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Legend

⚠️ WARNING: A WARNING icon indicates a potential for property damage, personal injury, or death.

⚠️ CAUTION: A CAUTION icon indicates potential damage to hardware or loss of data if instructions are not followed.

❓ IMPORTANT, NOTE, TIP, MOBILE, or VIDEO: An information icon indicates supporting information.

One Identity Manager Target System Synchronization Reference Guide
Updated - August 2019
Version - 8.1.1
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Target system synchronization with the Synchronization Editor

The central component of the One Identity Manager is to map employees and their master data with permissions through which they have control over different target systems. For this purpose, information about user accounts and permissions can be read from the target system into the One Identity Manager database and linked to employees. This gives an overview of the permissions for each employee in all of the connected target systems. One Identity Manager provides the possibility to manage user accounts and their permissions. You can provision modifications in the target systems. Employees are supplied with the necessary permissions in the connected target systems according to their function in the company. Regular synchronization keeps data consistent between target systems and the One Identity Manager database.

The Synchronization Editor instantiates connecting the various target systems to the One Identity Manager. Use this tool to configure data synchronization for any target system and specify which target system data is mapped to the One Identity Manager database. You also define the object properties mapping and the synchronization sequence as a workflow. One Identity Manager provides default mappings and workflows for synchronizing all target systems which are supported by the installed modules.

Architecture

Use the Synchronization Editor to configure synchronization between the One Identity Manager database and a target system. A system connector takes over the connection to and communication with the target system. The system connector prepares target system objects, properties and methods such that they can be read and written by the One Identity Manager. The system connector communicates with the target system and carries out all read and write operations.
Synchronization and provisioning

During target system synchronization with the One Identity Manager database, system objects and their properties are compared with one another. Synchronization results in the target system and One Identity Manager database having an identical data structure. Some target systems are supported by default. For these target systems, One Identity Manager provides default processes and workflows.

Provisioning

In addition, changes to One Identity Manager database objects can be promptly provisioned in the connected target systems. For standard target systems, One Identity Manager provides default processes and workflows for provisioning.

The same workflows and mappings can be used for provisioning as for synchronization. The processing methods defined in the synchronization step are only executed during provisioning if the condition defined in the processing method is fulfilled and the synchronization and mapping directions for the object to process match.

Object changes are not provisioned in target system connections with read-access only.

Synchronization of single objects

For standard target systems, One Identity Manager provides default processes and workflows for synchronizing single objects.

The same workflows and mappings can be used for single object synchronization as for synchronization. The processing methods defined in the synchronization step are only executed during single object synchronization if the condition defined in the processing
method is fulfilled and the synchronization and mapping directions for the object to process match.

Individual objects can only be synchronized if the object is already present in the One Identity Manager database. The changes are applied to the mapped object properties. If a member list is belongs to one of these properties, then the entries in the allocation table will also be updated. If the object is no longer present in the target system, then it is deleted from the One Identity Manager database.

Related topics
- Direction of synchronization and mapping on page 43
- System connection properties on page 97

Working with the Synchronization Editor

The Synchronization Editor is the One Identity Manager tool you use to configure synchronization of the One Identity Manager database on the one side and any target system on the other. The Synchronization Editor provides a homogeneous interface for all target systems to be controlled.

You can run the following tasks with the Synchronization Editor:
- Set up a connection to any target system
- Load target system schema and mapping with the One Identity Manager database schema (called "One Identity Manager schema" in the following)
- Specify key object properties based on which the other associated objects are identified during synchronization (object matching rules).
- Specify the base object and scope of synchronization
- Define filters to limit the number of objects to synchronize
- Specify the direction of synchronization
- Define the synchronization workflow
  - Select schema classes to be synchronized
  - Specifying Processing Methods
  - Define the sequence of synchronization steps
- Specify the time and frequency of synchronization

There are different ways to start the Synchronization Editor.
- From the Windows start menu using the entry One Identity | One Identity Manager | Configuration | Synchronization Editor.
- From the Launchpad.
- In the Manager

## Synchronization Editor Views

The Synchronization Editor has several views for showing the synchronization configuration of the connected systems.

<table>
<thead>
<tr>
<th>View</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation view</td>
<td>The navigation view is made up of suggested entry points for the interface navigation.</td>
</tr>
<tr>
<td>Document view</td>
<td>The document view shows the form or editor selected through the navigation view respectively. The forms and editors are displayed on different tabs.</td>
</tr>
<tr>
<td>Start page</td>
<td>The start page shows an overview of all synchronization projects. You can add new synchronization projects here.</td>
</tr>
<tr>
<td>Mapping Editor</td>
<td>You can edit maps in the mapping editor. The mapping editor is divided into two schema view and two rule views. Each mapping editor view has its own toolbar.</td>
</tr>
<tr>
<td>Schema view</td>
<td>Views in the mapping editor. The One Identity Manager schema and schema property details are displayed in the left-hand area of the mapping editor. The target system schema and schema property details are displayed on the right side.</td>
</tr>
<tr>
<td>Rule view</td>
<td>Views in the mapping editor. Property mapping and object matching rules are displayed in the middle of the mapping editor.</td>
</tr>
<tr>
<td>Workflow Editor</td>
<td>Synchronization steps are organized and displayed as workflows in the workflow editor. The workflow editor is divided into two views: a general properties view and the workflow view.</td>
</tr>
<tr>
<td>Workflow view</td>
<td>View in the workflow editor in which synchronization steps are handled. The workflow view has its own toolbar.</td>
</tr>
<tr>
<td>Patch view</td>
<td>The patch view, displays all installation patches for new functions and solved issues in the One Identity Manager, which affect target system synchronization. Patches can be applied to existing synchronization projects.</td>
</tr>
<tr>
<td>Log view</td>
<td>The log view displays the error log.</td>
</tr>
</tbody>
</table>
Status bar information

The following information is shown in the status bar.

**Table 2: Status bar icons**

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄</td>
<td>Current user and system user.</td>
</tr>
<tr>
<td>🔄</td>
<td>Connected database in the notation <code>&lt;server&gt;&lt;database (description)&gt;</code>.</td>
</tr>
<tr>
<td>🔄</td>
<td>Synchronization project open.</td>
</tr>
<tr>
<td>🔴</td>
<td>A warning has been written to the error log.</td>
</tr>
<tr>
<td>🔴</td>
<td>An error message has been written to the error log.</td>
</tr>
<tr>
<td>🔄</td>
<td>Database status (database activity such as loading or saving objects).</td>
</tr>
</tbody>
</table>

Menu items

The Synchronization Editor user interface contains the following menu items and toolbars:

**Table 3: Meaning of Items in the Menu Bar**

<table>
<thead>
<tr>
<th>Menu</th>
<th>Menu Item</th>
<th>Meaning</th>
<th>Shortcut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database</td>
<td>New connection</td>
<td>Creates a new database connection.</td>
<td>Ctrl + Shift + N</td>
</tr>
<tr>
<td></td>
<td>Close connection</td>
<td>Closes the current database connection.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Settings…</td>
<td>For configuring general program settings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Changing a Synchronization User's Password</td>
<td>The password for the system user <strong>Synchronization</strong> can be changed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exit</td>
<td>Exits the program.</td>
<td>Alt + F4</td>
</tr>
<tr>
<td>Edit</td>
<td>How to Edit a Synchronization Project</td>
<td>Properties of the loaded synchronization project can be edited.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Update synchronization project</td>
<td>System connector updates can be applied to existing synchronization projects.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Create template</td>
<td>Creates a template for a new synchronization project.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>This menu item is only available in expert mode.</td>
<td></td>
</tr>
<tr>
<td>Menu</td>
<td>Menu Item</td>
<td>Meaning</td>
<td>Shortcut</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Help</td>
<td>Community</td>
<td>Opens the One Identity Manager community website.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Support Portal</td>
<td>Opens the One Identity Manager product support website.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Training</td>
<td>Opens the One Identity Manager training portal website.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Online documentation</td>
<td>Opens the One Identity Manager documentation website.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Search</td>
<td>Opens the search dialog box.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Help</td>
<td>Opens the help for this form.</td>
<td>F1</td>
</tr>
<tr>
<td></td>
<td>Info</td>
<td>Shows the version information for program.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Generate synchronization analysis report</td>
<td>Generates a synchronization analysis report.</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4: Meaning of the Icons in the Toolbar**

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Commit to database]</td>
<td>Saves changes permanently.</td>
</tr>
<tr>
<td></td>
<td>To save changes with change labels, open the submenu and click <strong>Commit and assign a change label</strong>. For detailed information about working with change labels, see the <em>One Identity Manager Operational Guide</em>.</td>
</tr>
<tr>
<td>![Technical view]</td>
<td>Shows technical names.</td>
</tr>
<tr>
<td>![Additional data]</td>
<td>Shows additional properties.</td>
</tr>
<tr>
<td>![remote connection]</td>
<td>Shows additional properties.</td>
</tr>
<tr>
<td>![Enabled variable set]</td>
<td>Variable set used in the Synchronization Editor to connect to the target system. This menu item is only enabled if more than one variable set is defined. To select another variable set, open the submenu.</td>
</tr>
</tbody>
</table>
### Table 5: Meaning of Icons in the Navigation View

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Create a new workflow with the workflow wizard.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Creates a new mapping/workflow.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Edits mapping/workflow.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Deletes mapping/workflow.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Reload the data.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Display synchronization log.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Display provisioning log.</td>
</tr>
</tbody>
</table>

### Table 6: Meaning of Icons in the Schema Tool Bar

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Add schema property.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Edit selected schema property.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Delete selected schema property.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Filter schema properties.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Search schema properties.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Filter schema properties with similar names in other schema respectively.</td>
</tr>
</tbody>
</table>

### Table 7: Meaning of Icons in the Rule Tool Bar

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Add rule.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Edit selected rule.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Delete selected rule.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Filter rules.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Transform selected property mapping rule into an object matching rule.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Sorts object matching rule.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Tests object matching rule.</td>
</tr>
<tr>
<td><img src="image" alt="Create" /></td>
<td>Create new rules with help of the mapping wizard.</td>
</tr>
</tbody>
</table>
### Table 8: Meaning of icons in the workflow view

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>📃</td>
<td>Adds new step.</td>
</tr>
<tr>
<td>📃</td>
<td>Shows execution plan.</td>
</tr>
<tr>
<td>🔽</td>
<td>Opens detail view of all synchronization steps.</td>
</tr>
<tr>
<td>🔼</td>
<td>Closes detail view of all synchronization steps.</td>
</tr>
<tr>
<td>✅</td>
<td>Enable or disable synchronization steps.</td>
</tr>
</tbody>
</table>

### Table 9: Meaning of icons in the variable set tool bar

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>📃</td>
<td>Add a variable/variable set.</td>
</tr>
<tr>
<td>🗑️</td>
<td>Delete variable/variable set.</td>
</tr>
<tr>
<td>🔧</td>
<td>Rename variable set.</td>
</tr>
<tr>
<td>👤</td>
<td>Convert variable to script.</td>
</tr>
<tr>
<td>🕯️</td>
<td>Convert script variable to a plain variable.</td>
</tr>
<tr>
<td>🙏</td>
<td>Display variable usage.</td>
</tr>
<tr>
<td>🍃</td>
<td>Default value for restoring the selected variable.</td>
</tr>
</tbody>
</table>

### Table 10: Meaning of icons in the rule tool bar

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>🧪</td>
<td>Shows patches with fixes.</td>
</tr>
<tr>
<td>🍃</td>
<td>Shows all patches for new features.</td>
</tr>
<tr>
<td>🆘</td>
<td>Shows all patches that are cannot be applied to the synchronization project.</td>
</tr>
<tr>
<td>🥼</td>
<td>Shows all patches that are already applied to the synchronization project.</td>
</tr>
</tbody>
</table>

### Table 11: Meaning of Icons in the Error Log

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>Logs all critical error messages. (Severity level = Fatal)</td>
</tr>
<tr>
<td>📌</td>
<td>Logs all information. (Severity level = Info)</td>
</tr>
<tr>
<td>🚨</td>
<td>Logs all warnings. (Severity level = Warning)</td>
</tr>
<tr>
<td>🎽</td>
<td>Logs all error messages. (Severity level = error)</td>
</tr>
</tbody>
</table>
| 🍃    | Logs debugger output. This setting should only be used for testing. (Severity level
### Customizing program settings

To change the program settings

- Select the menu **Database | Settings**.

Set the following options on the **General** tab.

### Table 12: General Program Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>Language for the user interface. The initial program login uses the system language for the user interface. Changes to the language settings take effect after the program has been restarted. The language is set globally for all One Identity Manager programs which means that the language setting does not have to be configured for each program individually.</td>
</tr>
</tbody>
</table>
Setting | Meaning
--- | ---
Enable expert mode | Specifies whether expert mode is used. If you set this option, functions become available that should only be used by experienced Synchronization Editor users. For more information, see Additional information for experts on page 138.
Enable the technical view after program start | Specifies whether technical captions are used in the Synchronization Editor views. Disable this option to use display names.
Show additional data | Specifies whether additional properties are displayed.
Show hints | Specified whether additional hint, like explanations, warnings or examples are displayed.

Set the following options on the **Security** tab.

**Table 13: Security settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saved passwords</td>
<td>List of all saved passwords that are saved locally-</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the selected value.</td>
</tr>
<tr>
<td>Delete all the synchronization project's sensitive data</td>
<td>Deletes all locally saved sensitive data in the current synchronization project.</td>
</tr>
<tr>
<td>Delete all saved passwords</td>
<td>Deletes all the Synchronization Editor's locally saved sensitive data.</td>
</tr>
</tbody>
</table>

**Wizard for entering filters**

At certain points you can define custom filter conditions. The filter conditions are formulated like a condition (WHERE clause) for a database query.

You can enter database queries directly or put them together with a wizard. Use the button to switch to the relevant view.

- The comparison operators $=$, $<>$, $<$, $>$, $<=$, $>=$ and like are supported for defining conditions.
- To link condition you can use the logical operators **AND**, **OR** and **NOT**.
- You can use variables in your condition definitions. Variable must be masked.
  Syntax: `$<variable>$'
**NOTE:** If the condition contains a dollar sign, which is not labeling a variable, it must be masked with $.
Example: ‘300 $’ compared to the value ‘300 ’

**TIP:** If you enter a condition directly, you can access predefined variables with the button.

Each condition is displayed in a special control in the wizard. The controls contain connection points to logically join single conditions or delete single conditions. The connection points are set if you mouse over the edge of the respective control.

**Figure 2: Wizard for Entering Filters**

**To create a filter with a wizard**

1. Click **Create condition**.
   This inserts a control for the first condition.

2. Enter the condition.
   a. Click the left-hand part of the condition and select the property to filter by.
      The properties for filtering are listed. You can also define other properties and use variables.
   b. Specify the comparison operator. Click the comparison operator to change it.
      The comparison operators =, <>, <, >, <=, >= and like for defining conditions are supported.
c. Specify the comparison value on the right-hand side of the condition.
   You can enter a string for a comparison value or select a property from the list. You can also use variables.

   **NOTE:** To subsequently switch back to the input field, select **Input field** from the menu.

3. To link condition you can use the logical operators **AND**, **OR** and **NOT**.
   a. Mouse over the edge of the control to which you wish to create a link.
      The connection points appear.
   b. Mouse over a connection point and select the connection.
      This adds a new control for the next condition.

   **NOTE:** To remove a control, select the **Delete** connection point.

### Support for writing scripts

You can apply scripts at various points in the synchronization project; for example, when defining the schema properties or when you define data operations for system connection through the native database connector. You can enter scripts in **C#** or **Visual Basic .NET** depending on script's language, which was specified for the synchronization project.

You write scripts in a special editing dialog box. It has an advanced edit mode which provides additional actions.

**To switch to advanced mode**

- Press **Ctrl + Alt + Enter** or click the button at the bottom right.

#### Figure 3: Directly Entering a Database Query

![Directly Entering a Database Query](image)

**Table 14: Meaning of icon in advanced edit mode**

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✂️</td>
<td>Quitting advanced edit mode.</td>
</tr>
<tr>
<td>Icon</td>
<td>Meaning</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
</tr>
<tr>
<td>⬆️</td>
<td>Undoes last change.</td>
</tr>
<tr>
<td>⬇️</td>
<td>Redoes last change.</td>
</tr>
<tr>
<td>✂️</td>
<td>Cuts selected code.</td>
</tr>
<tr>
<td>📋</td>
<td>Copies selected code into clipboard.</td>
</tr>
<tr>
<td>📝</td>
<td>Inserts code from clipboard.</td>
</tr>
<tr>
<td>🚫</td>
<td>Deletes selected code.</td>
</tr>
<tr>
<td>←</td>
<td>Decreases insert.</td>
</tr>
<tr>
<td>→</td>
<td>Increases insert.</td>
</tr>
<tr>
<td>📑</td>
<td>Shows/hides line numbers.</td>
</tr>
<tr>
<td>✉️</td>
<td>Inserts code snippet.</td>
</tr>
<tr>
<td>🔍</td>
<td>Word wrap automatically.</td>
</tr>
<tr>
<td>🔍</td>
<td>Search within code.</td>
</tr>
</tbody>
</table>

One Identity Manager provides code snippets for you to use as templates.

**To insert a code snippet**

1. Change to advance editing mode.
2. Click 📝 in the toolbar.
3. Select a category.
4. Select a code snippet.
5. Customize the script code as required.
6. Click ✉️ to quit extended editing mode.

Additional input aids are provided for creating script code.

**Syntax highlighting**

The input fields support syntax highlighting depending on the syntax type.

**Auto-completion**

Auto-completion can be used when creating script code. The amount of scripted code to enter is reduced by displaying the names of properties or functions that can be used. To use auto-completion, use the shortcut `Ctrl + SPACE` in the relevant positions within the input fields. The contents of the list is determined by the key words in the code.

**Entering code snippets**

You can insert code snippets using the following options:
1. Using the icon ☐
   - Select the ☐ icon.
2. Using a shortcut
   - Press F2.

**NOTE:** If you select a code snippet directly using a shortcut or the ☐ icon, a short description and the shortcut name are displayed in a tooltip.

**TIP:** You can use custom code snippets. To do this, create a directory CustomSnippets in the One Identity Manager installation directory to store the code snippets. Use Visual Studio documentation to develop your own code snippets.

## Save changes permanently

Different wizards are run to add new objects like synchronization projects, mappings or workflows with the Synchronization Editor. The data you enter is temporarily saved. Changes to these objects are also saved only temporarily.

**To save changes to the synchronization project permanently**

- In the Synchronization Editor toolbar, click **Commit to database**.
  - OR -
  - To save the synchronization project with change labels, open the **Commit to database** submenu and click **Commit and assign a change label**. For detailed information about working with change labels, see the One Identity Manager Operational Guide.

One Identity Manager compresses the schemas when the synchronization project is saved for the first time. This removes schema data from the synchronization projects, which is not required in the synchronization configuration. This can speed up loading the synchronization project.

**Related topics**

- [How to remove unnecessary project data](#) on page 51

## Establish remote connection

To configure synchronization with a target system, One Identity Manager must load the data from the target system. One Identity Manager communicates directly with target system to do this. Sometimes direct access from the workstation on which the Synchronization Editor is installed is not possible, because of the firewall configuration, for example, or because the workstation does not fulfill the necessary hardware and software...
requirements. If direct access to the workstation is not possible, you can set up a remote connection.

**Prerequisite**

The remote connection server and the workstation must be in the same Active Directory domain.

**To permit remote access to a target system**

1. Provide a server installed with the following software.
   - One Identity Manager Service with the *RemoteConnectPlugin*

   **Table 15: RemoteConnectPlugin parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authentication method</td>
<td>ADSGroup</td>
<td>Method with which incoming queries can be authenticated. Permitted values: ADGroup</td>
</tr>
<tr>
<td>Permitted AD group</td>
<td></td>
<td>Distinguished name or object SID of the Active Directory group whose members are permitted to use a remote connection. This parameter is only required for the ADGroup authentication method.</td>
</tr>
<tr>
<td>Port</td>
<td>2880</td>
<td>Port for reaching the server.</td>
</tr>
</tbody>
</table>

   ❗ **NOTE:** Authentication of a remote connection can only be done through an Active Directory group. For more information, see the One Identity Manager Configuration Guide.

   - target system connector
   - Target specific client components as they must be installed on the synchronization server.

   For more information, see the administration guides for connecting target systems.

2. Declare the remote connection server as Job server in One Identity Manager.

3. Start the One Identity Manager Service.

   ❗ **TIP:** The remote connection server requires the same configuration as the synchronization server (with regard to the installed software and entitlements). Use the synchronization as remote connection server at the same time, by simply installing the RemoteConnectPlugin as well.
To edit a Job server

1. Select the **Base Data | Installation | Job server** category in Designer.
2. Enter a new Job server using **Job servers | New**.
3. Edit the Job server's master data.
4. Select **View | Server functions** and specify the server functionality.
   - Select a minimum of the following server functions:
     - <target system connector>
     - One Identity Manager Service installed
5. Select the **View | Machine roles** menu item and assign roles to the server.
   - Select at least the following roles:
     - Server/Jobserver/<target system>
6. Enter the queue name of the Job server in the configuration file of the One Identity Manager Service.

For more information, see the One Identity Manager Configuration Guide and the administration guides for connecting target systems.

Remote access may be necessary, if:

a. A synchronization project must be set up.

b. An existing synchronization project must be configured but there is generally no direct access to the target system.

c. A existing synchronization project must be configured but there is temporarily no direct access to the target system.

One Identity Manager requires a connection to the target system, for example, to update the target system schema, to define the scope, or to test the object-matching rules. A message appears if you cannot connect to the target system when editing the synchronization configuration. Then you can decide whether you want to connect through a remote connection server, temporarily. In this case, a remote connection dialog opens.

d. An existing synchronization project needs to be configured but some connection data is encrypted and the encryption values are not known to the Synchronization Editor user.

To set up a remote connection for a new synchronization project.

- Set the option **Connect using remote connection server** in the project wizard on the **System access** page and select the server to use for the connection under **Job server**.
  The remote connection stays connected as long as the project wizard is open.
To set up a remote connection for an existing synchronization project.

1. Open the synchronization project.
2. In the Synchronization Editor toolbar, click Remote connection....
   This opens the remote connection dialog.
3. Enter the remote connection properties.
4. Click Connect.
   This sets up the remote connection. The connection remains in place for as long as the synchronization project is open in the Synchronization Editor.

Table 16: Remote connection properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select remote connection server automatically</td>
<td>Select this option if you want the remote connection server to be selected automatically.</td>
</tr>
<tr>
<td>Job server</td>
<td>In the menu, select the Job server you want for One Identity Manager communicating with the target system. All Job servers are displayed for which the server function One Identity Manager Service installed is selected.</td>
</tr>
<tr>
<td>Select remote connection server manually</td>
<td>Select this option if you do not want the remote connection server to be selected automatically because, for example, the server name cannot be resolved.</td>
</tr>
<tr>
<td>Server</td>
<td>Enter the full server name or the server's IP address.</td>
</tr>
<tr>
<td>Port</td>
<td>RemoteConnectPlugin uses the port 2880.</td>
</tr>
</tbody>
</table>

To close a remote connection

- In the Synchronization Editor toolbar, click Remote connection....

Related topics

- Creating a synchronization project on page 58
- How to configure synchronization on page 63
- Menu items on page 12
- Working with an encrypted database on page 25
Working with an encrypted database

Table 17: Configuration Parameter for Handling Encrypted Values

<table>
<thead>
<tr>
<th>Configuration parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPR\UI\EncryptedValueHandling</td>
<td>The configuration parameter defines the Synchronization Editor behavior when handling encrypted values.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ByUser</td>
<td>The user can decide whether encrypted values should be ignored or not.</td>
</tr>
<tr>
<td>IgnoreAll</td>
<td>The decryption dialog does not appear when you open the synchronization project. All encrypted values are ignored by default. (default)</td>
</tr>
</tbody>
</table>

When you set up a synchronization project in an encrypted One Identity Manager database, sensitive data is encrypted. This affects passwords for connection data as well as variables that are labeled as secret. The Synchronization Editor requires all connection data in decrypted form in order to access connected systems. You can nevertheless open the synchronization project and edit it partially.

If the Synchronization Editor now accesses the connection system, it cannot establish a system connection because certain connection parameters are encrypted. The values can be decrypted through an appropriately configured remote connection. Set up a remote connection server to do this. For more information, see Establish remote connection on page 21. Note here the relevant restrictions for setting up a remote connection server.

To enable the system connection despite encrypted connection data

1. Edit the system connection.
   
   For more information, see How to edit system connection properties on page 97.
   
   An extra dialog box is displayed.

2. Set the first option and click OK.
   
   a. Enter the remote connection properties.
      
      For more information, see Remote connection properties on page 24.
   
   b. Click Connect.
      
      This sets up the remote connection. The connection remains in place for as long as the synchronization project is open in the Synchronization Editor.

   **NOTE:** If a remote connection is not possible, you have the option, at this point, to enter values for establishing the system connection.

   * Set the second option for this and enter the missing values. Click OK.
To decrypt encrypted values by default when you open a synchronization project

- Set the configuration parameter "DPR\UI\EncryptedValueHandling" in the Designer and select the value "ByUser" on the Options tab.

The user can decide whether encrypted values should be ignored or not.

Table 18: Decryption dialog

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encrypted value</td>
<td>Value required by the connector to establish a system connection.</td>
</tr>
<tr>
<td>Ignore this value</td>
<td>Specifies whether to ignore the value. The synchronization project can be selectively edited. However, all actions which required accessing the connected system, cannot be executed.</td>
</tr>
<tr>
<td>Show values</td>
<td>Specifies whether the values entered are shown. If this option is not set, input is masked.</td>
</tr>
<tr>
<td>Remember the values and save locally</td>
<td>Specifies whether the data entered is saved locally. The next time the synchronization project is opened, the stored values are applied and can be confirmed or altered.</td>
</tr>
</tbody>
</table>

**IMPORTANT:** If an encrypted value has been changed in the One Identity Manager database, the changed value must also be changed on the workstation as soon as the synchronization project is next opened.

Otherwise, the value is overwritten by the locally stored data when the synchronization project is saved. Modifications (of passwords, for example) go missing this way!

**To avoid overwriting**

- Update the pre-filled values and enable the option Remember the values and save locally.

**To delete locally saved data**

1. Select the menu Database | Settings....
2. Select the Security tab.
3. Select a value and click Delete.

Ignore all | Ignores encrypted values and open the synchronization project.

Changing a synchronization user's password

One Identity Manager provides a system user with all the permissions necessary to set up target system synchronization through an application server and to run it. When you set up
the One Identity Manager database, you entered a password for the **Synchronization** system user. You can change this password in the Synchronization Editor. The password must then be changed in all synchronization projects that connect to the database through an application server. One Identity Manager can try to update these passwords automatically. If this is not possible, modify the synchronization projects manually.

**IMPORTANT:** The password may not be changed while synchronization is starting up or running. Only change the password outside working hours!

Only passwords that are managed in One Identity Manager can be changed. There is no menu item shown for externally managed passwords. For detailed information about managing system user passwords, see the *One Identity Manager Authorization and Authentication Guide*.

**To change the system user’s Password**

1. Select **Database | Change synchronization user password**.
2. Enter the required data:
3. Click **OK**.

**Table 19: Password data**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old password</td>
<td>Password valid until now.</td>
</tr>
<tr>
<td>New password and password confirmation</td>
<td>New password for the system user to log on to the database.</td>
</tr>
<tr>
<td>Show passwords</td>
<td>Passwords are not masked.</td>
</tr>
<tr>
<td>Try to update existing synchronization projects</td>
<td>One Identity Manager checks all the synchronization projects and tries to update the password. The password is only changed in synchronization projects that are connected with the database through an application server.</td>
</tr>
</tbody>
</table>

**To manually update the database connection password**

1. Open the synchronization project which needs to have its password updated.
2. Select the category **Configuration | One Identity Manager connection**.
3. Confirm the prompt with **OK**.
   Do **not** establish a remote connection.
4. Click **Edit connection**.
5. Select the **Connection parameter** page in the system connection wizard.
6. Enter the new password in **Synchronization user’s password**.
7. Click **Test**.
8. If the connection is successfully established, click **Next**.
9. Close the system connection wizard.
10. Save the changes.
Basics of target system synchronization

To configure target system synchronization you must have knowledge of the One Identity Manager’s basic procedure for synchronizing and provisioning data. These basics are explained in the following sections.

Table 20: Basic Synchronization Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Described in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependency resolution</td>
<td>How does dependency resolution work? on page 39</td>
</tr>
<tr>
<td>Outstanding objects</td>
<td>Deleting objects in One Identity Manager on page 49</td>
</tr>
<tr>
<td>Synchronization of single objects</td>
<td>Synchronization and provisioning on page 9</td>
</tr>
<tr>
<td>Filter</td>
<td>What are filters? on page 33</td>
</tr>
<tr>
<td>Mapping direction</td>
<td>Direction of synchronization and mapping on page 43</td>
</tr>
<tr>
<td></td>
<td>Mapping against the direction of synchronization on page 44</td>
</tr>
<tr>
<td>Primary and secondary systems</td>
<td>Synchronizing user data with different systems on page 48</td>
</tr>
<tr>
<td>Provisioning</td>
<td>Synchronization and provisioning on page 9</td>
</tr>
<tr>
<td>Revision filter</td>
<td>How does revision filtering work? on page 37</td>
</tr>
<tr>
<td>Schema</td>
<td>How are schemas mapped on page 31</td>
</tr>
<tr>
<td>Scope</td>
<td>What is a scope? on page 36</td>
</tr>
<tr>
<td>Direction of synchronization</td>
<td>Direction of synchronization and mapping on page 43</td>
</tr>
<tr>
<td>Rogue modification</td>
<td>Detecting rogue modifications on page 46</td>
</tr>
</tbody>
</table>
Communication methods of the Synchronization Editor

A server installed with the One Identity Manager Service and, if necessary, other target system specific software, is required for synchronization. This server (named the synchronization server in the following) requires direct access to the target system. The synchronization server communicates directly with the One Identity Manager database by default. You can also set up a connection over an application server for this.

To configure synchronization with a target system, One Identity Manager must load the data from the target system. One Identity Manager communicates directly with target system to do this. Sometimes direct access from the workstation on which the Synchronization Editor is installed is not possible, because of the firewall configuration, for example, or because the workstation does not fulfill the necessary hardware and software requirements. If direct access to the workstation is not possible, you can set up a remote connection.

Related topics

- Establish remote connection on page 21
How are schemas mapped

To synchronize a target system with the One Identity Manager database, you must first map the data models of both systems to each other. The data models (schema) are different for each system. They must be extended in such a way that they can be uniquely mapped.

The One Identity Manager distinguishes between four sorts of schema: One Identity Manager schema, target system schema, connector schema, extended schema. Each schema is characterized through schema types and schema properties. You can extend schema with schema classes and schema properties such that they can be mapped uniquely.

Just how the schema are mapped to each other is defined in mappings. Mappings group together the rules used to map the schema properties of two connected systems. Object matching rules assign schema properties through which system objects can be uniquely identified. Property mapping rules describe how the target system schema properties are mapped in the One Identity Manager schema.

Figure 6: Schema Mapping

Table 21: Terms for Schema Mapping

<table>
<thead>
<tr>
<th>Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schema</td>
<td>Data model of a connected system. The schema describes all the master data from the connected system.</td>
</tr>
<tr>
<td>One Identity Manager</td>
<td>The One Identity Manager data model.</td>
</tr>
<tr>
<td>Target system schema</td>
<td>Data model of a specific target system.</td>
</tr>
<tr>
<td>Term</td>
<td>Explanation</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Connector schema</td>
<td>The system connector extends the target system schema with additional information which is required for mapping in the Synchronization Editor. This includes:</td>
</tr>
<tr>
<td></td>
<td>* Information about which schema properties map memberships</td>
</tr>
<tr>
<td></td>
<td>* Information about which schema properties represent references to other objects</td>
</tr>
<tr>
<td></td>
<td>* Virtual properties that the system connector creates</td>
</tr>
<tr>
<td></td>
<td>If a target system does not deliver its own schema, the system connector generates the connector schema based on the imported data structure, for example, the import of CSV files by the CSV connector.</td>
</tr>
<tr>
<td>Extended schema</td>
<td>A schema can be customized in the Synchronization Editor, for example, to allow or simplify mapping of complex schema properties. The following options are available:</td>
</tr>
<tr>
<td></td>
<td>* Add new schema classes</td>
</tr>
<tr>
<td></td>
<td>* Define user-specific virtual schema properties</td>
</tr>
<tr>
<td></td>
<td>* Derive schema properties</td>
</tr>
<tr>
<td></td>
<td>Label the modified schema as &quot;extended schema&quot;.</td>
</tr>
<tr>
<td>Schema type</td>
<td>Defines an object type within a schema. A schema type refers to exactly one table or view of the database based schema or exactly one object type of the non-database based schema.</td>
</tr>
<tr>
<td>Schema class</td>
<td>Subset of a schema type. The result list of a schema type is filtered by defined criteria. The number of objects found is limited thus.</td>
</tr>
<tr>
<td></td>
<td>Example: Active Directory contacts (schema class) are Active Directory user accounts (schema type) with their own object class = 'CONTACT' (filter criteria).</td>
</tr>
<tr>
<td>Schema property</td>
<td>Property of a schema type. A schema property refers to exactly one column of a table or view of the database based schema or exactly one object type property of the non-database based schema. There are two different sorts of schema property:</td>
</tr>
<tr>
<td></td>
<td>* Schema properties of schema types from the target system and One Identity Manager schema.</td>
</tr>
<tr>
<td></td>
<td>* Virtual schema properties,</td>
</tr>
<tr>
<td></td>
<td>* added by the user to extend the target system schema or the One Identity Manager schema</td>
</tr>
<tr>
<td></td>
<td>* added by the user to extend the connector schema or the One Identity Manager schema</td>
</tr>
</tbody>
</table>
### Term | Explanation
--- | ---
Virtual schema properties | Schema class property added by the system connector or the user. Virtual schema properties extend the basic schema with additional data required for the mapping. You can use virtual schema properties to represent combinations of schema properties as well as processing step results as schema properties.
Object matching rule | Specifies how a concrete object of a target system schema class can be set in relation to a concrete object of a One Identity Manager schema class. An object matching rule encompasses the target system schema property based on which the target system objects can be uniquely identified.
Property mapping rule | Describes how a target system schema property is mapped in the One Identity Manager schema.

### Related topics
- Setting up mappings on page 64

### What are filters?

You can define different filters in the Synchronization Editor. You can use filters to define the scope of a synchronization project, define schema classes or to create virtual schema properties. There are three sorts of filter that differ in their effect and way they are defined. The number of objects to be synchronized can also be limited by a revision filter.

### Table 22: Sorts of Filter

<table>
<thead>
<tr>
<th>Filter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System filter</td>
<td>This filter limits the number of objects to load in the connected system. It is more effective than the object filter and object matcher because the system connector only load the objects that are really required. You cannot link more than one filter criteria with logical operators. The filter is given in system specific notation, for example, as LDAP filter for an LDAP system. The following connected systems support system filters: Active Directory, LDAP, Microsoft Exchange, One Identity Manager databases. A special form of the system filter is the hierarchy filter. The hierarchy filter is built based on the target system's real objects. All the objects to be filtered are selected from the object hierarchy. The hierarchy filter can be used in the definition of the scope of certain target systems.</td>
</tr>
<tr>
<td>Filter</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Object filter</td>
<td>The filter affects objects already loaded. All schema properties of the schema can be used as filter criteria and linked with logical operators. The filter is formulated as a query applied to loaded objects. It can be used when the scope is defined and by virtual schema properties.</td>
</tr>
<tr>
<td>Object selection</td>
<td>The filter affects objects already loaded. All schema properties of the schema can be used as filter criteria and linked with logical operators. In order to ensure that the filter returns the desired results when provisioning single objects, you must add additional system filter criteria to the filter condition. The filter is formulated as a query applied to loaded objects. It can be implemented in the schema class definition.</td>
</tr>
<tr>
<td>Revision filter</td>
<td>This filter determines all object that have changed since the last synchronization run. The deciding factor being the revision property modification. The filter can be applied to workflows and start up configurations.</td>
</tr>
</tbody>
</table>

It is recommended you combine system filter and object filter/schema class filter to utilize the advantages of the various filters.

If scope, schema class and virtual schema property filters are defined in the synchronization configuration and revision filtering is permitted, the number of objects to be synchronized results from the combination of all filters.
Variables can be used in the filter conditions. This enables the same synchronization project to be used for synchronizing different target systems or different objects within the same target system.

**Related topics**

- What is a scope? on page 36
- Schema class properties on page 70
- How does revision filtering work? on page 37
What is a scope?

The scope specifies which parts of the connected system should be synchronized. The scope is set for the target system to be synchronized as well as for the One Identity Manager schema. If no scope is defined, all objects in the connected system are synchronized.

Example:

Active Directory domains "xyz" and "uvw" are managed through One Identity Manager. The containers "abc", "def" and "ghi" from the Active Directory domain "xyz" should be synchronized. A scope is defined for the target system connection and the One Identity Manager database connection which filters only these objects. The Active Directory domain "uvw" should initially not be synchronized.

Figure 8: Example for Scope Definition

To specify a scope, define a system filter and object filter.

Hierarchy filter

Some target systems offer an additional option to specify the scope: the hierarchy filter. This filter limits the number of objects to load in the connected system. It is therefore effectively the same as a system filter. The hierarchy filter is built based on the target system's real objects. The objects are displayed in their hierarchical structure. All objects included in the scope are marked in the hierarchy. All objects that are not marked remain outside the scope and are not included in the synchronization. The hierarchy filter can only be applied to objects and not to their schema properties. Create an additional object filter to include schema properties as criteria in the scope definition.
A fully defined hierarchy filter can be transformed into a variable. Thus the filter can be redefined in a specialized variable set and used for other synchronization configurations.

**Reference scope**

References to objects in different target systems can be mapped in the One Identity Manager database. In order to solve these references, the target system scope must be extended to include the referenced target systems. For this, you can additionally define a reference scope for each system connection. You can enter the reference scope for the database in the same way. This means that references to parts of the One Identity Manager database can be resolved which are not included in the general scope.

If no reference scope is defined, the general scope is also used for the reference resolution.

Example:

Active Directory domains "xyz" and "uvw" are trusted domains. User accounts from both domains are members in Active Directory groups in the Active Directory domain "xyz".

Define a reference scope to assign referenced user accounts of the domain "uvw" during group membership synchronization. In the reference scope, specify that referenced objects should also be searched for in the Active Directory domain "uvw".

If you have not defined a reference scope, Active Directory SIDs are determined for Active Directory domain "uvw" user accounts during Active Directory domain "uvw" group membership synchronization and entered in the One Identity Manager synchronization buffer.

**Related topics**

- Editing the scope on page 100
- What are filters? on page 33
- Using variables and variable sets on page 104

**How does revision filtering work?**

When you start synchronization, all synchronization objects are loaded. Some of these objects have not been modified since the last synchronization and, therefore, must not be processed. Synchronization is accelerated by only loading those object pairs that have changed since the last synchronization. One Identity Manager uses revision filtering to accelerate synchronization.

**Prerequisites**

- The target system supports revision filtering.
  
  This data is supplied by the system connector.
- Schema types own a schema property which is labeled as a revision counter. This schema property stores the information about the last object modifications.

Example of an Active Directory group:
- In the target system: UNS Changed
- In the One Identity Manager schema: Revision Date

- Revision filtering permitted for this synchronization workflow.

Revision filtering can be applied to workflows and start up configuration. The workflow setting is valid for all synchronizations with this workflow. In order to synchronize with the same workflow at different times, with and without revision filtering, create different start up configurations and specify revision filtering for them.

**To permit revision filtering on a workflow**

- Open the synchronization project in the Synchronization Editor.
- Edit the workflow properties. Select the entry **Use revision filter** from Revision filtering.

  For more information, see How to edit a workflow on page 83.

**To permit revision filtering for a start up configuration**

- Open the synchronization project in the Synchronization Editor.
- Edit the start up configuration properties. Select the entry **Use revision filter** from Revision filtering.

  For more information, see How to edit start up configurations on page 109.

Normally, each object keeps information about the last changes made. The highest change data value of all synchronized objects of a schema type is taken as the revision in the One Identity Manager database (table DPRRevisionStore, column DPRRevisionStore). This value is used as a comparison for revision filtering when the same workflow is synchronized the next time. This means that when this workflow is next synchronized, the object change data is compared with the revision saved in the One Identity Manager database. This involves finding object pairs where one has newer change data than the last time it was synchronized. Thus, only objects that have changed since the last synchronization are updated.

The reference parameter for revision filtering is also the last schema type synchronization with the same workflow. The table DPRRevisionStore contains one entry per workflow and schema type.

**Related topics**

- Properties of a workflow on page 86
- Setting up start up configurations on page 109
- What are filters? on page 33
- Resetting revisions on page 125
How does dependency resolution work?

Dependencies can arise between schema classes that require synchronization steps to be repeated. For example, object references can not be set until the reference object has been added. Dependencies can also arise between schema properties within a schema class.

Figure 9: Example of a Workflow with Dependent Schema Classes and Schema Properties

One Identity Manager can automatically resolve such dependencies. In this case, the synchronization steps are group together such that the referenced objects are synchronized first and then the dependent objects next. If dependencies exist within a schema class, additional synchronization steps are inserted to synchronize the dependent schema properties. The final sequence of synchronization steps can be viewed in the report "Execution Plan".

NOTE: If dependencies exist between schema classes, the schema classes must be synchronized by the same workflow so that dependencies can be automatically resolved.
To set up automatic resolution of dependencies

- Edit the workflow properties. Select the following options as appropriate:

  Dependency resolution: Automatic

  For more information, see How to edit a workflow on page 83.

Use automatic dependency resolution by default. Only select manual dependency resolution if individual dependencies cannot be resolved automatically. This might be necessary, for example, if two objects reference each other as mandatory properties.

NOTE: If dependency resolution is set to "Manual", One Identity Manager does not check whether dependencies exits between schema classes and schema properties during synchronization. The synchronization steps are processed sequentially in the order displayed in the workflow view.

Synchronization exits with an error if dependencies exist that cannot be resolved!

To resolve dependencies manually

1. Find the schema properties between which dependencies exist.
2. Create a workflow with synchronization steps which take the following criteria into account:
   a. Synchronization steps which synchronize independent and references objects.
      Property mapping rules for dependent schema properties must be excluded for this.
b. Synchronization steps which reference dependent objects.
   Property mapping rules for dependent schema properties must be included for this.

3. Specify the synchronization step sequence such that all synchronization steps for a) are executed first and then the synchronization steps for b).

4. Edit the workflow properties. Select the following options as appropriate:

   - Dependency resolution: Manual

   For more information, see How to edit a workflow on page 83.

Related topics
- Show execution plan on page 96
- Properties of a workflow on page 86
- Rule filters on page 95
- Editing synchronization steps on page 87

Unresolvable references

If a reference object does not exist in the One Identity Manager database, the object reference cannot be resolved by synchronizing. Unresolvable object references are written in a synchronization buffer (table DPRAttachedDataStore). This ensures that these references remain intact and are not deleted in the target system by provisioning.

Example:
An Active Directory group has an account manager, which owns a domain not in the current synchronization run. The account manager is not in the One Identity Manager database either.

Synchronization cannot assign an account manager. In order to retain the assignment, the object reference is saved with the account manager’s distinguished name in the synchronization buffer.

During each synchronization One Identity Manager tries to clean up the synchronization buffer. If referenced objects in the One Identity Manager database exist, the references can be resolved and the entries are deleted from the synchronization buffer. The synchronization buffer is cleaned up depending on the synchronization type (with or without revision filter) and the maintenance mode.
The following applies depending on the maintenance mode:

<table>
<thead>
<tr>
<th>Maintenance mode</th>
<th>Synchronization without revision filer</th>
<th>Synchronization with revision filer</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following applies depending on the maintenance mode:</td>
<td>Object references of all synchronization objects are cleaned up if they exist in the One Identity Manager database.</td>
<td>Only object references for modified objects are cleaned up.</td>
</tr>
<tr>
<td>No maintenance</td>
<td>There is no additional task of clearing up the synchronization buffer.</td>
<td>No effect.</td>
</tr>
<tr>
<td>Always synchronize affected objects</td>
<td>No effect.</td>
<td>The filter is removed on objects with unresolved references. Therefore, references are also cleaned up if the objects have not been changed since the last synchronization.</td>
</tr>
<tr>
<td>Full maintenance after every synchronization</td>
<td>The One Identity Manager tries to resolve object references following synchronization. As a result, unresolved references are processed that arose during this synchronization run.</td>
<td>The One Identity Manager tries to resolve object references following synchronization. As a result, unresolved references are processed that arose during this synchronization run. Object references that were not modified are also cleaned up.</td>
</tr>
</tbody>
</table>

You can enter the number of retries for resolving object references. It may be necessary to try several times to resolve an object if it maps a hierarchy with several levels. One hierarchy level at a time can be resolved with each attempt to resolve an object.

**To set up maintenance mode**

- Edit the start up configuration properties. Select the **Maintenance** tab.
  
  For more information, see How to edit start up configurations on page 109.

  **NOTE:** One Identity Manager supplies a scheduled process plan, which regularly cleans up the contents of the table DPRAttachedDataStore. Object entries, which no longer exist in the One Identity Manager database are deleted. The process plan is executed during daily maintenance.

**Related topics**

- Maintenance modes on page 112

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**Table 23: Maintenance for Unresolved Object References**

<table>
<thead>
<tr>
<th>Maintenance mode</th>
<th>Synchronization without revision filer</th>
<th>Synchronization with revision filer</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following applies depending on the maintenance mode:</td>
<td>Object references of all synchronization objects are cleaned up if they exist in the One Identity Manager database.</td>
<td>Only object references for modified objects are cleaned up.</td>
</tr>
<tr>
<td>No maintenance</td>
<td>There is no additional task of clearing up the synchronization buffer.</td>
<td>No effect.</td>
</tr>
<tr>
<td>Always synchronize affected objects</td>
<td>No effect.</td>
<td>The filter is removed on objects with unresolved references. Therefore, references are also cleaned up if the objects have not been changed since the last synchronization.</td>
</tr>
<tr>
<td>Full maintenance after every synchronization</td>
<td>The One Identity Manager tries to resolve object references following synchronization. As a result, unresolved references are processed that arose during this synchronization run.</td>
<td>The One Identity Manager tries to resolve object references following synchronization. As a result, unresolved references are processed that arose during this synchronization run. Object references that were not modified are also cleaned up.</td>
</tr>
</tbody>
</table>
Direction of synchronization and mapping

To synchronize a target system with One Identity Manager, you must specify which of the connected systems is the data master. Specify the master system in the synchronization configuration with the direction of synchronization. The direction in which schema properties are mapped may differ from this. Therefore, the permitted mapping direction must be given in the schema properties mapping.

### Table 24: Direction of synchronization

<table>
<thead>
<tr>
<th>Defined on</th>
<th>Direction of Synchronization Specifies</th>
</tr>
</thead>
<tbody>
<tr>
<td>start up configuration</td>
<td>In which direction a specific synchronization is executed</td>
</tr>
<tr>
<td>Workflow</td>
<td>In which direction synchronizations are executed</td>
</tr>
<tr>
<td>Synchronization step</td>
<td>By which synchronization direction the step is executed</td>
</tr>
</tbody>
</table>

### Table 25: Permitted mapping direction

<table>
<thead>
<tr>
<th>Defined on</th>
<th>Specifies the Mapping Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mapping</td>
<td>By which synchronization direction property mapping rules are used</td>
</tr>
<tr>
<td>Property mapping rule</td>
<td>By which synchronization direction this property mapping rule is used</td>
</tr>
</tbody>
</table>

One Identity Manager synchronizes two connection systems in the direction given in the start up configuration or in the workflow. A synchronization step is only executed in this case, if the direction of synchronization stored with the step matches with the direction of the current synchronization. If the mapping direction stored with the mapping corresponds to the current direction of synchronization, the system object from this schema class are synchronized. Thus, One Identity Manager checks which property mapping rule can be used in the current synchronization direction. This property mapping rule rule is ignored if the mapping direction of the property mapping rule differs from the current direction of synchronization.
Mapping against the direction of synchronization

For certain schema properties, it may be necessary to copy the schema property value from the connected system into the master synchronization system each time synchronization is run. In this case, the schema property must also be mapped in the opposing synchronization direction when synchronization is run. This behavior can be configured in the property mapping rule.
To force mapping a schema property against the direction of synchronization

- Edit the property mapping rule.
  
  Set Force mapping against direction of synchronization.
  
  For more information, see How to edit property mapping rules on page 76.

Property mapping rules with this option set are executed again after the synchronization step is completed. This copies changes from the connected system against the direction of synchronization into the master system.

Synchronization Sequence

1. All property mapping rules whose mapping direction is the opposite to the direction of synchronization are ignored whilst a synchronization step is being executed. Property mapping rules whose mapping direction corresponds to the direction of synchronization are run.

2. All changes to the connection system are saved when the synchronization step is complete.

3. All property mapping rules with the option Force mapping against direction of synchronization set are executed again. For those schema properties involved, the changes are copied from the connected system into the master system.

**NOTE:** The property mapping rules are also rerun after completion of the synchronization step if there are no processing methods given in the synchronization step.

**NOTE:** The option Force mapping against direction of synchronization is also taken into account when changes to objects are provisioned.

Example

An Active Directory environment should be administrated through One Identity Manager. One Identity Manager is the master system for synchronizing both systems. The user account object GUIDs are, however, not mapped in One Identity Manager but in the Active Directory environment. This means the mapping direction is different for a user account object GUID. To copy the object GUID from Active Directory to One Identity Manager during synchronization, the mapping must be forced in the opposite direction of synchronization for this schema property.

Table 26: Synchronization Configuration

<table>
<thead>
<tr>
<th>Configuration Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direction of Synchronization:</td>
<td>To the target system</td>
</tr>
<tr>
<td>Property mapping rule for schema properties:</td>
<td>ADSAccount.ObjectGUID - User.ObjectGUID</td>
</tr>
<tr>
<td>Mapping direction:</td>
<td>To the One Identity Manager</td>
</tr>
<tr>
<td>Configuration Setting</td>
<td>Value</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Force mapping against direction of synchronization</td>
<td>Set</td>
</tr>
</tbody>
</table>

**Synchronization Sequence**

Scenario: A new Active Directory user account was added in One Identity Manager.

1. The user account is added in the target system through synchronization.
2. The property mapping rule for the object GUID is ignored because of the opposing the mapping direction.
3. Once all property mapping rules of the synchronization step have been processed, the user account is saved in the target system. The Active Directory finds a value for User.ObjectGUID.
4. Once the synchronization step is complete the property mapping rule for the object GUID is run again. The object GUID is copied from Active Directory to One Identity Manager.

**Related topics**

- Editing property mapping rules on page 75

**Detecting rogue modifications**

To synchronize a target system environment with One Identity Manager, you must specify which of the connected systems is the data master. You should only make changes to object properties in the master system.

Changes in the connected system, which is not the master system, can be identified, logged and corrected by One Identity Manager. Every difference between object project properties of the connection system are considered to be a change. These changes are described as "rogue modification" in the following.

Mapping property rules must by configured correspondingly so that One Identity Manager can detect rogue modification during synchronization. Rogue modifications can be found for all property mapping rules with opposite mapping direction.

**NOTE:** Rogue modifications can only be corrected if there is write access for schema property to be corrected.

**To detect and log rogue modifications**

- Edit the property mapping rule.
  a. Select the Mapping direction "Target system" or "One Identity Manager".
  b. Select Rogue detection enabled.
For more information, see How to edit property mapping rules on page 76.

**To correct rogue modifications**

- Also set the option Correct rogue modifications in the property mapping rule.

**Synchronization Sequence with Modification Detection**

1. A property mapping rule is detected whose mapping direct is opposite to the actual direction of synchronization.
2. If Rogue detection enabled is set, One Identity Manager checks the object of the connected system for rogue modifications. Rogue modification are logged.
3. If Correct rogue modification is set, the One Identity Manager overwrites the object property with the value from the synchronization master system. This value is saved in the connection system.

**Table 27: Effects of this Option**

<table>
<thead>
<tr>
<th>Option</th>
<th>Effect</th>
</tr>
</thead>
</table>
| Detecting rogue modifications | Effect if option set:  
Rogue modifications in the linked system are identified and logged.  
The log can be evaluated after synchronization. For more information, see Synchronization analysis on page 127.  
Effect if option is not set:  
The property mapping rule is ignored by synchronization. |
| Correct rogue modifications | Effect if option set:  
Rogue modifications are corrected in the connected system, which means overwritten with the value from the synchronization master system.  
Effect if option is not set:  
Rogue modifications are not logged. |

**NOTE:** Rogue modifications are also handled when object modifications are provisioned.

**Related topics**

- Editing property mapping rules on page 75
Synchronizing user data with different systems

The source for the user data and permissions managed by One Identity Manager may be different systems. For example, SAP R/3 user accounts are managed in One Identity Manager. The associated employee data, however, is imported into the database through the CSV connector from another system.

The CSV import may cause the objects coming from another target system through synchronization to be modified. For example, the first and last names of an SAP user account change when the first and last names of an employee change through the CSV import. Changes to the SAP user account should be immediately provisioned in SAP R/3. To illustrate this, the connected systems will be named "primary systems" in the following; the systems whose data is synchronized with the CSV connector as "secondary systems".

Figure 12: Example of Synchronizing User Data with Different Systems

You can specify whether the data comes from a secondary system in the synchronization steps. In this case, changes are provisioned immediately (actually during synchronization) in the primary system. Conversely, the provisioning process may not start if primary systems are being synchronized.

To configure immediate provisioning when synchronizing a secondary system

1. Open the synchronization project for the secondary system.
   For more information, see How to edit a synchronization project on page 59.
2. Edit the synchronization step properties.
   Set the option Import data on the General tab.
   For more information, see How to edit synchronization steps on page 88.
NOTE: To prevent immediately provisioning of a primary system during synchronization, open the primary system synchronization project and disable the option Import data in the synchronization step.

The session variable FullSync=FALSE is set if the option Data import is enabled. The session variable is set to FullSync=TRUE if the option is disabled. Different processes, scripts and templates are only executed in the One Identity Manager database if FullSync=FALSE. In this context it means they are only synchronized with a secondary system. Synchronizing with a primary system ignores processes, scripts and templates.

Related topics
- General properties of a synchronization step on page 89

Deleting objects in One Identity Manager

You have two options for deleting objects in the One Identity Manager, which do not exist in the target system, by using synchronization.

1. The objects are deleted immediately on synchronization.
   You can view the synchronization log to see which objects have been deleted.
   
   NOTE: Memberships that exist based on an inheritance cannot be deleted immediately. They are always marked as outstanding.

2. The objects are marked as outstanding by synchronization.
   Outstanding objects must be post-processed separately in One Identity Manager. They can either be deleted or published in the target system in the process. This prevents objects being deleted because of an incorrect data situation or an incorrect synchronization configuration.

   Outstanding objects
   - Cannot be edited in One Identity Manager.
   - Are ignored by subsequent synchronization.
   - Are ignored by inheritance calculations.

   This means, all memberships and assignments remain intact until the outstanding objects have been processed.

To delete objects immediately in One Identity Manager

1. Edit the synchronization step properties.
   For more information, see How to edit synchronization steps on page 88.
2. Select the Processing tab.
3. Specify the processing method. Select the following options as appropriate:

<table>
<thead>
<tr>
<th>For synchronization from the target systems to One Identity Manager</th>
<th>Processing Method (technical name)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objects that are only found in One Identity Manager:</td>
<td>Delete</td>
</tr>
</tbody>
</table>

**To mark object as outstanding in One Identity Manager**

1. Edit the synchronization step properties.
   For more information, see How to edit synchronization steps on page 88.
2. Select the Processing tab.
3. Specify the processing method. Select the following options as appropriate:

<table>
<thead>
<tr>
<th>For synchronization from the target systems to One Identity Manager</th>
<th>Processing Method (technical name)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objects that are only found in One Identity Manager:</td>
<td>MarkAsOutstanding</td>
</tr>
</tbody>
</table>

Outstanding objects cannot be editing in One Identity Manager until they have been verified. They are ignored by every other synchronization.

**To delete outstanding objects in the One Identity Manager**

1. Start the Manager.
2. Select the category `<target system type> | Target system synchronization: <target system type> | <table>.
3. Select the objects you want to delete. Multi-select is possible.
4. Click 🗑.
5. Confirm the security prompt with Yes.
   The selected objects are immediately deleted in the One Identity Manager database. Deferred deletion is not taken into account. The "outstanding" label is removed from the objects.

**Related topics**

- Specifying processing methods on page 91
- Target system synchronization on page 128
- Include custom tables in the synchronization on page 147
- Synchronizing user data with different systems on page 48
- General properties of a synchronization step on page 89
- Deleting memberships on page 129
How to remove unnecessary project data

All the schema data (schema types and schema properties) of the target system schema and the One Identity Manager schema are available when you are editing a synchronization project. Only a part of this data is really needed for configuring synchronization. If a synchronization project is finished, the schema is compressed to remove unnecessary data from the synchronization project. This can speed up loading the synchronization project.

- Activating the Synchronization Project
  Unnecessary schema data is automatically removed from the synchronization project on activation.

- Shrink schema
  a. Schemas are shrunk when the synchronization project is saved for the first time.
  b. Each time the system is connected, you have the option to shrink the schema.
     All the schema types that are not currently in use are displayed in a dialog. You may remove these from the synchronization project. Here you can select the schema types that should remain available for you to use later.

To shrink the system connection schema

1. Select Configuration | Target system.
   - OR -
   Select the category Configuration | One Identity Manager connection.
2. Click Shrink schema... in the General view.
3. Mark all the schema types that should not be removed.
   These schema types remain there and can still be used in the synchronization configuration.
4. Click OK.

You can add the deleted schema data back into the synchronization project again later. To do this you must update the respective schema.

Related topics

- How to edit system connection properties on page 97
- Activating the synchronization project on page 121
- Save changes permanently on page 21
- Updating schemas on page 52
Updating schemas

To include schema data that have been deleted through compressing and schema modifications in the synchronization project, update each schema in the synchronization project. This may be necessary if:

- A schema was changed by:
  - Changes to a target system schema
  - Customizations to the One Identity Manager schema
  - A One Identity Manager update migration
- A schema in the synchronization project was shrunk by:
  - enabling the synchronization project
  - saving the synchronization project for the first time
  - compressing a schema

To update a system connection schema

1. Select Configuration | Target system.
   - OR -
   Select Configuration | One Identity Manager Connection.
2. Select the view General and click Update schema.
3. Confirm the security prompt with Yes.
   This reloads the schema data.

Then you can add the changes to the schema property mapping.

**NOTE:** The synchronization is deactivated if the schema of an activated synchronization project is updated. Reactivate the synchronization project to synchronize.

Related topics

- System connection properties on page 97
- How to remove unnecessary project data on page 51
- Setting up mappings on page 64
- Activating the synchronization project on page 121
Synchronizing and provisioning memberships

Memberships, for example, user accounts in groups, are saved in assignment tables in One Identity Manager database. Membership lists are commonly maintained as an object property in the target system. If a membership is modified in One Identity Manager, the object must be updated.

Changing a membership label

To label whether a membership was changed, a base table assignment is maintained, which maintains information about the last change of membership in the column Dependencies modification date (XDateSubItem). During provisioning of modified memberships, One Identity Manager decided which objects must be updated based on this date. In the case of synchronization with revision filtering, the highest value from XDateSubItem and XDateUpdated is used as a revision counter for the database objects.

If a membership is changed in One Identity Manager, the change date for dependencies must updated so that the modification can be provisioned.

Prerequisites

- The base table has the column XDateSubItem.

  ![NOTE: If this column does not exist in the assignment's base table, you can extend the base table. Create the column CCC_XDateSubItem to do this.]

- The property Update dependencies modification date is true in the table relation between assignment and base table (QBMRelation.IsForUpdateXDateSubItem = TRUE).

Figure 13: Memberships in the One Identity Manager database

If a membership changes (through insertion, deletion or resetting of status "Outstanding") a task for updating the column XDateSubItem of the base table is queued in the DBQueue (QBM-K-XDateSubItemUpdate). If necessary, more processing tasks, for example, calculating inheritance, are queued in the DBQueue. These tasks are handled first. The task QBM-K-XDateSubItemUpdate is deferred until all the processing tasks for the modified object and the module to which it belongs, have been handled. If other memberships in this module are changed in the meantime, these changes are collected by the existing task for updating the column XDateSubItem and subsequently handled together. Once the task QBM-K-
XDateSubItemUpdate is run, an update task for the column XDateSubItem is queued in the Job queue. The column value is updated. The task for provisioning changed memberships is then placed in the Job queue.

**Figure 14: Processing a Membership Change in One Identity Manager**

### Example

Active Directory user account membership in an Active Directory group is deleted in One Identity Manager (table ADSAccountInADSGroup). The change date for dependencies is updated on the Active Directory group (ADSGroup.XDateSubItem). The change to the membership for this Active Directory group is provisioned in the target system. The next time synchronization with revision filtering is run, XDateSubItem is taken as the highest change date for the revision counter and is compared to the schema type’s revision.

### Related topics
- How does revision filtering work? on page 37

### Single membership provisioning

During the membership provisioning, changes made in the target system will probably be overwritten. This behavior can occur under the following conditions:

- Memberships are saved in the target system as an object property in list form (Example: List of user accounts in the Members property of an Active Directory group).
- Memberships can be modified in either of the connected systems.
- A provisioning workflow and provisioning processes are set up.
If a membership in One Identity Manager changes, the complete list of members is transferred to the target system by default. Memberships, previously added to the target system are removed by this; previously deleted memberships are added again.

To prevent this, provisioning can be configured such that only the modified membership is provisioned in the target system. To do this, you must set the option **Enable merging** on the assignment table (DPRNameSpaceHasDialogTable.IsAdHocSingleMembership = TRUE). For more detailed information about setting this option, see the administration guides for connecting each target systems.

Additional processing steps are executed for tables with this option enabled.

1. A task is set up in the DBQueue Processor to update the table DPRMemberShipAction. This table contains the modified objects and operations to be run.

2. The membership list of modified objects is compared to the table DPRMemberShipAction. Therefore, if only one membership changes, not the entire members list in the target system has to be updated. Only each modified membership is transferred to the members list. Changes to memberships of the modified object, which were made in the target system in the meantime, are therefore not overwritten.

3. Once the change has been successfully provisioned in the target system, the entry is deleted from the table DPRMemberShipAction. If an error occurs during provisioning, the entry remains in the table.

### Table 28: Handling Entries in the Table DPRMemberShipAction

<table>
<thead>
<tr>
<th>Provisioning Process</th>
<th>Entry in DPRMemberShipAction</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Deleted</td>
<td></td>
</tr>
<tr>
<td>Fail</td>
<td>Remains intact</td>
<td>A new modification to the object is reprocessed by provisioning and deleted on success.</td>
</tr>
<tr>
<td>Re-enabled</td>
<td>Reprocessed</td>
<td></td>
</tr>
<tr>
<td>Failed and deleted</td>
<td>Remains intact</td>
<td>Deleted during daily maintenance. All entries without a provisioning task in the Job queue are deleted in the process of these maintenance jobs.</td>
</tr>
</tbody>
</table>

**NOTE:** The complete members list is updated by synchronization. During this process, objects with changes but incomplete provisioning are not handled. These objects are logged in the synchronization log.
Performance and memory optimization

During synchronization, data packets are loaded into memory to process synchronization objects in parallel. The size of these data packets can be increased to speed up synchronization but this required more memory. By default, the size of the data packet is selected such that the ratio of memory to performance is balanced out. However, memory issues can still occur during synchronization. This often depends on the configuration of the system environment, the amount of data to synchronize and the exact synchronization configuration. You can control memory usage to avoid such problems. The degree of change is determined with the performance/memory factor.

The performance/memory factor can be set for each synchronization step separately because the amount of data varies from object to object. The first thing to do if a memory problem occurs during synchronization, is to find the affected synchronization step. Reduce the performance/memory factor for this synchronization step until you find the optimal balance between memory requirements and performance.

To adjust the performance/memory factor for a synchronization step

1. Edit the synchronization step properties.
   For more information, see How to edit synchronization steps on page 88.
2. Select the Extended tab.
3. Use the slider to set the performance/memory factor.
   - Move the slider to the left to reduce memory usage. This reduces performance.
   - OR -
   - To increase performance, move the slider to the right. This requires more memory.
4. Click OK.

TIP: You can adjust the memory requirements for all the data to be processed in the start-up configuration. You can set the reload threshold, partition size and bulk level here. These setting are only possible in expert mode. For more information, see Extended properties for start up configuration on page 139.

The performance/memory factor specifies the percentage with which the reload threshold, partition size and bulk level are applied to an object type.

Related topics

- Extended synchronization step properties on page 95
Setting up synchronization

Use the Synchronization Editor to configure connections for different target system in One Identity Manager. The components of a synchronization configuration are used for both synchronization and for provisioning and synchronizing single objects. Synchronization can be configured so it can be used for connecting different target systems of the same target system type.

### Table 29: Synchronization Configuration Components

<table>
<thead>
<tr>
<th>Term</th>
<th>Described in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base object</td>
<td>Setting up base objects on page 116</td>
</tr>
<tr>
<td>Mapping</td>
<td>Setting up mappings on page 64</td>
</tr>
<tr>
<td>start up configuration</td>
<td>Setting up start up configurations on page 109</td>
</tr>
<tr>
<td>Synchronization project</td>
<td>Creating a synchronization project on page 58</td>
</tr>
<tr>
<td>Variable set</td>
<td>Using variables and variable sets on page 104</td>
</tr>
<tr>
<td>Workflow</td>
<td>Setting up synchronization workflows on page 82</td>
</tr>
</tbody>
</table>

Starting the Synchronization Editor

There are different ways to start the Synchronization Editor.

- From the Windows start menu using the entry One Identity | One Identity Manager | Configuration | Synchronization Editor.
- From the Launchpad.
- In the Manager
Creating a synchronization project

A synchronization project collects all the information required for synchronizing the One Identity Manager database with a target system. Connection data for target systems, schema types and properties, mapping and synchronization workflows all belong to this. Various synchronization projects can be created with a different scope for each target system.

Prerequisites

- A synchronization server is set up and declared in the One Identity Manager database.

There is an wizard to assist you with setting up a synchronization project. This wizard takes you all the steps you need to set up initial synchronization with a target system. The project wizard takes over the following tasks:

- Connecting to the Target System
- Connecting to the One Identity Manager database
- Defining synchronization behavior
  
  The synchronization behavior can be configured based on target system-specific project templates. Project templates are supplied by One Identity Manager for certain target systems, The project wizard copies the project template data. This can be modified with the project wizard to suit the new synchronization project.

After saving the synchronization project, you can alter the synchronization configuration.

To complete synchronization configuration

1. Check the mappings, workflows, start up configuration and system connection that the wizard has added.
2. Assign a schedule to the start up configuration.
3. If you want to use the synchronization project to synchronize different target systems, specify variables and variable sets.
4. Activate the synchronization project. The synchronization cannot be started until these are resolved.

**NOTE:** The current synchronization project is closed when you open another synchronization project.

Detailed information about this topic

- How to create a synchronization project on page 59
- How to edit a synchronization project on page 59
- Templates for creating synchronization projects on page 62
- Specifying a schedule on page 113
How to create a synchronization project

**NOTE:** The current synchronization project is closed when you open another synchronization project.

**To create a new synchronization project**

a. Select the synchronization project view on the start page.

b. Click **Start a new synchronization project**.

   This starts the project wizard.

c. Follow the project wizard instructions.

d. Click **Commit to database** to save the new project.

How to edit a synchronization project

**NOTE:** The current synchronization project is closed when you open another synchronization project.

**To open a synchronization project**

1. Select the synchronization project view on the start page.

2. Select the synchronization project you want to load by double-clicking on it.

   **TIP:** To limit the list of synchronization projects displayed, select the target system connection you want on the left-hand side of the project selection view.

3. If the connection data is encrypted, enter the values required to establish the system connection and click **OK**.

4. Edit the mappings, workflows and other components of the synchronization configuration.

**To edit synchronization project properties**

1. Select the synchronization project view on the start page.

2. Select the synchronization project you want to load by double-clicking on it.

3. If the connection data is encrypted, enter the values required to establish the system connection and click **OK**.

4. Click **Edit**....
5. Edit the display name and the synchronization project description.
6. Click OK.

Detailed information about this topic
- Working with an encrypted database on page 25

How to delete a synchronization project

NOTE: The current synchronization project is closed when you open another synchronization project.

To delete a synchronization project
1. Select the synchronization project view on the start page.
2. Select the synchronization project to delete.

TIP: To limit the list of synchronization projects displayed, select the target system connection you want on the left-hand side of the project selection view.
3. Click in the project selection view toolbar.
4. Confirm the security prompt with Yes.

The schedule assigned to this synchronization project is also deleted if it is not used by any other database object.

General properties of a synchronization project

You can edit the synchronization project's display names and description on the General tab.

Table 30: General Properties of a Synchronization Project

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display name</td>
<td>Display name for the synchronization project.</td>
</tr>
<tr>
<td>Script language</td>
<td>Language in which the scripts for this synchronization project are written.</td>
</tr>
<tr>
<td>Description</td>
<td>Spare text box for additional explanation.</td>
</tr>
</tbody>
</table>

On the Migration tab, you can see the migration versions of the One Identity Manager module required for the synchronization project. All the patches already installed are also
listed. Migration data is only available for synchronization projects that were created with One Identity Manager version 7.1.

### Table 31: Synchronization Project Migration Data

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin</td>
<td>Information about the project template used to create the synchronization project.</td>
</tr>
<tr>
<td>Context</td>
<td>Module or connected system for which the synchronization project is valid.</td>
</tr>
<tr>
<td>Current version</td>
<td>The currently installed version of the program.</td>
</tr>
<tr>
<td>Patches added later</td>
<td>Patches that have been applied to the synchronization project since the One Identity Manager was installed or updated.</td>
</tr>
</tbody>
</table>

**Related topics**

- Applying patches on page 135

## Specifying the script language in synchronization projects

Scripts can be implemented at different points in the synchronization configuration. You can use scripts, for example, to define a scope, add schema classes or virtual schema properties of type "script property".

When you define a synchronization project with the project wizard, you specify a script language in which to create the script. You can select either "C#" or "Visual Basic.NET". You can only use project templates in the synchronization wizard that support the selected script language.

**NOTE:** If you want to create a synchronization project using a template, check whether the project template supports the selected script language.

**NOTE:** You cannot change the script language once the project wizard is finished! Create a new synchronization project to change the script language later.

**Related topics**

- Edit schema properties on page 73
- Scope properties on page 102
- Schema class properties on page 70
Templates for creating synchronization projects

Some system connectors provide templates which you can use to configure a complete synchronization project with the project wizard. The project templates add the following components to the synchronization configuration in the synchronization project, depending on the target system type.

- The scope
- A start up configuration (without schedule)
- The default variable set
- A base object
  The synchronization base object, e.g. the actual Active Directory domain that you want to synchronize, is added as an object in the One Identity Manager database.
- A synchronization workflow for the initial import of the target system into the One Identity Manager database
  The workflow has the following characteristics:
  - Direction of synchronization is "One Identity Manager".
  - Processing methods in the synchronization steps are only defined in synchronization direction "One Identity Manager".

- A provisioning workflow
  This workflow is only created if the Read/write access to target system. Provisioning available. option is selected on the Restrict target system access page of the project wizard.
  The workflow has the following characteristics:
  - Synchronization in the direction of the "target system"
  - Processing methods are only defined in the synchronization steps in synchronization direction "target system".
  - Synchronization steps are only created for such schema classes whose schema types have write access.

- The schema classes required
- Mappings for all schema classes required
  These include:
  - Required virtual schema properties
  - Property mapping rules
  - Object matching rules

Also created is:
- Operations for provisioning and single object synchronization
Once a synchronization project has been created from a project template, you can check the settings assign a schedule and start synchronization.

Restricting system access

When you set up a synchronization project with the project wizard, you decide whether the target system is only read in or whether One Identity Manager can also make changes. If you select the option **Target system has read-only access**, only modifications in the target system are transferred to the One Identity Manager database. Changes in the One Identity Manager database are not written to the target system. This means:

- Direction of synchronization is "One Identity Manager".
- The project wizard only creates one synchronization workflow. A provisioning workflow is not added.
- Processing methods in the synchronization steps are only defined in synchronization direction "One Identity Manager".

Related topics

- Templates for creating synchronization projects on page 62
- Specifying processing methods on page 91
- Direction of synchronization and mapping on page 43

How to configure synchronization

Not all system connectors provide a project template for creating a full configured synchronization project. Therefore, you can also create a synchronization project manually. In this case, the project wizard sets up the system connection. All other synchronization configuration components must be configured after you have saved the synchronization project.

**To manually set up synchronization of the One Identity Manager database with a target system**

1. Install and configure a synchronization server and declare the server as Job server in One Identity Manager.
2. Create a new synchronization project.
   - The project wizard sets up the system connection.
   - On the **Select project template** page, select **Create blank project**.
4. Create synchronization workflows.
5. Create a start up configuration.
6. Define the synchronization scope.
7. Specify the base object of the synchronization.
8. Specify the extent of the synchronization log.
9. Run a consistency check.
10. Activate the synchronization project.
11. Save the new synchronization project in the database.

**Detailed information about this topic**
- How to create a synchronization project on page 59
- Setting up mappings on page 64
- Setting up synchronization workflows on page 82
- Setting up start up configurations on page 109
- Editing the scope on page 100
- Setting up base objects on page 116
- Configuring the synchronization log on page 100
- Activating the synchronization project on page 121

**Setting up mappings**

Mappings group together the rules used to map the schema properties of two connected systems. For this, a schema class is created for every schema type which requires mapping. A schema class limits the result list of a schema type through defined filter criteria. A mapping maps schema properties from exactly one target system schema class to the schema properties of exactly one schema class in the One Identity Manager schema. A schema class without a filter condition represents the schema type.

Property mapping rules describe how the target system schema properties are mapped in the One Identity Manager schema. Object matching rules assign schema properties through which system objects can be uniquely identified. For example, Active Directory groups can be uniquely identified by the schema properties DistinguishedName and ObjectGUID.

You specify in the mapping, which mapping direction is permitted for the connected schema classes. Furthermore, you can also specify the permitted mapping direction for individual property mapping rules.

Default mappings for target system synchronization are added if the synchronization project was created with a default project template. You can edit or delete these mappings or create new mappings. If the synchronization project was created without a project template, no mappings are set up.

The schema property mapping is edited with the mapping editor.
Detailed information about this topic
- How are schemas mapped on page 31

Mapping editor

The schema property mapping is edited with the mapping editor. The mapping editor is divided into two schema view and two rule views. Each mapping editor view has its own toolbar.

**Figure 15: Views in the Mapping Editor**

<table>
<thead>
<tr>
<th>Left: One Identity Manager schema view</th>
<th>Rule view</th>
<th>Right: Target system schema view</th>
</tr>
</thead>
<tbody>
<tr>
<td>Details of the selected schema property in One Identity Manager</td>
<td></td>
<td>Details of the selected schema property in the target system</td>
</tr>
</tbody>
</table>

**TIP:**

*To display mapped schema properties of a shelf*

- Select a property mapping rule or an object mapping rule in the shelf view.
  All the schema properties mapped by this shelf are displayed.

- OR -

- Select the schema property in the schema view.
  All the property mapping and object mapping rules mapped by this schema property are marked.
### Table 32: Meaning of Icons in the Navigation View

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✖️ Create a new mapping.</td>
<td></td>
</tr>
<tr>
<td>✖️ Edit mapping.</td>
<td></td>
</tr>
<tr>
<td>✖️ Delete mapping.</td>
<td></td>
</tr>
</tbody>
</table>

### Table 33: Meaning of Icons in the Schema Tool Bar

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✖️ Add schema property.</td>
<td></td>
</tr>
<tr>
<td>✖️ Edit selected schema property.</td>
<td></td>
</tr>
<tr>
<td>✖️ Delete selected schema property.</td>
<td></td>
</tr>
<tr>
<td>✖️ Filter schema properties.</td>
<td></td>
</tr>
<tr>
<td>✖️ Search schema properties.</td>
<td></td>
</tr>
<tr>
<td>✖️ Filter schema properties with similar names in other schema respectively.</td>
<td></td>
</tr>
</tbody>
</table>

### Table 34: Meaning of Icons in the Rule Tool Bar

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✖️ Add rule.</td>
<td></td>
</tr>
<tr>
<td>✖️ Edit selected rule.</td>
<td></td>
</tr>
<tr>
<td>✖️ Delete selected rule.</td>
<td></td>
</tr>
<tr>
<td>✖️ Filter rules.</td>
<td></td>
</tr>
<tr>
<td>✖️ Transform selected property mapping rule into an object matching rule.</td>
<td></td>
</tr>
<tr>
<td>✖️ Sorts object matching rule.</td>
<td></td>
</tr>
<tr>
<td>✖️ Tests object matching rule.</td>
<td></td>
</tr>
<tr>
<td>✖️ Create new rules with help of the mapping wizard.</td>
<td></td>
</tr>
</tbody>
</table>

### Table 35: Meaning of Icons in the Schema View

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✯ The schema property is a unique key.</td>
<td></td>
</tr>
<tr>
<td>✶ The schema property references another schema property.</td>
<td></td>
</tr>
<tr>
<td>Icon</td>
<td>Meaning</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td>📝</td>
<td>Schema property with a special feature.</td>
</tr>
<tr>
<td>👤</td>
<td>User defined virtual schema property.</td>
</tr>
<tr>
<td>📜</td>
<td>The schema property contains several values.</td>
</tr>
<tr>
<td>🗒️</td>
<td>Mandatory property.</td>
</tr>
<tr>
<td>🔴</td>
<td>Rule based mandatory property.</td>
</tr>
<tr>
<td>🗜️</td>
<td>The schema property is read-only.</td>
</tr>
<tr>
<td>🗜️</td>
<td>The schema property is write-only.</td>
</tr>
<tr>
<td>🕐</td>
<td>The value of the schema property is calculated automatically.</td>
</tr>
</tbody>
</table>

Table 36: Meaning of Icons in the Rule View

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>←</td>
<td>Direction of synchronization: One Identity Manager.</td>
</tr>
<tr>
<td>→</td>
<td>Direction of synchronization: target system.</td>
</tr>
<tr>
<td>⏳️</td>
<td>A condition limited use of the rule.</td>
</tr>
<tr>
<td>🔄️</td>
<td>Mapping in the opposite direction of synchronization is permitted.</td>
</tr>
<tr>
<td>🚨</td>
<td>Indicates configuration errors. Mouse over the icon to display the error description.</td>
</tr>
</tbody>
</table>

How to create a mapping

To create a mapping

1. Select the category **Mappings**.
2. Click 📝 in the navigation view.
3. Enter the general properties of a mapping and create the required schema classes.
4. Click OK.

How to edit a mapping

To edit the general properties of a mapping

1. Select the category **Mappings**.
2. Select a mapping in the navigation view.
3. Click ⏳️ in the navigation view toolbar.
4. Click **Edit** to enable the properties available for editing.
5. Edit the mapping's properties.
6. Click **OK**.

**How to delete a mapping**

*To delete a mapping*
1. Select the category **Mappings**.
2. Select a mapping in the navigation view.
3. Click 🗓 in the navigation view.
4. Confirm the security prompt with **Yes**.
5. Save the changes.

**Properties of a mapping**

Enter the following properties for a mapping.

<table>
<thead>
<tr>
<th>Table 37: Properties of a Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Properties</strong></td>
</tr>
<tr>
<td>Mapping name</td>
</tr>
<tr>
<td>Mapping direction</td>
</tr>
<tr>
<td>Both directions</td>
</tr>
<tr>
<td>To the target system</td>
</tr>
<tr>
<td>To the One Identity Manager</td>
</tr>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Hierarchy synchronization</td>
</tr>
<tr>
<td>Properties</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Example:</td>
</tr>
<tr>
<td>Only suitable for updates</td>
</tr>
<tr>
<td>Can map through multiply referenced objects</td>
</tr>
<tr>
<td>Schema class in One Identity Manager</td>
</tr>
<tr>
<td>Schema class in the target system</td>
</tr>
</tbody>
</table>

**Detailed information about this topic**

- [Direction of synchronization and mapping](#) on page 43
- [Schema class properties](#) on page 70
## Schema class properties

Enter the following properties for a schema class:

<table>
<thead>
<tr>
<th>Property</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class types</strong></td>
<td>Types of schema classes. The class type can only be specified when a new schema class is added.</td>
</tr>
<tr>
<td>Generic schema class</td>
<td>Schema classes without a native filter function.</td>
</tr>
<tr>
<td>Unique objects</td>
<td>Schema classes, which filter objects based on unique values from different properties. Only distinct objects are filtered. This prevents the system connector from trying to add objects that already exist.</td>
</tr>
</tbody>
</table>

### CAUTION

- The schema class filters objects in an undefined order. Therefore, the result may not be the same each time the filter is used.
- Only use this class type for mapping in the direct of One Identity Manager. Otherwise, you cannot guarantee that the same object is updated every time the CSV file is written.

<table>
<thead>
<tr>
<th>Property</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schema type</strong></td>
<td>Select the schema type for which you want to create a schema class.</td>
</tr>
<tr>
<td><strong>Display name</strong></td>
<td>Schema class display name.</td>
</tr>
<tr>
<td><strong>Class name</strong></td>
<td>Unique schema class identifier. By default, the class name is based on the schema type. The class name must be unique within a schema type.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Spare text box for additional explanation.</td>
</tr>
<tr>
<td><strong>Distinction</strong></td>
<td>Schema properties, which form a unique value when combined.</td>
</tr>
<tr>
<td></td>
<td>This only applies to schema classes with the class type &quot;Unique objects&quot;</td>
</tr>
</tbody>
</table>

### NOTE

- The system filter does not work, if changes are being provisioned. Therefore, it may not filter more objects than the object selection.
## Related topics

- [Support for writing scripts](#) on page 19
- [Use cases for class types](#) on page 71

### Use cases for class types

You want to import employee and organization data from an external personnel management system into One Identity Manager. All the data is provided in a CSV file and transferred to the database through the CSV connector in the One Identity Manager database.

### Table 39: Example of a CSV file

<table>
<thead>
<tr>
<th>Lastname</th>
<th>FirstName</th>
<th>Department</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harris</td>
<td>Clara</td>
<td>Marketing</td>
<td>London</td>
</tr>
<tr>
<td>Bloggs</td>
<td>Jan</td>
<td>Marketing</td>
<td>Berlin</td>
</tr>
<tr>
<td>King</td>
<td>Jenny</td>
<td>Marketing</td>
<td>London</td>
</tr>
<tr>
<td>Basset</td>
<td>Jenny</td>
<td>Sales</td>
<td>Berlin</td>
</tr>
<tr>
<td>King</td>
<td>Ben</td>
<td>Sales</td>
<td>London</td>
</tr>
<tr>
<td>Harris</td>
<td>Ben</td>
<td>Sales</td>
<td>Berlin</td>
</tr>
</tbody>
</table>

Employee objects, departments and location will be added to the One Identity Manager database from this data. The CSV synchronization exits with an error when a second object with the same name is added because the names of the departments and location are not unique. This can be prevented.

**Which objects should be created?**
1. Employees with properties LastName and FirstName. Object can be uniquely identified through these two properties. The file contain six different objects.

2. Departments with the properties Department and Location. The file contains four different objects.

3. Location with the property Location. The file contains two different objects.

Distinct objects must be supplied for 2. and 3. Therefore, schema classes with the class type "Unique objects" are created in the mapping.

**To set up the mappings**

1. Create a mapping for employees.
   - Create a new schema class in the target system.
     Select the class type **Generic schema class** and enter the mandatory data.

2. Create a mapping for the department.
   - Create a new schema class in the target system.
     a. Select the class type **Unique objects** and enter the mandatory data.
     b. Enable **Department** and **Location** on the **Distinction** tab.
        The schema class filters exactly those objects from the CSV file that are unique identifiable by the combination of **Department** and **Location**.

3. Create a mapping for the location.
   - Create a new schema class in the target system.
     a. Select the class type **Unique objects** and enter the mandatory data.
     b. Enable **Location** on the **Distinction** tab.
        The schema class filters exactly those objects from the CSV file that are unique identifiable by the property **Location**.

4. Check the filter results in the target system browser.

**Table 40: Schema Class Definition Results**

<table>
<thead>
<tr>
<th>Schema class</th>
<th>Filtered Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees</td>
<td>Harris; Clara</td>
</tr>
<tr>
<td></td>
<td>Bloggs; Jan</td>
</tr>
<tr>
<td></td>
<td>King; Jenny</td>
</tr>
<tr>
<td></td>
<td>Basset; Jenny</td>
</tr>
<tr>
<td></td>
<td>King; Ben</td>
</tr>
<tr>
<td></td>
<td>Harris; Ben</td>
</tr>
<tr>
<td>Departments</td>
<td>Marketing; London</td>
</tr>
<tr>
<td></td>
<td>Marketing; Berlin</td>
</tr>
</tbody>
</table>
### Edit schema properties

1️⃣ **IMPORTANT:** Schema properties should only be added, modified or deleted by experienced Synchronization Editor users and system administrators.

All schema properties of a schema class are displayed in the mapping editor's schema view. There are two different sorts of schema property:

- Schema properties of schema types from the target system and One Identity Manager schema.
- Virtual schema properties,
  - added by the user to extend the target system schema or the One Identity Manager schema
  - added by the user to extend the connector schema or the One Identity Manager schema

You can use virtual schema properties to represent combinations of schema properties as well as processing step results as schema properties. They are used amongst other things to map lists of members to One Identity Manager database auxiliary tables. Some virtual schema properties are added by the system connector when you set up the synchronization project. You can create user specific schema properties. You can use these, for example, to include custom One Identity Manager database schema extensions in the mapping.

1️⃣ **NOTE:** Virtual schema properties are only saved in the synchronization project. They do not modify basic One Identity Manager schema or target system schema.

1️⃣ **NOTE** You can use variables with fixed values in schema properties. In this case, variable names with dollar signed are included. If the schema property value contains a dollar sign, which is not used to label a variable, it must be masked with $.

Example: Enter the value '300 $$' for a variable with the value '300 $'.

### Related topics

- [Schema editor](#) on page 141
How to add virtual schema properties

1. **IMPORTANT:** Schema properties should only be added, modified or deleted by experienced Synchronization Editor users and system administrators.

**To add a virtual schema property**

1. Select the category **Mappings**.
2. Select a mapping in the navigation view.
3. In the menu bar of the schema view, click ☰️.
4. Enter details for the virtual schema property.
5. Click **OK**.

The icon ☰️ marks custom virtual schema properties in the schema view.

How to display and edit schema properties

1. **IMPORTANT:** Schema properties should only be added, modified or deleted by experienced Synchronization Editor users and system administrators.

**To edit a virtual schema property**

1. **NOTE:** Only user specific virtual schema properties can be edited.
2. Select the category **Mappings**.
3. Select a mapping in the navigation view.
4. Double-click on the schema property in the schema view.
5. Edit the schema property details.
6. Click **OK**.

How to delete virtual schema properties

1. **IMPORTANT:** Schema properties should only be added, modified or deleted by experienced Synchronization Editor users and system administrators.

**To delete a virtual schema property**

1. **NOTE:** Only user specific virtual schema properties can be deleted.
2. Select the category **Mappings**.
3. Select a mapping in the navigation view.
4. Select the virtual schema property in the schema view.
4. Click in the schema view menu bar.
5. Confirm the security prompt with Yes.

Editing property mapping rules

Property mapping rules describe how the target system schema properties are mapped in the One Identity Manager schema. You can specify whether the permitted mapping direction is taken over from the mapping for each property mapping rule. You can also specify a different mapping direction than the one in the mapping.

How to create property mapping rules

To create a property mapping rule

1. Select the category Mappings.
2. Select a mapping in the navigation view.
3. In the rule view menu bar for property mapping rules, click .
4. Select a rule type and enter the rule details.
5. To create a rule from a template, click .
6. Click OK.

To create a property mapping rule by "drag and drop".

1. Select the category Mappings.
2. Select a mapping in the navigation view.
3. Select the schema property to map in the schema view.
4. Drag the schema property with the mouse from one schema view onto the schema property in the other schema view.
5. If the schema property data types match, a property mapping rule is added for the selected schema property. You can edit the rule details later.
   If the schema property data types do not match, the conflict wizard is started which helps you create the property mapping rules.

One Identity Manager helps you to set up new property mapping rules based on existing rules. Use the mapping wizard for this.

To create a property mapping rule with the mapping wizard

1. Select the category Mappings.
2. Select a mapping in the navigation view.
3. Click in the rule view menu bar for property mapping rules.
4. Follow the mapping wizard's instructions.
5. Test the new rule.
How to edit property mapping rules

**To edit a property mapping rule**

1. Select the category **Mappings**.
2. Select a mapping in the navigation view.
3. Double-click on the property mapping rule you want to edit in the rule view.
4. Edit the rule details.
5. Click **OK**.

How to delete property mapping rules

**To delete a property mapping rule**

1. Select the category **Mappings**.
2. Select a mapping in the navigation view.
3. Click ⌁ in the rule view menu bar for property mapping rules.
4. Confirm the security prompt with **Yes**.

Property mapping rule details

Enter the following details for a property mapping rule.

**TIP:** To create a rule from a template, click 📑.

<table>
<thead>
<tr>
<th>Table 41: Property Mapping Rule Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Detail</strong></td>
</tr>
<tr>
<td>Rule Types</td>
</tr>
<tr>
<td>Value compare rule</td>
</tr>
<tr>
<td>Multiple reference rule</td>
</tr>
<tr>
<td>Rule name</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Display name</td>
</tr>
<tr>
<td><strong>Detail</strong></td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>Mapping direction</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Ignore mapping</td>
</tr>
<tr>
<td>direction</td>
</tr>
<tr>
<td>restrictions on</td>
</tr>
<tr>
<td>adding</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Schema property</td>
</tr>
<tr>
<td>Do not overwrite</td>
</tr>
</tbody>
</table>
### Mapping condition
Condition under which the property mapping rule is used.

Click **Create condition** to create the condition with the wizard. For more information, see [Wizard for entering filters](#) on page 17.

Example: `Left.CanonicalName = 'Managed Service Accounts'`

The property mapping rule is applied to all objects assigned to the container "Managed Service Accounts" in One Identity Manager.

### Table 42: Additional Detail of a Value Compare Rule

<table>
<thead>
<tr>
<th>Detail</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force mapping against direction of synchronization</td>
<td>If this option is set, the property mapping rule can also be applied if the synchronization mapping is in the opposite direction. For more information, see <a href="#">Mapping against the direction of synchronization</a> on page 44. &quot;Target system&quot; or &quot;One Identity Manager&quot; must be set as mapping direction. The property mapping rule may not be executed in both directions. The option can only be set if <strong>Detect rogue modifications</strong> is not set.</td>
</tr>
<tr>
<td>Detecting rogue modifications</td>
<td>If this option is set, rogue modifications are detected and logged. For more information, see <a href="#">Detecting rogue modifications</a> on page 46. This option can only be set if <strong>Force mapping against direction of synchronization</strong> is disabled.</td>
</tr>
<tr>
<td>Correct rogue modifications</td>
<td>If this option is set, rogue modifications are corrected. For more information, see <a href="#">Detecting rogue modifications</a> on page 46. The option can only be set if <strong>Detect rogue modifications</strong> is set. The option may only be set if the schema property that may changed through the correction has write-access. Example: Rogue modification should be corrected when schema property &quot;DB abc&quot; (in One Identity Manager) and &quot;TS rst&quot; (in the target system) are synchronized. The mapping direction is &quot;Target system&quot;. The option <strong>Rogue detection enabled</strong> may only be set if the schema property &quot;DB abc&quot; has write-access.</td>
</tr>
<tr>
<td>Ignore case</td>
<td>If this option is set, the mapping ignores case sensitivity. If this option is not set, case sensitivity is taken into account in the mapping.</td>
</tr>
<tr>
<td>Deal with the first value of the property as a single value</td>
<td>If a multi-value schema property is mapped using a value compare rule, the first value from the value list is taken into account by synchronization.</td>
</tr>
</tbody>
</table>
### Table 43: Additional Detail of a Multi-Reference Mapping Rule

<table>
<thead>
<tr>
<th>Member filter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only include these</td>
<td>Select all members in the value list to be mapped to the schema property of the connected system.</td>
</tr>
<tr>
<td>Exclude these</td>
<td>Select all members in the value list <strong>not</strong> to be mapped to the schema property of the connected system.</td>
</tr>
</tbody>
</table>

### Editing object matching rules

Object matching rules assign schema properties through which system objects can be uniquely identified. For example, Active Directory groups can be uniquely identified by the schema properties `DistinguishedName` and `ObjectGUID`.

Object matching rules can be added or created from property mapping rules. If system objects can only be identified through several schema properties, different property matching rules can be linked with logical operators to form an object matching rule.

If several object matching rules are set up, they are executed in the order in which they are listed in the rule view. If system objects can be identified using the top rule, the rest of the rules are not executed. If system objects cannot be identified using the top rule, One Identity Manager uses the next rule to determine the system objects.

**NOTE:**

- Object matching rules must use schema properties with read-access. Write-only schema properties are not suitable for identification of system objects.
- Schema property that are only used for identifying system objects are not mapped by default.
- Schema properties used to identify system objects must contain a value. They cannot be empty.

### How to create object matching rules

**To create an object matching rule from a property mapping rule**

1. Select the category **Mappings**.
2. Select a mapping in the navigation view.
3. Select the property mapping rule in the rule view.
4. Click ![pen](image) in the rule view toolbar.
   - A message appears.
5. To convert the property mapping rule to an object matching rule, click **No** in the message dialog.

- OR -
To convert the property mapping rule into an object matching rule and create a copy of the property mapping rule, click Yes in the message dialog.

**To create a new object matching rule**
1. Select the category Mappings.
2. Select a mapping in the navigation view.
3. Click in the rule view toolbar for object matching rules.
4. Select a rule type and enter the rule details.
5. Click OK.

One Identity Manager helps you to set up new object matching rules based on existing rules. Use the mapping wizard for this.

**To create an object matching rules with the mapping wizard**
1. Select the category Mappings.
2. Select a mapping in the navigation view.
3. Click in the menu bar for the object matching rule view.
4. Follow the mapping wizard's instructions.
5. Test the new rule.

**How to edit object matching rules**

**To edit an object matching rule**
1. Select the category Mappings.
2. Select a mapping in the navigation view.
3. Double-click on the object matching rule you want to edit.
4. Edit the rule details.
5. Click OK.

**How to delete object matching rules**

**To delete an object matching rule**
1. Select the category Mappings.
2. Select a mapping in the navigation view.
3. Click in the rule view menu bar for object matching rules.
4. Confirm the security prompt with Yes.

**Object-matching rule details**

Enter the following details for an object mapping rule.
### Table 44: Object Matching Rule Details

<table>
<thead>
<tr>
<th>Detail</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule Types</td>
<td>Select the rule type for a new rule.</td>
</tr>
<tr>
<td>Value compare rule</td>
<td>Compares the schema property value of the One Identity Manager schema with the value of a target system schema.</td>
</tr>
<tr>
<td>Logical Expression Rule</td>
<td>Evaluates the logical connective of several rules. Use this rule type to identify if you can only identify system objects using several schema properties.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Detail</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule name</td>
<td>Name for the rule. The rule name must be unique within a mapping.</td>
</tr>
<tr>
<td>Display name</td>
<td>Rule display name.</td>
</tr>
<tr>
<td>Case sensitive</td>
<td>If this option is set, the case sensitivity is taken into account when system objects are being identified.</td>
</tr>
<tr>
<td></td>
<td>If this option is not set, case sensitivity is ignored when system objects are being identified.</td>
</tr>
</tbody>
</table>

| Description | Spare text box for additional explanation. |

### Table 45: Additional Detail of a Value Compare Rule

<table>
<thead>
<tr>
<th>Detail</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schema property</td>
<td>Select the schema properties which uniquely identify the system objects.</td>
</tr>
</tbody>
</table>

### Table 46: Additional Details of a Logical Expression Rule

<table>
<thead>
<tr>
<th>Detail</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expression</td>
<td>Links the existing rules to each other using logical operators. Permitted operators are AND, OR and NOT as well as brackets.</td>
</tr>
<tr>
<td>Syntax:</td>
<td>`&lt;rule name&gt; {AND</td>
</tr>
<tr>
<td>Click</td>
<td>to select an existing rule.</td>
</tr>
</tbody>
</table>

### Testing object-matching rules

You can test which results the object matching rules return in the rule editor. This displays all object pairs found by one of the rules. In addition, objects are shown that are only found in one of the connected systems.

The test uses the variable set that is selected in the Synchronization Editor's toolbar.
To test object matching rules

1. Select the category **Mappings**.
2. Select a mapping in the navigation view.
3. Click ✓ in the rule view toolbar for object matching rules.

Setting up synchronization workflows

The synchronization sequence is controlled by a workflow. Use workflows to combine the synchronization steps to be executed. The number of synchronization projects can be limited by using revision filters and quotas. You can set up different workflows within a synchronization project which map different purposes of the synchronization.

Define workflows:

- Direction of synchronization
- Number and order of synchronization steps
- Objects to compare (revision filter)

Default workflows for target system synchronization are added if the synchronization project was created with a default project template. You can edit these workflows with the workflow editor and set up new workflows. If the synchronization project was created without a project template, no workflows are set up.

Toolbars in the workflow editor

Both workflow and navigation views have their own toolbars.

Table 47: Meaning of Icons in the Navigation View

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="create.png" alt="Create" /></td>
<td>Create a new workflow with the workflow wizard.</td>
</tr>
<tr>
<td><img src="create.png" alt="Create" /></td>
<td>Create a new workflow.</td>
</tr>
<tr>
<td><img src="edit.png" alt="Edit" /></td>
<td>Edit a workflow.</td>
</tr>
<tr>
<td><img src="delete.png" alt="Delete" /></td>
<td>Delete a workflow.</td>
</tr>
<tr>
<td><img src="copy.png" alt="Copy" /></td>
<td>Copy selected workflow.</td>
</tr>
</tbody>
</table>
Table 48: Meaning of icons in the workflow view

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>📌</td>
<td>Adds new step.</td>
</tr>
<tr>
<td>📝</td>
<td>Shows execution plan.</td>
</tr>
<tr>
<td>🔽</td>
<td>Opens detail view of all synchronization steps.</td>
</tr>
<tr>
<td>🔺</td>
<td>Closes detail view of all synchronization steps.</td>
</tr>
<tr>
<td>🔵</td>
<td>Enable or disable synchronization steps.</td>
</tr>
</tbody>
</table>

**How to create a workflow**

*To create a workflow*

1. Select the category **Workflows**.
2. Click 📌 in the navigation view.
3. Enter a name and description for the workflow.
4. Click **OK**.
   
   Default values are saved for the other workflow properties. To modify these values, edit the workflow properties.

*To create a workflow with the workflow wizard*

1. Select the category **Workflows**.
2. Click 📌 in the navigation view.
3. Follow the workflow wizard instructions.

**How to edit a workflow**

*To edit workflow properties*

1. Select the category **Workflows**.
2. Select a workflow in the navigation view.
3. Select the **General** view in the Workflow Editor and click **Edit**.
4. Edit the workflow properties.
5. Click **OK**.
How to copy a workflow

To copy a workflow
1. Select the category Workflows.
2. Select the workflow in the navigation view.
3. Click in the navigation view.
4. Edit the workflow properties.
5. Click OK.

How to delete a workflow

To delete a workflow
1. Select the category Workflows.
2. Select the workflow in the navigation view.
3. Click in the navigation view.
4. Confirm the security prompt with Yes.

Creating workflows with the workflow wizard

The project wizard creates a synchronization workflow for initially loading the target system objects into the One Identity Manager database. You can use the workflow wizard to set up more workflows. The workflow wizard specifies workflows for the direction of synchronization "target system".

To create a workflow with the workflow wizard
1. Select the category Workflows.
2. Click in the navigation view.
   This starts the workflow wizard.
   Click Next.
3. Enter the following workflow properties

Table 49: General workflow properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display name</td>
<td>Enter a display name for the workflow.</td>
</tr>
<tr>
<td>Description</td>
<td>Spare text box for additional explanation.</td>
</tr>
</tbody>
</table>
4. Select the mapping to be handled by the workflow.
   All mappings are enabled by default.
   To disable a mapping, double click 🗑. 
   To enable a mapping, double click 🎉.

   **NOTE:** The Part of hierarchy displays which mappings form part of the object hierarchy. To prevent errors, all mappings, which map the object hierarchy, must be entirely selected or entirely de-selected.

5. Specify the mappings for which revision filtering is permitted.
   Revision filtering is permitted for all mappings, by default.
   Click **Next**.

6. Specify synchronization behavior for the object pair whose properties have changed.
   a. In the **Database method** column, select the processing method to be executed in the One Identity Manager database.

   - OR -

   b. Select the processing method to be executed in the target system in the **Target system method** column.

   Click **Next**.

7. Specify synchronization behavior for the objects that only exist in the One Identity Manager database.
   a. In the **Database method** column, select the processing method to be executed in the One Identity Manager database.

   - OR -

   b. Select the processing method to be executed in the target system in the **Target system method** column.

   Click **Next**.

8. Specify synchronization behavior for objects that only exist in the target system.
   a. In the **Database method** column, select the processing method to be executed in the One Identity Manager database.

   - OR -

   b. Select the processing method to be executed in the target system in the **Target system method** column.

   Click **Next**.

9. Click **Close** to end the workflow wizard.
   This creates the workflow. You can check the properties of the Workflow and the synchronization steps with the workflow editor and rework them.

   **NOTE:** A disabled synchronization step is added if no processing methods have been specified for a mapping.
Detailed information about this topic

- Properties of a mapping on page 68
- Specifying processing methods on page 91

Properties of a workflow

Enter the following properties for a workflow.

Table 50: General Workflow Properties

<table>
<thead>
<tr>
<th>Properties</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workflow</td>
<td>Workflow display name.</td>
</tr>
<tr>
<td>Direction of synchronization</td>
<td>Select the direction in which synchronization should take place.</td>
</tr>
<tr>
<td>Defined by execution</td>
<td>The synchronization direction is defined in the start up configuration.</td>
</tr>
<tr>
<td></td>
<td>For more information, see Start up configuration properties on page 110.</td>
</tr>
<tr>
<td>Target system</td>
<td>One Identity Manager is the master system for synchronization.</td>
</tr>
<tr>
<td>One Identity Manager</td>
<td>The target system is the master system for synchronization.</td>
</tr>
<tr>
<td>Revision filtering</td>
<td>The revision filtering can be used to limit synchronization to just the objects that have been modified since the last synchronization. For more information, see How does revision filtering work? on page 37.</td>
</tr>
<tr>
<td>Defined by execution</td>
<td>The required behavior is defined in the start up configuration.</td>
</tr>
<tr>
<td>Use revision filter</td>
<td>Only modified objects are synchronized.</td>
</tr>
<tr>
<td>Do not use revision filter</td>
<td>All objects are synchronized.</td>
</tr>
<tr>
<td>Error Handling</td>
<td>Specify whether synchronization should be continued if an error occurs during processing of synchronization objects (adding, deleting, updating and reloading objects). Object processing is continued using the next object; the error is logged. To optimize error localization, you can abort synchronization if an error occurs during the processing of synchronization objects. In this case, no further synchronization objects are processed.</td>
</tr>
</tbody>
</table>
### Properties |
### Meaning

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOTE:</td>
<td>This property does not affect configuration, network or general synchronization errors (for example, if it is not possible to resolve a reference). The effectiveness of this property depends on the actual error, error position, the target system and the implementation of the target system connectors.</td>
</tr>
<tr>
<td><strong>Continue on error</strong>:</td>
<td>Processing continues with the next object. Errors are logged. This option should be used for productive systems.</td>
</tr>
<tr>
<td><strong>Break on error</strong>:</td>
<td>Synchronization is aborted. This option should only be used to find errors, for example in going live processes.</td>
</tr>
</tbody>
</table>

**Dependency resolution**

Specify how dependencies between synchronization step are resolved. For more information, see How does dependency resolution work? on page 39.

- **Automatic**: Dependencies are resolved automatically. One Identity Manager determines the sequence of the synchronization steps automatically. It takes into account dependencies between schema classes to synchronize and schema properties.
- **Manual**: Dependencies are not resolved. The synchronization steps are processed sequentially in the order listed in the workflow view. Dependencies between the schema classes and the schema properties must be taken into account when compiling the synchronization steps.

**Description**

Spare text box for additional explanation.

### Editing synchronization steps

The synchronization steps in a workflow specify which mappings are processed in which order during synchronization. There may be dependencies between synchronization steps. These must be resolved automatically or manually.

Synchronization steps are displayed in the workflow view. Here, you can edit synchronization step properties and their order.

**Defining synchronization steps**:

- Mappings to be processed
- Property mapping rules to apply
- Processing methods
- Number of objects to compare
- Objects to compare (revision filter)
- Direction of synchronization

Detailed information about this topic
- How does dependency resolution work? on page 39

How to create synchronization steps

To create a synchronization step
1. Select the category Workflows.
2. Select a workflow in the navigation view.
3. Click in the workflow view.
4. Enter the synchronization step properties.
5. Click OK.

How to edit synchronization steps

To edit synchronization step properties
1. Select the category Workflows.
2. Select a workflow in the navigation view.
3. Double-click on the synchronization step in the workflow.
4. Edit the synchronization step properties.
5. Click OK.

To manually specify the order of synchronization steps
1. Select the category Workflows.
2. Select a workflow in the navigation view.
3. Click in the workflow view toolbar to open all the synchronization steps.
4. To change the order of the synchronization steps, click and on the synchronization step.

To enable or disable synchronization steps
1. Select the category Workflows.
2. Select a workflow in the navigation view.
3. Click in the workflow view’s toolbar.
4. Check the boxes for all synchronization steps that you want to disable.
   - OR -
   Uncheck the boxes for all synchronization steps that you want to enable.
   Multi-select is possible.
5. Click **OK**.

**How to delete synchronization steps**

To delete a synchronization step

1. Select the category **Workflows**.
2. Select a workflow in the navigation view.
3. Click ✔️ in the synchronization step in the workflow view to open the synchronization step dialog box.
4. Click ✗.
5. Confirm the security prompt with **Yes**.

**General properties of a synchronization step**

Enter the following general properties for a synchronization step.

<table>
<thead>
<tr>
<th>Property</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>An arbitrary name for the synchronization step. The name must be unique within a synchronization workflow.</td>
</tr>
<tr>
<td>Mapping</td>
<td>Select the mapping to be processed by the synchronization step.</td>
</tr>
<tr>
<td>Direction of synchronization</td>
<td>Select the direction in which synchronization should take place.</td>
</tr>
<tr>
<td>Use workflow template</td>
<td>The direction of synchronization is defined in the workflow.</td>
</tr>
<tr>
<td></td>
<td>For more information, see <a href="#">Properties of a workflow</a> on page 86.</td>
</tr>
<tr>
<td>To the target system</td>
<td>One Identity Manager is the master system for synchronization.</td>
</tr>
<tr>
<td>To the One Identity Manager</td>
<td>The target system is the master system for synchronization.</td>
</tr>
<tr>
<td>Property</td>
<td>Meaning</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Revision filtering</td>
<td>The revision filtering can be used to limit synchronization to just the objects that have been modified since the last synchronization.</td>
</tr>
<tr>
<td></td>
<td>For more information, see How does revision filtering work? on page 37.</td>
</tr>
<tr>
<td>Use workflow template</td>
<td>The desired behavior is specified with the workflow.</td>
</tr>
<tr>
<td>Use revision filter</td>
<td>Only modified object are synchronized.</td>
</tr>
<tr>
<td>Do not use revision filter</td>
<td>All objects are synchronized.</td>
</tr>
<tr>
<td>Error Handling</td>
<td>Specify whether synchronization should be continued if an error occurs during processing of synchronization objects (adding, deleting,</td>
</tr>
<tr>
<td></td>
<td>updating and reloading objects). Object processing is continued using the next object; the error is logged.</td>
</tr>
<tr>
<td></td>
<td>To optimize error localization, you can abort synchronization if an error occurs during the processing of synchronization objects. In</td>
</tr>
<tr>
<td></td>
<td>this case, no further synchronization objects are processed.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> This property does not affect configuration, network or general synchronization errors (for example, if it is not possible to</td>
</tr>
<tr>
<td></td>
<td>resolve a reference). The effectiveness of this property depends on the actual error, error position, the target system and the</td>
</tr>
<tr>
<td></td>
<td>implementation of the target system connectors.</td>
</tr>
<tr>
<td></td>
<td>Use workflow template</td>
</tr>
<tr>
<td></td>
<td>Continue on error</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Break on error</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Data import</td>
<td>Set this option if the synchronization step synchronizes a secondary system and changes are immediately provisioned in the primary system.</td>
</tr>
<tr>
<td></td>
<td>Do not set this option if the synchronization step synchronizes a primary system.</td>
</tr>
<tr>
<td></td>
<td>For more information, see Synchronizing user data with different ID Manager 8.1.1 Target System Synchronization Reference Guide 90</td>
</tr>
</tbody>
</table>
### Specifying processing methods

Specify how changes to system objects should be handled on the Processing tab. You can select the following default methods. Furthermore, the schema types of the various target systems provide additional processing methods if required.

The processing methods are defined for different sets of synchronization objects.

- **Objects only found in the target system** and missing in One Identity Manager.
- **Objects only found in One Identity Manager** and missing in the target system.
- **Objects with modified properties**
  This means there are object pairs whose objects differ.
- **Objects without modifications**
  This means there are object pairs whose objects are identical.

#### Table 52: Default Processing Methods in a Synchronization Step

<table>
<thead>
<tr>
<th>Processing Method (technical name)</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert</td>
<td>Objects that only exist in one of the connected system are added to the other system.</td>
</tr>
<tr>
<td>Delete</td>
<td>Objects that only exist in one of the connected system are deleted from the system.</td>
</tr>
</tbody>
</table>
  
  The following applies to synchronization in One Identity Manager.  
  
  The object is immediately deleted if it came from a primary system. 
  
  Deferred deletion is not taken into account. Deferred deletion is taken into account if the object comes from a secondary system. 
  
  For more information, see Synchronizing user data with different systems on page 48. For more information about deferred deletion, see the One Identity Manager Configuration Guide. |
| Update                            | Objects whose properties have change are updated. |
| MarkAsOutstanding                 | Objects that only exist in the One Identity Manager are marked as outstanding during synchronizing in the direction of One Identity Manager. These objects can be reworked after synchronization is complete. Objects marked as outstanding are ignored by |
## Processing Method (technical name)

<table>
<thead>
<tr>
<th>Processing Method</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>subsequent synchronization.</td>
<td></td>
</tr>
<tr>
<td>No processing</td>
<td>No processing methods are executed.</td>
</tr>
</tbody>
</table>

### Table 53: Meaning of the Icons

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>➕</td>
<td>Adds an extra processing method for the object set. If you allow several processing methods for one object set, add conditions for executing these methods.</td>
</tr>
<tr>
<td>✣</td>
<td>Create a condition for executing the method. All objects are processed the same way if you do not create a condition.</td>
</tr>
<tr>
<td>⬆️</td>
<td>Moves the processing method forwards in the order of execution.</td>
</tr>
<tr>
<td>⬇️</td>
<td>Moves the processing method backwards in the order of execution.</td>
</tr>
<tr>
<td>🗑️</td>
<td>Deletes the processing method.</td>
</tr>
</tbody>
</table>

### Detailed information about this topic

- Editing subsets on page 93
- Specifying additional processing methods on page 92
- Deleting objects in One Identity Manager on page 49

### Specifying additional processing methods

Some target systems provide extra processing methods in addition to the default ones. One Identity Manager can execute different processing methods in sequence for the same set of objects.

**To define different processing methods for a set of objects**

1. Select a processing method from the menu for synchronizing an object set.
2. Click ➕ to specify another processing method for this object set. Select a processing method from the menu.
3. Use ⬆️ and ⬇️ to specify the order in which to execute the processing methods.

### Example

You can enter external user IDs for SAP user accounts in One Identity Manager. User accounts that only exist in One Identity Manager are added if SAP user accounts from One Identity Manager are synchronized with SAP R/3. The associated external user ID’s are also transferred into the target system.
Objects only found in One Identity Manager are:

- Insert
- AddExtID

Related topics

- Specifying processing methods on page 91

Editing subsets

Processing methods can be limited to a set of the objects. To do this, specify the condition under which the processing method is to be executed. You can specify different processing methods for different sets of objects. These are executed in the given order.

**To define processing for different sets**

1. Select a processing method from the menu for synchronizing an object set.
2. Click to specify another processing method for this object set. Select a processing method from the menu.
3. Create the condition defining the execution point the processing method. Click next to the method.
   - Enter the condition. You can use comparisons, logical operators and variables. You can write queries with a wizard or enter them directly.
   - Use the following expression in the condition to access the schema properties of the system in which you want the processing method to be executed:
     ```
     Base.<schema property>
     ```
   - To access the schema properties of the other system in the condition, use the expression:
     ```
     Other.<schema property>
     ```
4. Use and to specify the order in which to execute the processing methods.

Example

All user accounts that only exist in One Identity Manager are processed as follows when synchronizing Active Directory user accounts from Active Directory in the direction of One Identity Manager:

<table>
<thead>
<tr>
<th>Object Set</th>
<th>Processing Method</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>All user accounts, connected to an employee, are marked for deletion.</td>
<td>MarkForDeletion</td>
<td>Base.UID_Person &lt;&gt; ''</td>
</tr>
<tr>
<td>All user accounts, not connected with an employee, are deleted.</td>
<td>Delete</td>
<td>Base.UID_Person = ''</td>
</tr>
<tr>
<td>Object Set</td>
<td>Processing Method</td>
<td>Condition</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>All user accounts, in container A, are deleted.</td>
<td>Delete</td>
<td>Base.UID_ADSContainer = '4b53ff19-6ae4-4a87-86bd-eca3ddf5ebf2'</td>
</tr>
<tr>
<td>2</td>
<td>MarkForDeletion</td>
<td>Base.UID_ADSContainer &lt;&gt; '4b53ff19-6ae4-4a87-86bd-eca3ddf5ebf2'</td>
</tr>
</tbody>
</table>

**Related topics**

- Specifying processing methods on page 91
- Wizard for entering filters on page 17

**Specifying quotas**

Errors in the synchronization configuration can cause system objects to be processed incorrectly. Errors in the data through incorrect configuration can be reduced. Often, it is known how many system objects have been modified, added or deleted in a connected system. If this number is exceeded when a processing method is executed, a warning appears and synchronization is aborted. The synchronization step and mapping configurations can be checked and corrected before repeating synchronization.

A quota can be defined for each processing method in each synchronization step to specify the part of the system objects to process. A quota provides the number of object to process relative to the total number of all objects in the schema class to be synchronized. When a synchronization step is executed, One Identity Manager calculates the number of objects to process for each processing method with a quota. If this number exceeds the quota, the synchronization step is aborted.

Quotas can only be defined for processing methods which modify data (for example, Insert, Update, Delete).

**NOTE:** One Identity Manager takes total number objects to be synchronized into account when it calculates the number of objects to process. Conditions defined for processing methods are not taken into account!

Enter an higher quota for processing methods which limit the number of objects to synchronize with a condition.

**Table 54: Quotas for a Synchronization Step**

<table>
<thead>
<tr>
<th>Property</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>No quota</td>
<td>If this is set, quotas are not included.</td>
</tr>
<tr>
<td>Use these</td>
<td>Specify which processing methods include a quota. Enter the quota in</td>
</tr>
</tbody>
</table>
One Identity Manager specifies quotas for synchronization in the target system in workflows created with the workflow wizard, by default. These quotas can be changed later.

<table>
<thead>
<tr>
<th>Processing Method</th>
<th>Quota</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update</td>
<td>75 %</td>
</tr>
<tr>
<td>Delete</td>
<td>10 %</td>
</tr>
</tbody>
</table>

**Rule filters**

You can specify which Property mapping rules must be applied to each synchronization step. For example, dependencies between schema class objects can be resolved this way.

Included rules: Select the property mapping rule to be applied during synchronization.

Excluded rules: Select the property mapping rules which should not be applied during synchronization.

**NOTE:** Unmarked rules are included automatically.

**Detailed information about this topic**

- How does dependency resolution work? on page 39

**Extended synchronization step properties**

You can optimize memory usage for processing synchronization step data on the Extended tab.

**Table 55: Extended Synchronization Step Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance/memory factor</td>
<td>This controls the behavior of memory and performance in the synchronization step. If more memory is available, you can change the performance/memory factor in favor of performance. Reduce the performance/memory factor if there are memory problems. The performance/memory factor specifies the percentage with which the reload threshold, partition size and bulk level are...</td>
</tr>
</tbody>
</table>
### Property | Description
---|---
| | applied to an object type. Use the slider to set the performance/memory factor.
| | • Move the slider to the right to increase performance. This requires more memory.
| | • Move the slider to the left to reduce the memory requirement. This also reduces the performance.

**Reload threshold**

Specifies the maximum number of properties that can be loaded by synchronization to prevent partitioned reloading. You can increase this value to accelerate synchronization of target systems with small mappings. However, more memory is required.

The default value for all data to be processed is fixed in the start up configuration. It can be specified separately for every synchronization step.

**To specify the threshold for a synchronization step**

1. Disable **Use start up configuration settings**.
2. Change the preset reload threshold.

**TIP:** You can adjust the memory requirements for all the data to be processed in the start-up configuration. You can set the reload threshold, partition size and bulk level here. These setting are only possible in expert mode. For more information, see *Extended properties for start up configuration* on page 139.

### Detailed information about this topic

- Performance and memory optimization on page 56

### Show execution plan

The execution plan shows all synchronization steps of a workflow in the order in which they will be executed. Dependencies between schema classes are resolved. Thus, additional synchronization steps that are added automatically are also displayed.

**To display a workflow execution plan**

1. Select the category **Workflows**.
2. Select a workflow in the navigation view.
3. Click 📊 in the workflow view.
   - The execution plan is displayed as a report. You can save the report.
Connecting systems

You connect to the One Identity Manager database when you log into the Synchronization Editor. You connect to the target system with the project wizard. The system connection is automatically set up once One Identity Manager accesses the target system. The icon 🔄 is displayed in the Synchronization Editor status bar if a target system is connected.

Other system connection properties are saved in the synchronization project. You can edit these properties in Synchronization Editor.

How to edit system connection properties

To edit database connection properties.

1. Select the category Configuration | One Identity Manager connection.
   The sections General, Scope, Connection parameters and Schema classes are displayed in the document view with the database connection properties.
2. To edit general properties of the database connection, select the General view and click Setup....

To edit target system connection properties

1. Select the category Configuration | Target systems.
   The sections General, Scope, Connection parameters and Schema classes are displayed in the document view with the target system connection properties.
2. To edit general properties of the target system connection, select the General view and click Setup....

System connection properties

The following information about system connections is mapped.
Table 56: System Connection Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System connection</td>
<td>Default display value for the system connection.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> If the connection parameters of the connected system differ from the loaded schema, the schema's display name is also displayed. In this case, the schema must be updated before the synchronization project can be used.</td>
</tr>
<tr>
<td>Setup...</td>
<td>Opens a dialog box for editing the system connection's general properties and configuring the contents of the synchronization log.</td>
</tr>
<tr>
<td>☑️ Updating Schemas</td>
<td>Updates the schema. The synchronization project is saved before the schema is updated. This allows the existing schema to be reloaded if an error occurs during update.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The synchronization is deactivated if the schema of an activated synchronization project is updated. Reactivate the synchronization project to synchronize.</td>
</tr>
<tr>
<td>☑️ Shrink schema...</td>
<td>All schema types of the respective schema, which cannot be used in the synchronization project, are deleted from it. You can select schema type to be retained even though they are not used.</td>
</tr>
<tr>
<td>☐️ Browse...</td>
<td>Start the Target System Browser. Use the target system browser to view the target system data/One Identity Manager database. You can add, change and delete system objects. You can test virtual schema properties.</td>
</tr>
<tr>
<td></td>
<td>The variable set selected in the Synchronization Editor's toolbar is used to connect to the target system.</td>
</tr>
<tr>
<td>☐️ Edit connection...</td>
<td>Starts the system connection wizard. The system connection wizard allows you to edit the connection parameters of the current system connection, for example, if the synchronization server has changed.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Certain connection parameters correspond with the loaded schema. If these connection parameters are changed, the schema must be updated in the synchronization project so that synchronization can be configured and run successfully. This is necessary, for example, if the connection to another One Identity Manager database is established that has a different schema to the connection database.</td>
</tr>
<tr>
<td></td>
<td>• Click Update schema before continuing to edit the synchronization project.</td>
</tr>
<tr>
<td>Connection</td>
<td>Lists all connection parameters. You can define connection parameter</td>
</tr>
</tbody>
</table>
### Property Description

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>parameter</td>
<td>values as variables in order to use one synchronization configuration for synchronizing different target systems.</td>
</tr>
<tr>
<td>Scope</td>
<td>Specifies whether a scope is defined. You can edit the scope.</td>
</tr>
<tr>
<td>Schema Classes</td>
<td>All schema classes are listed in groups of schema types.</td>
</tr>
<tr>
<td>Schema Browser</td>
<td>This displays the target system schema with all its schema types and their properties. The schema browser is only available in expert mode.</td>
</tr>
</tbody>
</table>

### Table 57: General Properties of a System Connection

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schema</td>
<td>Name of the schema.</td>
</tr>
<tr>
<td>Display name</td>
<td>Schema display name.</td>
</tr>
<tr>
<td>Connection is read-only</td>
<td>If this option is set, the system connector only has read access to the target system. Write operations are not executed, only logged. Changes to objects in the One Identity Manager database are not provisioned in the target system.</td>
</tr>
<tr>
<td>Retry count</td>
<td>Number of attempts at establishing the connection.</td>
</tr>
<tr>
<td>Delay between retries</td>
<td>Time delay between retry attempts.</td>
</tr>
<tr>
<td>Create synchronization log</td>
<td>Specifies whether a synchronization log with detailed information about the synchronization object is created.</td>
</tr>
<tr>
<td>Data to log</td>
<td>Data to be recorded in the synchronization log.</td>
</tr>
</tbody>
</table>

### Detailed information about this topic

- Activating the synchronization project on page 121
- Using variables and variable sets on page 104
- Editing the scope on page 100
- Configuring the synchronization log on page 100
- Overview of schema classes on page 118
Configuring the synchronization log

### Table 58: Configuration Parameters for Configuring Synchronization Logs

<table>
<thead>
<tr>
<th>Configuration parameter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPR\Journal\LifeTime</td>
<td>This configuration parameter specifies the synchronization log’s retention period (in days). Use the configuration sub parameters to specify the retention period for each warning level. Older logs are deleted from the database.</td>
</tr>
</tbody>
</table>

All the information, tips, warnings, and errors that occur during synchronization are recorded in the synchronization log. You can configure the type of information to record separately for each system connection.

**To configure the content of the synchronization log**

1. Edit the system connection properties.
   
   For more information, see [How to edit system connection properties](#) on page 97.

2. To configure the synchronization log for target system connection, select the category **Configuration | Target system** in Synchronization Editor.

   - **OR** -

   To configure the synchronization log for the database connection, select **Configuration | Synchronization Editor connection** in One Identity Manager.

3. Select the **General** view and click **Configure**.

4. Select the **Synchronization log** view and set **Create synchronization log**.

5. Enable the data to be logged.

   **NOTE:** Some content generates a particularly large volume of log data! The synchronization log should only contain data required for error analysis and other analyses.

6. Click **OK**.

Synchronization logs are stored for a fixed length of time.

**To modify the retention period for synchronization logs**

- In Designer, enable the **DPR | Journal | LifeTime** configuration parameter and enter the maximum retention period.

### Editing the scope

In the general scope, you can specify system objects to be handled by synchronization. This allows you to limit the number of objects to synchronize. If no general scope is
defined, all objects in the connected system are synchronized.

In the reference scope, you define which system objects are loaded for the reference resolution. If no reference scope is defined, the general scope is also used for the reference resolution.

**TIP:** If a general scope is defined, but you want all system objects of a target system type to be available, create an empty reference scope. To do this, simply enter the display name of the reference scope. This means that no scope is calculated in the reference resolution.

If the synchronization project was creating using a default project template, a scope is defined. You may edit this scope. A scope is not define if the synchronization project was created without a project template.

**NOTE:** To avoid data inconsistencies, define the same scope in both of the connected systems.

**Detailed information about this topic**

- What is a scope? on page 36
- What are filters? on page 33
- Scope properties on page 102

**How to edit a scope**

**To edit the scope**

1. Edit the system connection properties.
   
   For more information, see How to edit system connection properties on page 97.
2. Select the **Scope** view.
3. Click **Edit scope**.

**To edit the reference scope**

1. Edit the system connection properties.
   
   For more information, see How to edit system connection properties on page 97.
2. Select the **Scope** view.
3. Click **Edit reference scope**.
How to delete a scope

To delete the scope or scope reference.

1. Edit the system connection properties.
   For more information, see How to edit system connection properties on page 97.
2. Select the Scope view.
3. Click Delete.

Scope properties

Enter the following properties for a scope. Set a filter for the target system whose object are referenced from the connection system. For more information, see What is a scope? on page 36.

Table 59: Scope Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schema</td>
<td>Display name for the schema to which the scope will be applied.</td>
</tr>
<tr>
<td>Name</td>
<td>Scope display name. The name must be unique within a synchronization project.</td>
</tr>
<tr>
<td>Scope hierarchy</td>
<td>List of all schema types for the selected schema. To filter the list, click ✔.</td>
</tr>
<tr>
<td></td>
<td>Show all object types</td>
</tr>
<tr>
<td></td>
<td>Only show hierarchically structured object types</td>
</tr>
<tr>
<td></td>
<td>All object types of the schema are displayed.</td>
</tr>
<tr>
<td></td>
<td>Only the object types of the schema that form a hierarchical structure are displayed.</td>
</tr>
<tr>
<td>Is filtered?</td>
<td>All schema types with a filter are marked.</td>
</tr>
<tr>
<td>✔</td>
<td>A filter is defined and effective.</td>
</tr>
<tr>
<td>✔</td>
<td>A filter is effective.</td>
</tr>
</tbody>
</table>
### Property | Description
--- | ---
Condition | Specify the filter condition for the scope. Select an object type in the scope hierarchy for this.  

**System filter**  
Filter that immediately affects the connection system.  
Enter the filter in system specific notation, for example, as Where clause for a database system or as LDAP filter for an LDAP system.  
This filter is only effective when loading the system objects.  

**Object filter**  
Filter that affects loaded objects.  

Condition | Formulate a query for loaded objects. Use the wizard for entering filter.  

Script | You can also store a script which determines system objects. The script must be written in the script language specified in the synchronization project.  

**Hierarchy filter**  
Filter created on the bases of existing system objects. This filter limits the number of objects to load in the connected system.  
This filter is only available for individual target systems.  
For more information, see Creating hierarchy filters on page 103.

## Related topics
- Support for writing scripts on page 19

## Creating hierarchy filters

Certain target systems support the definition of a scope based on the hierarchy of existing target system objects. The hierarchy filter limits the number of objects to load in the connected system. The hierarchy filter can only be applied to objects and not to their schema properties.

The objects are displayed in their hierarchical structure on the right-hand side of the scope view. The Synchronization Editor establishes a connection to the target system to do this, using the variable set selected in the Synchronization Editor's toolbar.

### To create a hierarchy filter
- Mark all the objects in this hierarchy which are included in the scope.  
  All unmarked objects remain outside the scope.
If you enable the hierarchy’s root note, new objects within the hierarchy are included by the scope. If the root node is disabled, only the marked objects are within the scope. New objects are not synchronized.

**NOTE:** Create an additional object filter to include schema properties as criteria in the scope definition.

A fully defined hierarchy filter can be transformed into a variable. Thus the filter can be redefined in a specialized variable set and used for other synchronization configurations.

**To convert a variable into a hierarchy filter**

1. Click **Convert into a variable**.
2. Confirm the security prompt with **Yes**.

The hierarchy filter is saved as variable. To change the filter, edit the variable.

**Related topics**

- What is a scope? on page 36
- Editing the scope on page 100
- Using variables and variable sets on page 104

**Using variables and variable sets**

You can use variables to create generally applicable synchronization configurations that contain the necessary information about the synchronization objects when synchronization starts. For example, you can use variables in the target system connection to synchronize different Active Directory domains with the same synchronization project.

Variables can be used in the following Synchronization Editor definitions.

- System connections in parameters
- Scopes in the filter
- Schema classes in the filter
- Schema properties as defined value
- Property mapping rules in the condition
- Processing methods in the condition
- Base objects in the definition

Variable sets are added for different instances of the variables. Each synchronization project has a default variable set, which has all the variables with a default value. The start up configuration contains a link to the variable set in use. If no variable set is given, the default variable set is used.
A default variable set is defined if the synchronization project was creating using a default project template. You can add variables to this variable set. If the synchronization project was created without a project template, no variable sets are set up.

Create a specialized variable set to use variables with other values. You can change the values of the variables individually. Assign the specialized variable set to a start up configuration in order to use it.

The default variable set contains all variables that are required in the synchronization project. New variables are created in the default variable set. They are automatically added to all specialized variable sets, with their default values. A variable's value can also be found with a script, for example, for reading a system user's password from an external password management system.

Table 60: Meaning of icons in the variable set tool bar

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✏️</td>
<td>Add a variable/variable set.</td>
</tr>
<tr>
<td>✏️</td>
<td>Delete variable/variable set.</td>
</tr>
<tr>
<td>🔥</td>
<td>Rename variable set.</td>
</tr>
<tr>
<td>🕵️‍♂️</td>
<td>Convert variable to script.</td>
</tr>
<tr>
<td>🕵️‍♂️</td>
<td>Convert script variable to a plain variable.</td>
</tr>
<tr>
<td>🕵️</td>
<td>Display variable usage.</td>
</tr>
<tr>
<td>🕵️</td>
<td>Default value for restoring the selected variable.</td>
</tr>
</tbody>
</table>

How to create variables

To create a variable in the default variable set

1. Select the category Configuration | Variables.
   The default variable set is displayed with all available variables in the upper part of the document view.

2. Click ✏️ in the upper view's toolbar.

3. Edit the variable’s properties.

4. Save the changes.

To create variables from connection parameters

1. Edit the system connection properties.
   For more information, see How to edit system connection properties on page 97.

2. Open the Connection parameters view.
3. Select the parameter whose value should be converted and click **Convert**.
   This button is not available if the parameter has already been converted into a variable. The variable name is displayed instead.

4. Save the changes.

**Related topics**
- Using scripts in variables on page 108

**How to edit variables**

**NOTE:** Variable labeled as system variables cannot be modified.

**To edit a variable in the default variable set**

1. Select the category **Configuration | Variables**.
   The default variable set is displayed with all available variables in the upper part of the document view.

2. Select a variable in the default variable set.

3. Edit the variable's properties.

4. Save the changes.

**To edit a variable in the specialized variable set**

1. Select the category **Configuration | Variables**.
   All specialized variable sets are shown in the lower part of the document view.

2. Open a specialized variable set in the variable set view.

3. Select a variable and enter a new value.

4. Save the changes.

**How to delete variables**

**To delete a variable in the default variable set**

1. Select the category **Configuration | Variables**.
   The default variable set is displayed with all available variables in the upper part of the document view.

2. Click in the upper view's toolbar.
How to create specialized variable sets

To create a specialized variable set

1. Select the category Configuration | Variables.
   All specialized variable sets are shown in the lower part of the document view.
2. Click 📊 in the variable set view toolbar.
3. Click 🏷️ in the variable set toolbar to rename the variable set and enter the new name.
4. Select a variable and enter a new value.
   Edit all the variable values which take on another characteristic.
5. Save the changes.

How to delete specialized variable sets

To delete a specialized variable set

1. Select the category Configuration | Variables.
   All specialized variable sets are shown in the lower part of the document view.
2. Select a specialized variable set in the variable set view.
3. Click 📊 in the variable set view toolbar.

Variable properties

ℹ️ **NOTE:** Variable labeled as system variables cannot be modified.

Enter the following properties for a variable in the default variable set.

**Table 61: Variable Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Variable name. The name must be unique within a variable set.</td>
</tr>
<tr>
<td>Display name</td>
<td>Display name of the variable.</td>
</tr>
<tr>
<td>Value</td>
<td>Default value of the variable.</td>
</tr>
<tr>
<td></td>
<td>• To display and edit the value of a hierarchy filter, click <strong>Edit</strong>.</td>
</tr>
<tr>
<td></td>
<td>• To display and edit the script of a script variable, click <strong>Edit</strong>.</td>
</tr>
<tr>
<td>Secret value</td>
<td>Specifies whether the variable in the Synchronization Editor may be</td>
</tr>
<tr>
<td>Property</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>displayed.</td>
</tr>
<tr>
<td></td>
<td>If this option is set, the value is not displayed.</td>
</tr>
</tbody>
</table>

**In use** Specifies whether the variable is used in a Synchronization Editor function.

**Description** Spare text box for additional explanation.

**To show all definition used in a variable set**

1. Select a variable in the default variable set.
2. Click in the toolbar.

**To restore a variable’s default value in a specialized variable set**

1. Select a variable in the specialized variable set.
2. Click in the toolbar.

**Related topics**

- Using scripts in variables on page 108
- Creating hierarchy filters on page 103

**Using scripts in variables**

You can write scripts for finding variable values. You can use scripts, for example, for reading a system user's password from an external password management system.

**NOTE:** The option External password management must be set for a system user in order to use their password from an external password management system. For detailed information about editing system users, see the One Identity Manager Authorization and Authentication Guide.

**To create a script variable.**

1. Create the variable in the default variable set.
2. Select the variable and click in the toolbar.
3. In the Value input field, click Edit.
4. Enter the script and click OK.
5. Save the changes.

In this way, you can convert existing variables into script variables.
To convert script variables into simple variables.

1. Select the script variable in the default variable set.
2. Click in the toolbar.
3. Confirm the security prompt with Yes.

Related topics

- Verifying scripts on page 148

Setting up start up configurations

A start up configuration contains all the required properties and options for a tangible synchronization. This specifies which synchronization configuration components (workflows, mappings, variable sets) should be used for synchronization. Synchronization is started with a schedule. Different start up configurations can be set up for different synchronization targets.

If the synchronization project was creating using a default project template, a start up configuration is added. You can edit this start up configuration and create new start up configurations. If the synchronization project was created without a project template, start up configuration is set up.

How to create start up configurations

To create a start up configuration

1. Select the category Configuration | Start up configurations.
2. Click in the document view toolbar.
3. Edit the start up configuration's master data.
4. Click OK.

How to edit start up configurations

To edit a start up configuration

1. Select the category Configuration | Start up configurations.
2. Select a start up configuration in the document view and click Edit....
3. Edit the start up configuration's master data.
4. Click OK.
How to delete start up configurations

To delete a start up configuration

1. Select the category Configuration | Start up configurations.
2. Select a start up configuration in the document view.
3. Click Delete.
4. Confirm the security prompt with Yes.

Start up configuration properties

Enter the following general properties for a start up configuration.

Table 62: General Properties of a Start up Configuration

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display name</td>
<td>Name of the start up configuration.</td>
</tr>
<tr>
<td>Workflow</td>
<td>Workflow processed by this start up configuration.</td>
</tr>
<tr>
<td>Direction of synchronization</td>
<td>Direction in which synchronization will be executed.</td>
</tr>
<tr>
<td></td>
<td>Select a synchronization direction from the list if &quot;Defined by execution&quot;</td>
</tr>
<tr>
<td></td>
<td>and at least one synchronization step &quot;Use workflow default&quot; is saved with</td>
</tr>
<tr>
<td></td>
<td>the workflow. Otherwise the direction of the synchronization workflow or</td>
</tr>
<tr>
<td></td>
<td>synchronization step is used for synchronization.</td>
</tr>
<tr>
<td>To the target system</td>
<td>One Identity Manager is the master system for synchronization.</td>
</tr>
<tr>
<td>To the One Identity Manager</td>
<td>The target system is the master system for synchronization.</td>
</tr>
<tr>
<td>Revision filtering</td>
<td>The revision filtering can be used to limit synchronization to just the</td>
</tr>
<tr>
<td></td>
<td>objects that have been modified since the last synchronization.</td>
</tr>
<tr>
<td></td>
<td>Select a value from the list if &quot;Defined by execution&quot; and at least one</td>
</tr>
<tr>
<td></td>
<td>synchronization step &quot;Use workflow default&quot; is saved with the workflow.</td>
</tr>
<tr>
<td></td>
<td>Otherwise the value of the workflow or synchronization step is used for</td>
</tr>
<tr>
<td></td>
<td>synchronization.</td>
</tr>
<tr>
<td></td>
<td>Use revision filter</td>
</tr>
<tr>
<td></td>
<td>Only modified object are synchronized.</td>
</tr>
<tr>
<td></td>
<td>Do not use revision filter</td>
</tr>
<tr>
<td></td>
<td>All objects are synchronized.</td>
</tr>
<tr>
<td>Schedule</td>
<td>Schedule for starting synchronization.</td>
</tr>
</tbody>
</table>
Property | Description
--- | ---
Variable set | Assign the variable set with which to run synchronization. If no variable set is given, the default variable is used. If a specialized variable set is assigned, a list of all variables with their values is displayed. If changes are provisioned from One Identity Manager to the target system, each start up configuration must have a corresponding base object that uses the same variable set.

Description | Spare text box for additional explanation.

**Detailed information about this topic**
- Direction of synchronization and mapping on page 43
- How does revision filtering work? on page 37
- Using variables and variable sets on page 104
- Setting up synchronization workflows on page 82
- Specifying a schedule on page 113

### Grouping

**Table 63: Configuration parameters for the delayed start of further synchronizations**

<table>
<thead>
<tr>
<th>Configuration parameter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>This configuration parameter specifies the wait time (latency) in minutes before the Job server attempts to execute a process step again.</td>
</tr>
<tr>
<td>Jobservice</td>
<td></td>
</tr>
<tr>
<td>RedoDelayMinutes</td>
<td></td>
</tr>
</tbody>
</table>

You can group start up configurations logically on the **Grouping** tab. If you have several start up configurations, you can group them together. Specify the start up behavior for each group. The same start up behavior applies to all start up configurations belonging to the same group.

**Table 64: Grouping Start up Configurations**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Name of the group.</td>
</tr>
<tr>
<td></td>
<td>- To create a new group, enter a name.</td>
</tr>
<tr>
<td></td>
<td>- OR -</td>
</tr>
</tbody>
</table>
### Property Description

- Select an existing group from the menu.

**Concurrence behavior**

One Identity Manager behavior if multiple start up configurations are executed simultaneously.

- **Ignore**
  
  Multiple synchronization can be executed simultaneously.

  **NOTE:** This behavior can cause synchronization errors or loss of data.

  Plan your start times carefully. If possible, specify your start times so that synchronization does not overlap.

- **Stop on error**
  
  If synchronization is already running, each new synchronization attempt breaks off with an error. Check the One Identity Manager Service log file for this.

- **Postpone and wait**
  
  If synchronization is already running, the each new synchronization is postponed until the first one has finished. You can adjust the wait time using the configuration parameter `Common | Jobservice | RedoDelayMinutes`.

  This configuration parameter specifies the wait time in minutes before the Job server attempts to start synchronization again. If the first synchronization is still running, the start of a further synchronization is delayed for the specified length of time. This configuration parameter is only effective on grouped start up configurations whose concurrence behavior is configured with the option `Postpone and wait`. The default value is two minutes.

### Related topics

- Running synchronization on page 123

### Maintenance modes

You set the maintenance mode for start up configuration on the **Maintenance** tab. Here, you can specify how data can be maintained that could not be saved during synchronization. Object references, which have not (yet) been loaded are included in this (for example, cross-domain references). Complex hierarchies loaded through a CSV import might also have to be reworked because reference objects could not be assigned to them. Unresolvable object references are written to a synchronization buffer. The synchronization buffer is cleaned up by maintenance.
Table 65: Start up Configuration Maintenance Mode

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>Maintenance mode for cleaning up the synchronization buffer.</td>
</tr>
<tr>
<td>No maintenance</td>
<td>There is no additional task of clearing up the synchronization buffer.</td>
</tr>
<tr>
<td>Always synchronize affected objects</td>
<td>The filter is removed on objects with unresolved references.</td>
</tr>
<tr>
<td>Full maintenance after every synchronization</td>
<td>The One Identity Manager tries to resolve object references following synchronization.</td>
</tr>
<tr>
<td>Retries</td>
<td>Number of retries resolving an object reference. It may be necessary to try several times to resolve an object if it maps a hierarchy with several levels.</td>
</tr>
</tbody>
</table>

Detailed information about this topic
- Unresolvable references on page 41

Specifying a schedule

Synchronization is started using scheduled process plans. A scheduled process plan is added once a start up configuration is assigned to a schedule. Use schedules to define executing times for synchronization.

**NOTE:** Synchronization can only be started if the synchronization project is enabled.

**IMPORTANT:** As long as synchronization is running, you must not start another synchronization for the same target system. This applies especially, if the same synchronization objects would be processed.

If another synchronization is started with another start up configuration, that addresses same target system, it may lead to synchronization error or loss of data. Plan your start times carefully. If possible, specify your start times so that synchronization does not overlap.

To assign an existing schedule to a start up configuration

1. Select the category **Configuration | Start up configurations**.
2. Select a start up configuration in the document view and click **Edit**.
3. Select a schedule from the **Schedule** menu.
   - All active schedules assigned to the table JobAutoStart are available for selection.
4. Click **OK**.

One Identity Manager specifies a process plan when changes are committed to the One Identity Manager database. This process plan starts the synchronizing process.
NOTE: You can manage existing schedules with Designer. For detailed information, see the One Identity Manager Operational Guide.

How to set up schedules

To create a schedule

1. Select the category Configuration | Start up configurations.
2. Select a start up configuration in the document view and click Create schedule.
3. Edit the schedule properties.
4. Click OK.

One Identity Manager specifies a process plan when changes are committed to the One Identity Manager database. This process plan starts the synchronizing process.

To edit a schedule

1. Open the synchronization project in the Synchronization Editor.
2. Select the category Configuration | Start up configurations.
3. Select a start up configuration in the document view and click Edit schedule.
4. Edit the schedule properties.
5. To enable the schedule, click Activate.
6. Click OK.

Related topics

- Properties of a schedule on page 114

Properties of a schedule

Enter the following properties for a schedule.

Table 66: Schedule properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Schedule ID. Translate the given text using the button.</td>
</tr>
<tr>
<td>Description</td>
<td>Detailed description of the schedule. Translate the given text using the button.</td>
</tr>
<tr>
<td>Enabled</td>
<td>Specifies whether the schedule is enabled or not.</td>
</tr>
<tr>
<td></td>
<td>NOTE: Only active schedules are run.</td>
</tr>
<tr>
<td>Time zones</td>
<td>Unique identifier for the time zone that is used for running the schedule.</td>
</tr>
<tr>
<td>Property</td>
<td>Meaning</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Choose</td>
<td>Choose between <strong>Universal Time Code</strong> or one of the time zones in the menu.</td>
</tr>
<tr>
<td><strong>NOTE:</strong></td>
<td>When you add a new schedule, the time zone is preset to that of the client from which you started the Synchronization Editor.</td>
</tr>
<tr>
<td>Start (date)</td>
<td>The day on which the schedule should be run for the first time.</td>
</tr>
<tr>
<td>Validity period</td>
<td>Period within which the schedule is run.</td>
</tr>
<tr>
<td></td>
<td>• If the schedule will be run for an unlimited period, select the option <strong>Unlimited duration</strong>.</td>
</tr>
<tr>
<td></td>
<td>• To set a validity period, select the option <strong>Limited duration</strong> and enter the day the schedule will be run for the last time in <strong>End (date)</strong>.</td>
</tr>
<tr>
<td>Occurs</td>
<td>Interval in which the task is run. Permitted interval types are <strong>Hourly, Daily, Weekly, Monthly</strong> and <strong>Yearly</strong>.</td>
</tr>
<tr>
<td></td>
<td>For the <strong>Weekly</strong> interval type, specify the precise weekday. For the <strong>Monthly</strong> interval type, specify the day of the month (1st to 31st day of the month). For the <strong>Yearly</strong> interval type, specify the day of the year (1st to 366th day of the year).</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> If the schedule is not going to be run until next month because the interval type is <strong>Monthly</strong> with sub interval <strong>29, 30</strong> or <strong>31</strong>, the last day of the current month is used.</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>A schedule that is run on the 31st day of each month is run on 30th April. In February, the schedule is run on the 28th (or 29th in leap year).</td>
</tr>
<tr>
<td></td>
<td>Schedules with the interval type <strong>Yearly</strong> with sub interval <strong>366</strong> are only run in leap year.</td>
</tr>
<tr>
<td>Start time</td>
<td>Fixed start type for the <strong>Daily, Weekly, Monthly</strong> and <strong>Yearly</strong> interval types. Enter the time in local format for the chosen time zone.</td>
</tr>
<tr>
<td></td>
<td>For the interval type <strong>Hourly</strong>, the start time is calculated from the rate of occurrence and the interval type.</td>
</tr>
<tr>
<td>Repeat every</td>
<td>Rate of occurrence for running the schedule within the selected time interval. For the <strong>Weekly</strong> interval type, select at least one weekday.</td>
</tr>
</tbody>
</table>
Setting up base objects

Base objects contain data about the target system to be synchronized, its system connection and the synchronization server. Base objects form the basis for provisioning changes in the target system and synchronizing single objects. A base object is, for example, a specific Active Directory domain from the One Identity Manager database. The connection parameters for logging into a target system are assigned through a variable set. In addition, the synchronization server is declared in the base object.

Base objects are required for provisioning processes and single object synchronization of all target systems that are connected by default to the One Identity Manager. You cannot normally specify a specific base object for provisioning and synchronizing a single object with database connectors and the CSV connector. In this case, assignment of one base table and the synchronization server is sufficient. Only one synchronization project can be set up in the One Identity Manager database per base object.

If the synchronization project was creating using a default project template, a base object is added. You can edit this base object and create more base objects. If the synchronization project was created without a project template, no base object is set up.

NOTE: You cannot add base objects until the synchronization project has been permanently saved in the database.

How to create base objects

To add a base object using an existing database object

1. Select the category Configuration | Base objects.
2. Click in the document view toolbar.
3. Edit the base objects' master data.
4. Click OK.

If the base object does not yet exist in the One Identity Manager database, use the wizard to create a base object.

NOTE: The wizard is only available to target systems that are contained in One Identity Manager as default modules. The wizard cannot be used in synchronization projects with the CSV connector or the native database connector.

To add a base object using a wizard

1. Select the category Configuration | Base objects.
2. Click in the document view toolbar.
3. On the welcome page, click Next.
4. Specify how One Identity Manager can access the target system on the System access page.
If access is possible from the workstation on which you started Synchronization Editor, you do not need to make any settings.

If access is not possible from the workstation on which you started Synchronization Editor, you can set up a remote connection.

Enable the **Connect using remote connection server** option and select the server to be used for the connection under **Job server**.

5. Select the system connection for the new base object on the **Create system connection** page.

Follow the system connection wizard instructions. For detailed information about which connection parameter you required, see the administration guide for the respective system.

6. On the **Synchronization server** page, select the synchronization server to execute synchronization.

If the synchronization server is not declared as a Job server in the One Identity Manager database yet, you can add a new Job server.

   - Click 📊 to add a new Job server.
   - Enter a name for the Job server and the full server name conforming to DNS syntax.
   - Click **OK**.

The synchronization server is declared as Job server for the target system in the One Identity Manager database.

   **NOTE:** After you save the synchronization project, ensure that this server is set up as a synchronization server.

7. Click **Finish** to complete the wizard.

The wizard creates a variable set with the given connection parameters. It creates the synchronization base object, for example, the actual Active Directory domain you want to synchronize, as an object in the One Identity Manager database.

## How to edit base objects

**To edit a base object**

1. Select the category **Configuration | Base objects**.
2. Select a base object in the document view and click 📊.
3. Edit the base object’s master data.
4. Click **OK**.
How to delete base objects

To delete a base object

1. Select the category Configuration | Base objects.
2. Select a base object in the document view and click .
3. Confirm the security prompt with Yes.

Properties of base objects

Enter the following properties for a base object.

Table 67: Properties of Base Objects

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronization has no base object</td>
<td>Defines whether a specific base object is required for synchronization. If this option is set, a specific object cannot be selected from the base table.</td>
</tr>
<tr>
<td>Base table</td>
<td>Select the table from which to select the base object, for example, ADSDomain.</td>
</tr>
<tr>
<td>Base object</td>
<td>Select the object from the base table formed by the base object for synchronization and provisioning processes.</td>
</tr>
<tr>
<td>Synchronization server</td>
<td>Select the synchronization server.</td>
</tr>
<tr>
<td>Variable set</td>
<td>Select the variable set that contains the connection parameter which corresponds with the base object. Variables from selected variable sets are displayed. For each base objects there must be a start up configuration, which uses the same variable set.</td>
</tr>
</tbody>
</table>

Overview of schema classes

Synchronization Editor displays a schema overview for each system connection. The schema overview contains all schema types and the derived schema classes used in the synchronization project. You can edit schema classes here.
To display the schema overview

1. Edit the system connection properties.
   For more information, see How to edit system connection properties on page 97.
2. Open the Schema classes view.
   This displays the schema type and schema class structures.

How to add schema classes

To create a schema class

1. Edit the system connection properties.
   For more information, see How to edit system connection properties on page 97.
2. Open the Schema classes view.
3. Click in the schema overview menu bar.
4. Edit the schema class properties.
   For more information, see Schema class properties on page 70.
5. Save the changes.

To create a new mapping for a schema class

1. Create a new mapping.
   For more information, see How to create a mapping on page 67.
2. Select One Identity Manager schema class or Target system schema class.
3. Click .
4. Edit the schema class properties.
   For more information, see Schema class properties on page 70.
5. Save the changes.

How to edit schema classes

NOTE:

- You can only edit customized schema classes.
- Modifications to schema classes in use can cause errors!
**To edit a schema class**

1. Edit the system connection properties.
   For more information, see [How to edit system connection properties](#) on page 97.
2. Open the **Schema classes** view.
3. Double-click on a schema class in the schema overview.
4. Edit the schema class properties.
   For more information, see [Schema class properties](#) on page 70.
5. Save the changes.

**How to delete schema classes**

**NOTE:** Custom schema classes, which are not in use, can be deleted.

**To delete a schema class**

1. Remove the schema class from all mappings in which they are used.
   For more information, see [How to edit a mapping](#) on page 67.
2. Edit the system connection properties.
   For more information, see [How to edit system connection properties](#) on page 97.
3. Open the **Schema classes** view.
4. Select the schema class in the schema overview and click ![schema class](#) in the toolbar.
   If the schema class is still in use, the location is displayed.
5. Confirm the security prompt with **Yes**.

**TIP:** Compress the schema to remove unnecessary schema classes from the target schema or the One Identity Manager schema from the synchronization project. For more information, see [How to remove unnecessary project data](#) on page 51.

**Customizing synchronization configuration**

Use the project wizard to set up a synchronization project for initial synchronization of a target system. You can use this synchronization project to load target system objects into the One Identity Manager database. These objects can be edited with One Identity Manager tools. You must customize synchronization configuration in order to compare the database with the target system regularly and to synchronize changes. You can configure a synchronization project such that the necessary information about the direction of
synchronization, objects to synchronize and the property mapping rules to be applied, is made available when synchronization starts.

Edit the target system connection scope and the One Identity Manager database connection to specify which target system and database object are handled by synchronization. To prevent data inconsistencies, define the same scope in both systems. If no scope is defined, all objects will be synchronized.

You can use variables to create generally applicable synchronization configurations that contain the necessary information about the synchronization objects when synchronization starts. Variables can be implemented in base objects, schema classes, or processing methods, for example.

Use variables to set up a synchronization project which can be used for several different target systems. For this, connection parameters for logging onto target systems are stored as variables.

Checking the consistency of the synchronization configuration

Before activating a synchronization project, check the consistency of the synchronization configuration. The consistency check detects configuration errors which would lead to errors during synchronization. The synchronization project cannot be activated until the configuration error are corrected.

The consistency check amongst others whether:

- All mandatory properties are mapped through property mapping rules.
- Dependencies can be automatically resolved in workflows.
- Different schema classes of a schema type are differentiated from one another by filters.

To check consistency the loaded synchronization project

1. Select General on the start page.
2. Click on Verify project.

Activating the synchronization project

Once you have collected all the data in the synchronization project you require for synchronizing from the One Identity Manager database to a target system, you must activate the project. This optimizes the size of the synchronization project. Data is removed which is not required, for example, unused schema types. Synchronization can be run after activating.

TIP: To prevent synchronization errors, run a consistency check before activating.
Table 68: Meaning of Icons on the Start Page

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔒</td>
<td>The synchronization project is activated.</td>
</tr>
<tr>
<td>🔒</td>
<td>The synchronization project is deactivated.</td>
</tr>
</tbody>
</table>

**To activate the loaded synchronization project**

1. Select General on the start page.
2. Click Activate project.

An activated synchronization project can only be edited to a limited extent. The schema in the synchronization project must be updated if schema modifications are required. The synchronization project is deactivated in this case and can be edited again.

Furthermore, the synchronization project must be deactivated if synchronization should not be started by any means (not even manually).

**To deactivate the synchronization project**

1. Open the synchronization project in the Synchronization Editor.
2. Select General on the start page.
3. Click Deactivate project.

**Related topics**

- Checking the consistency of the synchronization configuration on page 121
- System connection properties on page 97
- How to remove unnecessary project data on page 51
- Updating schemas on page 52
Running synchronization

Synchronization is started using scheduled process plans. It is possible to start synchronization manually in the Synchronization Editor. You can simulate synchronization beforehand to estimate synchronization results and discover errors in the synchronization configuration. If synchronization was terminated unexpectedly, you must reset the start information to be able to restart synchronization.

**IMPORTANT:** As long as synchronization is running, you must not start another synchronization for the same target system. This applies especially, if the same synchronization objects would be processed.

- If another synchronization is started with the same start up configuration, this process is stop and is assigned the **Frozen** execution status. An error message is written to the One Identity Manager Service log file.
- If another synchronization is started with another start up configuration, that addresses same target system, it may lead to synchronization error or loss of data. Specify One Identity Manager behavior in this case, in the start up configuration.
  - Use the schedule to ensure that the start up configurations are executed in sequence.
  - Group start up configurations with the same start up behavior.

**To start synchronization manually**

1. Open the synchronization project in the Synchronization Editor.
2. Select the category **Configuration | Start up configurations**.
3. Select a start up configuration in the document view and click **Execute**.
4. Confirm the security prompt with **Yes**.

**Detailed information about this topic**

- Simulating synchronization on page 124
- Handling unexpected termination of synchronization on page 124
- Grouping on page 111
Simulating synchronization

You can simulate synchronization before using a start up configuration to execute it. The simulation allows you to estimate the result of synchronization. This means you can, for example, recognize potential errors in the synchronization configuration. Reactions from the connected system and its consequences cannot be incorporated because simulation cannot modify data.

Simulation executes the following actions:

- Creates execution plan
- Connects to the target system and One Identity Manager database
- Loads system objects
- Logs write operations but do not execute

Dependent object and schema properties cannot be resolved if the objects already exist in the connected system. Unresolvable dependencies are logged.

**IMPORTANT:** Simulation changes data in neither One Identity Manager nor the target system. However, large amounts of data are read from both systems. This can affect system performance and processing.

To start simulation

1. Select the category Configuration | Start up configurations.
2. Select a start up configuration in the document view and click Simulate....
3. Specify missing properties.
4. Click Start simulation.
5. Confirm the security prompt with Yes.

A report is displayed after simulation has completed. You can save the report.

Handling unexpected termination of synchronization

If synchronization is executed with a start up configuration, some One Identity Manager processes are stopped. It is not possible to start this start up configuration again. The One Identity Manager saves start information of the current synchronization in the database. This start information is reset once synchronization is completely normally.

If synchronization was terminated unexpectedly, for example, a server was no available, you must manually reset the start information. You can only restart synchronization after this.
IMPORTANT: Start information may not be reset if synchronization is running normally. Before you reset the start information, ensure that synchronization has really been aborted.

To reset synchronization start information

1. Select the category Configuration | Start up configurations.
2. Select a start up configuration in the document view and click Reset.
3. Confirm the security prompt with Yes.

   The status "Broken" is entered in the synchronization log.

NOTE: If necessary, start information can be reset automatically. To do this, customize the process DPR_DPRProjectionStartInfo_Run_Synchronization. Changes made to the process are applied to all target systems connected to the One Identity Manager database when synchronization takes place.

Resetting revisions

Synchronization with revision filtering involves finding object pairs where one has newer change information than the last time it was synchronized. It may also be necessary to process those objects during synchronization, whose change information has not been updated since the last synchronization. This might be required if changes to data were made without the change information for the object being updated, for example. It is possible that data in one of the connected systems was restored from a backup. This means the change information for the objects is now older than before the last synchronization. Such objects are not processed by synchronization with revision filtering.

One Identity Manager provides an option to reset revision numbers in a start up configuration. The revision can be reset for one schema type or for all of a schema's types. The next time synchronization is run with this start up configuration, all affected objects are seen as changed.

To reset the revision number

1. Select the category Configuration | Start up configurations.
2. Select a start up-configuration in the document view and click Revisions...
   This opens the Manage revisions dialog window. which displays all the schema types with their respective revision numbers. Schema types without a revision number, are not displayed.
3. Select the schema for which you want to reset the revision number.
   - OR -
   From the target system schema or the One Identity Manager schema, select the schema type for which you want to reset the revision.
4. Click **Reset**.
5. Select another schema type if required.
6. Click **Apply**.
7. Confirm the security prompt with **Yes**.
   The revisions of the selected schema types are deleted from the start up configuration.

**Related topics**

- How does revision filtering work? on page 37
Synchronization analysis

Synchronization results are summarized in the synchronization log. You can specify the extent of the synchronization log for each system connection individually. One Identity Manager provides several reports in which the synchronization results are organized under different criteria.

Toolbars in the log view

The navigation view in the Logs category has its own toolbar.

Table 69: Meaning of Icons in the Navigation View

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔁</td>
<td>Reload the data.</td>
</tr>
<tr>
<td>⏳</td>
<td>Display synchronization log.</td>
</tr>
<tr>
<td>☢</td>
<td>Display provisioning log.</td>
</tr>
<tr>
<td>⏳</td>
<td>Only display most recent logs. This display logs from within the past 24 hours.</td>
</tr>
<tr>
<td>⏳️</td>
<td>Sort by execution time.</td>
</tr>
<tr>
<td>⏳️️</td>
<td>Sort by execution status.</td>
</tr>
</tbody>
</table>

How to display synchronization logs

To display a synchronization log

1. Open the synchronization project in the Synchronization Editor.
2. Select Logs.
3. Click
in the navigation view toolbar.
Logs for all completed synchronization runs are displayed in the navigation view.

4. Select a log by double-clicking on it.
An analysis of the synchronization is shown as a report. You can save the report.

To display a provisioning log.
1. Open the synchronization project in the Synchronization Editor.
2. Select Logs.
3. Click in the navigation view toolbar.
   Logs for all completed provisioning processes are displayed in the navigation view.
4. Select a log by double-clicking on it.
   An analysis of the provisioning is show as a report. You can save the report.

The log is marked in color in the navigation view. This mark shows you the execution status of the synchronization/provisioning.

Target system synchronization

Objects, which do not exist in the target system, can be marked as outstanding in One Identity Manager by synchronizing. This prevents objects being deleted because of an incorrect data situation or an incorrect synchronization configuration.

Outstanding objects

- Cannot be edited in One Identity Manager.
- Are ignored by subsequent synchronization.
- Are ignored by inheritance calculations.

This means, all memberships and assignments remain intact until the outstanding objects have been processed.

Start target system synchronization to do this.

To post-process outstanding objects

1. Start the Manager.
2. Select <target system type> | Target system synchronization: <target system type> | <table>.

   TIP:

   To display object properties of an outstanding object
   a. Select the object on the target system synchronization form.
   b. Open the context menu and click Show object.
3. Select the objects you want to rework. Multi-select is possible.

4. Click one of the following icons in the form toolbar to execute the respective method.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Delete icon]</td>
<td>Delete</td>
<td>The object is immediately deleted in the One Identity Manager database. Deferred deletion is not taken into account. The Outstanding label is removed for the object. Indirect memberships cannot be deleted.</td>
</tr>
</tbody>
</table>
| ![Publish icon] | Publish | The object is added in the target system. The Outstanding label is removed for the object. The method triggers the HandleOutstanding event. This runs a target system specific process that triggers the provisioning process for the object. Prerequisites:  
  - The table containing the object can be published.  
  - The target system connector has write access to the target system.  
  - A custom process is set up for provisioning the object. |
| ![Reset icon] | Reset | The Outstanding label is removed for the object. |

5. Confirm the security prompt with Yes.

**NOTE:** By default, the selected objects are processed in parallel, which speeds up execution of the selected method. If an error occurs during processing, the action is stopped and all changes are discarded. Bulk processing of objects must be disabled if errors are to be localized, which means the objects are processed sequentially. Failed objects are named in the error message. All changes that were made up until the error occurred are saved.

**To disable bulk processing**

- Deactivate in the form toolbar.

For more detailed information about post-processing outstanding objects from connected target systems, see the target system connection guides.

### Deleting memberships

Membership of user accounts in groups, for example, can result from direct assignment or through inheritance in One Identity Manager. The membership's origin is stored in the assignment table XOrigin. Inherited memberships cannot be deleted as long as the...
inheritance source still exists. If inherited memberships are deleted in the target system, they are marked as outstanding by synchronization, depending on which processing method was selected.

You can differentiate between the following cases of deleting membership through synchronization:

**Table 71: Deleting Memberships**

<table>
<thead>
<tr>
<th>Membership Origin</th>
<th>Method Delete</th>
<th>Method MarkAsOutstanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only direct</td>
<td>The membership is deleted immediately by synchronization.</td>
<td>The membership is marked as outstanding by synchronization.</td>
</tr>
<tr>
<td>Only inherited</td>
<td>The membership is marked as outstanding by synchronization.</td>
<td>The membership is marked as outstanding by synchronization.</td>
</tr>
<tr>
<td>Direct and inherited</td>
<td>The membership is marked as outstanding by synchronization. The reference to direct assignment is removed (column value XOrigin is updated).</td>
<td>The membership is marked as outstanding by synchronization.</td>
</tr>
</tbody>
</table>

Outstanding memberships must be post-processed separately. You can publish these memberships if the inheritance source still exists or you set the status back and remove the inheritance source.

**Example**

Ben King has an Active Directory user account that is a member of the Active Directory group "Backup operators". This membership is loaded into the One Identity Manager database by initial synchronization and saved as direct membership in the table ADSAccountInADSGroup (XOrigin = '1'). Ben King is member of the business role "Project A". This business role is assigned to the Active Directory group "Backup operators". Therefore, Ben King becomes an indirect member of this Active Directory group (ADSAccountInADSGroup.XOrigin = '3'). The group membership is deleted in the target system. The deleted membership is immediately deleted in the One Identity Manager database the next time synchronization is run (ADSAccountInADSGroup.XOrigin = '2'). The membership is marked as outstanding because it remains in the One Identity Manager database due to inheritance. The outstanding membership must be post-processed in target system synchronization. There are two possible ways to do this:

a. Assignments to the business role "Project A" are correct.

   The method "Publish" is applied. Membership is re-added to the target system.
b. Mapping in the target system is correct.
   - The method "Reset status" is applied.
   - The assignment of the Active Directory group to the business role "Project A", or Ben King's membership of this business role must be deleted. The group membership must also be deleted from table ADSAccountInADSGroup.

The method "Delete" cannot be applied.

**Related topics**

- Deleting objects in One Identity Manager on page 49
- Target system synchronization on page 128

**Help for the analysis of synchronization issues**

You can generate a report for analyzing problems which occur during synchronization, for example, insufficient performance. The report contains information such as:

- Consistency check results
- Revision filter settings
- Scope applied
- Analysis of the synchronization buffer
- Object access times in the One Identity Manager database and in the target system

**To generate a synchronization analysis report**

1. Select the menu Help | Generate synchronization analysis report and answer the security prompt with Yes.
   The report may take a few minutes to generate. It is displayed in a separate window.
2. Print the report or save it in one of the available output formats.
Setting up synchronization with default connectors

One Identity Manager provides connectors for synchronizing with the following target systems:

- **Native supported target systems**
  Separate modules are provided for mapping and processing target system objects. Each target system has its own connector. This includes, for example, the following target systems:
    - Active Directory
    - SharePoint
    - SAP R/3
  Connectors for natively supported target systems are described in the administration guides for the relevant modules.

- **Cloud Applications**
  Using the SCIM connector, Cloud applications can be connected to the Universal Cloud Interface Module of the One Identity Manager. Cloud objects are transferred to the Cloud Systems Management Module over the Universal Cloud Interface and can be linked there to employees.
  For detailed information, see the following guides:
    - One Identity Manager Administration Guide for Connecting to Cloud Applications
    - One Identity Manager Administration Guide for Connecting to the Universal Cloud Interface

- **CSV files**
  The CSV connector can transfer data between CSV files and the One Identity Manager database. In this context, the CSV files map the target system.
  For detailed information, see the One Identity Manager CSV Connector User Guide.
- One Identity Manager databases
  Use the One Identity Manager connector to synchronize One Identity Manager databases with the same product version.
  For detailed information, see the One Identity Manager User Guide for the One Identity Manager Connector.

- Target systems that are not natively supported
  You can use the Windows PowerShell connector to connect target systems to One Identity Manager that do not have native support in One Identity Manager. Windows PowerShell cmdlets are used to execute read/write operations in the target system.
  For detailed information, see the One Identity Manager Windows PowerShell Connector User Guide.

- Native database systems
  Using this native database connector, you can synchronize external databases with the One Identity Manager database.
  For detailed information, see the following guides:
  - One Identity Manager Native Database Connector User Guide for Connecting DB2 (LUW) Databases
  - One Identity Manager Native Database Connector User Guide for Connecting MySQL Databases
  - One Identity Manager Native Database Connector User Guide for Connecting Oracle Databases
  - One Identity Manager Native Database Connector User Guide for Connecting SQLite Databases
  - One Identity Manager Native Database Connector User Guide for Connecting SQL Server Databases
  - One Identity Manager Native Database Connector User Guide for the CData ADO.NET Provider
  - One Identity Manager Native Database Connector User Guide for the generic ADO.NET Provider
  - One Identity Manager Native Database Connector User Guide for Connecting SAP HANA Databases
Updating existing synchronization projects

Any required changes to system connectors or the synchronization engine are made available when you update One Identity Manager. These changes must be applied to existing synchronization projects to prevent target system synchronizations that are already set up, from failing. There are two way to do this:

- Apply the required patches to the existing synchronization projects.
  - Patches for new functions and resolved issues in One Identity Manager are installed via hotfix packages and migration packages. You must apply these patches manually for the changes to take effect in existing synchronization projects. The default configuration of these synchronization projects is update in the process. Custom modifications are not effected by the patches.
  - This method is recommended if the synchronization projects conform to the default configuration and contain no, or only very little, customization.

- Delete existing synchronization projects and create them again.
  - This method is recommended if your synchronization projects contain extensive customizations that might conflict with the modifications in the patches.

Detailed information about this topic

- Applying patches on page 135
- How to delete a synchronization project on page 60

For more detailed information about setting up synchronization projects, see the administration guides for connecting target systems.
Applying patches

**CAUTION:** Patches do not change customizations in synchronization projects. This means that conflicts may occur if patches are applied to synchronization projects, which have been customized. This may cause loss of data.

**Before you apply a patch**

1. Read the patch description to decide whether it provides necessary improvements for the synchronization project.
2. Check whether conflict with customizations could occur.
3. Create a backup of the database so that you can restore the original state if necessary.
4. Deactivate the synchronization project.

One Identity Manager has three patch types. All patches that are applied are displayed in the synchronization project's migration details. Once a milestone has been applied, the associated patches are not listed separately in the migration details anymore.

### Table 72: Patch types

<table>
<thead>
<tr>
<th>Patch type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature</td>
<td>Patch for a new feature.</td>
</tr>
<tr>
<td>Fix</td>
<td>Patch for solved problems.</td>
</tr>
<tr>
<td>Milestone</td>
<td>Milestones are provided with every new One Identity Manager version. A milestone is provided for each context, which includes all the solved issues of the previous version. It can also contain new features of the previous version.</td>
</tr>
</tbody>
</table>

Patches can be dependent on each other. These dependencies determine the order in which the patches are applied. When a patch is applied, the patches that are dependent on it are also applied. If a new version of One Identity Manager is installed, all patches for the version are consolidated into one milestone. If patches are available for different versions of the program, the older patches must always be applied first. Therefore, One Identity Manager automatically applies all previous milestone once a patch for a later version is selected.

Patches and their dependencies are displayed in the patch view. The left side shows the patches that are available. The newest patches are at the top. Dependent patches are displayed below. In this area, select the patches that you want to apply to the current synchronization project. Then the patches are displayed on the right-hand side, with all their predecessor in the order in which they will be applied.

Each patch contains a script which checks if the patch can be applied to the synchronization project. Whether or not a patch can be applied depends on the concrete synchronization configuration.
Table 73: Meaning of icons in the rule tool bar

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄</td>
<td>Fixes</td>
</tr>
<tr>
<td>🚀</td>
<td>Features</td>
</tr>
<tr>
<td>🚮</td>
<td>Shows all patches that are cannot be applied to the synchronization project.</td>
</tr>
<tr>
<td>✅</td>
<td>Shows all patches that are already applied to the synchronization project.</td>
</tr>
</tbody>
</table>

Some patches required user input during installation, for example, to confirm that you really want a particular change to be executed.

**To apply patches**

1. Open the synchronization project in the Synchronization Editor.
2. Select **Edit | Update synchronization project**... from the menu.
3. Optional: Select the patches to be applied under **Available patches**. Multi-select is possible.
   - In the patch detail view, patches are listed in the order in which they will be applied.
4. Click **Apply selected patches**.
5. Enter any user input as prompted.
6. If necessary, use the patch log to check whether customization need to be reworked.
7. If required, rework customizations in the synchronization configuration.
8. Run a consistency check.
9. Simulate the synchronization.
10. Activate the synchronization project.
11. Save the changes.

**NOTE:** A patch does not take effect until the changes associated with it are saved in the database. If consistency check or simulation errors occur that cannot be corrected, you can dismiss the patch changes by reloading the synchronization project without saving the changes.

**Related topics**

- General properties of a synchronization project on page 60
- Automatic patches on page 137
Automatic patches

Patches can be labeled as automatic patches. All existing synchronization projects are migrated after One Identity Manager is updated, for example, with a service pack. This updates the One Identity Manager schema and applies automatic patches. A process is queued in the Job queue to do this. After the One Identity Manager update, you should check whether the process DPR_Migrate_Shell was run successfully. If a patch could not be applied, for example because the target system was not available, you can apply the patch manually later.

Related topics

- Applying patches on page 135
Additional information for experts

NOTE: The following functions should only be carried out by experienced Synchronization Editor users and system administrators.

The properties and processes described here are only available in expert mode.

IMPORTANT: Changes to properties described here may affect system performance. Check the effects on system performance of you environment before you change properties in expert mode.

To enable export mode
1. Select the menu Database | Settings....
2. Enable Enable expert mode.
3. Click OK.

Additional properties of a mapping

Enter the following additional property for a mapping when you are in expert mode.

Table 74: Properties of a Mapping

<table>
<thead>
<tr>
<th>Properties</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base mapping</td>
<td>Property mapping rules can be inherited from a existing mapping. Select a mapping from the menu for this. Inherited property mapping rules can only be editing in the base mapping. Other property mapping rules can be added. This is only visible in expert mode.</td>
</tr>
</tbody>
</table>

Related topics
- Properties of a mapping on page 68
Extended properties for start up configuration

In expert mode, the tab **Advanced** is displayed in the start up configuration dialog.

**Table 75: Extended Properties for Start Up Configuration**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure handling mode</td>
<td>Specifies how failed objects are handled during synchronization.</td>
</tr>
<tr>
<td></td>
<td>- Repeat (default)</td>
</tr>
<tr>
<td></td>
<td>Synchronization is repeated until the failed objects do not yield any changes.</td>
</tr>
<tr>
<td></td>
<td>Advantage: This results in a full synchronization. Certain, highly complex hierarchical structures cannot only be synchronized in this mode.</td>
</tr>
<tr>
<td></td>
<td>Disadvantage: Synchronization in this mode takes considerably longer if a failed object arises.</td>
</tr>
<tr>
<td></td>
<td>- Ignore</td>
</tr>
<tr>
<td></td>
<td>The synchronization ignores failed objects.</td>
</tr>
<tr>
<td></td>
<td>Advantage: Synchronization does not take longer because of failed objects that cannot be corrected by repeating (data error).</td>
</tr>
<tr>
<td></td>
<td>Disadvantage: Errors, which can occur through complex data dependencies, are no longer corrected, The synchronization results may therefore not be complete.</td>
</tr>
</tbody>
</table>

**NOTE:** Repetitions of failed objects means a reduced synchronization.

It makes sense to ignore failed objects if synchronization with this start up configuration is run frequently because the failed objects are processed again by the next synchronization. This also achieves full synchronization results and at the same time reduces the runtime of each synchronization.

| Reload threshold                  | Specifies the maximum number of properties that can be loaded by synchronization to prevent partitioned reloading. You can increase this value to accelerate synchronization of target systems with small mappings. However, more memory is required. |
|                                   | The reload threshold can be specified separately for each synchronization step. |

| Partition size                    | Specifies the number of objects and object pairs the can be processed at the same time. To prevent frequent reloading and to speed up synchronization, you can increase the size of the partition. However, more memory is required. |
### Property Description

**Bulk level**
Controls internal bulk processing of data. For example, this is used to calculate how much object data is buffered in main memory. Depending on the operations to be run, a multiple of the value may be applied.

Higher values speed up processing but require more memory. Smaller values reduce memory usage. This value should only be reduced if synchronizing causes memory problems.

**Debug mode**
Sets debug mode. Processing steps are handled sequentially in debug mode. This makes it much easier to find errors. Only set this option for finding errors!

**TIP:** If memory problems occur, you should examine the reload threshold, partition size and bulk level together and adjust them.

The reload threshold, partition size and the bulk level also depend on how the performance/memory factor is configured in the synchronization steps. The performance/memory factor specifies the percentage with which the reload threshold, partition size and bulk level are applied to an object type.

### Detailed information about this topic
- Processing synchronization steps on page 151
- Performance and memory optimization on page 56

### Related topics
- Setting up start up configurations on page 109
- Extended synchronization step properties on page 95

### Using the local cache

Some connectors support the use of local cache. If you enable this cache, the connector loads all the necessary data into a local database after the connection has been established with the target system. The data is loaded for each schema type. The data required for synchronization are then supplied by the local database.

The aim is, to replace numerous small single read accesses to the target system by one large one. This can significantly increase the performance of target system synchronization where individual accesses need a lot of time but list access can be relatively quickly handled. This is generally the case for cloud-based target systems. Apart from that, the cache reduces the number of queries to the target system. The cache should, therefore, be used for target systems where the number of queries is limited through quotas.
It does not always make sense to use the cache. When synchronizing with revision filtering, which is executed at short intervals, you can expect few accesses to the target system. Filling the cache in this case, might cost more time than the sum of all system accesses without caching.

**TIP:** Use the cache for initial and the next synchronization after that as well as synchronization without revision filtering.

Cache is only used for synchronization.

The cache database is added in the user's 'temp' directory and deleted after the system is disconnected. Schema type contents with sensitive data (if known) are encrypted with the "Data Protection API" with the current user's key.

You specify whether the local is used in the target system connection settings. For more information, see the One Identity Manager administration guides for connecting to target systems that support local caching.

**Schema browser**

In addition to the schema overview, the Synchronization Editor provides a schema browser in expert mode. The details of the connected target system's entire schema and the details of the entire One Identity Manager schema are shown in the schema browser. Schema types, schema properties and the processing methods available are displayed in a hierarchical structure. The schema can be saved as XML for error analysis.

**To save a schema**

1. Select the category **Configuration | One Identity Manager connection.**
    - OR -
    Select **Configuration | Target system.**
2. Open the **Schema browser** view.
    This display the entire schema of the connected system in a hierarchical structure.
3. Click ![Menu Bar](image) in the schema browser menu bar.
4. Enter a file name and repository.
5. Click **Save.**

**Schema editor**

A schema editor is integrated into the schema browser. It is only available in expert mode and allows you to edit custom virtual schema properties.
To open the schema editor

1. Select Configuration | One Identity Manager Connection.
   - OR -
   Select the category Configuration | Target systems.
2. Open the Schema browser view.
3. In the schema browser menu bar, click 📡.

To add a custom schema property

1. Select the schema in the Schema view to which you want to add a new virtual schema property.
2. Click Add schema property 📡 in the Action bar.
3. Select the schema property type and edit its details.
4. Click Create.
5. Click Commit to database to save the changes.

To edit a custom schema property

1. Select the schema property in the Schema view.
2. Edit the schema property details.
3. Click Commit to database to save the changes.

To delete a custom schema property

1. Select the schema property in the Schema view.
2. Click Delete schema property ✗ in the Action bar.
3. Confirm the security prompt with Yes.
4. Click Commit to database to save the changes.

Detailed information about this topic

- Edit schema properties on page 73

Using custom project templates

You can make your own project templates based on existing synchronization projects. This is particularly useful if you want to use customized mappings or synchronization workflows in synchronization projects for other target systems. If you base a synchronization project on a custom project template, it includes all settings of the underlying synchronization project. To use the new project, you merely change the target system specific settings.
Script language and supported scripts

A script language and the script languages, which are supported, are specified for the project template. These properties have different functions and can therefore, have different values.

- **Script language**
  - Language that is used to write the project template’s script code.
  - Only change a project template's script language if the script code needs to be modified manually and a specific script language should be used to do this.

- **Supported script languages**
  - Script languages to be used for scripts in synchronization projects created with this project template.
  - If a project template supports more than one script language, select the script language to use when you set up the synchronization project (only in expert mode).
  - If you create a project template from an existing synchronization project, it only supports the script language of the underlying synchronization project.

Related topics

- Creating project templates on page 143
- Creating synchronization projects from a custom project template on page 144
- Specifying the script language in synchronization projects on page 61

Creating project templates

Project templates can be created in expert mode from existing synchronization projects. You can use these to create new synchronization projects with the project wizard.

**TIP:** Before you create a project template from an existing synchronization project, apply all available patches to the synchronization project and save the changes. For more information, see Applying patches on page 135.

To create a project template

1. Select Edit | Create template....
2. Enter the template properties.
   - The values are preset with the properties of the open synchronization project.
3. Click OK.
Table 76: Project Template Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display name</td>
<td>Name of the project template to display in the project wizard.</td>
</tr>
<tr>
<td>Script language</td>
<td>Language used to write the project template's script code. Only change this setting if you want to manually change the script code in the project template at a later date.</td>
</tr>
<tr>
<td>Description</td>
<td>Spare text box for additional explanation.</td>
</tr>
</tbody>
</table>

**Related topics**
- Creating synchronization projects from a custom project template on page 144

**Creating synchronization projects from a custom project template**

Take note of the following advice before creating a synchronization project:

1. **NOTE**: It is possible that project templates created with an older version of One Identity Manager are not compatible with the currently installed version. Errors may occur if these project templates are used. Recreate the project templates with the currently installed version of One Identity Manager.

2. **NOTE**: The script language of the synchronization project you want to set up, supports the project template script language.

Custom project templates can also be used if expert mode is not enabled.

**To create a synchronization project from a custom project template**

1. Create a new synchronization project with the project wizard.
   a. Select the custom project template on the Select project template page.
   b. Disable the option **Activate and save the new synchronization project automatically** on the last page of the project wizard.
      The synchronization project should not be activated jet because it is not completely configured.

2. Changed the display names and description of the synchronization project if required.

3. Save the synchronization project in the database.
To configure synchronization with this synchronization project

1. Specify the synchronization base object in the Manager. This might be the specific Active Directory domain to be synchronized, for example.
2. Specify the synchronization base object in the Synchronization Editor. Select the base table for the base object you just added and the synchronization server.
3. Select the variables in the default variable set. Modify at least the value of variables with connection parameters.
4. Define the synchronization scope.
5. Specify the extent of the synchronization log.
6. Assign a schedule to the start up configuration.
7. Run a consistency check.
8. Activate the synchronization project.
9. Save the changes.

To configure provisioning and single object synchronization with this synchronization project

- In the Designer, define the operations for provisioning and single object synchronization.

Detailed information about this topic

- How to edit variables on page 106
- How to create base objects on page 116
- How to edit a scope on page 101
- Specifying a schedule on page 113
- Configuring the synchronization log on page 100
- Checking the consistency of the synchronization configuration on page 121
- Activating the synchronization project on page 121
- Operations for provisioning and single object synchronization on page 153

Related topics

- Creating project templates on page 143

Managing project templates

The Synchronization Editor provides an overview of all available project templates. Here you can edit display names and descriptions of custom project templates and delete project
templates you no longer need.

To display a list of project templates

1. Select Database | Manage templates....
   This menu item is only displayed in export mode.
   This opens the dialog window Manage templates....
2. To hide custom project templates, disable in the dialog box toolbar.
3. To hide default project templates, disable in the dialog box toolbar.

Table 77: Project Template Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project template</td>
<td>Name of the project template.</td>
</tr>
<tr>
<td>Target system</td>
<td>Type of target system, which applies to the project template.</td>
</tr>
<tr>
<td>Supported versions</td>
<td>Version of the target system that are supported by this project template. If no value is displayed, the project template supports every version that can be connected with the target system connector. For detailed information, see the administration manuals for connection to the respective target system.</td>
</tr>
<tr>
<td>Description</td>
<td>Description of the project template.</td>
</tr>
<tr>
<td>Last change</td>
<td>Date of the last change to the project template.</td>
</tr>
</tbody>
</table>

To edit a custom project template

1. Enable in the dialog box toolbar.
2. Select the project template.
3. Edit the display name or description in the Properties pane.
4. Click Save and close.
5. Confirm the security prompt with Yes.

To delete a custom project template

1. Enable in the dialog box toolbar.
2. Select the project template.
3. Click in the dialog box toolbar.
4. Confirm the security prompt with Yes.
5. Click Save and close.
6. Confirm the security prompt with Yes.
Include custom tables in the synchronization

Custom schema extensions can be included in the synchronization configuration. Custom columns are automatically assigned to additional schema properties which can be included in the mapping. The following settings must be made in order to include custom tables that were created using the default project templates in synchronization projects.

To prepare a custom table for synchronization

1. In Manager, assign a target system type to the custom table.
   - Specify whether outstanding objects can be published in post-processing.
2. Select a synchronization project in Synchronization Editor and create a schema class for the custom table in the One Identity Manager schema.
3. In the Synchronization Editor, define the mapping and synchronization steps for the schema class.

For detailed information about target system types and post-processing outstanding object, see the target system connection guides.

Integrate a custom table into provisioning processes

- In the Designer, define the provisioning operations.
  - Use the settings from other operations for the same target system and modify the following properties:
    - **Synchronization workflow**: Select the provisioning workflow.
    - **Table**: Select the custom table.

Configuring single object synchronization for a custom table

1. In the Designer, define the operations for single object synchronization.
   - Use the settings from other operations for the same target system and modify the following properties:
     - **Name**: Read
     - **Synchronization workflow**: Select the synchronization workflow.
     - **Table**: Select the custom table.
2. In the Designer, assign the custom table to customizer DPR.Customizer.ProjectorReadEntityLogic.
3. Create a process in the Designer for the custom table.
   - Use the settings from another read process for the same target system and modify the following properties.
Replace all references to the original table with a reference to the custom table.

Process properties:
- **Table**: Select the custom table.
- **Event**: Read
- **Pre-script for generating**: Pass the defined single object operation as a parameter to script DPR_GetAdHocData.

Process step properties:
- **Process task**: ProjectorComponent - UpdateProjection
- **Process information term**: Replace the display name of the object with the display name of the custom table.

For detailed information about setting up processes, see the *One Identity Manager Configuration Guide*.

4. Record the path to the base object of synchronization for the custom table in the Manager.

For detailed information about this, please consult the manuals for connecting target systems.

**Detailed information about this topic**
- How to add schema classes on page 119
- Operations for provisioning and single object synchronization on page 153

**Related topics**
- Deleting objects in One Identity Manager on page 49

**Verifying scripts**

You can apply scripts at various points in the synchronization project; for example, when defining the schema properties or when you define data operations for system connection through the native database connector. You can enter scripts in C# or Visual Basic .NET depending on script's language, which was specified for the synchronization project.

Compiling and debugging are available to you for trouble shooting script code.

**Table 78: Edit Box Buttons**

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![open-advanced-edit-mode]</td>
<td>Opens advanced edit mode.</td>
</tr>
<tr>
<td>![check-script-syntax]</td>
<td>Checks the script's syntax.</td>
</tr>
</tbody>
</table>
### Button Description

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compile</td>
<td>![Checkmark] Script was compiled without errors. ![X] Script contains syntax errors.</td>
</tr>
<tr>
<td>Debug</td>
<td>Export the current script code to a Visual Studio project. This button is only available in &quot;Edit schema properties&quot; dialog window and in the system connection wizard for the native database connector.</td>
</tr>
</tbody>
</table>

### Compile

**To verify the script code's syntax**

1. Open the script in the Synchronization Editor.
2. Click **Compile**.

Compiler errors are shown immediately and written to in the Synchronization Editor's error log.

### Debug

The script code is export to a Visual Studio project for debugging. Once the project is run, the Synchronization Editor starts in debug mode and the script is tested.

### Prerequisites

- Visual Studio is installed on the workstation on which the Synchronization Editor is running.
- All changes to the synchronization project are saved.
- The debugger can be used in scripts that are used in:
  - Schema properties
  - Script variables
  - Data operations for system connections using the native database connector

### To debug a script

1. Open the script in the Synchronization Editor.
2. Click **Debug**.
3. Confirm the prompt with **OK**.
4. Start debugging in the Visual Studio project.
5. If necessary, correct the script code in the Synchronization Editor's default mode.
6. Save the changes.
Starting synchronization

You can also start synchronization manually by either running it on your workstation or from the synchronization server. If you run synchronization from your workstation, you cannot work with the Synchronization Editor until synchronization is complete. To be able to continue working with the Synchronization Editor during synchronization, run synchronization from the synchronization server.

To start synchronization manually

1. Open the synchronization project in the Synchronization Editor.
2. Select the category Configuration | Start up configurations.
3. Select a start up configuration in the document view and click Execute.
4. Confirm the security prompt with Yes.

Defining downstream processes

Certain actions must be executed in the One Identity Manager database after synchronization has finished. For this, you can define additional processes in the tables, which return base objects. These additional processes are executed through the "PostSync" event, which is triggered in the process DPR_DPRProjectionStartInfo_Run_Synchronization.

To create a downstream process for synchronization

1. In the Designer, select the Process Orchestration category.
2. Start Process Editor using Create a new process.
   This makes a new element for the process and opens it in the Process Editor.
3. Edit at least the following process properties.
   - Table: Table that returns the base object for the synchronization, for example ADSDomain.
   - Event: PostSync
4. Create the required process steps.
   For more information, see the One Identity Manager Configuration Guide.
5. Save the changes.

**Example**

- To automatically assign employees to Active Directory user accounts, the table ADSDomain contains the process ADS_ADSDomain_SearchAndCreate_FullSync. The process is triggered by the event "PostSync".
- If group memberships cannot be resolved when an Active Directory domain is synchronized, the One Identity Manager finds the Active Directory SIDs of the user accounts. For this, there is the process ADS_ADSDomain_PostSync set on the table ADSDomain. The process is triggered by the event "PostSync".

**Processing synchronization steps**

When a synchronization step is processed in a process plan, synchronization objects are determined and processed as follows:

1. **Load slim list of object to be synchronized**
   
   Objects to be synchronized are loaded according to the object matching rules from the target system and the One Identity Manager database. Only key properties, the revision property (if exists) and individually specified schema properties in the system connector are loaded in this case.

   **TIP:** For systems whose schema type only have a few schema properties, this list can already be loaded with all schema properties. This can speed up synchronization.
   
   You can configure the appropriate behavior in the start up configuration when in expert mode. Modify the reload threshold to do this. For more information, see [Extended properties for start up configuration](#) on page 139.

2. **Use revision filter**

   Modified object pairs are filtered, if revision filtering is permitted and the target system supports revision filtering. The revision filter is applied to slim list, which means objects that are already loaded.

3. **Load lists of object pairs with all schema properties**

   One Identity Manager loads list of object and object pairs to be synchronized with all mapped schema properties. The lists are loaded in partitions with a fixed size. Once a partition (for example 1000 object pairs) has been loaded, they are processed asynchronously and at the same time the next partition is being loaded. Therefore, a maximum of two partitions are located in main memory at any time.

   **TIP:** In expert mode, you can define the partition size in the start configuration. For more information, see [Extended properties for start up configuration](#) on page 139.
4. Use mapping

The moment a partition (for example, 1000 list pairs) have been loaded, the mapping is used for all objects and object pairs. Processing methods are subsequently executed according to the given condition.

Detailed information about this topic

- How does revision filtering work? on page 37
- Start up configuration properties on page 110
- Editing property mapping rules on page 75
- Specifying processing methods on page 91

Exporting a synchronization configuration

Synchronization projects created for a test database, for example, can be transported to a live database. To be able to use synchronization configuration here, modify the One Identity Manager database connection parameter and the start up configuration.

Prerequisite

- The schema of both One Identity Manager databases are identical. Customized schema extensions used in the mapping exist in both databases.

To export a synchronization project from one One Identity Manager database to another

1. Save the synchronization project in the source database with change labels. Add new changes labels to do this.
   - To save the synchronization project with change labels, open the Commit to database submenu and click Commit and assign a change label.
2. Create a transport package for the synchronization project using the Database Transporter.
   a. Select the export criteria Transport by change label.
   b. Select the change label.
   c. Click Options and activate Add dependent objects to transport file and Close change label after export.
      
      TIP: To display the objects belonging to the change label, click Show.
3. Import the transport package into the target database with the Database Transporter.
4. Edit the synchronization project in the target database.
   a. Add a new base object.
      Use the wizard to do this, if it is available.
      The wizard creates a variable set with the given connection parameters. It creates the synchronization base object, for example, the actual Active Directory domain you want to synchronize, as an object in the One Identity Manager database.
   b. Adjust the connection data for the One Identity Manager database.
      Select the category Configuration | One Identity Manager Connection | General and click Edit connection.
   c. Customize your start up configuration.
      - Assign a schedule.
      - Assign the variable set that is assigned to the corresponding base object.
   d. Run a consistency check.
   e. Activate the synchronization project.

Detailed information about this topic
- System connection properties on page 97
- How to edit start up configurations on page 109
- Specifying a schedule on page 113
- How to create base objects on page 116
- Checking the consistency of the synchronization configuration on page 121
- Activating the synchronization project on page 121

For detailed information about saving with change labels as well as creating and importing transport packages, see the One Identity Manager Operational Guide.

Operations for provisioning and single object synchronization

In order to provision object modifications and perform single object synchronization, you must specify which synchronization workflow should be used for this task. When setting up the synchronization using the default project templates, the required single object operations will be created. If you create your own provisioning processes or would like to include custom tables in the provisioning or single object synchronization, then you need to define your own single object operations.
To define single object operations

1. Select the Process Orchestration | Provisioning process operations category in Designer.
2. Select the menu item Object | New.
3. Edit the operation properties.
4. Save the changes.
5. Use this operation in the pre-script to generate the provisioning process or process for single object synchronization as a parameter for script DPR_GetAdHocData.

Table 79: Single object operations

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Name of the operation.</td>
</tr>
<tr>
<td>Synchronization workflow</td>
<td>Workflow that is to be used for provisioning or single object synchroniza-</td>
</tr>
<tr>
<td></td>
<td>tion.</td>
</tr>
<tr>
<td>System connection</td>
<td>Target system connection of the target system to be used.</td>
</tr>
<tr>
<td>Table</td>
<td>Table for which the operation has been defined. Provisioning or single</td>
</tr>
<tr>
<td></td>
<td>object synchronization can only be run for the objects in this table.</td>
</tr>
<tr>
<td>Display name</td>
<td>Operation display name in the One Identity Manager tools' user</td>
</tr>
<tr>
<td></td>
<td>interface.</td>
</tr>
<tr>
<td>Description</td>
<td>Spare text box for additional explanation.</td>
</tr>
<tr>
<td>Processing status</td>
<td>Only used internally by One Identity Manager.</td>
</tr>
</tbody>
</table>

Load balancing during provisioning and single object synchronization

You can accelerate provisioning and single object synchronization by distributing processes over several Job servers. To do this, you use the base objects to specify, which Job servers will handle the objects in parallel.

Load balancing can be implemented to manage spikes in data traffic, for example, when a college semester begins, numerous accounts must be added and provisioned in the target system.

If a property of a user account is changed after restructuring in the target system, you can use single object synchronization to select all the affected user accounts and load the changed property into the One Identity Manager database.
There are specific Job servers configured for cases like this. For each base object, a server function is defined and assigned to the Job server. All Job servers with this attribute run provisioning and single object synchronization processes in parallel.

NOTE: You should not implement load balancing for provisioning or single object synchronization on a permanent basis. Parallel processing of objects might result in dependencies not being resolved because referenced objects from another Job server have not been completely processed.

Once load balancing is not longer required, ensure that the synchronization server executes the provisioning processes and single object synchronization.

To configure load balancing for a target system

1. Configure the servers and declare them as Job servers in One Identity Manager.
   - Assign the standard server function of the respective target system to these Job servers.
   All Job servers must be able to access the same target system as the synchronization server for the respective base object. For detailed information about setting up the synchronization server, see the administration guides for connecting to target systems.

2. Use the Synchronization Editor to create a server function for the target system's base object.
   a. On the base object's master data form, click next to the Service function field.
   b. Enter a name for the server function.
   c. Enable all the Job servers to which the server function will be assigned.
      Only enable the Job servers that can access the same target system as the base object's synchronization server.
   d. Click OK.

To use the synchronization server without load balancing.

- In the Synchronization Editor, remove the server function from the base object.

Restrictions

Load balancing is only used if the number of maximum instances for the executed process task or process component is set to 0 or >1.

If the maximum number of instances on the process function or process component is set to 1 or -1, load balancing cannot take place. This affects processes, which use the following process tasks:

- AdHocProjectionSingle
- AdHocProjectionSinglex86
- UpdateProjectionSingle
- UpdateProjectionSinglex86
These process tasks are used, for example, by different provisioning processes for the IBM
Notes and G Suite target system types.

For more information about these process tasks, see the One Identity Manager
Configuration Guide.

Detailed information about this topic

- How to edit base objects on page 117
- Properties of base objects on page 118

Automatically create and update synchronization projects

You can create synchronization projects automatically. This can be particularly useful if you
want to set up synchronization projects for different Active Directory domains, which
require the same configuration. A new synchronization project is generated from the
command line or with a Windows PowerShell CmdLet using the configuration of a reference
project. The reference project’s configuration is supplied in a configuration file, which you
can modify. You can define variable settings, like the target system to connect or
password, in parameters, which are used passed values when the command is called.

Existing synchronization projects for which patches are available can be updated in the
same way. A configuration file is made available using a reference project that contains a
list of all the patches that are to be applied. Only patches that do not require any user input
can be applied.

To set up automatic creation of synchronization projects:

1. Enable expert mode in the Synchronization Editor.
2. Create the reference project using the project wizard.
   a. Create a new synchronization project.
   b. Click Save configuration on the last page of the project wizard.
   c. Select a repository for the configuration file and give it a name.
      The file is saved as a Synchronization Editor workspace file with the
      extension *sews*.
   d. End the project wizard.
3. Customize the synchronization configuration in the configuration file.
   - Check the saved settings and adjust the values.
   - Create the parameters for changeable settings.
4. To create synchronization projects with this configuration
Open up the Synchronization Editor Command Line Interface.
- OR -
Load the Synchronization Editor Module for Windows PowerShell.

5. To automatically create synchronization projects, use scripts which execute the Synchronization Editor Command Line Interface or the Synchronization Editor Module for Windows PowerShell.

**To set up automatic updating of synchronization projects:**

1. Enable expert mode in the Synchronization Editor.
2. Create the configuration file.
   a. Open the reference project.
   b. Select Edit | Update synchronization project from the menu.
   c. Optional: Select the patches to be applied under Available patches. Select at least one patch or milestone. Multi-select is possible.
   d. Click Save configuration.
   e. Select a repository for the configuration file and give it a name.
      The file is saved as a Synchronization Editor workspace file with the extension sews.
3. Customize the synchronization configuration in the configuration file.
   - Check the saved settings and adjust the values.
   - Create the parameters for changeable settings.
4. To update synchronization projects with this configuration:
   - Open up the Synchronization Editor Command Line Interface.
     - OR -
   - Load the Synchronization Editor Module for Windows PowerShell.
5. To automatically update synchronization projects, use scripts which execute the Synchronization Editor Command Line Interface or the Synchronization Editor Module for Windows PowerShell.

**TIP:** A configuration file created for setting up new synchronization projects can also be used for updating synchronization projects. Add the necessary editor and parameters to the configuration file.

**Detailed information about this topic**

- How to create a synchronization project on page 59
- Customizing the Configuration File on page 158
- Synchronization Editor Command Line Interface on page 164
- Synchronization Editor Module for Windows PowerShell on page 165
- Appendix: Configuration file examples on page 172
Customizing the Configuration File

All data required for creating or updating a synchronization project is saved in XML format. The file is divided into three main sections:

- Parameter Definitions
  For more information, see Parameter definitions on page 161.
- Global definitions
  For more information, see Global definitions on page 162.
- Editor Definitions
  For more information see Defining the editor for new synchronization projects on page 162 or Defining the editor for existing synchronization projects on page 163

Structure of the configuration file

```xml
<?xml version="1.0" encoding="utf-8"?>
<SynchronizationEditorWorkspace Version="1.0">
  <Parameters>
    ...
  </Parameters>
  ...
  <Global>
    ...
  </Global>
  <Editors>
    ...
  </Editors>
</SynchronizationEditorWorkspace>
```

Customize the settings to create or update a new synchronization project based on this configuration file. Use parameters for all variable values if different synchronization projects are going to be created or updated with this configuration file.

**To Customize the configuration file**

1. Decide on the variable values.
2. Define parameters for each of these values.
3. Replace the values with parameters.
Example

Synchronization projects should be created for various Active Directory domains in different One Identity Manager databases on one and the same database server. A synchronization project has been created with the project wizard for one of these domains. This reference project's configuration file must be adjusted such that it can be used for all the other domains.

The following settings must be customized:

- Define parameters for the One Identity Manager database, database user, system user and its password.
- Define parameter for the domain name, domain controller Active Directory user and its password.
- Define a parameter for the synchronization project, if more than one synchronization projects is going to added to one database.
- Replace the respective values in the global and editor sections with these parameters.

**IMPORTANT:** The connection data for the One Identity Manager database in the global definitions (WorkDatabase.ConnectionString) and in the editor definitions (MainConnection.ConnectionParameter) must be identical. If you replace these value with parameters, use the same parameter in each case.

The following table shows the required adjustments in the configuration file based on a reference project from an SQL Server database. For detailed information about the connection data for an SQL Server database, see the One Identity Manager Installation Guide. For detailed information about the One Identity Manager authentication modules, see the One Identity Manager Authorization and Authentication Guide.

### Table 80: Customizing the configuration file

<table>
<thead>
<tr>
<th>Element/Value</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>WorkDatabase.ConnectionString</td>
<td>Replace &lt;database&gt; and &lt;user&gt; with parameters, for example $Database$ and $DBUser$.</td>
</tr>
<tr>
<td>data source=&lt;database server&gt;;</td>
<td></td>
</tr>
<tr>
<td>initial catalog=&lt;database&gt;;</td>
<td></td>
</tr>
<tr>
<td>user id=&lt;user&gt;;</td>
<td></td>
</tr>
<tr>
<td>pooling=false;</td>
<td></td>
</tr>
<tr>
<td>Password=$DBPassword$</td>
<td></td>
</tr>
<tr>
<td>WorkDatabase.AuthenticationString</td>
<td></td>
</tr>
<tr>
<td>Element/Value</td>
<td>Changes</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Module=&lt;authentication module&gt;; User[VI.DB_USER]=&lt;system user&gt;;</td>
<td>Replace &lt;system user&gt; and &lt;password&gt; with parameters, for example $SystemUser$ and $SystemPassword$.</td>
</tr>
<tr>
<td>(Password)Password[VI.DB_Password]=&lt;password&gt;</td>
<td></td>
</tr>
<tr>
<td>MainConnection.ConnectionParameter Authentication=ProjectorAuthenticator;</td>
<td>Replace &lt;database&gt;, &lt;DBPassword&gt; and &lt;user&gt; with the parameters from the element WorkDatabase.ConnectionString.</td>
</tr>
<tr>
<td>data source=&lt;database server&gt;; DBFactory=&quot;VI.DB.ViSqlFactory, VI.DB&quot;;</td>
<td></td>
</tr>
<tr>
<td>initial catalog=&lt;database&gt;; password=&quot;:&lt;DBPassword&gt;&quot;;</td>
<td></td>
</tr>
<tr>
<td>pooling=false; user id=&lt;user&gt;</td>
<td></td>
</tr>
<tr>
<td>ConnectedSystemConnection. ConnectionParameter ADAuthentication=&lt;authentication type&gt;;</td>
<td></td>
</tr>
<tr>
<td>ADEnableras=&lt;Remote Access Service&gt;; ADEnablerecyclebin=&lt;Active Directory recycle bin&gt;;</td>
<td>Replace &lt;Distinguished name of the domain&gt;, &lt;Domain controller&gt;, &lt;Active Directory user&gt; and &lt;Active Directory password&gt; with the required parameters.</td>
</tr>
<tr>
<td>ADEnableterminal=&lt;Terminal service&gt;; ADPort=&lt;Port&gt;; ADRootdn=&quot;&lt;Distinguished name of the domain&gt;&quot;;</td>
<td></td>
</tr>
<tr>
<td>ADServer=&lt;domain controller&gt;; ADTypeEnableExtensions=&lt;Type class permitted&gt;;</td>
<td></td>
</tr>
<tr>
<td>ADTypeExtensions=&lt;Type class definition&gt;; baseloginaccount=&lt;Active Directory user&gt;;</td>
<td></td>
</tr>
<tr>
<td>basepassword=&quot;:&lt;Active Directory password&gt;&quot;</td>
<td></td>
</tr>
</tbody>
</table>
For more information, see Configuration file for creating new synchronization projects on page 172.

Parameter definitions

First, define all the parameters for variable settings. You can use these parameters in the global and editor definitions.

Table 81: Parameter definition

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter name</td>
<td>Name of the parameter.</td>
</tr>
<tr>
<td>Display</td>
<td>Display name of the parameter.</td>
</tr>
<tr>
<td>IsQueryParameter</td>
<td>Specifies whether the parameter's value is given by the user.</td>
</tr>
<tr>
<td></td>
<td>• False: the parameter value is pass on the command line.</td>
</tr>
<tr>
<td></td>
<td>• True: the parameter value is queried after the command is executed. The</td>
</tr>
<tr>
<td></td>
<td>user must enter a value. This setting can be used to input a password, for</td>
</tr>
<tr>
<td></td>
<td>example.</td>
</tr>
<tr>
<td>IsSecret</td>
<td>Specifies whether the parameter value is displayed or not.</td>
</tr>
<tr>
<td></td>
<td>• False: The parameter value is displayed when the user enters it.</td>
</tr>
<tr>
<td></td>
<td>• True: the parameter is masked when the user enters it.</td>
</tr>
<tr>
<td>Example value</td>
<td>Default value used if no value is entered on the command line or by user</td>
</tr>
<tr>
<td></td>
<td>input. If no default value is defined, a value must be passed on the</td>
</tr>
<tr>
<td></td>
<td>command line or entered by the user.</td>
</tr>
</tbody>
</table>
Global definitions

The global definitions contain the information required for logging into the One Identity Manager database where the changes are to be made.

### Table 82: Global definitions

<table>
<thead>
<tr>
<th>Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WorkDatabase.ConnectionString</td>
<td>Database server connection parameter. Modify these settings or define a parameter if adding new synchronization projects to a different database.</td>
</tr>
<tr>
<td>WorkDatabase.AuthenticationString</td>
<td>Login data for the One Identity Manager database. Modify these settings or define a parameter if adding new synchronization projects to a different database.</td>
</tr>
<tr>
<td>WorkDatabase.DatabaseFactory</td>
<td>Supported database system. Only SQL Server is supported at present (VI.DB.ViSqlFactory, VI.DB).</td>
</tr>
<tr>
<td>LoadedShell.Uid</td>
<td>Unique ID of the synchronization project to be loaded. Only required when making changes to existing synchronization projects.</td>
</tr>
</tbody>
</table>

### Defining the editor for new synchronization projects

To create new synchronization projects, use the ShellWizard editor. The definition part of this editor contains the following information:

### Table 83: ShellWizard editor definitions

<table>
<thead>
<tr>
<th>Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TemplateUid</td>
<td>Unique project template ID to be used. This element does not exist if the reference project was created without a project template.</td>
</tr>
<tr>
<td>ConnectedSystemIdentity</td>
<td>Schema information, such as type, version and schema ID of the connected system.</td>
</tr>
<tr>
<td>ScriptLanguage</td>
<td>Script language used in the synchronization project.</td>
</tr>
<tr>
<td>ShellDisplay</td>
<td>Synchronization project display name.</td>
</tr>
<tr>
<td>ShellDescription</td>
<td>Description of the synchronization project.</td>
</tr>
<tr>
<td>Elements</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>AutoCompletion</td>
<td>Specifies whether the synchronization project is activated immediately.</td>
</tr>
<tr>
<td>MainConnection</td>
<td>The connection data for the One Identity Manager database to be synchronized in this synchronization project.</td>
</tr>
<tr>
<td>ConnectedSystemConnection</td>
<td>Connection data for the target system to be synchronized with this synchronization project.</td>
</tr>
<tr>
<td>TemplateConfiguration</td>
<td>Additional settings that were made in the project wizard. For example:</td>
</tr>
<tr>
<td></td>
<td>• Provisioning data</td>
</tr>
<tr>
<td></td>
<td>• Enabled revision filter</td>
</tr>
<tr>
<td></td>
<td>• Setting for the synchronization log</td>
</tr>
<tr>
<td></td>
<td>• Selected synchronization server</td>
</tr>
<tr>
<td></td>
<td>This element does not exist if the reference project was created without a project template.</td>
</tr>
</tbody>
</table>

**Defining the editor for existing synchronization projects**

To apply patches to existing synchronization projects, use the ShellPatchEditor. The definition part of this editor contains the following information:

**Table 84: ShellPatchEditor editor definitions**

<table>
<thead>
<tr>
<th>Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PatchesToApply</td>
<td>Comma-separated list of patch numbers for all patches that are to be applied. Only patches that do not require any user input can be applied. Keywords can be specified in order to apply all available patches.</td>
</tr>
<tr>
<td></td>
<td>• <strong>AllFixes</strong>: Applies all patches for resolved issues.</td>
</tr>
<tr>
<td></td>
<td>• <strong>AllFeatures</strong>: Applies all patches for new features.</td>
</tr>
<tr>
<td></td>
<td>Example: &lt;Data Name=&quot;PatchesToApply&quot; Display=&quot;Patches to apply&quot; Type=&quot;System.String, mscorlib&quot;&gt;AllFixes,AllFeatures&lt;/Data&gt;</td>
</tr>
<tr>
<td></td>
<td>All dependent milestones will also be applied.</td>
</tr>
</tbody>
</table>
Synchronization Editor Command Line Interface

Once you have created a configuration file and have customized it accordingly, you can generate new synchronization projects or update existing synchronization projects with the Synchronization Editor Command Line Interface. You can also opt to use the Synchronization Editor Module for Windows PowerShell to do this. For more information, see Synchronization Editor Module for Windows PowerShell on page 165.

To create or update a synchronization project with the Synchronization Editor Command Line Interface:

1. Start a command line editor.
2. Switch to the One Identity Manager installation directory.
3. Execute the Synchronization Editor Command Line Interface with the option -V and set the parameter values.
   - To create a synchronization project, execute the command --CreateShell.
     SynchronizationEditor.CLI.exe --CreateShell {<Options>} <configuration file> {<Parameter>}
     Example: SynchronizationEditor.CLI.exe --CreateShell -V /Workspace=D:\ActiveDirectoryProject.sews /SetParam SyncProject="Synchronization Project for Active Directory Domain XYZ"
   - To update a synchronization project, execute the command --PatchShell.
     SynchronizationEditor.CLI.exe --PatchShell {<options>} <configuration file> {<parameter>}
     Example: SynchronizationEditor.CLI.exe --PatchShell -V /Workspace=D:\ActiveDirectoryProject.sews /SetParam SyncProject="CCC-99D111DD1CF11111BCF11111E1111BE9" /SetParam Patches=AllFixes,Milestone_OneIM_8.0.2017.1104,VPR#12345,VPR#23456,VPR#34567

   **NOTE:** If the value of a parameter contains a space or special character, it must be enclosed in quotes.

4. Enter values for the parameters requiring user input.
   - To enter an empty value, press **ENTER**.
   - To transfer the default value defined in the configuration file, click **Esc**.
5. If no error occur, execute steps 3 and 4 with the option -S.
   If the synchronization project was created with a project template, the schemas are shrunk when saved.

   **TIP:** Run the SynchronizationEditor.CLI.exe without additional input to view help for the Synchronization Editor Command Line Interface.
Table 85: Synchronization Editor Command Line Interface commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--CreateShell</td>
<td>Create a new synchronization project using the data from the defined workspace.</td>
</tr>
<tr>
<td></td>
<td>Short form: --CS</td>
</tr>
<tr>
<td>--PatchShell</td>
<td>Applies patches to an existing synchronization project.</td>
</tr>
<tr>
<td></td>
<td>Short form: --PS</td>
</tr>
</tbody>
</table>

Table 86: Synchronization Editor Command Line Interface Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-?</td>
<td>H</td>
</tr>
<tr>
<td>-Q</td>
<td>No alert before running irreversible actions.</td>
</tr>
<tr>
<td>-V</td>
<td>The Synchronization Editor Command Line Interface is run in verbose mode. Use this option for debugging.</td>
</tr>
<tr>
<td>-S</td>
<td>Saves the new synchronization project in the database. If this option is not given, creating the synchronization project is simulated.</td>
</tr>
<tr>
<td>-N</td>
<td>Defines whether the Synchronization Editor Command Line Interface opens in non-interactive mode. This may cause requests for parameter input to fail.</td>
</tr>
</tbody>
</table>

Table 87: Parameter Declaration

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/Workspace</td>
<td>Full or relative path of the configuration file.</td>
</tr>
<tr>
<td>/SetParam</td>
<td>Sets the value of the parameter defined in the configuration file. Overwrites default values.</td>
</tr>
<tr>
<td></td>
<td>Format: Parameter name=value</td>
</tr>
<tr>
<td></td>
<td>Pay attention to the upper and lower case characters in the parameter name.</td>
</tr>
<tr>
<td></td>
<td>If a value contains a space or special character, it must be enclosed in quotes. Multiple parameters are declared individually: /SetParam ParamName1=Value1 /SetParam ParamName2=Value2</td>
</tr>
</tbody>
</table>

Synchronization Editor Module for Windows PowerShell

Once you have created a configuration file and have customized it accordingly, you can generate new synchronization projects or update existing synchronization projects with the Synchronization Editor Module for Windows PowerShell. You can also opt to use the
Synchronization Editor Command Line Interface to do this. For more information, see Synchronization Editor Command Line Interface on page 164.

To create or update a synchronization project with the Synchronization Editor Module for Windows PowerShell:

2. Switch to the One Identity Manager installation directory.
3. Load the Synchronization Editor Module for Windows PowerShell.
   Import-Module .\VI.Projector.Editor.PowerShell.dll
4. Run one of the following CmdLets and set the parameter values in the process.
   - To create a synchronization project, execute the CmdLet New-ProjectorShell.
     New-ProjectorShell -Workspace <configuration file> {option} {parameter}
     Example: New-ProjectorShell -Workspace D:\ActiveDirectoryProject.sews -WorkspaceParameter @{SyncProject="Synchronization Project for Active Directory Domain XYZ"}
   - To update a synchronization project, execute the CmdLet Update-ProjectorShell.
     Update-ProjectorShell -Workspace <configuration_file> {Option} {Parameters}
     Example: Update-ProjectorShell -Workspace D:\ActiveDirectoryProject.sews -WorkspaceParameter @{SyncProject="CCC-99D111DD1CF11111BCF11111E1111BE9";Patches="AllFixes,Milestone_OneIM_8.0.2017.1104,VPR#12345,VPR#23456,VPR#34567"}

   **NOTE:** Mandatory parameter are queried one at a time if you execute the CmdLet without additional input.

5. Enter values for the parameters requiring user input.
   - To enter an empty value, press ENTER.
6. If no error occur, execute steps 3 and 4 with the option -SaveToDatabase.
   If the synchronization project was created with a project template, the schemas are shrunk when saved.

<table>
<thead>
<tr>
<th><strong>Table 88: Synchronization Editor Module for Windows PowerShell CmdLets</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CmdLet</strong></td>
</tr>
<tr>
<td>New-ProjectorShell</td>
</tr>
<tr>
<td>Update-ProjectorShell</td>
</tr>
</tbody>
</table>
Table 89: Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-?</td>
<td>Displays help.</td>
</tr>
<tr>
<td>-Workspace</td>
<td>Full or relative path of the configuration file.</td>
</tr>
<tr>
<td>-SaveToDatabase</td>
<td>Saves the new synchronization project in the database. If this option is</td>
</tr>
<tr>
<td></td>
<td>not given, creating the synchronization project is simulated.</td>
</tr>
<tr>
<td>-WorkspaceParameter</td>
<td>Sets the value of the parameter defined in the configuration file.</td>
</tr>
<tr>
<td></td>
<td>Overwrites default values.</td>
</tr>
<tr>
<td></td>
<td>Format: @{Parameter name=&quot;value&quot;}</td>
</tr>
<tr>
<td></td>
<td>Multiple parameters are separated with semicolons: -</td>
</tr>
<tr>
<td></td>
<td>WorkspaceParameter @</td>
</tr>
<tr>
<td></td>
<td>{ParamName1=&quot;Value1&quot;;ParamName2=&quot;Value2&quot;}</td>
</tr>
</tbody>
</table>

Error analysis

One Identity Manager offers different options for logging errors. These logs help you to analyze synchronization errors. These include:

- Synchronization logs
  For more information, see How to display synchronization logs on page 127.
- One Identity Manager Service log files on the synchronization server
- Synchronization analysis report
  For more information, see Help for the analysis of synchronization issues on page 131.
- Error log
  For more information, see Error log on page 167.
- Messages logged with NLog
  Configure the required security level in the SynchronizationEditor.exe.config file.

For detailed information and help on troubleshooting in One Identity Manager and configuring log files, see the One Identity Manager Process Monitoring and Troubleshooting Guide.

Error log

In expert mode, you can show the error log. In the error log, you can view all the errors that have occurred since the program started up. The error log is reinitialized when the
Synchronization Editor restarts.

**To display items from error log**

- Enable expert mode.
  
  By default, the error log is displayed in the lower section of the Synchronization Editor.

For detailed information about functions in the error log, see the *One Identity Manager Process Monitoring and Troubleshooting Guide*. 
Resolving errors when connecting target systems

Incorrect mapping of object hierarchies after synchronization

If objects, which map a hierarchy, are synchronized the following errors can occur:

- Objects are mapped to the wrong position in the hierarchy.
- Objects are not loaded.

Probable reason

The parent objects could not be referenced. If the parent object is a mandatory property, the child objects cannot be saved.

By default, objects are processed in blocks of 1024 each during synchronization. Objects are loaded in random order. Therefore, a child object might be processed before its parent object has been loaded. Thus the parent object cannot be assigned.

Example: Importing cost center with the CSV connector

Cost centers make up an object hierarchy. The respective parent object is assigned through the column UID_ParentProfitCenter. The complete hierarchy path is kept in the column FullPath.

During synchronization, a cost center might be loaded before its parent cost center. Therefore, the parent cost center cannot be referenced. Because the parent cost center is not a mandatory property, the object is loaded but appears at a strange place in the hierarchy. A different full name is formatted in the database as given in the CSV file. If the full name is the only matching criteria for identifying the object the objects cannot be assigned uniquely.

Solution

NOTE:

- The solution approach only applies for resolving references of the same object type.
- Synchronization can get slower if the amount of data is large.
- The solution described is one way to prevent the error. There may be other solutions depending on the actual data situation.
To prevent the error

- Label the column containing the hierarchy path as the sort criteria in the target system schema and set the partition size to "1".
- Ensure manual dependency resolution is set in the synchronization workflow.

The objects are sorted by hierarchy path during synchronization and loaded one by one in the database in this order. This ensures that the parent object is already loaded and can be referenced.

In the case of manual dependency resolution, all property mapping rules are executed in one synchronization step. The parent object assigned immediately. This way, the template finds the correct full names.

To mark a column as sort criterion

1. Edit the target system schema in the Synchronization Editor.
   a. Select Configuration | Target system.
   b. Click Edit connection.
      This starts the system connection wizard.
2. Select the page where you can edit the option Hierarchical sort order.
   i. NOTE: The system connection wizards of the various target systems display different pages. For example, in the system connection wizard for CSV systems, choose the Display information page.
3. Select the column containing the hierarchy path.
4. Enable the option Hierarchical sort order.
5. Save the changes.

To adjust the partition size

1. Enable expert mode in the Synchronization Editor.
   a. Select the menu Database | Settings....
   b. Enable Enable expert mode.
   c. Click OK.
2. Edit the start up configuration properties.
   a. Select the category Configuration | Start up configurations.
   b. Select the start up configuration in the document view and click Edit....
3. Select the Advanced tab.
4. Enter the value "1" in Partition size.
   For detailed information about start up configuration advanced properties, see the One Identity Manager Target System Synchronization Reference Guide.
5. Click OK.
6. Disable expert mode

To set manual dependency resolution

1. Edit the workflow properties.
   a. Select the category Workflows.
   b. Select the workflow in the navigation view.
   c. Select the General view in the Workflow Editor and click Edit.
2. Select the value "Manual" in Dependency resolution.
3. Click OK.
4. Save the changes.
5. Activate the synchronization project.
Appendix: Configuration file examples

The following examples demonstrate the modifications required in the configuration files in order to automatically create or update synchronization projects.

Detailed information about this topic

- Configuration file for creating new synchronization projects on page 172
- Configuration file for updating existing synchronization projects on page 174
- Automatically create and update synchronization projects on page 156

Configuration file for creating new synchronization projects

The following extract from a configuration file contains the changes required for the example in section Customizing the Configuration File on page 158.

```xml
<?xml version="1.0" encoding="utf-8"?>
<SynchronizationEditorWorkspace Version="1.0">
  <Parameters>
    <Parameter Name="Database" Display="Connected database" IsQueryParameter="false" IsSecret="false"></Parameter>
    <Parameter Name="DBUser" Display="Database server user" IsQueryParameter="false" IsSecret="false"></Parameter>
    <Parameter Name="DBPassword" Display="Database server password" IsQueryParameter="true" IsSecret="true"></Parameter>
    <Parameter Name="SystemUser" Display="One Identity Manager system user" IsQueryParameter="false" IsSecret="false"></Parameter>
  </Parameters>
</SynchronizationEditorWorkspace>
```
<Parameter Name="SystemPassword" Display="Password of system user" IsQueryParameter="true" IsSecret="true"/>
<Parameter Name="Domain" Display="Distinguished name of the domain" IsQueryParameter="false" IsSecret="false"/>
<Parameter Name="DomainController" Display="Distinguished name of the domain controller" IsQueryParameter="false" IsSecret="false"/>
<Parameter Name="ADUser" Display="Active Directory user" IsQueryParameter="false" IsSecret="false"/>
<Parameter Name="ADUserPassword" Display="Password of Active Directory user" IsQueryParameter="true" IsSecret="true"/>
<Parameter Name="SyncProject" Display="Synchronization Project" IsQueryParameter="false" IsSecret="false"/>

</Parameters>

<Global>
<Data Name="WorkDatabase.ConnectionString" Display="Connection string" Type="System.String, mscorlib">data source=Datenbankserver;initial catalog=$Database$;user id=$DBUser$;pooling=false;Password=$DBPassword$</Data>
<Data Name="WorkDatabase.AuthenticationString" Display="Authentication string" Type="System.String, mscorlib">Module=Authentifizierungsverfahren;User[VI.DB_USER]=$SystemUser$; (Password)Password[VI.DB_Password]=$SystemPassword$</Data>

</Global>

<Editors>
<Editor Name="ShellWizard" Type="VI.Projector.Editor.Wizards.ShellWizard, VI.Projector.Editor.Editor"/>

<Data Name="ShellDisplay" Display="Script display name" Type="System.String mscorlib">$SyncProject$</Data>

<Data Name="MainConnection.ConnectionParameter" Display="Connection parameter" Type="System.String, mscorlib">Authentication=ProjectorAuthenticator;data source=databaseserver; DBFactory="VI.DB.ViSqlFactory, VI.DB"; initial catalog=$Database$;password=$DBPassword$; pooling=False;user id=$DBUser$</Data>

<Data Name="ConnectedSystemConnection.ConnectionParameter" Display="Connection parameter" Type="System.String, mscorlib">$SyncProject$</Data>

</Editors>
Configuration file for updating existing synchronization projects

The following excerpt from a configuration file contains the changes required for applying patches.

```xml
<?xml version="1.0" encoding="utf-8"?><SynchronizationEditorWorkspace Version="1.0">
  <Parameters>
    <Parameter Name="Database" Display="Connected database" IsQueryParameter="false" IsSecret="false"></Parameter>
    <Parameter Name="DBUser" Display="Database server user" IsQueryParameter="false" IsSecret="false"></Parameter>
    <Parameter Name="DBPassword" Display="Database server password" IsQueryParameter="true" IsSecret="true"></Parameter>
    <Parameter Name="SystemUser" Display="One Identity Manager system user" IsQueryParameter="false" IsSecret="false"></Parameter>
    <Parameter Name="SystemPassword" Display="Password of system user" IsQueryParameter="true" IsSecret="true"></Parameter>
    <Parameter Name="SyncProject" Display="Synchronization Project" IsQueryParameter="false" IsSecret="false"></Parameter>
    <Parameter Name="Patches" Display="Comma separated list of patches to apply" IsQueryParameter="True"></Parameter>
  </Parameters>
  <Global>
    <Data Name="WorkDatabase.ConnectionString" Display="Connection string" Type="System.String, mscorlib">data source=Datenbankserver;initial catalog=$Database$;user
```
id=$DBUser$;pooling=false;Password=$DBPassword$</Data>
<Data Name="WorkDatabase.AuthenticationString" Display="Authentication string" Type="System.String,mscorlib">Module=Authentifizierungsverfahren;User[VI.DB_USER]=$SystemUser$; (Password)Password[VI.DB_Password]=$SystemPassword$</Data>
<Data Name="WorkDatabase.DatabaseFactory" Display="Database factory" Type="System.String,mscorlib">VI.DB.ViSqlFactory, VI.DB</Data>
<Data Name="LoadedShell.Uid" Display="Loaded shell" Type="System.String,mscorlib">$SyncProject$</Data>
</Global>
<Editors>
<Editor Name="ShellPatchEditor" Type="VI.Projector.Editor.AppModel.Editors.ShellPatchEditor, VI.Projector.Editor"> 
<Data Name="PatchesToApply" Display="Patches to apply" Type="System.String,mscorlib">$Patches$</Data>
</Editor>
</Editors>
</SynchronizationEditorWorkspace>
One Identity solutions eliminate the complexities and time-consuming processes often required to govern identities, manage privileged accounts and control access. Our solutions enhance business agility while addressing your IAM challenges with on-premises, cloud and hybrid environments.

Contacting us

For sales or other inquiries, visit https://www.oneidentity.com/company/contact-us.aspx or call +1-800-306-9329.

Technical support resources

Technical support is available to One Identity customers with a valid maintenance contract and customers who have trial versions. You can access the Support Portal at https://support.oneidentity.com/.

The Support Portal provides self-help tools you can use to solve problems quickly and independently, 24 hours a day, 365 days a year. The Support Portal enables you to:

- Submit and manage a Service Request
- View Knowledge Base articles
- Sign up for product notifications
- Download software and technical documentation
- View how-to-videos at www.YouTube.com/OneIdentity
- Engage in community discussions
- Chat with support engineers online
- View services to assist you with your product
A

**Active Directory connector**  
System connector for connecting to an Active Directory system.

**Active Roles connector**  
System connector for connecting to an Active Directory system though One Identity Active Roles.

**Azure Active Directory connector**  
System connector for connecting to an Azure Active Directory system.

B

**Base mapping**  
Mapping from which to inherit a mapping.

**Base object**  
Base objects contain data about the target system to be synchronized, its system connection and the synchronization server.

C

**Cloud application**  
Mapping a cloud application in the One Identity Manager's Universal Cloud Interface Module.

**Connector schema**  
The system connector extends the target system schema with additional information which is required for mapping in the Synchronization Editor.

**CSV connector**  
System connector which allow data to be imported from CSV files.

D

**Database connection**  
System connection to the One Identity Manager database.
**Direction of synchronization**
Direction in which synchronization is run. The master system is defined by the direction of synchronization.

**E**

**Exchange Online connector**
System connector for connecting to an Exchange Online system.

**Extended schema**
A schema can be customized in the Synchronization Editor, for example, to allow or simplify mapping of complex schema properties. Label the modified schema as "extended schema".

**F**

**Filter**
see revision filter; see object filter; see system filter; see object selection

**G**

**G Suite connector**
System connector for connecting to an G Suite.

**H**

**Hierarchy filter**
Used to limit the number of objects to be loaded directly into the target system. It is based on the real objects of the target system. This filter can be used for defining the scope.

**I**

**IBM Notes connector**
System connector for connecting to an IBM Notes system.

**Intersection**
Objects which occur in both of the connected systems

**J**

**Job server**
Server with the One Identity Manager Service installed.
**LDAP connector**
System connector for connecting to an LDAP system.

**Maintenance**
Post processing of data that could not be saved during synchronization.

**Mapping**
List of object matching rules and property mapping rules which map the schema properties of two connected systems to one another.

**Mapping direction**
Direction of synchronization permitted for mapping schema properties.

**Microsoft Exchange connector**
System connector for connecting to an Microsoft Exchange system.

**Native database connector**
System connector for connecting to an external database.

**Object filter**
Filter for limiting the results of the scope. For example, the system objects of an Active Directory domain are limited to one container.

**Object matching rule**
Specifies how a concrete object of a target system schema class can be set in relation to a concrete schema class object of a One Identity Manager schema. An object matching rule encompasses the target system schema property based on which the target system objects can be uniquely identified.

**Object selection**
Filter for limiting the number of objects to synchronize. For example, the system objects of an domain are limited to one container. You can also filter single objects.

**One Identity Manager connector**
System connector for connecting to a One Identity Manager database.

**One Identity Manager schema**
The One Identity Manager data model.
**Oracle E-Business Suite connector**
System connector for connecting to an Oracle E-Business Suite.

**Performance/memory factor**
Percentage with which the reload threshold, partition size and bulk level are applied to an object type.

**Processing Method**
Method used to process objects within a synchronization step. Example: Add object (insert), update object (update), delete object (delete). Processing methods and their mandatory parameters are define with the schema type.

**Project wizard**
Wizard which aids configuration of synchronization projects.

**Property mapping rule**
Describes how a target system schema property is mapped in the One Identity Manager schema.

**Provisioning**
Actual changes to an object in the One Identity Manager database (added, modified, deleted) are made immediately written to the target system.

**quota**
A set of system object that can be processed in a synchronization step with a particular processing method.

**Reference scope**
Used to resolve reference between objects of different systems. The reference scope specifies the system in which objects for resolving references may be found.

**Relative complement**
Objects that only occur in one of the two system systems involved in synchronizing.

**Remote connection server**
Job server installed with the RemoteConnectPlugin and the target system connector is installed. If direct access to the target system is not possible, a remote connection can be set up. Communication between the Synchronization Editor and Target System is done through a remote connection server.
**Revision**
Highest value for change data for all system objects to be synchronized when synchronization is run. This value is saved in the table "DPRRevisionStore", column "value".

**Revision filter**
Filters all system objects not changed since the last synchronization. The deciding factor being the revision property modification. Synchronization can be speeded up with revision filtering.

**Revision property**
Schema property containing the revision counter of a system object. Objects that have not changed since the last synchronization are found through the revision property.

**Rogue modification**
A change that was not made in the synchronization master system. Example: the direction of synchronization is define as "target system". This makes One Identity Manager the master system for synchronization. Changes to the target system are identified as invalid.

**S**

**SAP R/3 connector**
System connector for connecting to an SAP R/3 system.

**Schema**
Data model of a connected system. The schema describes all the master data from the connected system. see target system schema; see One Identity Manager schema; see connector schema; see extended schema

**Schema Browser**
The component of Synchronization Editor which shows details of the connected target system’s entire schema and the details of the entire One Identity Manager schema.

**Schema class**
Subset of a schema type. The result list of a schema type is filtered by defined criteria. Example: Active Directory contacts are Active Directory user accounts with the property objectclass = "CONTACT".

**Schema Editor**
The component of the schema browser which can be used to edit user-specific virtual schema properties.

**Schema property**
Property of a schema type. Property of a schema type. Refers to exactly one column of a table or view of the database based schema or exactly one object type property of the non-database based schema.
**Schema type**
Defines an object type within a schema. Refers to exactly one table or view of the database based schema or exactly one object type of the non-database based schema.

**SCIM connector**
System connector, which connects a cloud application using the System for Cross-domain Identity Management specification.

**Scope**
Section of a connected system which should be synchronized. The scope is defined with a filter.

**SharePoint connector**
System connector for connecting to a SharePoint farm.

**SharePoint Online connector**
System connector for connecting to a SharePoint Online farm.

**Start up configuration**
Specifies which synchronization configuration components are used for a specific synchronization. Specifies the synchronization schedule.

**Synchronization**
The process of comparing data between One Identity Manager and a target system. Objects and their properties are compared by fixed rules. Synchronization results in the identical data situation in the target system and One Identity Manager database.

**Synchronization buffer**
One Identity Manager table with information about referenced objects which could not be assigned by synchronization.

**Synchronization Editor**
One Identity Manager tool for configuring target system synchronization.

**Synchronization Editor Command Line Interface**
Synchronization Editor components with which synchronization projects can be created on the command line.

**Synchronization Editor Module for Windows PowerShell**
Synchronization Editor components with which synchronization projects can be created by Windows PowerShell CmdLet.

**Synchronization engine**
One Identity Manager component which executes synchronization and provisioning tasks.

**Synchronization master**
System which is verified as data master. The master system is specified by the direction of synchronization.
**Synchronization of single objects**
Recent changes to an object in the target system (modified, deleted) are immediately written to the One Identity Manager database.

**Synchronization project**
A collection of all data required for synchronizing and provisioning a target system. Connection data, schema classes and properties, mappings, and synchronization workflows all belongs to this.

**Synchronization server**
Job server installed with the target system connector. All One Identity Manager actions are executed against the target system environment on the synchronization server.

**Synchronization step**
Specific rule for processing exactly two schema classes.

**Synchronization workflow**
see Workflow

**System connector**
Software interface for accessing a connected system.

**System filter**
Used to limit the number of objects to synchronize in the connected system. The connector only loads the object found through this filter.

**System object**
Object from the target system. A system object always belongs to a schema class.

**T**

**Target System**
An instance of a target system in which the employees managed by One Identity Manager have access to network resources. Example: An Active Directory domain X for target system type "Active Directory", a directory Y for target system type "LDAP", a client Z for target system type "SAP R/3".

**Target System Browser**
The component of Synchronization Editor with which objects in the connected system can be viewed and edited.

**Target system schema**
Data model of a specific target system. Describes all the data originating from the target system.

**Target System Synchronization**
Post processing of objects that were marked as outstanding by synchronization.
**Target system type**
Grouping similar target systems. Example: Active Directory, LDAP, SharePoint.

**Template**
Template used by the project wizard to create a preconfigured synchronization project.

**Universal Cloud Interface connector**
System connector for connecting to the Universal Cloud Interface.

**Variable set**
Used to configure synchronization configuration for different systems. Each variable set contains at least the variables for the system connection parameter. The value of the variables are redefined for different uses.

**Virtual schema properties**
Schema class property added by the system connector or the user.

**Windows PowerShell connector**
System connector for connecting non-native supported target systems. Windows PowerShell cmdlets are used to execute read/write operations in the target system.

**Workflow**
Collection of all the synchronization steps to be executed.

**Workflow wizard**
Wizard which aids configuration of synchronization workflows.
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