



OX Connector app

Release 2.2.5

Univention GmbH

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Welcome to the documentation about the **OX Connector** app. The app installs a connector to provision selected users and groups to a remote OX App Suite installation through the OX SOAP API. The app **doesn't** install OX App Suite to UCS (Univention Corporate Server).

This document addresses system administrators, who:

- operate UCS and OX App Suite.
- want to centrally manage users and groups in UCS.
- want to provision permitted users to OX App Suite.

This document covers the following topics:

1. *Installation* (page 3) about prerequisites and how to install with web browser and command-line.
2. *Configuration* (page 11) with a reference list about the app settings of the OX Connector app.
3. *Architecture* (page 15) of the app, how the connector works and the connector cache.
4. *Limitations* (page 19) of the app.
5. *Troubleshooting* (page 21) about log files, health check, queuing and rebuild the cache.
6. *Changelog* (page 27) about what changed in the different app versions.

This document doesn't cover the following topics:

- Installation, setup and usage of OX App Suite, see *App Suite Admin Guide 7.10.5* [1].
- Installation, setup and usage of UCS, see *UCS 5.0 Manual* [2].

To understand this document, you need to know the following concepts and tasks:

- Use and navigate in a remote shell on Debian GNU/Linux derivative Linux distributions like UCS. For more information, see *Shell and Basic Commands*¹ from *The Debian Administrator's Handbook*, Hertzog and Mas [3].
- *Manage an app through Univention App Center*² in *UCS 5.0 Manual* [2].

Your feedback is welcome and highly appreciated. If you have comments, suggestions, or criticism, please [send your feedback](#)³ for document improvement.

¹ <https://www.debian.org/doc/manuals/debian-handbook/short-remedial-course.en.html#sect.shell-and-basic-commands>

² <https://docs.software-univention.de/manual/5.0/en/software/further-software.html#computers-softwareselection>

³ <https://www.univention.com/feedback/?ox-connector=generic>

INSTALLATION

The **OX Connector** app connects the UCS identity management with the OX App Suite database. For more information about how it works, see *How the connector works* (page 16).

1.1 Prerequisites

Before you as administrator can install the **OX Connector** app, you need to make sure that your environment fulfills the prerequisites.

1.1.1 OX App Suite server

For the *OX App Suite* server, you must ensure the following prerequisites:

1. The environment requires an installed OX App Suite instance. This documentation assumes that an OX App Suite installation already exists.

For limitations about the **OX App Suite** app from Univention App Center and the connector, see *Integration of OX Connector and OX App Suite app* (page 19).

For installation of OX App Suite, see *App Suite Admin Guide 7.10.5* [1].

2. The OX App Suite instance must allow SOAP requests, so that the UCS system, where the *administrator installs the OX Connector app* (page 4), can connect to `/webservices`.
3. You have to set up an administrator user in OX App Suite that can create OX contexts.

The OX Connector can manage OX contexts. The installation of the **OX Connector** app needs username and password for that user and references them in the setting `OX_MASTER_ADMIN` (page 12) and `OX_MASTER_PASSWORD` (page 12).

For manually managing OX contexts without the OX Connector, see *Contexts* (page 7).

4. Since version 2.2.0, OX must allow the use of duplicated *displaynames*. To enable it, add the following lines to the `user.properties` file.

```
com.openexchange.user.enforceUniqueDisplayName=false
com.openexchange.folderstorage.database.preferDisplayName=false
```

Note: This is configured by default in version 7.10.6-ucs7 of **OX App Suite** from the App Center.

1.1.2 UCS domain

Another prerequisite needs some steps in the UCS domain. To use the **OX Connector** app, the central LDAP directory needs the *referential integrity* overlay enabled. The overlay ensures that UDM objects provided by the OX Connector keep their integrity and always reference user objects correctly in the LDAP directory.

If you install **OX Connector** on Primary Directory Node, the app already takes care of the necessary step. No further action required.

If you install **OX Connector** on other UCS system roles⁴ than the Primary Directory Node, you need to run the following commands:

Listing 1.1: Activate OpenLDAP *referential integrity* overlay on Primary Directory Node.

```
$ ucr set ldap/refint=true
$ service slapd restart
```

For more information about the *referential integrity* overlay, see *Referential Integrity in OpenLDAP Software 2.4 Administrator's Guide* [4].

1.2 Installation on UCS system

As administrator, you can install the **OX Connector** app like any other app with Univention App Center. Make sure to fulfill the *Prerequisites* (page 3).

UCS offers two different ways for app installation:

- With the web browser in the UCS management system
- With the command-line

For general information about Univention App Center and how to use it for software installation, see *Univention App Center*⁵ in *UCS 5.0 Manual* [2].

1.2.1 With the web browser

To install **OX Connector** from the UCS management system, use the following steps:

1. Use a web browser and sign in to the UCS management system.
2. Open the *App Center*.
3. Select or search for *OX Connector* and open the app with a click.
4. To install the OX Connector, click *Install*.
5. Adjust the *App settings* to your preferences. For a reference, see *Configuration* (page 11).
6. To start the installation, click *Start Installation*.

Note: To install apps, the user account you choose for login to the UCS management system must have domain administration rights, for example the username `Administrator`. User accounts with domain administration rights belong to the user group `Domain Admins`.

For more information, see *Delegated administration for UMC modules*⁶ in *UCS 5.0 Manual* [2].

⁴ <https://docs.software-univention.de/manual/5.0/en/domain-ldap/system-roles.html#system-roles>

⁵ <https://docs.software-univention.de/manual/5.0/en/software-app-center.html#software-appcenter>

⁶ <https://docs.software-univention.de/manual/5.0/en/central-management-umc/delegated-administration.html#delegated-administration>

1.2.2 With the command-line

To install the **OX Connector** app from the command-line, use the following steps:

1. Sign in to a terminal or remote shell with a username with administration rights, for example `root`.
2. Adjust the settings to your preferences with the appropriate installation command. For a reference, see *Configuration* (page 11). To pass customized settings to the app during installation, see the following command template:

```
$ univention-app install ox-connector --set $SETTING_KEY=$SETTING_VALUE
```

Example:

```
$ univention-app install ox-connector --set \  
OX_MASTER_ADMIN="oxadminmaster" \  
OX_MASTER_PASSWORD="some secure password" \  
LOCAL_TIMEZONE="Europe/Berlin" \  
OX_LANGUAGE="de_DE" \  
DEFAULT_CONTEXT="10" \  
OX_SMTP_SERVER="smtp://my-smtp.example.com:587" \  
OX_IMAP_SERVER="imap://my-imap.example.com:143" \  
OX_SOAP_SERVER="https://my-ox.example.com"
```

Note: The installation process asks for the password of the domain administrator Administrator. To use another username and password for installation, pass different values with the options `--username` and `--pwdfile`. For more information, see **`univention-app install -h`**.

The **OX Connector** centrally manages users, groups, OX contexts, OX access profiles and functional accounts with the web based management system in UCS. This section shows how.

To follow the tasks, you need to sign-in to Univention Management Console (UMC) with a user account with domain administration rights. For more information, see [Delegated administration for UMC modules⁷](#) in *UCS 5.0 Manual* [2].

2.1 Contexts

OX App Suite uses *contexts* to collect users, groups, and resources for collaboration in a virtual space. Data from one context isn't visible to other contexts. For more information about contexts, see *App Suite Context management* [5].

To view, add, update, or delete a context, you navigate to *Domain* ▶ *OX Contexts* in UMC.

Note: If you don't want the OX Connector to manage *contexts*, you can manually manage them in OX App Suite, as long as you maintain the *context* configuration for the OX Connector in the `/var/lib/univention-appcenter/apps/ox-connector/data/secrets/contexts.json`.

This approach doesn't require to share the credentials for the OX context administrator.

2.2 Users

To enable users for OX App Suite, administrators can either create user accounts or update existing ones.

To enable a user account for OX App Suite, run the following steps:

1. Navigate to *Users* ▶ *Users* in UMC and click to open.

To create a user account:

2. Click *Add* to create a user account and select the *User template open-xchange groupware account*.
3. Click *Next*.
4. Fill out the required fields. To fill out more attributes, click *Advanced*.
5. When finished, click *Create user*.

To update a user account:

2. Click the username for the user you want to update.
3. Go to the *Apps* tab and activate the *Open-Xchange* checkbox. The tab *Open-Xchange* appears.
4. Define an email address for the user at *General* ▶ *Primary e-mail address (mailbox)*.

⁷ <https://docs.software-univention.de/manual/5.0/en/central-management-umc/delegated-administration.html#delegated-administration>

5. Click *Save*.

See also:

User management⁸ in *UCS 5.0 Manual* [2].

2.3 Groups

The **OX Connector** app adds a group to the same context as the group members. When the last group member leaves the group, the connector removes the group from OX App Suite.

To enable a group for OX App suite, run the following steps:

1. Navigate to *Users* ▶ *Groups* in UMC and click to open.

To create a group:

2. Click *Add* to create a group.
3. On the *General* tab, fill out the required fields and add users as group members.
4. Go to the *OX App Suite* tab and activate the *Activate Group in OX*.
5. Click *Create group*.

To update a group:

2. Click a group to edit.
3. The UDM module *Groups* automatically enables *Activate Group in OX*, when you edit a group. UMC displays a notification.

If you don't want to enable the group, clear the checkbox *Activate Group in OX* on the *OX App Suite* tab.

4. Click *Save*.

Warning: When you as administrator update a group, that already is a group in OX App Suite, and you clear the checkbox *Activate Group in OX* on the *OX App Suite* tab, the connector removes this group from OX App Suite.

To update a group from the command-line, run the following command:

```
$ udm groups/group modify --dn $dn_of_group --set isOxGroup=OK
```

To remove a group from OX App Suite:

2. Click a group to edit.
3. Go to the *OX App Suite* tab and clear the checkbox *Activate Group in OX*.
4. Click *Save*.

To remove the group from OX App Suite through command-line, run the following command:

```
$ udm groups/group modify --dn $dn_of_group --set isOxGroup=Not
```

See also:

Group management⁹ in *UCS 5.0 Manual* [2].

⁸ <https://docs.software-univention.de/manual/5.0/en/user-management/index.html#users-general>

⁹ <https://docs.software-univention.de/manual/5.0/en/groups.html#groups>

2.4 Access profiles

The OX Connector already provides ready-to-use *access profiles* for OX App Suite users. Administrators can create custom *access profiles* in UMC in the *LDAP directory* module at *Domain* ▶ *LDAP directory* at the directory location `open-xchange/accessprofiles/`.

For limitations about plausibility verification, see *No plausibility validation in access profile rights* (page 20).

2.5 Functional accounts

New in version 2.0.0.

OX App Suite shares functional mailboxes among other users in the same context.

With the UDM (Univention Directory Manager) module `oxmail/functional_account` administrators can add, update or delete objects for functional accounts. OX App Suite users with the same functional account share the read status. Emails to addresses of functional accounts show up in the OX Mail view for every user where administrators granted the permission.

2.6 Resources

OX App Suite uses *OX Resources* to manage resources like rooms or equipment that users can book for appointments. For more information about resource management, see *App Suite Resource management* [6].

To view, add, update, or delete a resource, you navigate to *Domain* ▶ *OX Resources* in UMC.

CONFIGURATION

The following reference shows the available settings for the **OX Connector** app.

3.1 App Settings

OX_SOAP_SERVER

Defines the server that has OX App Suite installed. Provide the protocol and the FQDN, for example `https://ox-app-suite.example.com`.

[OX_SOAP_SERVER](#) (page 11) instructs the OX Connector app in the Docker container, where it must look for the OX App Suite system. The Docker container must resolve the FQDN.

Required	Type	Initial value
Yes	String	<code>https://\$hostname.\$domainname</code>

For secure connections with HTTPS the Docker container needs to validate the certificate.

Note: If the OX App Suite instance uses a self-signed certificate or a certificate it can't validate, the OX Connector Docker container needs the root certificate for validation.

For example, to add a custom certificate, run the following commands on the UCS system, where OX Connector is installed:

```
$ univention-app shell ox-connector
/oxp # wget --no-check-certificate \
  https://ox-app-suite.example.com/root-ca.crt \
  -O /usr/local/share/ca-certificates/ox-app-suite.crt
/oxp # update-ca-certificates
"WARNING: ca-certificates.crt does not contain exactly one certificate or CRL:␣
↪skipping"
```

Administrators can ignore the warning.

OX_IMAP_SERVER

Defines the default IMAP server for new users, if not explicitly set at the user object.

Required	Type	Initial value
Yes	String	<code>imap://\$hostname.\$domainname:143</code>

OX_SMTP_SERVER

Defines the SMTP server for new users, if not explicitly set at the user object.

Required	Type	Initial value
Yes	String	<code>smtp://\$hostname.\$domainname:587</code>

DEFAULT_CONTEXT

Defines the default context for users. The OX Connector doesn't create the `DEFAULT_CONTEXT` automatically. You as administrator must ensure, the default context exists before the OX Connector provisions the first user. To create a context, see *Contexts* (page 7).

Required	Type	Initial value
Yes	Integer	10

OX_LANGUAGE

Defines the default language for new users

Required	Type	Initial value
Yes	String	<code>de_DE</code>

LOCAL_TIMEZONE

Defines the default timezone for new users

Required	Type	Initial value
Yes	String	<code>Europe/Berlin</code>

OX_MASTER_ADMIN

Defines the user for the OX App Suite administrator user, also called *OX Admin user*. This user can create, modify, and delete contexts. The user must already exist. The administrator defines the username for the *OX Admin user* during the installation of OX App Suite.

Required	Type	Initial value
Yes	String	<code>oxadminmaster</code>

OX_MASTER_PASSWORD

Defines the password for the *OX Admin user*.

Required	Type	Initial value
No	Password	N/A

OX_IMAP_LOGIN

Defines the value that is used by OX to log in to the user's inbox. If this value is empty it is set to the user's mail address.

Required	Type	Initial value
No	String	N/A

Note: In cases where SSO is to be used, this variable has to be appended with an asterisk and the mail server's master user. For Dovecot this would be **dovecotadmin*. In this case `OX_IMAP_LOGIN` can be set to `'{*}dovecotadmin'`. The curly braces are used as a template for the primary mail address. The resulting *imaplogin* value would then look like this:

```
myuser@maildomain.de*dovecotadmin
```

OX_FUNCTIONAL_ACCOUNT_LOGIN_TEMPLATE

A template that defines the value which is used by OX to log in to the functional account inbox. If this value is empty it is set to a concatenation of the functional account LDAP entry UUID and the user LDAP uid.

This template has to include the functional account entry UUID (*fa_entry_uuid*) and can additionally include any OX user UDM property (including the user's *entry_uuid* and *dn*). Every value used in this template must be enclosed by `{{ }}` e.g `{{fa_entry_uuid}}{{username}}`. Multiple values can optionally be separated by any combination of the characters `;` `+`.

Required	Type	Initial value
No	String	N/A

Note: If the UCS OX App Suite is used, this app setting can be left empty, which is equivalent to using the value `{{fa_entry_uuid}}{{username}}`.

OX-Connector installations that previously only used the functional account entry UUID should configure this app setting to `{{fa_entry_uuid}}`.

Some examples:

```
"{{fa_entry_uuid}}::{{entry_uuid}}" # Functional account entry UUID and user_
↳UUID separated by two colons.
"{{username}}+{{fa_entry_uuid}}+{{dn}}" # username, functional account entry_
↳UUID and user dn separated by a '+'
```

3.2 Univention Configuration Registry variables

ox/context/id

The app setting *DEFAULT_CONTEXT* (page 12) sets the value of the Univention Configuration Registry variable *ox/context/id* (page 13).

Upon installation of the app **OX Connector**, the OX Connector creates the extended attribute *oxContext* and uses the value from *ox/context/id* (page 13) as initial value for the extended attribute *oxContext*.

When an administrator creates a new user account that the OX Connector synchronizes, UDM sets the OX context for the user account to value of the extended attribute *oxContext*.

Caution: The UCR variable *ox/context/id* (page 13) **isn't** for manual usage.

Changing the variable **doesn't** change the OX context on existing user accounts.

Changing the value of the app setting *DEFAULT_CONTEXT* (page 12) does **neither** change *ox/context/id* (page 13) **nor** the extended attribute *oxContext*.

ARCHITECTURE

The **OX Connector** app architecture consists of the following elements:

- The operating environment UCS with the App Center and the Docker engine running OX Connector.
- The OX Connector software inside a Docker image.
- The OpenLDAP LDAP directory in UCS as identity management source for OX App Suite.

4.1 Overview

The **OX Connector** app consists of a Docker image with all the software needed to provision user identities from UCS identity management to OX App Suite. The OX connector connects to the OX App Suite SOAP API and creates, updates, or deletes object entries in OX App Suite depending on what changed in the UCS LDAP directory with relevance to OX App Suite.

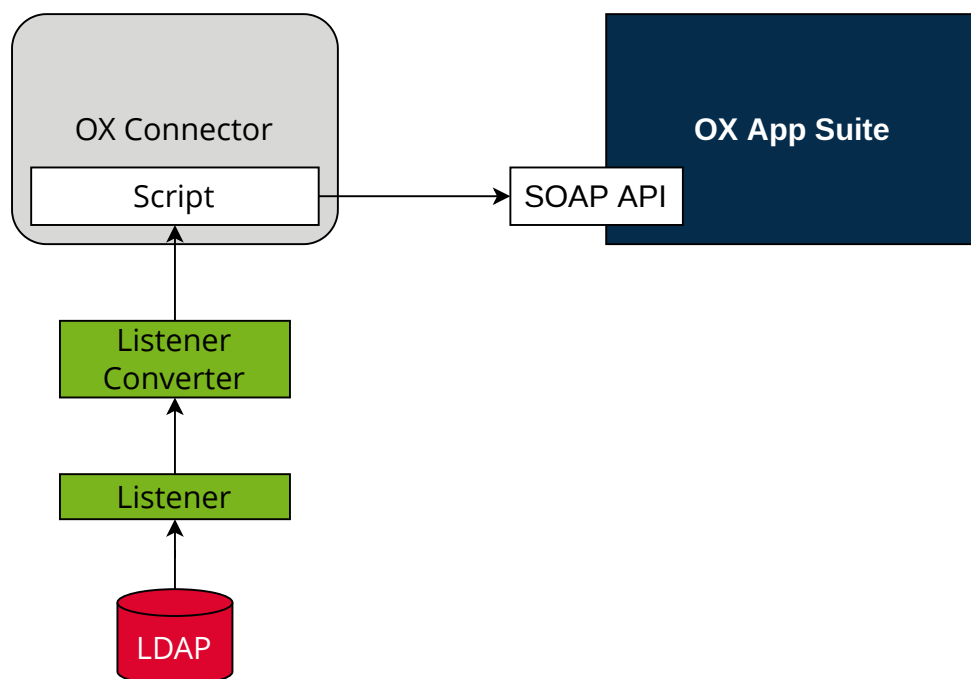


Figure 4.1: OX Connector app architecture

View focuses on the elements LDAP Directory, Listener, Listener Converter, OX Connector with the provisioning script, OX App Suite, and its SOAP API.

LDAP

The OpenLDAP software provides the *LDAP* directory in UCS. The LDAP directory stores all identity and infrastructure data of the UCS domain. For more information, see [LDAP directory](https://docs.software-univention.de/manual/5.0/en/domain-ldap/ldap-directory.html#domain-ldap)¹⁰ in *UCS 5.0 Manual* [2].

¹⁰ <https://docs.software-univention.de/manual/5.0/en/domain-ldap/ldap-directory.html#domain-ldap>

Listener

The App Center creates a *Listener* module for the **OX Connector** app, when it installs the app on a UCS system. The *Listener* writes the `entryUUID` of the LDAP object that changed, in JSON format to `/var/lib/univention-appcenter/listener/ox-connector/timestamp.json`. Each change creates one file.

Listener Converter

The *Listener Converter* is a services running on UCS with the following responsibility:

1. Process the JSON files from the *Listener* ordered by the timestamp in the filename.
2. Request the LDAP object attributes through UDM for each `entryUUID`.

The converter writes the results in JSON format to `/var/lib/univention-appcenter/apps/ox-connector/data/listener/timestamp.json`.

OX Connector

OX Connector connects the UCS identity management with OX App Suite. The connector receives data about changes in the LDAP directory. A *Script* handles the data, processes it and sends it to the *SOAP API* in OX App Suite.

Script

The *Script* runs inside the Docker container of the OX Connector. It handles the files in JSON format from the *Listener Converter*, processes it and sends data to the *SOAP API*.

The *Script* doesn't run multiple times at the same time.

It exits upon the first failed *SOAP API* request and repeats once the *Listener Converter* triggers the *Script*.

OX App Suite

OX App Suite is the groupware and collaboration software from Open-Xchange.

SOAP API

OX App Suite uses [SOAP¹¹](https://en.wikipedia.org/wiki/SOAP) as network protocol to receive data and run remote procedure calls. The connector uses the SOAP API to create, update, or delete object entries in OX App Suite.

4.2 How the connector works

The OX Connector reacts on changes in the LDAP directory in UCS and relies on modules in the Univention Directory Manager (UDM) modules. UDM is a layer on top of the LDAP directory in UCS.

UCS provides the following UDM modules:

- `users/user`
- `groups/group`

The OX Connector provides the following UDM modules:

- `oxmail/oxcontext`
- `oxresources/oxresources`
- `oxmail/accessprofile`

The OX Connector reacts on changes to the listed UDM modules and sends data to the SOAP API in OX App Suite.

¹¹ <https://en.wikipedia.org/wiki/SOAP>

4.2.1 Access profiles

Upon changes in the UDM module `oxmail/accessprofile`, the connector rewrites the local file `/var/lib/univention-appcenter/apps/ox-connector/data/ModuleAccessDefinitions.properties` and doesn't send data to the SOAP API in OX App Suite. The module handles the user rights and roles in OX App Suite. Administrators find the *access profiles* in UMC in the module LDAP directory at `open-xchange ▶ accessprofile`.

4.2.2 Provisioning

In detail, the provisioning has the following steps, see [Figure 4.2](#):

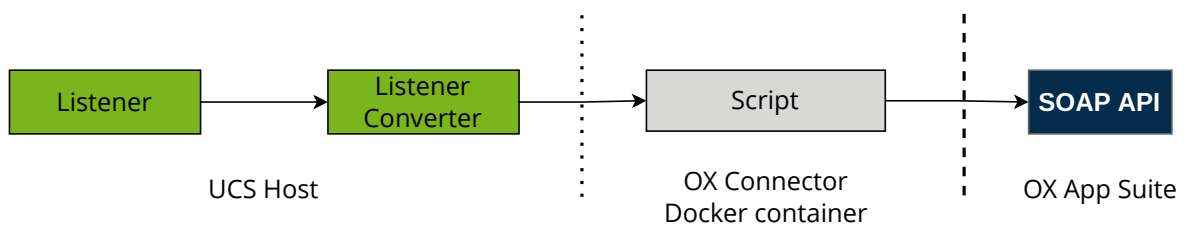


Figure 4.2: Provisioning procedure

1. The *Listener* writes one file per change.
2. The *Listener Converter* writes one file per change with the LDAP object attributes.
3. The *Listener Converter* triggers the *Script* in the OX Connector Docker container.
4. In the Docker container, the *Script* iterates over the JSON files from the *Listener Converter*.
5. After the *SOAP API* received the data and processed them successfully, the *Script* deletes each JSON file.
6. The *Listener Converter* waits for 5 seconds and restarts the at step 2.

For more information about the file contents of the *Listener* and *Listener Converter*, see [Overview](#) (page 15).

4.3 Provisioned attributes

The **OX Connector** provisions a lot of attributes to OX App Suite. A detailed description is beyond the scope of this document.

The OX Connector comes with the source code. The user attributes for provisioning locate in the function `update_user()` in `univention-ox-provisioning/univention/ox/provisioning/users.py` inside the Docker container. To view the attributes, for example with `vim`, run the following command on the UCS system with OX Connector installed. Replace `$version` with the proper Python version used in the Connector:

Listing 4.1: Example for how to view the definition of provisioned attributes.

```

$ univention-app shell ox-connector \
  cat /usr/lib/python"$version"/site-packages/univention/ox/provisioning/users.py \
  | vim -
  
```

Likewise, the attributes for groups, context, and resources locate in the respective source files in the `update_*()` function.

4.4 Cache

New in version 2.0.0.

OX App Suite creates an *internal ID* for every user object it creates or updates. The OX Connector saves this *internal ID* in the JSON files, when it processed the objects without errors. The connector doesn't store that ID in the UCS LDAP directory, but maintains a file based cache on *internal IDs* created by OX App Suite.

The directory for the JSON files is `var/lib/univention-appcenter/apps/ox-connector/data/listener/old/`.

When the *Listener Converter* updates groups in OX App Suite, the request to the *SOAP API* must include the internal ID of all group members. The connector would need to ask the database of OX App Suite for the *internal ID* of each group member, involving network requests and database queries. To speed up the processing, the OX Connector uses the *internal ID* from the cache.

LIMITATIONS

To ensure a smooth operation of the **OX Connector** app on UCS, you as administrator need to know the following limitations.

5.1 Integration of OX Connector and OX App Suite app

Starting with version 2.1.2, Univention does support the use of **OX Connector** towards the **OX App Suite** app from Univention App Center. The **OX Connector** takes over the provisioning, the **OX App Suite** ships the actual groupware.

However, the **OX Connector** needs administrative credentials to create context objects in OX' database. The installation process doesn't know these credentials. Thus, you may need to reconfigure the **OX Connector** after you installed **OX App Suite** successfully. The reconfiguration runs automatically, if, and only if, both apps locate on the same UCS system.

If not, you find the password on the UCS system that runs **OX App Suite** in the file `/etc/ox-secrets/master.secret`. The username of the administrative account is `oxadminmaster`. You can set the credentials in the app settings of the **OX Connector**, see *Configuration* (page 11).

5.2 OX Connector stops at faulty items

When the **OX Connector** encounters a faulty queue item that it can't process, it stops the provisioning at the item and logs the filename with its path in the *Listener Converter* log file, see *Log files* (page 21).

Despite the stop, the *Listener* continues to add items to the queue. After the administrator removed the faulty queue item, the *Listener Converter* continues to process the queue and also takes care of the added items.

As administrator, you need to resolve that conflict manually when it happens, see *Provisioning stops working* (page 22). After the conflict resolution, the connector continues to process the provisioning queue.

Design decision

The **OX Connector** doesn't provide logic to resolve conflicts automatically, because the conflict causes can vary a lot. For example, when connector would ignore the conflict and continue, a later operation may refer to the ignored item. The connector can't complete it, because the current queue item refers to a previous, unprocessed item. The **OX Connector** could ignore the next conflict again, and again. The ignores pile up unresolved conflicts that can lead to a heavy conflict or a serious problem with the user provisioning without any relation to the actual root cause. Administrators would have quite a hard job to resolve the conflict.

5.3 No plausibility validation in access profile rights

The **OX Connector** app doesn't evaluate permission level for created *access profiles* and tries to create any access profile.

For more information, see [OX App Suite Permission Level](#)¹².

¹² https://oxpedia.org/wiki/index.php?title=AppSuite:Permission_Level

TROUBLESHOOTING

When you encounter problems with the operation of the **OX Connector** app, this section provides information where you can look closer into and to get an impression about what's going wrong.

6.1 Log files

The **OX Connector** app produces different logging information in different places.

Listener Converter: /var/log/univention/listener_modules/ox-connector.log

Contains log information from the *Listener Converter* about create, update and delete actions of objects.

It also shows warnings and errors when the OX Connector configuration isn't correct, or the connector can't establish a connection to the *SOAP API*.

App Center: /var/log/univention/appcenter.log

Contains log information around activities in the App Center.

The App Center writes OX Connector relevant information to this file, when you run app lifecycle tasks like install, update and uninstall or when you change the app settings.

Domain join: /var/log/univention/join.log

Contains log information from the join processes. When the App Center install OX Connector, the app also joins the domain.

6.2 Health check

First, have a look at the log file for the *Listener Converter* and look for warnings and errors, see *Log files* (page 21).

The OX Connector has a good health when the number of files for provisioning for the *Listener* and the *Listener Converter* is low. For a quick verification, run the following command on the UCS system with the OX Connector installed:

Listing 6.1: Verify the number of unprocessed files for the *Listener*.

```
$ DIR_LISTENER="/var/lib/univention-appcenter/listener/ox-connector"
$ ls -l "$DIR_LISTENER"/*.json 2> /dev/null | wc -l
0
```

Listing 6.2: Verify the number of unprocessed files for the *Listener Converter*.

```
$ DIR_CONVERTER="/var/lib/univention-appcenter/apps/ox-connector/data/listener"
$ ls -l "$DIR_CONVERTER"/*.json 2> /dev/null | wc -l
0
```

The *Listener Converter* logs consecutive errors in the log file, for example:

```
INFO This is consecutive error #{some number}
```

Such entries indicate that the provisioning has issues with processing the queue. For more information, see [Queuing](#) (page 22).

6.3 Provisioning stops working

When the provisioning stopped working, a previous change in UDM is a probable reason and the OX Connector doesn't know how to proceed. The connector retries the action over and over again until an administrator repairs the cause manually.

First, see the [Log files](#) (page 21) and look for warnings and errors. If it's not a temporary problem like for example network connectivity, the fix requires manual action.

As a last resort, the administrator can delete the flawed file. The log file reveals the flawed file and its path, see [Delete one item from the queue](#) (page 22).

6.4 Queuing

The queue for provisioning consists of JSON files. [How the connector works](#) (page 16) describes the connector's data processing. Administrators can manually intervene with the queue in the following cases.

6.4.1 Delete one item from the queue

Administrators can remove an item in the queue, if the connector can't process it and interrupts the provisioning process. The connector retries to provision this item and continually fails.

To find and remove the problematic item from the queue, follow these steps:

1. Open the log file of the [Listener Converter](#). For the log file location, see [Log files](#) (page 21).
2. Find the filename of the item that the [Listener Converter](#) retries to provision. For example, the log file shows:

```
Error while processing /var/lib/univention-appcenter/apps/ox-connector/data/  
→listener/$timestamp.json
```

\$timestamp has the format %Y-%m-%d-%H-%M-%S.

3. Remove the problematic item:

```
$ rm /var/lib/univention-appcenter/apps/ox-connector/data/listener/$timestamp.  
→json
```

6.4.2 Re-provision one specific UDM object

The OX Connector allows to re-provision one UDM object to OX App Suite. The following snippet provisions one user object:

Listing 6.3: Re-provision one UDM object

```
DN="uid=user100,cn=users,$(ucr get ldap/base) "  
ENTRY_UUID="$(univention-ldapsearch -b "$DN" + | grep entryUUID | awk '{ print $2 }  
→') "  
cat > /var/lib/univention-appcenter/listener/ox-connector/$(date +%Y-%m-%d-%H-%M-  
→%S).json <<- EOF  
{
```

(continues on next page)

(continued from previous page)

```

"entry_uuid": "$ENTRY_UUID",
"dn": "$DN",
"object_type": "users/user",
"command": "modify"
}
EOF

```

6.4.3 Re-provision all data

Warning: Depending on the number of users and groups in the UCS LDAP directory, this task may take a lot of time.

Reprovisioning all data isn't recommended.

The following command reads all UDM objects from the UCS LDAP directory and adds them to the provisioning queue:

Listing 6.4: Re-provisioning all UDM objects to OX App Suite

```
$ univention-directory-listener-ctrl resync ox-connector
```

The re-provisioning won't run any *delete* operations, because the Listener only adds existing UDM objects to the queue.

Caution: The OX Connector may decide to delete objects based on data in the JSON files. For example `isOxGroup = Not in a group object`.

6.5 Rebuild cache

The *internal ID* of objects in the database of OX App Suite can become corrupted, for example after a backup restore of the database. For more information about the cache, see [Cache](#) (page 18).

To rebuild the cache, run the following commands:

Listing 6.5: Rebuild cache for *internal ID*

```
$ univention-app shell ox-connector
/oxp # update-ox-db-cache --delete
/oxp # update-ox-db-cache
```

Changed in version 2.0.0: Rebuild the cache after an update to version 2.0.0, because previous versions didn't maintain the cache for the *internal ID*.

Otherwise, the OX Connector app falls back into the much slower mechanism and runs a database query per user during the provisioning.

Tip:

Retrieve all users per context in one request

Rebuilding the cache may take a long time and depends on the amount of users in the OX App Suite database.

`update-ox-db-cache --build-cache` can speed up the rebuild, because it retrieves all users of a context with one request.

Warning:

Memory consumption

On the UCS system with the OX Connector, the rebuild process may use up to 1 GB memory per 10,000 users in the database for OX App Suite.

System load

Furthermore, the process may generate a lot of load on the OX App Suite system and the OX Connector app.

6.6 Duplicated *displaynames*

In OX Connector version 2.2.0 the UDM property *oxDisplayName* does not have a unique constraint anymore.

If duplicate values are used, but OX is not prepared for that, the *SOAP API* calls will fail with the following exception.

```

2023-05-30 11:59:31 WARNING Traceback (most recent call last):
2023-05-30 11:59:31 WARNING   File "/tmp/univention-ox-connector.listener_trigger",
↳ line 324, in run_on_files
2023-05-30 11:59:31 WARNING       f(obj)
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/univention/ox/
↳ provisioning/__init__.py", line 86, in run
2023-05-30 11:59:31 WARNING       modify_user(obj)
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/univention/ox/
↳ provisioning/users.py", line 420, in modify_user
2023-05-30 11:59:31 WARNING       user.modify()
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/univention/ox/
↳ soap/backend.py", line 477, in modify
2023-05-30 11:59:31 WARNING       super(SoapUser, self).modify()
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/univention/ox/
↳ soap/backend.py", line 180, in modify
2023-05-30 11:59:31 WARNING       self.service(self.context_id).change(obj)
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/univention/ox/
↳ soap/services.py", line 536, in change
2023-05-30 11:59:31 WARNING       return self._call_ox('change', usrdata=user)
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/univention/ox/
↳ soap/services.py", line 163, in _call_ox
2023-05-30 11:59:31 WARNING       return getattr(service, func)(**kwargs)
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/zeep/proxy.py
↳ ", line 46, in __call__
2023-05-30 11:59:31 WARNING       return self._proxy._binding.send(
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/zeep/wsdli
↳ bindings/soap.py", line 135, in send
2023-05-30 11:59:31 WARNING       return self.process_reply(client, operation_obj,
↳ response)
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/zeep/wsdli
↳ bindings/soap.py", line 229, in process_reply
2023-05-30 11:59:31 WARNING       return self.process_error(doc, operation)
2023-05-30 11:59:31 WARNING   File "/usr/lib/python3.9/site-packages/zeep/wsdli
↳ bindings/soap.py", line 329, in process_error
2023-05-30 11:59:31 WARNING       raise Fault(
2023-05-30 11:59:31 WARNING zeep.exceptions.Fault: The displayname is already used;
↳ exceptionId 1170523631-4
    
```

To fix this issue, a change in the *OX App Suite* configuration is required. Add the following lines to the user. properties file.

```
com.openexchange.user.enforceUniqueDisplayName=false  
com.openexchange.folderstorage.database.preferDisplayName=false
```

Note: This is configured by default in the *OX App Suite* installation from the App center.

6.7 Collect information for support ticket

Before you open a support ticket, make sure to collect and provide relevant details about your case, so that the Univention Support team can help you:

- Provide relevant details about your environment¹³.
- Provide the relevant messages and tracebacks from *Log files* (page 21), specifically the *Listener Converter*.
- Describe the steps that can reproduce the faulty behavior.
- Describe the expected behavior.
- Provide data from the provisioning that causes the error.

¹³ <https://help.univention.com/faq#posting-guidelines>

CHANGELOG

This changelog documents all notable changes to the OX Connector app. [Keep a Changelog](#)¹⁴ is the format and this project adheres to [Semantic Versioning](#)¹⁵.

7.1 2.2.6

Released: 18. August 2023

7.1.1 Changed

The Functional Account login field is now configurable via the app setting `OX_FUNCTIONAL_ACCOUNT_LOGIN_TEMPLATE`.

7.2 2.2.5

Released: 16. August 2023

7.2.1 Changed

User context change uses the *UserCopy* service.

7.3 2.2.4

Released: 13. July 2023

7.3.1 Changed

The *imaplogin* field is now configurable via the app setting `OX_IMAP_LOGIN`.

¹⁴ <https://keepachangelog.com/en/1.0.0/>

¹⁵ <https://semver.org/spec/v2.0.0.html>

7.4 2.2.3

Released: 27. June 2023

7.4.1 Fixed

Corrected a typo in the *listener_trigger* script.

7.5 2.2.2

Released: 22. June 2023

7.5.1 Fixed

The OX-Connector now prevents a scenario in which values set by users in the App Suite app were overwritten in a wrong way.

7.6 2.2.1

Released: 07. June 2023

7.6.1 Changed

The OX-Context of a group is no longer modifiable in the groups module of UMC since the OX-Context of a group is always derived from the OX-Contexts of its users.

7.7 2.2.0

Released: 01. June 2023

7.7.1 Changed

Removed use of old *oxDrive* and *oxAccessUSM* UDM properties. The OX Connector only uses the *oxmail/accessprofile* objects to control access rights.

The OX Connector does not require the *oxDisplayName* to be unique anymore.

The OX connector only sets a user's *default_sender_address*, *language*, and *timezone* when initially creating a user. Afterwards, any user can configure their settings in the OX App suite front-end.

The OX connector can handle user files in *listener/old/* without the *oxContext* attribute.

7.7.2 Deprecated

oxTimeZone and *oxLanguage* still exist as UDM attributes. But they are not evaluated anymore (see above in Changed; the Connector sets these attributes to the value set in the App Settings instead).

oxDisplayName still exists and is evaluated. At some later version, we will use the original *displayName* of a user.

7.8 2.1.4

Released: 31. May 2023

This version has been revoked

7.9 2.1.3

Released: 21. April 2023

7.9.1 Fixed

Changes to the *oxAccessUSM* attribute are now considered by the provisioning logic.

7.9.2 Changed

Added helper script to remove old listener files from users with empty *oxContextIDNum* attribute.

Removed *bindpwd* uses from *createextattr.py* script (#55985).

7.10 2.1.2

Released: 4. April 2023

7.10.1 Changed

Changes in *inst* script for compatibility with App Center's OX App Suite.

7.11 2.1.1

Released: 9. December 2022

7.11.1 Fixed

Fixed bug that prevented users from creating OX users from UMC (Univention Management Console).

7.12 2.1.0

Released: 14. November 2022

7.12.1 Fixed

Remove the use of unnecessary *gid_ox* syntax for OX group names. All valid group names in UCS are now accepted in OX.

Avoid unnecessary group *change`* operation that can fail in large groups and lead to an infinite loop where the ox-connector tries to delete an already deleted user.

Change *oxcontext contextid* syntax from string to integer.

7.12.2 Changed

Refactor of internal project structure.

Update of scripts and internal files.

7.12.3 Added

Prepare support for Univention OX App suite.

7.13 2.0.1

Released: 9. September 2022

7.13.1 Fixed

Avoid unnecessary look-ups in the OX database when syncing groups: Users that appear to not be present in the database will be treated as such instead of double checking.

Avoid 500 log messages in OX by guarding user look-ups by an *exists* call.

7.14 2.0.0

Released: 26. April 2022

7.14.1 Added

With OX App Suite 7.10.6 Open-Xchange added *Functional Mailboxes* to OX App Suite, see *OX App Suite - Minor Release v7.10.6 - Feature Overview* [7]. OX App Suite shares functional mailboxes among other users in the same context.

For more information, see *Functional accounts* (page 9).

7.15 1.1.0

7.15.1 Added

OX App Suite knows access and can grant them individually to users. The **OX Connector** app supports *access profiles* through the file `ModuleAccessDefinitions.properties`.

The connector generates the file locally on the UCS system each time an administrator modifies objects in the UDM module `oxmail/accessprofile`. It doesn't provision the data to OX App Suite directly. The connector uses the *access profiles* and sets the attribute `oxAccess` during provisioning.

For limitations, see *No plausibility validation in access profile rights* (page 20).

BIBLIOGRAPHY

- [1] *App Suite Admin Guide 7.10.5*. OX Software GmbH, 2022. URL: https://oxpedia.org/wiki/index.php?title=AppSuite:AdminGuide_7.10.5.
- [2] *UCS 5.0 Manual*. Univention GmbH, 2021. URL: <https://docs.software-univention.de/manual/5.0/en/>.
- [3] Raphaël Hertzog and Roland Mas. *The Debian Administrator's Handbook*, chapter Shell and Basic Commands. Freexian SARL, First edition, 2020. URL: <https://www.debian.org/doc/manuals/debian-handbook/short-remedial-course.en.html#sect.shell-and-basic-commands>.
- [4] *Referential Integrity in OpenLDAP Software 2.4 Administrator's Guide*. The OpenLDAP Project, March 2021. URL: <https://openldap.org/doc/admin24/overlays.html#Referential%20Integrity>.
- [5] *App Suite Context management*. OX Software GmbH, 2020. URL: https://oxpedia.org/wiki/index.php?title=AppSuite:Context_management.
- [6] *App Suite Resource management*. OX Software GmbH, 2015. URL: https://oxpedia.org/wiki/index.php?title=AppSuite:Resource_management.
- [7] *OX App Suite - Minor Release v7.10.6 - Feature Overview*. OX Software GmbH, December 2021. URL: https://www.open-xchange.com/hubfs/Imported%20files/Feature_Overview_OXAppSuite_7_10_6.pdf?hsLang=en.

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