SQL Connector

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SQL Connector

Introduction

Description

The SQL connector allows an easy way to configure and manage relational databases.

Managed System

There are a lot of relational databases, currently, these are the supported databases.

- MySQL
- MariaDB
- PostgreSQL
- Oracle
- Informix
- IBM DB2/400
- Sybase
- ODBC

For more information: List of relational databases

> If your system is not in the previous list, it's possible to include it easily!
>
> For more information to check if your system may be synchronized with this connector you do not hesitate to contact us through our Contact form

Prerequisites

It is needed a user with access and permissions to the schemes and tables required in the scope of the integration.

To configure DB2/400 or Sybase it is mandatory to install the drivers in the lib directory of the Sync Server.

The Java-ODBC bridge is deprecated in Java, and the support will be removed shortly.

Download and Install

The SQL is part of the default connectors, you do not need to install it, but you can upgrade it from the download management section.

> You can visit the Connector Getting started page for more information about the installation process.

Agent Configuration

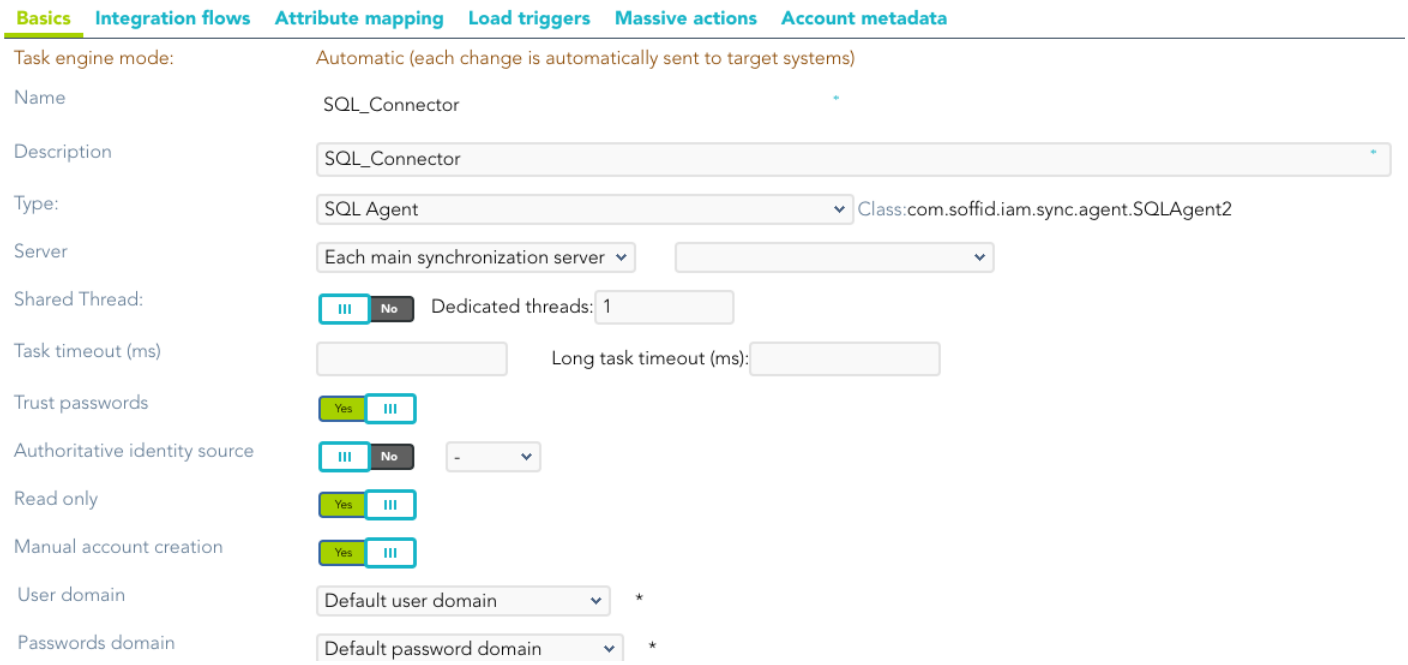
Basic

Generic parameters

After the installation of the addon, you may create and configure agent instances.

To configure this SQL connector you must select "Customizable SQL agent" in the attribute "Type" of the generic parameters section in the agent's page configuration.

> For more information about how you may configure the generic parameters of the agent, see the following link: Agents configuration



Custom parameters

Below there are the specific parameters for this agent implementation:

Parameter	Description
User name	Database user name to authenticate
Password	The password of the database user
Driver	Identifies the driver of the relational database to use. Currently, these are the supported databases: MySQL (& MariaDB), PostgreSQL, Oracle, MS SQL Server, Informix, DB2/400, DB2 Universal, Sybase, ODBC

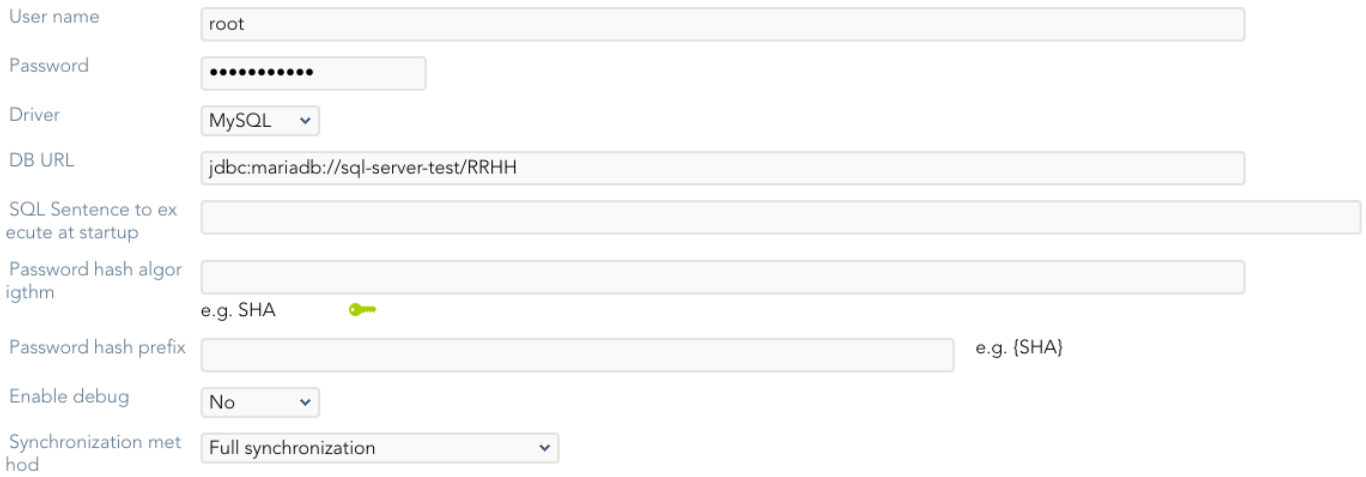
Parameter	Description

DB URL	URL that identifies the connection properties. Please refer to the specific database vendor documentation to build this URL.
	
	`jdbc:mariadb://<HOST>/<DATA_BASE>`
	
	`jdbc:mysql://<HOST>/<DATA_BASE>`
	
	`jdbc:postgresql://<HOST>/<DATA_BASE>`
	
	`jdbc:oracle:<drivertype>:@<database>`
	
	`jdbc:sqlserver://<HOST>;databaseName=<DATA_BASE>`
	
	(*) More documentation about the DB URL

SQL Sentence to execute at startup	Each time the connection to the agent is established, this SQL statement will be executed.
Password hash algorithm	The algorithm is used to encrypt the password. For instance SHA1, SHA256, MD5, etc

Password hash prefix	Prefix to add it to the password.
	
	`{SHA1}BzE/DjIPIsv6Nc/CIFCOs/9FfH4=`
	
	`{SHA256}AIEM+LlNb8ucXeSE077EGHYgs+KHblmquQ2FL+Dxj7Y=`

Enable debug	Two options: **Yes**, and **No**. It enables or not more log traces in the Synchronization Server log
Synchronization method	• **Full synchronization**: persists the changes made in Soffid, regardless of the possible changes made in the final system. • **Incremental synchronization**: this type of synchronization is used to avoid losing changes that have been made to the target system. First, Soffid's changes will be propagated to the target system, and then the changes on the target system will be made in the Soffid system. If the changes are in the same attribute, the Soffid value is the one that will persist. *(**)*



Attribute mapping

This connector can manage users, accounts, roles, groups, and grants.

Properties

Some agents require to configure some custom attributes, you will use the properties section to do that.

Any SQL sentence gets its parameters in three step process:

1. The synchronization engine creates the Soffid object.
2. The Soffid object is translated into a managed system object, using the attribute translation rules.
3. Soffid parser looks for any identifier preceded by a colon (:) symbol. For any symbol found, the symbol is replaced by a parameter whose value is the managed system attribute with the replaced identifier.

Once the SQL sentence has been executed, in the case of SELECT clauses, the column names are used to generate a virtual managed system object. The last step is to apply the attribute translation to generate the Soffid object to be populated.

These are the properties required to map every object of the mapping:

Property	Value

selectAll	SQL sentence that needs to be executed to retrieve all the objects that currently exist on the database.
	• Applies to authoritative identity sources.
	• On non-authoritative identity sources, only the columns needed to calculate the **name** soffid attribute are needed.
	
	You can use this property with the following objects: **user**, **account**, **role**, and **authoritative change**.
	
	`SELECT * FROM USERS`
	
	`SELECT * FROM ROLES`

check	SQL sentence that will return when a single object already exists on the database.
	You can use this property with **all the Soffid objects**.
	
	`SELECT ID FROM USERS WHERE USER=:USER`
	
	`SELECT ID FROM ROLES WHERE ROLE=:ROLE`

insert	SQL sentence to create a new object.
	You can use this property with **all the Soffid objects**.
	
	`INSERT INTO USERS VALUES (:USER, :FIRST_NAME, :LAST_NAME, :MAIL, :GROUP)`
	
	`INSERT INTO USER_ROLES (USETNAME, ROLNAME) VALUES (:USERNAME, :ROLNAME)`

update	SQL sentence to update an existing object.
	You can use this property with **all the Soffid objects**.
	
	`UPDATE USERS SET FIRST_NAME=:FIRST_NAME, LAST_NAME=:LAST_NAME, MAIL=:MAIL, GROUP=:GROUP WHERE ID=:ID`
	
	`UPDATE ROLES SET DESCRIPTION=:DESCRIPTION WHERE ROLE=:ROLE`

delete	SQL sentence to remove (or disable) an existing object.
	You can use this property with **all the Soffid objects**.
	
	`DELETE FROM USERS WHERE ID=:ID`
	
	`DELETE FROM USER_ROLES WHERE ID=:ID`

selectByAccount	SQL sentence to retrieve all the role grants made to an account (for single account information). You can use this property with the following objects: **grant.** `SELECT * FROM USER_ROLES WHERE USERNAME=:USER`
selectByName	SQL sentence to fetch role information based on its name (for single role information). You can use this property with the following objects: **role.** `SELECT * FROM ROLES WHERE ROLE=:ROLE`
updatePassword	SQL sentence to update the user password. You can use this property with the following objects: **user** and **account.** `UPDATE USERS SET PASS=:PASS WHERE USER=:USER`
validatePassword	SQL sentence to check the user password. You can use this property with the following objects: **user** and **account.** `SELET 1 FROM USERS WHERE PASS=:PASS AND USER=:USER`

Attributes

You can customize attribute mappings, you only need to select system objects and the Soffid objects related, manage their attributes, and make either inbound or outbound attribute mappings.

You may map the attributes of the target system with the Soffid available attributes.

- For the target system attributes are required to be accessible to its specification
- For the Soffid attributes, you may follow the next link

> For more information about how you may configure attribute mapping, see the following link: Soffid Attribute Mapping Reference

Example for roles:

Property	Value
delete	DELETE FROM USER_ROLES WHERE ID=:ID
insert	INSERT INTO USER_ROLES (USETNAME, ROLNAME) VALUES (:USERNAME, :ROLNAME)
selectByAccount	SELECT * FROM USER_ROLES WHERE USERNAME=:USER
selectByRole	SELECT * FROM USER_ROLES WHERE USERNAME=:USER

System attribute		Direction	Soffid attribute		
MAIL		←	shortName==null ? attributes{"MAIL"} : shortNa me+"@"+mailDomain		
LAST_NAME		⇄	lastName		
PASS		←	password		
GROUP		⇄	primaryGroup		
FIRST_NAME		⇄	firstName		
USER		⇄	accountName		

Example for accounts:

Property	Value
check	SELECT ID FROM USERS WHERE USER=:USER
delete	DELETE FROM USERS WHERE ID=:ID
insert	INSERT INTO USERS VALUES (:USER, :FIRST_NAME, :LAST_NAME, :MAIL, :GROUP)
selectAll	SELECT * FROM USERS
selectByAccountName	SELECT * FROM USERS WHERE USER=:USER
update	UPDATE USERS SET FIRST_NAME=:FIRST_NAME, LAST_NAME=:LAST_NAME, MAIL=:MAIL, GR OUP=:GROUP WHERE ID=:ID
updatePassword	UPDATE USERS SET PASS=:PASS WHERE USER=:USER
validatePassword	SELET 1 FROM USERS WHERE PASS=:PASS AND USER=:USER

System attribute		Direction	Soffid attribute		
USER		⇄	accountName		
PASS		←	password		
LAST_NAME		⇄	lastName		
FIRST_NAME		⇄	firstName		
GROUP		⇄	primaryGroup		
MAIL		←	shortName==null ? attributes{"MAIL"} : shortNa me+"@"+mailDomain		

Triggers

You can define BeanShell scripts that will be triggered when data is loaded into the target system (outgoing triggers). The trigger result will be a boolean value, true to continue or false to stop.

Triggers can be used to validate or perform a specific action just before performing an operation or just after performing an operation on target objects.

> To view some examples, visit the Outgoing triggers examples page.

Integration flows

Update User

> Visit the Integration flows Update user page for more information

Update Account

> Visit the Integration flows Update account page for more information

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(*)

https://mariadb.com/kb/en/about-mariadb-connector-j/

https://docs.microsoft.com/es-es/sql/connect/jdbc/building-the-connection-url?view=sql-server-ver16

(**) Soffid provides two synchronization types:

- *Full synchronization*
- *Incremental synchronization*

*The first type, the **full synchronization** method, persists the changes made in Soffid, regardless of the possible changes made in the target system.*

*For the second type, the **incremental synchronization** method, Soffid has developed a synchronization system, using custom internal attributes, to check what changes have been made to the different attributes of an object. Thus, it tries to avoid losing the changes that have been made in the target system. First, Soffid's changes will be propagated to the target system, and then the changes on the target system will be made in the Soffid system. If the changes are in the same attribute, the Soffid value is the one that will persist.*

SQL Integration flows - Update user

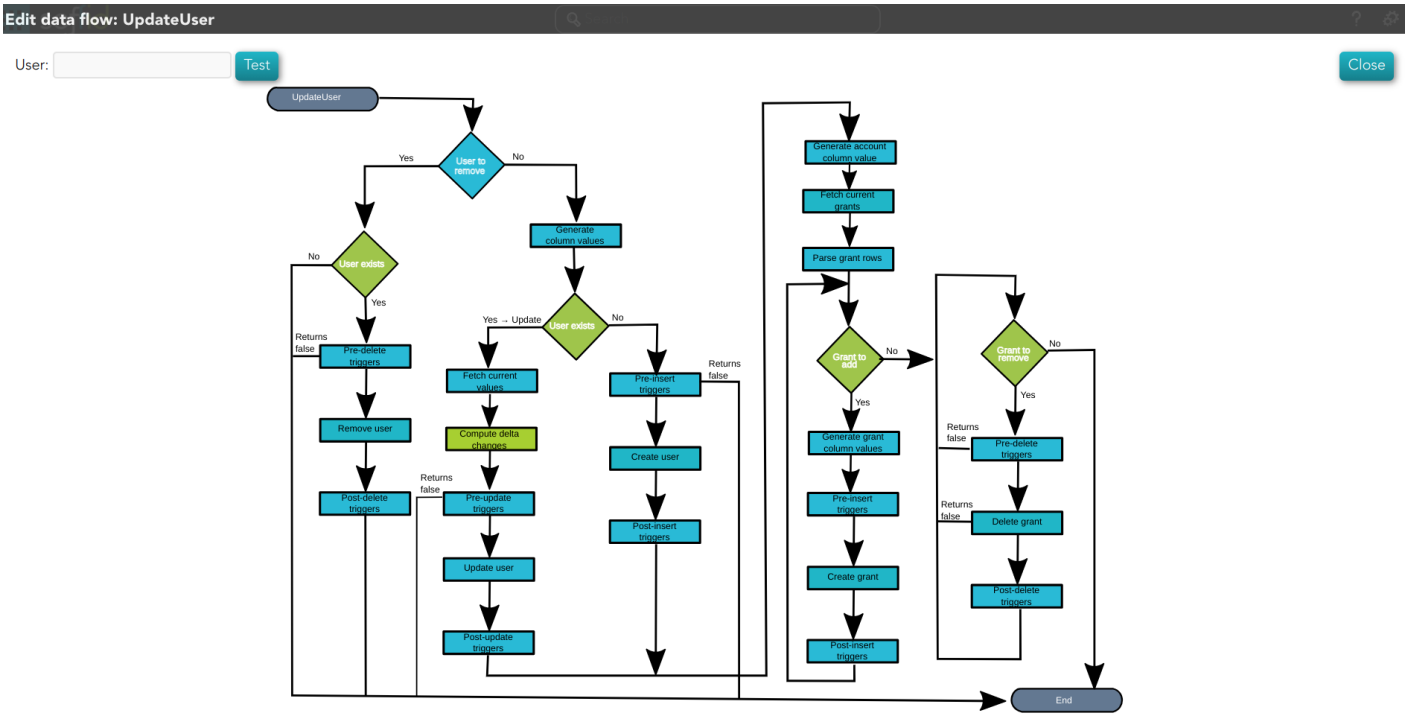
Update user

Introduction

Soffid provides a workflow to create, modify, and delete a user in the final system. One can see the steps of the process in the following diagram.

This process only applies to account type single users.

Diagram



Step by Step

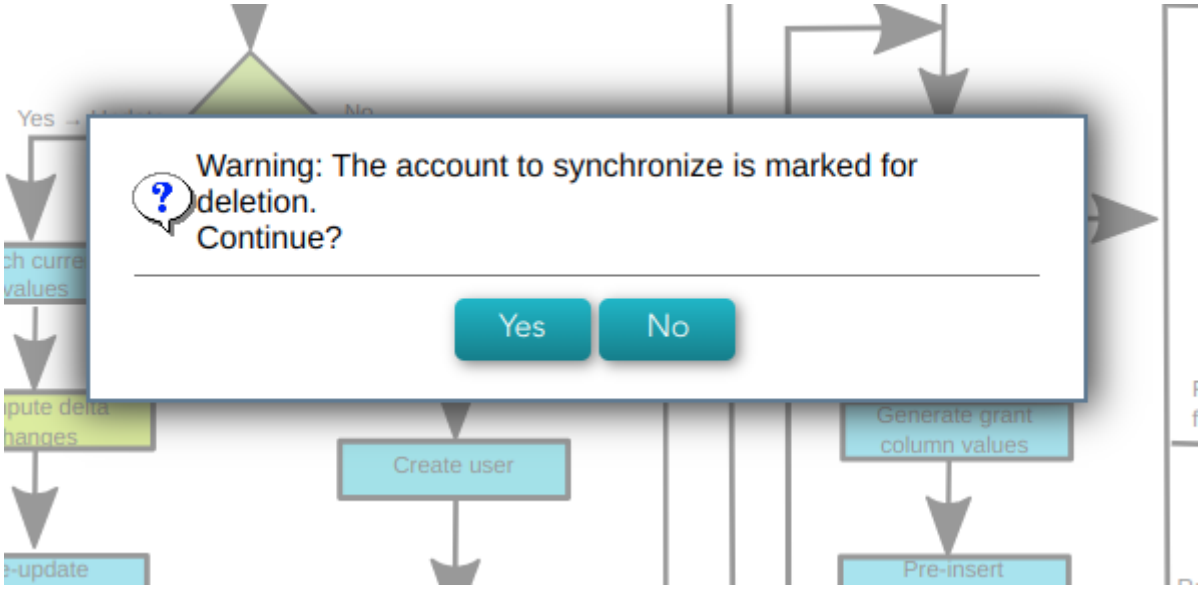
In this document, we will explain the process that Soffid performs to modify a user for the SQL connector.

1. Initial step

First of all, Soffid checks if the user exists in Soffid and then checks the operation to perform, update or delete.

1.1. If the **user does not exist in Soffid**, then Soffid asks to delete the user in the target System.

Warning message



1.1.1. Yes: If the answer is Yes, the process follows through the Yes branch, [3. Delete branch].

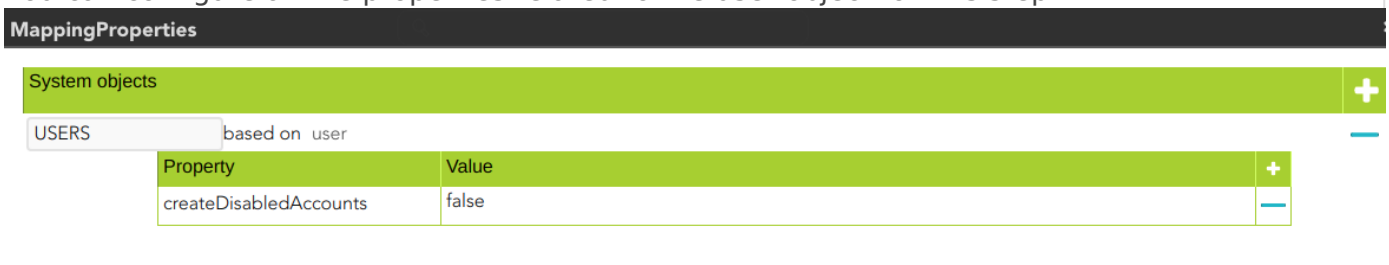
1.1.2. No: If the answer is Yes, the process finishes [10. End].

1.2. If the **user exists in Soffid**, the process continues through [2. User to remove?]. to check if the

2. User to remove?

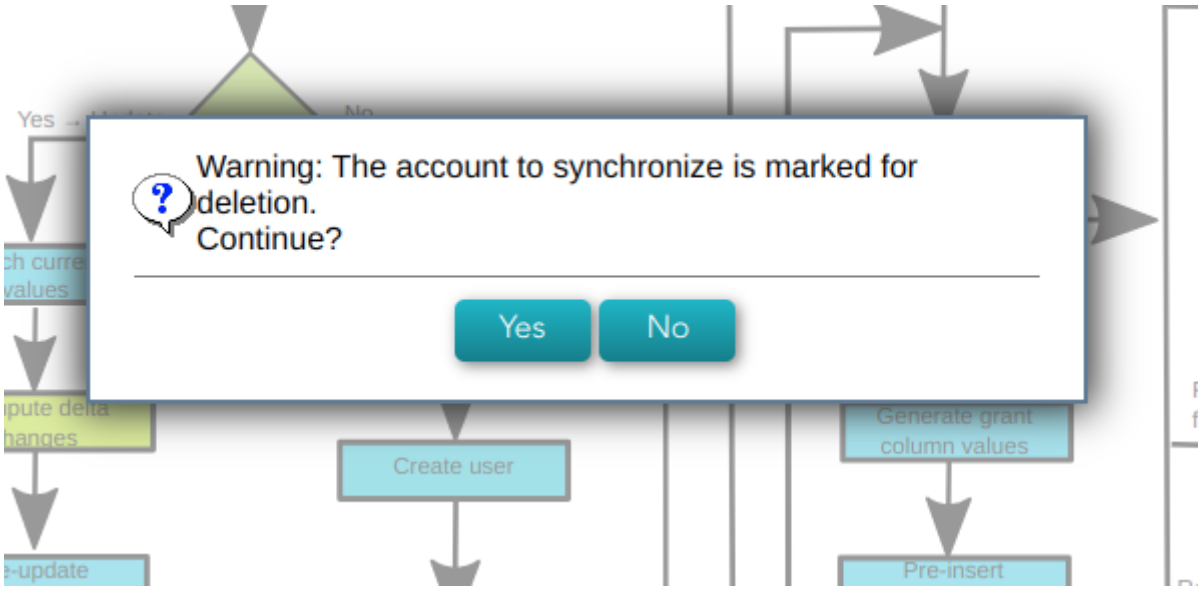
By clicking on the User to remove? step,...

You can configure all the properties related to the user object for this step.



2.1. If the user is **marked for Deletion**, Soffid will ask for user consent to continue with the process or to cancel it. If the answer is Yes, the process follows through the Yes branch, [3. Delete branch].

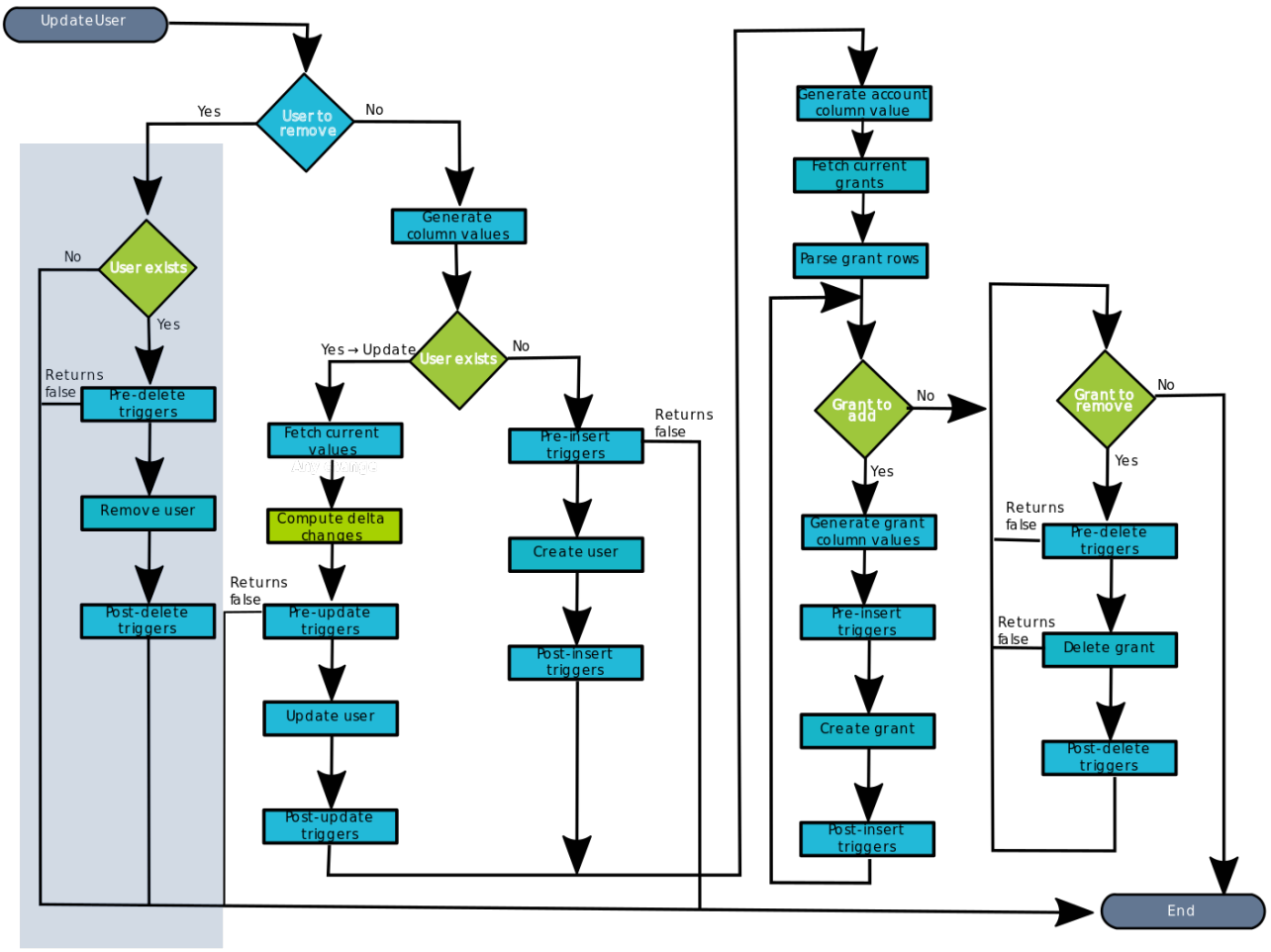
Warning message



2.2. If the user is **marked for Update**, it continues with the flow following through the No branch, [4. Insert or Update branch].

3. Delete branch

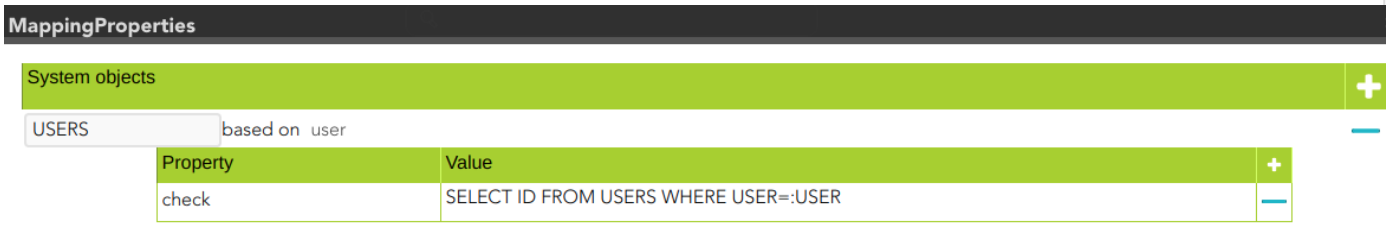
Diagram



3.1. When the operation to perform is to delete a user, first of all, Soffid has to check if the user exists in the target system. To do this, Soffid executes the **property check** of the User object. This property executes the SQL command to check if the user exists or not.

◫ By clicking on the User exists? step,...

You can configure all the properties related to the user object for this step.



3.1.1. If the **user does not exist**, there are no actions to perform in the target system, so the process finishes [10. End].

3.1.2. If the **user exists**, the flow continues executing the **pre-delete triggers** if there is anyone configured. More than one script can be configured. These scripts are executed just before the main action, user delete, and the result (true or false) determines if the main

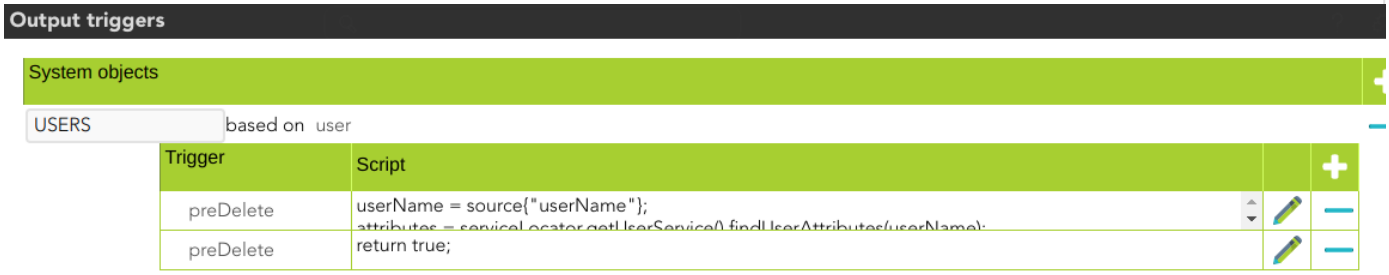
action will be performed or not.

3.1.2.1. False: if the result is false for one or more of these triggers, the process finishes [10. End].

3.1.2.2.True: if the result is true for all of these triggers, Soffid continues to the next step.

By clicking on the Pre-delete triggers step,...

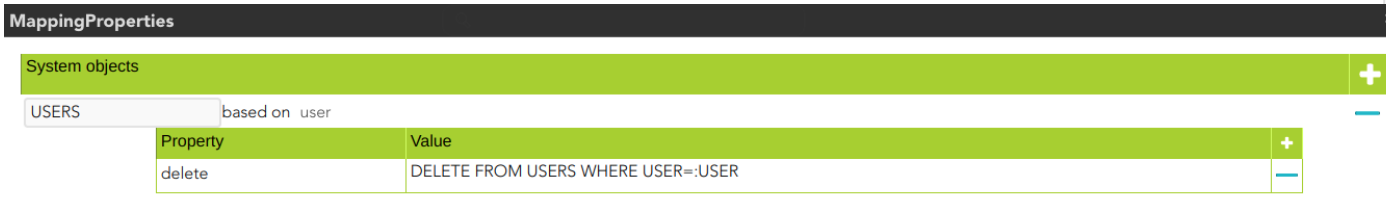
You can configure all the pre-delete triggers related to the user object for this step.



3.1.3. Soffid **removes the user**. To do that, Soffid executes the **property delete** of the User object.

By clicking on the Remove user step,...

You can configure the properties related to the user object for this step.



3.1.3. Then Soffid executes the **post-delete triggers** if any. These triggers can be used to perform a specific action just after performing the remove user operation on the target object.

By clicking on the Post-delete triggers step,...

You can configure the post-delete triggers related to the user object for this step.

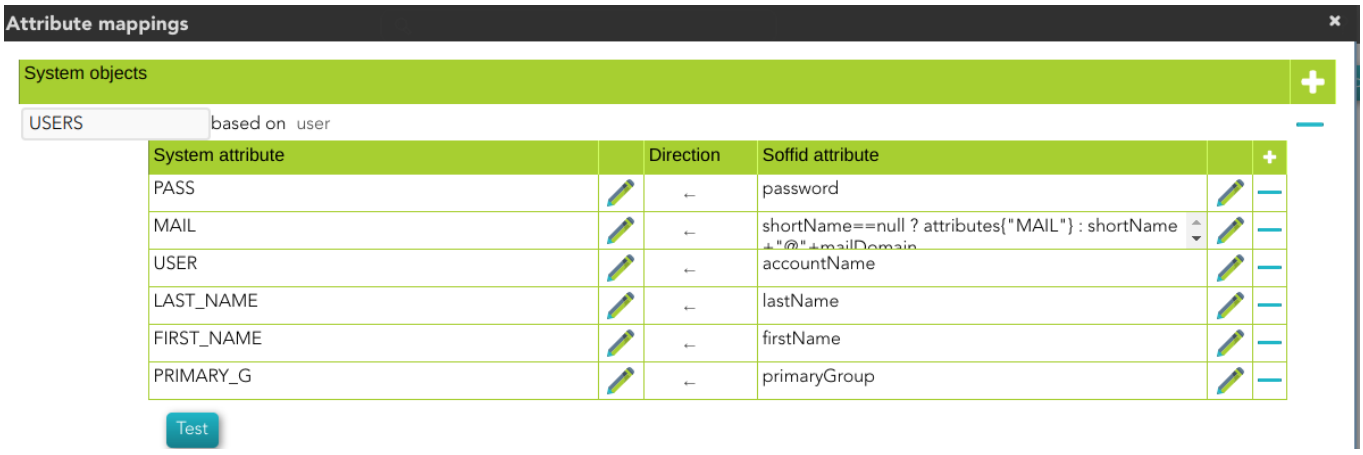
3.1.3. Then the process finishes [10. End].

4. Insert or Update branch

4.1. When the operation to perform is to update a user, first of all, Soffid **generates the columns values**. That is, Soffid calculates the values of the columns from the original values of Soffid.

By clicking on the generate column values step,...

You can configure the attributes related to the user object for this step.



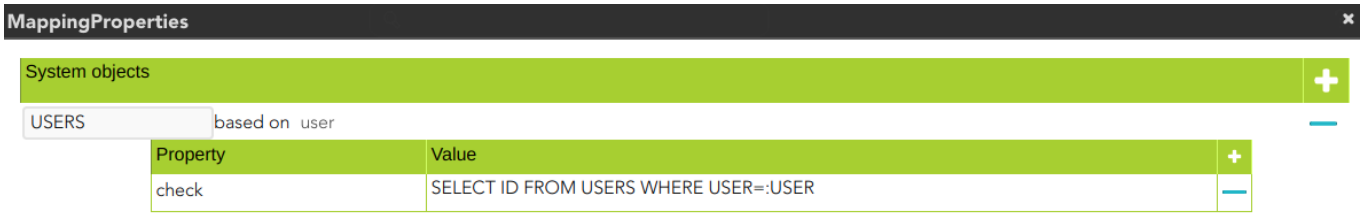
4.2. Then Soffid asks if the **user exists** in the target system to decide the action to execute, this action can be an update or an insert. Soffid executes the **property check** of the User object.

4.2.1. If the **user does not exist** in the target system, the process continues through [5. Insert user branch].

4.2.2. If the **user exists** in the target system, the process continues through [6. Update user branch].

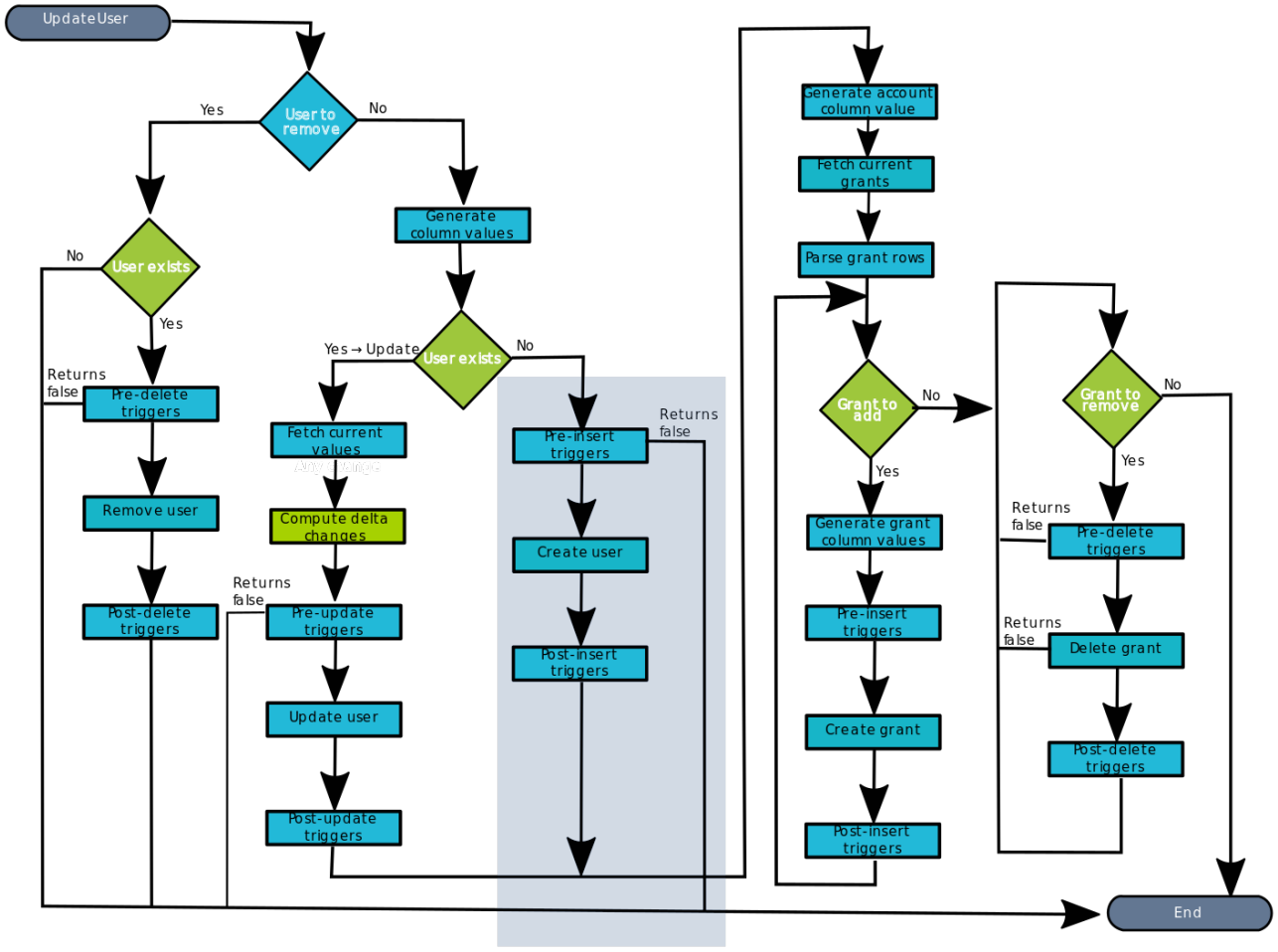
By clicking on the User exists? step,...

You can configure the properties related to the user object for this step.



5. Insert user branch

Diagram



5.1. Soffid executes the **pre-insert triggers** if there is anyone configured. More than one script can be configured. These scripts are executed just before the main action, user create, and the result (true or false) determines if the main action will be performed or not.

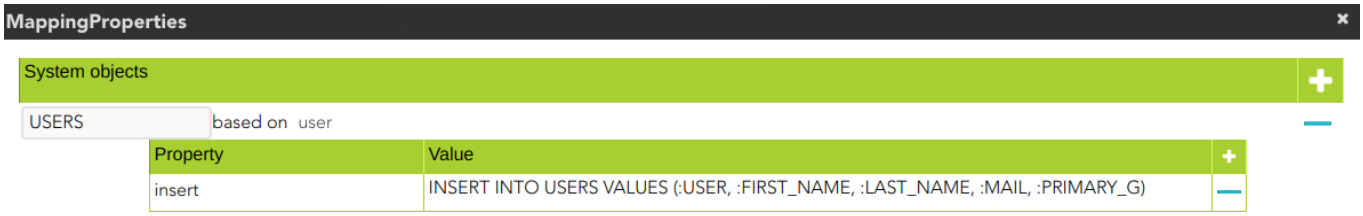
> **5.1.1. False**: if the response is false for one or more of these triggers, the process finishes [10. End] and the user is not created.

5.1.2. True: if the response is true for all of these triggers, Soffid continues to the next step.

5.2. Soffid **creates the user.** To do that, Soffid executes the **property insert** of the User object.

By clicking on the Create user step,...

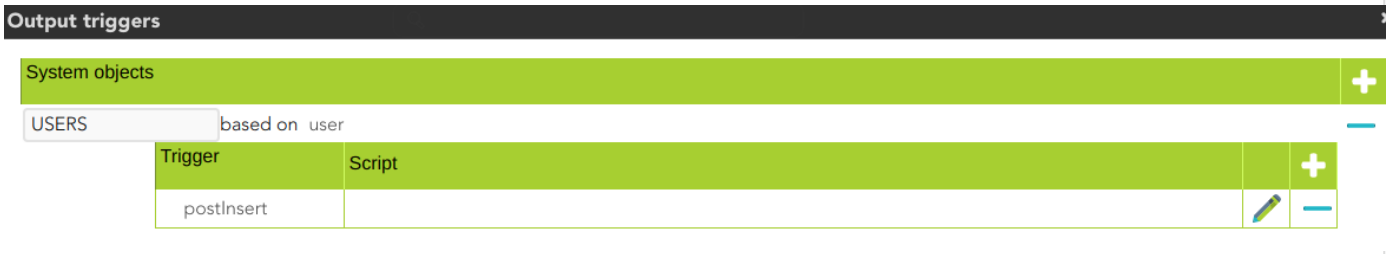
You can configure the properties related to the user object for this step.



5.3. Then Soffid executes **post-insert triggers** if any. These triggers can be used to perform a specific action just after performing the create user operation on the target object.

By clicking on the Post-insert triggers step,...

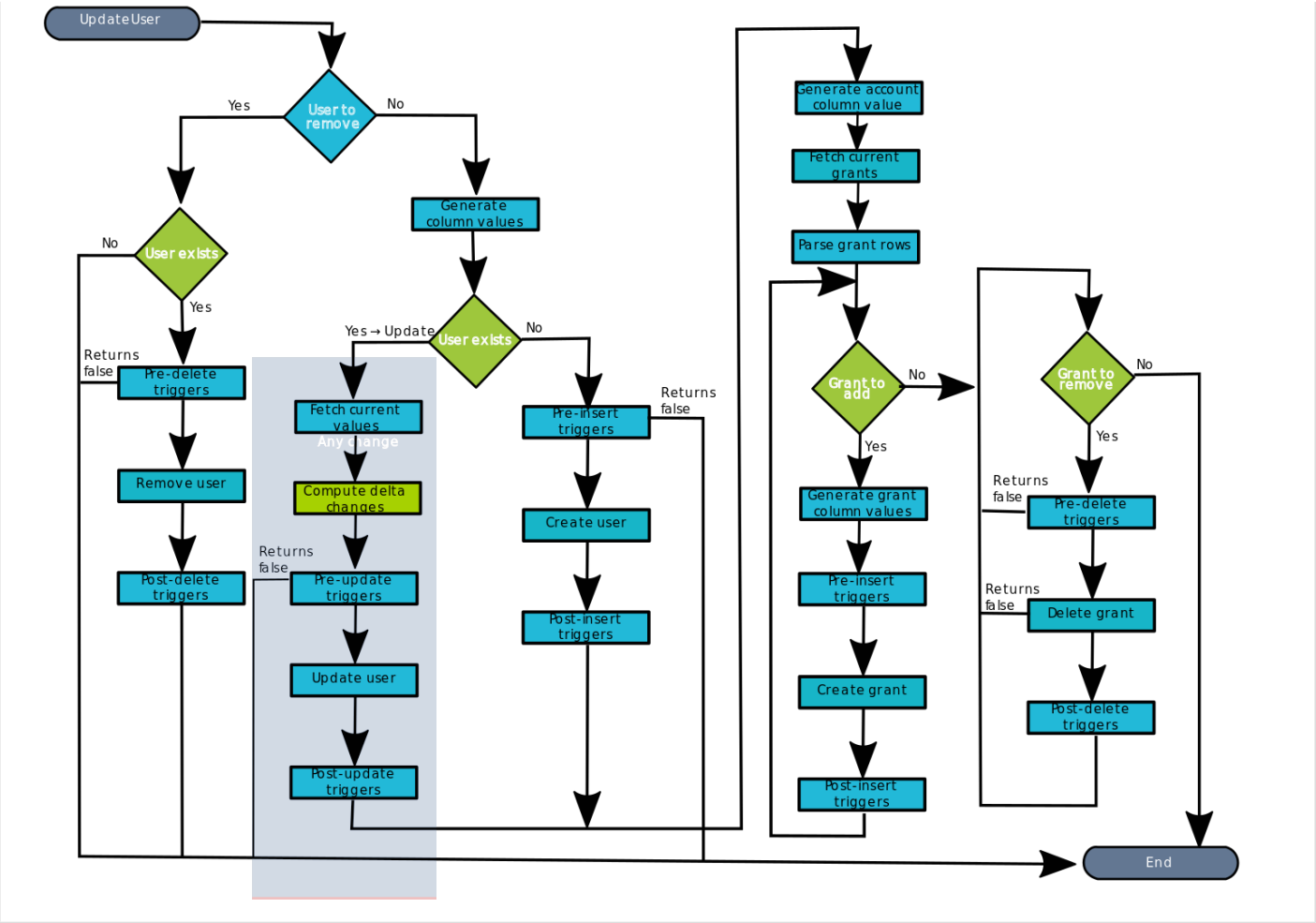
You can configure the Post-insert triggers related to the user object for this step.



5.4. Then the process continues through [7. Grants].

6. Update user branch

Diagram



6.1. Soffid **fetches the current values** of the user. Soffid executes the **property selectByAccountName** of the **User** object.

&&TODO&& IMAGEN

6.2. Then **compute delta changes**, if the property Synchronization method selected is Full Synchronization, then Soffid has to keep the columns values of the last update. If there was any change in the target system:

- There is no conflict, then Soffid only updates the values of the attributes that have changed in Soffid.
- There is conflict, Soffid values prevail over the target system values, so, Soffid updates all the attributes that have changed in Soffid.

&&TODO&& IMAGEN

6.3. And finally execute the **pre-update triggers** if there is anyone configured. More than one script can be configured. These scripts are executed just before the main action, user update, and the result (true or false) determines if the main action will be performed or not.

> **6.3.1. False**: if the response is false for one or more of these triggers, the process finishes [10. End] and the user is not updated

6.3.2. True: if the response is true for all of these triggers, Soffid continues to the next step.

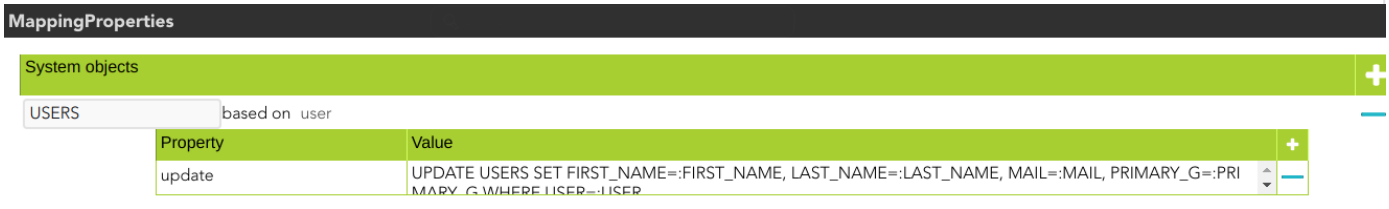
By clicking on the Pre-update triggers step,...

You can configure the Pre-update triggers related to the user object for this step.

6.4. Soffid **updates the user.** To do that, Soffid executes the **property update** of the **or User** object.

By clicking on the update user step,...

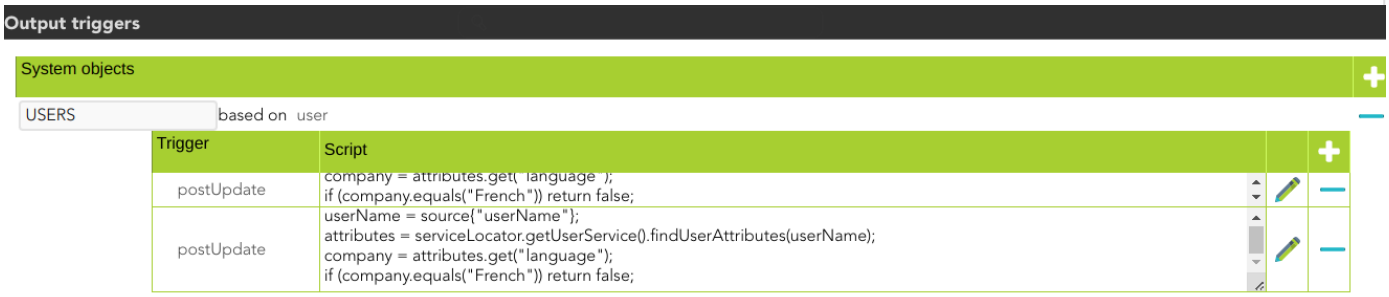
You can configure the properties related to the user object for this step.



6.5. Then Soffid executes the **post-update triggers** if any. These triggers can be used to perform a specific action just after performing the update user operation on the target object.

By clicking on the Post-update triggers step,...

You can configure the Post-update triggers related to the user object for this step.



6.6. Then the process continues through [7. Grants].

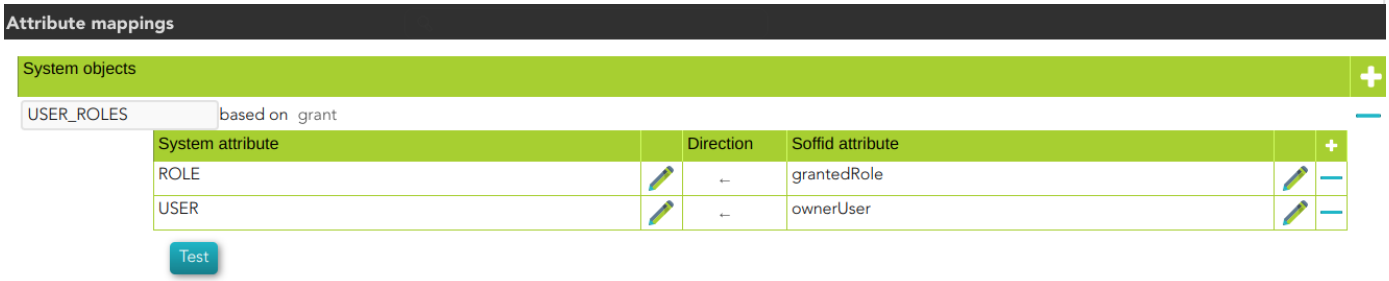
7. Grants

At this point, soffid runs the actions relative to the grants

7.1. Once the process arrives at this step, Soffid **generates account column values**. That is, Soffid creates a dummy object with only the account name, this object will be used later.

By clicking on the generates account columns values step,...

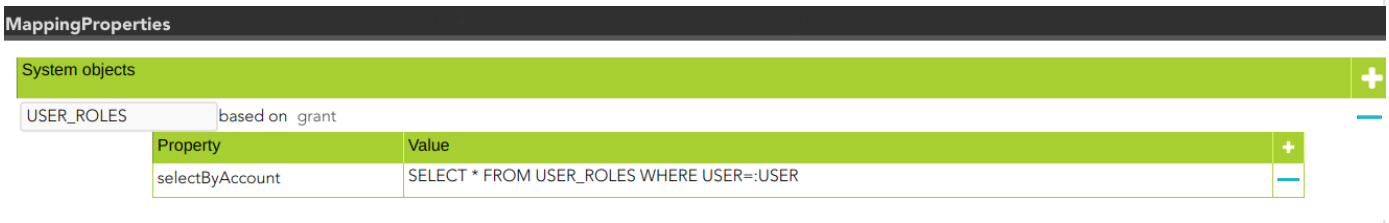
You can configure the attribute mappings related to the grant object for this step.



7.2. Then, Soffid **fetches the current grants** for the user. Soffid executes the **property selectByAccount** of the grant object with the values of the previous step

By clicking on the fetch current grants step,...

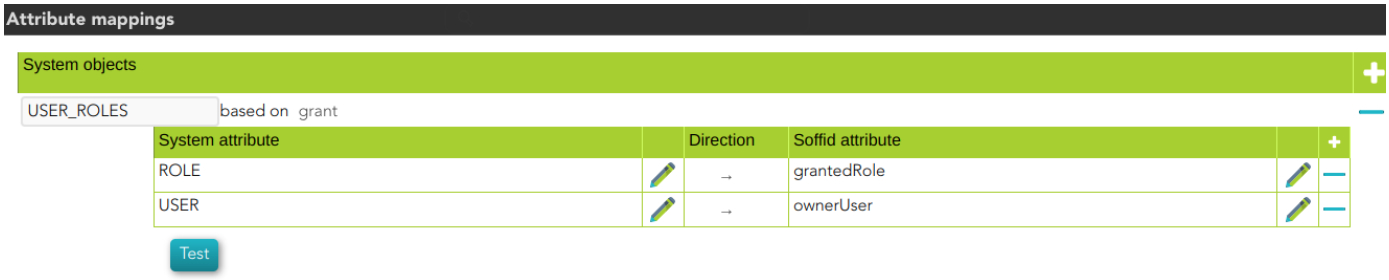
You can configure the properties related to the grant object for this step.



7.3. Finally, Soffid **parses grant rows,** that is Soffid makes the mappings defined

By clicking on the parse grant rows step,...

You can configure the attribute mappings related to the grant object for this step.

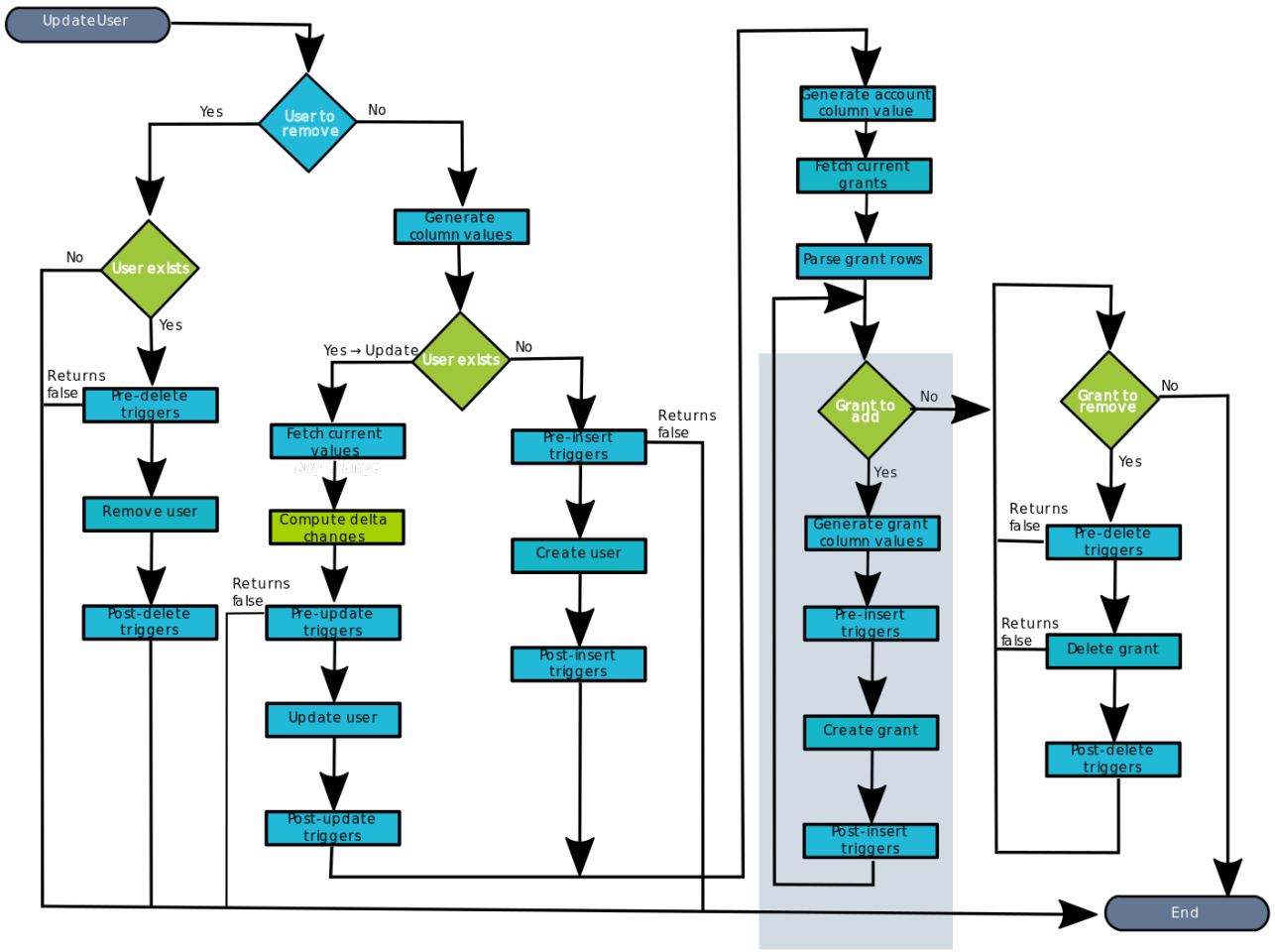


7.3. Then the process continues through [8. Grant to add].

8. Grant to add

This is a loop while there are grants to add. This grants list comes from the previous step [7. Grants].

Diagram



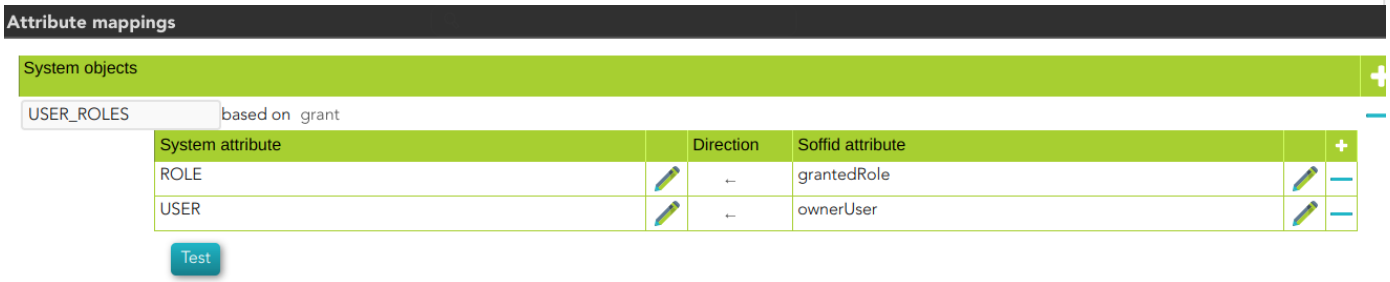
8.1. If there are **No** grants to add, the process goes to [9. Grant to Remove].

8.2. Yes, there are grants to add:

8.2.1. Soffid **generates grant column values** and Soffid checks if the grant exists in the target system, Soffid executes the **property check** of the grant object.

◫ By clicking on the generate grant column values step,...

You can configure the attribute mappings related to the grant object for this step.



8.2.2. Soffid executes the **pre-insert triggers** if there is anyone configured. More than one script can be configured. These scripts are executed just before the main action, a grant create, and the result (true or false) determines if the main action will be performed or not.

8.2.2.1. False: if the response is false for one or more of these triggers, the process goes to [8. Grant to add] and the grant is not created.

8.2.2.2. True: if the response is true for all of these triggers, Soffid continues to the next step.

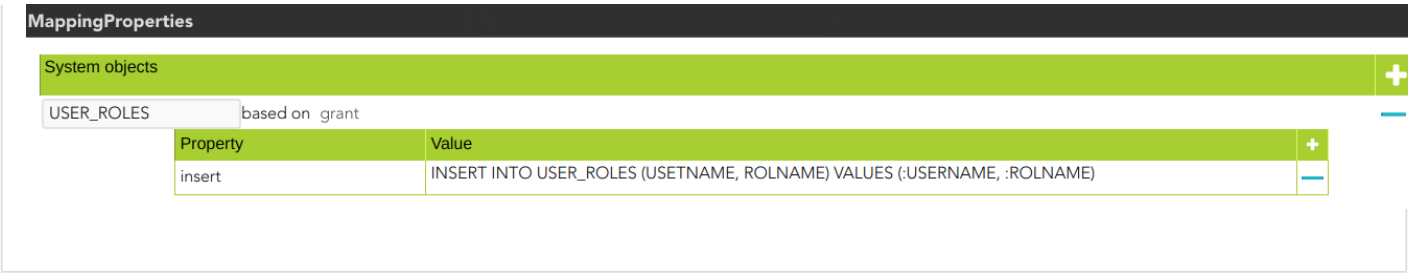
◫ By clicking on the Pre-insert triggers step,...

You can configure the Pre-insert triggers related to the grant object for this step.

8.2.3. If the result of the triggers is true, then Soffid **creates the grant.** To do that, Soffid executes the **property insert** of the grant object.

◫ By clicking on the create grant step,...

You can configure the properties related to the grant object for this step.



8.2.4. Then Soffid executes the **post-insert triggers** if any. These triggers can be used to perform a specific action just after performing the create grant operation on the target object.

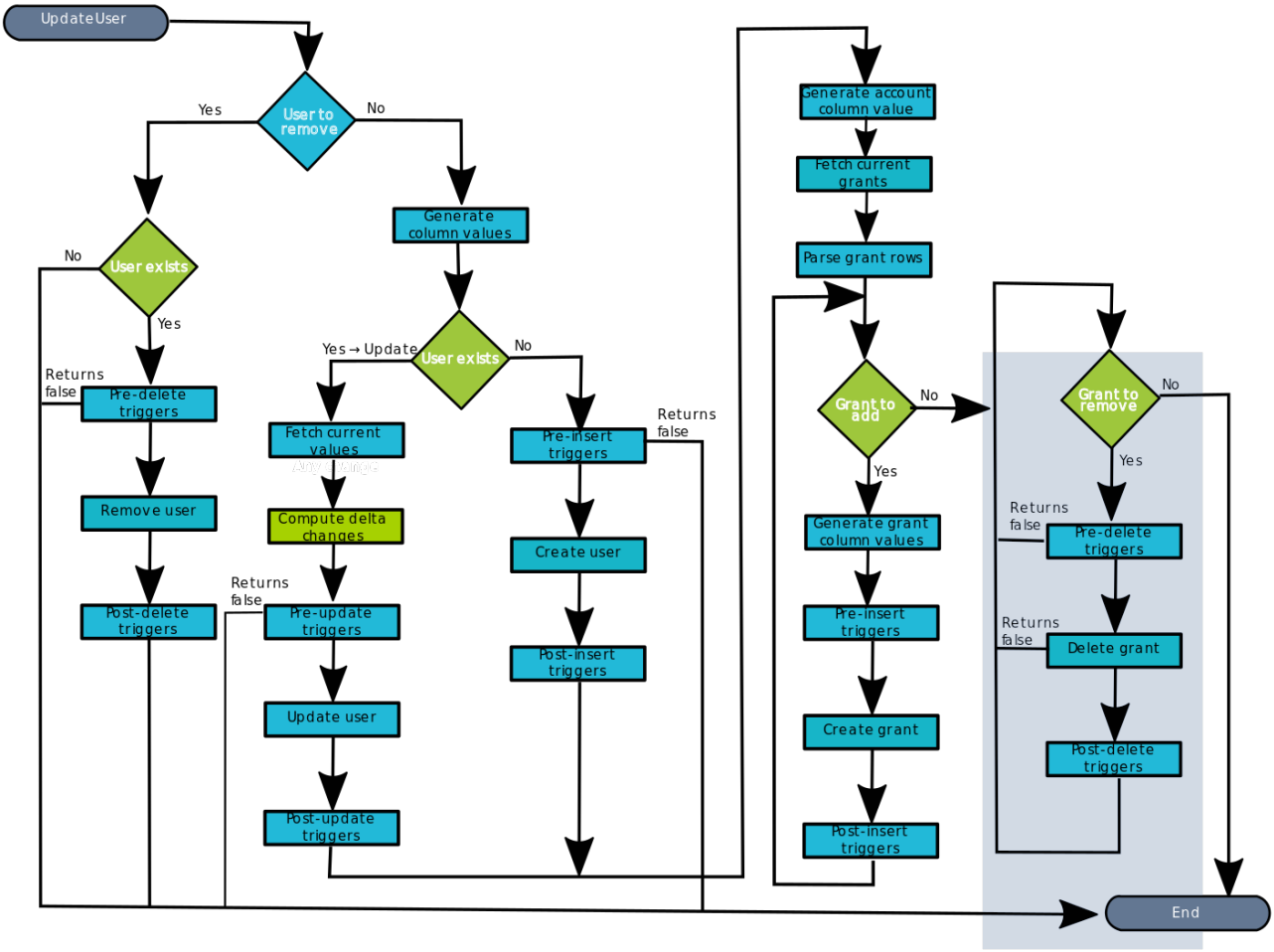
◫ By clicking on the Post-insert triggers column values step,...

You can configure the Post-Update related to the grant object for this step.

8.2.5. Then the process continues through [8. Grant to add].

9. Grant to remove

◫ Diagram



This is a loop while there are grants to remove. This grants list comes from the previous step [7. Grants].

9.1 No: If there are No grants to add, the process goes to [10. End].

9.2. Yes, there are grants to remove:

9.2.1. Soffid executes the **pre-delete triggers** if there is anyone configured. More than one script can be configured. These scripts are executed just before the main action, a grant delete, and the result (true or false) determines if the main action will be performed or not.

9.2.1.1. False: if the response is false for one or more of these triggers, the process finishes [10. End] and the grant is not deleted.

9.2.1.2. True: if the response is true for all of these triggers, Soffid continues to the next step.

□□ By clicking on the pre-delete trigger step,...

You can configure the Pre-delete triggers related to the grant object for this step.

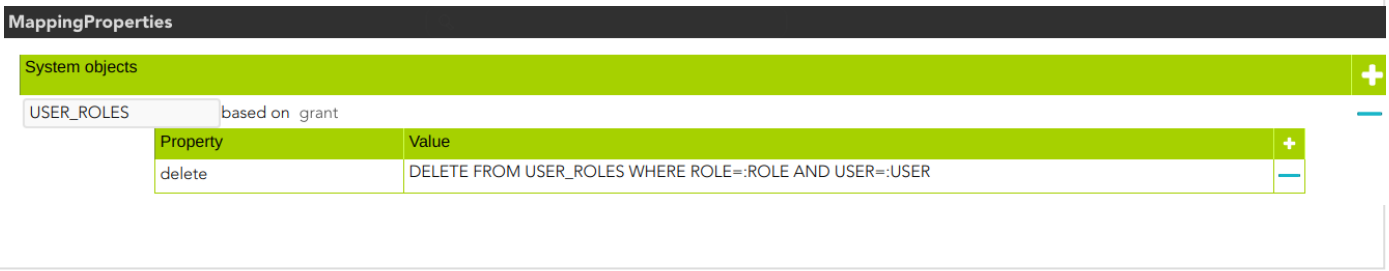
9.2.2. If the result of the triggers is true, then Soffid **deletes the grant.** To do that, Soffid executes the **property delete** of the grant object. This operation can return a true or false result.

9.2.2.1. False: the delete action could not be performed and the process check for another grant [9. Grant to remove].

9.2.2.2. True: the delete action could be performed properly. Soffid continues to the next step.

◫ By clicking on the delete grant step,...

You can configure the properties related to the grant object for this step.



9.2.3. Then Soffid executes the **post-delete triggers** if any. These triggers can be used to perform a specific action just after performing the delete grant operation on the target object.

◫ By clicking on the post-delete trigger step,...

You can configure the Post-delete triggers related to the grant object for this step.

9.2.4. Then the process continues through [9. Grant to remove].

10. End

The process finishes and the log is displayed, and you can download it by clicking the *Download* button.