Versioned Model Repository

You open a reference table in read-only mode. To work on the reference table, you must enter edit mode or you must check out the reference table from the Model repository.

1. On the Informatica toolbar, click **Open**.

   The asset library opens.
2. Select the **Reference Tables** asset category, and select a reference table name.

   The reference table opens in read-only mode.
3. To edit the current version of the reference table, click **Edit**.

   To edit the reference table in a versioned Model repository, check out the reference table.
4. When you complete work on the reference table, click **Finish**. The Analyst tool saves your changes to the reference table.

   If you checked out the reference table from a versioned Model repository, check in the object. A versioned Model repository does not update the reference table version until you check in the object.

Reference Table Updates

The business data that a reference table contains can change over time. Review and update the data and metadata in a reference table to verify that the table contains accurate information. You update reference tables in the Analyst tool. You can update the data and metadata in a managed reference table and an unmanaged reference table.

You can perform the following operations on reference table data and metadata:

Manage columns

You can add columns, delete columns, and edit column properties.

Manage rows

You can add rows of data to a reference table.

Edit reference data values

You can edit a reference data value.

Replace data values

Use the **Find and Replace** option to replace data values that are no longer accurate or relevant to the organization. You can find a value in a column and replace it with another value. You can replace all values in a column with a single value.

Export a reference table

Export a reference table to a comma-separated values (CSV) file, dictionary file, or Excel file.

Enable or disable edits on an unmanaged table

Update an unmanaged reference table to enable or disable edits to table data and metadata.

Refresh the reference table data

Reload the reference table data to the Analyst tool to view the latest changes to the data.

Managing Columns

You can add columns to a reference table and update the column properties. You can also update the editable status of an unmanaged reference table.

1. Click **Open**.

   The asset library opens.
2. Select the **Reference Tables** asset category, and select a reference table name.

   The reference table opens in read-only mode.
3. To edit the current version of the reference table, click **Edit**.

   To edit the reference table in a versioned Model repository, check out the reference table.
4. Open the **Actions** menu and select **Alter Column Properties**.

   The **Alter column properties** dialog box opens. Use the dialog box options to perform the following operations:

   - Add a column.
   - Change the valid column in the table.
   - Change a column name.
   - Update the descriptive text for a column.
   - Update the editable status of an unmanaged reference table.
   - Update the audit note for the table.
5. When you complete the operations, click **OK**.

Managing Rows

You can add, edit, or delete rows in a reference table.

1. Click **Open**.

   The asset library opens.
2. Select the **Reference Tables** asset category, and select a reference table name.

   The reference table opens in read-only mode.
3. To edit the current version of the reference table, click **Edit**.

   To edit the reference table in a versioned Model repository, check out the reference table.
4. Edit the data rows. You can edit the data rows in the following ways:

   - To add a row, select **Actions** > **Add Row**.

     In the **Add Row** dialog box, enter a value in the valid column and at least one other column. Optionally, enter an audit note.

     Click **OK** to add the row.
   - To update a single data value, click the value and update the data.

     After you update the data, use the row-level options to accept or reject the data. You cannot enter an audit note when you enter data directly in the data row.
   - To update the data values in a row, select **Actions** > **Edit Row**.

     In the **Edit Row** dialog box, enter a value in one or more columns. Optionally, enter an audit note.

     Click **Apply** to update the data in the columns that you selected.

- To update the values in multiple rows, select the rows to edit and select **Actions** > **Edit Row**.

  In the **Edit Multiple Rows** dialog box, enter a value in one or more columns. Optionally, enter an audit note.

  Click **OK** to update the data in the columns that you selected.
- To delete rows, select the rows to delete and click **Actions** > **Delete**.

  In the **Delete Rows** dialog box, optionally enter an audit note.

  Click **OK** to delete the rows.

Note: Use the Developer tool to edit row data in a large reference table. For example, if a reference table contains more than 500 rows, edit the table in the Developer tool.

Finding and Replacing Values

You can find and replace data values in a reference table. Use the find and replace options when a table contains one or more instances of a data value that you must update.

1. Click **Open**.

   The asset library opens.
2. Select the **Reference Tables** asset category, and select a reference table name.

   The reference table opens in read-only mode.
3. To edit the current version of the reference table, click **Edit**.

   To edit the reference table in a versioned Model repository, check out the reference table.
4. Click **Actions** > **Find and Replace**.

   The **Find and Replace** toolbar appears.
5. Enter the search criteria on the toolbar:
   - Enter a data value in the **Find** field.
   - Select the columns to search. By default, the operation searches all columns.
   - Enter a data value in the **Replace with** field.
6. Use the following options to replace values one by one or to replace all values:
   - Use the **Next** and **Previous** options to find values one by one.
   - To replace a value, select **Replace**.
   - To display all instances of the value, select **Highlight All**.
   - To replace all instances of the value, select **Replace All**.

Exporting Reference Table Data

Export the data in a reference table to a comma-separated file, dictionary file, or Microsoft Excel file. You can export the data in read-only mode.

1. Click **Open**.

   The asset library opens.
2. Select the **Reference Tables** asset category, and select a reference table name.

   The reference table opens in read-only mode.

3. Click **Actions** > **Export Data.**

   The **Export data to a file** dialog box opens.

   The following table describes the dialog box options:

Option	Description
File Name	Name of the file to contain the data. The export operation creates the file.
File Format	Format of the file to contain the data. Select one the following formats: • csv. Comma-separated file. Default format. • xls. Microsoft Excel file. • dic. Informatica dictionary file.
Export field names as first row	Column name option. Select the option to indicate that the first row of the file contains the column names.
Code Page	Code page of the reference data. The default code page is UTF-8.

4. Click **OK** to export the file.

Enable and Disable Edits in an Unmanaged Reference Table

You can enable or disable updates to the data values and columns in an unmanaged reference table.

Before you change the editable status of the reference table, save the table.

1. Click **Open**.

   The asset library opens.

2. Select the **Reference Tables** asset category, and select a reference table name.

   The reference table opens in read-only mode.

3. To edit the current version of the reference table, click **Edit**.

   To edit the reference table in a versioned Model repository, check out the reference table.

4. Open the **Actions** menu and select **Alter Column Properties**.

   The **Alter column properties** dialog box opens.

5. Select or clear the **Editable** option.

Note: The following conditions apply to an unmanaged reference table that permits user updates:

- The reference table must use simple data types such as string and number.
- Do not define any constraint on the reference table metadata or specify a default value for any column.

Refresh the Reference Table Values

You might need to refresh the values that the Analyst tool displays for the reference table.

To reload the reference table values, click **Actions** > **Refresh**. The Analyst tool retrieves the current versions of the data values from database.

Audit Trail Events

You can view an audit trail of the changes that users made to a reference table. Use the Audit Trail view on the reference table to view the audit trail events. You can filter the audit trail events that the Analyst tool displays.

The following table describes the filter options that you can specify:

Option	Description
Date	Start and end dates for the actions to display. Use the calender options to set the dates.
Type	Type of audit trail event. You can view the following event types: - Data. Events that relate to the data values in the reference table. Events include operations to add a row, to delete a row, and to update a row. - Metadata. Events that relate to the reference table metadata. Events include operations to create the reference table, add or delete a column, and check in the reference table. **Note:** You cannot view data and metadata events concurrently.
User	User who edited the reference table. The filter displays the full name and the login name of the user.
Status	Status of the audit trail log events. The status corresponds to the action that you performed in the reference table editor. For example, the status might indicate that a user created the reference table or added a row.

The audit trail log events also include the audit trail comments and the column values that you inserted, updated, or deleted.

Viewing Audit Trail Events

View audit trail events to find out about the updates that users made to a reference table. You can view the audit trail events in read-only mode.

1. Click **Open**.

   The asset library opens.
2. Select the **Reference Tables** asset category, and select a reference table name.

   The reference table opens in read-only mode.
3. Click the **Audit Trail**.
4. Configure the filter options.

   You can filter by the date of the update, the update type, the update status, and the name of the user who performed the update.
5. Click **Show**.

   The log events appear for the filter options that you specified.

Rules and Guidelines for Reference Tables

Use the following rules and guidelines while working with reference tables in the Analyst tool:

- When you import a reference table from an Oracle, IBM DB2, or Microsoft SQL Server database, the Analyst tool cannot display the preview if the table, view, schema, synonym, or column names contain mixed case or lowercase characters.

  To preview data in tables that reside in case-sensitive databases, set the Support Mixed Case Identifiers attribute on the database connection to true.
- When you create a reference table from inferred column patterns in one format, the Analyst tool populates the reference table with column patterns in a different format.

  For example, when you create a reference table for the column pattern X(5), the Analyst tool displays the following format for the column pattern in the reference table: `XXXXX`.
- When you import an Oracle database table, verify the length of any VARCHAR2 column in the table. The Analyst tool cannot import an Oracle database table that contains a VARCHAR2 column with a length greater than 1000.
- To read a reference table, you need execute permissions on the connection to the database that stores the table data values. For example, if the reference data warehouse stores the data values, you need execute permissions on the connection to the reference data warehouse. You need execute permissions to access the reference table in read or write mode. The database connection permissions apply to all reference data in the database.
- When you run a mapping with a transformation that specifies a reference table, the mapping uses the current version of the reference table in the Model repository. You cannot select an historical version of the reference table when you configure the transformation.

  If another user restores the reference table to an earlier version in a concurrent Developer tool session, the reference table versions are no longer identical across the sessions. If you configure and run a mapping that uses the reference table, the mapping might fail, because the current session does not identify the current reference table version. To ensure that the mapping uses the current reference table, refresh the Model repository before you run the mapping.
- When you configure an unmanaged reference table to permit edits, verify that the reference table uses simple data types such as string and number. Also, verify that the reference table does not define any constraint on the reference table metadata or make use of default values for columns.

CHAPTER 3

Reference Data in the Developer Tool

This chapter includes the following topics:

Developer Tool Reference Data Overview

You can create, update, and view the configuration properties for reference data objects in the Developer tool.

Use the Developer tool to create and update the following types of object:

Reference tables

A reference table contains the standard version and alternative versions of a set of data values. You add a reference table to a transformation in the Developer tool to verify that source data values are accurate and correctly formatted.

Content Sets

A content set is a Model repository object that specifies reference data values in the repository or in a file. A content set contains different types of reference data that you can use to perform search operations in data quality transformations.

You can also work with address reference data files and identity population files in the Developer tool. You select address reference data files when you configure an Address Validator transformation. You select identity population files when you configure a Match transformation for identity match analysis.

Reference Data and Transformations

Multiple transformations read reference data to perform data quality tasks.

The following transformations can read reference data:

- Address Validator. Reads address reference data to verify the accuracy of addresses.
- Case Converter. Reads reference data tables to identify strings that must change case.
- Classifier. Reads content set data to identify the type of information in a string.
- Comparison. Reads identity population data during duplicate analysis.
- Labeler. Reads content set data to identify and label strings.
- Match. Reads identity population data during duplicate analysis.
- Parser. Reads content set data to parse strings based on the information the contain.
- Standardizer. Reads reference data tables to standardize strings to a common format.

The Data Quality Content Installer file set includes Informatica reference data objects that you can import.

Working with Reference Data Objects in a Versioned Model Repository

If you work with reference tables or content sets in a versioned Model repository, the repository might apply version control to the objects. To apply version control to an object, a user checks the object in to the Model repository.

If a reference table or a content set is not under version control, you can open and update the object outside the version control system. When you open the object, the Model repository locks the object so that another user cannot work on it.

If a reference table or a content set is under version control, you open the object in read-only mode. To work on the object, check out the object from the Model repository. Alternatively, check out the object and then open it. Check in the object to create a version of the object that contains your latest changes.

Checking Out Reference Data Objects

To work on a reference table or a content set that a user checked in to the Model repository, check out the object from the repository.

1. In Object Explorer, browse to a reference table or a content set.
2. Right-click the object name and click **Open**.

   The object opens in read-only mode.
3. Right-click the object name and click **Check Out**.

   You can edit the object.

Checking in Reference Data Objects

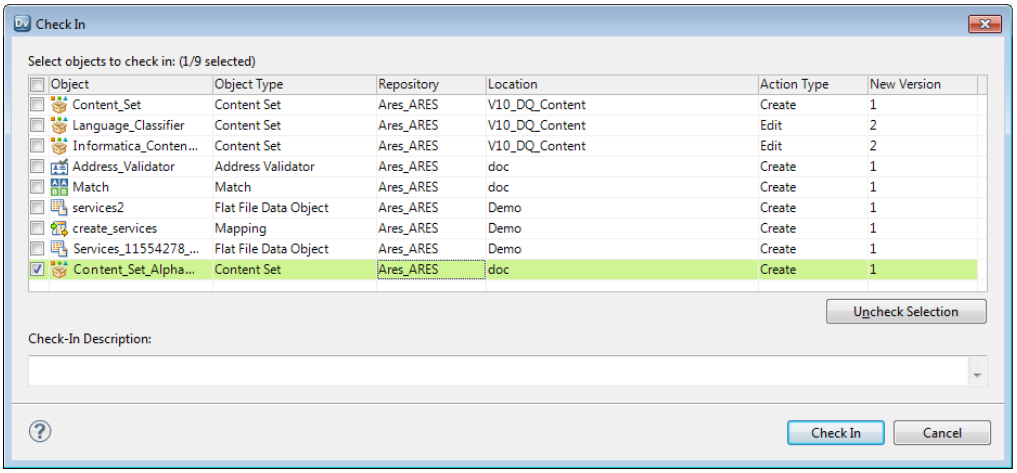
When you finish work on a reference table or a content set that you checked out from the Model repository, check in the object.

To view the list of currently checked-out objects, open the **Checked Out Objects** tab below the reference table editor.

1. Save any change that you made to the reference table or the content set.
2. In Object Explorer, browse to the reference table or the content set.
3. Right-click the object name and click **Check In**.

   The **Check In** dialog box opens.

   The following image shows the dialog box:



4. Select one or more objects to check in to the repository.

   Note: You can check in an object that is not open in the current session. You can check in any object in a checked-out state.
5. Optionally, enter a description for the operation.
6. Click **Check In**.

   The check-in operation updates the object version number. If you check in the object for the first time, the Model repository creates version one (1) of the object.

Reference Tables

You add a reference table to a transformation in the Developer tool. You configure the transformation to find reference table values in input data and to write the corresponding valid values from the reference table as output.

To create a reference table in the Developer tool, use one of the following methods:

- Create an empty reference table and enter the data values.
- Create a reference table from data in a flat file.
- Create a reference table from data in a database table, synonym, or view.

Reference Table Data Properties

You can view properties for reference table data and metadata in the Developer tool. The Developer tool displays the properties when you open the reference table from the Model repository.

A reference table displays general properties and column properties. You can view reference table properties in the Developer tool. You can view and edit reference table properties in the Analyst tool.

The following table describes the general properties of a reference table:

Property	Description
Name	Name of the reference table.
Description	Optional description of the reference table.

The following table describes the column properties of a reference table:

Property	Description
Valid	Identifies the column that contains the valid reference data.
Name	Name of each column.
Data Type	Data type of the data in each column.
Precision	Precision of each column.
Scale	Scale of each column.
Description	Description of the contents of the column. You can optionally add a description when you create the reference table.
Include a column for low-level descriptions	Indicates that the reference table contains a column for descriptions of column data.
Default value	Default value for the fields in the column. You can optionally add a default value when you create the reference table.
Connection Name	Name of the connection to the database that contains the reference table data values.

Creating a Reference Table Object

Choose this option when you want to create an empty reference table and add values by hand.

1. Select **File** > **New** > **Reference Table** from the Developer tool menu.
2. In the new table wizard, select **Reference Table as Empty**.
3. Enter a name for the table.
4. Select a project to store the table metadata.

   At the Location field, click **Browse**. The **Select Location** dialog box opens and displays the projects in the repository. Select the project you need.

   Click **Next**.

5. Add two or more columns to the table. Click the **New** option to create a column.

   The following table describes the properties for each column:

Property	Default Value
Name	column
Data Type	string
Precision	10
Scale	0
Description	Empty. Optional property.

6. Select the column that contains the valid values. You can change the order of the columns that you create.
7. The following table describes optional properties:

Property	Default Value
Include a column for row-level descriptions	Cleared
Audit note	Empty
Default value	Empty

   Click **Finish.**

The reference table opens in the Developer tool workspace.

Creating a Reference Table from a Flat File

You can create a reference table from data stored in a flat file.

1. Select **File** > **New** > **Reference Table** from the Developer tool menu.
2. In the new table wizard, select **Reference Table from a Flat File**.
3. Browse to the file you want to use as the data source for the table.
4. Enter a name for the table.
5. Select a project to store the table metadata.

   At the Location field, click **Browse**. The **Select Location** dialog box opens and displays the projects in the repository. Select the project you need.

   Click **Next**.
6. Set UTF-8 as the code page.
7. Specify the delimiter that the flat file uses.
8. If the flat file contains column names, select the option to import column names from the first line of the file.

9. The following table describes optional table properties:

Property	Default Value
Text qualifier	No quotation marks
Start import at line	Line 1
Row Delimiter	\012 LF (\n)
Treat consecutive delimiters as one	Cleared
Escape character	Empty
Retain escape character in data	Cleared
Maximum rows to preview	500

   Click **Next.**

10. Select the column that contains the valid values.
11. The following table describes optional properties:

Property	Default Value
Include a column for row-level descriptions	Cleared
Audit note	Empty
Default value	Empty
Maximum rows to preview	500

    Click **Finish.**

The reference table opens in the Developer tool workspace.

Create a Reference Table from a Relational Source

You can create a reference table from a relational table, synonym, or view.

When you create a managed reference table, you import the column data to the reference data warehouse. When you create an unmanaged reference table, you identify the database table that stores the column data. You can create a managed reference table from an OBDC connection or a native connection. You can create an unmanaged reference table from a native connection.

Before you create the reference table, verify that the Informatica domain contains a connection to the database that contains the reference data.

You can configure a database connection in the Connection Explorer. If the Developer tool does not show the Connection Explorer, select **Window** > **Show View** > **Connection Explorer** from the Developer tool menu.

Creating a Reference Table from a Relational Source

To create the reference table, connect to a database and select the table that contains the reference data.

1. Select **File** > **New** > **Reference Table** from the Developer tool menu.

2. In the table creation wizard, select **Reference Table from a Relational Source**.

   Click **Next**.

3. Select a database connection.

   At the Connection field, click **Browse**. The **Choose Connection** dialog box opens and displays the available database connections.

   Click **OK** when you select a connection.

4. Select a database resource.

   At the Resource field, click **Browse**. The **Select a Resource** dialog box opens and displays the resources on the database connection. Explore the database and select a database table, synonym, or view.

   You can optionally preview the entity information on the resource.

5. Enter a name for the table.
6. Select a location for the reference table object.

   At the Location field, click **Browse**. The **Select Location** dialog box opens and displays the projects in the repository.

   Select a location and click **Next**.

7. To create a reference table that does not store data in the reference data warehouse, select **Unmanaged table**.

   To enable users to edit an unmanaged reference table, select the **Editable** option.

   Click **Next**.

8. Select the column that contains the valid values.
9. The following table describes optional properties that you can specify:

Property	Default Value
Include a column for row-level descriptions	Cleared
Description	Cleared
Default value	Empty
Audit note	Empty
Maximum rows to preview	500

10. Click **Finish.**

Content Sets

A content set is a Model repository object that stores data or metadata for other reference data objects. A content set can include character sets, pattern sets, token sets, regular expressions, probabilistic models, and classifier models. Use a content set to define and organize reference data objects that relate to a single project, information type, or business purpose.

The Developer tool includes system-defined character sets and token sets that do not appear in the Model repository. To view and use the system-defined objects, configure a strategy in the Labeler transformation, Parser transformation, or Standardizer transformation.

Character Sets

A character set contains expressions that identify specific characters and character ranges. You can use character sets in Labeler transformations that use character labeling mode.

Character ranges specify a sequential range of character codes. For example, the character range "[A-C]" matches the uppercase characters "A," "B," and "C." This character range does not match the lowercase characters "a," "b," or "c."

Use character sets to identify a specific character or range of characters as part of labeling operations. For example, you can label all numerals in a column that contains telephone numbers. After labeling the numbers, you can identify patterns with a Parser transformation and write problematic patterns to separate output ports.

Character Set Properties

Configure properties that determine character labeling operations for a character set.

The following table describes the properties for a user-defined character set:

Property	Description
Label	Defines the label that a Labeler transformation applies to data that matches the character set.
Standard Mode	Enables a simple editing view that includes fields for the start range and end range.
Start Range	Specifies the first character in a character range.
End Range	Specifies the last character in a character range. For a range with a single character, leave this field blank.
Advanced Mode	Enables an advanced editing view where you can manually enter character ranges using range characters and delimiter characters.
Range Character	Temporarily changes the symbol that signifies a character range. The range character reverts to the default character when you close the character set.
Delimiter Character	Temporarily changes the symbol that separates character ranges. The delimiter character reverts to the default character when you close the character set.

Classifier Models

A classifier model analyzes input strings and determines the types of information that the strings are most likely to contain. You use a classifier model in a Classifier transformation.

A classifier model contains reference data rows and label values. The rows represent the input data on the port that you might connect to the Classifier transformation. The label values describe the types of information that the data rows contain. When you configure a classifier model, you assign a label to each reference data row in the model.

To link the reference data rows to the labels in a classifier model, you compile the model. The compilation process generates a series of logical associations between the data rows and the label values. When you run a mapping that reads the model, the Data Integration Service applies the model logic to the Classifier transformation input data. The Data Integration Service returns the labels that most accurately describe the information in each input data field.

You create a classifier model in the Developer tool. The Model repository stores the classifier model object. The Developer tool writes the data rows, the labels, and the compilation data to a file in the Informatica directory structure.

Pattern Sets

A pattern set contains expressions that identify data patterns in the output of a token labeling operation. You can use pattern sets to analyze the Tokenized Data output port and write matching strings to one or more output ports. Use pattern sets in Parser transformations that use pattern parsing mode.

For example, you can configure a Parser transformation to use pattern sets that identify names and initials. This transformation uses the pattern sets to analyze the output of a Labler transformation in token labeling mode. You can configure the Parser transformation to write names and initials in the output to separate ports.

Pattern Set Properties

Configure properties that determine the patterns in a pattern set.

The following table describes the property for a user-defined pattern set:

Property	Description
Pattern	Defines the patterns that the pattern parser searches for. You can enter multiple patterns for one pattern set. You can enter patterns constructed from a combination of wildcards, characters, and strings.

Probabilistic Models

A probabilistic model analyzes input data values and determines the types of information that the values are most likely to contain. Use a probabilistic model in a Labeler transformation and a Parser transformation.

A probabilistic model contains reference data values and label values. The reference data values represent the data on an input port that you connect to the transformation. The label values describe the types of information that the reference data values contain. You assign a label to each reference data value in the model.

To link the reference data values to the labels in a probabilistic model, you compile the model. The compilation process generates a series of logical associations between the data values and the labels. When you run a mapping that reads the model, the Data Integration Service applies the model logic to the transformation input data. The Data Integration Service returns the label that most accurately describes the input data values.

You create a probabilistic model in the Developer tool. The Model repository stores the probabilistic model object. The Developer tool writes the data values, the labels, and the compilation data to a file in the Informatica directory structure.

Regular Expressions

In the context of content sets, a regular expression is an expression that you can use in parsing and labeling operations. Use regular expressions to identify one or more strings in input data. You can use regular

expressions in Parser transformations that use token parsing mode. You can also use regular expressions in Labeler transformations that use token labeling mode.

Parser transformations use regular expressions to match patterns in input data and parse all matching strings to one or more outputs. For example, you can use a regular expression to identify all email addresses in input data and parse each email address component to a different output.

Labeler transformations use regular expressions to match an input pattern and create a single label. Regular expressions that have multiple outputs do not generate multiple labels.

Regular Expression Properties

Configure properties that determine how a regular expression identifies and writes output strings.

The following table describes the properties for a user-defined regular expression:

Property	Description
Number of Outputs	Defines the number of output ports that the regular expression writes.
Regular Expression	Defines a pattern that the Parser transformation uses to match strings.
Test Expression	Contains data that you enter to test the regular expression. As you type data in this field, the field highlights strings that matches the regular expression.
Next Expression	Moves to the next string that matches the regular expression and changes the font of that string to bold.
Previous Expression	Moves to the previous string that matches the regular expression and changes the font of that string to bold.

Token Sets

A token set contains expressions that identify specific tokens. You can use token sets in Labeler transformations that use token labeling mode. You can also use token sets in Parser transformations that use token parsing mode.

Use token sets to identify specific tokens as part of labeling and parsing operations. For example, you can use a token set to label all email addresses that use that use an "AccountName@DomainName" format. After labeling the tokens, you can use the Parser transformation to write email addresses to output ports that you specify.

Token Set Properties

Configure properties that determine the labeling operations for a token set.

The following table describes the properties for a user-defined character set:

Property	Token Set Mode	Description
Name	N/A	Defines the name of the token set.
Description	N/A	Describes the token set.

Property	Token Set Mode	Description
Token Set Options	N/A	Defines whether the token set uses regular expression mode or character mode.
Label	Regular Expression	Defines the label that a Labeler transformation applies to data that matches the token set.
Regular Expression	Regular Expression	Defines a pattern that the Labeler transformation uses to match strings.
Test Expression	Regular Expression	Contains data that you enter to test the regular expression. As you type data in this field, the field highlights strings that match the regular expression.
Next Expression	Regular Expression	Moves to the next string that matches the regular expression and changes the font of that string to bold.
Previous Expression	Regular Expression	Moves to the previous string that matches the regular expression and changes the font of that string to bold.
Label	Character	Defines the label that a Labeler transformation applies to data that matches the character set.
Standard Mode	Character	Enables a simple editing view that includes fields for the start range and end range.
Start Range	Character	Specifies the first character in a character range.
End Range	Character	Specifies the last character in a character range. For single-character ranges, leave this field blank.
Advanced Mode	Character	Enables an advanced editing view where you can manually enter character ranges using range characters and delimiter characters.

Property	Token Set Mode	Description
Range Character	Character	Temporarily changes the symbol that signifies a character range. The range character reverts to the default character when you close the character set.
Delimiter Character	Character	Temporarily changes the symbol that separates character ranges. The delimiter character reverts to the default character when you close the character set.

Rules and Guidelines for Probabilistic Models and Classifier Models

Each probabilistic model and classifier model in the Model repository identifies a file in the Informatica directory structure. The files contain the data values and the labels that you add to the model in the Developer tool. The files also contain the compilation logic that defines the associations between the data values and the labels.

Consider the following rules and guidelines when you work with probabilistic models or classifier models:

- When you run a mapping that includes a model, the Data Integration Service applies the compiled model logic to the transformation input data. The Data Integration Service does not read the data values or the labels in the model when the mapping runs.
- You can optionally remove the data values and the labels from a probabilistic model or a classifier model. For example, you might decide to remove sensitive data or proprietary data from a model. You can remove individual data values and labels in the Developer tool. You can remove all data values and labels when you export a model from the Model repository.

  Note: If you remove all data values and labels from a model, you cannot compile the model.
- When you remove one or more data values or labels from a model, the compiled model logic no longer represents the current data in the model file. To synchronize the model logic and the data values and labels, compile the model again. Do not compile the model if you want to maintain the current model logic.
- To protect the data in a classifier model or a probabilistic model, back up the model file in the Informatica directory structure. Back up the file before you remove all the data values and labels from a model.
- Find the model files in the Content Management Service host machine.

  Probabilistic model files have the following default location and file name extension:

  `<Informatica_Installation_Directory>/tomcat/bin/ner/<filename>.ner`

  Classifier model files have the following default location and file name extension:

  `<Informatica_Installation_Directory>/tomcat/bin/classifier/<filename>.classifier`
- If you upgrade the Informatica installation, you might need to compile the probabilistic models and classifier models before you use the models in a mapping. If a model does not contain any data, replace the current file in the Informatica directory structure with the backup file that contains the data.

Managing Labels in Classifier Models and Probabilistic Models

To review and update the labels in a probabilistic model or a classifier model, use the **Manage Labels** dialog box.

1. Open the content set that contains the classifier model.
2. Select the model name, and click **Edit**.
3. Open the **Manage Labels** dialog box.

   The dialog box lists the labels in the model.

Related Topics:

- "Classifier Model Label Management" on page 45
- "Probabilistic Model Configuration" on page 60

Creating a Content Set

Create a content set to manage reference data objects that refer to a single project, information type, or business purpose.

1. In the **Object Explorer** view, select a project or folder to store the content set.
2. Click **File** > **New** > **Content Set**.
3. Enter a name for the content set.
4. Optionally, select **Browse** to change the Model repository location for the content set.
5. Click **Finish**.

Creating a Reference Data Object in a Content Set

You can create a character set, pattern set, token set, regular expression, probabilistic model, and classifier model in a content set.

1. Open a content set in the editor and select the **Content** view.
2. Select a reference data object type.
3. Click **Add**.
4. Enter a name for the reference data object.

   Optionally, enter a description of the object.
5. Configure the reference data object properties.
6. Click **Finish**.

Tip: You can copy reference data objects from one content set to another. Use the **Copy To** and **Paste From** options to create a copy of an object in a content set. Use the **CTRL** key to select multiple content set objects.

CHAPTER 4

Classifier Models

This chapter includes the following topics:

Classifier Models Overview

A classifier model is a reference data object in a content set. Use a classifier model to analyze long text strings that contain multiple values. A classifier model identifies the most common type of information in each string.

You add a classifier model to a Classifier transformation. The transformation searches for common values between the classifier model data and the data in each input row. The transformation uses the common values to categorize the type of information that each row represents.

You use a classifier model when the input data has the following characteristics:

- The input data contains text. Classifier models apply natural language processes to text data to identify the types of information in the text. Natural language processes detect relevant words in the input string. Natural language processes disregard words that are not relevant.
- The input data strings contain multiple values. For example, you can create a data column that contains the contents of an email message in each field.

The Classifier transformation reads string datatypes. The transformation imposes no limit on the length of the input strings.

You compile classifier models in the Developer tool. When you compile a model, you create associations between similar data values in the model. The Classifier transformation uses the compiled data to search for information in the input data.

Classifier Model Structure

A classifier model contains reference data values and label values. The reference data values represent the data that you want to classify. The label values specify the types of information that a Classifier transformation can identify in the data.

A classifier model also contains compilation data. The Classifier transformation uses the compilation data to measure the similarities between the reference data in the model and the transformation input data. When you compile a classifier model, you create or update the compilation data. When a Classifier transformation compares the input data to the model data, the transformation returns the label values that describe each row of input data.

The Developer tool writes the reference data values, the label values, and the compilation data to a file in the Informatica directory structure. The classifier model object in the Model repository stores the file name. When you save a classifier model, you write the current reference data values and the label values to the file. When you compile the model, you update the compilation data in the file. You can read the file name from the model properties in the Developer tool.

Classifier Scores

A Classifier transformation compares each row of input data with every row of reference data in a classifier model. The transformation calculates a score for each comparison. The scores represent the degrees of similarity between the input row and the reference data rows.

When you run a mapping that contains a Classifier transformation, the mapping returns the label that identifies the reference data row with the highest score. The score range is 0 through 1. A high score indicates a strong match between the input data and the model data.

Review the classifier scores to verify that the label output accurately describes each row of input data. You can also review the scores to verify that the classifier model is appropriate to the input data. If the transformation output contains a large percentage of low scores, the classifier model might be inappropriate. To improve the comparisons, compile the model again. If the compiled model does not improve the scores, replace the model in the transformation.

Classifier Transformation Example

You can use a classifier model and a Classifier transformation to categorize email messages based on the text that they contain.

For example, you are a data steward in the customer support center of a software manufacturer. You review the email messages that the support center receives from customers. The organization has customers in many countries, and the support center receives emails in many languages. You decide to sort the emails by language, so that you can send each email to the department that can best reply to the customer.

To sort the emails, perform the following steps:

1. Write the email messages to a single file or a database table.
2. Create a data object in the Model repository that reads the file or the database table.
3. Create data objects in the Model repository for each language that a message uses.

4. Create a classifier model that contains sample text for each language.

   Note: You can use sample data from the email messages data as source data for the model.

5. Add the classifier model to a reusable Classifier transformation.
6. Configure a mapping to apply the Classifier transformation to the message data.

   To configure the mapping, perform the following steps:

   - Add the Classifier transformation and the data objects to the mapping.
   - Connect a Classifier transformation input port to the source data object.
   - Connect the Classifier transformation output ports to the target data objects.

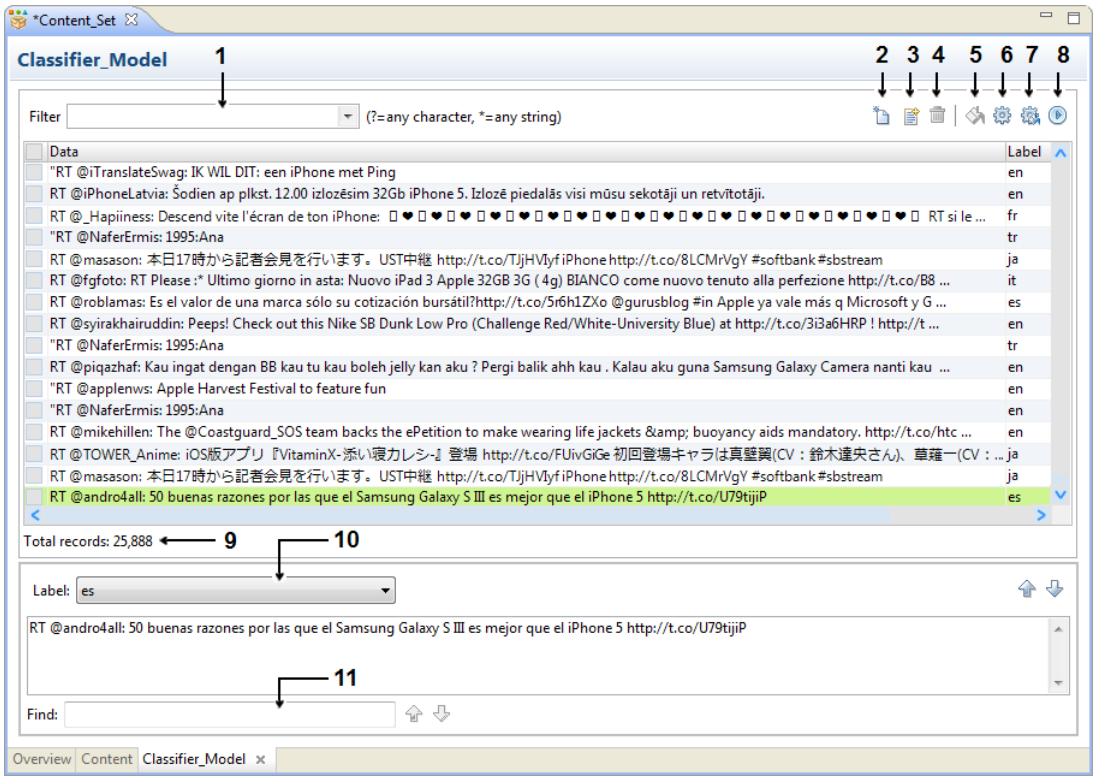
When you run the mapping, the Classifier transformation analyzes the email messages and writes the email text to the correct data target. You can share the data targets with the team members in each department.

Classifier Model Options

The Developer tool displays the classifier model data in an editor with an upper pane and a lower pane. The upper pane displays each row of reference data and any label that you assign to the data. The lower pane displays the contents of a row that you select.

Use the upper pane to review the reference data rows and to identify any row that does not use a label. Use the lower pane to review the contents of a row and to assign a label to the row. The upper pane displays approximately 100 characters of data on each row. The lower pane displays all of the data in the row that you select.

The following image shows the classifier model editor:



The editor includes the following options:

1. Filter field

   Filters the list of reference data rows based on the data value or the label that you specify.
2. Add Row

   Inserts a blank reference data row.
3. Append data

   Imports data from a data object in the Model repository.
4. Delete

   Deletes the reference data rows that you select. Use the check boxes to select the rows.
5. Assign Label

   Assigns a label to one or more reference data rows that you select. Use the check boxes to select the rows.
6. Edit Properties

   Displays the classifier model properties.
7. Manage Labels

   Opens the **Manage Labels** dialog box. Use the dialog box to add or delete label values from the classifier model.
8. Compile

   Compiles the classifier model.
9. Total records

   Indicates the number of reference data rows in the classifier model.
10. Label field

    Displays a label value that you can apply to the current reference data row.
11. Find field

    Finds a data value that you specify in the current reference data row.

Classifier Model Reference Data

A classifier model contains a reference data column that can include sentences, paragraphs, or pages of text. The reference data represents the different types of text input that a Classifier transformation can read in a mapping. When you create a model, verify that the reference data includes the types of text that you expect to find when you run the mapping.

You can use the mapping source data to create a classifier model. Select a sample of the source data and copy the data sample to the model.

Consider the following rules and guidelines when you work with classifier model reference data:

- A reference data field can be of any length. You can enter pages of text into each data field.
- You import reference data from a data object.
- You cannot edit reference data values. However, you can delete a data row.
- When you compile a classifier model, the compilation process disregards any number values in the reference data.

Classifier Model Label Data

A classifier model contains one or more descriptive labels that summarize the types of information in the reference data rows. Assign a label to each reference data row.

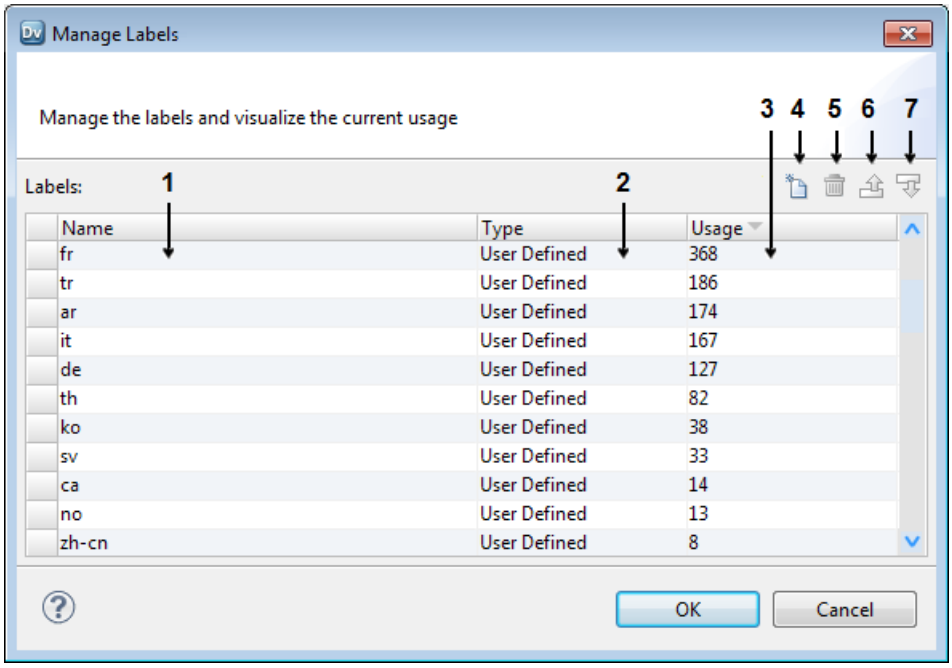
When you add data from a data source to a classifier model, you can specify a column as a label data column. You can also create labels in the model.

Labels are independent of the reference data values that they describe. If you delete the reference data rows that use a label, you do not delete the label from the model. If you delete a label, you do not delete the reference data values that you associated with the label.

Classifier Model Label Management

Use the **Manage Labels** dialog box to review and update the label values in a classifier model. You can also sort and update the label values.

The following image shows the **Manage Labels** dialog box:



The **Manage Labels** dialog box contains the following elements:

1. Name column.

   Contains the label values that the Classifier transformation can apply to the input data rows. You can sort the labels by name.

2. Type column.

   Identifies the source of the label values. The classifier model identifies all labels as user-defined values.

3. Usage column.

   Indicates the number of reference data rows that use each label. You can sort the labels by the number of rows.

4. Add button.

   Adds a label to the classifier model. Enter a label value in the Name column on the row.

Note: To update a label value, double-click the value and enter the value that you need.

5. Delete button.

   Deletes a label from the classifier model.

6. Up arrow.

   Moves the label up a single row in the dialog box.

7. Down arrow.

   Moves the label down a single row in the dialog box.

Classifier Model Configuration

The steps to configure a classifier model begin with the data that you want to classify. The content of the reference data that you add to the model must reflect the data that you connect to the Classifier transformation. The transformation compares the data values and patterns in the input data to the data values and patterns in the classifier model.

To create a classifier model that you can use in a Classifier transformation, perform the following tasks:

1. Identify the reference data values and the label values to add to the model.

   You can use a fragment of the data that you want to classify. Create a data object in the Model repository that reads the data fragment.

2. Create a content set, and add a classifier model to the content set.
3. Add the reference data values to the model.
4. Add the label values to the model.

   You can import the data from the data object in the Model repository. You can also enter a single row of reference data or a single label.

5. Assign a label to each row of reference data.

   You can assign a label to multiple rows in a single operation.

6. Compile the model.

After you compile the classifier model, you can use the model in a Classifier transformation.

Creating a Classifier Model

Use a data object as the source for the classifier model data.

A classifier model performs optimally when you use the input data to the Classifier transformation as the source for the model reference data.

1. In Object Explorer, open or create a content set.
2. Select the **Content** view.
3. Select **Classifier Models**, and click **Add**.

   The Classifier Model wizard opens.

4. Enter a name for the classifier model.

   Optionally, enter a text description of the model.

5. Browse the Model repository and select the data object that contains the data to import.

Do not select a social media data object.

Click **Next.**

6. Review the columns on the data object, and select one or more columns to add to the model. You can add reference data columns and a label column in the same operation.
   - To import a column of data as reference data, select the column name and click **Data**.

     You can select multiple data columns. The Developer tool merges the contents of the columns that you select to a single column.
   - To import a column of data as label values, select the column name and click **Label**.

   When you import reference data and label values, the Developer tool assigns the label on each row to the reference data string on the same row. You can preview the data before you select the columns. You can change the label assignments after you create the model.

   Click **Next.**
7. Select the number of rows to import from the data source.

   By default, the Developer tool imports all rows from the data source. If you enter a number, the model counts the rows from the start of the data set.
8. Click **Finish**, and save the model.

After you create the model, verify the label assignments and compile the model.

Appending Data from a Data Source to a Classifier Model

You can import multiple rows of reference data values or label values to a classifier model in a single operation.

1. Open the content set that contains the classifier model.
2. Select the model name, and click **Edit**.
3. Click **Append Data**.

   The Classifier Model wizard opens.
4. Browse the Model repository and select the data object that contains the data to import.

   Do not select a social media data object.

   Click **Next.**
5. Review the columns on the data object, and select one or more columns to add to the model. You can add reference data columns and a label column in the same operation.
   - To import a column of data as reference data, select the column name and click **Data**.

     You can select multiple data columns. The Developer tool merges the contents of the columns that you select to a single column.
   - To import a column of data as label values, select the column name and click **Label**.

   When you import reference data and label values, the Developer tool assigns the label on each row to the reference data string on the same row. You can preview the data before you select the columns. You can change the label assignments after you create the model.

   Click **Next.**
6. Select the number of rows to import from the data source.

   By default, the Developer tool imports all rows from the data source. If you enter a number, the model counts the rows from the start of the data set.
7. Click **Finish**, and save the model.

Adding a Reference Data Row to a Classifier Model

You can add a single row of reference data to a classifier model.

1. Open the content set that contains the classifier model.
2. Select the model name, and click **Edit**.
3. Click **Add Row**.

   The Developer tool adds a row below the current row in the reference data.
4. Enter the reference data values to the row.

   You can use Windows shortcuts to paste data to the row.

Adding a Label to a Classifier Model

You can add a single label to a classifier model.

1. Open the content set that contains the classifier model.
2. Select the model name, and click **Edit**.
3. Open the **Manage Labels** dialog box.

   The dialog box lists the labels in the model.
4. Click **New**.

   The Developer tool adds a row at the bottom of the list of labels.
5. Double-click the default value in the Name column, and enter a label name.
6. Click **OK**.

After you create the label, you can assign the label to one or more rows of reference data. The Usage column in the **Manage Labels** dialog box indicates the number of rows that use the label.

Assigning a Label to Reference Data Rows

You can assign a label to one or more reference data rows in a single operation.

1. Open the content set that contains the model.
2. Select the model name, and click **Edit**.
3. Select one or more reference data rows. Use the check box options to select the rows.

   Note: You can use the filter option to show all of the rows that contain a data value that you specify. Use the Select All check box option to select all of the rows that contain the value.
4. Click **Assign Label**.

   The Developer tool displays the list of labels in the classifier model.
5. Select a label value, and click **Assign**.

   The Developer tool updates the reference data rows that you selected with the label value.

Optionally, compile the model to add the label names to the classifier model logic.

Identifying Unused Label Values

Use the **Manage Labels** dialog box to find any label value that remains unused in the classifier model. The **Manage Labels** dialog box displays usage data for the label values in the classifier model. Use the usage data to verify the number of reference data rows that use a label value and to find unused label values.

1. Open the content set that contains the classifier model.
2. Select the model name, and click **Edit**.
3. Open the **Manage Labels** dialog box. The dialog box lists the labels in the classifier model.
4. Review the Usage column data for each label.

   The Usage column lists the number of reference data rows that use the label. If a label value is unused, the Usage column has a value of zero.

Deleting Rows from a Classifier Model

You can delete one or more reference data rows from a classifier model in a single action.

1. Open the content set that contains the model.
2. Select the model name, and click **Edit**.
3. Select one or more reference data rows. Use the check box options to select the rows.
4. Click **Delete**.

   The Developer tool removes the rows that you selected from the classifier model.

To undo the operation, press the Ctrl + Z keys on the keyboard.

Deleting a Label from a Classifier Model

Use the **Manage Labels** dialog box to delete a label from a classifier model.

1. Open the content set that contains the model.
2. Select the model name, and click **Edit**.
3. Open the **Manage Labels** dialog box.
4. Click **Delete**.
5. Click **Yes** to confirm the operation.

   The Developer tool deletes the label from the model. The Developer tool does not delete any reference data row that uses the label.
6. Click **OK** to close the dialog box.

To undo the operation, press the Ctrl + Z keys on the keyboard.

Compiling a Classifier Model

Each time you edit a label value or reference data value in a classifier model, you must compile the model. When you compile the model, you update the compilation data in the model.

- To update the compilation data, open the model in the Developer tool and click **Compile**.

Filter Operations and Find Operations

Use the filter options to show or hide the reference data rows that meet the criteria that you specify. When you apply a filter, you can perform additional actions on the data rows that the classifier model displays. For example, you can apply a label value to all of the data rows.

Use the filter option to perform the following tasks:

- Find the reference data rows that contain a value that you enter.
- Find the reference data rows that use a label that you select.
- Find the reference data rows that do not use a label.

You can also search for a data value within a row of reference data.

Using a Data Value to Filter the Reference Data Rows

Use the filter to verify that one or more reference data rows contain the data values you expect.

1. Open the content set that contains the classifier model.
2. Select the model name, and click **Edit**.
3. Enter a value in the Filter field.

   You can include wildcard characters in the value that you enter.

   The Developer tool displays the reference data rows that contain the filter text.

Using a Label Value to Filter the Reference Data Rows

Use the filter to show or hide the reference data rows that use a label that you select.

1. Open the content set that contains the model.
2. Select the model name, and click **Edit**.
3. Select a label value from the Filter menu.

   The Developer tool displays the reference data rows that use the label value.

   Note: To find any reference data row that does not use a label, select the **No Label** option from the Filter menu.

Finding a Value in a Reference Data Row

Use the Find field to search for a data value in a row that you select.

1. Open the content set that contains the model.
2. Select the model name, and click **Edit**.
3. Select a row of reference data.
4. Enter a value in the Find field.

   The model highlights the instances of the value in the reference data row.
5. Use the Up arrow or the Down arrow to find additional instances of the value in the row.

Copy and Paste Operations

You can copy a classifier model from one content set to another in a Model repository. Copy a classifier model to share resources with other Developer tool users.

You can copy a model to another content set, or you can import a model to the current content set. You can import multiple models from multiple content sets in the repository in a single operation.

When you copy a model, the Content Management Service creates a copy of the model data file on the service machine. Each model uses a different data file.

Copying a Classifier Model to Another Content Set

You can copy a classifier model from one content set to another in a Model repository. When you copy a classifier model, you specify the model object and the source and destination content sets.

1. Open the content set that contains the classifier model.
2. Select a classifier model and click **Copy To**.
3. Browse the Model repository and select a content set.

   You can copy the classifier model to a content set in the current project or another project.
4. Click **OK**.

   The Developer tool copies the classifier model to the selected content set.

Importing a Classifier Model from Another Content Set

You can import a classifier model from one content set to another in a Model repository. When you import a classifier model, you specify one or more model objects and the source and destination content sets.

1. Open the content set to contain the classifier model.
2. Select a classifier model and click **Paste From**.
3. Browse the Model repository and select a classifier model.

   You can paste the classifier model from a content set in the current project or another project.
4. Click **OK**.

   The Developer tool pastes the classifier model to the current content set.

CHAPTER 5

Probabilistic Models

This chapter includes the following topics:

Probabilistic Models Overview

A probabilistic model is a reference data object that you create in a content set. Use a probabilistic model to analyze a data string that contains multiple data values. A probabilistic model identifies the type of information in each value in the string. You can add a probabilistic model to a Labeler transformation and a Parser transformation.

Use a probabilistic model in a Labeler transformation to apply a descriptive label to each value in an input string. The Labeler transformation writes the labels to a single output port. Use a probabilistic model in a Parser transformation to write each value in an input string to a port that represents the information in the value. The Parser transformation creates an output port for each type of information.

You design and compile a probabilistic model in the Developer tool. When you define a probabilistic model, you add a series of data rows to the model and you assign a label to each value in each row. When you compile a probabilistic model, the Developer tool creates associations between the data values and the labels that you added. The Labeler transformation and Parser transformation use natural language processes to compare the probabilistic model data to the input port data.

Natural language processes use the following techniques to identify the types of information in data values:

- Natural language processes can recognize similar data values and apply the same label to the values.
- Natural language processes can compare a data value to the adjacent values in the string. Natural language processes analyze the sequence of values to understand the usage of each string and to verify the types of information that the strings represent.

Probabilistic Model Structure

A probabilistic model contains rows of reference data values and label values. The reference data values represent the different values that might appear in the transformation input data. The label values identify the types of information that you expect the input data to contain.

A probabilistic model also contains compilation data. The Labeler transformation and the Parser transformation use the compilation data to measure the similarities between the reference data in the model and the transformation input data. When you compile a probabilistic model, you create or update the compilation data.

A data row can contain a single value or multiple values. Each data row can have a different structure. You can assign the same label to different values in a data row. Alternatively, you can assign a different label to identical values that appear in different positions on a row. The Data Integration Service considers the relative positions of the values in the input string when the mapping runs. Assign each label to at least one data value before you compile the probabilistic model.

The Developer tool writes the reference data values, the label values, and the compilation data to a file in the Informatica directory structure. The probabilistic model object in the Model repository stores the file name. When you save a probabilistic model, you write the current reference data values and the label values to the file. When you compile the model, you update the compilation data in the file. You can read the file name from the model properties in the Developer tool.

Note: To optimize the capabilities of the probabilistic model, verify that each data row contains multiple reference data values. The order of the values in each row must correspond as closely as possible to the order in which the values occur in the transformation input data. If the data rows contain single reference data values, the Labeler transformation or the Parser transformation cannot apply natural language processes during the probabilistic analysis.

Labeler Transformation Example

The customer database at an insurance organization contains multiple data entry errors. You are a data steward at the insurance organization. You configure a mapping with a Labeler transformation to determine the different types of data that each column contains.

The following table describes sample data from the customer database:

Row ID	Field 1	Field 2	Field 3
1	19132954	AIM SECURITIES	PETRIE TAYBRO
2	10110169	JASE TRAPANI	BANK OF NEW YORK
3	10111786	WANGER ASSET MANAGEMENT, LLP	JAN SEEDORF
4	10112299	FELIX LEVENGER	HARVARD MAGAZINE
5	10112036	DESCHÊNES & FILS LTÉE (QUEBEC)	RICHARD TREMBLAY
6	BERGER ASSOCIATES	10111101	DAREEN HULSMAN

Row ID	Field 1	Field 2	Field 3
7	19131385	EAGLE FINANCIAL GROUP INC	PATRICK MCKINNIE
8	LAKENYA PASKETT	WHITEHALL FINANCIAL GROUP	15954710

When you run the mapping, the Labeler transformation compares the input data with the probabilistic model reference data. The Labeler transformation selects a label for the data on each input port. The transformation writes the labels to an output port. Each output row contains a set of labels that defines the data structure on the corresponding input row.

The following table describes the labels that the Labeler transformation adds to the output port:

Row ID	Output Labels
1	number organization contact
2	number contact organization
3	number organization contact
4	number contact organization
5	number organization contact
6	organization number contact
7	organization number contact
8	contact organization number

Parser Transformation Example

A supermarket stores product descriptions in a single column in a database table. The product descriptions contain multiple data values that represent different types of information. You are a data steward at the supermarket. You want to create columns for the different types of information in the product descriptions.

You configure a mapping with a Parser transformation to organize the data values into the correct fields.

The following data fragment contains the product description for orange juice:

```
Sunnydream Orange Juice Unsweetened 12 oz
```

The following table describes the output data that the Parser transformation creates from the input data:

Product Name	Product Type	Product Details	Product Size
Sunnydream	Orange Juice	Unsweetened	12 oz

Probabilistic Model Options

When you edit a probabilistic model, you can work in the Data view or the Label view.

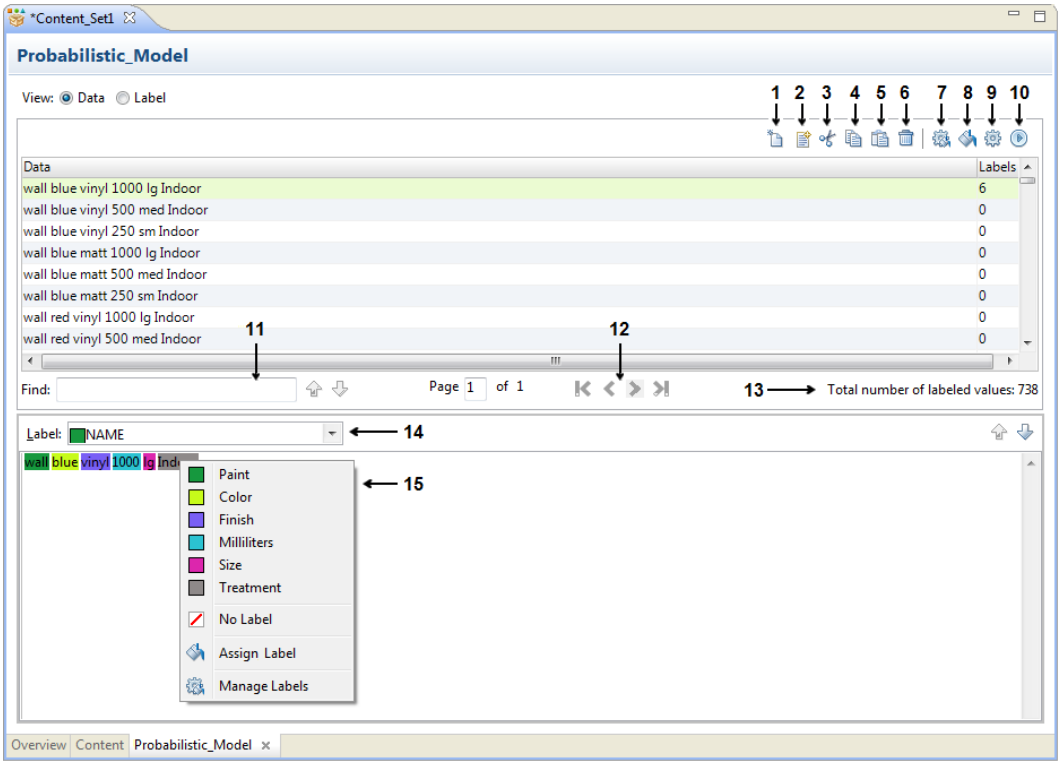
Use the Data view to add reference data rows to the model and to assign the labels to the data values in each row. Use the Label view to review detailed information about the use of the label values in the model. You can add labels to the probabilistic model in the Data view and in the Label view.

Probabilistic Model Data View

The Data view displays the reference data rows in the probabilistic model and the number of label values that you assign to each row. The Data view also displays the total number of labels that you assigned to the values in the current model.

When you select a reference data row, the values in the row appear in an editor below the Find field. To assign a label to a reference data value in a row, right-click the value in the editor and select a label value.

The following image shows the probabilistic model options that you can use when you select the Data view:



The Data view includes the following options:

1. Add Row

   Inserts a blank data row.

2. Append data.

   Imports data from a data object in the Model repository.

3. Cut

   Removes a data row from the probabilistic model and adds the data row to the clipboard.

4. Copy

   Copies a data row to the clipboard.

5. Paste

   Pastes a data row from the clipboard to the probabilistic model.

6. Delete

   Deletes a data row from the probabilistic model.

7. Manage Labels

   Opens the **Manage Labels** dialog box. Use the dialog box to add or delete label values from the probabilistic model.

8. Assign Label

   Assigns a label to one or more reference data values that you select. You can use the option to assign a label to all instances of a reference data value in the model.

9. Edit Properties

   Displays the probabilistic model properties.

10. Compile

    Compiles the probabilistic model.

11. Find field

    Finds rows in the model that contain the reference data value that you enter. Use the Up arrow and Down arrow to move to the rows that contain the value.

12. Forward and back arrows

    Moves forwards and backwards through the rows of data values in the model.

13. Total number of labeled values

    Indicates the number of reference data values that use a label.

14. Label field

    Displays a label value that you can apply to the reference data value that you select.

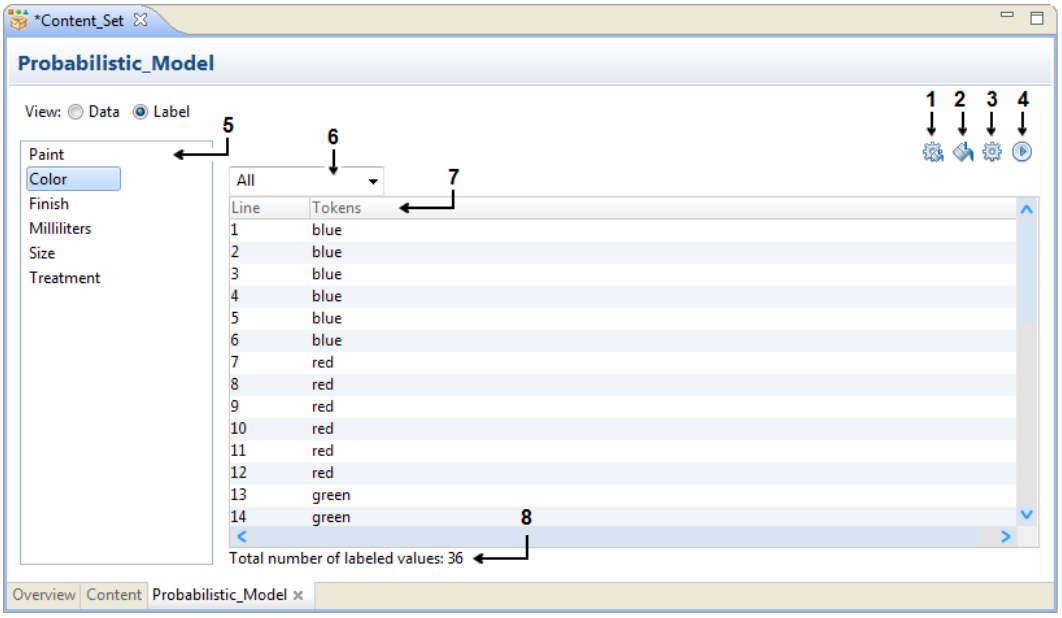
15. Label menu

    Displays a list of options that you can use to assign a label to one or more reference data values. To open the menu, right-click a reference data value in the reference data editor.

Probabilistic Model Label View

The Label view lists the labels that you define in the probabilistic model. When you select a label, the Label view shows the data values that you assigned to the label in each row.

The following image shows the probabilistic model options that you can use when you select the Data view:



The Label view includes the following options:

1. Manage Labels

   Opens the **Manage Labels** dialog box. Use the dialog box to add or delete label values from the probabilistic model.

2. Assign Label

   Assigns a label to one or more reference data values that you select.

   You can assign a label to a single data value, or you can assign a label to multiple values in a single operation.

3. Edit Properties

   Displays the probabilistic model properties.

4. Compile

   Compiles the probabilistic model.

5. List of label values

   Lists the labels that you can assign to the reference data values in the model.

6. Assignment filter

   Filters the list of reference data values that use the label that you select. The filter options show or hide the reference data values based on the method that you used to assign the label to the data values.

   When you apply a filter, the total number of labeled values in the Label view reflects the number of values that satisfy the filter condition.

7. Reference data value column

   Lists the reference data values that use the current label.

8. Total number of labeled values

   Indicates the number of reference data values that use the current label.

Probabilistic Model Reference Data

The reference data values in a probabilistic model represent the types of input data that you might connect to a transformation in a mapping.

You can add, edit, and delete reference data rows in the Developer tool. You can paste data from the clipboard, and you can import data from a data source. After you add the reference data values, assign a label to each data value in each row.

Probabilistic Model Label Data

The label values in a probabilistic model represent the types of information that the reference data values might contain. When you add reference data rows to a model, assign a label to each value in each row. The labels that you add to the model appear in the Label view and in the menu options in the Data view.

You can assign any label in the model to any reference data value. If the same value has different meanings in different rows of reference data, you can assign a different label to each value in each row.

The range of label values can correspond to the range of input ports that the Labeler transformation or the Parser transformation reads during probabilistic analysis. The probabilistic model must contain at least one label value that the transformation can apply to the data values on each input port.

For example, a warehouse might store inventory data in a comma-delimited file that defines eight columns. You design a mapping that parses the inventory data to a database table. You create a probabilistic model with a label value for each data column. When you run the mapping, the Parser transformation writes each value in the input data to the correct column in the target table.

The following table shows the columns of inventory data and the label values that you might create in a probabilistic model:

Inventory Column Name	Label Name
Product_Name	Product_Name
Quantity	Quantity
Location	Location
Barcode	Barcode
SKU	Stock_Keeping_Unit
Arrival_Date	Arrival_Date
Cost_Price	Cost_Price

Note: You can use the input column names, or you can use other names. The names do not need to match.

Overflow Label

When a transformation cannot apply a label to an input data value, the transformation treats the data value as overflow data. The Labeler transformation applies an overflow label to any data value that it cannot identify. The Parser transformation writes any data value that it cannot identify to an overflow port.

The following table shows how a Parser transformation might use an overflow port to parse address data elements that a probabilistic model does not recognize:

Input Data	Street_Name port	Street_Descriptor port	Overflow port
Park Place	Park	Place	No overflow data
Park Avenue	Park	Avenue	No overflow data
Madison Avenue	Madison	Avenue	No overflow data
Central Park	Central	Park	No overflow data
Washington Square Park	Washington	Square	Park
Madison Square Garden	Madison	Square	Garden

The Parser transformation also writes values to an overflow port when the number of input values is greater than the number of labels in the model. Before you use a probabilistic model in a transformation, review the input data and verify that the model contains the correct number of label values.

Probabilistic Model Properties

You can review the general properties and the advanced properties for a probabilistic model.

To open the properties editor, select the **Edit Properties** option on the Data view or the Label view.

The general properties show the name of the probabilistic model, any description of the model, and the name of the model data file. The advanced properties display the computational properties that the Developer tool uses to compile the probabilistic model.

The basic element in the compilation of probabilistic models is the *n-gram*. An n-gram is a series of letters that follow or precede other letters to complete a word. When a mapping runs, the Labeler transformation or Parser transformation creates multiple n-grams for each value in the reference data column of the probabilistic model. The transformation compares the input data values with the reference data values and the n-grams. The advanced properties on a probabilistic model determine how the probabilistic model handles n-grams and other model features.

Note: The default values on the advanced properties represent the preferred settings for probabilistic analysis and probabilistic model compilation. If you edit an advanced property, you might adversely affect the accuracy of the probabilistic analysis. Do not edit the advanced properties unless you understand the effects of the changes you make.

Related Topics:

- "Rules and Guidelines for Probabilistic Models and Classifier Models" on page 39

Probabilistic Model Configuration

The steps to configure a probabilistic model begin with the type of analysis that you want to perform. Use a probabilistic model in a Labeler transformation to identify the types of information in each value in an input string. Use a probabilistic model in a Parser transformation to parse the data values in an input string to different output ports.

You can use the same probabilistic model to label data and to parse data. When you use the model in a Labeler transformation, the transformation creates a single output port for each input port that you select. When you use the model in a Parser transformation, the transformation creates an output port for each type of input data that it identifies.

To create a probabilistic model, perform the following tasks:

1. Identify the reference data values and the label values to add to the model.

   You can use a fragment of the data that you want to analyze. Create a data object in the Model repository that reads the data fragment.
2. Create a content set, and add a probabilistic model to the content set.
3. Add the reference data values to the model.
4. Add the label values to the model.

   You can import the data from the data object in the Model repository. You can also enter a single row of reference data or a single label.

   To use the probabilistic model to parse data, verify that the model contains a label value for each output port that the transformation must create.
5. Assign a label to reference each data value in each row.

   You can assign a label to multiple reference data values in a single operation.
6. Compile the model.

After you compile the probabilistic model, you can use the model in a transformation.

Creating an Empty Probabilistic Model

You can create a probabilistic model object that does not contain reference data or label data. Create the empty model, and add data or import data to the model.

1. In Object Explorer, open or create a content set.
2. Select the Content view.
3. Select **Probabilistic Models**, and click **Add**.

   The Probabilistic Model wizard opens.
4. Select the **Probabilistic Model** option.

   Click **Next**.
5. Enter a name for the probabilistic model.

   Optionally, enter a text description of the model.
6. Click **Finish**.

Creating a Probabilistic Model from a Data Object

You can use a data object as a source for probabilistic model data.

A probabilistic model performs optimally when you use the input data to the Labeler or Parser transformation as the source for the model reference data.

1. In Object Explorer, open or create a content set.
2. Select the **Content** view.
3. Select **Probabilistic Models**, and click **Add**.

   The Probabilistic Model wizard opens.
4. Select the **Probabilistic Model from Data Objects** option.

   Click **Next.**
5. Enter a name for the probabilistic model.

   Optionally, enter a text description of the model.
6. Browse the Model repository and select the data object that contains the data to import.

   Do not select a social media data object.

   Click **Next.**
7. Review the columns on the data object, and select one or more columns to add to the model. You can add reference data columns and a label column in the same operation.
   - To import a column of data as reference data, select the column name and click **Data**.

     You can select multiple data columns. The Developer tool merges the contents of the columns that you select to a single column.
   - To import a column of data as label values, select the column name and click **Label**.

   When you import reference data and label values, the Developer tool assigns the label on each row to the reference data string on the same row. You can preview the data before you select the columns. You can change the label assignments after you create the model.

   Click **Next.**
8. Select the number of rows to import from the data source.

   By default, the Developer tool imports all rows from the data source. If you enter a number, the model counts the rows from the start of the data set.
9. Specify the delimiters for the data values that you import.

   You can specify different delimiters for reference data values and label values. The default delimiter is a character space.
10. Click **Finish**, and save the model.

After you create the probabilistic model, verify the label assignments and compile the model.

Appending Data from a Data Source to a Probabilistic Model

You can import multiple rows of reference data values and label values to a probabilistic model in a single operation.

1. Open the content set that contains the probabilistic model.
2. Select the model name, and click **Edit**.
3. Click **Append Data**.

   The Probabilistic Model wizard opens.

4. Browse the Model repository and select the data object that contains the data to import.

   Do not select a social media data object.

   Click **Next.**

5. Review the columns on the data object, and select one or more columns to add to the model. You can add reference data columns and a label column in the same operation.

   - To import a column of data as reference data, select the column name and click **Data**.

     You can select multiple data columns. The Developer tool merges the contents of the columns that you select to a single column.

   - To import a column of data as label values, select the column name and click **Label**.

   When you import reference data and label values, the Developer tool assigns the label on each row to the reference data string on the same row. You can preview the data before you select the columns. You can change the label assignments after you create the model.

   Click **Next.**

6. Select the number of rows to import from the data source.

   By default, the Developer tool imports all rows from the data source. If you enter a number, the model counts the rows from the start of the data set.

7. Specify the delimiters for the data values that you import.

   You can specify different delimiters for reference data values and label values. The default delimiter is a character space.

8. Click **Finish**, and save the model.

Adding a Reference Data Row to a Probabilistic Model

Use the Data view to add an empty row to a probabilistic model.

1. Open the content set that contains the model.

   Select the model name, and click **Edit**.

2. Select the Data view.

3. To add an empty row to the model, click **New**.

4. Select the row that you added, and enter one or more reference data values to the row.

5. Save the probabilistic model.

After you save the model, assign a label to each value in the row. Optionally, compile the model.

Adding a Label to a Probabilistic Model

You can add a single label to a probabilistic model. Add a label for every type of information that the model data values represent. If you use the probabilistic model in a Parser transformation, add a label for each output port that you expect the transformation to create.

1. Open the content set that contains the model.

2. Select the model name, and click **Edit**.

3. In the Data view or the Label view, click **Manage Labels**.

   The **Manage Labels** dialog box appears.

4. In the **Manage Labels** dialog box, click **New**.

   A label appears in the first empty row in the dialog box.

5. Edit the label name. Optionally, update the color for the label.
6. Click **OK** to add the label to the model.
7. Save the probabilistic model.

After you add the label, assign the label to at least one data value.

Assigning a Label to a Reference Data Value

You can assign a label to a single data value in a reference data row.

You can assign different labels to the same data value if the data value appears in different locations in the row or in different rows.

1. Open the content set that contains the model.
2. Select the model name, and click **Edit**.
3. Select the Data view.
4. Find a data value that does not have a label or that has an incorrect label. Data values that use a label are color-coded.
5. Select the data row that contains the data value.

   The row appears in the editor.
6. Right-click a data value in the editor and select a label from the context menu.

   The Developer tool assigns the label to the data value.
7. Save the probabilistic model.

After you save the probabilistic model, optionally compile the model.

Assigning a Label to Multiple Data Values

You can assign a label to multiple reference data values in a single operation.

1. Open the content set that contains the model.
2. Select the model name, and click **Edit**.
3. Click **Assign Label**.

   The **Assign a Label to Multiple Values** dialog box opens.
4. Enter one or more characters in the Find field.

   You can enter wildcard characters in the Find field.
5. Optionally, select additional search criteria.

   You can select or clear the following options:

   - Match case.

     Specifies that the search operation is case sensitive. Do not use wildcard characters with the option.
   - Match full string. Specifies that the search operation looks for a complete match between the characters in the reference data value and the characters that you enter. Do not use wildcard characters with the option.
   - Ignore labeled values.

     Specifies that the search operation skips any reference data value that uses a label.
6. Select a label to assign to the reference data values that match the search criteria.

You can also select the **No Label** option. Select the option to remove the label from the reference data values that include the characters that you enter.

7. Click **Start**.

   The Developer tool assigns the label to all reference data values that match the search criteria that you define.

   Note: To view the reference data values that you labeled in a single operation, use the **Assigned by bulk** filter in the Label view.

Deleting Rows from a Probabilistic Model

You can delete one or more reference data rows from a probabilistic model in a single action.

1. Open the content set that contains the model.
2. Select the model name, and click **Edit**.
3. In the Data view, select one or more reference data rows.
4. Click **Delete**.

   The Developer tool removes the rows that you selected from the classifier model.

To undo the operation, press the Ctrl + Z keys on the keyboard.

Deleting a Label from a Probabilistic Model

When you delete a label value from a model, any reference data value that used the label remains in the model. Assign another label value to each reference data value.

1. Open the content set that contains the model.
2. Select the model name, and click **Edit**.
3. In the Data view or the Label view, click **Manage Labels**.
4. In the **Manage Labels** dialog box, select a label value.
5. Click **Delete**.
6. Click **OK** to delete the label.
7. Save the probabilistic model.

Note: A label is a structural element in a probabilistic model. If you add or remove a label after you add the model to a transformation, you invalidate the operation that uses the model. To use the model that you updated, delete and re-create the transformation operation.

Compiling the Probabilistic Model

When you update the data or the label assignments in a probabilistic model, you can compile the model. Compile the model to update the model logic with the associations between the current reference data values and the current label values.

Before you compile the probabilistic model, verify that each label value identifies at least one reference data value.

- To compile the model, open the model in the Developer tool and click **Compile**.

Finding Data Rows in a Probabilistic Model

Use the Data view to find the reference data rows that contain a value that you enter.

1. Open the content set that contains the probabilistic model.
2. Select the model name, and click **Edit**.
3. Select the Data view.
4. Enter one or more characters in the **Find** field.

   The Data view displays the first row in the model that contains the value that you entered.
5. Use the Up arrow or Down arrow to move to other rows that contain the value.

Filtering Reference Data Values by Label Assignment

Use the Label view to find the reference data values that use a label that you specify. Filter the results based on the method that you used to assign the label.

1. Open the content set that contains the probabilistic model.
2. Select the model name, and click **Edit**.
3. In the Label view, select a label value.

   The probabilistic model displays a list of the reference data values that use the label. The model also shows the number of data values that use the label.
4. Apply a filter to the list of reference data values that use the label.

   Select one of the following filters:

   - All. Displays the reference data values that use the label. All is the default option.
   - Assigned by user. Displays any reference data value that you selected individually when you assigned the label.
   - Assigned by bulk. Displays the reference data values to which you assigned a label as part of a bulk assignment operation.

   The probabilistic model displays the reference data values that satisfy the filter condition.

Finding Unused Label Values

Use the Label view to find any label value that you did not assign to a reference data value. You must assign each label to at least one reference data value.

1. Open the content set that contains the probabilistic model.
2. Select the model name, and click **Edit**.
3. In the Label view, select a label value.

   The probabilistic model displays a list of the reference data values that use the label. The model also shows the total number of data values that use the label.

   If the total number of data values is zero, you did not assign the label to any reference data value in the probabilistic model.

Copy and Paste Operations

You can copy a probabilistic model from one content set to another in a Model repository. Copy a probabilistic model to share resources with other Developer tool users.

You can copy a model to another content set, or you can import a model to the current content set. You can import multiple models from multiple content sets in the repository in a single operation.

When you copy a model, the Content Management Service creates a copy of the model data file on the Informatica services host machine. Each model uses a different data file.

Copying a Probabilistic Model to Another Content Set

You can copy a probabilistic model from one content set to another in a Model repository. When you copy a probabilistic model, you specify the model object and the source and destination content sets.

1. Open the content set that contains the probabilistic model.
2. Select a probabilistic model and click **Copy To**.
3. Browse the Model repository and select a content set.

   You can copy the probabilistic model to a content set in the current project or another project.
4. Click **OK**.

   The Developer tool copies the probabilistic model to the selected content set.

Importing a Probabilistic Model from Another Content Set

You can import a probabilistic model from one content set to another in a Model repository. When you import a probabilistic model, you specify one or more model objects and the source and destination content sets.

1. Open the content set to contain the probabilistic model.
2. Select a probabilistic model and click **Paste From**.
3. Browse the Model repository and select a probabilistic model.

   You can paste the probabilistic model from a content set in the current project or another project.
4. Click **OK**.

   The Developer tool pastes the probabilistic model to the current content set.

Copying Reference Data Rows to the Clipboard

You can copy one or more rows of reference data from a probabilistic model to the clipboard. You can paste the rows to another probabilistic model.

1. Open the content set that contains the probabilistic model.
2. Select the model name, and click **Edit**.
3. In the Data view, select one or more rows of reference data.
4. Use the Ctrl + C keys to copy the rows to the clipboard.

   The operation copies the reference data and the label values that you assigned to the reference data.

You can use the Ctrl + V keys to paste the rows to a text editor or to the Data view of another probabilistic model.

APPENDIX A

Reference Data and Informatica Big Data Management

This appendix includes the following topic:

Reference Data and Informatica Big Data Management Overview

Informatica Big Data Management® is a big data solution that combines an Informatica domain and client applications with a Hadoop cluster. You can push a mapping from the Developer tool down to the cluster and run the mapping on the nodes in the cluster.

The pushdown operation copies any reference table data and content set data that the mapping reads to the cluster. After the mapping runs, the cluster deletes the reference data that the pushdown operation copies with the mapping.

The pushdown operation does not copy address validation reference data. If you push a mapping that performs address validation, you must install the address validation reference data files on each DataNode that runs the mapping. The cluster does not delete the address validation reference data files after the address validation mapping runs.

Note: Informatica Big Data Management does not use identity population data files. You cannot run a mapping that performs identity match analysis in a Hadoop cluster.

Reference Data for Address Validation

When you run an address validation mapping in a Hadoop environment, the address reference data files must reside on each DataNode on which the mapping runs. Informatica Big Data Management installs with a shell script that you can use to install the files on the DataNodes.

Use the shell script to install the address reference data files on the DataNodes in a single operation. The script reads a file that contains the names or IP addresses of the nodes. The script copies the address reference data files to each node that the file identifies.

The script name is `copyRefDataToComputeNodes.sh`.

Find the script in the following directory in the Informatica Big Data Management installation:

```
<Informatica installation directory>/tools/dq/av
```

The following table describes the options that the script uses:

Option	Description
-n	The file that contains the list of names or IP addresses of the DataNodes in the Hadoop cluster. Enter each node name or IP address on a separate line in the file. By default, the script reads the file from the `$BASEDIR/HadoopDataNodes` directory, where `$BASEDIR` is the location of the shell script.
-p	A prompt to confirm that you want to install the address reference data files. By default, the script displays a prompt to confirm that you want to copy the files from the source directory to the target directories on the DataNodes. if you run the shell script on a schedule, you can disable the prompt. The default option value is Y. To disable the prompt, set the value to N.
-s	The source directory for the address reference data files that the script copies to the nodes. By default, the script reads the files from the `/reference_data` directory on the local machine. **Note:** Address reference data files use the file name extension .MD. The source directory must contain the address reference data files and no other files.
-t	The directory on each node to which the script copies the address reference data files. By default, the script copies the files to the `/reference_data` directory on each node.
-u	The user name of the user who runs the script. The user must have passwordless secure shell access to the nodes.

Installing the Address Reference Data Files

To install address reference data files on the DataNodes in a Hadoop cluster, run the `copyRefDataToComputeNodes.sh` shell script. Or, define a job to run the shell script in a job scheduler application at time intervals that you specify.

Before you run the script or define the job, review the option values that you specify for the script. You can accept the default values or update the values.

Installing the Address Reference Data Files at the Command Prompt

To install the files at the command prompt, perform the following steps:

1. At the command prompt, open the following directory:
   `<Informatica installation directory>/tools/dq/av`
2. Run `copyRefDataToComputeNodes.sh`.
   Optionally, enter one or more values for the script options. If you do not enter a value for an option, the script runs with the default value for the option.

   By default, the script prompts you to confirm the installation of the files. To install the files, enter Y.

Installing the Address Reference Data Files with a Scheduled Job

You can define a job to run the shell script at time intervals that you specify. Add the job to a job scheduler application. If you define a job to install the files, you must disable the prompt to confirm installation.

To disable the prompt, set the following option on the shell script:

```
-p n
```

INDEX

V