Exercise 1 : Change detection on Sentinel-2 data product

Objective : Find the high-level of changes on the vineyard of the Aquitaine and the related information

Connexion information :

- platform.candela-H2020.eu/hub
- login : test_user_01 ➔ test_user_10, password : atos1234

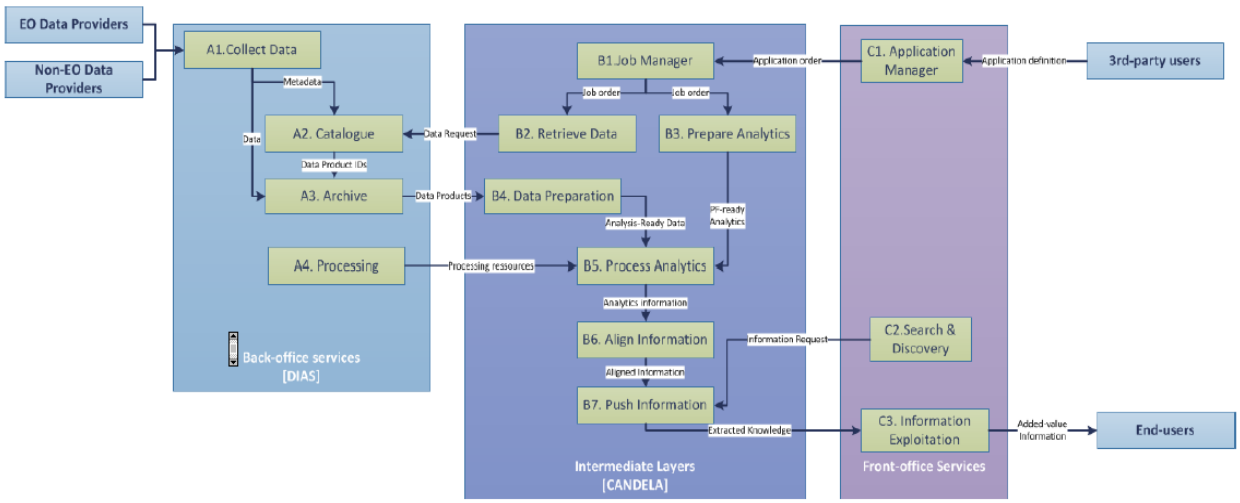
In this exercise, all needed functions are regroup in the folder *Hackaton/Exercise1* in your work space, which is organized as follow :

- *S2_ChangeDetect.ipynb*
- *Triplification.ipynb*
- *SemanticSearch.ipynb*
- A folder, named *Library*, with python files
- A folder, named *templates*, with .ttl files

And, all needed data are regroup in the folder *DATA/Exercise1* in the folder *SHARED* of the public space, which is organized as follow :

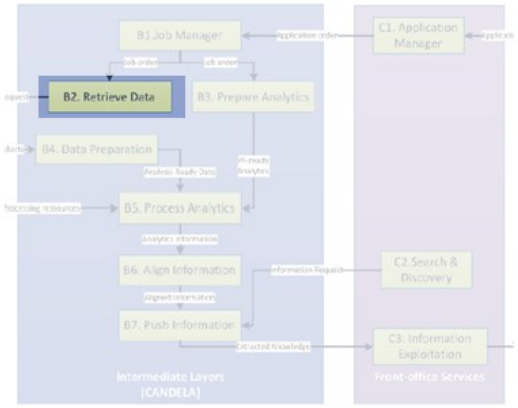
- A folder, named *S2_ChangeDetect*, with 5 GeoTiff subimages
- *OCS_2018_CESBIO.tif* (land-cover data from CESBIO)

The following exercise not only allows people to run some building blocks developed in CANDELA project, but also to discover the functional architecture of CANDELA platform.



Step 1 : Find the image of interest

Objective : Create a folder that contains the Sentinel-2 data products of interest



Open the jupyter-notebook named ***S2_ChangeDetect*** (Part 1)

1/ Search all the Sentinel-2 data product of level 2A, which have been acquired between the 15th of April 2017 and the 30th of April 2017, with a cloud cover lower than 20%, and that represent the Aquitaine area

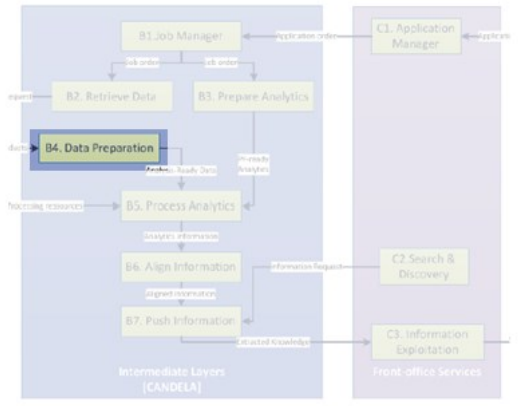
2/ Filter your result to select only the Sentinel-2 data product of the tile T30TYQ

3/ Create a folder with your filtered result

It is possible to visualize the covered area by the tile T30TYQ

Step 2 : Prepare the image of interest

Objective : Transform Sentinel-2 data products into GeoTiff images

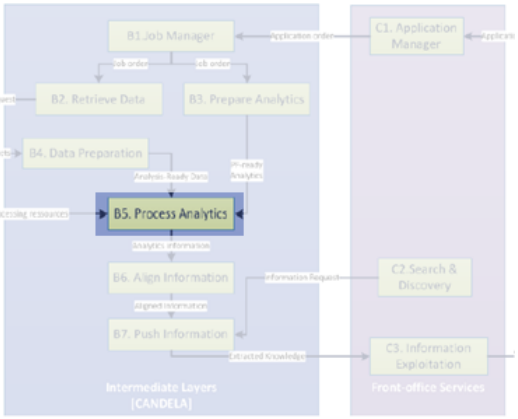


Open the jupyter-notebook named ***S2_ChangeDetect*** (Part 2)

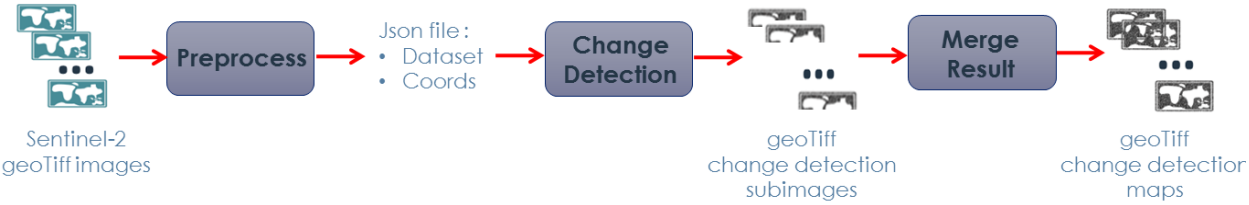
Convert the Sentinel-2 data products into single GeoTiff image with 4 bands : blue (02), green (03), red (04) and NIR (08)

Step 3 : Run the optical change detection tool

Objective : Generate change detection maps that represent the probability of generic change



Open the jupyter-notebook named ***S2_ChangeDetect*** (Part 3)



1/ Run the module named *Preprocess*, and choose to split the GeoTiff images in 5 to set up the following computations

2/ In the current configuration of the platform, the following module named *ChangeDetection* takes several hours to run, so it is better to skip this module and use the change detection subimages put in the folder *DATA* in the public space. *It is advised to copy/paste the subimages into another folder inside your work space.*

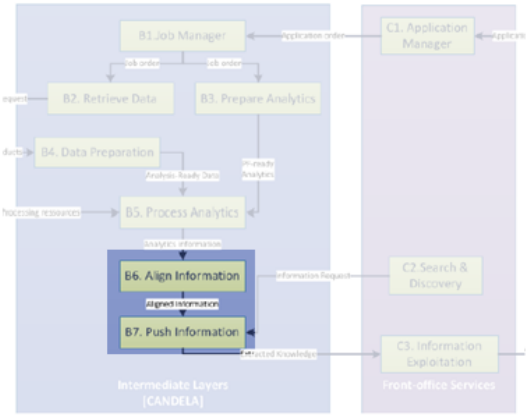
3/ Run the module named *MergeResult*

Once your Change Detection map is generated, it is possible to visualize it

Step 4 : Run the triplification tool

Objective : Interlink various data sources at parcel-level, including :

- *Change detection result*
- *Land-cover*
- *NDVI*
- *Weather forecast*



Open the jupyter-notebook named **S2_*Triplification***

I/ Search for villages of interest

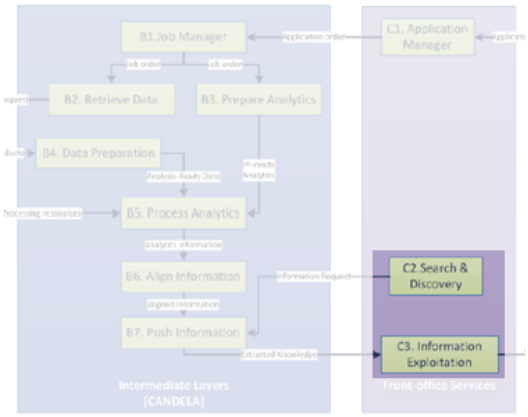
1. Retrieve the 30TYQ tile information and store its geometry
2. Search and visualize villages (limit to 20) inside the 30TYQ tile
3. Choose one village from the list and note its insee number

II/ Download parcels information for the chosen village, and triplify data at parcel level

1. Download cadastral parcels information for the chosen village
2. Triplify cadastral parcels data combined with the land cover information from CESBIO.
   The file OCS_2018_CESBIO.tif containing land cover data has already been downloaded in the DATA folder in the public space in order to gain time
3. Upload triplified data to the semantic database
4. Triplify change detection result on these cadastral parcels
   The change detection result is obtained at step 3
5. Upload triplified data to the semantic database
6. Compute and triplify the NDVI information for these parcels
   The GeoTiff file is obtained at step 2
7. Upload triplified data to the semantic database
8. *As the weather information is the same for every villages, the results have already been triplified and uploaded to the semantic database in order to gain time and not overcharged the database.*

Step 5 : Run the semantic search tool

Objective : Search the high-level change detection and interlinked information



I/ Semantic search through Jupiter notebook.

Open the jupyter-notebook named **S2_*SemanticSearch***

1. Search for high-level changes on vineyard (whose land-cover code is '15') of all the villages inside the database
2. Choose a parcel from the list, and note its ID and the insee number of the village corresponding
3. Search for NDVI information of the chosen parcel on the acquisition dates of Sentinel-2 data products selected at step 1
4. Search for weather forecast measures of the village containing the chosen parcel. Choose a period that contains the acquisition dates below.
   Display the measures on a diagram

II/ Semantic search through web interface

1. Open the link "http://melodi.irit.fr/semantic-search/" in a web browser.
2. Check the *what checkbox* and choose a change level (high change or middle change)
3. Let the *where checkbox* checked, click on "Clear all and Redraw" and draw an area on the map.

   - The zone must contain parcels whose information are processed at the previous steps, may be by another user.

   - The zone must not be very large to prevent server overload.

   - To draw the area: left click to define a vertex, double click to finish drawing.

4. Wait for the server response, then click on a parcel (shown on the map) to view returned information. Can try both the tabular and diagram mode.

Why there were high-level change on vineyard?