What’s New in SAS Reference Data Manager

Overview

The main enhancements for SAS Reference Data Manager include the following:

• updated user interface
• documentation enhancements

Updated User Interface

The user interface for SAS Reference Data Manager has been rewritten in HTML5. Previously, applications in SAS 9.4, as well as many SAS solutions that are based on SAS 9.3 and SAS 9.4, used the Adobe Flash Player to provide interactive user interfaces. Adobe announced that it intends to end support for Flash technology and will cease to update and distribute the Flash Player at the end of 2020. Browser vendors will disable Flash by default in 2019. For more information about Adobe Flash end-of-life, see SAS Software and Its Use of the Adobe Flash Player.
Accessibility Features of SAS Reference Data Manager

Overview

SAS Reference Data Manager has not been tested for compliance with U.S. Section 508 standards and W3C web content accessibility guidelines. If you have specific questions about the accessibility of SAS products, send them to accessibility@sas.com or call SAS Technical Support.

Documentation Format

Please contact accessibility@sas.com if you need this document in an alternative digital format.
Chapter 1
About SAS Reference Data Manager

Introduction to SAS Reference Data Manager

Overview

SAS Reference Data Manager provides hierarchy and data management capabilities for your organization's reference data. Using SAS Reference Data Manager, you can access a repository to manage important reference data that is used by technical, business, and IT users. This repository can be:

- centrally managed
- versioned (the history and progression of changes to the data can be maintained and managed)
- linked to business terms defined in the Business Data Network component of Web Studio
- exported to external systems

SAS Reference Data Manager consists of the following:

- data jobs deployed as batch jobs and real-time web services that must exist on a Data Management Server
- a repository that is created with a standard unified repository
Reference Data

The term reference data is used in data management to define characteristics of an identifier that are used within other data-centric processes. In contrast to transaction data, which changes second-to-second, reference data is fairly static. It does not change often. Reference data defines an item in ways that can be used by applications for selection, support, or description. Some examples of common reference data are as follows:

- a list of valid gender codes
- a list of valid ZIP codes with their associated cities and states
- a list of product codes
- a list of NASDAQ stock symbols with their associated company names
- a material taxonomy such as the United Nations Standard Products and Services Code (UNSPSC)
- a list of acceptable responses to a survey question

Domains

A related collection of reference data is referred to as a domain. In SAS Reference Data Manager, each domain contains reference data for one set of information, such as colors, clothing sizes, or car manufacturers. SAS Reference Data Manager includes the following three domain types: list, lookup, and hierarchy.

- list domain
  - is a list of items, such as a list of valid state codes or product names. A list domain can be used to populate a selection list within an application or to validate data.

- lookup domain
  - is a list of valid values linked to other values, such as a list of ISO currency codes linked to their associated global currency names. A lookup domain can be used to return a standardized version of a value.

- hierarchy domain
  - is a table of data related in a parent and child fashion, where each data item might have child items. An example is the product lookups on a typical retail website, where you navigate from a high-level category such as “electronics” to lower-level categories such as “computers.” You could then navigate to “laptops,” “manufacturers,” and finally to individual items. A typical hierarchy domain could contain the names of cities in North America, in the United States, in the state of Ohio.

For example, a geographic domain could be any of the following:

- a list domain containing valid state codes
- a lookup domain that maps state codes to their names
- a hierarchy domain that defines the parent-child relationships between regions, states, counties, cities, and ZIP codes
**Items**

Every entry in a domain is referred to as an item. As a minimum, an item has an item key, which is the value of the item. List domains have only item keys. In a list or lookup domain, item keys must be unique. In a hierarchy domain, the item key must be unique only within its parent level. Two parent items in a hierarchy domain can have identical child items, but one parent cannot have "identical twins."

An item can also have an item label, which is a text description of the item key. Lookup domains have both item keys and item labels.

In a hierarchy domain, an item can have a parent, which is the item key of the next-highest item.

**Attributes**

In addition to keys, labels, and parents, items can have any number of associated attributes. An attribute is information that you are storing about an item. For example, a list domain containing valid ZIP codes might use the city, county, and state associated with each ZIP code as attributes. A lookup domain containing two-digit state codes might use the state name as its item label, but might also contain attributes such as the state bird, the year in which the state joined the union, the state motto, or the name of the state's governor.

Within a domain, attributes can be either default or optional. Default attributes are associated with every item that is added to a domain. Optional attributes are selected at the time the item is created.

For example, a list of states might have the state bird, the year in which the state joined the country, and the governor's name as default attributes. Optional attributes might include the state's highest mountain, number of miles of coastline, or tallest lighthouse: items that some states might not have.

Another example is the hierarchy of items sold on a retail website, in which you can drill down from department to item category to item type to an individual item. Each item at each level might have a default description attribute. However, the attributes used to describe a laptop computer are not the same as those used to describe a refrigerator, a pair of shoes, or a suitcase and are therefore optional.

Each attribute can be defined in any number of languages. When you create a domain, you select the languages in which the attributes can be defined. Every attribute that you create within that domain can be expressed in any or all of the selected languages. For example, if you are creating a product hierarchy for a clothing store, a dress might have a 'color' attribute. If the domain is defined with both English and French as possible languages, color can be defined as both 'Blue' and 'Bleu'.

It is possible to create list, lookup, or hierarchy domains without defining languages or attributes. In these cases, the domains consist solely of the item key, item label, and parent key as applicable for each domain type.

**Domain Properties**

You can create any number of reference data domains. Domains can have any number of items, with any number of attributes, in any number of languages. The person who creates a domain is its owner. A domain has the following properties:

- domain name
domain type (which cannot be changed after the domain is created): List (single column) Lookup (two columns) Hierarchy (parent/child)

domain permissions:

• If a domain is public, any SAS Reference Data Manager user can open, search, and edit the domain. If a domain is private, the domain's owner or an administrator can open, search, and edit the domain. The domain does not appear in the domain list for other users.

• An enabled domain is visible and active. A disabled domain cannot be viewed, even by its owner. (Note that SAS Reference Data Manager provides an option for enabling a previously disabled domain.)

• optional and default attributes

• the languages in which attributes can be defined

Domain Versions

Each time you submit changes to a domain, you create a new version of that domain. When you open a domain for editing, you open the most recent version by default. You can also choose to open a previous version. Regardless of whether you open and save a domain from the most recent version or from a previous version, the changes that you make become the new "current" version.

Prerequisites for Using SAS Reference Data Manager

Before you begin, you must complete the following steps in order to work with SAS Reference Data Manager:

• You must be a part of the Reference Data Manager: Administration group or a non-administrator Data Management: Reference Data Manager group to access SAS Reference Data Manager features. This permission is granted by a member of the group that controls access to SAS Reference Data Manager, as described in the Installation and Configuration Guide.

• If you want DataFlux Data Management Studio and DataFlux Data Management Server to consume domains from SAS Reference Data Manager 3.3, see “Optional Configuration Steps for Data Management Platform Integration with Reference Data Manager” in DataFlux Data Management Studio: Installation and Configuration Guide.

SAS Reference Data Manager Interface

Overview

The SAS Reference Data Manager interface consists of a domain list, a toolbar, and a domain edit window.
**Domain List**

The domain list displays the reference data domains that have been created. This includes domains with public access and any private domains depending on your privileges or role. The following types of domains are available:

- **List Domains**
- **Lookup Domains**
- **Hierarchy Domains**

A check mark on the domain icon indicates that the domain is available for editing. A lock icon indicates that the domain is locked. A locked domain is unavailable to all Reference Data Manager users except its owner or an administrator.

By default, disabled domains are not included in the domain list. You can choose to either show or hide disabled domains in the domain list by selecting **Actions ⇒ Hide Disabled.** Disabled domains are marked with a Disabled icon and cannot be edited until they have been enabled.

**Toolbar**

The Reference Data Manager toolbar, which is displayed above the domain list, is highlighted in the following image.
**Actions** - Click **Actions** to display the drop-down menu. You can also access the **Actions** menu by right-clicking any domain in the domain list. You can use the **Actions** menu options to perform the following tasks:

- **Open** - Open a domain.
- **Version History** - Open a previous version of a domain.
- **Import** - Import data from a text file into a domain.
- **Publish** - Publish a domain to a database, a comma-separated values (CSV) file, or a tab-delimited text file.
- **Delete** - Delete a domain.
- **Duplicate** - Create a domain by duplicating the properties of an existing domain. The reference data items in the existing domain are not duplicated.
- **Disable or Enable** - Disable or enable a domain.
- **Hide Disabled** - Show or hide disabled domains in the domain list.
- **Lock or Unlock** - Lock or unlock a domain.
- **Force Unlock** - Unlock a domain that has been locked by another user.

**New Domain** - Click **New Domain** to create a new domain.

**Search** - There are two places to access search. You can search for in the domain list by using the search field. You can also click **Search** in the Reference Data Manager toolbar to access more filter options. For more filter options, click **Filter** to display the following options:

- **Item Type**
- **Domain Name**
- **Version**
- **User**
- **Domain Type**

For more Search options, click **Settings**. Use the check boxes to enable or disable the following search options:

- **Domain options**
- **Search field options**
- **Domain type**
- **Language**
- **Last modified by**
- **Domain**

**Refresh** - Click **Refresh** to refresh the status (locked or unlocked) of domains in the domain list.
Domain Edit Window

When you open a reference data domain, you can view domain items or add, edit, and remove domain items.

• View - Switch the domain editor to View (read-only) mode, enabling you to view domain items. This action unlocks the domain.

• Edit - Switch the domain editor to Edit mode, enabling you to add, edit, and remove domain items and modify attribute values. This action locks the domain.

• Save - Save changes that you have made to a domain. This action creates a new version of the domain.

To close a domain, click Close.

Properties Tab

The properties tab has three tabs that you can use to perform the following tasks.

• **General** - edit the name and description of the domain, change the type, or change the access to either public or private.

• **Attributes** - select or add new attributes to the domain and set them as default.

• **Languages** - select the languages that are used in the domain. The first language is the default. Use the arrow buttons to change the default language.
**Reference Data Tab**

You can use the **Reference Data** tab to perform the following tasks.

- **New Item** - Add a new item to a domain.
- **Item Properties** - Edit a selected item in a domain.
- **Delete Selected Item** - Remove an item from a domain.
- **Publish** - Publish the current open version.
- **Download** - Download the reference data to a CSV or text file.
- **Change Parent** - Move a hierarchy domain item and all of its child items to a new parent item.

You can also change the values and language of the item.
Chapter 2
Installing and Configuring SAS Reference Data Manager

Installing SAS Reference Data Manager

SAS Reference Data Manager is available through SAS delivery channels. See your SAS Software Order Email (SOE) for information about installing SAS Reference Data Manager.

Migrating SAS Reference Data Manager

Premigration Steps

To migrate reference data to the latest version of SAS Reference Data Manager, complete the following steps before you run the migration.

• Install SAS Reference Data Manager and review the instructions.html file. Note that SAS Reference Data Manager 3.3 requires SAS 9.4M6.

• Verify that the SAS Metadata Server is running.

• Verify that you are a member of the SAS Administrators group on the SAS Metadata Server.

• Stop the SASServer 13 running instance.

• Move the JDBC driver JAR file for the database that was used with the version of the SAS Reference Data Manager module of DataFlux Web Studio to the proper location. (Note that some databases might require more than one JAR file.) This step is necessary because the migration code needs JDBC 4 drivers for the appropriate source database to read the data from the old databases. Typically, the JAR file can be found in the installation of the source database. If you are not sure which JAR files to use, ask your database administrator. You can also
search the database vendor’s website. The JAR files must be appropriate for JDBC 4 and Java 6. They must also work with the correct version of your database. You might also need to copy other files, such as license files and ancillary JAR files.

After ensuring that SASServer 13 has been stopped, copy the JAR file (and any other files that are needed) to the lib directory under the SASServer13_1 installation. The path varies by installation but will be similar to C:\SAS\Config\Web\WebAppServer\SASServer13_1\lib.

- Restart SASServer13_1.

**Running the Migration**

To configure and start the migration, go to `yourserver:port/migration/configure`, and enter the appropriate values as described in the following table.

**Table 2.1  SAS Reference Data Manager Migration Fields and Options with Connection to RDM 2.x Database Server**

<table>
<thead>
<tr>
<th>Field or Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of database server</td>
<td>Specifies the databases that were supported by RDM 2.x: SQL Server, Oracle, and DB2.</td>
</tr>
<tr>
<td>Database server host</td>
<td>Specifies the name of the machine hosting the database server instance.</td>
</tr>
<tr>
<td>Database server port</td>
<td>(Optional) Specifies the port to which the database server instance is listening.</td>
</tr>
<tr>
<td>Database name</td>
<td>Specifies the name of the database within the server instance.</td>
</tr>
<tr>
<td>Override generated JDBC URL</td>
<td>The migration configuration generates a JDBC URL to connect to the RDM 2.x database. If a correct URL for the database cannot be generated by the migration code, selecting this check box enables the user to override the generated JDBC URL. This is used in case the user cannot resolve a connection problem.</td>
</tr>
<tr>
<td>JDBC URL to database</td>
<td>When Override generated JDBC URL is not selected, specifies the generated JDBC URL to the database. When Override generated JDBC URL is selected, the text field is editable so that you can enter the JDBC URL to the database.</td>
</tr>
<tr>
<td>RDM 2.x database connection properties</td>
<td>Specifies additional properties needed for connecting to the RDM 2.x database. An example for SQL Server is the instance name: <code>instanceName=SQLSERVER2008</code>.</td>
</tr>
<tr>
<td>Field or Option</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Optional prefix for RDM 2.x tables</td>
<td>Specifies an optional prefix for the tables that can include catalog and schema prefixes. An example is <code>Repository1.RDM_</code>.</td>
</tr>
<tr>
<td>User name for database connection</td>
<td>Specifies the user name for connecting to the database.</td>
</tr>
<tr>
<td>Password for database connection</td>
<td>Specifies the password for connecting to the database.</td>
</tr>
<tr>
<td>Run</td>
<td>Runs the migration.</td>
</tr>
</tbody>
</table>

**Troubleshooting**

If the migration fails, the generated JDBC URL might be incorrect for your configuration. Select **Override generated JDBC URL** and supply your own JDBC URL.
Chapter 3
Working with Domains

Creating Domains

To create a new reference data domain and specify its structure, perform these steps.

1. Click New domain.

2. Use the Properties tab to perform the following actions:
   - Select the General tab to specify the domain name, description, type, and access.
   - Select the Attributes tab to create and select attributes for use in the domain.
   - Select the Languages tab to select the languages in which item attributes in the domain can be defined. One domain language must be available. The first in the selected list is the default language.

3. To save your changes, click Save.
Specifying Domain Properties

To specify reference data domain properties, perform the following steps.

This task assumes that you are creating a new domain and specifying its properties. You can also edit the properties of an existing domain. For instructions, see “Editing Domain Properties” on page 19.

1. In the New Domain window, select the General tab.
2. On the General tab, specify the following domain properties:
   - In the Name field, enter a name for the domain (such as OhioCityGeo). Domain names can contain up to 100 characters and must be unique.
     Note: The domain name cannot be changed after the domain has been created.
   - In the Description field, enter a description for the domain. Domain descriptions can contain up to 1,000 characters. Enter Ohio City Geocodes for this example.
   - From the Type drop-down menu, select the domain type (List, Lookup, or Hierarchy). Select Hierarchy for this example. Note: The domain type cannot be changed after the domain has been created.
   - In the Access section, select Private or Public. If a domain is public, any SAS Reference Data Manager user can open, search, and edit the domain. If a domain is private, the owner or an administrator can open, search, and edit the domain. The domain does not appear in the domain list for other users.
3. Click Save. Click Close to return to the Domain List.

Creating and Selecting Attributes

To create new attributes and select them for use in a reference data domain, perform the following steps.

Note: This task assumes that you are creating a new domain and selecting attributes for use in the domain. You can also add attributes to an existing domain. For instructions, see “Editing Domain Properties” on page 19.

1. In the New Domain window, select the Attributes tab.
2. On the Attributes tab, click Add Attribute to display the Add Attribute window.
3. In the Add Attribute window, enter the following:
   - In the Name field, enter a name for the attribute. Attribute names such as Latitude can contain up to 100 characters and must be unique.
   - (Optional) In the Description field, enter a description for the attribute. Attribute descriptions can contain up to 1,000 characters. Enter Latitude value for this example.
4. Click OK to save the changes. The new attribute is displayed in the Available Attributes list on the Attributes tab.
5. To add more attributes, repeat steps 2 through 4.
6. To select attributes for use in the domain, use any of the following methods. Note you can also hold down the Ctrl key and click or hold down the Shift key and click multiple items. When you add a new default attribute, it is added to every item that is subsequently added to the domain. When you add a new optional attribute, it
becomes available for selection when adding new domain items, and can be added to existing domain items. For more information, see “Adding, Editing, and Removing Domain Items” on page 26.

- Right-click and select either: Add items to list: Domain attributes, or Add items to list: Domain default attributes.
- Select the attribute in the Available Attributes list, and click Add or Add all to move it to the Domain Attributes list or the Domain default attributes list.

7. To remove an attribute or attributes from the domain, use any of the following methods:
   - Double-click the attribute in the Domain Attributes list to move it to the Available Attributes list.
   - Select the attribute in the Domain Attributes list, and click Remove to move it to the Available Attributes list. Note you can also hold down the Ctrl key and click or hold down the Shift key and click multiple items.
   - To select all the attributes in the Domain Attributes list and move them to the Available Attributes list, click Remove All.

Select the Latitude, Longitude, and Match Code attributes for this example.

8. To save the changes, click Save.

**Selecting Attribute Languages**

The default language for item attributes in a reference data domain is English. To select additional languages or to designate a different default language, perform the following steps.

*Note:* This task assumes that you are creating a new domain and selecting languages for use in the domain. You can also add languages to an existing domain or change an existing domain’s default language. For instructions, see “Editing Domain Properties” on page 19.

1. In the New Domain window, on the Properties tab, select Languages.

2. On the Languages tab, the English (EN) language is displayed in the Domain Languages list by default. To select additional languages for the domain, use any of the following methods:
   - Double-click a language in the Available Languages list to move it to the Domain Languages list.
   - Highlight a language in the Available Languages list, and click Add to move it to the Domain Languages list.
   - To select all the languages in the Available Languages list and move them to the Domain Languages list, click Add All.

3. The default language is the language that is selected in the attributes panel when a domain is opened for editing new items. The default language for a new reference data domain is English (EN). The language at the top of the list is the default. To select a different default language, use the arrow buttons to move the desired language to the top of the Domain languages list.

4. To remove languages from the domain, use any of the following methods:
   - Double-click a language in the Domain Languages list to move it to the Available Languages list.
Duplicating Domains

You can create a new reference data domain using the structure of an existing domain. When you duplicate a domain, the new domain has the same type, attributes, and languages as the original domain, but contains no items.

1. Select the domain in the domain list.
2. Click Actions ⇒ Duplicate to display the Duplicate Domain window.
3. In the Duplicate Domain window, enter the following:
   a. In the Name field, enter a name for the domain. Domain names can contain up to 100 characters and must be unique. Enter Duplicate of States for this example.
   b. (Optional) In the Description field, enter a description for the domain. Domain descriptions can contain up to 1,000 characters. Enter State codes for this example.
   c. Select either Public or Private access.
4. Click OK to save the changes and close the Duplicate Domain window. The domain name is displayed in the domain list.

Opening Domains

To open a reference data domain, use one of the following methods:

- Double-click the domain in the domain list.
- Click the domain in the domain list, and click Actions ⇒ Open.
- Right-click the domain, and select Open.

By default, the most recent version of the domain is opened. The version number appears in parentheses after the domain name (for example, "TheDomainName (2.0)"). You can also open a previous domain version.

When you open a domain, it is initially opened in View (read-only) mode, enabling you to view domain items. To switch to Edit mode, click Edit. In Edit mode, you can add, edit, and remove domain items and modify attribute values. You can also edit the domain properties, such as attributes and languages.
When you open a domain and choose to edit it, the domain is locked and is marked with a lock icon.

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**Opening Previous Domain Versions**

When you open a reference data domain, the most recent version of the domain is opened by default. To open a previous domain version, perform the following steps.

You can have multiple versions of a domain open at the same time, but only one version can be locked for editing at any time.

1. Select the domain in the domain list.
2. Click **Actions** → **Version history** to display the Open Version window.
3. In the Open Version window, select the domain version that you want to open, and click **OK**. You can also select **See all versions** to display major and minor versions.

The selected domain version is opened in a domain editor. The version number is displayed in parentheses after the domain name on the domain editor tab [for example, "(2.0)"].

When you open a domain, it is initially opened in View (read-only) mode, enabling you to view domain items. To switch to Edit mode, click **Edit** on the domain editor toolbar.

In Edit mode, you can add, edit, and remove domain items and modify attribute values.

When you open a domain and choose to edit it, the domain is locked and is marked with a lock icon.

---

**Editing Domain Properties**

To edit the properties of a reference data domain, perform the following steps.

*Note:* You cannot edit the properties of a domain that is locked for editing. Before editing a domain's properties, ensure that the domain is not locked.

1. Open the domain.
2. Click **Edit**.
3. Select the **Properties** tab.
   - On the **General** tab, you can update the description and change the access of the domain to either public or private.
     *Note:* You cannot change the name or type of an existing domain.
   - On the **Attributes** tab, you can add or remove attributes, or create new attributes. When you add an attribute to a domain for which items are already defined, the new attribute is not automatically added to the existing items. However, the new attribute is automatically added to new items, and can be designated as either a default or optional attribute. When you remove an attribute from a domain, the attribute is removed from all items in the domain.

You can change existing attributes from default to optional, or from optional to default. When you change an attribute from default to optional, the attribute continues to be associated with existing domain items, but is not automatically
associated with new items. When you change an attribute from optional to default, the attribute is associated with all new domain items, but not with existing items.

- On the **Languages** tab, you can do the following. The steps for performing these tasks are the same as those described in “Creating Domains” on page 15.
  - Add languages.
  - Remove existing languages.

  *Note:* At least one language must be selected.

  - Select a new default language. The default language is the first language in the list. To change the default language, select the first language in the list and use the arrows to change the order.

4. Click **Close** to save the changes and return to the **Domains** list.

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**Disabling and Enabling Domains**

When a domain is disabled, it is unavailable to all SAS Reference Data Manager users, including its owner. To disable or enable a domain, you must be the owner of the domain or an administrator. You cannot disable or enable a domain that is locked for editing.

- To disable a domain, do the following:
  1. Select the domain in the domain list.
  2. Click **Actions** \(\Rightarrow\) **Disable**.
  3. In the confirmation window, click **Disable** to confirm that you want to disable the domain.
  4. The disabled domain no longer is displayed in the domain list. If you want to display the disabled domain in the domain list, click **Actions**. Deselect **Hide disabled**. The disabled domain is displayed in the domain list but is marked with a disabled icon and cannot be opened for editing.

- To enable a domain, do the following:
  1. Click **Actions**. Deselect **Hide disabled** to show the disabled domain in the domain list.
  2. Select the disabled domain in the domain list.
  3. Click **Actions** \(\Rightarrow\) **Enable**. The domain is no longer marked with a disabled icon, and can be opened for editing.

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**Locking and Unlocking Domains**

When you open a domain and choose to edit it, the domain is locked and is marked with a lock icon in the domain list. A locked domain is unavailable to all SAS Reference Data Manager users except the current user. When you save your changes and close the domain, the domain is unlocked.

You can also lock a domain without choosing to edit it.
To lock a domain, select the domain in the domain list, and click Actions ⇒ Lock.

To unlock a previously locked domain, select the domain in the domain list, and click Actions ⇒ Unlock.

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**Publishing Domains**

In addition to managing reference data, your organization might need to use the reference data in other systems or locations. By publishing a domain, you can manually or automatically push domain changes as needed based on domain and downstream requirements.

**Publication Outputs**

**Database Publications**

Publishing a domain to a database creates the following database tables:

- `domain_name`_[version]_DM - Domain
- `domain_name`_[version]_IT - Items
- `domain_name`_[version]_AT - Attributes
- `domain_name`_[version]_AV - Attribute values

where `domain_name` is the domain name (truncated to 23 characters), and `version` is the domain version being published. If you are publishing the most recent version of the domain, the table names do not contain the version number.

The table layouts are as follows.

**Table 3.1 DM (Domain) Table Layout**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOMAIN_NAME</td>
<td>Domain name</td>
<td>C</td>
</tr>
<tr>
<td>DOMAIN_DESC</td>
<td>Domain description</td>
<td>C</td>
</tr>
<tr>
<td>DOMAIN_VERSION</td>
<td>Domain version published</td>
<td>N</td>
</tr>
<tr>
<td>DOMAIN_TYPE</td>
<td>Domain type (List, Lookup, Hier)</td>
<td>C</td>
</tr>
<tr>
<td>DOMAIN_SCOPE</td>
<td>P-Public, S-Private</td>
<td>C</td>
</tr>
<tr>
<td>DOMAIN_ENABLED</td>
<td>Was domain enabled at the time it was published (Y/N)</td>
<td>C</td>
</tr>
<tr>
<td>PUBLISH_DATE</td>
<td>Date and time of publication</td>
<td>D</td>
</tr>
</tbody>
</table>
Table 3.2 IT (Items) Table Layout

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM_ID</td>
<td>Internal item identifier</td>
<td>N</td>
</tr>
<tr>
<td>ITEM_KEY</td>
<td>Item's ITEM KEY value</td>
<td>C</td>
</tr>
<tr>
<td>ITEM_VALUE</td>
<td>Item's ITEM_LABEL value</td>
<td>C</td>
</tr>
<tr>
<td>PARENT_ID</td>
<td>ITEM_ID of this item's parent</td>
<td>N</td>
</tr>
</tbody>
</table>

Table 3.3 AT (Attributes) Table Layout

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTRIBUTE_ID</td>
<td>Internal attribute identifier</td>
<td>N</td>
</tr>
<tr>
<td>ATTRIBUTE_NAME</td>
<td>Attribute name</td>
<td>C</td>
</tr>
<tr>
<td>ATTRIBUTE_DESC</td>
<td>Attribute description</td>
<td>C</td>
</tr>
</tbody>
</table>

Table 3.4 AV (Attribute Values) Table Layout

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM_ID</td>
<td>Internal item identifier</td>
<td>N</td>
</tr>
<tr>
<td>ATTRIBUTE_ID</td>
<td>Internal attribute identifier</td>
<td>N</td>
</tr>
<tr>
<td>ATTRIBUTE_VALUE</td>
<td>Attribute value</td>
<td>C</td>
</tr>
<tr>
<td>LANGUAGE_NAME</td>
<td>Language in which attribute is expressed</td>
<td>C</td>
</tr>
<tr>
<td>LANGUAGE_CODE</td>
<td>Language code</td>
<td>C</td>
</tr>
</tbody>
</table>

CSV or Text File Publications

Publishing a domain to a .csv file or a tab-delimited text file creates the following four files in the following directory: \[DMServer\]\var\batch_jobs\ReferenceData\publish. If this directory does not already exist, it is created during the publication process.

- [domain_name]_[version]_DM.[ext] - Domain
- [domain_name]_[version]_IT.[ext] - Items
- [domain_name]_[version]_AT.[ext] - Attributes
- [domain_name]_[version]_AV.[ext] - Attribute values
where [domain_name] is the domain name (truncated to 23 characters), [version] is the domain version being published, and [ext] is the file extension (.csv or .txt). If you are publishing the most recent version of the domain, the filenames do not contain the version number. Note that if the .csv format file contains Latin2 characters, it cannot display properly in Microsoft Excel. Instead, review the file in a text editor such as Notepad.

**Publishing Procedure**

To publish a reference data domain, perform the following steps:

1. Select the domain in the domain list.
2. Click **Actions** ⇒ **Publish**. The Publish window is displayed. The Publish window shows the version, description, and published state of the selected domain.
3. Select the version to be published. Click **OK**. The selected version of the domain is published and the Domain list is displayed.

**Deleting Domains**

To delete a reference data domain, perform the following steps. To delete a domain, you must be the owner of the domain or an administrator. You cannot delete a domain that is locked for editing. Deleting a domain is permanent and cannot be undone.

1. Select the domain in the domain list.
2. Click **Actions** ⇒ **Delete**.
3. Click **Delete** to confirm that you want to delete the domain. The domain is deleted from the SAS Reference Data Manager repository and is no longer displayed in the domain list.
Chapter 4
Working with Domain Items

Viewing Domain Items

To view items in a reference data domain, perform the following steps.

1. To open the domain, click the domain to select it. Click Actions ➤ Open. By default, the domain is opened in View mode.

2. On the Reference Data tab, select the item that you want to view. The attributes that are associated with the item are displayed in the Values panel.

3. If you have selected more than one language for the domain, you can view attribute values in one of the other languages. Select the desired language from the Language drop-down menu. The attribute values are displayed in the selected language.

4. For list domains, a filter field at the top of the Item Key column enables you to locate domain items. Only the items that begin with the character that you enter in the filter fields are displayed. The filters are case-insensitive. To clear a filter field and remove the filtering from the item list, click x.

Hierarchy domains are displayed in a tree view. In this view, you can expand or collapse items by selecting the arrow or by clicking Expand all and Collapse all.

Clicking the arrow on an item expands one level. To expand all items an additional level, click Expand all. To view the highest level only, click Collapse all.
Adding, Editing, and Removing Domain Items

Adding Domain Items

To add items to a reference data domain, perform the following steps:

1. Open the domain.

2. The domain is initially opened in view (read-only) mode. Switch to Edit mode by clicking Edit.

3. Click New Item.

   Note: the fields in this dialog box are different depending on the domain type that you are working with.

4. Enter the following in the New Item window:
   a. Enter the desired item key in the Item key field. Enter Raleigh as the item key.
      
      Note: The item key is required and must be unique.
   
   b. (Optional, lookup and hierarchy domains only) Enter the desired item label in the Item Label field.

   c. (Hierarchy domains only) If you are adding a top-level parent item, clear the Add as child to check box. By default, when you add a child item, its parent item is the item that was selected when you clicked New Item. In this case, North Carolina (NC) has been populated into the field. If you are adding a child item and you have not selected a parent item, or if you want to select a different parent item, select the Add as child to check box. Click Browse to display the Select Parent window. Select the desired parent item and click OK to save the changes and return to the New Item window.

   d. In the Select Attributes to add list, select the attributes for the new item by selecting the check boxes next to the attribute names. Select Population and Square Miles for this example.

      Note: Attributes that were designated as default attributes when the domain was created are automatically selected. See Creating and Selecting Attributes in “Creating Domains” on page 15.

5. Click OK to save the changes and close the New Item window.

Editing Domain Items

To edit items in a reference data domain, perform the following steps:

1. Open the domain.

2. The domain is initially opened in View (read-only) mode. Switch to Edit mode by clicking Edit.

3. To edit an item's properties, do the following:
   a. Select the Reference Data tab.
   
   b. Select an item to edit.
c. Click **Item Properties**.

d. In the Properties window, you can change the item key and item label. You can also add attributes to the item by selecting the check boxes next to the attribute names (such as Largest City, Population, and Square Miles). In hierarchy domains, you can select the **Cascade** check box to add an attribute to the item being edited and to all of its child items.

*Note:* The **Cascade** check box is displayed only if the item that you are editing has child items.

e. Click **OK** to save the changes and close the Properties window.

4. (Hierarchy domains only) You can change a child item to a parent item, move a child item to a different parent item, or change a parent to a child item. Do the following:

   a. Select the item, and click **Change Parent** to display the Change Parent window.

   b. To change the selected child item to a parent item, select **No parent**.

   c. To designate a different parent item for the child item, click **Change Parent** and select the desired parent item (such as North Carolina). Note that this moves the child item and all of its child items (if any) to the new parent item.

   d. Click **OK** to save the changes and close the Change Parent window.

5. To edit an item's attribute values, do the following:

   a. Select the item. The item's attributes are displayed in the Attributes panel.

   b. Edit the attribute values by entering them into the fields on the attributes panel.

   *Note:* If you have selected more than one language for the domain, you can edit attribute values in one of the other languages. Select the desired language (such as English) from the **Language** drop-down menu at the top of the attributes panel.

---

**Removing Domain Items**

To remove items from a reference data domain, perform the following steps:

1. Open the domain.

2. The domain is initially opened in View (read-only) mode. Switch to Edit mode by clicking **Edit**.

3. Select the item that you want to remove, and click **Delete**.

---

**Importing Domain Items**

**Import File Requirements**

You can import items into a reference data domain from a comma-separated values (CSV) or delimited text file with a header row. The domain can be empty or can contain existing items.

Importing items into a reference data domain automatically creates a new version of the domain.
Before you can import items into a reference data domain, the domain must already exist and must contain all the attributes and languages that you are importing. For instructions for creating a reference data domain, see “Creating Domains” on page 15.

The delimiter can be any character. You can select Other for any other delimiter.

There is no file size limitation for the DataFlux Data Management Server. However, your application server (for example, Tomcat) can limit the size of files. Also, the memory that is available to the client (web browser) can be a limiting factor. If you encounter any issues related to file size limitation, you must increase the maximum heap size setting for your application server. For instructions, refer to your application server’s documentation.

If you are importing into a list domain, the only required field in the import file is the Value.

If you are importing into a lookup domain, the import file must have two columns to be used as the Value and Label in the domain.

If you are importing into a hierarchy domain, each row in the import file must contain a Value, a Label, and a field that defines that row’s Parent. (Top-level items have blank parent fields.) There are two ways to define a parent:

- The Parent Key field can contain the Item Key of the parent row.

Here is an example of an import file that uses the Item Key as the parent. The Parent Key column contains the Value for the row’s parent.

*Table 4.1 Input File with the Item Key as Parent*

<table>
<thead>
<tr>
<th>Item Key</th>
<th>Item Label</th>
<th>Parent Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>North America</td>
<td></td>
</tr>
<tr>
<td>NA-US</td>
<td>United States of America</td>
<td>NA</td>
</tr>
<tr>
<td>NA-US-NC</td>
<td>North Carolina</td>
<td>NA-US</td>
</tr>
<tr>
<td>NA-US-NC-183</td>
<td>Wake County</td>
<td>NA-US-NC</td>
</tr>
</tbody>
</table>

- The import file can contain a separate Parent ID field, and the Parent Key refers to the Parent ID. The Parent ID field is a unique identifier for the row of data. It can be either numeric or character, but it must be unique for each row.

Here is an example of an import file that uses a Key field. In this case, the Parent Key value refers to the Parent ID field. These fields are used to determine the parent-child relationship during import, but they are not retained in the imported domain.

*Table 4.2 Input File That Uses a Key Field*

<table>
<thead>
<tr>
<th>Parent ID</th>
<th>Item Key</th>
<th>Item Label</th>
<th>Parent Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NA</td>
<td>North America</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>NA-US</td>
<td>United States of America</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>NA-US-NC</td>
<td>North Carolina</td>
<td>2</td>
</tr>
</tbody>
</table>
Attributes

The items in the domain into which you are importing can contain attributes, and attributes can be presented in any language that is defined for the domain. In the import file, the attributes associated with an item should be on the same row as the item. If using multiple languages, there should be one column for each attribute language pair.

Note: It is not required that every import file contain values, or columns, for every attribute and language pair. Blank attributes are not imported, and attributes with no corresponding column in the import file will not be defined. This procedure applies even to default attributes. Therefore, the default attributes are not defined for an item after import when it does not have a value in the import file.

The Value column must be unique for each record. If an import encounters a Value that already exists in the domain, the following occurs:

- The label and attributes are updated with any non-blank values provided in the import.
- New attributes that are defined in the import are added.

Import Processing

This section explains the processing that occurs during the first import and subsequent imports into a domain.

First Import

If the import file contains multiple records for an item key (or item key and parent key combination), the following occurs:

- The item label is taken from the first occurrence in the import file, including blank first occurrences.
- Attribute values are taken from any record for that item key, using the first non-blank occurrence of each attribute value in the import file.

For example, if the import file is as follows, the highlighted values are selected.

Table 4.3 Example of Import File with Highlighted Values

<table>
<thead>
<tr>
<th>Item Key</th>
<th>Item Label</th>
<th>Attribute 1 - Employees</th>
<th>Attribute 2 - State</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF</td>
<td>DataFlux</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>DF</td>
<td></td>
<td>165</td>
<td>NC</td>
</tr>
<tr>
<td>SAS</td>
<td></td>
<td></td>
<td>NC</td>
</tr>
<tr>
<td>SAS</td>
<td>SAS Institute, Inc</td>
<td>9000</td>
<td></td>
</tr>
</tbody>
</table>
For hierarchy domains, if an item key appears under multiple parent keys, it is added to each parent.

If an item key is listed with a parent key that is not in the import file, it is added at the root level.

If the import file contains multiple legal instances of an item key and parent combination, you must use a Parent ID to identify the relationship. Otherwise, all instances are rolled up to the first appearance of the item key in the import file.

**Subsequent Imports**

Subsequent imports either add new items or update existing items. Items are never deleted or moved.

If you import an item that does not currently exist, it is handled as if it were the first import.

If you import an item that already exists, the following occurs:

- The existing record is updated with the new item label, even if that label is blank.
- Existing attributes are updated with any non-blank incoming data.
- Attributes are added to items if and only if a value is supplied.

If an item key is listed with a parent key that is not in the import file, it is added at the root level, even if the parent key already exists in the domain. For hierarchy imports, all parents should exist in the import file.

**Specific Scenarios**

<table>
<thead>
<tr>
<th>Action</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add new item</td>
<td>New item added as in a first import.</td>
</tr>
<tr>
<td>Remove item</td>
<td>Invalid (action cannot be done in an import).</td>
</tr>
<tr>
<td>Add new attribute to domain and import new values</td>
<td>New attribute values are added to existing items.</td>
</tr>
<tr>
<td>Change attribute value to blank</td>
<td>Blank attribute values do not overwrite existing values.</td>
</tr>
<tr>
<td>Change blank attribute to a value</td>
<td>Change is made.</td>
</tr>
<tr>
<td>Change attribute value to a new value</td>
<td>Change is made.</td>
</tr>
<tr>
<td>Change blank label to value (lookup or hierarchy domain)</td>
<td>Label is changed to new value.</td>
</tr>
<tr>
<td>Change label value to blank (lookup or hierarchy domain)</td>
<td>Label is changed to blank value.</td>
</tr>
<tr>
<td>Change label value to new value (lookup or hierarchy domain)</td>
<td>Label is changed to new value.</td>
</tr>
</tbody>
</table>
Delete attribute | Invalid (action cannot be done in an import).
---|---
Default attribute not represented in file | Attribute is not added to any items.
Optional attribute not represented in file | Attribute is not added to any items.
Default attribute represented in file | Attribute is added to the item if it has a value.
Optional attribute represented in file | Attribute is added to the item if it has a value.
Change parent value to blank (hierarchy domain) | New item is created at root level; existing item is not deleted.
Change blank parent to value (hierarchy domain) | Item remains at root level, and new item is created under the new parent.
Change parent value to new value (hierarchy domain) | New item is created under new parent; existing item is not deleted.

**Import Procedure**

To import items into a reference data domain, perform the following steps.

*Note:* You cannot import items into a domain that is locked for editing. Before importing items into a domain, you must close the domain.

1. Select the domain in the domain list.
2. Click **Actions** ⇒ **Import** to display the Import window.
3. Select the import file, text qualifier, and field delimiter.
   - Click **Browse** to browse and select the desired import file (such as `RDM_GeocodeOHImport_MC.TXT`).
   - From the **Text qualifier** drop-down menu, select the text qualifier (None, Single quotation, or Double quotation) that is used in the import file. Select **Double quotation** for this example.
   - From the **Field delimiter** drop-down menu, select the field delimiter character that is used in the import file (Comma, Tab, Space, Semicolon, or Other). If you select **Other**, enter the delimiter character in the adjacent text entry field. Select **Comma** for this example.
4. Click **Finish** to continue. You can map the fields in the import data to the ways in which they are to be used within the domain.

The File Preview panel displays the first 100 records from the import file. This enables you to verify that you have selected the correct file and file parameters on the previous wizard page.

The File Column column contains the list of fields in the import file. The Domain Field column enables you to choose how each incoming column is used in the imported domain.

If you are importing into a hierarchy domain, the **This data contains a key for parent identification** check box is displayed. If your incoming data uses the parent's item key to identify each item's parent, you should clear this check box.
incoming data uses some other key value to identify the parent, you should select this check box and select the appropriate key values in the Domain Field column.

The Domain Field values are as follows:

• ITEM_KEY - The key value for the item. (All domain types.) For example, this value could be VALUE.

• ITEM_LABEL - The label for the item. (Lookup and hierarchy domain types only.) This value could be DISPLAY_VALUE.

• PARENT_KEY - The value on each item that specifies its parent. (Hierarchy domain types only.) This value could be PARENT_VALUE.

• PARENT_ID - The ID value on each row used to refer to this row as a parent. (Hierarchy domain types only. Available only if the This data contains a key for parent identification check box is selected.)

• [Attribute (Language)] - One selection appears for each combination of attribute and language. Associate each selection with the column containing that attribute in that language. Your attributes could include values such as LATITUDE, LONGITUDE, and MATCHCODE.

5. Click Next to continue. The domain is created from the import file. The Item Preview panel on the next page of the Import window displays the first 500 rows of the file. The import can take a minute, depending on your data.

The Warnings area (not shown here) at the bottom of the Item Preview panel returns any messages generated by the consistency check of the import file. Here are examples:

• 'You have x instances of duplicate Item Key values. If you continue, they will be consolidated into a single item.'

• 'You have x records with invalid Parent Key values. If you continue, those items will be placed at the root level.'

• 'You have x records with missing Item Key values. Item keys cannot be blank, so these records will be ignored.'

6. Click Finish to proceed with the import. A progress indicator appears next to the domain name in the domain list while the import is being performed.

Note: You can continue to work in other SAS Reference Data Manager domains, or in other Web Studio components, while the import is in progress.

7. When the import is complete, a confirmation message is displayed. Click Yes if you want to open the domain.

---

**Searching for Domain Items**

The Search capability enables you to find domains or items containing data values that match specified criteria. You can quickly find specific item key, item label, or attribute values within a domain or across multiple domains.

To search for items in a reference data domain, perform the following steps:

1. Click Search.

2. Enter a search term in the text entry field. Press Enter or click the Search button to the right of the text entry field. The search results are displayed in a table.
3. The search results table contains the following columns:
   - Value - The search result value.
   - Item Type - The search result type, which can be any of the following:
     - Attribute Description
     - Attribute Name
     - Domain Description
     - Item Key
     - Item Value
     - Domain Name
     - Version Description
     - Item Attribute Value
   - Version - The version number of the domain in which the search term was found.
   - Date Modified - The "last modified" date/time of the domain in which the search term was found.
   - User - The user ID of the user who last modified the domain in which the search term was found.
   - Domain Name - The name of the domain in which the search term was found.
   - Domain Type - The type of domain: hierarchy, list, or lookup.

For terms that are unique to an item (Item Key, Item Label, and Attribute Value), each record is returned individually. For terms that are common across many items (Attribute Name and Attribute Description), each term is shown only once, and the Version column indicates how many times each term appeared.

To change the order in which the columns in the search results table are displayed, click and drag the column headings to the desired positions.

To resize columns, click and drag the column dividers or right-click the column heading and select **Resize**.

To sort columns in ascending or descending order, click the column headings or right-click the column heading and select **Sort**. You can sort with the following options:
   - Add to sort (ascending)
   - Add to sort (descending)
   - Sort (ascending)
   - Sort (descending)
   - Remove sort

To freeze a column, right-click and select **Freeze**.

4. To clear the search term and search results, click the **Clear** button on the right side of the text entry field.

5. To further refine or filter the results, you can perform an advanced search. Click **Search Options** to open the Search Options window with the following filters.

   **Note:** All filters are populated when you invoke a search. To update the filters, open a new search window.
Domain Options
- Current domain versions only
- Private domains only

Search field options
- All
- Domain name
- Domain description
- Version description
- Item key
- Item label
- Attribute name
- Attribute description
- Item attribute value

Domain type
- All
- Hierarchy
- List
- Lookup

Language: all languages that you have selected.

Last modified by: any applicable user or administrator.

Domain: any domain from the domain list.

6. To go directly to a found domain from the search results, select the item in the table and click Open.
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