Custom Reference Data Tables

Custom Reference Data Tables Overview

In Cisco Policy Suite, reference data is considered information that is needed to operate the policy engine, but not used for evaluating policies. For example, under the Reference Data tab in Policy Builder, are the forms used to define systems, clusters, and instances, and to set times and dates used for tariff switching. The policy engine needs to refer to these data only to process policies correctly, but they do not define the policy itself.

Custom reference data is considered reference data that is specific to a service provider, perhaps the names and characteristics of their networks or cell sites.

Such custom reference data is stored in the data structure of a table, with the columns and field attributes defined by the service provider for their specific use. The Policy Builder interface does not provide screens for such customized information because it would be so limiting.

Rather, in Cisco Policy Suite, custom reference data tables provide a way for service providers to create their own data tables and to populate them.

The resulting custom reference data tables can then be used within Policy Builder as criteria to use when escalating policy decisions.

Two interfaces are used to construct and populate custom reference data tables:

- Policy Builder 8.0.0 or greater

  Data table structures are managed in Policy Builder.

- Control Center 3.6 or greater, either the full admin or read only privileges

  Data table content is managed in Control Center.

The information in custom reference data tables handles special considerations such as these:

- Specialty area codes.

- A list of device parameters.

- Location data mapping, to map network sites and cell sites into the subscriber's home network, roaming network, or preferred roaming network.

- IMEI data tagging for smart phone, Apple, or Android device, and then use of that in policies.

Custom reference data tables allow the service provider to create their own data structures and populate them with your own proprietary data.

The data in the tables is then used during policy evaluation.

You can construct your reference data tables yourself, or Cisco may build them for you after installation. If you need any help with custom reference data tables, call your Cisco technical representative.

Concepts for Custom Reference Data Tables

- The Policy Builder interface creates and edits the custom reference data table structure, defines its columns, and defines the data type, ranges and size of the fields.

- Control Center reflects the custom reference data tables constructed in Policy Builder.

- You provide data content to the custom reference data tables in Control Center.

- Spreadsheets can be imported into a custom reference data table structure. Log in to the Control Center interface to do so.

- A key icon is displayed before the column name of the selected CRD tables. This provides the following information:

  - Indicates whether the column in the selected CRD table is a key column or non-key column.

  - Indicates the type of Runtime Binding and its value in a tooltip when you hover over it.

When constructing the custom reference data table in the Policy Builder, look at the spreadsheet you want to import later and use the same column names, data types and other attributes.

Steps and Procedures

- Use Custom Reference Table with Policy Builder.

  These steps need only be completed once and may already be completed.

- Use Custom Reference Table with Control Center.

  These steps need to be completed for every custom reference data table you want to create or edit.

Policy Builder: Constructing Custom Reference Data Tables

There are two tasks needed to create custom reference data tables:

- Setting Up the System Plug-in Configuration
- Creating or Editing a Custom Reference Data Table

Set Up the System Plug-in Configuration

You only have to do this one time for each system, cluster, or instance. Then you can create as many tables as needed. The steps below configure an example system.

Before You Begin

Before you can create a custom reference data table, configure your system to use the Custom Reference Data Table plug-in configuration.

Step 1 Log in to Policy Builder and click **Reference Data tab** > **Systems node** > **the system of your choice** > **Plugin Configurations**.

Step 2 Click **Custom Reference Data Configuration** in the main pane.
The tree on the left is populated with the configuration.

Step 3 Fill in the Custom Reference Data Configuration screen that appears.

Field	Description
Primary Database IP	This is the IP of the sessionMgr database.
Secondary Database IP	Optional, this field is the IP address of a secondary, backup, or failover sessionMgr database.
Port	This is the port number of the sessionMgr. It should be the same for both the primary and secondary databases.

Step 4 Go on to create data table structures as described at Create or Edit a Custom Reference Data Table, on page 4.

Create or Edit a Custom Reference Data Table

Before You Begin

Before you begin, be sure that you have configured the plug-in as described in Setting Up the System Plug-in Configuration. Click **Reference Data** > **Systems** > **Plugin Configuration** and make sure you see the Custom Reference Data Config in the tree.

Step 1   In Policy Builder, click **Reference Data** > **Custom Reference Data Tables node**.

Step 2   To create a new data table, click **Summary** > **Custom Reference Data Tables link** in the main pane.

Step 3   To edit a table, click a table name in the tree.

A String	A Long	A Double	A Bool...	A Table...	A Valid...	A Date	A Reg Ex	add
6	111999	111142.04	☐					
13	1121	3331.0...	☐				4A3	
141	213123...	13.011	☑	5string...	Value 3	03/23/2...	212	
3ddd	1312334	3	☐	s1	Value 2		12	
000000	44446	111142.04	☐					
090000	3	21	☐	s1	Value 2		12	

Note   Simply editing the name of a table results in a loss of the table. If you want to change a table name, make a copy first, and then change the name of the copy. No data is in the newly copied table but you have the new name.

Step 4   Fill in the Data Table screen that appears.

Step 5   The example shows the columns defined for a table called Countries.

Field	Description
Name	Here, Name is the internal name for the column. Best practice is to name the column so that it is recognizable as a key.
Display Name	This is the table name as you want it to display in Control Center.
Type	This is the data type of the column, that is: • Date, month day and year • Date and time. A valid date is from 1900 to 2099. • Decimal, for decimal or currency • Number, or integer • Text • True / False as Boolean

Field	Description
Key	If checked, it specifies that each row in the table must be unique. If unchecked, when
	entering data in Control Center the admin receives an error message.
	Note that several columns can contribute to the whole key.
	Best practice is to name the column so that it is recognizable as a key.
Is Required	If checked, this box forces the Control Center admin to enter some value when populating data in the table.
Columns Area	You must change the first row to enable fields in the rest of the screen.

Step 6 Click on a row in the Columns definition table at the top, and access the fields on the bottom, working your way through all of the column names listed.
In the example, at the top, the row selected is the column called Continent, a key and required data. In the Valid Values area, only the names of continents in the list is permitted as valid entries. In the example, some continent names have been omitted.

On the right side of the screen, these fields are available.

Field	Description
Regular Expression	Define a regular expression to define a specific data format. For example, if you define a regular expression here, you ensure that a phone number is entered in a phone number format, or a date is entered as a date format.
Regular Expression Description	This is the description of what you are trying to achieve above. In Control Center, this appears as user help or as a tip to help those administrators enter data in the correct format.
None	Select this radio button if you do not have any need for Binding to CPS.
Bind to Subscriber AVP Code	Control Center and Cisco Policy Server may correlate on the basis of AVP codes. If so, specify these codes here.

Field	Description
Bind to Session/Policy State Field	Bind fields are the specific points of intersection to the policy engine, and are optional. Control Center may not have any specific or defined 'hooks' into the Cisco Policy Server.
	Click the Select button to display a list of objects that can be used to relate Control Center with Cisco Policy Server at specific data points.
Bind to a result column from another table	Optional.
	This field lets you specify a column in this table or any other table in the tree and lets that table furnish the data for the current table. This practice helps maintain consistency across tables.
	This example selects the table named test_table, column aString, to use the value in that table's column and row to use as a result in the current table.
Bind to Diameter request AVP code	This field lets you enter a specific AVP to bind to. Doing so improves processing times.

Delete Reference Data Tables

Contact your Cisco technical representative for these delete tasks:

- Delete a custom reference data table

- Delete columns in a table

- To change the name of a table without using the copy link

Changing a table name has the same result as creating a new table. The first named table does not appear to the admin in Control Center. The New table name has no data in it. this is because Policy Builder does not write to the database and change the table name.

Last Tasks

Now populate or edit the contents of these table columns. provide them with rows and rows of data.

See Control Center: Populating a Custom Reference Data Table, on page 7.

Control Center: Populating a Custom Reference Data Table

The custom reference data table structures are created and edited in the Policy Builder interface. See Policy Builder: Constructing Custom Reference Data Tables, on page 3 for those procedures.

Import Data from a Spreadsheet

If you have a spreadsheet that already has data rows, you can import the spreadsheet into a custom reference data tables. Of course, the data table itself must be created in Policy Builder. However, importing the data occurs in Control Center.

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Note   When the tables are created in Policy Builder, have your spreadsheet open to make sure you match the data type, for example string, date, or number.

Step 1   Log in to Control Center.

Step 2   **Configuration tab** > **Reference Data folder** > **table list**.

Step 3   Select the table that receives data from the spreadsheet.

Step 4   Click the **import** link.

Figure 1: Import Data

Note   The CRD tables whose Svn Crd Data flag is disabled do not get listed in the dropdown as import of Svn CRD table data is not supported.

Step 5   The table you selected under the Reference Data tree appears in the Import into Table field. You do not have to type it in. Make sure this is the table that is to receive data from the spreadsheet.

Step 6   Either name or browse for the .xls or .xlsx file you want to import, the one that populates the table.
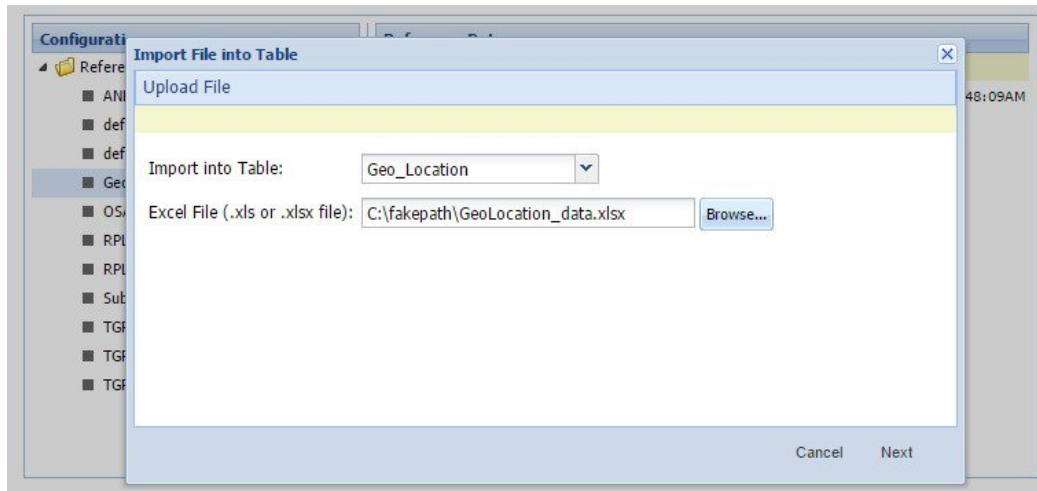
Step 7   Click the Next button in the lower corner.
               The Map file to Table Columns screen lets you select the columns in the spreadsheet that you want to use in the Access Technology table.

Step 8   Check Exclude first row if your .xls spreadsheet has headers.

Step 9   Check Delete all rows if you want to completely empty the Access Technology table and bring in all new rows.

Step 10   In the Select Column drop-down lists, specify what column of the Access Technology table you want to place your spreadsheet columns in.

Note The Select Column list shows the column names in Access Technology table as they were created in Policy Builder. This drop-down list does not show the column names in your spreadsheet.

In our example, we want to place the device names in the Code column and the numeric values in the Description column.

Step 11 In the lower right, click the Import link to proceed, or the Prev link to go back.

Step 12 Notice the Import Successful screen.

Step 13 Select Open AccessTechnology in the lower left to check your import, then click Done.
The newly populated table appears for you to check.

The AccessTechnology table has the new rows added, in the proper columns.

Enter Data Manually

For data tables that are small, or are not derived from a spreadsheet, use the Control Center interface to enter data manually into the rows of custom reference data tables.

Step 1 Log in to Control Center.

Step 2 Click **Configuration tab** > **Configuration node** and open the Reference Data folder.
The items under the Reference Data folder are the table names created in Policy Builder.

> **Note** If you do not see the table name that you want, go to the Policy Builder and create it.

Step 3 In the tree, click a table name to open it.
The table window shows the table structures and columns.

Our example uses AccessTechnology, which has several rows of data already in it.

Note	Add to and edit rows in a table with these tips:

- Click on a row and it becomes editable.

- You can enter content in fields, select check boxes, use the drop downs.

- You can build a table of values to use in another table.

- Date fields use the calender widget.

- Save or cancel the row. Save persists the rows to the database.

- Cancel lets the table data revert with no change.

- Carefully delete a row, there is no confirmation.

- Click the add link to add new blank rows.

If the **Svn Crd Data** option is enabled in Policy Builder, Control Center hides all the DML links (delete, insert, edit) of the rows and disables editing option at row level.

Add a Row

Step 1 Open a table.

Step 2 Click the add link in the upper right corner.

Step 3 Note that the new rows is added to the bottom of the table for you to fill in. You cannot insert a row at a specific place.

Step 4 Notice row count in lower right corner.

Note	In this interface, the columns do not indicate which are Key columns or Key fields. Best practice is to name the columns with this attribute when creating them in Policy Builder.

Note	Any required fields display with red margins to let you know that you must enter data.

Step 5 Use any of the save methods mentioned above to save the row. However, you cannot save a row that has errors.

Edit a Row

There are several ways to save row data and so prevent data loss.

- Click the save link in the column on the far right.

- Press Enter after you have finished in a field.

- Tab over from one field to another until the row is saved.

- Finish in your field and click on another row.

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Note   There is no way to promote or demote rows.

- There is no way to sort on columns.

- There is no filter or search feature at this time.

Fix Errors in a Row

Errors are denoted as the field margined in red. Help text displays to the far left or far right. Only the cancel link is available until you make a correction.

Delete a Single Row

Step 1   Hover over the row you want to delete.

Step 2   Click the delete link to the right.
The data row is deleted immediately. No refresh needs to occur.

Create a Snapshot

You can create a snapshot of CRD tables on the system. The created snapshot will contain CRD table data, policy configuration and checksum information for all CRD tables.

Perform the following steps to create a snapshot

Step 1   Log in to Control Center.

Step 2   Navigate to **Configuration** tab.

Step 3   Click **Reference Data**.

Step 4   Click **create snapshot**.
A **Create a Snapshot** dialog box is displayed.

Step 5   Enter snapshot details.

Step 6   Click **Create**.
The snapshot is created displaying the following details:

- Snapshot Name

- Policy version

- Creation Date and time

• User Comments

• Snapshot Path

• Checksum Details

To view the checksum information, click **Checksum Details**.

If the snapshot creation fails an error message is displayed.

If there are Svn CRD tables in the database while creating a snapshot, they are skipped and the following warning message is displayed:

Datasource for tables [svnTable-1 is subversion]. Skipping these tables to be a part of created snapshot as create snapshot is not allowed for subversion tables.

Revert a Snapshot

You can revert the CRD data to a specific snapshot.

Preform the following steps to revert a snapshot:

Step 1 Log in to Control Center.

Step 2 Navigate to **Configuration** tab.

Step 3 Click **Reference Data**.

Step 4 Click **revert snapshot**.
A **Revert a Snapshot** dialog box is displayed.

Step 5 Select a specific snapshot from the **Snapshot Name** drop down list.
Note   If a specific snapshot name is not selected, the latest snapshot will be populated.

If the snapshot directory is empty, **No snapshot found in the system** message will be displayed.

Step 6 Click **Revert**.
A **Confirmation Required** dialog box is displayed.

Step 7 Click **Yes**.
The specific snapshot is reverted displaying the following details:

• Snapshot Name

• Policy version

• Creation Date and time

• User Comments

• Snapshot Path

• Checksum Details

If the snapshot revert fails an error message is displayed.

If there are SVN CRD tables in the database while reverting a snapshot, they are skipped and the following warning message is displayed:

Datasource for tables [table_with_date_time] is subversion. Data for these tables will be reverted using svn datasource not from datasource (mongodb)

Export All

You can export contents of all CRD tables to Microsoft Excel. The data is exported in CSV format in a zip file.

Perform the following steps to export CRD table data:

Step 1 Log in to Control Center.

Step 2 Navigate to the **Configuration** tab.

Step 3 Click **Reference Data**.

Step 4 Click **Export All**.
The contents of the CRD table is generated in a csv format in a zip file.

Step 5 Click **Save File**.

Step 6 Click **OK**.
The zip file contains multiple CSV file containing CRD table schema and content corresponding to every CRD table and an '.exportCrdInfo' metadata file containing the following data:

  • exportDate - Date of the CRD Data when it is exported.

  • exportDateMillis - Time in milli seconds when the CRD Data is exported.

  • exportVersion - Exported verison of the CRD Data whose value is 1 currently.

Import All

You can import contents of all CRD tables in bulk from Control Center. The data is imported in CSV format in a zip file.

When Import All operation is performed the tables whose CSV files are present in the archive zip file will be updated with the corresponding content without affecting other CRD tables existing in Control Center.

Perform the following steps to import CRD tables data in bulk:

Step 1 Log in to Control Center.

Step 2 Navigate to **Configuration** tab.

Step 3 Click **Reference Data**.

Step 4 Click **Import All**.
An **Import All Tables** dialog box is displayed.

Step 5 Click **Browse** and select the file to be imported.

Step 6 Click **Import**.
The following warning message is displayed for Svn Crd tables which are skipped under the Import All option:

Datasource for tables [table_1, table_2, ...] is subversion. Skipping these tables to be a part of import operation. Import operation is not allowed for subversion tables.

Typical Tasks for Everyday

These navigation tasks and activities are specific to the custom reference data tables in Control Center.

Refresh the Screen

- The refresh link in the upper right corner.

- Click the refresh link to force a refresh.

- A successful refresh message appears on the right.

- The usual refresh time is every 5 minutes, and is refreshed from the server.

- In the middle of updating, refresh is deferred.

- Upon close and reopen a table, the refreshed table is displayed.

- The refresh interval for these tables cannot be changed.

Navigate the Table Screens

- Multiple tables can be open at one time.

- Icons in the tree to show the open and active focus.

  - Circle with hyphen—open table

  - Circle with arrows—active table focus

  - Square—table not open

• Blue square—table open and in the tray at bottom

• Icons in the upper right corner of a table minimize, maximize, or close the table. When minimized, the table heading displays at the bottom of the screen in the tray.

• To restore a table to view,

> • Click the restore button of the table in the tray,

> • Or

> • Double click the table tab in the tray.

• Resize a table for viewing by dragging the edges.

• Narrow or widen a column by dragging the margin of the column head.

Navigate in a Row

• If you have many columns, they cannot all display in the browser. You must scroll to the far right to get to the delete, edit, save, cancel links.

• Notice that in the bottom right corner, there is a indicator of how may rows you are viewing at the moment, and how many rows there are total in the table.