Adobe Consulting

User Synchronization Tool

Documentation

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1 Introduction

Adobe User Sync is a command-line tool that moves user and group information from your organization's enterprise directory system (such as Active Directory or other LDAP system) to the Adobe User Management system.

Each time you run the tool it looks for differences between the user information in the two systems, and updates the Adobe system to match the enterprise directory.

1.1 Prerequisites

You run User Sync on the command line or from a script, from a server that your enterprise operates, which must have Python 2.7.9 or higher installed. (The latest 2.x version is recommended as security fixes are regularly released.) The server must have an internet connection, and be able to access Adobe's User Management system and your own enterprise directory system.

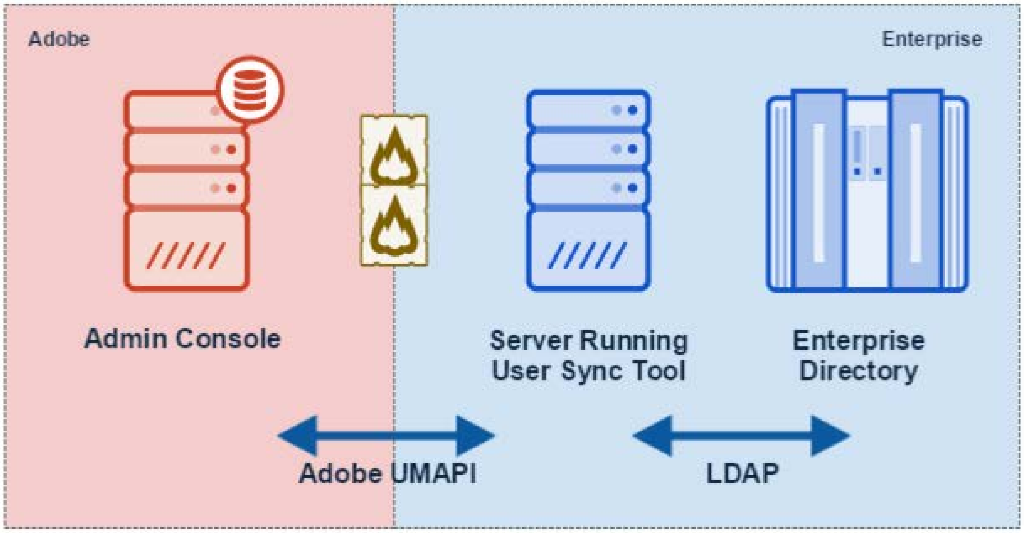
The User Sync tool is a client of the User Management API (UMAPI). In order to use it, you must first register it as an API client in the Adobe I/O console, then install and configure the tool, as described below. You must have administrative access to your organization in order to do this.

The operation of the tool is controlled by local configuration files and command invocation parameters that provide support for a variety of configurations. You can control, for example, which users are to be synced, how directory groups are to be mapped to Adobe groups and product configurations, and a variety of other options.

The tool assumes that your enterprise has purchased Adobe product licenses. You must use the Adobe Admin Console to define User Groups and Product License Configurations. Membership in these groups controls which users in your organization can access which products.

1.2 Operation overview

User Sync communicates with your enterprise directory through LDAP protocols. It communicates with Adobe's Admin Console through the Adobe User Management API (UMAPI) in order to update the user account data for your organization. The following figure illustrates the data flow between systems.



Each time you run the tool:

- User Sync requests employee records from an enterprise directory system through LDAP.
- User Sync requests current users and associated product configurations from the Adobe Admin Console through the User Management API.

- User Sync determines which users need to be created, deleted, or updated, and what user-group and product configuration memberships they should have, based on rules you have defined in the User Sync configuration files.
- User Sync makes the required changes to the Adobe Admin Console through the User Management API.

1.3 Usage models

The User Sync tool can fit into your business model in various ways, to help you automate the process of tracking and controlling which of your employees and associates have access to your Adobe products.

Typically, an enterprise runs the tool as a scheduled task, in order to periodically update both user information and group memberships in the Adobe User Management system with the current information in your enterprise LDAP directory.

The tool offers options for various other workflows as well. You can choose to update only the user information, for example, and handle group memberships for product access directly in the Adobe Admin Console. You can choose to update all users, or only specified subsets of your entire user population.

In addition, you can separate the tasks of adding and updating information from the task of removing users or memberships. There are a number of options for handling the removal task.

For more information about usage models and how to implement them, see the Usage Scenarios section below.

2 Setup and Installation

The use of the User Sync tool depends on your enterprise having set up Product License Configurations in the Adobe Admin Console. For more information about how to do this, see the Configure Services help page.

2.1 Set up a User Management API integration on adobe.io

The User Sync tool is a client of the User Management API. Before you install the tool, you must register it as a client of the API by adding an *integration* in the Adobe I/O Developer Portal.   You will need to add an Enterprise Key integration in order to obtain the credentials the tool needs to access the Adobe User Management system.

The steps required for integration are described in the Setting up Access section of the Adobe I/O User Management API website.

- The registration process requires that you create a certificate. Instructions are included in the documentation on Adobe I/O.
- For complete information about the integration setup process and certificate requirements, see https://www.adobe.io/products/usermanagement/docs/setup.

When the process is complete, you will get an **API key**, a **client ID**, and a **client secret** that the tool will use to communicate securely with the Admin Console. When you install the User Sync tool, you must provide these as initial configuration values that the tool requires to access your organization's user information store in Adobe.

2.2 Set up product-access synchronization

If you plan to use the User Sync tool to update user access to Adobe products, you must create groups in your own enterprise LDAP directory that correspond to the User Groups and Product License Configurations that you have defined in the Adobe Admin Console.   Membership in a product configuration grants access to particular set of Adobe products. You can grant or revoke access to users or to defined User Groups by adding or removing them from a product configuration.

The User Sync tool can grant product access to users by adding users to user groups and product configurations based on their enterprise directory memberships, as long as the group names are correctly mapped and you run the tool with the option to process group memberships.

If you plan to use the tool in this way, you must map your enterprise directory groups to their corresponding Adobe groups in the main configuration file. To do this, you must ensure that the groups exist on both sides, and that you know the exact corresponding names.

Nested enterprise directory groups may not work with User Sync in some directory systems. If you intend to use nested directory groups, first try a small experiment to see if that works with your directory system. If not, you can create a mapping from each of the constituent group to get the same effect.

Check your products and product configurations

Before you start configuring User Sync, you must know what Adobe products your enterprise uses, and what Product License Configurations and User Groups are defined in the Adobe User Management system. For more information, see the help page for configuring enterprise services.

If you do not yet have any configurations, you can use the Console to create them. You must have some, and they must have corresponding groups in enterprise LDAP directory, in order to configure User Sync to update your user entitlement information.

The names of Product License Configurations generally identify the types of product access that users will need, such as All Access or Individual Product Access. To check the exact names, go to the Products section in the Adobe Admin Console to see the products that are enabled for your enterprise. Click a product to see the details of Product License Configurations that have been defined for that product.

Create corresponding groups in your enterprise directory

Once you have defined user groups and product configurations in the Adobe Admin Console, you must identify or create and name corresponding groups in your own enterprise directory. For example, a directory group corresponding to an “All Access” product configuration might be called “ADOBE-ALL-ACCESS”.

Make a note of the names you choose for these groups, and which Adobe groups they correspond to. You will use this to set up a mapping in the main User Sync configuration file. See details in the Configure group mapping section below.

2.3 Installing the User Sync tool

System requirements

The User Sync tool is implemented using Python, and requires Python version 2.7.9 or higher. For each environment in which you intend to install, configure and run the script, you must make sure that Python has been installed on the operating system before moving to the next step. For more information, see the Python web site. If you are using a pre-built distribution of the User Sync tool from the Github site on OSX or Linux, Python is included in the package and does not need to be installed.

The tool is built using a Python LDAP package, `pyldap`, which in turn is built on the `OpenLDAP` client library. Windows Server, Apple OSX and many flavors of Linux have an `OpenLDAP` client installed out of the box. However, some UNIX operating systems, such as OpenBSD and FreeBSD do not have this included in the base installation.

Check your environment to be sure that an `OpenLDAP` client is installed before running the script. If it is not present in your system, you must install it before you install the User Sync tool.

Installation

The User Sync Tool is available on github at https://github.com/adobe-apiplatform/user-sync.py. To install the tool:

1. Click the **Releases** link to locate the latest release.
2. Download the compressed package (the `.tar.gz` file) and locate a build for your environment.
    - If you are building from source, you can download the Source Code package that corresponds to the release, or use the latest source off the master branch. Builds for Windows, OSX, and Ubuntu are available.
3. Locate the Python executable file (`user-sync` or `user-sync.pex` for Windows) and place it in your User Sync root folder.

4. The package file Example configuration files are also available in the `.tar.gz` file. You can copy these to your root folder, then edit and rename them to make your own configuration files. (See the following section, Configuring the User Sync Tool.)

5. **In Windows only:**

   Before running the `user-sync.pex` executable in Windows, you might need to work around a Windows-only Python execution issue.

   The Windows operating system enforces a file path length limit of 260 characters. When executing a Python PEX file, it creates a temporary location to extract the contents of the package. If the path to that location exceeds 260 characters, the script does not execute properly.

   By default, the temporary cache is in your home folder. To work around this issue, create an environment variable in Windows called `PEX_ROOT`, a set the path to "`C:\user-sync\.pex`". The OS uses this variable for the cache location, which prevents the path from exceeding the 260 character limit.

6. To run the User Sync tool, run the Python executable file, `user-sync` (`user-sync.pex` in Windows).

Security Considerations

Secure access to sensitive information

Service Account Access: In order for the User Sync tool to establish a connection with both the Adobe User Management system and with your enterprise directory, it must be configured to read from the directory server using a service account. The service account used to access your LDAP directory system should be allowed only read access to that system.

Configuration Files: Configuration files must include sensitive information, such as your Adobe UM API key and the path to your private certificates. You must take necessary steps to protect this configuration file and ensure that only authorized users are able to access the file.

Certificate files

The files that contains the public and private keys, but especially the private key, contain sensitive information. You must retain the private key securely. It cannot be recovered or replaced. If you lose it or it is compromised, you must delete the corresponding certificate from your account. If necessary, you must create and upload a new certificate. You must protect these files at least as well as you would protect an account name and password. The best practice is to store the key files in a credential management system or use file system protection so that it can only be accessed by authorized users.

Sensitive information in log files

Logging is enabled by default, and outputs all transactions against the User Management API to the console. You can configure the tool to write to a log file as well. The files created during execution are date stamped and written to the file system.

The User Management API treats a user's email address as the unique identifier. Every action, along with the email address associated with the user, is written to the log. If you choose to log data to files, those files contain this sensitive information.

The utility does not provide any log retention control or management. If you choose to log data to files, take necessary precautions to manage the lifetime and access to these files.

If your company's security policy does not allow any personally identifiable information to be persisted on disk, configure the tool to disable logging to file. The tool continues to output the log transactions to the console, where the data is stored temporarily in memory during execution.

2.4 Support for the User Sync tool

For additional support for this utility, please open an issue in GitHub. To help with the debugging process, include any log files that are generated during the application execution in your support request (as long as they contain no confidential information).

Note that Adobe Customer Support is currently unable to provide support for the User Sync tool.

3 Configuring the User Sync Tool

The operation of the User Sync tool is controlled by a set of configuration files with these file names, located in the same folder as the command-line executable.

dashboard-config.yml	Required. Contains credentials and access information for calling the Adobe User Management API.
connector-ldap.yml	Required. Contains credentials and access information for accessing the enterprise LDAP directory.
user-sync-config.yml	Required. Contains configuration options that define the mapping of directory groups to Adobe product configurations and user groups, and that control the update behavior.

3.1 Setting up configuration files

Examples of these files are provided with the tool:

```
example.dashboard-config.yml
example.connector-ldap.yml
example.user-sync-config.yml
```

For you own configuration, copy the example files to your User Sync root folder and rename them. Use a plain-text editor to customize the configuration files for your environment and usage model. The example configuration files contain comments showing all possible configuration items. You can uncomment items that you need to use.

Configurations files are in YML format. When editing YML, remember some important rules:

- Sections and hierarchy in the file are based on indentation. You must use SPACE characters for indentation. Do not use TAB characters.
- The dash character (-) is used to form a list of values. For example, the following defines a list named “dashboard_groups” with two items in it.

  ```
  dashboard_groups:
    - Photoshop Users
    - Lightroom Users
  ```

  Note that this can look confusing if the list has only one item in it. For example:

  ```
  dashboard_groups:
    - Photoshop Users
  ```

3.2 Create and secure connection configuration files

The two connection configuration files store the credentials that give User Sync access to the Adobe Admin Console and to your enterprise LDAP directory. In order to isolate the sensitive information needed to connect to the two systems, all actual credential details are confined to these two files.

Important Security Notes:

- The connection configuration files contain sensitive information that must be kept secure. These credentials are used to access your Adobe organization and your enterprise LDAP directory on your behalf. Limit access to authorized individuals or store the data in a credential management system.
- Filesystem access permissions for the configuration files should be limited to only the account under which User Sync is going to be run, and possibly other privileged users.
- The service account used to access your LDAP should be limited to read-only access. The account should not have write permission in the enterprise directory.

Configure connection to the Adobe Admin Console

When you have obtained access and set up an integration with User Management in the Adobe I/O Developer Portal, make note of the following configuration items that you have created or that have been assigned to your organization:

- Organization ID
- API Key
- Client Secret
- Technical Account ID
- Private Certificate

Open your copy of the `dashboard-config.yml` file in a plain-text editor, and enter these values in the “enterprise” section:

```
enterprise:
  org_id: "Organization ID goes here"
  api_key: "API key goes here"
  client_secret: "Client Secret goes here"
  tech_acct: "Tech Account ID goes here"
  priv_key_path: "Path to Private Certificate goes here"
```

Note: Make sure you put the private key file at the location you point to here.

Configure connection to your enterprise directory

Open your copy of the `connector-ldap.yml` file in a plain-text editor, and set these values to enable access to your enterprise directory system:

```
username
password
host
base_dn
```

3.3 Configuration options

The main configuration file, `user-sync-config.yml`, is divided into three main sections: **dashboard**, **directory** and **logging**.

- The **dashboard** section specifies how the User Sync tool connects to the Adobe Admin Console through the User Management API. It should point to the separate, secure configuration file that stores the access credentials.

- The **directory** section contains two subsections, connectors and groups:
  - The **connectors** section points to the separate, secure configuration file that stores the access credentials for your enterprise directory.

- The **groups** section defines the mapping between your directory groups and Adobe product configurations and user groups.

- The **logging** section specifies an audit trail path and controls how much information is written to the log.

Configure connection files

The main User Sync configuration file contains only the names of the connection configuration files that actually contain the connection credentials. This isolates the sensitive information, allowing you to secure the files and limit access to them.

Provide pointers to the connection configuration files in the **dashboard** and **directory** sections:

```
dashboard:
  owning: dashboard-config.yml

directory:
  connectors:
    ldap: connector-ldap.yml
```

Configure group mapping

Before you can synchronize user groups and entitlements, you must create User Groups and Product License Configurations in the Adobe Admin Console, and corresponding groups in your enterprise directory, as described above in Set up product-access synchronization.

> **NOTE:** All groups must exist and have the specified names on both sides. The tool does not create any groups on either side; if a named group is not found, the tool logs an error.

The **groups** section under **directory** must have an entry for each enterprise directory group that represents access to an Adobe product or products. For each group entry, list the product configurations to which users in that group are granted access. For example:

```
groups:
  - directory_group: Acrobat
    dashboard_groups:
      - Default Acrobat Pro DC configuration

  - directory_group: Photoshop
    dashboard_groups:
      - "Default Photoshop CC - 100 GB configuration"
      - "Default All Apps plan - 100 GB configuration"
```

Configure logging

Log entries are written to the console from which the tool was invoked, and optionally to a log file that you specify. A new entry with a date-time stamp is written to the log each time the tool runs.

The **logging** section under **directory** lets you enable and disable logging to a file, and controls how much information is written to the log.

```
logging:
  log_to_file: True | False
  file_log_directory: path to log folder
  file_log_level: debug | info | warning | error | critical
  console_log_level: debug | info | warning | error | critical
```

The `log_to_file` value turns file-logging on or off. When it is off, log messages are still written to the console.

When file-logging is enabled, the `file_log_directory` value is required. It specifies the folder where the log entries are to be written. If logging is enabled and a path is not provided, the tool throws an exception.

- Provide an absolute path or a path relative to the folder containing this configuration file.
- Ensure that the file and folder have appropriate read/write permissions.

Log-level values determine how much information is written to the log file or console.

- The lowest level, `debug`, writes the most information, and the highest level, `critical`, writes the least.
- You can define different log-level values for the file and console.

Log entries that contain WARNING, ERROR or CRITICAL include a description that accompanies the status. For example:

```
2017-01-19 12:54:04 7516 WARNING dashboard.trustee.org1.action - Error requestID: action_5
code: "error.user.not_found" message: "No valid users were found in the request"
```

In this example, a warning was logged on 2017-01-19 at 12:54:04 during execution. An action caused an error with the code "error.user.not_found". The description associated with that error code is included.

You can use the `requestID` value to search for the exact request associated with a reported error. For the example, searching for "action_5" returns the following detail:

```
2017-01-19 12:54:04 7516 INFO dashboard.trustee.org1.action - Added action: {"do": [{"add":
{"product": ["default adobe enterprise support program configuration"]}}], "requestID":
"action_5", "user": "cceuser2@ensemble.ca"}
```

This gives you more information about the action that resulted in the warning message. In this case, User Sync attempted to add the "default adobe enterprise support program configuration" to the user "cceuser2@ensemble.ca". The add action failed because the user was not found.

3.4 Example configurations

These examples show the configuration file structures and illustrate possible configuration values.

user-sync-config.yml

```
dashboard:
  owning: dashboard-config.yml
  user_identity_type: federatedID

directory:
  connectors:
    ldap: connector-ldap.yml

  groups:
    - directory_group: Acrobat
      dashboard_groups:
        - Default Acrobat Pro DC configuration

    - directory_group: Photoshop
      dashboard_groups:
        - "Default Photoshop CC - 100 GB configuration"
        - "Default All Apps plan - 100 GB configuration"
        - "Default Adobe Document Cloud for enterprise configuration"
        - "Default Adobe Enterprise Support Program configuration"

logging:
  log_to_file: True
  file_log_directory: userSyncLog
  file_log_level: debug
  console_log_level: debug
```

connector-ldap.yml

```
username: "LDAP_ username"
password: "LDAP_ password"
host: ldap://LDAP_ host
base_dn: "base_DN"
all_users_filter: "(&(objectClass=person)(objectClass=top))"
```

dashboard-config.yml

```
server:
  # This section describes the location of the servers used for the dashboard. Default is:
  # host: usermanagement.adobe.io
  # endpoint: /v2/usermanagement
  # ims_host: ims-na1.adobelogin.com
  # ims_endpoint_jwt: /ims/exchange/jwt
enterprise:
  org_id: "Org ID goes here"
  api_key: "API key goes here"
  client_secret: "Client secret goes here"
  tech_acct: "Tech account ID goes here"
  priv_key_path: "Path to private.key goes here"
```

3.5 Testing your configuration

Use these test cases to ensure that your configuration is working correctly, and that the product configurations are correctly mapped to your enterprise directory security groups. Run the tool in test mode first (by supplying the `-t` parameter), so that you can see the result before running live.

User Creation

1. Create one or more test users in enterprise directory.
2. Add users to one or more configured security groups.
3. Run User Sync with options --users all
4. Check that test users were created in Adobe Admin Console.

User Update

1. Modify product group membership of one or more test user.
2. Run User Sync with options --users all --update-user-info
3. Check that test users in Adobe Admin Console were updated to reflect new product configuration membership.

User Disable

1. Remove or disable one or more existing test users in your enterprise directory.
2. Run User Sync with options --users all --remove-nonexistent-users
3. Check that users were removed from configured product configurations in the Adobe Admin Console.

4 Command Parameters

Once the configuration files are set up, you can run the User Sync tool on the command line or in a script. To run the tool, execute the following command in a command shell or from a script:

The tool accepts optional control arguments that determine its specific behavior is various situations.

`user-sync` [*optional parameters*]

Note: command line controls starting with -- can be abbreviated to the shortest unambiguous prefix. For example, --generate-remove-list can be abbreviated as --gen.

Parameters and arguments	Description
`-h` `--help`	Show this help message and exit.
`-v` `--version`	Show program's version number and exit.
`-t` `--test-mode`	Run API action calls in test mode (does not execute changes). Logs what would have been executed.
`-c` *filename* `--config-filename` *filename*	The complete path to the main configuration file, absolute or relative to the working folder. Default filename is "user-sync-config.yml"
`--users all|file|group [`*arg1 …*`]`	Specify the users to be considered for sync. One of: • all (Default) • file *filename* (Input file with group names) • group *names* (One or more specific groups)
`--user-filter` *regex_pattern*	Limit the set of users that are examined for syncing to those matching a pattern specified with a regular expression. See https://docs.python.org/2/library/re.html for information on constructing regular expressions in Python.

`--source-filter` *connector*`:`*file*	Names a file containing LDAP filter settings.
	The filter is an LDAP query string that is passed directly to the LDAP server. For example:
	`group_filter_format:`
	`"(&(objectClass=posixGroup)(cn={group}))"`
	`all_users_filter:`
	`"(&(objectClass=person)(objectClass=top))"`
	See further documentation in the example configuration file, `example-connector-ldap.yml`

`--update-user-info`	When supplied, synchronizes user information. If the information differs between the customer side and the Adobe side, the Adobe side is updated to match. This includes the `firstname` and `lastname` fields. Including this option may significantly increase run time and API calls as information for each user must be fetched.
`--process-groups`	When supplied, synchronizes group membership information. If the membership in mapped groups differs between the customer side and the Adobe side, the group membership is updated on the Adobe side to match.

`--remove-nonexistent-users`	When supplied, if Federated users are found on the Adobe side that are not in the customer-side LDAP directory, removes those user accounts from the organization.
`--generate-remove-list` *output_path*	When supplied, if Federated users are found on the Adobe side that are not in the enterprise directory, lists those users to the given file. You can then pass this file to the `--remove-list` argument in a subsequent run.
`-d input_path` `--remove-list` *input_path*	Removes a list of users contained in the given file from the Adobe organization.

5 Usage Scenarios

There are various ways to integrate the User Sync tool into your enterprise processes. This section provides some examples of how you might run the tool for particular scenarios.

Update users and group memberships	Sync users and group memberships by adding, updating, and deleting users in Adobe User Management system. This is the most general and common use case.
Sync only user information	Sync only user information. Product access is to be handled using the Admin Console.
Filter users to sync	You can choose to limit user-information sync to users in given groups, or limit sync to users that match a given pattern. You can also sync against a CSV file rather than an LDAP directory system.
Update users and group memberships, but handle deletions separately	Sync users and group memberships by adding and updating users, but do not delete users in the initial call. Instead keep a list of users to be deleted, then perform the deletions in a separate call.

5.1 Update users and group memberships

This is the most typical and common type of invocation. The tool finds all changes to user information and to user-group and product configuration membership information on the enterprise side. It syncs the Adobe side by adding, updating, and deleting users and memberships.

For users that have a Federated identity type, this action deletes users that exist on the Adobe side, but no longer exist in the enterprise directory.

This example assumes that the configuration file, `user-sync-config.yml`, contains a mapping from a directory group to an Adobe product configuration named **Default Acrobat Pro DC configuration**.

Command

This invocation supplies both the `users` and `process-groups` parameters, and allows deletion with the `remove-nonexistent-users` parameter.

```
./user-sync --users all --process-groups --remove-nonexistent-users
```

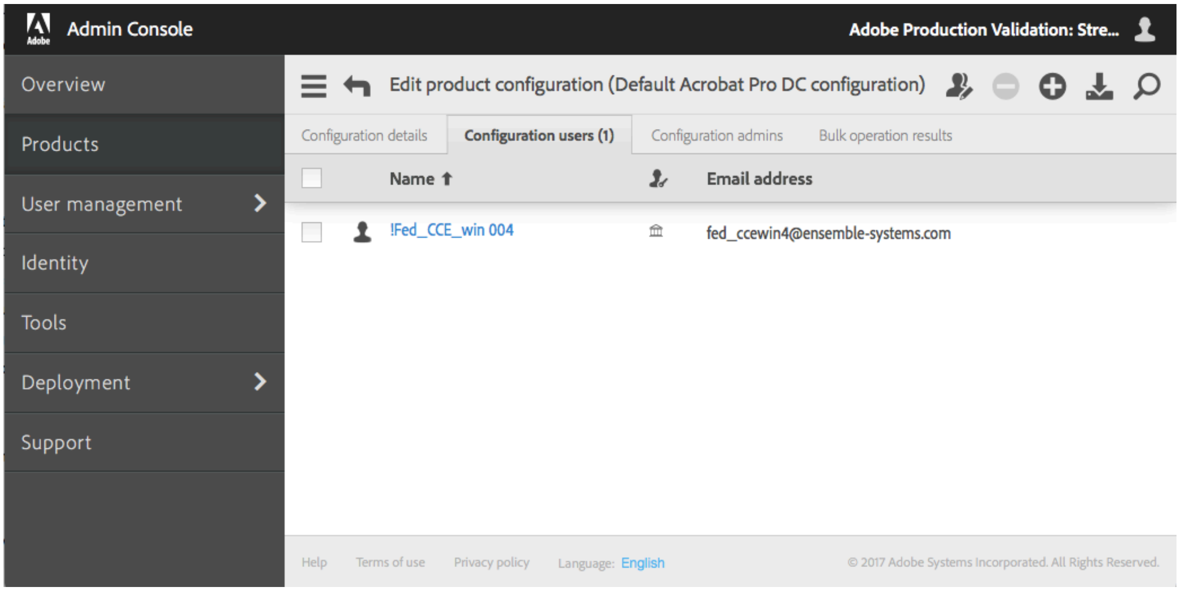
Log output during operation

```
2017-01-20 16:51:02 6840 INFO main - ========== Start Run ==========
2017-01-20 16:51:04 6840 INFO processor - ---------- Start Load from Directory ----------------------
2017-01-20 16:51:04 6840 INFO connector.ldap - Loading users...
2017-01-20 16:51:04 6840 INFO connector.ldap - Total users loaded: 4
2017-01-20 16:51:04 6840 INFO processor - ---------- End Load from Directory (Total time: 0:00:00) ---
```

```
2017-01-20 16:51:04 6840 INFO processor - ---------- Start Sync Dashboard --------------------------
2017-01-20 16:51:05 6840 INFO processor - Adding user with user key:  fed_ccewin4@ensemble-systems.com
2017-01-20 16:51:05 6840 INFO dashboard.owning.action - Added action: {"do": [{"createFederatedID": {"lastname": "004",
"country": "CA", "email": "fed_ccewin4@ensemble-systems.com", "firstname": "!Fed_CCE_win", "option":
"ignoreIfAlreadyExists"}}, {"add": {"product": ["default acrobat pro dc configuration"]}}], "requestID": "action_5", "user":
"fed_ccewin4@ensemble-systems.com"}
2017-01-20 16:51:05 6840 INFO processor - Syncing trustee org1...
/v2/usermanagement/action/210DB41957FFDC210A495E53@AdobeOrg HTTP/1.1" 200 77
2017-01-20 16:51:07 6840 INFO processor - ---------- End Sync Dashboard (Total time: 0:00:03) --------
2017-01-20 16:51:07 6840 INFO main - ========== End Run (Total time: 0:00:05) ==========
```

View result

When the synchronization succeeds, the Adobe Admin Console is updated. After this command is executed, your dashboard in the Admin Console shows that a user with a Federated identity has been added to the “Default Acrobat Pro DC configuration.”



□	Name ↑		Email address
□	!Fed_CCE_win 004	🏛	fed_ccewin4@ensemble-systems.com

5.2 Sync only users

If you supply only the `users` parameter to the command, the action finds changes to user information in the enterprise directory and updates the Adobe side with those changes. You can supply arguments to the `users` parameter that control which users to look at on the enterprise side.

This invocation does not look for or update any changes in group membership. If you use the tool in this way, it is expected you will control access to Adobe products by updating user-group and product configuration memberships in the Adobe Admin Console.

Sync all users

This action finds changes in user information for all the users from the enterprise side, and updates that information on the Adobe side. It ignores users that are on the Adobe side but no longer on the customer side, and does not perform any product configuration or user group management.

```
    ./user-sync --users all
```

5.3 Filter users to sync

Whether or not you choose to sync group membership information, you can supply arguments to the `users` parameter that filter which users are considered on the enterprise directory side, or that get user information from a CSV file instead of directly from the enterprise LDAP directory.

Sync only users in given groups

This action only looks for additions or deletions of users in the specified directory groups. It does not look at any other users in the enterprise directory, and does not perform any product configuration or user group management.

```
./user-sync --users groups "group1, group2, group3"
```

Sync only matching users

This action only looks for additions or deletions of users whose user ID matches a pattern. The pattern is specified with a Python regular expression.

```
user-sync --users all --user-filter bill@forxampl.com --process-groups
user-sync --users all --user-filter ‘b.*@forxampl.com’ --process-groups
```

Sync from a file

This action syncs to user information supplied from a CSV file, instead of looking at the enterprise directory. An example of such a file, `example.users-file.csv`, is provided with the tool.

```
./user-sync --users file user_information.csv
```

5.4 Update users and group memberships, but handle deletions separately

If you do not supply the `remove-nonexistent-users` parameter, you can sync user and group memberships without removing any users from the Adobe side.

If you want to handle deletions separately, you can instruct the tool to flag users that no longer exist in the enterprise directory but still exist on the Adobe side. The `generate-remove-list` parameter writes out the list of users who are flagged for deletion to a CSV file.

To perform the deletions in a separate call, you can pass the file generated by the `generate-remove-list` parameter, or you can pass a CSV file of users that you have generated by some other means. An example of such a file, `example.users-file.csv`, is provided with the tool.

Add users and generate a list of users to delete

This action synchronizes all users from the customer side with the Adobe side and also generates a list of users that no longer exist in the enterprise directory but still exist on the Adobe side.

```
./user-sync --users all --generate-remove-list users-to-remove.csv
```

Delete users from separate list

This action takes a CSV file containing a list of users that have been flagged for deletion, and removes those users from the Adobe side. The CSV file is typically the one generated by a previous call that used the `generate-remove-list` parameter.

You can create a CSV file of users to delete by some other means. However, if your list includes any users that still exist in your enterprise directory, those users will be added back in on the Adobe side by the next sync action that adds users.

```
./user-sync --remove-list users-to-remove.csv
```

6 Deployment Best Practices

The User Sync tool is designed to run with limited or no human interaction, once it is properly configured. You can use a scheduler in your environment to run the tool with whatever frequency you need.

- The first few executions of the User Sync Tool can take a long time, depending on how many users need to be added into the Adobe Admin Console. We recommend that you run these initial executions manually, before setting it up to run as a scheduled task, in order to avoid having multiple instances running.
- Subsequent executions are typically faster, as they only need to update user data as needed. The frequency with which you choose to execute the application depends on how often your enterprise directory changes.

6.1 Security considerations

Given the nature of the data in the configuration and log files, a server should be dedicated for this task and locked down with industry best practices. It is recommended that a server that sits behind the enterprise firewall be provisioned for this application. Only privileged users should be able to connect to this machine. A system service account with restricted privileges should be created that is specifically intended for running the application and writing log files to the system.

The application makes GET and POST requests of the User Management API against a HTTPS endpoint. It constructs JSON data to represent the changes that need to be written to the Admin console, and attaches the data in the body of a POST request to the User Management API.

To protect the availability of the Adobe back-end user identity systems, the User Management API imposes rate limits on client access to the data. Limits apply to the number of calls that an individual client can make within a time interval, and global limits apply to access by all clients within the time period. The User Sync tool implements back off and retry logic to prevent the script from continuously hitting the User Management API when it reaches the rate limit. It is normal to see messages in the console indicating that the script has paused for a short amount of time before trying to execute again.

6.2 Scheduled task examples

You can use a scheduler provided by your operating system to run the User Sync tool periodically, as required by your enterprise. These examples illustrate how you might configure the Unix and Windows schedulers.

Cron

This code runs the User Sync tool at minute 0 of each hour:

```
0 * * * * [python bin directory]/python [path to SyncTool executable]/user-sync --config=[path
to config]/config.yml > [path to logs]/cron-logs/$(date +\%Y-\%m-\%d).log 2>&1
```

Windows Task Scheduler

This code runs the User Sync tool every hour starting at 4:00 PM:

```
C:\> schtasks /create /tn "User Sync" /tr "[path to python]\python.exe [path to SyncTool
executable]\user-sync.pex --config=[path to config]\config.yml" /sc HOURLY /st 16:00
```