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# Clustering in Object Centric Process Mining: User Manual

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## Project Initiation

### Requirements Overview

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- Requires Python, pip and Graphviz.
- Requires Docker for the creation of a container, which may be downloaded here: <https://docs.docker.com/docker-for-windows/install/>.

### Initialisation

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- Firstly, clone the project from <https://github.com/Justus-Nitroklaus/Clustering-in-Object-Centric-Process-Mining.git>.
- After cloning to your local, run the command `pip install -r requirements.txt` to download all requirements.

### Running without a Container

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- Run the command `python manage.py runserver` in the project directory in order to run the development server at `http://127.0.0.1:8000/`.
- Type `http://127.0.0.1:8000/` into your browser and you should be able to run the project.

### Creating & Running a Docker Container

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- Run the command `docker build . -t [image_name]` with `[image_name]` being whatever name you want to give the image. For example: `docker build . -t ciocel_one`. This should build a Docker image with the passed name.
  - Run the Docker container that you have created using the command `docker run -d -p 8000:8000 [image_name]`, while replacing `[image_name]` with the name you have previously given the image. That should run the container in detached mode and port it to your local host; `http://127.0.0.1:8000/`.
  - Type `http://127.0.0.1:8000/` into your browser and you should be able to run the project.
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## Understanding the Application Layout



[Homepage](#) [Import File](#) [Draw DFG](#)

This Page serves as the home and help page

Please click on 'Import File' to start the process

## User Manual

**Import**

Select and import an Object-Centric Eventlog from your local storage

Choose Files <sup>1</sup> No file chosen Import Log <sup>2</sup>

File upload successful <sup>3</sup>

```

running-example.jsonocel
running-example_jNWwn0q.jsonocel
test_upload.jsonocel

```



Delete Clustering DFG page <sup>4</sup>

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- Click on the Choose Files button (1) and select an OCEL from your computer.
- Press the „Import Log“ button (2), if the upload of your file(s) was successful you will see it at (3).
- Then press the „Clustering DFG page“ button (4) to get to the draw page.
- You can also delete files by clicking on them and then pressing the „Delete“ button above button (4).

- The home page, like all other pages, includes a navigation bar at the top.
- The navigation bar includes three pages: the home page, which you are currently on, the file import page, and the DFG drawing page.
- To begin, click on "Import File", which should land you in the file import page.

## Uploading an Object-Centric Event Log



[Homepage](#) [Import File](#) [Draw DFG](#)

**Import**

Select and import an Object-Centric Eventlog from your local storage

Browse... No files selected. Import Log

```

running-example.jsonocel
running-example_H2umpCD.jsonocel
test_upload.jsonocel

```

Clustering DFG page

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**Current page** **File upload** **Process model drawing page** **Stored event logs**

- After you have landed in the file import page, this should be your view; here you will see a functionality to upload event logs, a storage of all previously imported event logs, and a button that brings you to the DFG drawing page.

## Import

Select and import an Object-Centric Eventlog from your local storage

Browse...

No files selected.

Import Log



**Browse button  
(file upload)**



**Currently selected file(s)**



**System upload button**

- Using the browse button, you can pick and then upload OCEL-standard files formatted as XML or JSON.
- After selecting your files, you are able to see the names and directories of the selected files.
- After making sure that you have selected the files you want to work with, press the "Import Log" button. That should upload your files to the database for use.

**Currently selected file  
(highlighted in grey)**



running-example.jsonocel

running-example\_H2umpCD.jsonocel

test\_upload.jsonocel

^

v

^

v



**All other stored event logs**

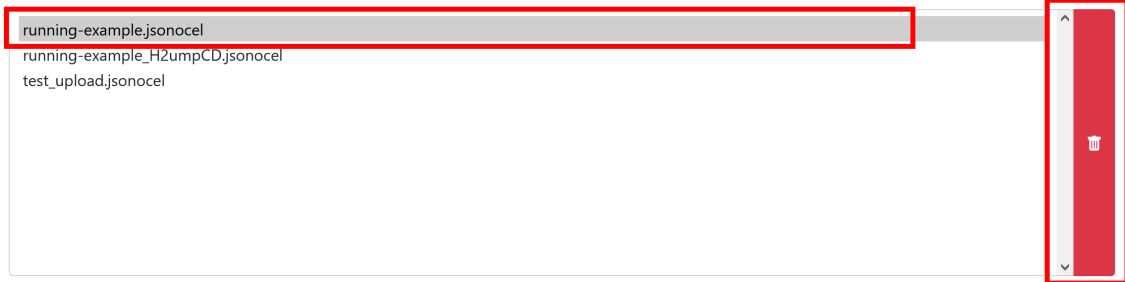


**Delete button**

- In the storage view, you are able to view which files you have previously uploaded.
- The selected file is highlighted in grey, and can even be removed from the saved files.

## Deleting an Event Log

Currently selected file  
(highlighted in grey)



Delete button

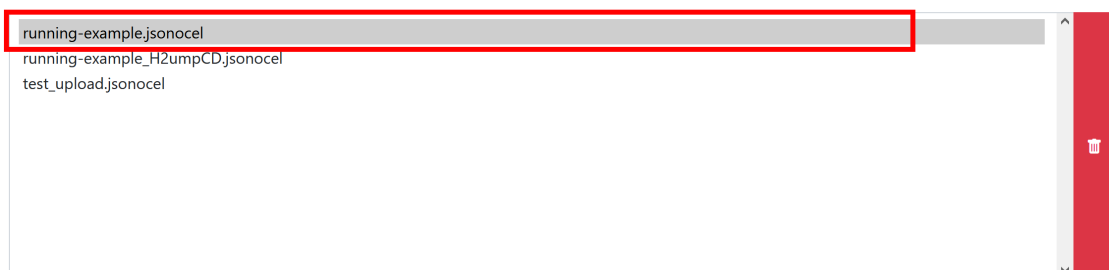


- Should you ever want to remove an event log from the system, simply head to the storage, select the event log, then press on the red delete button.

## Generating Clusters and a Process Model for the Object-Centric Event Log

### Going from the Import Page to the Draw Page

Currently selected file  
(highlighted in grey)



Clustering DFG page



To the process model drawing page

- In order to start creating clusters and viewing the cluster process models, press on the "Cluster DFG page" button. That button should lead you to the drawing page.

## Drawing the Clusters and the Main Process Model

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### Event Log Selection

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#### This is the Drawpage

Please select everything and press "Draw"

The screenshot displays the 'Drawpage' interface. At the top, there is a 'Select OCEL' dropdown menu with a list of event logs: 'running-example.jsonocel', 'running-example\_H2umpCD.jsonocel', 'running-example\_x8jr4ub.jsonocel', and 'test\_upload.jsonocel'. The first two items are circled in red. Below this is a 'Set Filters' section with two sliders: 'Minactivity: 0' and 'Minedge: 0'. A blue 'Filter' button is positioned below the sliders. Further down, there are two sections for selecting methods: 'Select Clustering method' with radio buttons for 'K-Means' and 'Hierarchical', and 'Select Event assignment' with radio buttons for 'All' and 'Existence'. At the bottom, a large blue 'Draw' button is visible.

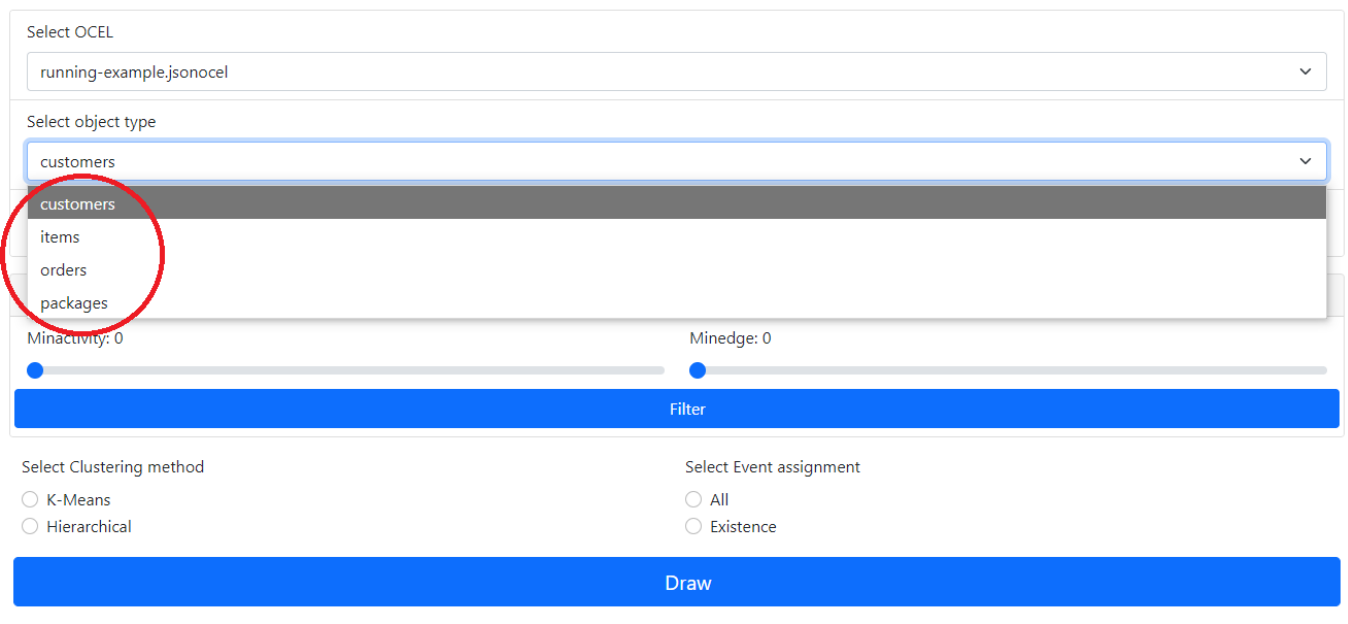
- Having landed in the draw page, you are now able to simply press on the dropdown menu and select one of your previously uploaded event logs.

### Object Type Selection

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## This is the Drawpage

Please select everything and press "Draw"



Select OCEL

running-example.jsonocel

Select object type

customers

customers

items

orders

packages

Minactivity: 0

Minedge: 0

Filter

Select Clustering method

☐ K-Means

☐ Hierarchical

Select Event assignment

☐ All

☐ Existence

Draw

Clustering in Object Centric Process Mining

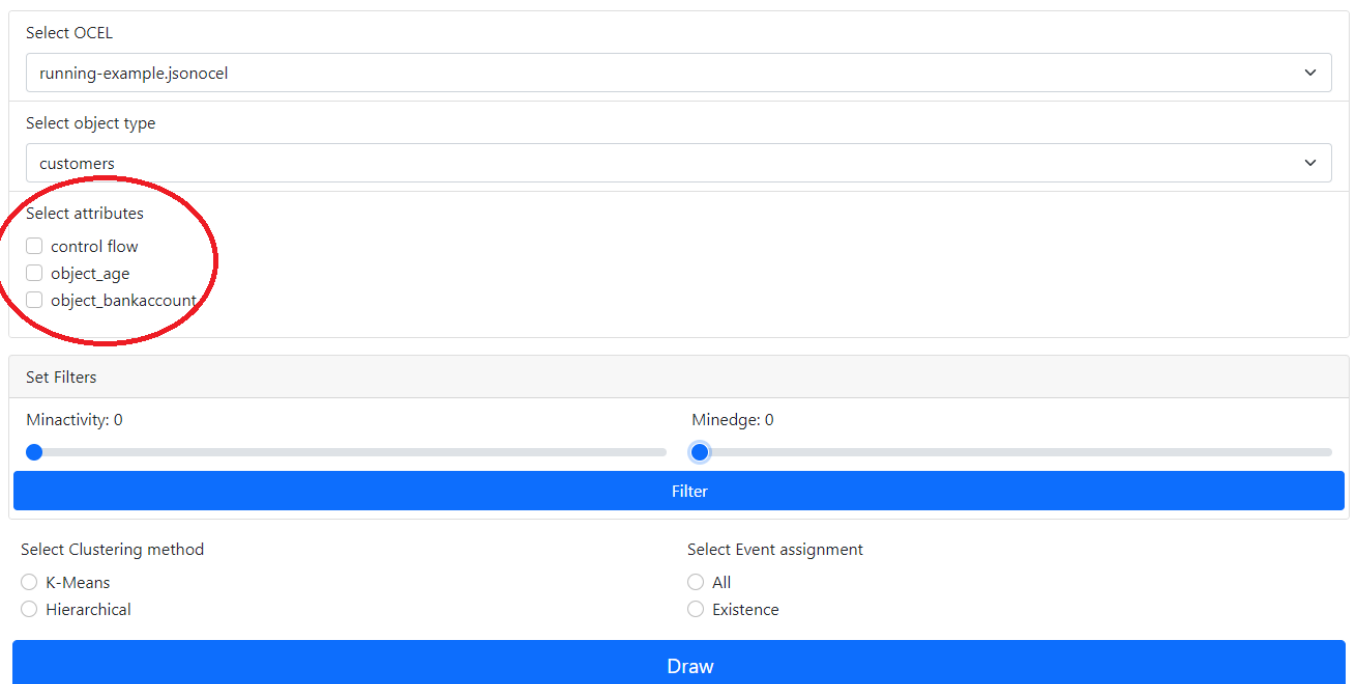
[Github](#) [? Help](#)

- Following the selection of an event log, you are able to select an object type by pressing on the dropdown menu right below it.

## Selecting the Object's Attributes

## This is the Drawpage

Please select everything and press "Draw"



Select OCEL

running-example.jsonocel

Select object type

customers

Select attributes

☐ control flow

☐ object\_age

☐ object\_bankaccount

Set Filters

Minactivity: 0

Minedge: 0

Filter

Select Clustering method

☐ K-Means

☐ Hierarchical

Select Event assignment

☐ All

☐ Existence

Draw

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- By click on the boxes, you are able to select one or more object attributes that you would like your clusters to be centered around.

## Filtering your Selections

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- You can set the minimum number of activities (1) and the minimal number of edges (2), both in a range of zero to 5000.
- After the filters have been set, you need to press the "Filter" button (3).
- Filtering of a cluster can be done repeatedly, even after the creation of a cluster. Just make sure to change the ranges and then press the "Filter" button.

## This is the Drawpage

Please select everything and press "Draw"

Select OCEL

running-example.jsonocel

Select object type

customers

Select attributes

☒ control flow

☐ object\_age

☐ object\_bankaccount

Set Filters

Minactivity: 0

Minedge: 0

Filter

Select Clustering method

☐ K-Means

☐ Hierarchical

Select Event assignment

☐ All

☐ Existence

Draw

## Selecting a Clustering Method

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# This is the Drawpage

Please select everything and press "Draw"

Select OCEL

running-example.jsonocel

Select object type

customers

Select attributes

☒ control flow

☐ object\_age

☐ object\_bankaccount

Set Filters

Minactivity: 0

Minedge: 0

Filter

Select Clustering method

☐ K-Means

☐ Hierarchical

Select Event assignment

☐ All

☐ Existence

Draw

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- The last step is to select a clustering method (4) and the method how to assign events to the clusters (5).
- If you choose "All" event assignment, an event is just assigned to a cluster if ALL objects in that event are in that cluster.
- If you choose "Existence" event assignment, an event is assigned to a cluster as soon as AT LEAST ONE object from the event is in the cluster

## Drawing the Process Model DFGs

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## This is the Drawpage

Please select everything and press "Draw"

Select OCEL

running-example.jsonocel

Select object type

customers

Select attributes

☒ control flow

☐ object\_age

☐ object\_bankaccount

Set Filters

Minactivity: 0

Minedge: 0

Filter

Select Clustering method

☐ K-Means

☐ Hierarchical

Select Event assignment

☐ All

☐ Existence

Draw

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- Simply press the "Draw" button!

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## Exporting the Clustered & Unclustered Process Models

Unclustered

Unclustered DFG's Title

Unclustered DFG download  
(as PNG)

/media/tmp/Frequency-customers-Unclustered-minactivity-370-minedge-1080.png

Cluster 1

Clustered DFGs' Titles

Cluster 2

Clustered DFGs download  
(as PNG)

Page export as PDF

Create PDF

- Following the drawing of the DFGs, you are able to see both the main, unclustered process model at the top (named "Unclustered"), as well as all cluster process models below that (named "Cluster n" with n denoting a simple enumeration).
- You can download the DFG for each process model separately as a PNG by using the download button right below the DFG on the right hand corner.
- If you would like, you also have the possibility of downloading the whole thing, including all DFGs, as a PDF by simply clicking the "Create PDF" button at the very bottom.