

MultiSoft

MDSync Add-On

User Guide

Version: #v2. | Status: Definitive

7/2/2020



DETAILS OF THE DOCUMENT

Creation date: 05.13.2020.

Last modified: 06.15.2020. 08:26

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File name: MultiSoft MDSync Add-on_User Guide

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1. INTRODUCTION

MDSync is a Microsoft Dynamics 365 Business Central Addon, which ensures real-time data synchronization of specified tables among multiple companies within the same database.

The technical background is that you can subscribe for database insert, update, delete or primary key rename, independently whether it originates from a user in the web client, or data insert from Excel (e.g.: RapidStart), or CRM synchronization, or modification from other programs (like OData services).

The idea of the synchronization is that before using Business Central, when the companies are “empty”, the administrator sets up the synchronization model. These steps are the following:

- assigns the companies into synchronization groups
- specifies the role of a company inside a certain group, which can be master or slave
- specifies which tables, and which fields should be synchronized
- activates the synchronization

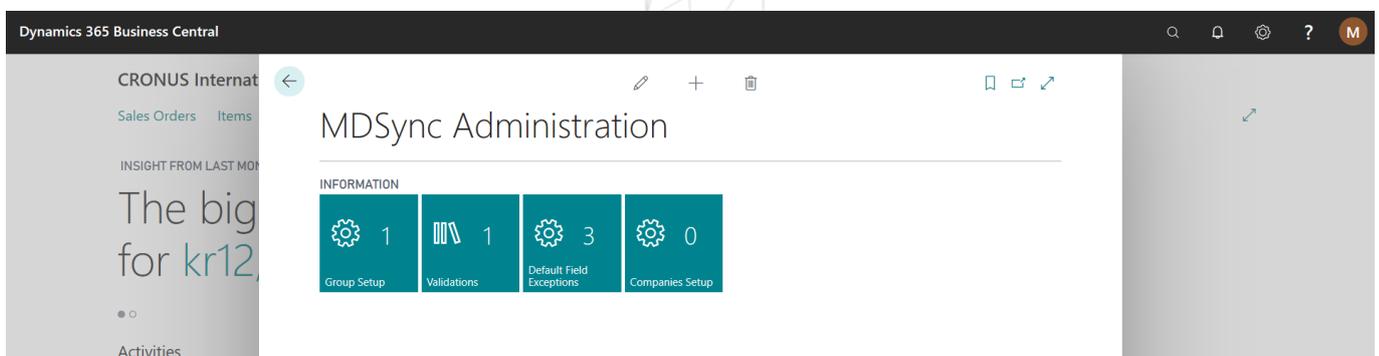
Synchronization ensures that modifications in the table record, set up for synchronization, made in a master company (with fields which should not be skipped) are transferred to other companies within the same group. Furthermore, it also ensures that the records of a table which is set up for synchronization cannot be modified in a slave company (except the fields which should not be synchronized).

The addon also contains a data sync. validation functionality, which can be started anytime, and shows whether the data is in sync. or not. If there are some sync. differences, then it provides detailed information about the cause. This is useful, if you need to repair the data synchrony manually.

2. ADMINISTRATION

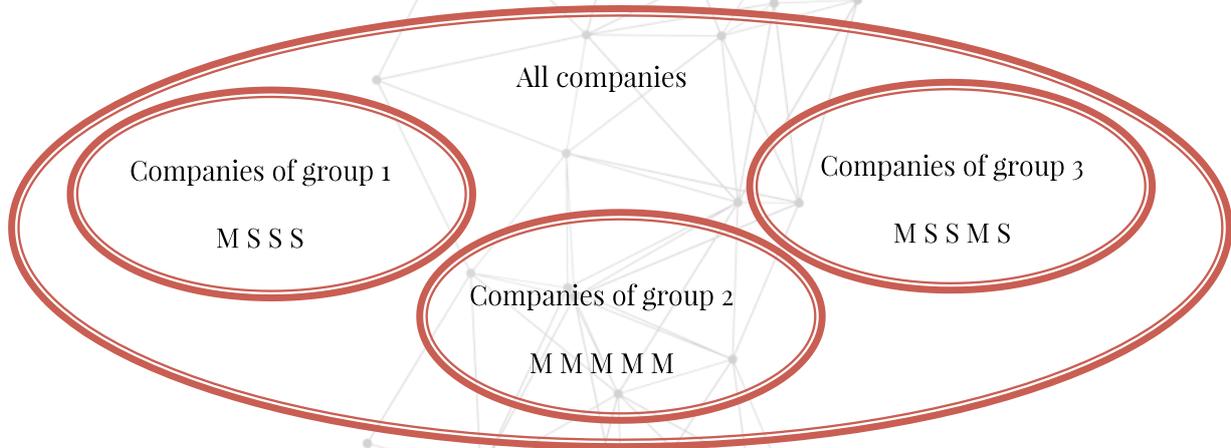
The MDSync addon settings and management user interface is the **MDSync Administration** window:

The **Group Setup** and the **Default Field Exceptions** tiles are setup tiles, while the **Validations** tile shows the data sync. validation history.



2.1. Which company do we sync?

In a Business Central database there can be multiple companies. From synchronization perspective, we define the following structure:

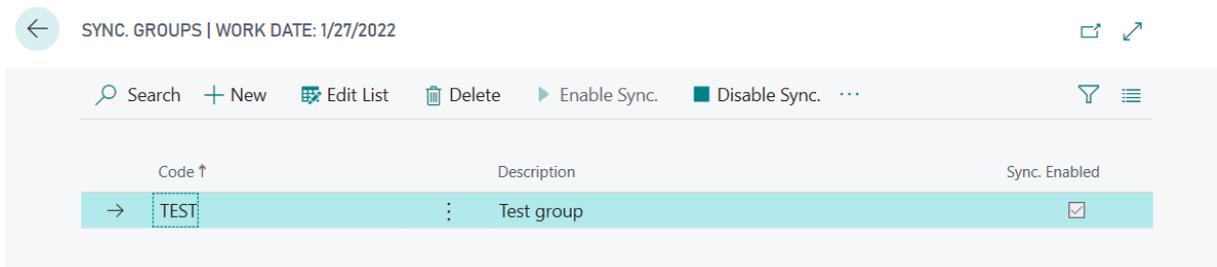


Namely:

- the companies of the database can be assigned to a synchronization group, one company can belong to zero or one group only
- optional number of synchronization groups can be defined
- inside the synchronization group the role of a company can be master of slave (M or S on the picture)
 - the synchronization direction is from master to slaves (and other masters)
 - there can be multiple masters inside the same group

This model can be achieved by the following settings:

By clicking on the **Group Setup** tile, the list of synchronization groups window opens. The list is empty at the beginning. Here we can create the synchronization groups. Example:



The group identifier is a unique code of maximum 10 characters long. You can enter a description for the group as well.

The **Sync. Enabled** field is the "main switch" of the synchronization. You can enable or disable the synchronization with this boolean field.

Validations:

- on a newly created group the synchronization is disabled
- if there are companies assigned to the group (the group ID is specified in the **Company Information** as **MDSync Group Code** tab), you cannot delete the group

- enabling or disabling the synchronization requires confirmation
- you can only enable the synchronization, if there is at least one master in the group
- before enabling the synchronization, the addon automatically invokes the data sync. validation functionality, and it can only be enabled, if everything is in sync

The companies can be assigned to synchronization groups on the **MDSync Setup** tab of the **Company Information** page:

MDSync Setup

MDSync Group Code MDSync Role

The **MDSync Group Code** can be empty or can point to an existing group.

The **MDSync Role** option can be one of the following:

- <Empty> (default)
- Master
- Slave

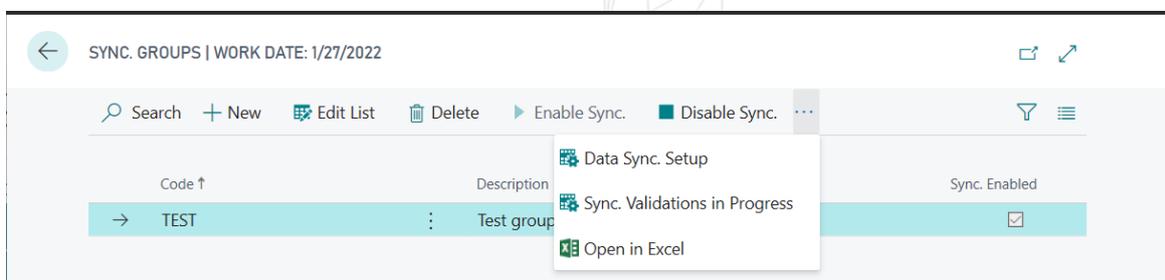
Validations:

- if the group code is not empty, the role cannot be empty
- if you want to assign the company into a group, where the synchronization is enabled, the addon will automatically invoke the data sync. validation functionality, and the group can only be filled, if everything is in sync
- if synchronization is enabled, you can only switch the role from Master to Slave, if there is at least one other Master in the group.

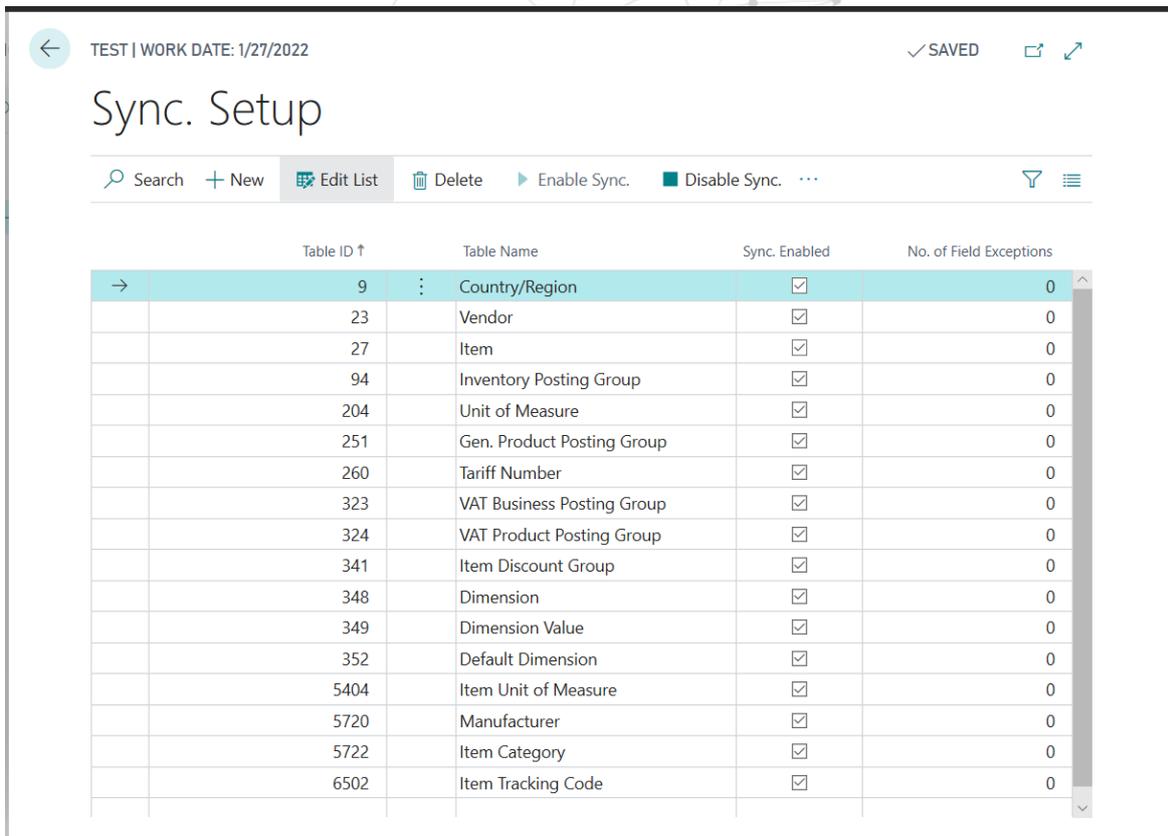
2.2. Which data do we sync?

The MDSync addon synchronizes the fields of a company-dependent table real-time.

You can specify the list of tables to sync. per synchronization group. You can select a group from the list of synchronization group which you want to set up, and you can press the **Data Sync. Setup** button.



This opens the list of tables set up for this synchronization group.



The screenshot shows the 'Sync. Setup' interface with a table of synchronization settings. The table has four columns: Table ID, Table Name, Sync. Enabled, and No. of Field Exceptions. The 'Country/Region' table is highlighted in blue.

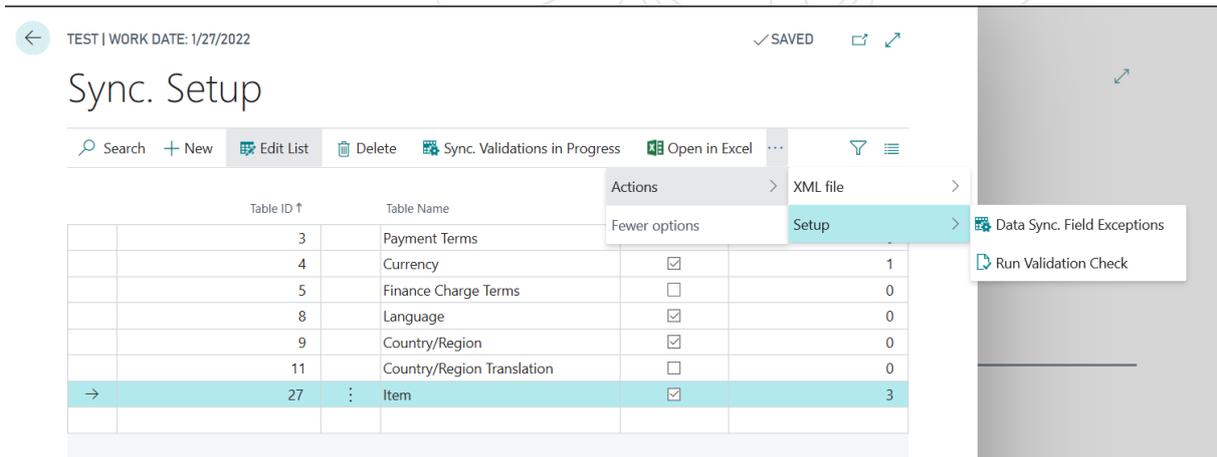
Table ID ↑	Table Name	Sync. Enabled	No. of Field Exceptions
9	Country/Region	<input checked="" type="checkbox"/>	0
23	Vendor	<input checked="" type="checkbox"/>	0
27	Item	<input checked="" type="checkbox"/>	0
94	Inventory Posting Group	<input checked="" type="checkbox"/>	0
204	Unit of Measure	<input checked="" type="checkbox"/>	0
251	Gen. Product Posting Group	<input checked="" type="checkbox"/>	0
260	Tariff Number	<input checked="" type="checkbox"/>	0
323	VAT Business Posting Group	<input checked="" type="checkbox"/>	0
324	VAT Product Posting Group	<input checked="" type="checkbox"/>	0
341	Item Discount Group	<input checked="" type="checkbox"/>	0
348	Dimension	<input checked="" type="checkbox"/>	0
349	Dimension Value	<input checked="" type="checkbox"/>	0
352	Default Dimension	<input checked="" type="checkbox"/>	0
5404	Item Unit of Measure	<input checked="" type="checkbox"/>	0
5720	Manufacturer	<input checked="" type="checkbox"/>	0
5722	Item Category	<input checked="" type="checkbox"/>	0
6502	Item Tracking Code	<input checked="" type="checkbox"/>	0

You can enable or disable the synchronization of the table with the Enable Sync. or Disable Sync. actions. The **No. of Field Exceptions** field shows the number of fields which does not need to be synchronized.

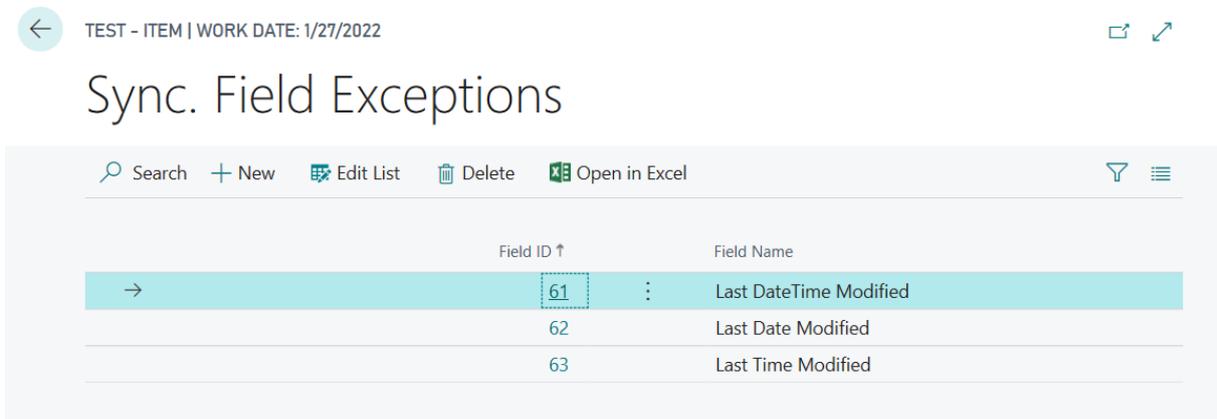
Validations:

- the **Table ID** can be any company dependent table, the name of the table will be displayed automatically
- the synchronization is disabled by default for a newly inserted table
- by enabling synchronization, the addon will automatically invoke the data sync. validation functionality, and it can only be enabled if everything is on sync

Certain fields may be left out from the synchronization. The addon will automatically insert certain field exceptions based on the specified **Default Field Exceptions** (see later), but the administrator can modify this. You can define a field as exception, if you select the table from the list, and press the **Actions -> Setup -> Data Sync. Field Exceptions** button.



This button opens a list screen, where you can specify the field exceptions.



Validations:

- you cannot select a field which is part of the primary key
- if you delete a field from the list, so that it should not be an exception anymore, the add-on will check, if the synchronization is enabled for the table. If enabled, it will invoke the data sync. validation functionality, and deletion is allowed only if everything is in sync.

2.3. Default Field Exceptions

You can ease the configuration of Field Exceptions, if you define global field exceptions.

Click on the **Default Field Exception** tile on the **MDSync Administration** page, to open a list page where you can configure those global field names, which you would like to have as Field Exception for all (or most) tables. This setting applies to all synchronization groups. The configured field names will be automatically added, when you add a new table for a synchronization group. Of course, only if that field name does exist on the page.

Sync. Field Exceptions

Field ID ↑	Field Name
→ 61	Last DateTime Modified
62	Last Date Modified
63	Last Time Modified

Validation:

- You cannot configure a field as Field Exception, if that field is part of the primary key

2.4. Export Setup Configuration

With this functionality you can export the MDSync table configuration into an XML file. This function is accessible from the **Data Sync. Setup** screen of a selected group: **Actions** -> **XML File** -> **Export Setup Configuration**. With the selected tables of the **MDSync Setup** list and the Field Exceptions belonging to the tables will be included in the XML file. This is useful, if you want to move the MDSync table configuration into another group, or another database (like from test to production).

Sync. Setup

Table ID ↑	Table Name	Actions	
3	Payment Terms		
4	Currency	<input checked="" type="checkbox"/>	1
5	Finance Charge Terms	<input type="checkbox"/>	0
8	Language	<input checked="" type="checkbox"/>	0
9	Country/Region	<input checked="" type="checkbox"/>	0
11	Country/Region Translation	<input type="checkbox"/>	0
→ 27	Item	<input checked="" type="checkbox"/>	3

2.5. Import Setup Configuration

With this functionality you can import a previously exported MDSync table configuration from an XML file. This function is accessible from the **Data Sync. Setup** screen of a selected group: **Actions** -> **XML File** -> **Import Setup Configuration**. During import, the tables which are already existing in the setup will be skipped. The imported tables will be disabled by default.

TEST | WORK DATE: 1/27/2022

Sync. Setup

Search + New Edit List Delete Sync. Validations in Progress Open in Excel

Table ID ↑	Table Name	Actions	XML file	Import Existing Setup Configuration from xml file.
3	Payment Terms			
4	Currency	<input checked="" type="checkbox"/>		1
5	Finance Charge Terms	<input type="checkbox"/>		0
8	Language	<input checked="" type="checkbox"/>		0
9	Country/Region	<input checked="" type="checkbox"/>		0
11	Country/Region Translation	<input type="checkbox"/>		0
→ 27	Item	<input checked="" type="checkbox"/>		3

More options: Setup > Import Setup Configuration

2.6. Run Sync. Validation

With this functionality you can run the data sync. validation for the selected tables. This function is accessible from the **Data Sync. Setup** screen of a selected group: **Actions** -> **Setup** -> **Run Validation Check**.

TEST | WORK DATE: 1/27/2022

Sync. Setup

Search + New Edit List Delete Sync. Validations in Progress Open in Excel

Table ID ↑	Table Name	Actions	XML file	Check if Data is in sync in the marked Tables.
3	Payment Terms			
4	Currency	<input checked="" type="checkbox"/>		1
5	Finance Charge Terms	<input type="checkbox"/>		0
8	Language	<input checked="" type="checkbox"/>		0
9	Country/Region	<input checked="" type="checkbox"/>		0
11	Country/Region Translation	<input type="checkbox"/>		0
→ 27	Item	<input checked="" type="checkbox"/>		3

More options: Setup > Run Validation Check

3. DATA SYNC. VALIDATION

When synchronization is enabled, it is important to check the data sync. status of the companies and highlight the possible data differences. This is useful, for example, when enabling a new table for synchronization, or removing a certain Field Exception, etc.

MDSync contains the separate functionality, which can be invoked at multiple places with different options/filters.

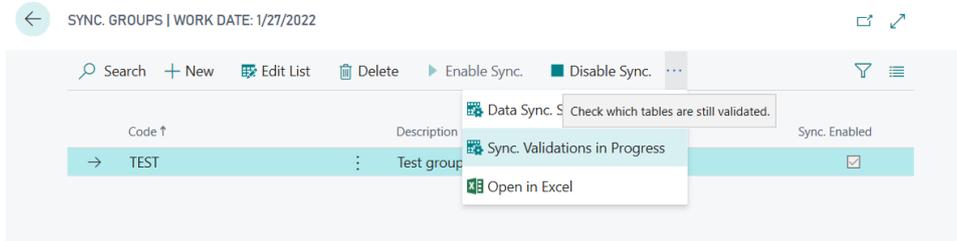
The data sync. validation always runs inside a certain synchronization group.

The sync. validation can be run for

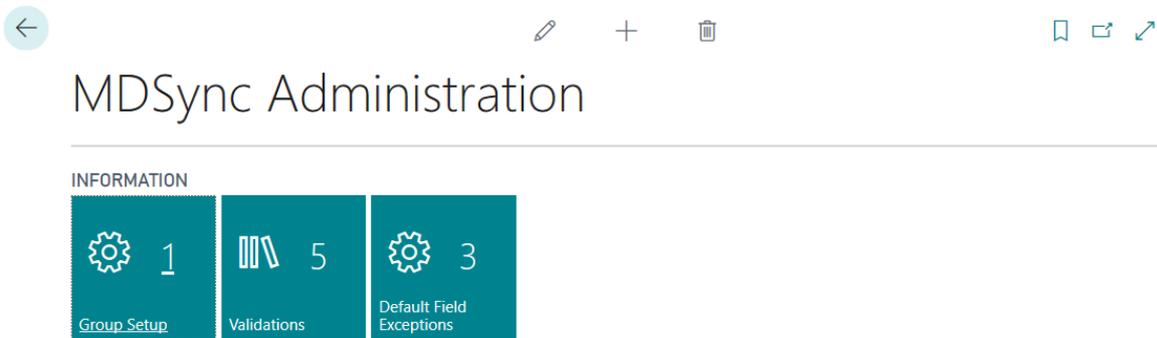
- all enabled tables of the setup (for example, during enabling the sync. at group level)
- one specified company (for example, during including a company into an enabled group)
- one specified table (for example, enabling a table for synchronization)
- one specified field of a specified table (for example, when you delete a field from Field Exceptions)

While the data sync. validation check runs, which can be long-lasting if you have many tables with lot of records in the setup, the data modification will be disabled in the master companies as well (not just in the slaves). You can check the status of the Sync. Validation checks, if you press the **Sync. Validations in progress** button on the toolbar.

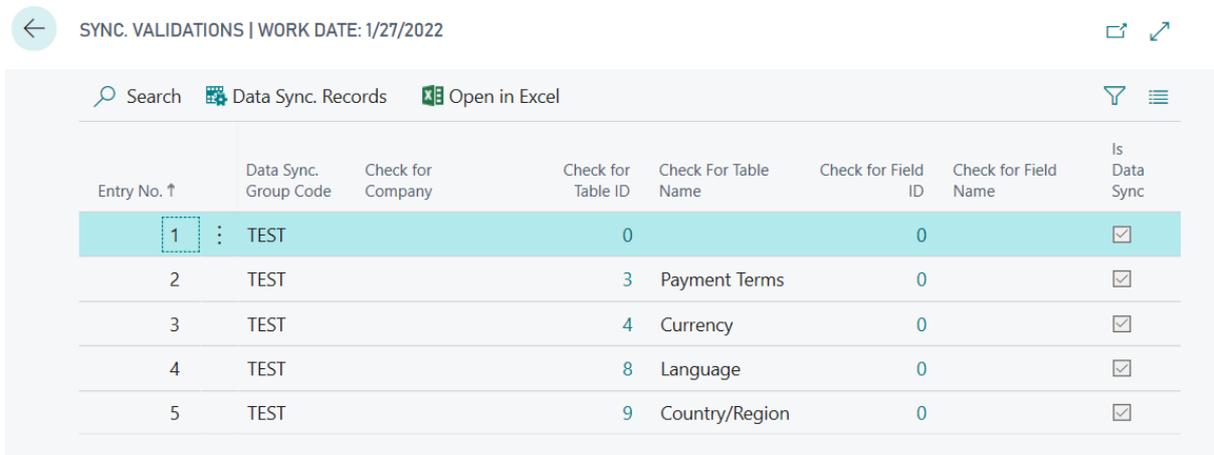
This function is accessible from the **Sync. Groups** list page toolbar.



The validation result will be persisted in a table. The validation history accessible from the **MDSync Administration -> Validations** tile.



The validation result has a boolean field **"Is Data Sync."**, which shows TRUE only if the data is in sync in the scope of the validation, and it shows FALSE in all other cases.



Data difference can have two high-level causes:

- Missing: there is a record which exists in one or more companies, but the same record is missing from one or more other companies.
- Different: there is a record, which exists in all companies, but data differs on one or more fields

Besides calculating the high-level cause, the addon also persists detailed information about the root cause:

- who, when, which group, which level of validation has been executed
- which tables and which records where different
- in case of data mismatch, which fields were different and what is the value in the different companies

In case of data mismatch, you can open the records which are different or missing in certain companies.

← SYNC. VALIDATIONS | WORK DATE: 1/27/2022 Show missing or incorrect lines.

Search Data Sync. Records Open in Excel

Entry No. ↑	Data Sync. Group Code	Check for Company	Check for Table ID	Check For Table Name	Check for Field ID	Check for Field Name	Is Data Sync
1	TEST		0		0		<input checked="" type="checkbox"/>
2	TEST		3	Payment Terms	0		<input checked="" type="checkbox"/>
3	TEST		4	Currency	0		<input checked="" type="checkbox"/>
4	TEST		8	Language	0		<input checked="" type="checkbox"/>
5	TEST		9	Country/Region	0		<input checked="" type="checkbox"/>
6	: TEST		5	Finance Charge ...	0		<input type="checkbox"/>

← SYNC. RECORDS | WORK DATE: 1/27/2022

Search Data Sync. Differences Open in Excel

Validation No. ↑	Company Name ↑	Record ID	Record ID Text	Table ID	Table Name	Status
6	: Company A	Record ID	Finance Charge Terms: 2.0 FOR.	5	Finance Charge Terms	Different
6	Company B		Finance Charge Terms: 2.0 FOR.	5	Finance Charge Terms	Different
6	CRONUS International L...		Finance Charge Terms: 2.0 FOR.	5	Finance Charge Terms	Different

Here you can see that CRONUS International Ltd., Company A and Company B Finance Charge Terms table contains a record with "2.0 FOR" primary key. The field differences can be displayed with the **Data Sync. Differences** button on the toolbar.

← SYNC. FIELD DIFFERENCES LIST | WORK DATE: 1/27/2022

Search Open in Excel

Validation No. ↑	Company Name ↑	Record ID	Record ID Text	Table ID	Table Name	Field ID ↑	Field Name	Field Value
6	: Company A	Record ID	Finance Charge Terms: 2.0 FOR.	5	Finance Charge ...	7	Description	2.0 % for Foreign Customers
6	Company B		Finance Charge Terms: 2.0 FOR.	5	Finance Charge ...	7	Description	2.0 % for Foreign Customers
6	CRONUS Interna...		Finance Charge Terms: 2.0 FOR.	5	Finance Charge ...	7	Description	2.0 % for Foreign Customers (mod)

In this example, there is difference in the **Description** field between CRONUS International Ltd., Company A and Company B:

4. SYNCHRONIZATION

The addon performs synchronization, if:

- the database contains a synchronization group
- the synchronization group contains at least one master company
- **Sync. Enabled** is set to TRUE in the synchronization group
- the synchronization group contains at least one table, where **Sync. Enabled** is set to TRUE

Code ↑	Description	Sync. Enabled
→ TEST	: Test group	<input checked="" type="checkbox"/>

Table ID ↑	Table Name	Sync. Enabled	No. of Field Exceptions
3	Payment Terms	<input type="checkbox"/>	0
4	Currency	<input checked="" type="checkbox"/>	1
5	Finance Charge Terms	<input type="checkbox"/>	0
8	Language	<input checked="" type="checkbox"/>	0
9	Country/Region	<input checked="" type="checkbox"/>	0
11	Country/Region Translation	<input type="checkbox"/>	0
→ 27	: Item	<input checked="" type="checkbox"/>	3

If all conditions are met, the addon provides the following features:

- Slave companies: in tables which are configured for synchronization
 - new records cannot be created
 - existing record cannot be deleted or renamed
 - existing record cannot be modified, only those fields which are configured as Field Exception in such case the user will receive an error message: "You cannot modify a synchronized table in a slave company (See Master Data Sync. settings)."
- Master companies: in tables which are configured for synchronization
 - all kinds of modification (create, update, delete or rename) is allowed, and these modifications are immediately synchronized to other companies in the synchronization group
 - calculated fields (FlowFields), Blobs, Media or MediaSet fields are not synchronized.
 - in case Data Sync. Validation is in progress, the modifications are also prohibited in the master companies as well, and the user will receive an error message: "You cannot modify a synchronized table at the moment, because data sync. validation is in progress."

Synchronization means that the modified field values are copied from the master to the other masters or slaves **without executing the validation or triggers in the other companies**.

This is important, because during the modification in the master, many different validation or trigger can run, which might contain additional validations, or even modification of other records.

In the other companies of the group, these triggers will not run. (for example, before an item record is deleted in the master company, the standard NAV/BC code will check whether the item is used on any kind of documents.

If the item is used, the deletion will fail. This check will not run in the other companies, therefore we might delete an item in the master, which should not be possible to delete in the other company.

Furthermore, if an item has been deleted in the master, its "children", like item unit of measures are also deleted.

These "children" will not be deleted in the other companies.

Because of these facts, the list of tables for synchronization should be selected carefully, and all the related tables should be configured for synchronization. For example, if the goal is to synchronize the items, then the unit of measures, the item unit of measure, the item cross references, etc. should also be configured for synchronization.



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