



TIBCO EBX® Data Exchange Add-on (New)

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Administrator Guide

CHAPTER 1

Connecting to external data sources

This chapter contains the following topics:

1. [Overview](#)
2. [Configuring a database connection](#)
3. [Connecting a database and data model](#)

1.1 Overview

An administrator can create connections that enable data integration with external data sources, such as databases. The add-on can also connect to TIBCO Data Virtualization (TDV) where multiple databases can be combined into views. In addition to the external data source connection, an administrator must configure a connection between the database and data model. This ensures that end users can only integrate data between a given data model and its approved data sources and targets.

To successfully complete these tasks, start with the [database connection information configuration](#) [p 10]. This is a prerequisite for [connecting a database and data model](#) [p 11].

1.2 Configuring a database connection

This section describes how to create a connection with a database, or TDV to enable data integration.

Attention

Prior to configuring a database connection, the correct JDBC driver must be deployed on your TIBCO EBX® server.

To connect to a database or TDV:

1. In the **Administration** panel, select TIBCO EBX® Data Exchange Add-on (New).
2. From the **Reference data** group, select the **Databases** table and create a new record.
3. Supply the required information:
 - **Name:** The name used to identify this connection.
 - **URL:** The URL used by the database for incoming connections. When using:
 - The **External system** authentication method, enter the URL for AWS.
 - The **Direct** authentication method, enter the URL specific to your database. For example:

- **MsSQL:** jdbc:sqlserver://<server>:<port>;databaseName=<databaseName>
 - **Oracle:** jdbc:oracle:<drivertype>:@<server>:<port>:<databaseName>
 - **Postgresql:** jdbc:postgresql://<server>:<port>/<databaseName>
 - **TDV:** jdbc:compositesw:dbapi@<server name>:<port>?domain=<domain name>&dataSource=<datasource name>
- **Authentication:** Sets the authentication type for this connection. A direct connection uses a username and password; external system requires an access key.
 - **Username** and **Password:** The login credentials for this database connection. If database access is granted through Windows permissions, enter those credentials here.
 - **Access key:** The access key required to access the external database.
4. Optionally, test the connection.
 5. Save and close.

This connection information is now available to use when connecting a database with a data model.

1.3 Connecting a database and data model

The option to import or export SQL is not available to end users until an administrator configures a connection between a database and a data model. To connect a database with a data model:

1. In the **Administration** panel, select TIBCO EBX® Data Exchange Add-on (New).
2. From the **Reference data** group, select **Database to data model connections** and create a new record.
3. Supply the following information:
 - **Database:** Select the database from the dropdown menu. This list populates with databases that you provided connection information for using the **Databases** table.
 - **Data model:** Select the data model to enable import and export between it and the selected database.
 - Optionally, provide a **Table name pattern**, **Schema name pattern**, and **Description**.
4. Save and close.

Users that have access to data in the specified data model can use the **SQL Import** and **SQL Export** services integrate data between the tables in the connected database and EBX®.

CHAPTER 2

Enabling data integration in workflows and perspectives

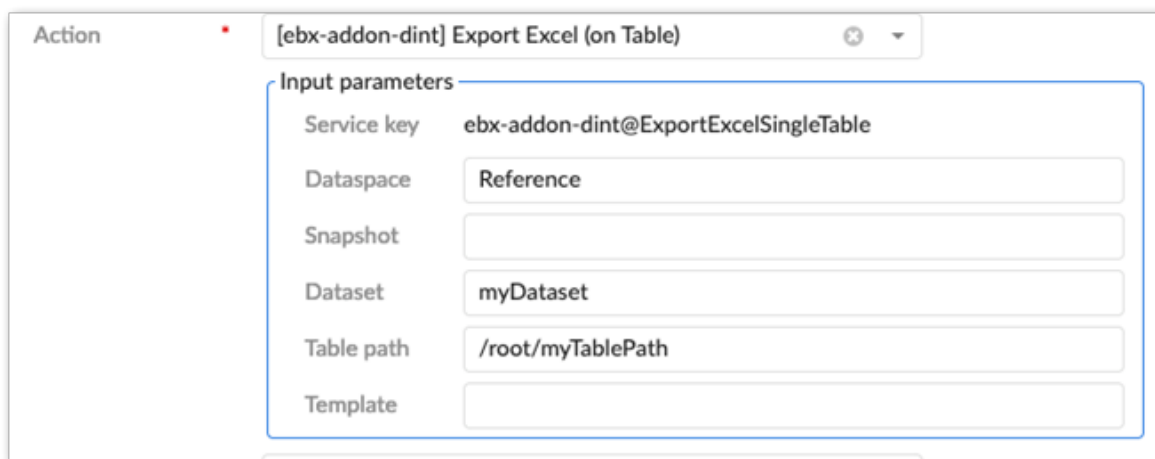
Administrators can enable add-on import, export, and transfer functionality in workflows and perspectives. These actions are available as services and actions in workflows and perspectives, respectively. See the EBX® product documentation for more information on working with perspectives and workflows.

To enable data integration in a perspective or workflow:

1. When configuring a:

- Perspective: select the appropriate action from the drop-down menu.

The add-on specific actions begin with [ebx-addon-dint]. There are two options for each import, export and transfer type. This allows you to specify whether the action applies to the selected table, or dataset.



The screenshot shows a configuration window for an action. The title bar says 'Action' with a red asterisk and '[ebx-addon-dint] Export Excel (on Table)'. Below the title bar is a section titled 'Input parameters' which contains several fields:

Parameter	Value
Service key	ebx-addon-dint@ExportExcelSingleTable
Dataspace	Reference
Snapshot	
Dataset	myDataset
Table path	/root/myTablePath
Template	

- Workflow: select the appropriate service from the drop-down menu.

The add-on specific actions begin with [ebx-addon-dint]. There are two options for each import, export and transfer type. This allows you to specify whether the action applies to the selected table, or dataset.

Service*

[ebx-addon-dint] Export Excel (on Table) ⓘ ▼

❗ Exports data from EBX® to an XLS or XLSX file.

Input parameters

Service key	ebx-addon-dint@ExportExcelSingleTable	
Dataspace	Reference	ⓘ
Snapshot		ⓘ
Dataset	myDataset	ⓘ
Table path	/root/myTablePath	ⓘ
Template		ⓘ

2. Use the required **Input parameters** to specify the location where you want to service or action to be active.
3. Optionally, specify a **Template** parameter.
If you specify a template, users cannot change the template during import, export, or transfer. Additionally, you might want to keep in mind that not all users can access each template.
4. Complete remaining workflow or perspective configuration steps. See the EBX® product documentation for more information on creating workflows and perspectives and how they work.

CHAPTER 3

Creating custom date and date/time patterns

This chapter contains the following topics:

1. [Overview](#)

3.1 Overview

In some cases when importing, the date or date/time format in the source is not compatible with the target. The add-on allows administrators to create custom formats for CSV import and export to overcome the compatibility issue.

Creating a custom pattern

To create a custom pattern:

1. Navigate to *Administration > TIBCO EBX® Data Exchange Add-on (New) > Reference data > Date time pattern*.
2. Create a new record.
3. Choose the application type.
4. Enter the pattern.

See [Date pattern reference](#) [p 15] for date pattern definitions and output information. See [Time pattern reference](#) [p 16] for time pattern definitions and output information.

Attention

The table will not accept duplicates.

5. Select the pattern type.
6. Save and close.

Date pattern reference

A date pattern must adhere to the following:

- It can only include the following characters: G, y, M, w, W, D, d, F, E, u

- It can only include the following special characters surrounded with double quotes: space, /, -, |, :, ;
- Any other characters must be surrounded with single quotes. For example: '#'
- It cannot begin with the space character.

Note

A date/time pattern can utilize the allowed characters for both the date and time patterns.

The following table provides a description of the date pattern parameters:

Symbol	Definition	Pattern/Output
G	Era designator	GG/AD
y	Year	yy/96 yyyy/1996
M	Month in year	MM/07 MMM/Jul MMMM/July
W	Week in year	W/27
D	Day number in year	D/189
d	Day number in month	d/9 dd/09
F	Day of week in month	F/2 (2nd Wednesday in July)
E	Day of week (name)	E, EE, or EEE/Tue EEEE/Tuesday EEEEEE/T EEEEEE/Tu
u	Day number in week	1/Monday 2/Tuesday

Time pattern reference

A date pattern must adhere to the following:

- It can only include the following characters: a, H, k, K, h, m, s, S, z, Z, X
- It can only include the following special characters surrounded with double quotes: space, /, -, |, :, ;
- Any other characters must be surrounded with single quotes. For example: '#'

- It cannot begin with the space character.

Note

A date/time pattern can utilize the allowed characters for both the date and time patterns.

The following table provides a description of the time pattern parameters:

Symbol	Definition	Pattern/Output
a	AM/PM designation	a/PM
H	Hour in the day Hour in the day (0-23)	H/0 HH/00
k	Hour in the day (1-24)	k/24 kk/24
K	Hour in am/pm for 12 hour format (0-11)	K/0 KK/00
h	Hour in am/pm for 12 hour format (1-12)	h/7 hh/07
m	Hour in am/pm for 12 hour format (1-12)	m/4 mm/04
s	Second in the minute	s/3 ss/03
S	Second in the minute	S/2 SS/22 SSS/225 SSSS/2250
z	Timezone	z, zz, zzz/PST zzzz/Pacific Standard Time
Z	Timezone offset in hours (RFC pattern)	-0800
X	Timezone offset in ISO format	-08; -0800; -08:00

User Guide

CHAPTER 4

About the add-on

This chapter contains the following topics:

1. [Overview](#)
2. [Data transformation overview](#)
3. [Your role with the add-on](#)
4. [What's next?](#)

4.1 Overview

The TIBCO EBX® Data Exchange Add-on (New) enables integration and transformation of data from one data store to another. The current version of the add-on can:

- Import and export data between tables in your TIBCO EBX® repository and external files.
- Transfer data between tables within your EBX® repository.
- Import and export data between tables in your EBX® repository and SQL databases.

4.2 Data transformation overview

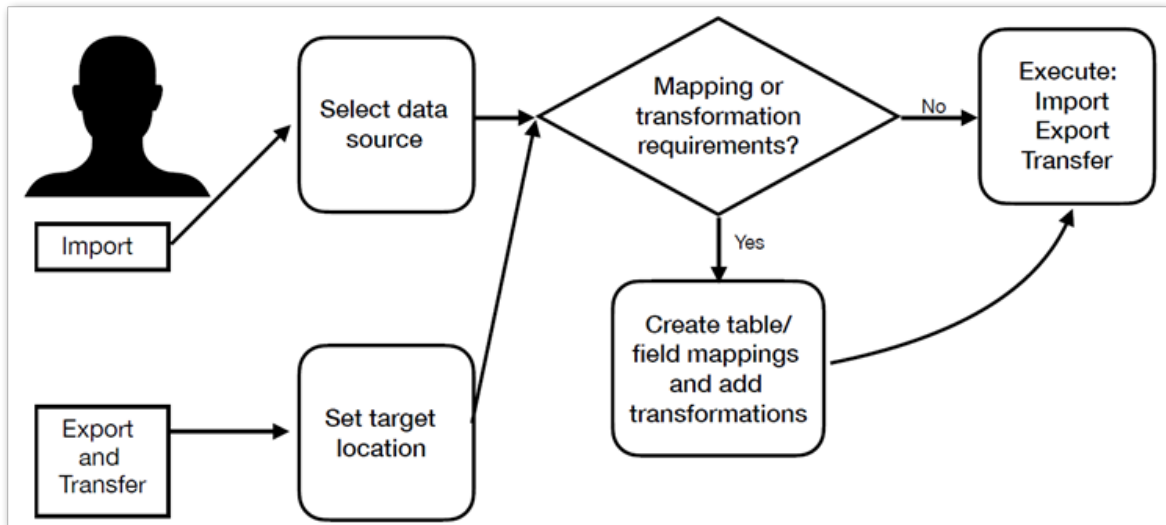
When requirements between your data source and target differ, you can use the add-on's transformation functions to reconcile the differences. These transformations provide the flexibility to change data values and convert data format between sources and targets. For example, a source might use the following codes for states 1, 2, 3, etc. But, the target expects Alabama, Alaska, and Arizona. You can use a transformation to populate the target with the expected value.

4.3 Your role with the add-on

As a business user you interaction with the add-on likely includes the tasks outlined in the following image:

Note

Where you access data integration services determines the source for exports and targets for imports.



4.4 What's next?

The following table outlines the topics covered in the documentation sections:

Importing	<p>For an introduction to the import process, see Import overview [p 24].</p> <p>For instructions on importing, see Importing to a table [p 25].</p>
Exporting	<p>For an introduction to the export process, see Export overview [p 46].</p> <p>For instructions on exporting, see Exporting a table [p 47].</p>
Data transfer	<p>For an introduction to the transfer process, see Transfer overview [p 70].</p> <p>For instructions on transferring data, see Transferring to a table [p 71].</p>
Mapping and transformations	<p>Map and transform overview [p 86] provides a look at how the add-on implements the concepts of mappings and transformations.</p> <p>Mapping interface reference [p 89] highlights the user interface used for mapping and transformation tasks during data integration. Additionally, it provides an example of using a transformation function.</p> <p>You can refer to Transformation function reference [p 97] to see a list and description of the add-on's built-in transformation functions.</p>

Importing data

CHAPTER 5

Import overview

The services provided by the add-on allow you to import data from source locations outside of EBX® to your repository. The location you initiate the import from determines the target for the import. For instance, running the import service from a table's **Actions** menu, sets the table as the target. Running the service from a dataset's **Actions** menu sets its tables as the targets. Overall, steps to complete these procedures are the same, except some details such as mapping differ. As outlined below, the import process includes:

- Selecting the source data. Currently supported source formats include XLS, XLSX, CSV and SQL. Importing from SQL is supported at the table level only and requires [administrative configuration](#) [p 10].
- Defining any required mappings or transformations. The add-on automatically maps source fields with those in the target that have the same name. If required, you can use the add-on's drag-n-drop functionality to create or update mappings. If you want to apply transformations to your data, you can use built-in functions to modify data during import. For more information on the topics of mapping and transformations, see [Map and transform overview](#) [p 86].
- Optionally, running a simulation to preview the import result. This allows you to update or fix your data before the import to prevent any potential errors.
- Saving settings as a template for later reuse. When import operations require the use of transformations or custom mappings, you can use templates to store these settings. This alleviates you from having to redo the same tasks each time you perform a specific import.

See also

[Importing to a table](#) [p 25]

[Map and transform overview](#) [p 86]

[Mapping interface reference](#) [p 89]

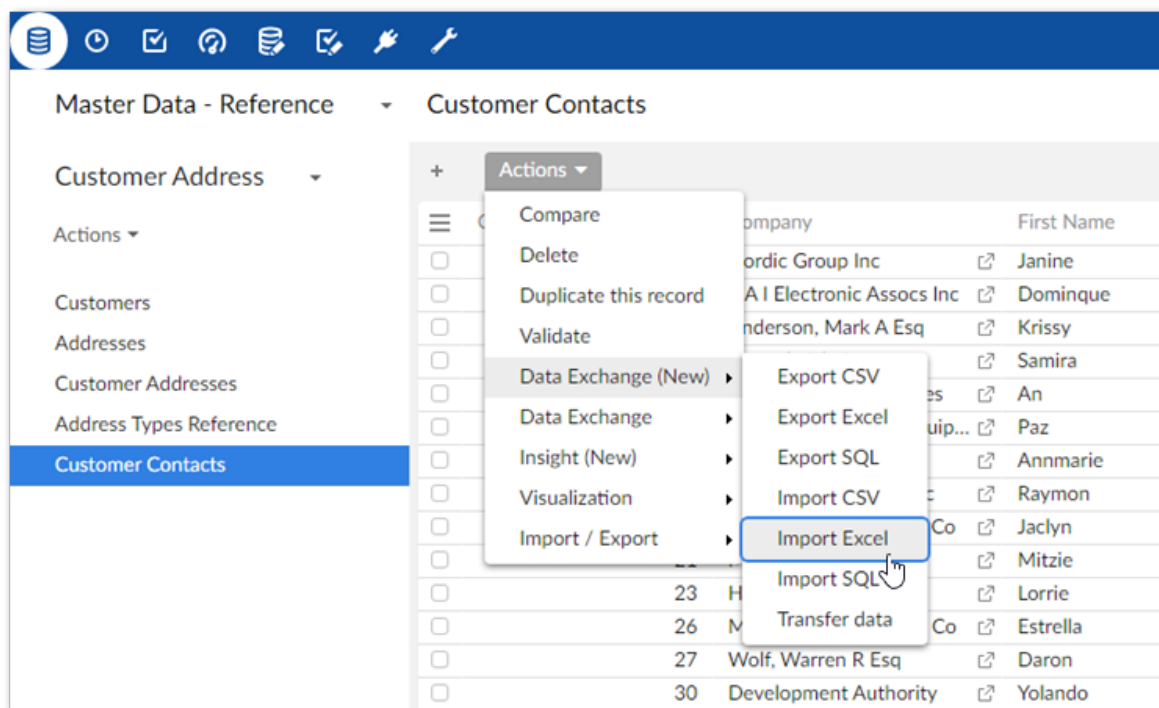
[Export overview](#) [p 46]

CHAPTER 6

Importing to a table

To import data from a CSV file, Excel file, or SQL data source to an individual table:

1. Initiate the import process:
 1. Navigate to the table you want to use as the target.
 2. Initiate the import process from the table by selecting *Actions > Data Exchange (New)* and one of the following options: **Import CSV**, **Import Excel**, or **Import SQL**. Administrators must [configure the available SQL sources](#) [p 10] to enable the SQL import option.

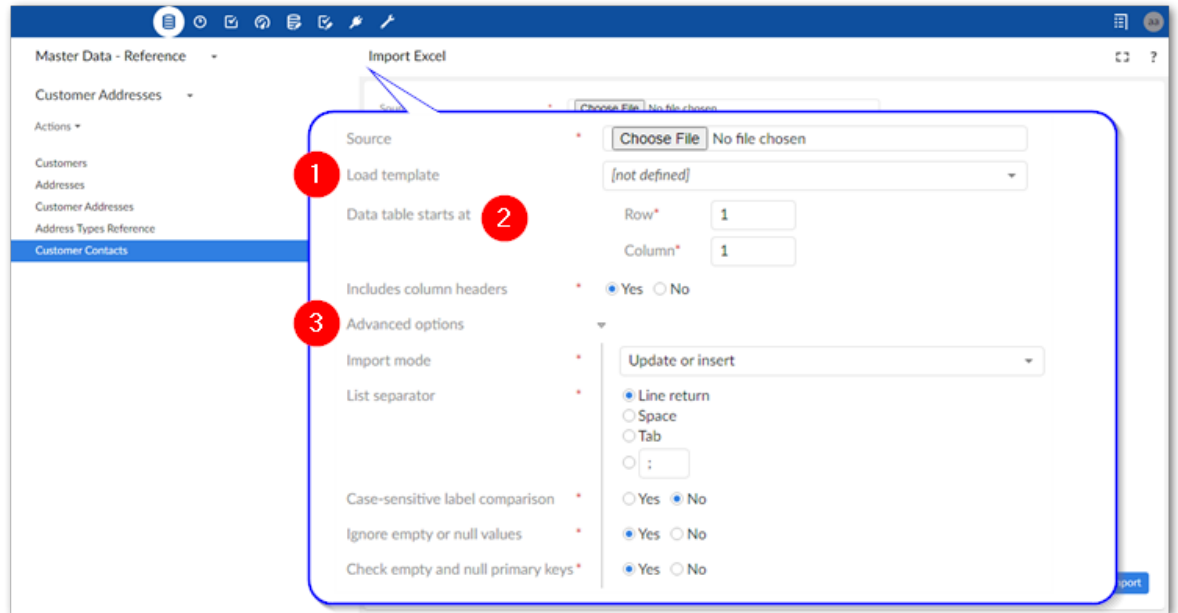


2. Choose the data source:
 - For CSV and Excel: Browse to select the file containing the source data for the import and optionally the template to use.
 - For SQL: Use the **SQL data source** and **SQL table** dropdown menus to select the source table or view for the import.
3. Optionally, use the **Load template** option to select any previously saved template to load its configuration and mapping options. After loading, you still have the ability to make changes

to options. Note that changes to certain import options will impact the template's mappings. Depending on the circumstances, the add-on can automatically create default mappings. In other cases you might have to update mappings and transformations manually.

4. Update format-specific options:

1. The following image and list highlight some of the options when importing from Excel:



1) Data table starts at and Includes column headers:

Data table starts at: Specifies the location in the spreadsheet where the data table begins.

Includes column headers: Use this option to indicate whether the data table contains a header row at the position specified by the **Data table starts at** property. The add-on will match the text in the first row of each source column with the field labels in the target location. Automatic mappings are generated when the values in the source and target match. When this option is set to **No**, the add-on maps columns sequentially. It begins by mapping the first column in the source with the first column in the target and so forth until one or both run out of columns.

2) Advanced options:

Import mode: Specifies how target data is updated. See the tooltip in the UI for descriptions of each mode.

Note

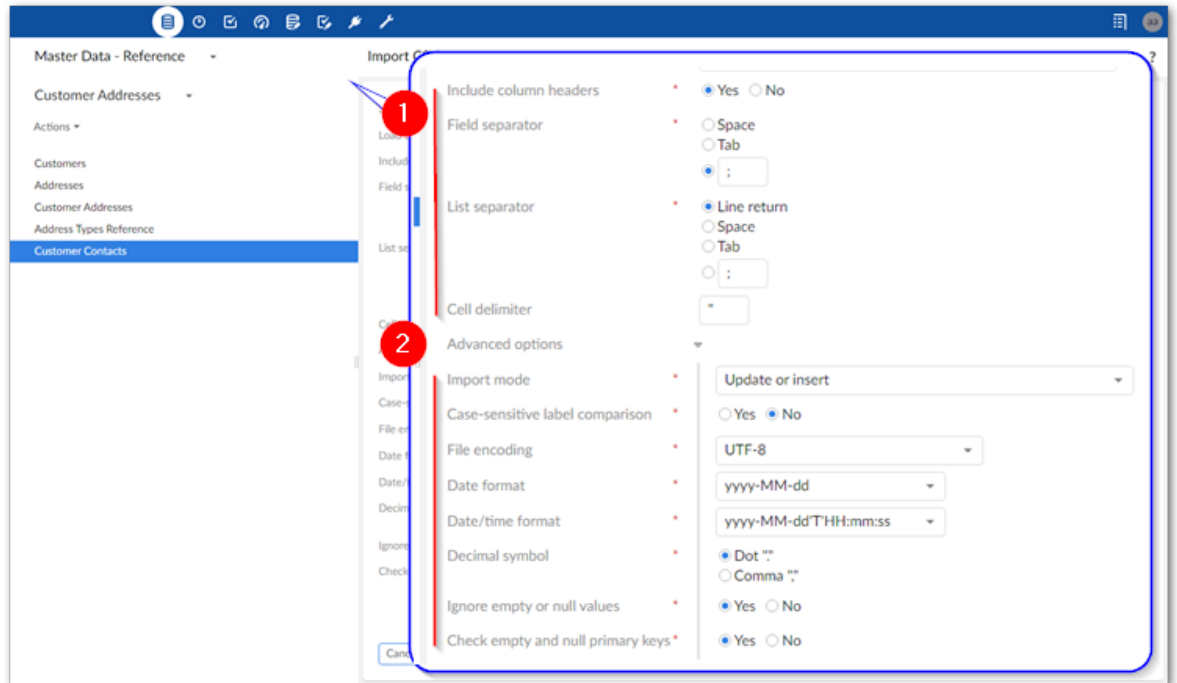
Depending on your deployment environment's resources, you might have issues using the **Insert only** and **Delete only** modes when importing a large volume of data. If this issue occurs, use any of the other import modes.

Case-sensitive label comparison: Determines whether the add-on pays attention to letter case when matching the labels in the source and target.

Ignore empty or null values: Determines whether existing records are updated with empty or null values from the imported file.

Check empty and null primary keys: Specifies whether all primary keys are matched and validated between source and target. This option is enabled by default.

2. The following image and list highlight some of the options when importing from CSV:



1)

Basic options: The data source for this import operation.

Includes column headers: Use this option to indicate whether the data table contains a header row at the position specified by the **Data table starts at** property. The add-on will match the text in the first row of each source column with the field labels in the target location. Automatic mappings are generated when the values in the source and target match. When this option is set to **No**, the add-on maps columns sequentially. It begins by mapping the first column in the source with the first column in the target and so forth until one or both run out of columns.

Field separator: The value used by the source file to denote a field.

List separator: The value used by the source file to denote a list.

Cell delimiter: The value used by the source file to denote the beginning and end of a cell in the source file.

2)

Advanced options:

Import mode: Specifies how target data is updated.

Case-sensitive label comparison: Determines whether the add-on pays attention to letter case when matching the labels in the source and target.

Decimal symbol: Specifies how the source file represents the decimal symbol.

Ignore empty or null values: Specifies whether to import values that are null or empty.

Check empty and null primary keys: Specifies whether all primary keys are matched and validated between source and target. This option is enabled by default.

3. The following image and list highlight some of the options when importing from SQL:

The screenshot shows a configuration window titled "Import SQL". It contains several settings:

- SQL data source:** A dropdown menu with "customerAddress" selected.
- SQL table or view:** A dropdown menu with "public.customers" selected.
- Load template:** A dropdown menu with "[not defined]" selected.
- Import mode:** A dropdown menu with "Update or insert" selected.
- Ignore empty or null values:** Radio buttons for "Yes" (selected) and "No".
- Check empty or null primary keys:** Radio buttons for "Yes" (selected) and "No".

- **Import mode:** Specifies how target data is updated. Use the property's tooltip for more information about import modes.
- **Ignore empty or null values:** Specifies whether to import values that are null or empty.
- **Check empty and null primary keys:** Specifies whether all primary keys are matched and validated between source and target. This option is enabled by default.

5. Optionally, run an import simulation to preview the import result:

1. Click **Simulation** at the bottom of the screen. Note, this option is also available from the mapping screen.
2. Configure the simulation options as desired. Select the '?' icon next to the configuration options and message categories in the report to view their description.
3. and click **Run simulation** to begin.

The report shows messages at the error, warning, and information levels. However, please note that the simulation does not take table triggers into account.

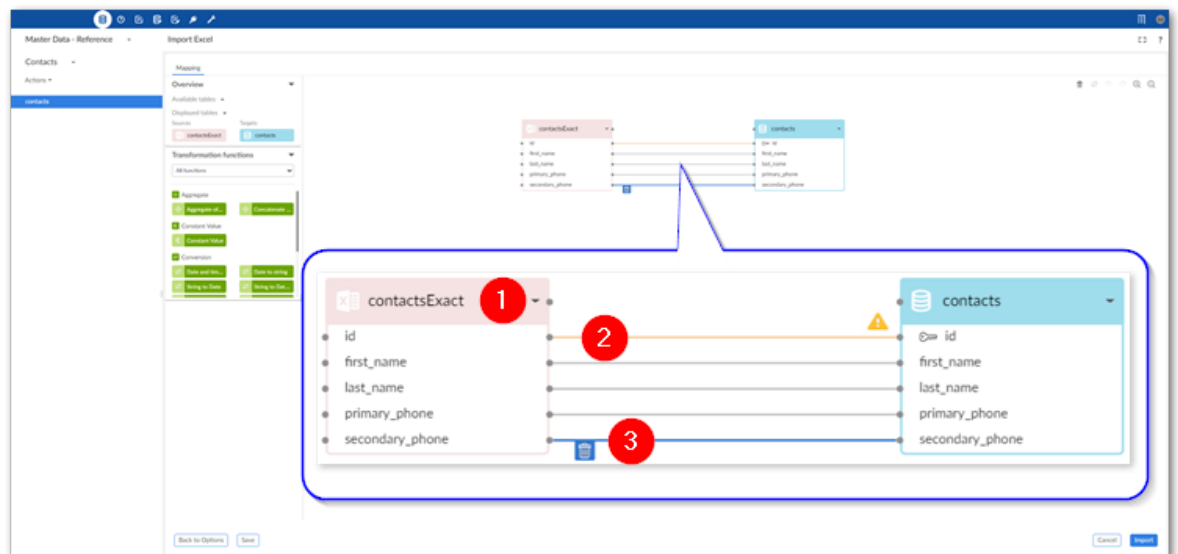
6. Create mappings, or optionally update existing ones:

Note

The following steps provide only high-level mapping instructions. See [Mapping interface reference](#) [p 89] for more detailed information on mapping and transformations.

1. Select **Mapping** to enter the mapping screen where you can update the default data mappings or add data transformations. For Excel and CSV import, the add-on automatically creates mappings where the source and target have the same labels. For SQL import, mappings are automatically created when the label and data type match. A mapping identifies which data is extracted from the source and where it is extracted to in the target.

The following image and list describe some features of table and field mapping:

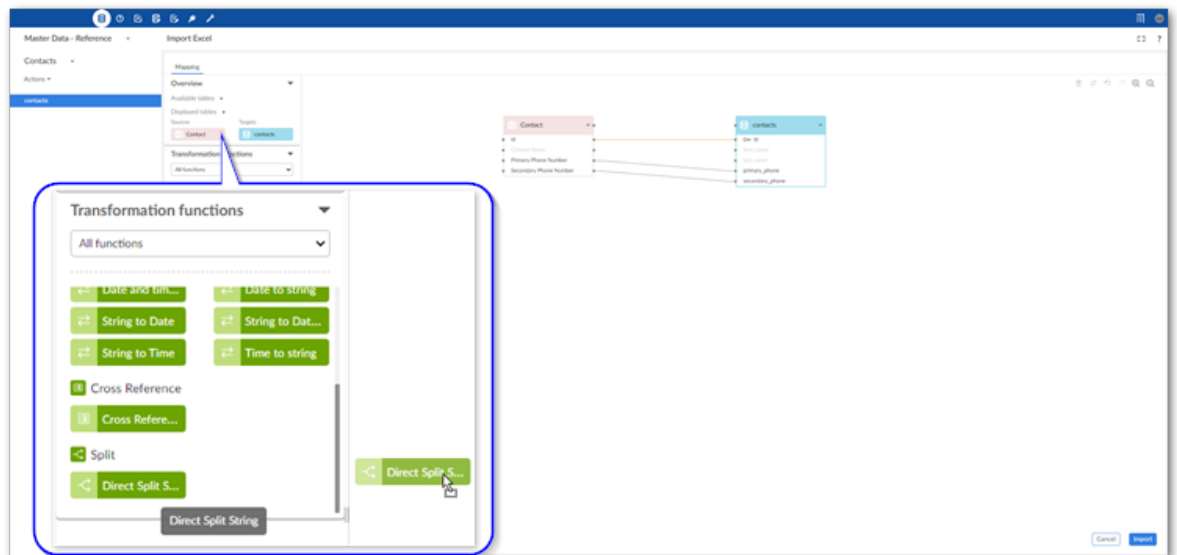


- 1) **Source (pink) and target (blue) tables:** By default, the data source displays on the left and the target on the right. Each table header has a label and uses an icon to show its type and selecting the small arrow collapses and expands the table. The headers also have connection points. Drag this top point to automatically generate mappings between tables.
- 2) **Mappings:** Each line is a mapping. An orange color and icon indicates there is a warning for a mapping. Select the icon to view the warning. Drag from one field's connection point to another to create a mapping.
- 3) **Delete selected:** To delete a mapping, select it and then the garbage icon.

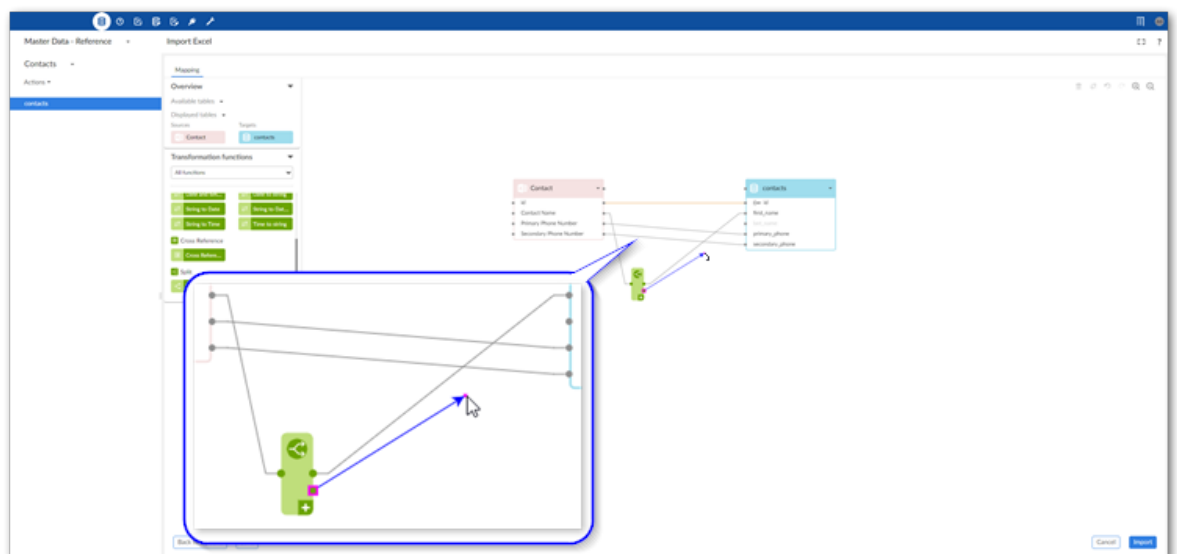
7. Optionally, add transformation functions:

Transformation functions allow you change the source data to meet technical or business requirements in the target. The add-on ships with several transformation functions that support common business cases. The available API also allows you to implement custom transformation functions. For more details on how to use transformation functions, see [Mapping interface reference](#) [p 89]. For information on the available transformations and their descriptions, see [Transformation function reference](#) [p 97].

1. To add a transformation, select and drag the desired transformation function to the mapping screen.



2. Select and drag fields from the source to the function's input (left) and connect the function's output (right) to target fields.



3. Double-click the transformation function to edit its parameters. Each function is different, for a complete list, see [Transformation function reference](#) [p 97].

8. Optionally, select **Save** to store your settings as a template for re-use. For more information on using templates, see [Using templates](#) [p 81].
9. Click **Import** to complete the process.

If errors prevent any of the records from importing correctly, the add-on presents you with the option of downloading an Excel file containing the invalid data. Depending on your circumstances, you can correct the data directly in the file and re-import it.

See also

[Map and transform overview](#) [p 86]

[Mapping interface reference](#) [p 89]

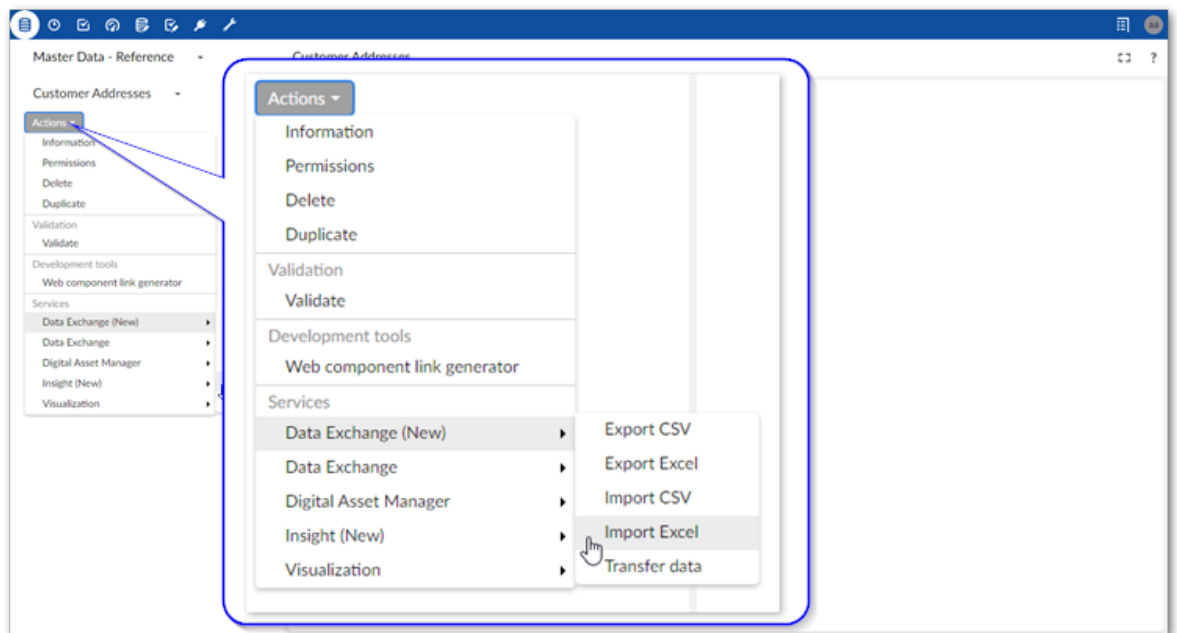
[Export overview](#) [p 46]

CHAPTER 7

Importing to multiple tables

To import data from an archive of CSV files or an Excel file to multiple tables in a dataset:

1. Initiate the import process:
 1. Navigate to the dataset that contains the target tables.
 2. Initiate the import process from the dataset by selecting: *Actions > Data Exchange (New) > Import CSV or Import Excel*.



2. Browse to select the file containing the source data for the import.
After selecting the file, additional options display.
3. Optionally, select any previously saved template to load its configuration and mapping options.
After loading, you can still make changes to configuration options. Changes to some import options impact the template's mappings. Depending on the circumstances, the add-on can automatically create default mappings. In other cases you might have to update mappings and transformations manually.
4. Update format-specific options:

1. The following image and list highlight some of the options when importing from Excel:

1) Includes column headers: Use this option to indicate whether the data tables contain a header row. The starting position of the data is specified below in the **Select source/target tables** option. The add-on will match the text in the first (header) row of each source column with the field labels in the target location. The add-on automatically generates links between tables when the values in the source and target match. When this option is set to **No**, the add-on maps columns sequentially. It begins by mapping the first column in the source with the first column in the target and so forth until one or both run out of columns.

2) Advanced options: **Import mode:** Specifies how target data is updated. See the tooltip in the UI for descriptions of each mode.

Note

Depending on your deployment environment's resources, you might have issues using the **Insert only** and **Delete only** modes when importing a large volume of data. If this issue

occurs, use any of the other import modes.

List separator: Specifies the character used in the source file to separate lists.

Case-sensitive label comparison: Determines whether the add-on pays attention to letter case when matching the labels in the source and target.

Ignore empty or null values: By default, existing records are not updated with empty or null values from the imported file. Disable this option to update the target with these values.

Check empty and null primary keys: Specifies whether all primary keys are matched and validated between source and target. This option is enabled by default.

Ignore table failure: Ensures that when one or more tables fails to import, the system still imports valid tables from the dataset. When disabled, the system rolls back all data when it fails to import a single table.

3) Select source/target tables

Determines the tables to import from the source, specifies the data starting point for each source table, and sets the target tables. Where possible, the add-on automatically pairs source and target tables. Deselect any sources that you want to exclude. If a source table is included, it must have a corresponding target table selection. Add multiple targets to a source to import the same data to multiple tables.

Note

You can add a maximum of 20 target tables.

2. The following image and list highlight some of the options when importing from CSV:

The screenshot shows a configuration window for importing CSV data. It is divided into three main sections, each highlighted with a red circle and a number:

- 1) Basic options:** Includes 'Includes column headers' (radio buttons for Yes/No), 'Field separator' (radio buttons for Space, Tab, and a text input with a semicolon), 'List separator' (radio buttons for Line return, Space, Tab, and a text input with a semicolon), and 'Cell delimiter' (a text input with double quotes).
- 2) Advanced options:** Includes 'Import mode' (a dropdown menu set to 'Update or insert'), 'Ignore table failure' (radio buttons for Yes/No), 'Case-sensitive label comparison' (radio buttons for Yes/No), 'File encoding' (a dropdown menu set to 'UTF-8'), 'Decimal symbol' (radio buttons for Dot and Comma), 'Ignore empty or null values' (radio buttons for Yes/No), and 'Check empty and null primary keys' (radio buttons for Yes/No).
- 3) Select source/target tables:** A table with two columns: 'Select all' and 'Target tables'. It lists two source files: 'Customers.csv' and 'Addresses.csv', each with a checkbox and a dropdown menu showing the target table name ('Customers' and 'Addresses' respectively). There are also delete and add icons for each row.

1) Basic options:

Includes column headers: Use this option to indicate whether the data table contains a header row at the position specified by the **Data table starts at** property. The add-on will match the text in the first row of each source column with the field labels in the target location. Automatic mappings are generated when the values in the source and target match. When this option is set to **No**, the add-on maps columns sequentially. It begins by mapping the first column in the source with the first column in the target and so forth until one or both run out of columns.

Field separator: The value used by the source file to denote a field.

List separator: The value used by the source file to denote a list.

Cell delimiter: The value used by the source file to denote the beginning and end of a cell in the source file.

2) Advanced options:

Import mode: Specifies how target data is updated.

Case-sensitive label comparison: Determines whether the add-on pays attention to letter case when matching the labels in the source and target.

Decimal symbol: Specifies how the source file represents the decimal symbol.

Ignore empty or null values: Specifies whether to import values that are null or empty.

Check empty and null primary keys: Specifies whether all primary keys are matched and validated between source and target. This option is enabled by default.

3) Select source/target tables

Determines the tables to import from the source and sets their targets. Where possible, the add-on automatically pairs source and target tables. Deselect any sources that you want to exclude. If a source table is included, it must have a corresponding target table selection. Add multiple targets to a source to import the same data to multiple tables.

Note

You can add a maximum of 20 target tables.

If you do not select all source tables and later decide to include one or more of the remaining tables, you can accomplish this using the options in the **Mapping** screen. See the next step for more details.

5. Optionally, run an import simulation to preview the import result:

1. Click **Simulation** at the bottom of the screen. Note, this option is also available from the mapping screen.
2. Configure the simulation options as desired. Select the '?' icon next to the configuration options and message categories in the report to view their description.
3. and click **Run simulation** to begin.

The report shows messages at the error, warning, and information levels. However, please note that the simulation does not take table triggers into account.

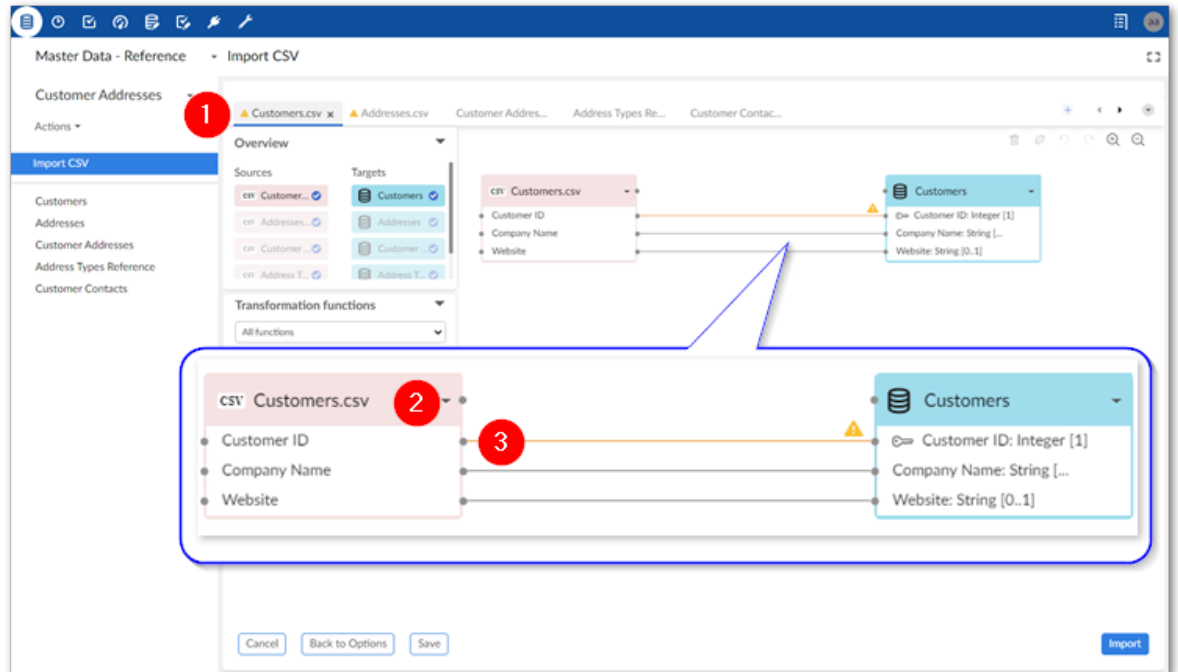
6. Optionally, update or create mappings:

Note

The following steps provide only high-level mapping instructions. See [Mapping interface reference](#) [p 89] for more detailed information on mapping and transformations.

1. Select **Mapping** to enter the mapping screen where you can update the default data mappings or add data transformations. The add-on automatically creates mappings where the source and target have the same labels. A mapping identifies which data is extracted from the source and specifies its target destination.

The following image and list describe some features of table and field mapping:



1) Table mapping tabs

Each tab contains the mappings between a different pair of source and target tables. The icons to the right allow you to locate and navigate between tabs. Additionally, you can create new tabs, and add any unmapped source and target tables by dragging them from the **Overview** box to the mapping pane. Note that the '+' icon is disabled when all sources are already included in a mapping tab.

Please note that:

- You can use the same source or target only once in the mapping screen. In other words, you cannot use a source or target in more than one table mapping tab.
- Sources can have multiple targets, but targets can only have one source.

2) Source (pink) and target (blue) tables

By default, the data source displays on the left and the target on the right. Each table header has a label and uses an icon to show its type and selecting the small arrow collapses and expands the table. The headers also have connection points. Drag this top point to automatically generate mappings between tables.

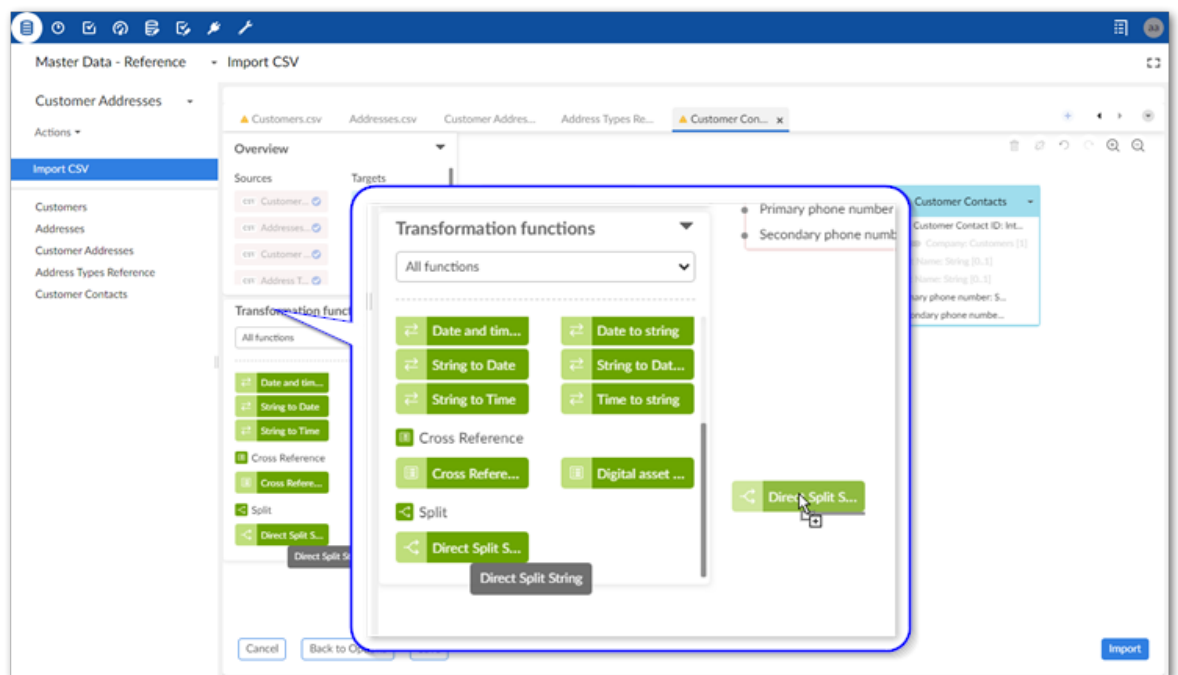
3) Mappings

Each line is a mapping. An orange color and icon indicates there is a warning for a mapping. Select the icon to view the warning. Drag from one field's connection point to another to create a mapping. To delete a mapping, select it and then select the trash icon. To create a mapping, drag from a source field's connection point to a connection point in the target.

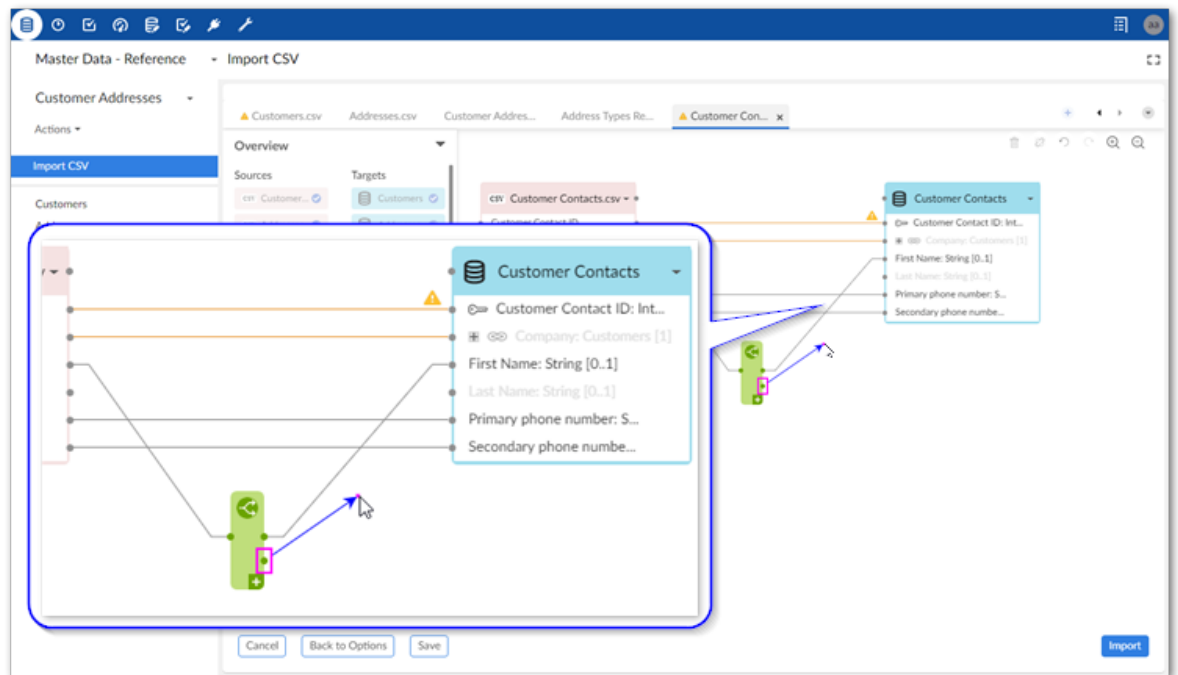
7. Optionally, add transformation functions:

Transformation functions allow you change the source data to meet technical or business requirements in the target. The add-on ships with several transformation functions that support common business cases. For more details on how to use transformation functions, see [Mapping interface reference](#) [p 89]. For information on the available transformations and their descriptions, see [Transformation function reference](#) [p 97].

1. To add a transformation, select and drag the desired transformation function to the mapping screen.



2. Select and drag fields from the source to the function's input (left) and connect the function's output (right) to target fields.



3. Double-click the transformation function to edit its parameters. Each function is different, for a complete list, see [Transformation function reference](#) [p 97].
8. Optionally, select **Save** to store your settings as a template for re-use. For more information on using templates, see [Using templates](#) [p 81].
9. Click **Import** to complete the process.

If errors prevent any of the records from importing correctly, the add-on presents you with the option of downloading an Excel file containing the invalid data. If you are importing CSV, the files containing invalid data for each table are combined in a zip file. If you are importing Excel, the invalid data for each table is added to a separate sheet in the downloadable file. Depending on your circumstances, you can correct the data directly in the files and re-import it.

See also

[Map and transform overview](#) [p 86]

[Mapping interface reference](#) [p 89]

[Export overview](#) [p 46]

Exporting data

CHAPTER 8

Export overview

The services provided by the add-on allow you to export data from your EBX® repository. The location you initiate the export from determines the source for the export. For instance, running the export service from a table's **Actions** menu, sets the table as the source. Running the service from a dataset's **Actions** menu sets its tables as sources. Overall, steps to complete these procedures are the same, except some details such as mapping differ. As outlined below, the export process includes:

- Specifying the source file name and any format-specific options for CSV and Excel export, or selecting the desired target location when exporting SQL. See [Exporting a table](#) [p 47] for instructions. Exporting to SQL is supported at the table level only and requires [administrative configuration](#) [p 10].
- Defining any required mappings or transformations. The add-on automatically generates a map of all source fields to target fields. If your circumstances require it, use the add-on's drag-n-drop functionality to update the mappings. If you want to apply transformations to your data, you can use built-in functions to modify data during export. For more information on the topics of mapping and transformations, see [Map and transform overview](#) [p 86].
- Saving settings as a template. When export operations require the use of transformations or custom mappings, you can use templates to store these settings. This alleviates you from having to redo the same tasks each time you perform a specific export.

See also

[Exporting a table](#) [p 47]

[Map and transform overview](#) [p 86]

[Mapping interface reference](#) [p 89]

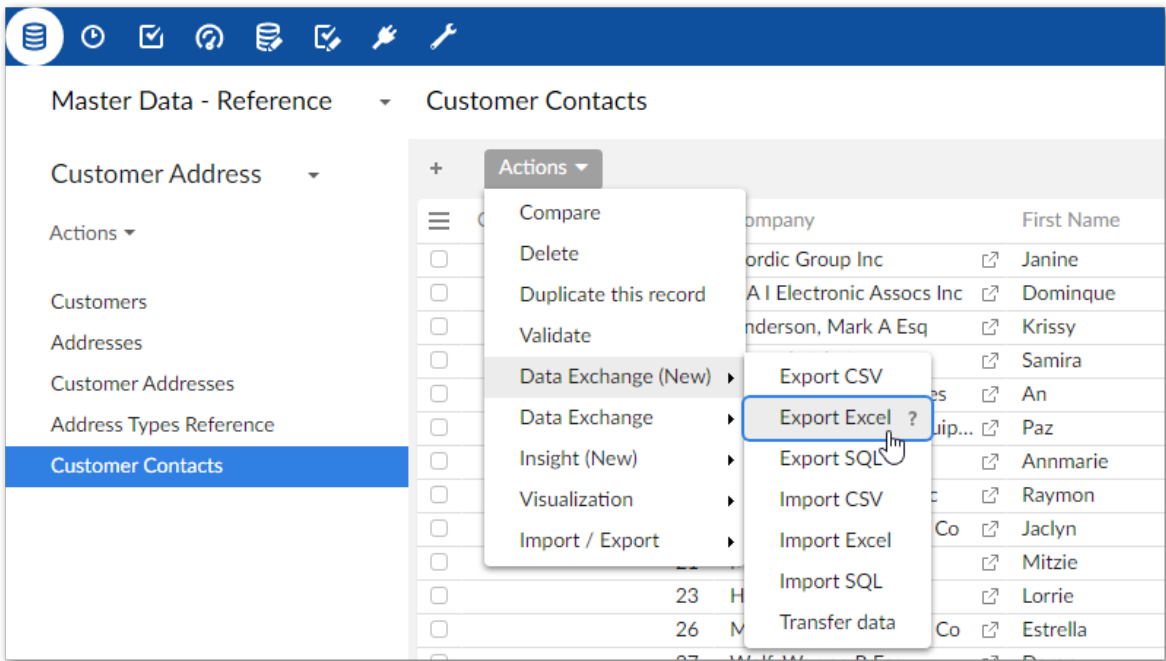
[Import overview](#) [p 24]

CHAPTER 9

Exporting a table

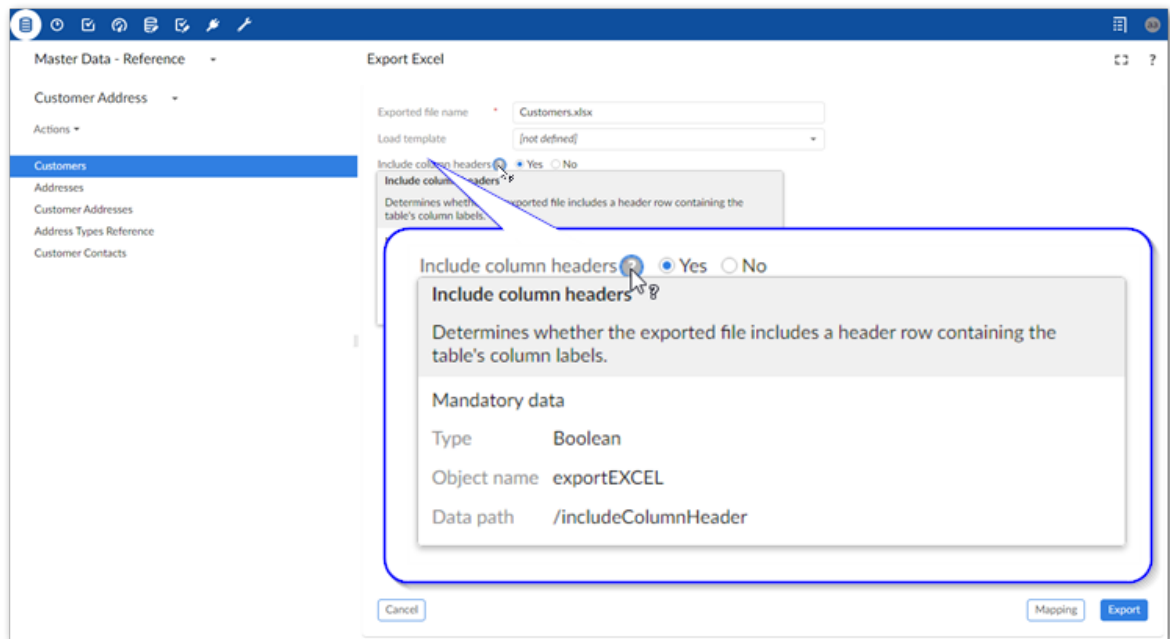
To export data to a CSV file, Excel file, or SQL table:

1. Initiate the export process:
 1. Navigate to the table you want to use as the source.
 2. Initiate the export process from the table by selecting *Actions > Data Exchange (New)* and choosing one of the following options: **Export CSV**, **Export Excel**, or **Export SQL**. Administrators must [configure the available SQL sources](#) [p 10] to enable the SQL export option.



2. Specify target information:
 - For CSV and Excel: Provide a file name and check the default options.
 - For SQL: Select the SQL data source, SQL target table, and check the default options.

If you have questions about the default options, hover your mouse over the label and select the '?' icon to see a description:



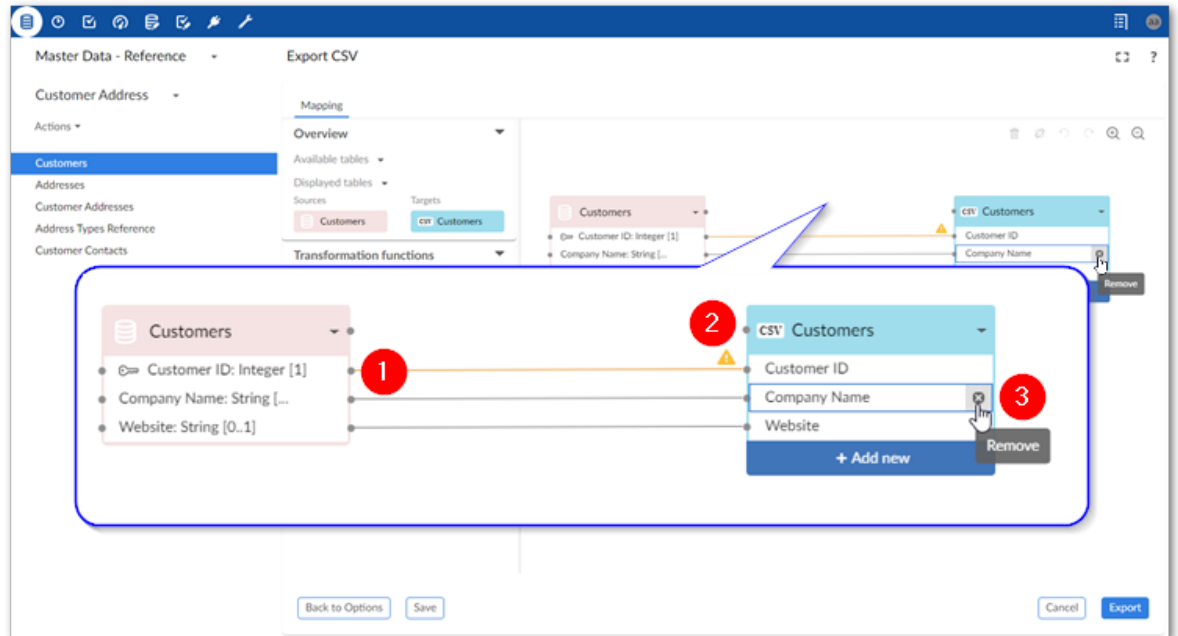
3. Optionally, update or create mappings:

Note

The following steps provide only high-level mapping instructions. See [Mapping interface reference](#) [p 89] for more detailed information on mapping and transformations.

1. Select **Mapping** to enter the mapping screen where you can update the default data mappings or add data transformations. For Excel and CSV export, the add-on automatically creates mappings where the source and target have the same labels. For SQL export, mappings are automatically created when the label and data type match. A mapping identifies which data is extracted from the source and where it is extracted to in the target.

The following image and list describe some features of table and field mapping:



-
- 1) **Mappings:** Each line is a mapping. Drag from one field's connection point to another to create a mapping. An orange color and icon indicates there is a warning for a mapping. Select the icon to view the warning. In these cases, where possible, the add-on will perform a default transformation.
-

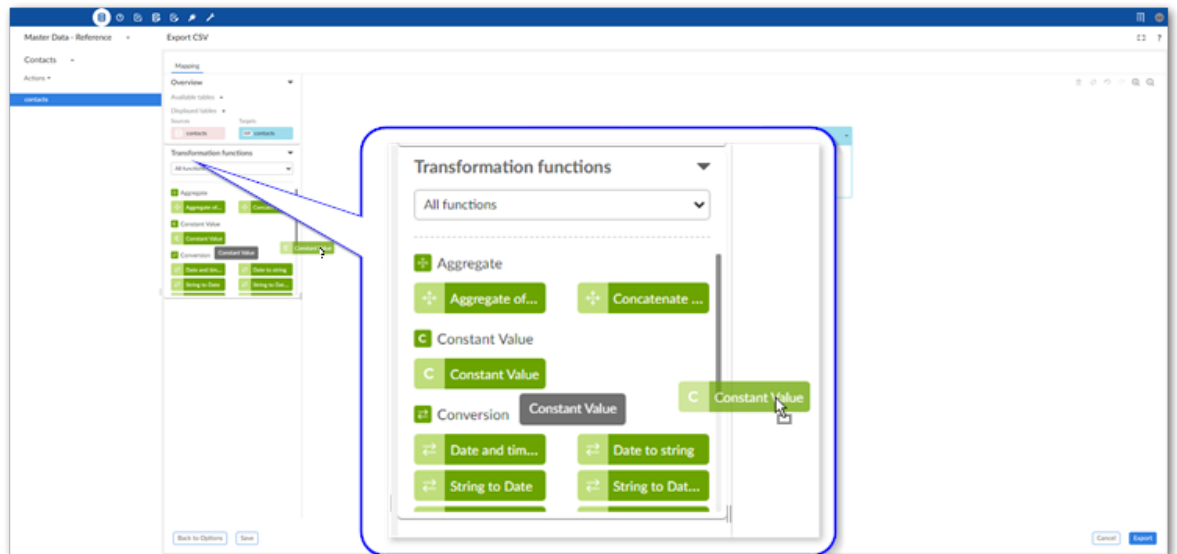
- 2) **Source (pink) and target (blue) tables:** By default, the data source displays on the left and includes data type and cardinality for fields. The target table on the right shows the field names that are included in the exported file. Each table header has a label and uses an icon to show its type and selecting the small arrow collapses and expands the table. The headers also have connection points. Drag this top point to automatically generate mappings between tables.
-

- 3) **Adding, editing, and removing fields (not available for SQL export):** You can add additional fields in the target file by selecting **Add new**. For instance you might want to use a transformation function to split a Full Name field into First Name and Last Name in the target. Double-click to edit field names. Hover your mouse over the field and select the 'x' icon to remove them.
-

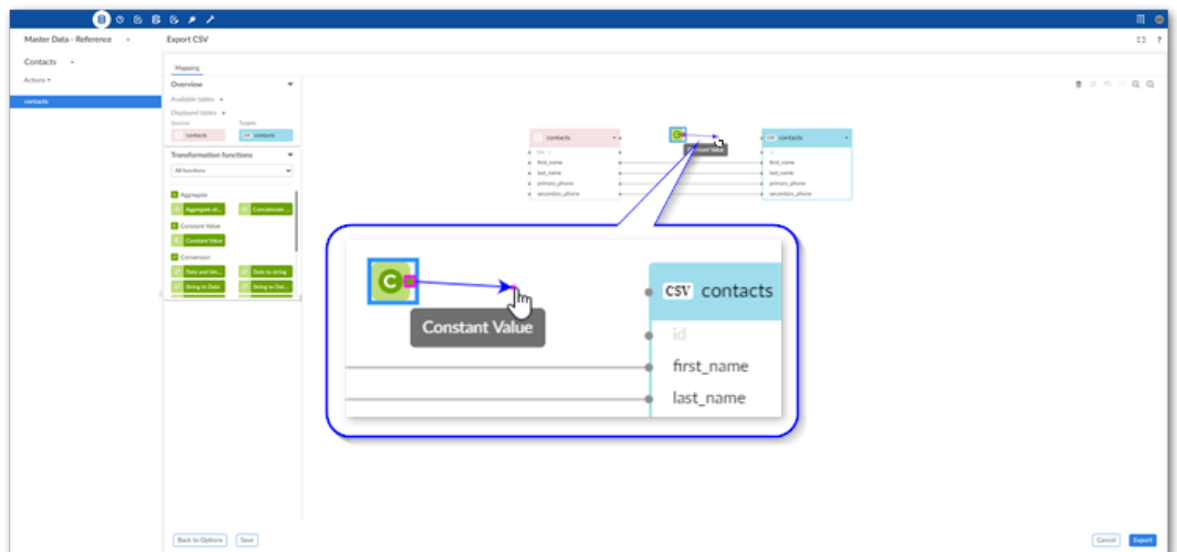
4. Optionally, add transformation functions:

Transformation functions allow you change the source data to meet technical or business requirements in the target. The add-on ships with several transformation functions that support common business cases. For more details on how to use transformation functions, see [Mapping interface reference](#) [p 89]. For information on the available transformations and their descriptions, see [Transformation function reference](#) [p 97].

1. To add a transformation, select and drag the desired transformation function to the mapping screen.



2. Select and drag fields from the source to the function's input (left) and connect the function's output (right) to target fields. In the example shown below a constant value is output to the target, so only the function's output is mapped.



3. Double-click the transformation function to edit its parameters. Each function is different, for a complete list, see [Transformation function reference](#) [p 97].
5. Optionally, select **Save** to store your settings as a template for re-use. For more information on using templates, see [Using templates](#) [p 81].

6. Click **Export** to complete the process.

See also

[*Map and transform overview*](#) [p 86]

[*Mapping interface reference*](#) [p 89]

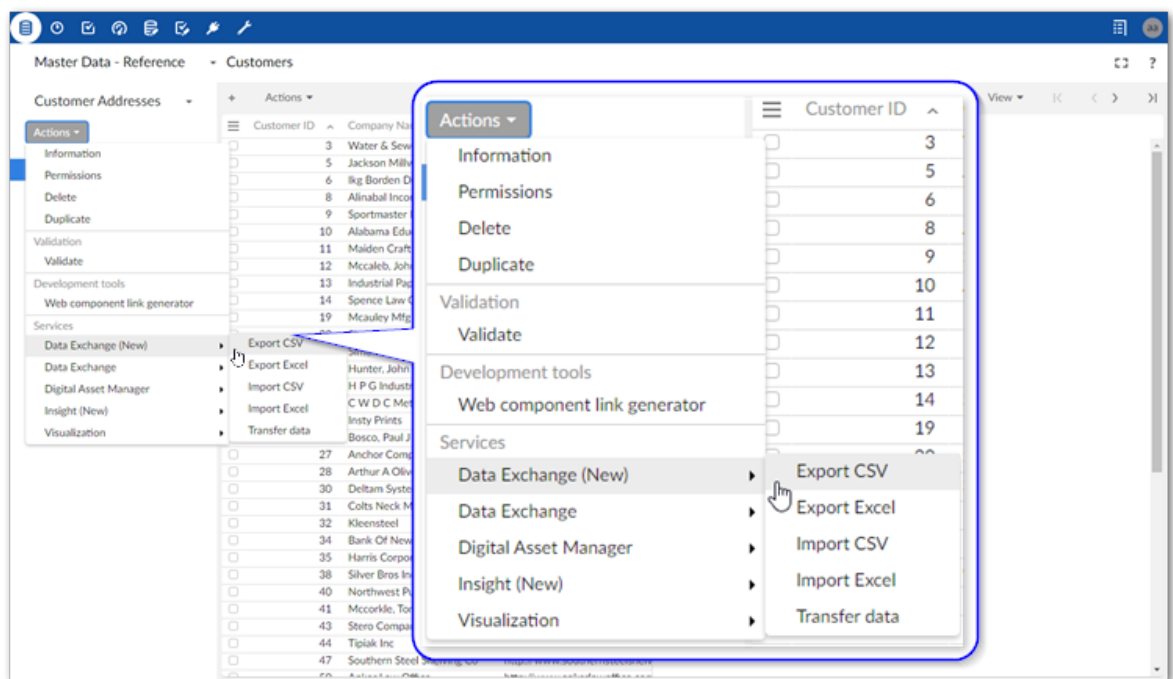
[*Export overview*](#) [p 46]

CHAPTER 10

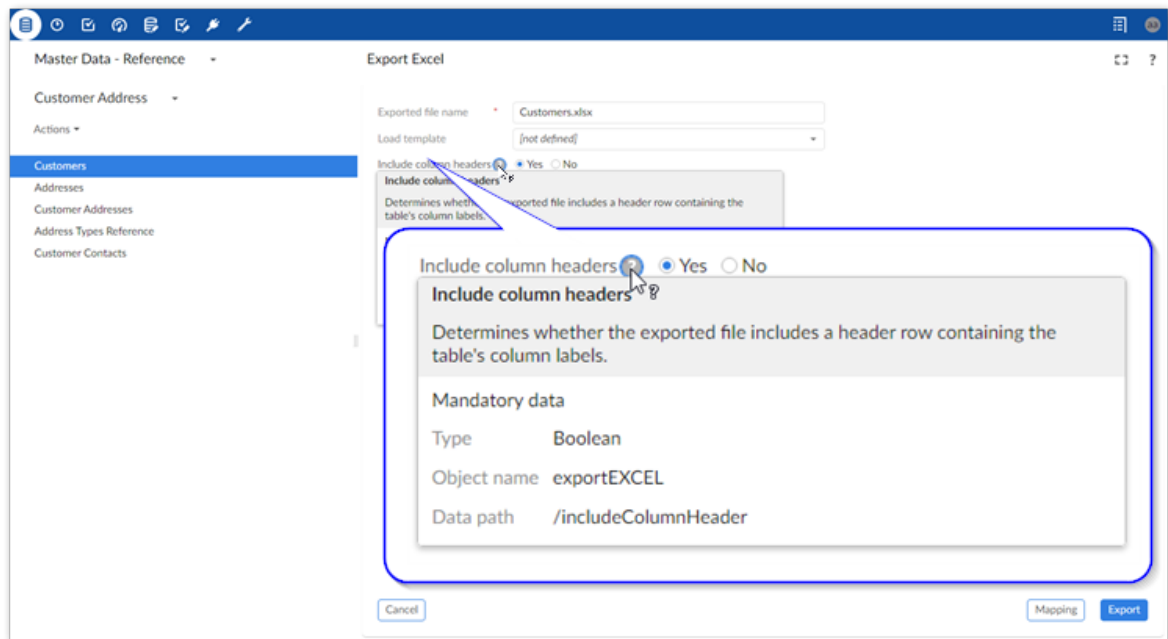
Exporting multiple tables

To export data to an Excel file or an archive (as CSV files):

1. Initiate the export process:
 1. Navigate to the dataset containing the source tables.
 2. Initiate the export process by selecting: *Actions > Data Exchange (New) > Export CSV or Export Excel*.



2. Supply a file name and check default options. If you have questions about individual settings, hover your mouse over the label and select the '?' icon to see a description:



3. Specify the tables you want to export with the **Choose the tables to export** property.

If you do not select all source tables and later decide to include one or more of the remaining tables, you can accomplish this using the options in the **Mapping** screen. See the next step for more details.

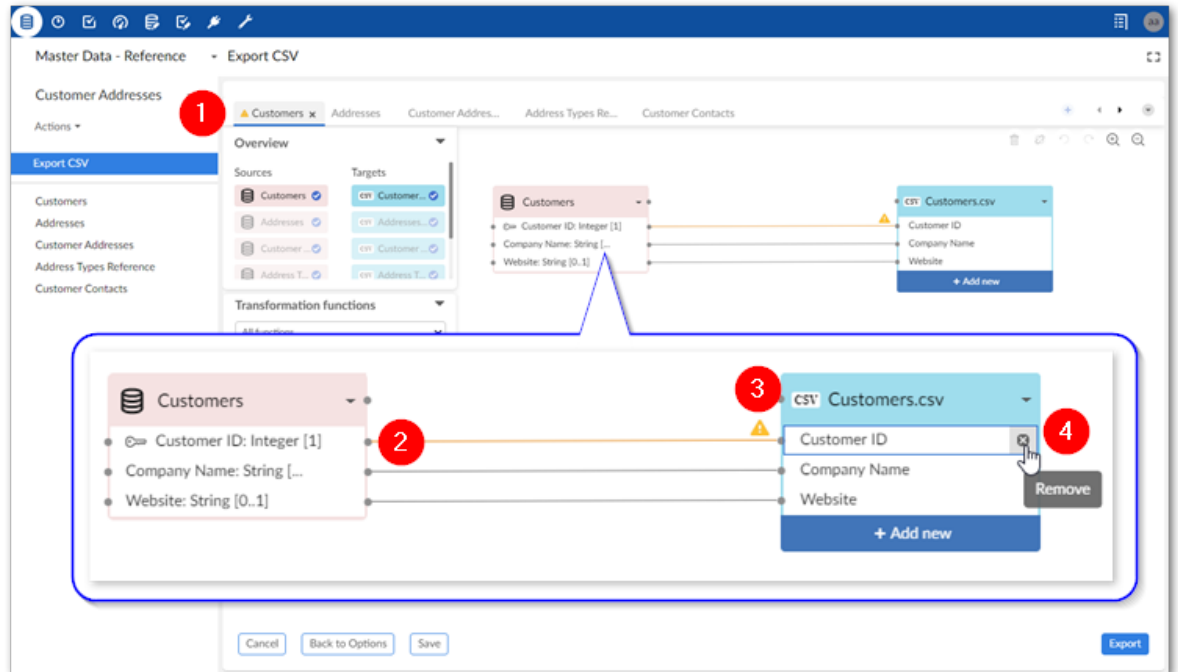
4. Optionally, update or create mappings:

Note

The following steps provide only high-level mapping instructions. See [Mapping interface reference](#) [p 89] for more detailed information on mapping and transformations.

1. Select **Mapping** to enter the mapping screen where you can update the default data mappings or add data transformations. The add-on automatically creates mappings where the source and target have the same labels. A mapping identifies which data is extracted from the source and where it is extracted to in the target.

The following image and list describe some features of table and field mapping:



1) Table mapping tabs

Each tab contains the mappings between a different pair of source and target tables. The icons to the right allow you to locate and navigate between tabs. Additionally, you can create new tabs, and add any unmapped source and target tables by dragging them from the **Overview** box to the mapping pane. Note that the '+' icon is disabled when all sources are already included in a mapping tab.

2) Mappings

Each line is a mapping. Drag from one field's connection point to another to create a mapping. An orange color and icon indicates there is a warning for a mapping. Select the icon to view the warning. In these cases, where possible, the add-on will perform a default transformation.

3) Source (pink) and target (blue) tables

By default, the data source displays on the left and includes data type and cardinality for fields. The target table on the right shows the field names that are included in the exported file. Each table header has a label and uses an icon to show its type and selecting the small arrow collapses and expands the table. The headers also have connection points. Drag this top point to automatically generate mappings between tables.

You can add, and map to additional target tables. See [Adding tables to the export](#) [p 57] for more information.

Please note that:

- You can use the same source or target only once in the mapping screen. In other words, you cannot use a source or target in more than one table mapping tab.
- Sources can have multiple targets, but targets can only have one source.

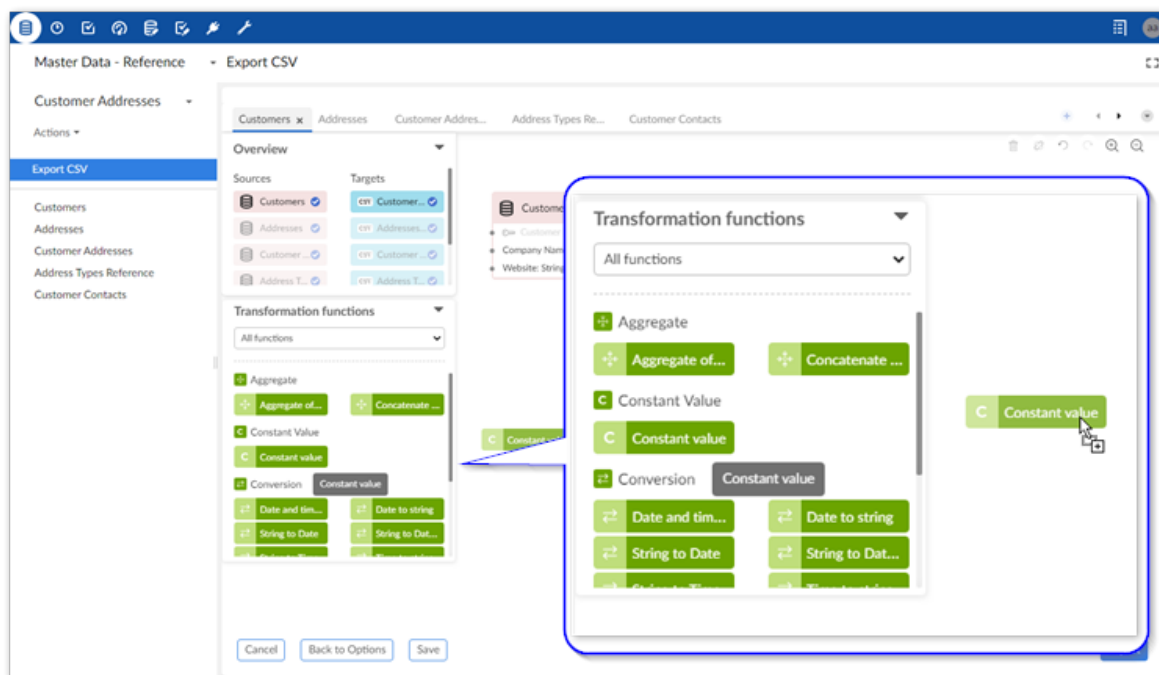
4) Adding, editing, and removing fields

You can add additional fields in the target file by selecting **Add new**. For instance you might want to use a transformation function to split a Full Name field into First Name and Last Name in the target. Double-click to edit field names. Hover your mouse over the field and select the 'x' icon to remove them.

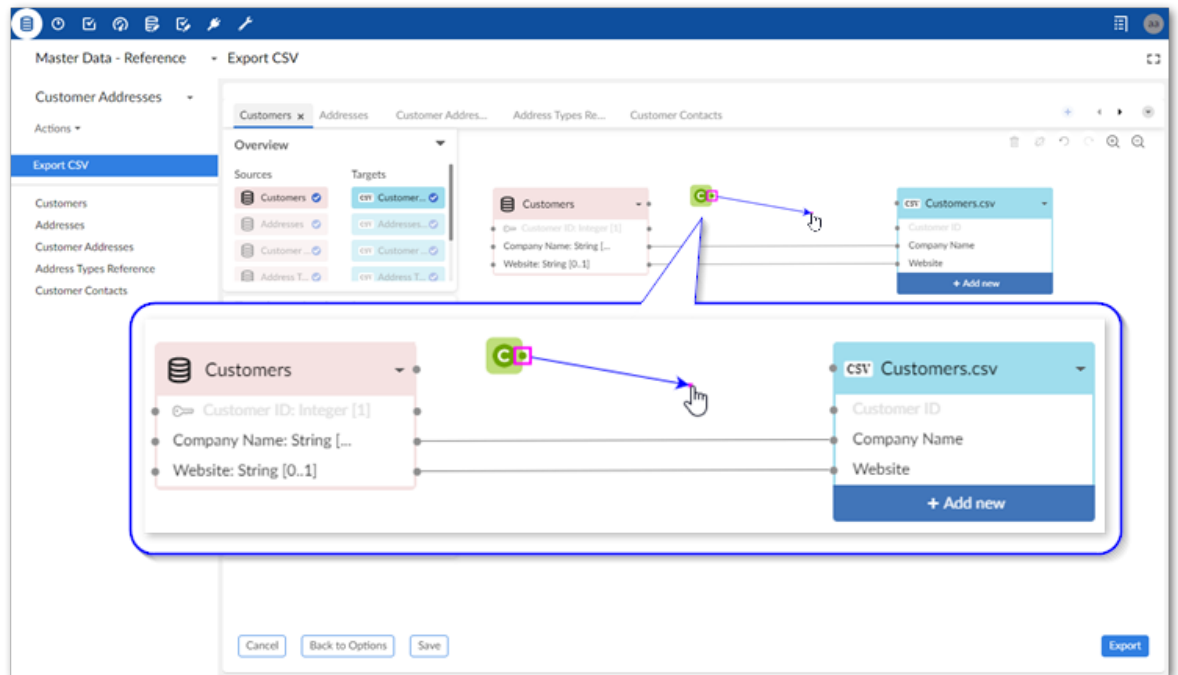
5. Optionally, add transformation functions:

Transformation functions allow you change the source data to meet technical or business requirements in the target. The add-on ships with several transformation functions that support common business cases. For more details on how to use transformation functions, see [Mapping interface reference](#) [p 89]. For information on the available transformations and their descriptions, see [Transformation function reference](#) [p 97].

1. To add a transformation, select and drag the desired transformation function to the mapping screen.



2. Select and drag fields from the source to the function's input (left) and connect the function's output (right) to target fields. In the example shown below a constant value is output to the target, so only the function's output is mapped.



3. Double-click the transformation function to edit its parameters. Each function is different, for a complete list, see [Transformation function reference](#) [p 97].
6. Optionally, select **Save** to store your settings as a template for re-use. For more information on using templates, see [Using templates](#) [p 81].
7. Click **Export** to complete the process.

See also

[Map and transform overview](#) [p 86]

[Mapping interface reference](#) [p 89]

[Export overview](#) [p 46]

This chapter contains the following topics:

1. [Adding tables to the export](#)

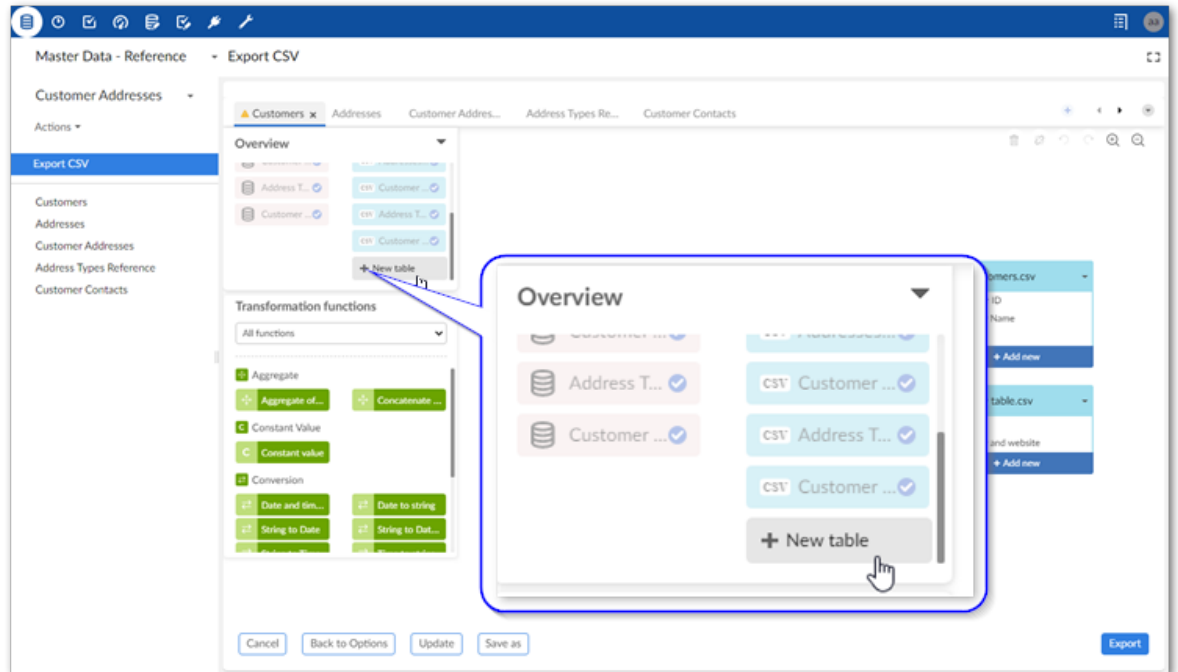
10.1 Adding tables to the export

You can include additional target tables in an export from the **Mapping** screen. One source table can map to multiple targets. This allows you to split source data into multiple tables.

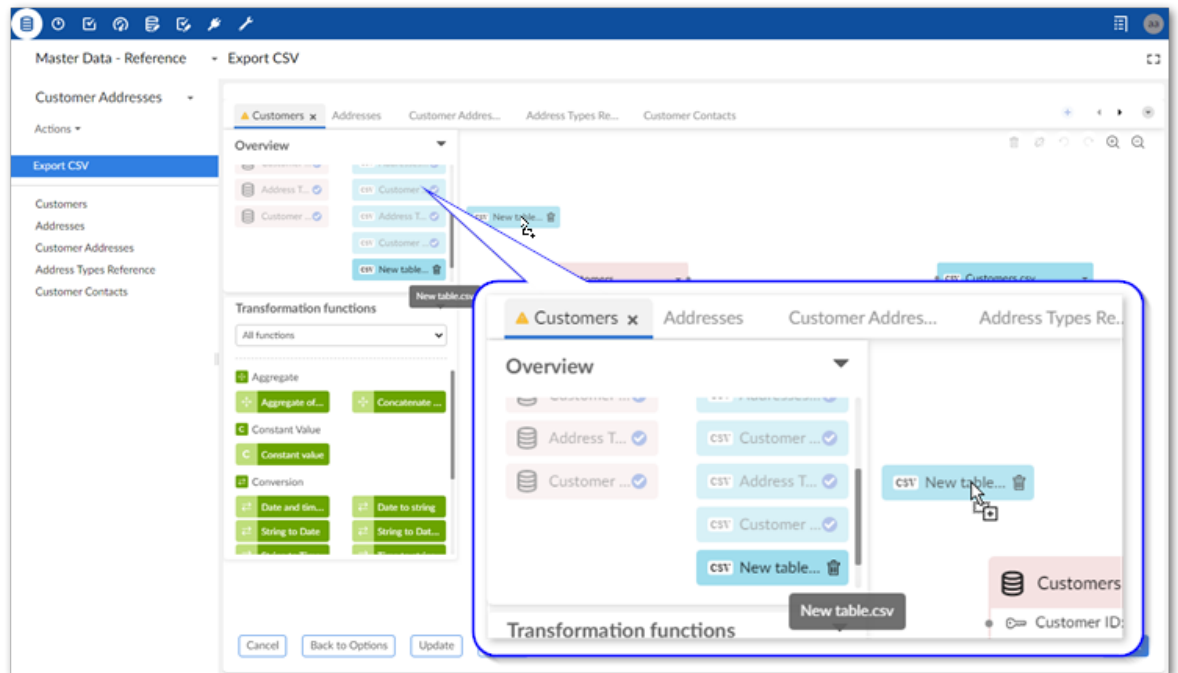
The following steps assume you have already initiated the export process and outline how to add target tables to an export:

1. Add a new target table:

1. From the **Overview** box in the **Mapping** screen, select **New table**.

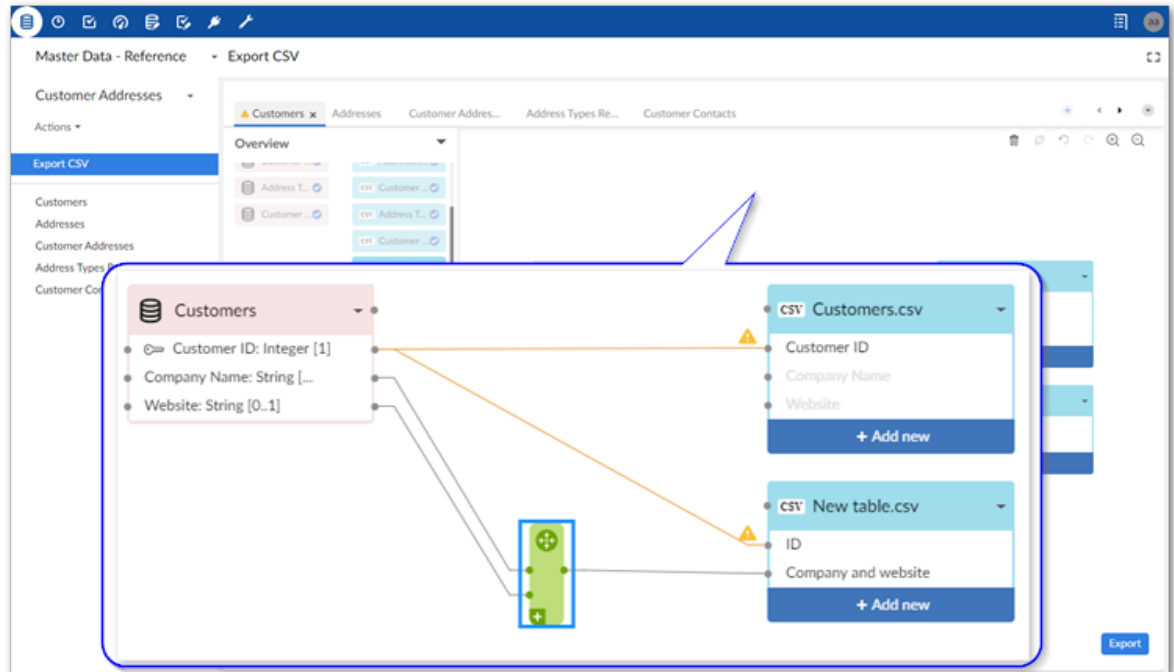


2. Drag the new table to the mapping screen.



2. Add fields to the new table by selecting **Add new**.
After adding a field, you can double-click to edit its name, or select the 'x' icon to remove it.
3. Drag from fields in the source table to fields in the new target to create mappings.

As shown below, you can also include a transformation function to manipulate data if required.



4. Repeat the previous steps until you have all required target tables.

CHAPTER 11

Exporting labels and related data

This chapter contains the following topics:

1. [Overview](#)
2. [Exporting labels](#)
3. [Exporting related data](#)

11.1 Overview

Instructional details for some of the add-on's export options and example output are included in the following sections:

- [Exporting labels](#) [p 61]
- [Exporting related data](#) [p 64]

11.2 Exporting labels

When exported data includes a primary key, foreign key, or enumeration, the resulting file might be difficult to parse. The values contained in these fields are often numbers or other identifiers, and make it challenging to extract meaningful information. To alleviate this, the add-on allows you to export the labels for these fields. Note, that labels for these fields must be defined in the data model and can only be set by someone with administrative access to edit the data model. See [Setting labels](#) [p 63] below for high-level information on where to set the labels.

To include labels in an exported file:

1. Initiate the export process.

Label export options are available at the dataset and table levels for CSV and Excel, but only the table level for SQL. This example demonstrates exporting from one table to Excel and including labels from a foreign key. With the exception of the following differences, the process and results are similar for the other export formats and label options:

- The option to export static enumerations is only available for Excel export.
- When exporting at the dataset level: each sheet in an Excel file will contain data for one table included in the export.
- If you do not have permission to view a field it is not included in the export.

See [Exporting a table](#) [p 47] or [Exporting multiple tables](#) [p 53] for detailed instructions on exporting.

2. Choose the types of labels to export by selecting the corresponding options.

Note

You cannot use a transformation function on a field that is a static enumeration.

Export Excel

Exported file name *

Customers.xlsx

Load template

[not defined]

Include column headers *

☒ Yes ☐ No

Export label

☐ From primary key
☒ From foreign key
☐ From enumeration field
☐ From static enumeration

Export related data

☐ Referred to by the source table

1

 Level

☐ That references the source table

1

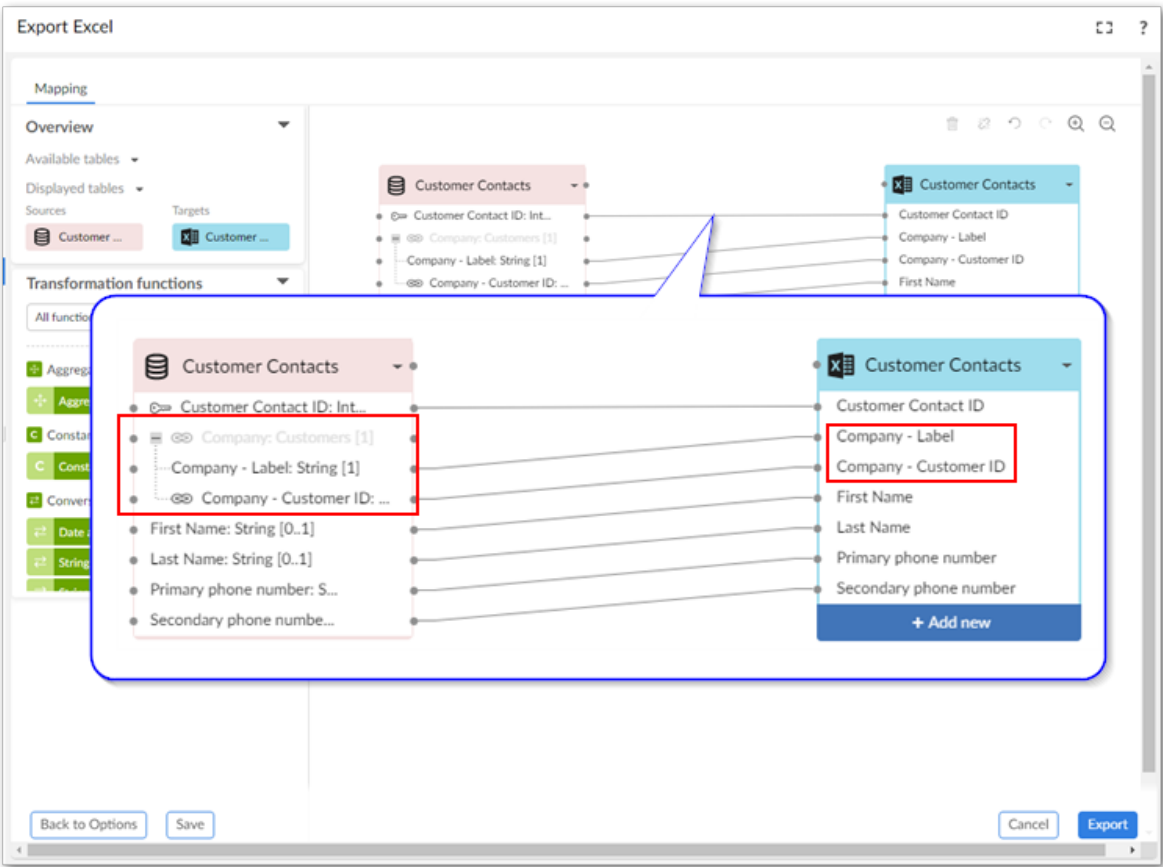
 Level

List separator *

☒ Line return
☐ Space
☐ Tab
☐ ;

3. Optionally, change mappings.

As shown in the example below, you can find the label mappings in an expandable section in the source table.



4. Complete the export process.

The following image shows the file resulting from the export with the label column (Company - Label) included:

	A	B	C	D	E
1	Customer Contact ID	Company - Label	Company - Customer ID	First Name	Last Name
2	1	Nordic Group Inc	540	Janine	Rhoden
3	2	E A I Electronic Assocs Inc	325	Dominque	Dickerson
4	3	Anderson, Mark A Esq	454	Krissy	Rauser
5	4	Mutual Fish Co	577	Samira	Heintzman

Setting labels

If you have administrative access to edit a data model in the Data Model Assistant (DMA), you can determine the exported labels for each field type by adding a label in the following locations:

- Enumerations: select the field and navigate to *Simple controls > Enumeration > Items > Label*.
- Primary keys: select the table and navigate to *Advanced properties > Table > Presentation > Record labeling*.

- Foreign keys: select the field and navigate to *Advanced controls > Foreign key constraint > Record labeling*.

Note

You can view the TIBCO EBX® product documentation for more details on this topic.

11.3 Exporting related data

You can export data from related tables when exporting to Excel or CSV formats. You have the option of including data from related tables up to 5 levels from the main source table (the table where you run the export service). Only data related to records selected for export in the export's source table are exported.

When exporting to:

- CSV: The add-on exports a ZIP file containing individual CSV files. Each file contains data from one table and one of the files includes metadata about the related tables included in the export.
- Excel: The add-on exports a single Excel file. The first sheet in the file contains the export's source data. Each additional sheet—one for each table—contains the related data. The final sheet in the file contains metadata about the related tables included in the export.

To export related data:

1. Initiate the export process for CSV or Excel.

See [Exporting a table](#) [p 47] for detailed instructions on exporting.

Note

Label export options are only available at the table level.

2. Include data from related tables using one of the following options:
 1. Select the related data to export using the following options:
 - Referred to by the source table
 - That references the source table

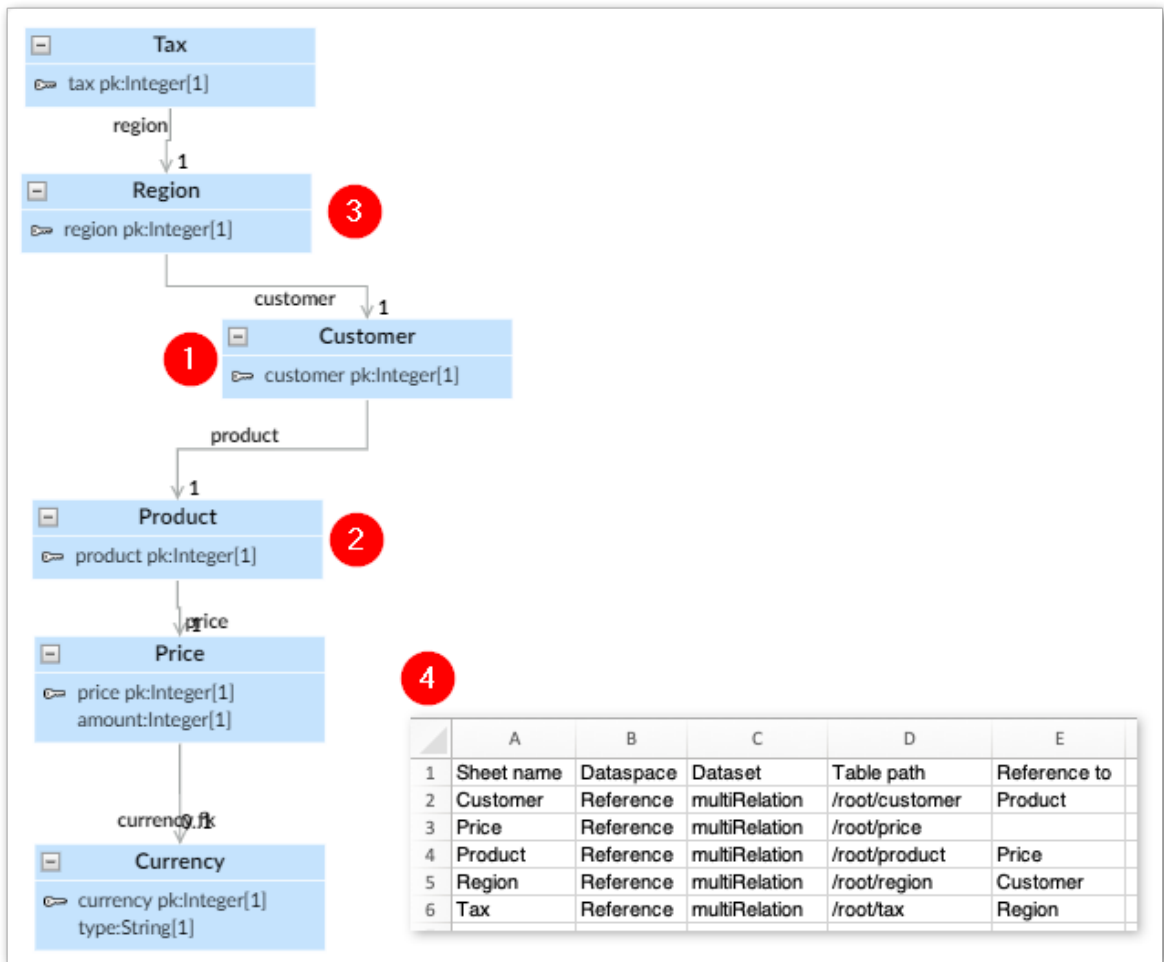
2. Optionally, use the **Level** drop down menu to determine how much related data should be included.

Export Excel

Exported file name *	<input type="text" value="Customer.xlsx"/>		
Load template	<input type="text" value="[not defined]"/>		
Include column headers *	<input checked="" type="radio"/> Yes <input type="radio"/> No		
Export label	<input type="checkbox"/> From primary key <input type="checkbox"/> From foreign key <input type="checkbox"/> From enumeration field <input type="checkbox"/> From static enumeration		
Export related data	<input checked="" type="checkbox"/> Referred to by the source table	<input type="text" value="2"/>	▼ Level
	<input checked="" type="checkbox"/> That references the source table	<input type="text" value="2"/>	▼ Level
List separator *	<input checked="" type="radio"/> Line return <input type="radio"/> Space <input type="radio"/> Tab <input type="radio"/> ;		

3. Optionally, change or update mappings.
4. Complete the export process.

The following image and list include a data model diagram and export results to highlight the behavior of exporting related data:



1) Source table	The export service was run from the Customer table.
2) Referenced by the source table	The Customer table holds a FK to the Product table, but not directly to Price, or Currency. The related data from Price was included in the export because it was within the number of levels specified (2), whereas Currency was not.
3) Tables that reference the source table	Data from the Region table, which has a direct FK to Customer, and Tax table was included in the export.
4) Results	The reference sheet includes metadata about all related tables included in the export.

See also

- [Exporting a table](#) [p 47]
- [Map and transform overview](#) [p 86]

[*Mapping interface reference*](#) [p 89]

[*Import overview*](#) [p 24]

Transferring data

CHAPTER 12

Transfer overview

The **Transfer data** service allows you to move data between tables within your EBX® repository. The table or dataset you initiate the action from sets the data source. You can then choose the targets and specify any required mappings or transformations.

Note

All EBX® permissions apply to data transfer operations. You cannot transfer to target tables and fields unless you have permission to write data in these locations.

As outlined below, the transfer process includes:

- Running the **Transfer data** service from a table or dataset's **Actions** menu.
- Defining any required mappings or transformations. The add-on automatically maps source fields with those in the target that have the same name. If required, you can use the add-on's drag-n-drop functionality to create or update mappings. If you want to apply transformations to your data, you can use built-in functions to modify data during transfer. For more information on the topics of mapping and transformations, see [Map and transform overview](#) [p 86].
- Saving settings as a template for later reuse. When import operations require the use of transformations or custom mappings, you can use templates to store these settings. This alleviates you from having to redo the same tasks each time you perform a specific import.

See also

[Transferring to a table](#) [p 71]

[Map and transform overview](#) [p 86]

[Mapping interface reference](#) [p 89]

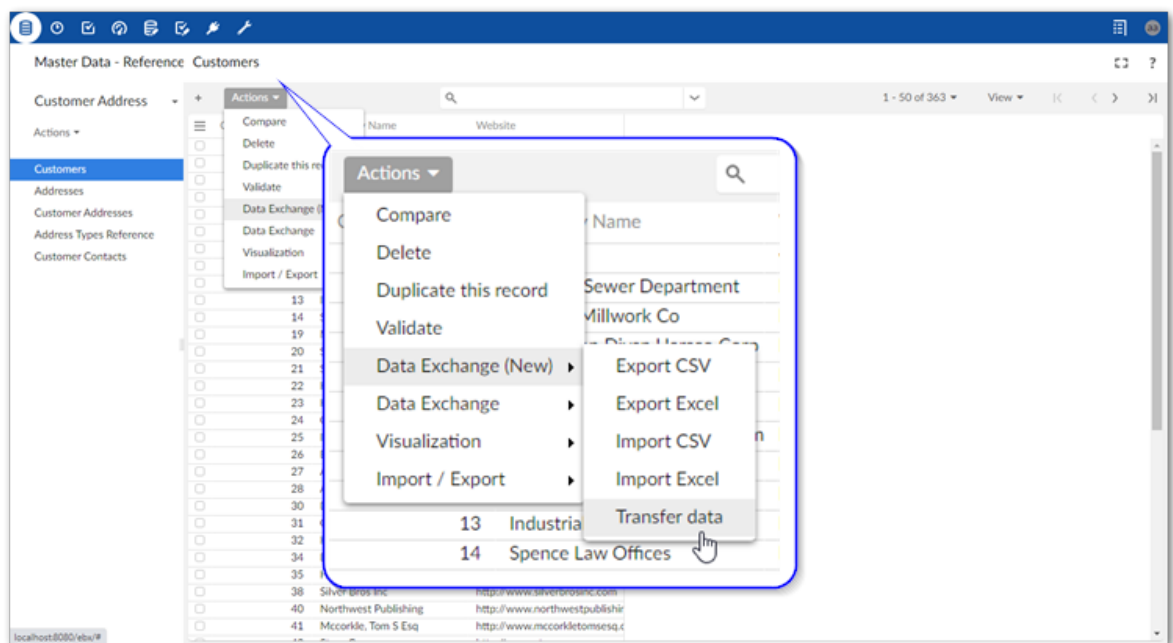
[Export overview](#) [p 46]

CHAPTER 13

Transferring to a table

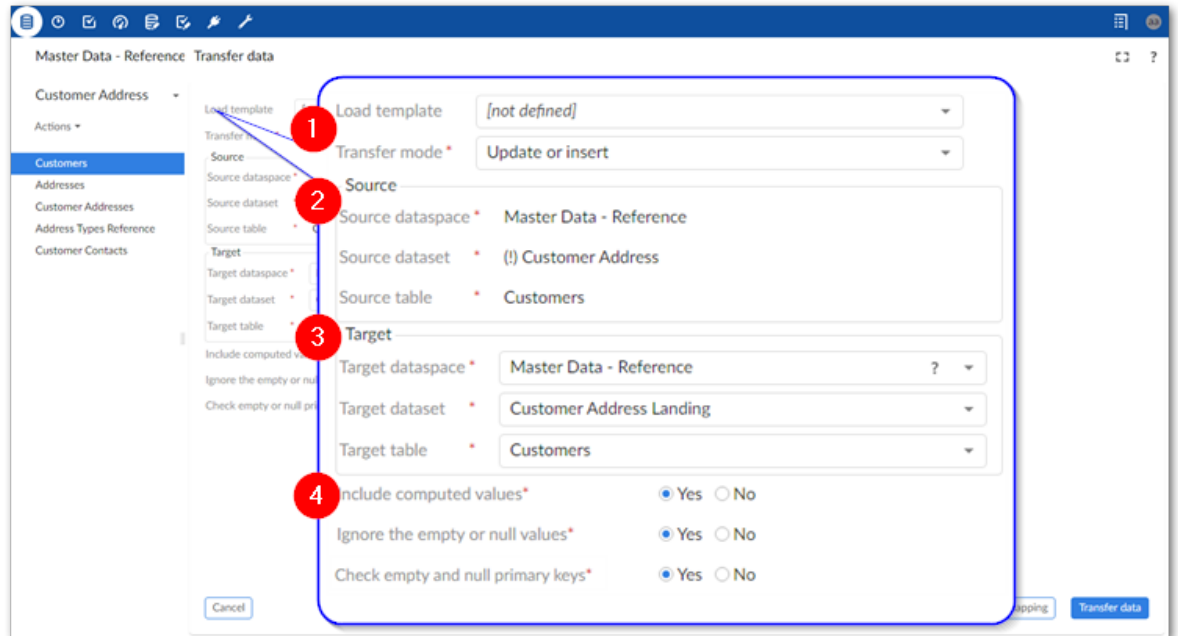
To transfer data between two tables:

1. Initiate the transfer process:
 1. Navigate to the table containing the source data you want to transfer.
 2. Initiate the import process from the table by selecting: *Actions > Data Exchange (New) > Transfer data*.



2. Set transfer options:

1. The following image and list highlight some of the options when transferring data:



- | | |
|----|---|
| 1) | <p>Load template: Optionally, select a template to populate all data transfer settings and mappings.</p> <p>Transfer mode: Select the desire transfer mode.</p> |
| 2) | <p>Source: displays the source table information.</p> |
| 3) | <p>Target: Use the menus to select the target table for this transfer.</p> |
| 4) | <p>Specify whether this transfer: includes computed values, ignores null and empty values, and checks empty and null primary keys.</p> |

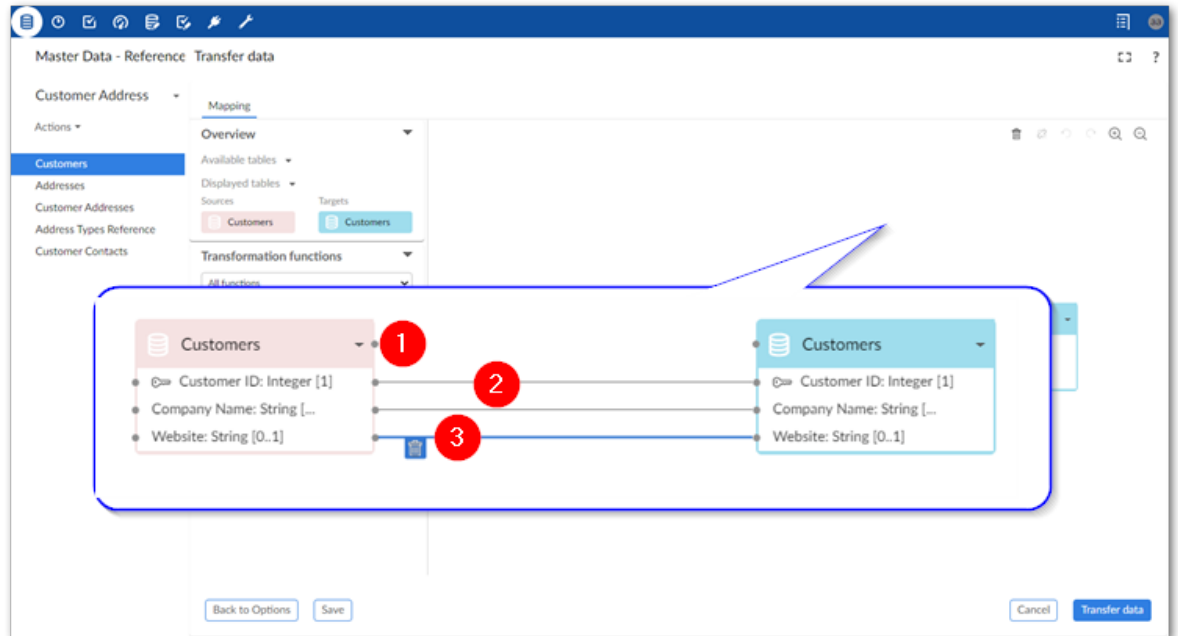
3. Optionally, update or create mappings:

Note

The following steps provide only high-level mapping instructions. See [Mapping interface reference](#) [p 89] for more detailed information on mapping and transformations.

1. Select **Mapping** to enter the mapping screen where you can update the default data mappings or add data transformations. The add-on automatically creates mappings where the source and target have the same labels. A mapping identifies which data is extracted from the source and where it is extracted to in the target.

The following image and list describe some features of table and field mapping:

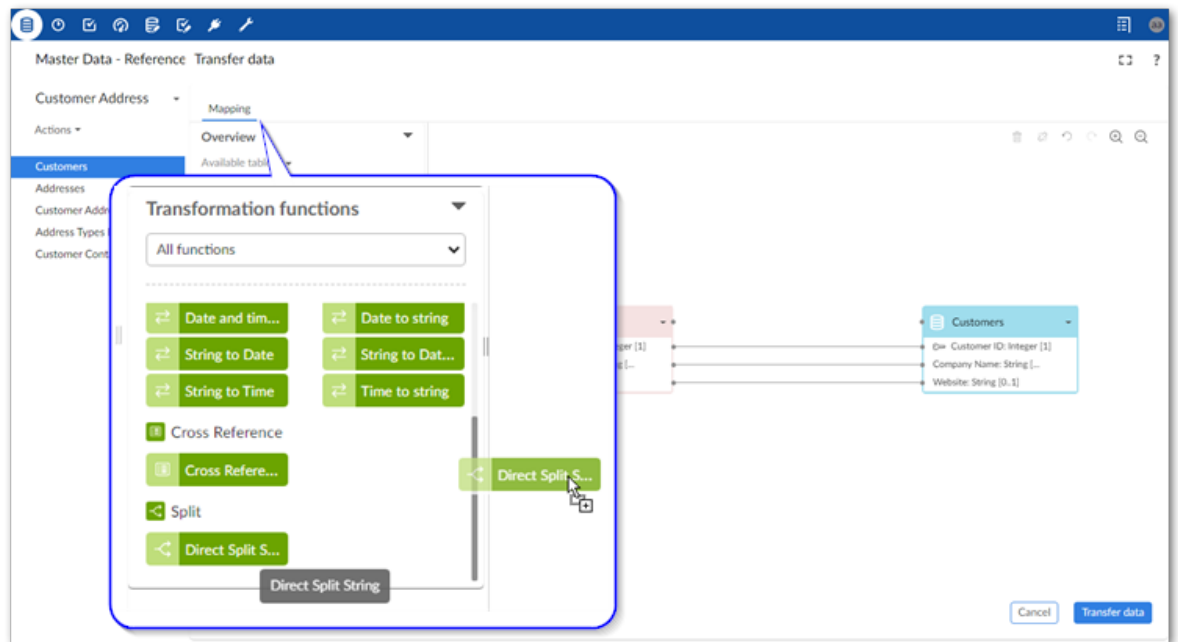


- 1) **Source (pink) and target (blue) tables:** By default, the data source displays on the left and the target on the right. Each table header has a label and uses an icon to show its type and selecting the small arrow collapses and expands the table. The headers also have connection points. Drag this top point to automatically generate mappings between tables.
- 2) **Mappings:** Each line is a mapping. An orange color and icon indicates there is a warning for a mapping. Select the icon to view the warning. Drag from one field's connection point to another to create a mapping.
- 3) **Delete selected:** To delete a mapping, select it and then the garbage icon.

4. Optionally, add transformation functions:

Transformation functions allow you change the source data to meet technical or business requirements in the target. The add-on ships with several transformation functions that support common business cases. For more details on how to use transformation functions, see [Mapping interface reference](#) [p 89]. For information on the available transformations and their descriptions, see [Transformation function reference](#) [p 97].

1. To add a transformation, select and drag the desired transformation function to the mapping screen.



2. Select and drag fields from the source to the function's input (left) and connect the function's output (right) to target fields.
3. Double-click the transformation function to edit its parameters. Each function is different, for a complete list, see [Transformation function reference](#) [p 97].
5. Optionally, select **Save** to store your settings as a template for re-use. For more information on using templates, see [Using templates](#) [p 81].
6. Click **Transfer data** to complete the process.

See also

[Map and transform overview](#) [p 86]

[Mapping interface reference](#) [p 89]

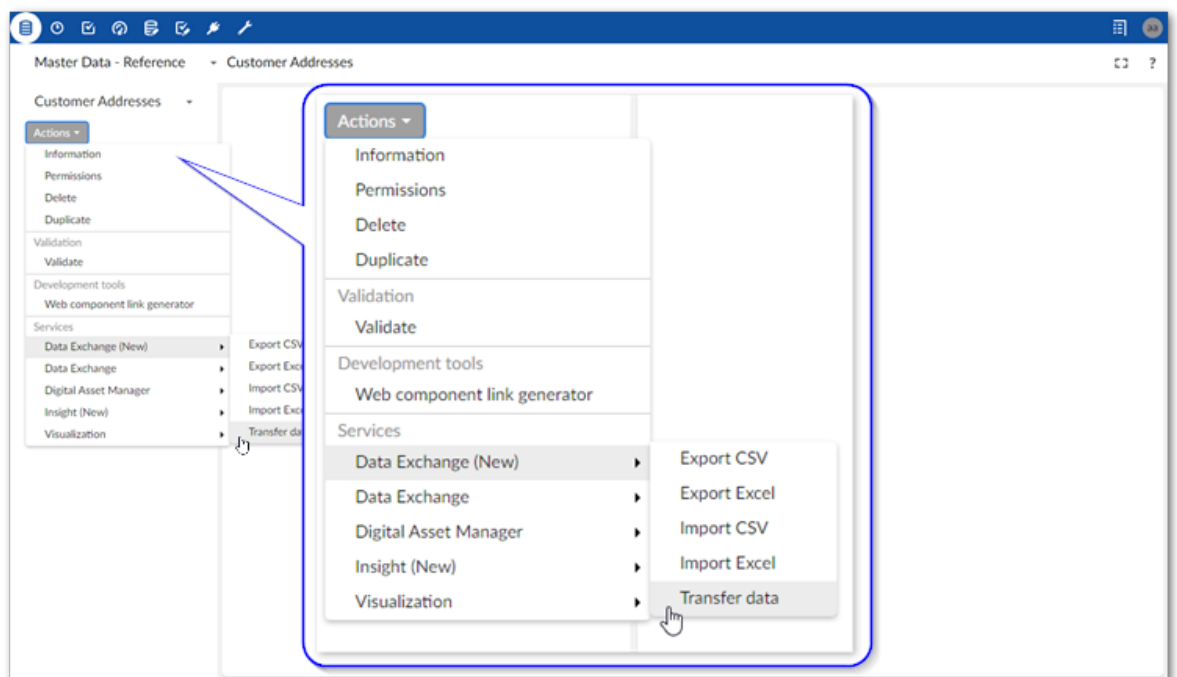
[Export overview](#) [p 46]

CHAPTER 14

Transferring to multiple tables

To transfer data between multiple tables:

1. Initiate the transfer process:
 1. Navigate to the dataset containing the source data you want to transfer.
 2. Initiate the import process from the table by selecting: *Actions > Data Exchange (New) > Transfer data*.



2. Set transfer options:

1. The following image and list highlight some of the options when transferring data:

The screenshot shows a configuration window for data transfer. It includes fields for 'Load template' (set to '[not defined]'), 'Transfer mode' (set to 'Update or insert'), and a 'Target' section. The 'Target' section contains a list of target groups, each with fields for 'Target datasource', 'Target dataset', and 'Target table'. The first target group is selected, showing 'Master Data - Reference' for the datasource, 'customerAddress' for the dataset, and a list of tables for the target table. The 'Select All' option is checked. At the bottom, there are three checkboxes: 'Include computed values', 'Ignore empty or null values', and 'Check empty and null primary keys', all of which are set to 'Yes'.

-
- 1) **Load template:** Optionally, select a template to populate all data transfer settings and mappings.
Transfer mode: Select the desired transfer mode.
-

- 2) **Target:** Use the menus to select the target table for this transfer. You can add additional targets by selecting the '+' icon in the bottom-left corner of the target group.

Note

You can add up to 7 target groups at a time. To add more, you must first select **Save**.

-
- 3) Specify whether this transfer: includes computed values, ignores null and empty values, and checks empty and null primary keys.
-

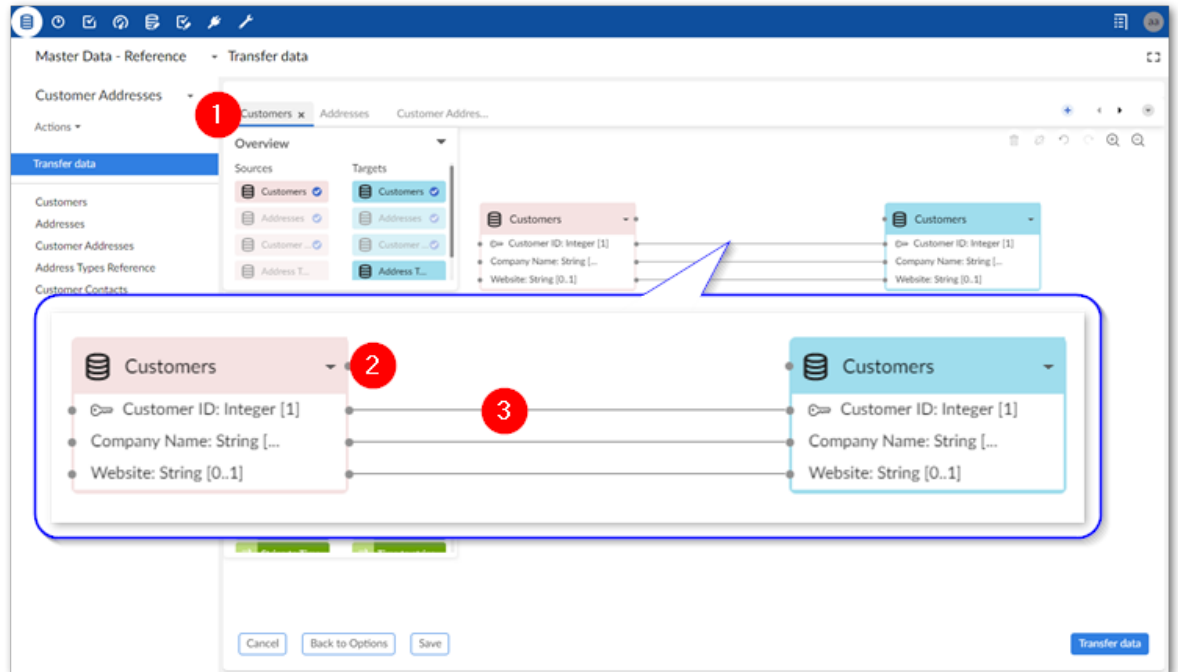
3. Optionally, update or create mappings:

Note

The following steps provide only high-level mapping instructions. See [Mapping interface reference](#) [p 89] for more detailed information on mapping and transformations.

1. Select **Mapping** to enter the mapping screen where you can update the default data mappings or add data transformations. The add-on automatically creates mappings where the source and target have the same labels. A mapping identifies which data is extracted from the source and where it is extracted to in the target.

The following image and list describe some features of table and field mapping:



1) Table mapping tabs

Each tab contains the mappings between a different pair of source and target tables. The icons to the right allow you to locate and navigate between tabs. Additionally, you can create new tabs, and add any unmapped source and target tables by dragging them from the **Overview** box to the mapping pane. Note that the '+' icon is disabled when all sources are already included in a mapping tab.

2) Source (pink) and target (blue) tables

By default, the data source displays on the left and the target on the right. Each table header has a label and uses an icon to show its type and selecting the small arrow collapses and expands the table. The headers also have connection points. Drag this top point to automatically generate mappings between tables.

Please note that:

- You can use the same source or target only once in the mapping screen. In other words, you cannot use a source or target in more than one table mapping tab.
- Sources can have multiple targets, but targets can only have one source.

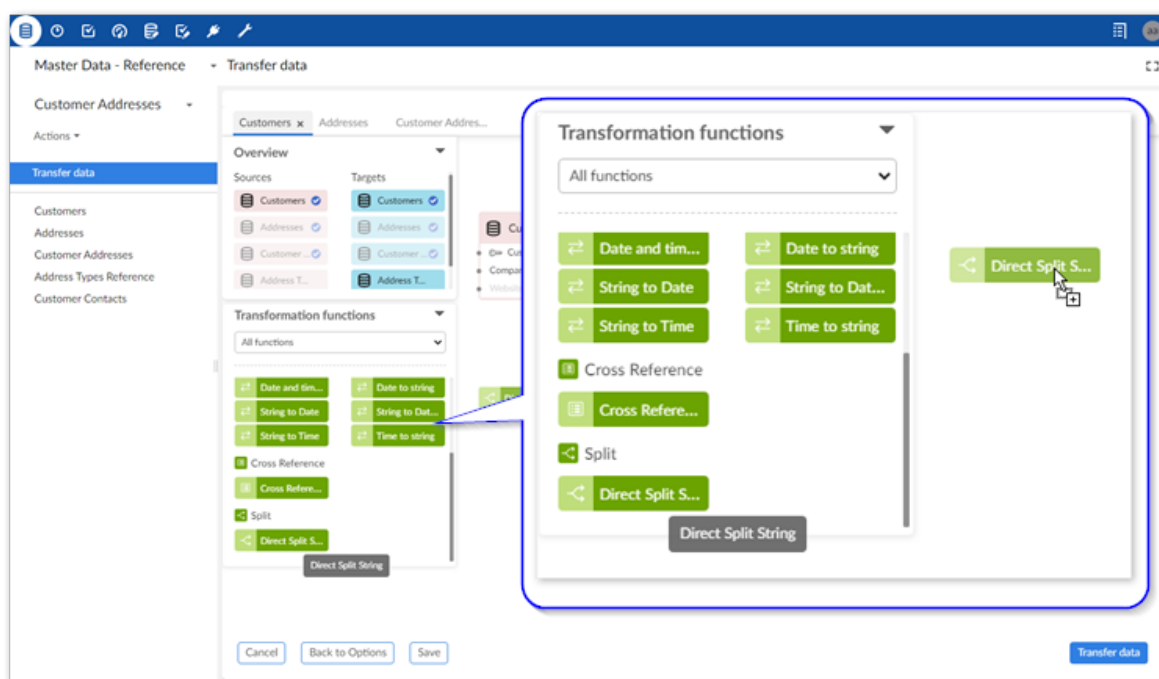
3) Mappings

Each line is a mapping. An orange color and icon indicates there is a warning for a mapping. Select the icon to view the warning. Drag from one field's connection point to another to create a mapping. To delete a mapping, select it and then the trash icon.

4. Optionally, add transformation functions:

Transformation functions allow you change the source data to meet technical or business requirements in the target. The add-on ships with several transformation functions that support common business cases. For more details on how to use transformation functions, see [Mapping interface reference](#) [p 89]. For information on the available transformations and their descriptions, see [Transformation function reference](#) [p 97].

1. To add a transformation, select and drag the desired transformation function to the mapping screen.



2. Select and drag fields from the source to the function's input (left) and connect the function's output (right) to target fields.
3. Double-click the transformation function to edit its parameters. Each function is different, for a complete list, see [Transformation function reference](#) [p 97].
5. Optionally, select **Save** to store your settings as a template for re-use. For more information on using templates, see [Using templates](#) [p 81].
6. Click **Transfer data** to complete the process.

See also

[Map and transform overview](#) [p 86]

[Mapping interface reference](#) [p 89]

[Export overview](#) [p 46]

CHAPTER 15

Using templates

The add-on allows you to store configuration settings in templates. Each template holds an import, export or data transfer operation's option settings and mapping details.

The option to save a template is available after entering the **Mapping** screen. At this point, you already entered source/target information and specified any format specific options to apply. The add-on auto-generated mappings where possible. You can save a template with the current configuration, or update mappings and add transformations before saving. As shown below, to create a template, you specify a unique name, optional description, owner, and template permissions:

The screenshot shows the 'Export CSV' configuration window. On the left, a sidebar lists navigation options: Master Data - Reference, Customer Address, Actions, Customers (selected), Addresses, Customer Addresses, Address Types Reference, and Customer Contacts. The main panel is titled 'Export CSV' and contains the following fields:

- Template name ***: CSV Export
- Description**: English (United States) Export Customers to CSV
- Owner ***: admin admin (admin)
- Permissions**:
 - 1. Profile: nonAdmin nonAdmin (nonAdmin)
 - Restriction policy: ☐ Yes ☒ No
 - Actions:
 - Use the template: ☒ Yes ☐ No
 - Modify the template: ☒ Yes ☐ No
 - Delete the template: ☐ Yes ☒ No

This chapter contains the following topics:

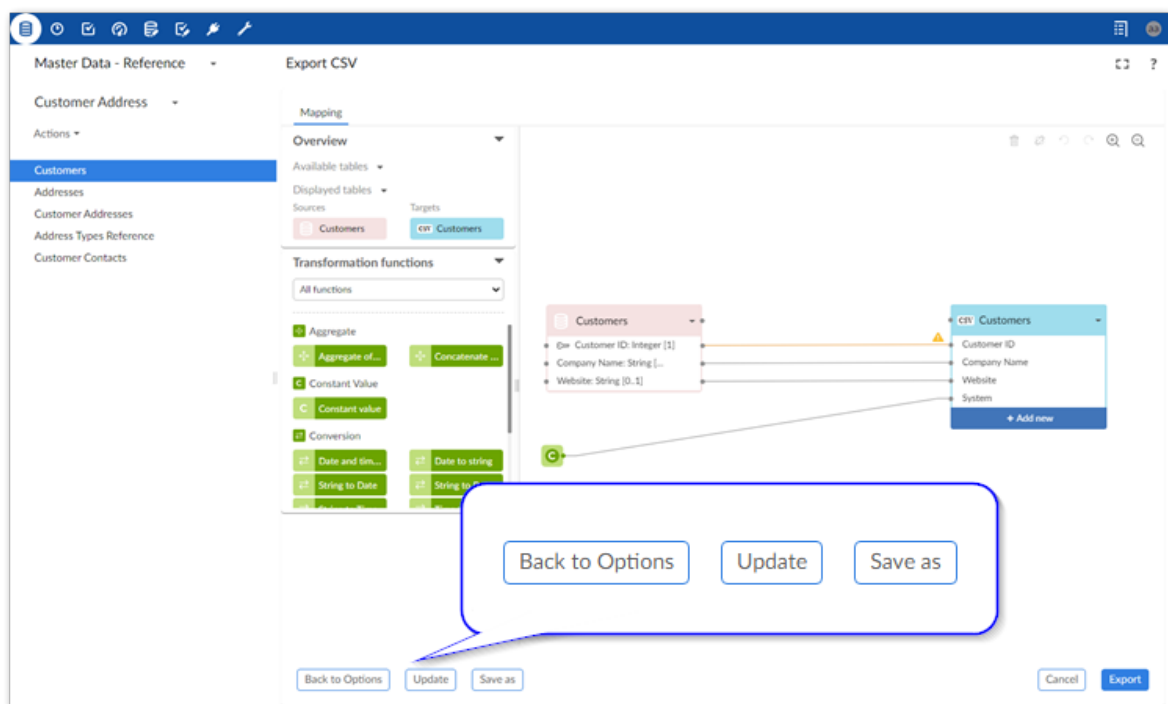
1. [Working with existing templates](#)

15.1 Working with existing templates

During an import, export, or data transfer operation you can select an existing template using the **Load template** field on the **Options** page. After choosing a template, the add-on automatically populates the option fields and mappings. You can:

- Change configuration options.
- View and update mappings.
- Initiate the import, export, or transfer operation.

If you have sufficient permission when viewing a template, you can select **Update** to change template settings. Additionally, you can create a copy of the current template by selecting **Save as**. After making changes, you have the option of removing the original template via the **Delete current template** option.



Some changes to configuration settings impact the mappings stored in a template. If you make changes to settings that impact mappings, a warning displays to inform you of the impact. Additionally, if you continue with the data transfer operation, a message prompt allows you to save or discard changes to the template.

CHAPTER 16

Handling special characters

Characters such as quotes, backslashes, and certain symbols, can have special meaning. For example, a ; used as a separator can denote the end of a field value in a CSV file. In this case, the add-on knows to import the value after the ; into the next field. When data *values* include special characters, they should be escaped so that they are treated as literal characters rather than having special meaning. During the data integration process, you can specify the separators and delimiters used to ensure that data imports correctly. However, please note that the add-on reserves use of the backslash (\) character in order to support multi-valued fields. Due to this you should avoid specify a list separator character that is also included in data values.

The following shows an example of how the \ character is handled by the add-on:

- When data contains the \ character:
 - When exporting a value of 100\000, it becomes 100\ \000.
 - When importing a value of 100\,000, it becomes 100,000.
- When data includes the selected list separator, for example, the space character as shown below:
 - When exporting a value of 100 000, it becomes 100\ 000.
 - When importing a value of 100\ 000, it becomes 100000.

Mapping and transforming data

CHAPTER 17

Map and transform overview

This chapter contains the following topics:

1. [Mapping overview](#)
2. [Transformation overview](#)

17.1 Mapping overview

Data integration involves the movement of data from one data store to another. The process requires data to be directed between a source and target. A goal, and sometimes requirement, is to make the source data available in the format and structure required by the target. In the context of the add-on, this goal is addressed using the concept of *mapping*.

Mapping refers to:

- The process of specifying the following:
 - Which data is extracted from a data source.
 - The data's destination in the target location.
 - Any required changes, or transformations, to the data along the way.
- The implementation results of the above process. For example, the *mappings* between fields in a source and target table.

See also

[Mapping interface reference](#) [p 89]

[Import overview](#) [p 24]

[Export overview](#) [p 46]

17.2 Transformation overview

Data transformations are added to mappings when types, formatting, or other constraints prevent successful movement of the data. A transformation makes the data compatible with the structure of the target.

Transformation types can include:

- Format changes: converting between technical formats, such as from String to Integer data types.

- **Structure changes:** changing the data's form. For example, splitting a Full name field into First Name and Last Name fields.
- **Semantic conversion:** converting the value to meet semantic requirements. For example, a source might use the following codes for states 1, 2, 3, etc. But, the target expects Alabama, Alaska, and Arizona. You can use a transformation to populate the expected value to the target.

See also

[*Mapping interface reference*](#) [p 89]

[*Transformation function reference*](#) [p 97]

CHAPTER 18

Mapping interface reference

This chapter contains the following topics:

1. [Overview](#)
2. [Mapping screen overview](#)
3. [Anatomy of a transformation function](#)
4. [Sample transformation use case](#)

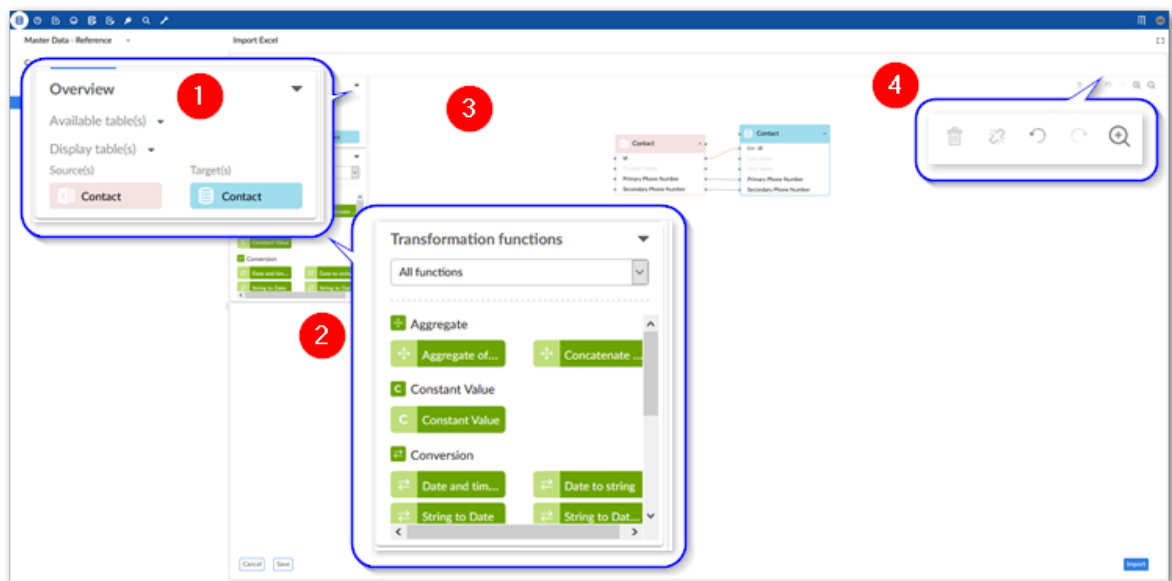
18.1 Overview

When moving data with the add-on, you use the **Mapping** screen to perform all mapping related tasks, including those related to transforming data. The following sections describe the user interfaces for mapping and transformations:

- [Mapping screen overview](#) [p 90]
- [Anatomy of a transformation function](#) [p 92]

18.2 Mapping screen overview

The image below and following list describe elements in the **Mapping** screen:



1) Overview box

This box shows you which tables are available to add to the mapping pane and which are currently in the mapping pane. To add an available table, select and drag it to the mapping pane.

2) Transformation functions palette

This palette contains all available transformation functions. To add a function to the mapping pane, select and drag it over.

3) Mapping pane

The mapping pane shows all tables included in this operation. To create a mapping, select and drag one connection point to another. For a mapping to be successful, it can only be mapped to the same type of component. For example, table to table and field to field.

4) Button bar

These icons allow you to:

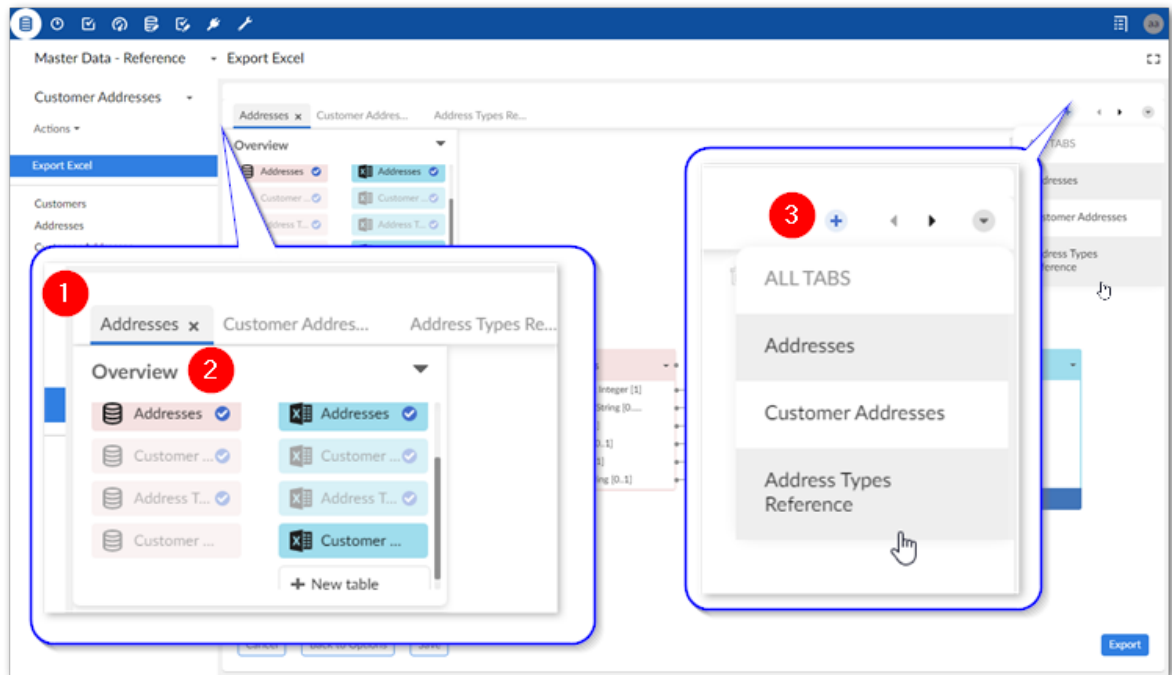
- Delete selected mappings.
- Unlink a selected table's mappings.
- Undo and redo actions in the mapping pane.
- Zoom in and out.

5) Back to Options, Save as, Save/Update

These buttons allow you to: return to the **Options** screen and save your mapping configuration as a template for later use.

If you make changes to an existing template, select **Update** to save the changes.

The image below and following list describe some of the **Mapping** screen features specific to data integration with multiple tables:



1 & 3) Table mapping tabs and navigation

Each tab contains a table mapping. If many tabs make it difficult to locate the one you want, you can use the icons to the right to page through the tabs. You can use the downwards-facing arrow to open the list of all tabs and select the one you want to view.

Use the '+' icon to add a blank tab. You can then drag unmapped source and target tables to the **Mapping** pane to create mappings. Note that if all sources are mapped, this option is disabled.

2) Overview box

The paired tables on the selected mapping tab display normally and the others are slightly obfuscated. Tables that are not obfuscated can be added to a mapping.

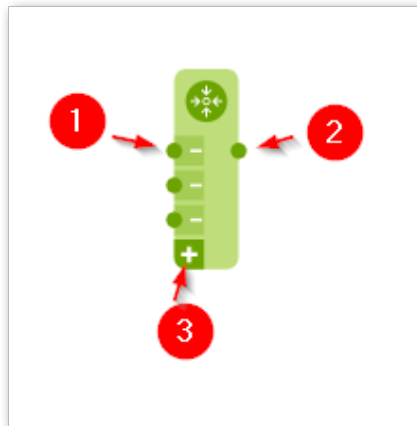
Blue check marks indicate that a table is included in a mapping.

Select **New table** to create a new target table. After you drag it to the mapping pane, you can add fields, mappings, transformations, etc. This option is only available when exporting.

18.3 Anatomy of a transformation function

As implied by its name, transformation functions transform data. Their input accepts data from a source, they operate on this data, and they output the changed data to a target location. One exception to this behavior is the constant value function which only has an output. As UI components, they have connection points that allow you to map incoming data *from* the source to the left-hand side and outgoing data *to* the target from the right-hand side.

The image below and following descriptions highlights transformation function options and components:



1) Input connection points

Each connection point accepts a mapping from one field in the source. The '-' icon allows you to remove an incoming or outgoing connection when there are more than the default number of connections.

Note

Transformation function inputs are always located on the left-hand side.

2) Output connection points

Each connection point can be mapped to one field in the target. Note in the image shown above there is only one point. However, some transformation functions can have more than one output.

Note

Transformation function outputs are always located on the right-hand side.

3) Add connection point

The '+' icon allows you to add additional connection points. Selecting this icon will add points automatically to the allowable side (input/output).

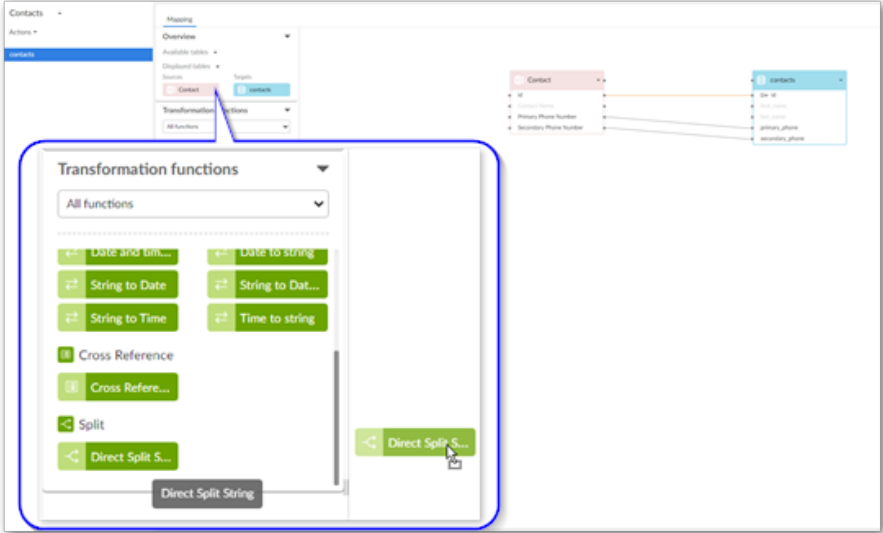
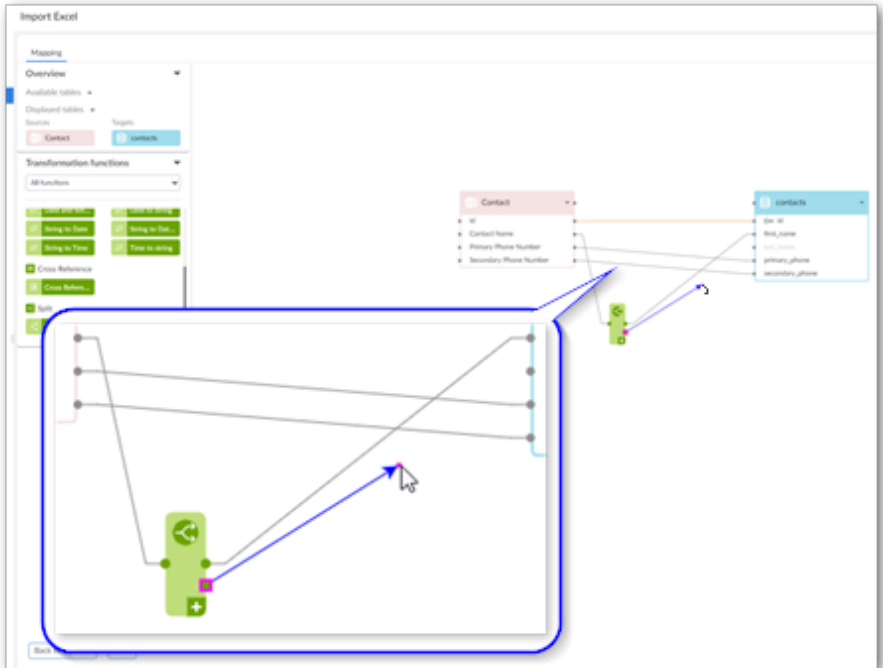
Available actions:

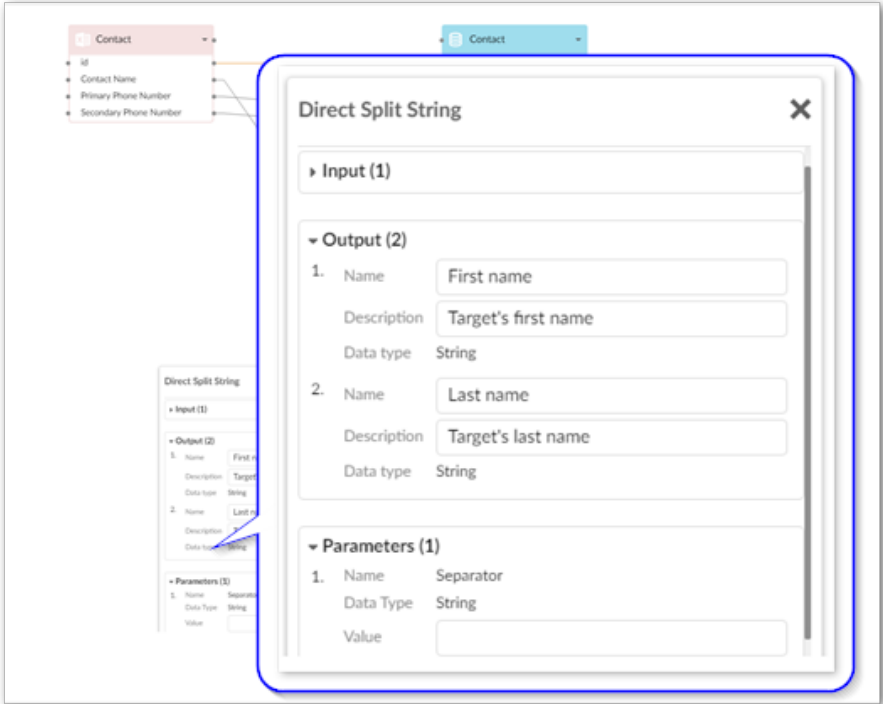
In addition to the functionality related to adding and removing connection points, you can double-click to edit the transformation function's configuration. The options vary depending on the function. But generally you can assign names and descriptions to the inputs and outputs. Additionally, you can edit parameters that determine certain aspects of the transformation function's behavior.

See [Transformation function reference](#) [p 97] for more information.

18.4 Sample transformation use case

The following provides an example of adding a transformation function during the import process to split a string in the source into multiple target fields:

Action	Description
Drag the function from the Transformation functions palette to the mapping pane.	 A screenshot of the 'Transformation functions' palette in the mapping tool. The palette is open, showing a list of functions under the 'All functions' tab. The 'Direct Split String' function is highlighted with a blue box. The background shows a mapping diagram with a 'Contact' source and a 'contacts' target.
Connect the source to the input and the output to the target.	<p>Drag from connection point to connection point. The order you map the connection points can matter. Transformation functions that split values order the output values from top (first) to bottom (last). So in this example the source Contact Name field contains names in the following order: 'John Smith'. When the system splits this string, the first value will be 'John'. So the topmost connection point is mapped to the First name field in the target. The same order of operations applies to concatenation.</p>  A screenshot of the mapping diagram showing the 'Direct Split String' function connected to the source and target. The function is placed in the mapping pane, and its output is connected to the 'contacts' target. The background shows the same mapping diagram as the previous screenshot.

Action	Description
Edit the transformation function.	<p>Double-click to edit the function. Note that the input/output names and descriptions are optional. Although, it does not display on the screen the important property to note here is the Parameter. A space has been entered in the Value field.</p> 

See also

[Mapping interface reference](#) [p 89]

[Import overview](#) [p 24]

[Export overview](#) [p 46]

CHAPTER 19

Transformation function reference

This chapter contains the following topics:


1. [Overview](#)
2. [Format conversion](#)
3. [Structure changing](#)
4. [Semantic conversion](#)

19.1 Overview

The add-on provides several built-in transformation functions. These are designed to cover common business use cases: format conversion, structure changing, and semantic conversion.



19.2 Format conversion

The following convert the technical format:

Icon	Description
	<p>The add-on includes the following transformation functions that convert from one technical format to another:</p> <ul style="list-style-type: none">• Date and time --> String• Date --> String• String --> Date• String --> Date and time• String --> Time• Time --> String <p>Parameters: For each transformation function of this type you can use the parameter to format the function's output to meet business requirements. For example, specify that a date value is output as yyyy-MM-dd or dd-MM-yyyy.</p>



19.3 Structure changing

The following functions change the data structure. For example denormalized to normalized.

Icon	Description
	<p>The add-on includes the following:</p> <p>Aggregate of integer numbers: takes as integers as input and outputs the sum of those integers. Parameters: N/A</p> <p>Concatenate string: takes multiple strings as input and outputs them joined together as a single string. The output string is in the same order as the input fields. Parameters: the value to separate each input string.</p>
	<p>Split string: takes a string contained in a single field and outputs parts of the string to other fields. A delimiter is used to tell the system how to partition the string. For example, a full name field might be split into first and last fields using the space character as a separator. Parameters: the separator used to determine where the string is split.</p>

19.4 Semantic conversion

The add-on includes:

Icon	Description
	<p>Constant value: you supply a value which this function outputs to the given field. Parameters: the data type and value to output.</p>
	<p>Cross reference: looks up the value and outputs a value contained in a cross reference table. Parameters: the location of the source and target fields.</p> <p>Digital asset UUID lookup: takes file names in the import source, looks up their UUIDs, and attaches the corresponding digital assets to the target field. Instead of having to manually open and attach assets to records, this function allows you to perform a bulk import operation to attach digital assets. The digital assets must already be located in a Drive. For instructions on completing this task, see the <i>TIBCO EBX® Digital Asset Manager Add-on</i> documentation.</p>

Release Notes

CHAPTER 20

Version 6.1.0

Released: March 2023

This chapter contains the following topics:

1. [New features](#)
2. [Changes in Functionality](#)
3. [Changes to third-party libraries](#)
4. [Closed Issues](#)
5. [Known Issues](#)

20.1 New features

This release contains the following new features:

- The add-on was updated to ensure compatibility with the new TIBCO EBX® staging feature. This feature allows you to migrate configuration settings between environments. Settings available to migrate from the add-on include database and data model connections and user-defined data integration templates.
- Add-on service memory usage was optimized to improve performance.
- When importing data you can use the new simulation feature to preview import results. This allows you to test the data and correct any potential errors prior to importing.
- The add-on now maintains **Options** and **Mapping** screen states, eliminating the need to reconfigure settings when switching between them.
- The add-on's API was updated to support record filters on EBX® source tables.
- When performing data integration tasks through a database connection, the following additional data types are now supported:
 - BigInt Identity
 - DateTime 2
- When connecting to a database, the add-on now supports the use of Windows credentials.

20.2 Changes in Functionality

This release contains no changes in functionality.

20.3 Changes to third-party libraries

This release contains no updated to third-party libraries.

20.4 Closed Issues

This release contains the following closed issues:

- **[DINT-3657]** The **Close** button is duplicated in the Excel import result screen when using the service in a perspective.
- **[DINT-4014]** Unexpected errors are not handled in user services.
- **[DINT-4013]** Misleading error logs can be generated when exporting files.
- **[DINT-1715]** The warning message is missing when the **Import mode** is set to **Replace all content**.
- **[DINT-3117]** An Ajax error occurs when loading an SQL data source when its name was changed in configuration settings.

20.5 Known Issues

This release contains the following known issues:

- Fonts are no longer shipped with the JDK 11. Font rendering in Java 11 JVMs now uses pre-installed operating system fonts. This can cause issues in Linux environments when exporting Excel files. As a workaround, you can install the `fontconfig` package.
- When exporting to SQL with TDV, if any error occurs, the operation is cancelled.
- Due to a limitation in Excel, long fields with the number data type display all numbers past the 16th place as a 0.
- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.
- When creating a custom transformation function, you must use a predefined data type for its input and output fields.

CHAPTER 21

All release notes

This chapter contains the following topics:

1. [Version 6.1.0](#)
2. [Version 4.5.2](#)
3. [Version 4.5.1](#)
4. [Version 4.5.0](#)
5. [Version 4.4.1](#)
6. [Version 4.4.0](#)
7. [Version 4.3.2](#)
8. [Version 4.3.1](#)
9. [Version 4.3.0](#)
10. [Version 4.2.1](#)
11. [Version 4.2.0](#)
12. [Version 4.1.1](#)
13. [Version 4.1.0](#)
14. [Version 4.0.1](#)
15. [Version 4.0.0](#)

21.1 Version 6.1.0

Released: March 2023

New features

This release contains the following new features:

- The add-on was updated to ensure compatibility with the new TIBCO EBX® staging feature. This feature allows you to migrate configuration settings between environments. Settings available to migrate from the add-on include database and data model connections and user-defined data integration templates.
- Add-on service memory usage was optimized to improve performance.

- When importing data you can use the new simulation feature to preview import results. This allows you to test the data and correct any potential errors prior to importing.
- The add-on now maintains **Options** and **Mapping** screen states, eliminating the need to reconfigure settings when switching between them.
- The add-on's API was updated to support record filters on EBX® source tables.
- When performing data integration tasks through a database connection, the following additional data types are now supported:
 - BigInt Identity
 - DateTime 2
- When connecting to a database, the add-on now supports the use of Windows credentials.

Changes in Functionality

This release contains no changes in functionality.

Changes to third-party libraries

This release contains no updated to third-party libraries.

Closed Issues

This release contains the following closed issues:

- **[DINT-3657]** The **Close** button is duplicated in the Excel import result screen when using the service in a perspective.
- **[DINT-4014]** Unexpected errors are not handled in user services.
- **[DINT-4013]** Misleading error logs can be generated when exporting files.
- **[DINT-1715]** The warning message is missing when the **Import mode** is set to **Replace all content**.
- **[DINT-3117]** An Ajax error occurs when loading an SQL data source when its name was changed in configuration settings.

Known Issues

This release contains the following known issues:

- Fonts are no longer shipped with the JDK 11. Font rendering in Java 11 JVMs now uses pre-installed operating system fonts. This can cause issues in Linux environments when exporting Excel files. As a workaround, you can install the fontconfig package.
- When exporting to SQL with TDV, if any error occurs, the operation is cancelled.
- Due to a limitation in Excel, long fields with the number data type display all numbers past the 16th place as a 0.
- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.
- When creating a custom transformation function, you must use a predefined data type for its input and output fields.

21.2 Version 4.5.2

Released: February 2023

New features

This release was updated to ensure compatibility with TIBCO EBX Add-ons Bundle version 5.6.1.

Changes in Functionality

This release contains no changes in functionality.

Changes to third-party libraries

This release contains no changes to third-party libraries.

Closed Issues

This release contains no closed issues.

Known Issues

This release contains the following known issues:

- When exporting to SQL with TDV, if any error occurs, the operation is cancelled.
- Due to a limitation in Excel, long fields with the number data type display all numbers past the 16th place as a 0.
- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.
- When creating a custom transformation function, you must use a predefined data type for its input and output fields.

21.3 Version 4.5.1

Released: November 2022

New features

This release contains no new features.

Changes in Functionality

This release contains no changes in functionality.

Changes to third-party libraries

The Excel-streaming-reader library was upgraded to version 4.0.4.

Closed Issues

This release contains no closed issues.

Known Issues

This release contains the following known issues:

- When exporting to SQL with TDV, if any error occurs, the operation is cancelled.
- Due to a limitation in Excel, long fields with the number data type display all numbers past the 16th place as a 0.
- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.
- When creating a custom transformation function, you must use a predefined data type for its input and output fields.

21.4 Version 4.5.0

Released: September 2022

New features

This release contains the following new features:

- API updates include:
 - The creation of custom services for SQL import and export. A custom script task can be created and used in workflows.
 - All triggers and blocking constraints can be turned off when running add-on services.
 - During a data integration operation, valid records are persisted in EBX®, whereas invalid records are skipped and listed in an error file after the operation. In the file, a column is added that shows the relevant error message for each record.
- If there is invalid data found during an import, a new option enables the download of a file containing the invalid data. A column is added that shows the relevant error message for each record.
- A connection with TIBCO Data Virtualization can be created to integrate data between TDV views and a TIBCO EBX® data model.
- Custom date and date/time patterns can now be created and used with CSV import and export services.
- Additional information about data integration services is now included in the add-on's logs.
- Error log performance is improved.
- When using a custom workflow script task:
 - The **Template** parameter now accepts the template's UUID or name as valid input.
 - When using a template with a custom workflow script task, transformation function parameters can be overridden.

Changes in Functionality

This release contains no changes in functionality.

Changes to third-party libraries

This release contains no changes to third-party libraries.

Closed Issues

This release contains the following closed issues:

- **[DINT-3161]** Excel file cells are incorrectly formatted when exporting numeric fields.
- **[DINT-3397]** The database connection test does not work when the URL contains a special character.
- **[DINT-3405]** The **Transform** table shows all cross reference transformations as having an error.
- **[DINT-3427]** Add-on services do not work if a connection is created with a TIBCO Data Virtualization server view that has no schema.
- **[DINT-3431]** When importing Excel at the dataset level, the execution order is not consistent with the Excel sheet order.
- **[DINT-3441]** A template created from a temporary dataspace cannot be used.

Known Issues

This release contains the following known issues:

- When exporting to SQL with TDV, if any error occurs, the operation is cancelled.
- Due to a limitation in Excel, long fields with the number data type display all numbers past the 16th place as a 0.
- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.
- When creating a custom transformation function, you must use a predefined data type for its input and output fields.

21.5 Version 4.4.1

Released: July 2022

New features

When defining a custom cross reference transformation via the API or script task, the `Ignore lookup failure` parameter can be defined.

Changes in Functionality

This release contains no changes in functionality.

Changes to third-party libraries

This release contains no changes to third-party libraries.

Closed Issues

[DINT-3317] It is not possible to call an existing template via the API for workflow script task.

Known Issues

This release contains the following known issues:

- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.
- When creating a custom transformation function, you must use a predefined data type for its input and output fields.

21.6 Version 4.4.0

Released: June 2022

New features

This release contains the following new features:

- You can save templates for SQL import and export operations.
- When importing SQL, you can import from configured database views.
- When exporting to Excel or CSV at the table level, you can include data from related tables.
- You can include Primary Key, Foreign Key and Enumeration labels when exporting to CSV, Excel and SQL. Excel export also allows you to export Static Enumeration labels.
- You can specify the **Date** and **Date/time** formats when importing CSV.
- You can use the API to create custom transformation functions. These transformation functions will be available for business users to add to mappings in the user interface.
- Support is now included for data model variants for the TIBCO EBX Match and Merge Add-on in the **Export SQL** service.

Changes in Functionality

This release contains no changes in functionality.

Changes to third-party libraries

This release contains no changes to third-party libraries.

Closed Issues

This release contains the following closed issues:

- [DINT-3100] An error occurs when using the **Export CSV** service with the **Export Label from Foreign Key** options selected.
- [DINT-3186] An error occurs when exporting data.

Known Issues

This release contains the following known issues:

- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.
- When creating a custom transformation function, you must use a predefined data type for its input and output fields.

21.7 Version 4.3.2

Released: April 2022

New features

This release contains the following new features:

- The performance for SQL export was improved.
- You can now use the API to:
 - Configure import, export, and transfer operations on any table or dataset that is based on the same data model.
 - Execute the template API at the dataset level.
 - Configure the template API on any dataset based on the same data model.

Changes in Functionality

This release contains no changes in functionality.

Changes to third-party libraries

This release contains no changes to third-party libraries.

Closed Issues

This release contains no closed issues.

Known Issues

This release contains the following known issues:

- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.

21.8 Version 4.3.1

Released: March 2022

New features

You can now use import, export, and transfer functionality in workflow services and perspective actions. The add-on specific services and actions begin with [ebx-addon-dint]. There are two options for each import, export and transfer type—one to apply to tables and one for datasets.

Changes in Functionality

This release contains the following changes in functionality:

- When saving a template, the position of tables, transformation functions, and links in the **Mapping** screen are now stored. When the template is loaded, the components display according to the state of the most recent save.
- Template names must now be unique.

Changes to third-party libraries

This release contains no changes to third-party libraries.

Closed Issues

This release contains no closed issues.

Known Issues

This release contains the following known issues:

- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.

21.9 Version 4.3.0

Released: February 2022

New features

This release contains the following new features:

- You can now import from and export to SQL databases. An administrator must configure the connection to the database and connection between the database and data model. See the *User Guide* for more information.
- The cross-reference transformation function contains the new **Ignore lookup failure** option. When enabled, records are imported and exported even when the cross-reference lookup does not find a corresponding value. If left disabled, records these records are not imported.

Changes in Functionality

This release includes the following changes in functionality:

- Behavior during import at the table level was updated to ensure consistency when importing an empty file.

- Templates are now available for use on tables from the same data model, regardless of their location.

Changes to third-party libraries

This release contains no changes to third-party libraries.

Closed Issues

This release contains no closed issues.

Known Issues

This release contains the following known issues:

- Importing and exporting SQL: Read and write is not possible with the Timestamp data type with MS SQL Server.
- Configuring a schema using the JNDI configuration in your web server is not supported.

21.10 Version 4.2.1

Released: December 2021

New features

This release includes no new features.

Changes in Functionality

This release includes no changes in functionality.

Changes to third-party libraries

This release contains no changes to third-party libraries.

Closed Issues

This release contains the following closed issue: *[DINT-2853]* Validate table name inputs.

Known Issues

This release contains no known issues.

21.11 Version 4.2.0

Released: November 2021

New features

This release includes:

- Support for multi-table import, export and transfer operations at the dataset level. Additionally, when exporting from a dataset, you can now add target tables. This allows you to export data from one table to multiple locations. See the *User Guide* for more information about this feature.

- When importing or exporting with Excel, the new **List separator** option allows you to define a separator for lists.

Changes in Functionality

This release contains no changes in functionality.

Changes to third-party libraries

This release contains no changes to third-party libraries.

Closed Issues

This release contains no closed issues.

Known Issues

This release contains no known issues.

21.12 Version 4.1.1

Released: September 2021

New features

This release includes no new features.

Changes in Functionality

This release contains no changes in functionality.

Changes to third-party libraries

The Apache Streaming Excel Reader library was upgraded to version 3.1.1.

Closed Issues

This release contains the following closed issue: *[DINT-2589]* An exception is thrown when multiple cross reference transformations are used in a TableMapping.

Known Issues

This release contains no known issues.

21.13 Version 4.1.0

Released: July 2021

New features

This release includes the following new features:

- You can now transfer data between EBX® tables.
- When exporting, you can now add, edit, and remove target fields in the **Mapping** screen.

- When working with templates, you can now:
 - Set user permissions to view, modify and delete templates.
 - Save copies of templates.
- The new **Digital asset UUID lookup** transformation function allows you to perform a bulk import operation to attach digital assets to records. Note that instructions for this process are contained in the *TIBCO EBX® Digital Asset Manager Add-on* documentation.
- A public API has been provided that allows you to import, export and transfer data. See the Java API documentation for more information.
- Tables in the **Mapping** screen now display data type and cardinality next to each field.

Changes in Functionality

This release contains no changes in functionality.

Closed Issues

This release contains no closed issues.

Known Issues

This release contains no known issues.

21.14 Version 4.0.1

Updates

Released: June 2021

This release contains the following updates:

- The **First row contains header** label was changed to **Include column headers** for Excel export and **Includes column headers** for Excel import. When selecting **Yes** for this option during import, you are now prompted to enter the starting location of table data.
- When exporting Excel the two rows at the beginning of the file were removed.
- The following library updates were made:
 - The Apache Commons BeanUtils library was upgraded to version 1.9.4.
 - The Apache CFX and HttpClient libraries were removed.

Bug Fixes

[DINT-2261] A documentation issue was corrected.

21.15 Version 4.0.0

New features

Released: March 2021

The TIBCO EBX® Data Exchange Add-on (New) allows you to integrate data from a source location into a target. Additionally, it can transform the data to meet business and technical requirements of disparate applications and systems.

This release allows you to import and export using CSV and Excel formats at the TIBCO EBX® table level. No configuration is required to initiate an import or export operation. The add-on provides the following graphical elements and features to support import and export:

- Automatic mappings are generated between source and target fields. Data mappings display as lines between source and targets. Where possible, the add-on generates these automatically and adds basic transformations if required. It will also alert you visually to possible errors or warnings.
- Drag and drop functionality to create mappings and transformations when required.
- Pop-up editors to define transformation functions. The add-on includes several built-in transformation functions to cover common use cases.
- Templates that save mappings and other configuration options for reuse.

The following list provides links to additional topics and tasks:

Introduction to the add-on	For a more in-depth overview of the add-on and your potential interaction with it, see About the add-on [p 20]
Importing	For an introduction to the import process, see Import overview [p 24]. For instructions on importing, see Importing to a table [p 25].
Exporting	For an introduction to the export process, see Export overview [p 46]. For instructions on exporting, see Exporting a table [p 47].
Mapping and transformations	Map and transform overview [p 86] provides a look at how the add-on implements the concepts of mappings and transformations. Mapping interface reference [p 89] highlights the user interface used for mapping and transformation tasks during data integration. Additionally, it provides an example of using a transformation function. You can refer to Transformation function reference [p 97] to see a list and description of the add-on's built-in transformation functions.