Orchestrator Manager

Contents

Overview

As RPA implementations scales, there are situations that require the manipulation of a large number of Orchestrator entities. Although Orchestrator's web interface provides a user-friendly way to see, create, edit and delete such entities, it can become a limiting factor if many operations need to be done in a short amount of time.

Orchestrator Manager is a tool that leverages Orchestrator's API to manipulate entities (Assets, Environments, Machines, Processes, Users and Robots) with data defined in Excel workbooks. It provides flexible and easy bulk operations on entities, enabling efficient solutions for situations that include:

- Registering a large quantity of users that obtain access to Orchestrator, including the specification of different roles and assignment to different Organization Units.
- Migrating Assets from development environment to test environment or production environment.
- Setting temporary passwords for a group of users according to security policies.
- Provisioning of a large number of recently robots purchased for a particular company department.
- Exporting data for reports with statistics about a particular tenant.

In addition, since Orchestrator Manager is offered as a UiPath Studio project, it can be customized and extended according to needs other than the ones above.

The target users of Orchestrator Manager are Orchestrator administrators with the required permissions and familiar with an Orchestrator instance's features, settings and data. By leveraging this tool, it is expected that Orchestrator administrators can decrease the time spent in regular data manipulation tasks and increase their overall efficiency.

The remaining of this guide is structured as follows: Section How to Use contains usage instructions, and the Architecture section details the main components of Orchestrator Manager. Limitations of the current version are listed in section Restrictions. Lastly, section Distribution and Support provides information about distribution, licensing and support.

How to Use

The current version of Orchestrator Manager can be used with Orchestrator 2018.4, Orchestrator 2019.4 and Orchestrator 2019.10. In the cases of Orchestrator 2018.4 and Orchestrator 2019.4, it is necessary to have Organization Units[1] enabled, even if only one Organization Unit is defined (usually named *Default*).

Before starting the execution of the process, the following preliminary steps must be followed:

1. Copy the **Workbook** folder, located in the root of the project to an appropriate location that can be accessed by the robot. This folder contains Excel workbooks used to define details about operations to be performed on entities (e.g., data about assets to be created and about machines defined in Orchestrator).
2. Specify values to the parameters defined in the **Settings** sheet of **Config.xlsx** (detailed in section Settings): *OrchestratorURL*, *OrchestratorTenant* and *EntitiesWorkbooksFolderPath*. The value of *EntitiesWorkbooksFolderPath* must be the full path to the folder Workbook copied during in the first step.

After that, the process can be executed from UiPath Studio by running the **Main.xaml** file. Alternatively, it can also be published to Orchestrator to be deployed to attended or unattended robots. In the case of unattended robots, the above parameters can also be defined as process parameters and modified without the need to edit **Config.xlsx**.

Once the process starts executing, the user will be prompted to enter a valid credential (username and password) for the Orchestrator instance defined in **Config.xlsx** (Figure 1). More information about this authentication step can be found in section Authentication.

If the authentication is successful, Orchestrator Manager's main control panel (Figure 2) is shown and the user can select an Orchestrator entity and an operation to perform (e.g., Asset creation, Machine deletion and User retrieval).

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[1] From Orchestrator 2019.10, Organization Units have been referred to as Classic Folders.

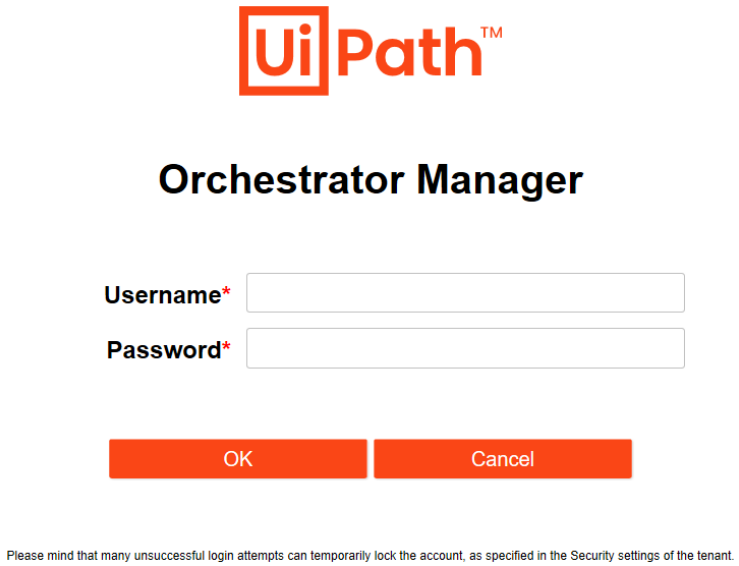

Figure 1 - Authentication Panel

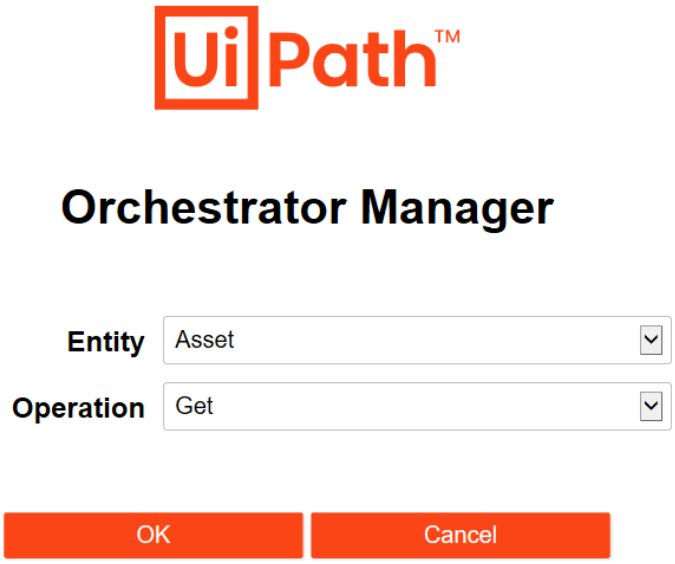

Figure 2 - Control Panel

Depending on the Internet security settings of the computer running Orchestrator Manager, it might be necessary to allow the execution of scripts to properly run the Custom Input activity, which is used to display input forms.

After confirming, Orchestrator Manager opens the Excel workbook corresponding to the selected entity and updates it as it performs the selected operation. This workbook can also be used to input data in sheets that create, edit and delete entities.

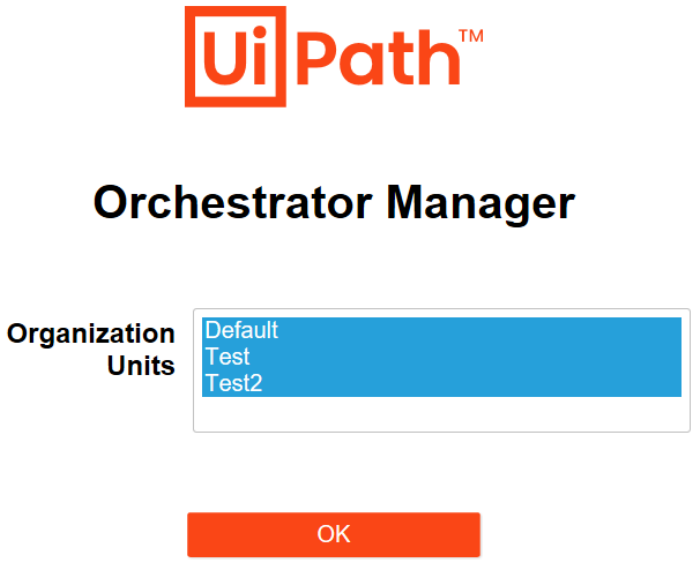

Figure 3 - Organization Units Panel

Note that the columns of the workbooks have different colors that represent cells that can be modified by the user (white cells) and cells that are reserved for Orchestrator Manager (gray cells). Refer to section Entities Workbooks for more details about workbooks.

In addition, different operations require different permissions to be set on Orchestrator. For instance, to create an Asset, it is necessary to have the *Assets.Create* permission. Consult Orchestrator's online documentation for more details about permissions[2]. For this reason, it is recommended for users of Orchestrator Manager to have the Administrator role, since it usually has all permissions in an Orchestrator tenant.

Other than the Authentication Panel and Control Panel, when it is necessary to choose Organization Units, Orchestrator Manager shows the Organization Units Panel for user selection (Figure 3). Organization Units, recently referred to as Classic Folders[3], are used to segregate entities into different groups that can be mapped to groups across an organization.

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[2] https://docs.uipath.com/orchestrator/reference/permissions-per-endpoint

[3] https://docs.uipath.com/orchestrator/docs/about-folders#section-folder-types

Configuration

The configuration file, **Config.xlsx**, stores settings used throughout Orchestrator Manager and it is divided in three sheets: **Settings**, **Advanced Settings** and **Localization**.

Settings

The first sheet, **Settings**, contains mandatory parameters that must be provided in order to run Orchestrator Manager:

- *OrchestratorURL*: URL to the Orchestrator instance to which Orchestrator Manager should connect. Note that currently only on-premises versions of Orchestrator are supported. Support to UiPath Cloud Platform[4] is planned to be included in future versions.
- *OrchestratorTenant*: Name of the Orchestrator tenant to be used by Orchestrator Manager. In the Authentication step of the execution, the user is prompted to specify username and password of an administrator of the tenant specified by this setting.
- *EntitiesWorkbooksFolderPath*: Full path to the folder that contains entities workbooks. These workbooks are used when retrieving data from Orchestrator entities as well as to define data to be used in the creation, editing and deletion of entities.

As detailed in section Process Arguments, the above parameters can also be specified as process parameters and set from Orchestrator, as shown by Figure 4. In this case, the values set as process parameters are used instead of the ones set in **Config.xlsx**.

Advanced Settings

The **Advanced Settings** sheet contains parameters that usually do not require modification, but that can be changed to adapt Orchestrator Manager to specific situations.

The first parameters can be used to control the throughput of HTTP requests by Orchestrator Manager and reduce its impact on Orchestrator's infrastructure. For instance, increasing the interval between requests can be helpful when there is a large number of requests done in a short period.

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[4] https://cloud.uipath.com/

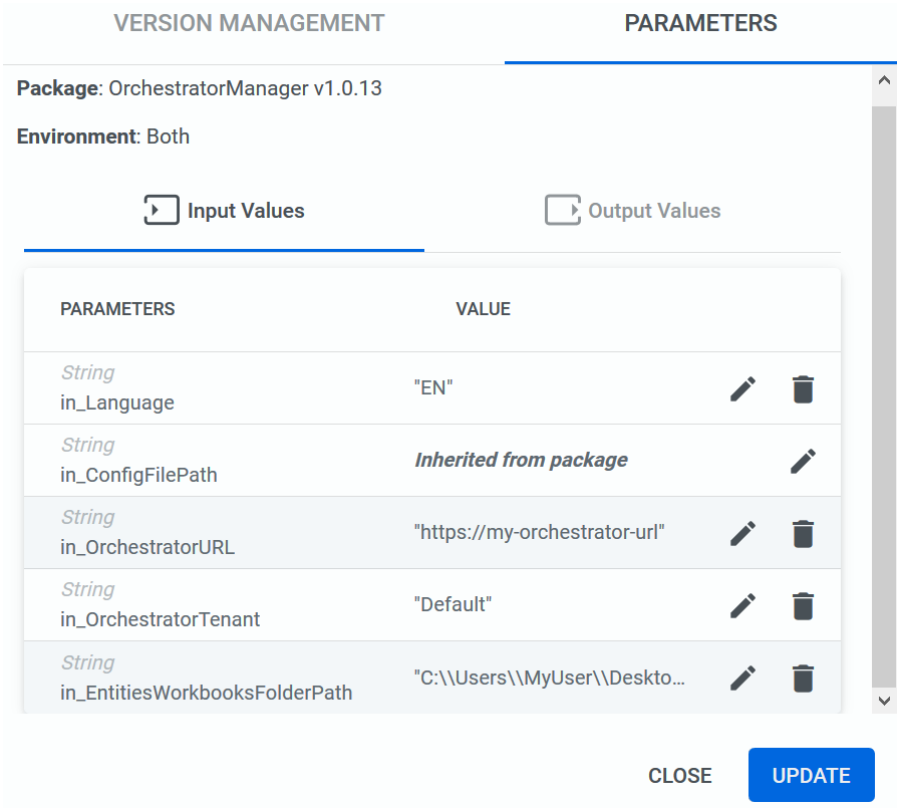

Figure 4 - Process Parameters

Other than those, the **Advanced Settings** sheets also define coordinates of columns in entities workbooks. Changing these usually requires changes to workflows themselves.

Localization

The **Localization** sheet contains localization strings that are used in different parts of Orchestrator Manager, such as input forms, paths for workbooks, error messages and warnings.

A new language can be included according to the following steps:

1. Add a new column to the **Localization** sheet and insert the translated strings into the appropriate rows. The header of the new column must be the two-letter representation of the language, according to ISO 639. This header is used by Orchestrator Manager when initializing the *Config* dictionary in the **Error! Reference source not found.**Initialization step.

2. Modify the *Switch* activity called *Switch System's Language* in the **Core\InitializeConfigurations.xaml** file by adding a case for the new language. The case *Key* must match the two-letter code that was specified as the new column header in the previous step.

Lastly, note that some strings have placeholders that are used by the *String.Format()* method, so, although their position may vary, they must be present in the translated string as well.

Architecture

Figure 5 shows the main steps of Orchestrator Manager, which are detailed in the following subsections.

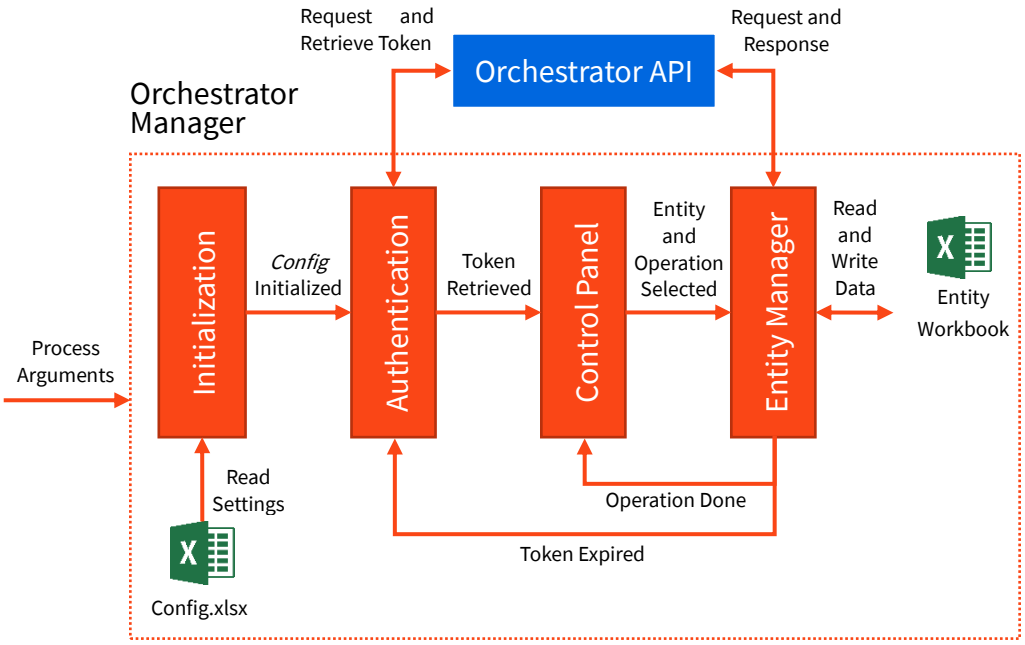

Figure 5 - Orchestrator Manager Architecture

Process Arguments

Orchestrator Manager's entry point, **Main.xaml**, accepts a few arguments (Table 1) that can be used when it is invoked by another workflow or when it is triggered as a process from Orchestrator.

The only mandatory argument is *in_ConfigFilePath*, which determines the path to the configuration file. If the other arguments are specified, their values are used during the Initialization step instead of the ones from the configuration file.

Table 1 - Arguments of Main.xaml

Argument	Details
in_Language	Two-letter ISO 639 code of the language to be used on Orchestrator Manager's interface. If this argument is not specified, the language is selected based on the system's locale settings.
in_ConfigFilePath	Path to the Excel workbook that contains configuration parameters to be used by Orchestrator Manager. Its default value points to the **Config.xlsx** file in the project's folder.
in_OrchestratorURL	URL to the Orchestrator's instance to which Orchestrator Manager should connect. If this argument is specified, it overwrites the value defined in the configuration file.
in_OrchestratorTenant	Name of tenant to be used by Orchestrator Manager. If this argument is specified, it overwrites the value defined in the configuration file.
in_EntitiesWorkbooksFolderPath	Path to the folder that contains the entities workbooks. If this argument is specified, it overwrites the value defined in the configuration file.

Initialization

The Initialization step reads process arguments and settings from **Config.xlsx**, storing them in a *Dictionary(Of String, GenericValue)* object called *Config*, which is used throughout Orchestrator Manager's execution.

Config also stores localization strings, selected according to the *in_Language* argument or, if this is empty, according to the system's locale settings.

Authentication

The next step, Authentication, uses *OrchestratorURL* and *OrchestratorTenant*, to perform an authentication request to Orchestrator's API and retrieve an authentication token that is necessary for all subsequent requests.

The authentication screen is shown until a token is successfully retrieved or until the user interrupts the execution by pressing the Cancel button or closing the screen. Note that multiple unsuccessful login attempts can cause an account lockout according to the tenant's security settings. For more information about account lockout, refer to Orchestrator's documentation[5].

For security reasons, the authentication token has a default expiration period of 30 minutes and it must be reissued after that. If a request fails due to an expired token, Orchestrator Manager prompts the user for credentials to perform the authentication step again, since no credentials are stored during execution. After that, it retries the failed request and resume its regular execution.

Control Panel

Once the authentication is successfully done, the user is prompted to choose an entity and an operation to be performed on it. The currently supported entities are Assets, Environments, Machines, Processes, Users and Robots. The available operations depend on the entity and are listed in section Entities Workbooks.

Once the user confirms the selection, the appropriate entity manager is invoked based on the chosen entity. After the operation is performed, the execution flow goes back to the Control Panel for the user to choose another operation. This cycle is repeated until the user stops the execution of Orchestrator Manager by clicking on the Cancel button or by closing the Control Panel (Figure 2). When that happens, Orchestrator Manager automatically closes all entities workbooks opened during its execution.

Entity Manager

The entity manager of a given entity invokes the workflow that implements the selected operation. This workflow contains all actions necessary to complete the operation, including communication with Orchestrator's API and data input and output using entities workbooks.

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[5] https://docs.uipath.com/orchestrator/docs/field-descriptions-tenant-settings#section-account-lockout

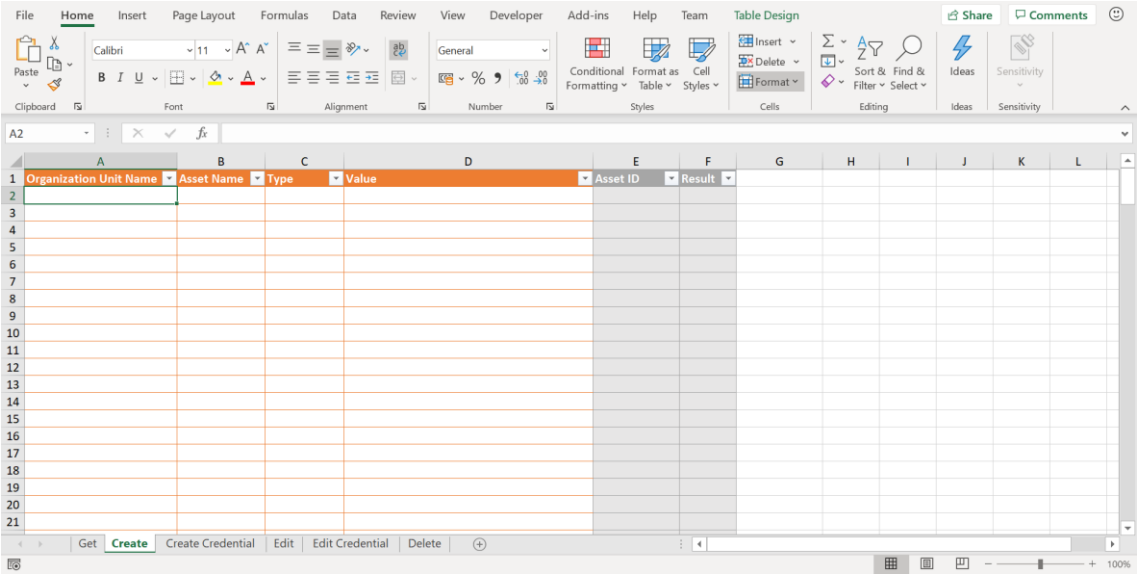

Figure 6 - Entity Workbook

Entities Workbooks

Operations make use of entities workbooks, which are Excel workbooks used to input and output data related to the chosen entities. These workbooks are automatically open by Orchestrator Manager when the corresponding entity is selected.

Each sheet of an entity workbook represents an operation that can be performed on that entity. As mentioned in section How to Use and shown in Figure , cells of each sheet have different colors that indicate their use:

- White cells can receive input from the user, such as data about Assets to be created.
- Gray cells are used by Orchestrator Manager to write data retrieved from Orchestrator, such as IDs of the created Assets. Data input into gray columns is overwritten by Orchestrator Manager.

The following tables provide more details about workbooks representing each entity: Table 2 - Assets, Table 3 - Environments, Table 4 - Machines, Table 5 - Processes, Table 6 - Robots and Table 7 - Users.

Table 2 - Assets

Operation	Details
Get	Retrieves data about the existing Assets. This sheet is populated by Orchestrator Manager, and the user is not required to input any data. The retrieved data can be copied to be used in other sheets. For security reasons, passwords of credential Assets are not retrieved.
Create	Creates Assets with the provided data. The field *Type* has a fixed number of possible values, according to Asset types available in Orchestrator: *Text*, *Bool* and *Integer*. Assets per Robot are currently not supported.
Create Credential	Creates credential Assets with the provided data. Although credentials are also classified as Assets, they have two values instead of one: *Username* and *Password*. Assets per Robot are currently not supported by Orchestrator Manager.
Edit	Edits Assets using the provided data. It is necessary to specify *Organization Unit Name* and *Asset ID* of the Asset to be edited, and both can be retrieved by the **Get** operation. The other fields are optional, and fields left blank are not modified. Note that it is not possible to change the type of the Asset, and the new value must be compatible with the current Asset type.

Edit Credential	Edits credential Assets with the provided data. It is necessary to specify *Organization Unit Name* and *Asset ID* of the credential Asset to be edited, and both can be retrieved by the **Get** operation. The other fields are optional, and fields left blank are not modified. If *Username* is to be updated, a new password must also be provided. On the other hand, it is possible to update only *Password* by not inputting a new *Username*.
Delete	Deletes the specified Assets. To prevent accidental deletion, it is necessary to provide both ID and name of the Organization Unit, as well as ID and name of each Asset to be deleted. This data can be retrieved by the **Get** operation.

Table 3 - Environments

Operation	Details
Get	Retrieves data about the existing Environments. This sheet is populated by Orchestrator Manager, and the user is not required to input any data. The retrieved data can be copied to be used in other sheets.
Create	Creates Environments with the provided data.
Delete	Deletes the specified Environments. To prevent accidental deletion, it is necessary to provide both ID and name of the Organization Unit, as well as ID and name of each Environment to be deleted. This data can be retrieved by the **Get** operation.

Add or Remove Robots	Adds Robots to or remove Robots from the specified Environment. The names of Robots must be provided as comma-separated values (e.g., *Robot1, Robot2, Robot3*).

Table 4 - Machines

Operation	Details
Get	Retrieves data about the existing Machines. This sheet is populated by Orchestrator Manager, and the user is not required to input any data. The retrieved data can be copied to be used in other sheets.
Create	Creates Machines with the provided data. The field *Type* has a fixed number of possible values, according to Machine types available in Orchestrator: *Standard* and *Template*. A Machine key is automatically generated when a machine is created, and it is written to the **Create** sheet by Orchestrator Manager.
Delete	Deletes the specified Machines. To prevent accidental deletion, it is necessary to provide both ID and name of each Machine to be deleted. This data can be retrieved by the **Get** operation.

Table 5 - Processes

Operation	Details
Get	Retrieves data about the existing Processes. This sheet is populated by Orchestrator Manager, and the user is not required to input any data. The retrieved data can be copied to be used in other sheets.

Create	Creates Processes with the provided data. *Package Name* and *Package Version* can be retrieved from the Packages page in Orchestrator's web interface.
Delete	Deletes the specified Processes. To prevent accidental deletion, it is necessary to provide both ID and name of each Process to be deleted. This data can be retrieved by the **Get** operation.

Table 6 - Robots

Operation	Details
Get	Retrieves data about the existing Robots. This sheet is populated by Orchestrator Manager, and the user is not required to input any data. The retrieved data can be copied to be used in other sheets.
Create	Creates Robots with the provided data. The field *Hosting Type* has a fixed number of possible values, according to hosting types available in Orchestrator: *Standard* and *Floating*. The field *Robot Type* also has a fixed number of possible values, but that can change depending on Orchestrator's version. For instance, Orchestrator 2018.4 accepts the values *NonProduction*, *Attended*, *Unattended* and *Development*. On the other hand, Orchestrator 2019.10 accepts the values *NonProduction*, *Attended*, *Unattended*, *Studio*, *Development* and *StudioX*. The possible values for each Orchestrator version can be confirmed on Orchestrator's Swagger page.

Edit	Edits Robots using the provided data. It is necessary to specify *Organization Unit Name* and *Robot ID* of the Robot to be edited, and both can be retrieved by the **Get** operation. The other fields are optional, and fields left blank are not modified. Note that it is not possible to change the *Hosting Type* of the Robot.
Delete	Deletes the specified Robots. To prevent accidental deletion, it is necessary to provide both ID and name of the Organization Unit, as well as ID and name of each Robot to be deleted. This data can be retrieved by the **Get** operation.

Table 7 - Users

Operation	Details
Get	Retrieves data about the existing Users. This sheet is populated by Orchestrator Manager, and the user is not required to input any data. The retrieved data can be copied to be used in other sheets.
Create	Creates Users with the provided data. The names of the Organization Units and of Roles must be provided as comma-separated values (e.g., *Default, Finance, HR* and *Administrator, Queue Watcher, Robot Creator*). The field *Password* must follow the security rules for passwords defined in the tenant's settings page on Orchestrator.

Edit	Edits Users using the provided data. It is necessary to specify the *ID* of the User to be edited, which can be retrieved by the **Get** operation. The other fields are optional, and fields left blank are not modified. Note that it is not possible to change the *Username* of the User. The field *Status* has a fixed number of possible values, according to hosting types available in Orchestrator: *Active* and *Inactive*. For changes regarding Organization Units and Roles, refer to the operations **Add or Remove OUs** and **Add or Remove Roles**.
Delete	Deletes the specified Users. To prevent accidental deletion, it is necessary to provide both ID and username of each User to be deleted. This data can be retrieved by the **Get** operation.
Add or Remove OUs	Adds the user to or remove the user from the specified Organization Units. The names of the Organization Units must be provided as comma-separated values (e.g., *Default, Finance, HR*).
Add or Remove Roles	Adds Roles to or remove Roles from the specified User. The names of the Roles must be provided as comma-separated values (e.g., *Administrator, Queue Watcher, Robot Creator*).

Note that Orchestrator Manager also considers Excel table filters applied to operation sheets. For example, if data about Assets are input into the **Create** sheet of **Assets.xlsx** and then the table is filtered to show only *Text* Assets, Orchestrator Manager will make requests to create only *Text* Assets.

Restrictions

The current version of Orchestrator Manager has the following limitations:

- The minimum Orchestrator version supported is 2018.4. It is required for Organization Units to be enabled if connecting to Orchestrator 2018.4 or Orchestrator 2019.4, even if there is only a single Organization Unit defined.
- Although Classic Folders (previously called Organization Units) are required, Modern Folders are not supported by Orchestrator Manager. For more details about Folders, consult Orchestrator's online documentation[6].
- Due to differences in authentication methods and assignment of users, Orchestrator tenants hosted on UiPath Cloud Platform[7] are not supported.
- Entities other than Assets, Environments, Machines, Processes, Robots and Users are not supported.
- The manipulation of Assets per Robot is not supported.

The above limitations will be addressed in future versions of Orchestrator Manager, along with improvements based on the received feedback.

Finally, note that Orchestrator Manager is mainly intended to be used for bulk operations, and it is by no means a replacement for Orchestrator's web interface.

Distribution and Support

Orchestrator Manager is available as a UiPath Studio project and it can be downloaded from UiPath Connect[8].

This tool is offered under the UiPath Open Platform Activity License Agreement (available as the file **LICENSE.pdf** and also online[9]), and support is provided on a best-effort basis.

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[6] https://docs.uipath.com/orchestrator/docs/using-modern-folders

[7] https://platform.uipath.com/

[8] https://connect.uipath.com/

[9] https://www.uipath.com/hubfs/legalspot/UiPath_Activity_License_Agreement.pdf