

Sen2Like

Introduction

The F-TEP Sen2Like services are used to generate an Analysis Ready Dataset from Sentinel-2 L1C (since July 2015) and Landsat-8 (since March 2013) imagery. The main goal of Sen2Like is to generate Sentinel-2 like harmonised/fused surface reflectances with higher periodicity by integrating additional compatible optical mission sensors. For details on the format specification of the harmonized products or the functionalities of the Sen2Like software, please refer to the [Product Format Specification](#), and the [User Manual v1.9](#), and the project [Github page](#).

Sen2Like is offered as two processing services which differ in input data selection:

- **Sen2LikeSingleTile**
In Sen2LikeSingleTile the user defines a Sentinel-2 tile and query constraints for the data (dates, cloudiness, coverage of the tile) and the service retrieves all images from the Creodias data archive that match these criteria. The Creodias archive contains global Sentinel-2 L1C dataset and European coverage for Landsat-8.
- **Sen2LikeProduct**
In Sen2LikeProduct the user selects the Sentinel-2 and Landsat-8/9 products that should be processed. If a Landsat image is not available on Creodias it can be uploaded as a zip file and processed with Sen2LikeProduct.

The processing phase is the same for both services.

The services are provided in pay-per-use mode and consume processing coins, see the section on coin consumption in the end of the document.

In addition to the two processing services there is a third service Sen2LikeSingleTileDataSearch that can be used to check which image products would be used by the Sen2LikeSingleTile service with a specific set of input parameters. It produces a text file with the listing of products and their cloud coverage and tile coverage values. It is equivalent to using the Sen2LikeSingleTile service in 'Only check data availability' mode but has less input parameters and starts usually faster as it is configured to use a worker pool that has always a worker virtual machine available.

Inputs

The input parameters that are common to both Sen2Like processing services are described in Table 1, inputs specific to Sen2LikeSingleTile in Table 2 and inputs specific to Sen2LikeProduct in Table 3. The parameters of Sen2LikeSingleTileDataSearch are a subset of the parameters in Table 1.

Table 1 Input parameters that are common to both Sen2Like services

Input	Description
Tile ID	The target Sentinel-2 tile identifier, e.g. 31TFJ.
Start date	Input data start date in format yyyy-mm-dd. Single tile mode will use this in data search but both need it for auxiliary data selection.
End date	Input data end date in format yyyy-mm-dd. Single tile mode will use this in data search but both need it for auxiliary data selection.
Cloud coverage	Maximum cloud cover percentage in the processed images, 0-100. Default 10.
Image coverage	The minimum image coverage percentage for the tile, 0-100. Default 50.
Create fusion output	Create also 10 meter output dataset. Note that to create fusion output from Landsat-8 images two earlier Sentinel-2 images from the area must be processed first. Default True.
Reference image	Reference image for geometry correction.
Reference image name pattern	String or regular expression that must match the reference image name. Use if there are multiple images in the given input. Use * to match any characters, e.g. *.tif to match all files with suffix .tif
Reference band	Reference band to use in geometry correction. Default B04.
Bands	Bands to process as a comma separated list (B01, ...). Default is all bands.
Atmospheric correction	The atmospheric correction to be applied to the images. The options are <ul style="list-style-type: none"> • No • SMAC • Sen2Cor
Output type	The default output from Sen2Like service is in zipped .SAFE folder structures. With output type GeoTiff it produces a single GeoTiff image of each output. The image contains bands B1, B2, B3, B4, B8A, B11, B12 (or a subset of those if output bands were limited).
Scale GeoTiff with quantification value	Applicable with GeoTiff output format only. Scale the data values with quantification value to produce a float32 output image in the range [0,1]. Otherwise an uint16 image with range [0,10000] will be produced.
Output GeoTiff resolution	Applicable with GeoTiff output format only. One of 10, 20, 30, or 60 meters.

Table 2 Input parameters that are specific to Sen2LikeSingleTile

Input	Description
Only check data availability	If set to True: Do not process the images, only create a text file with the list of images that would be processed with the given parameters. Running in this mode does not consume coins. Running Sen2LikeSingleTile in this mode is equivalent to running the Sen2LikeSingleTileDataSearch service.
Maximum product count	Maximum number of products to process. This can be used to set the estimated cost of the job to the number of products an image search run has indicated which matches the actual cost of the job. If the product count is not set the estimated cost of the job is the number of days in the period * 0.67 and the user must have at least that many coins left.

Table 3 Input parameters that are specific to Sen2LikeProduct

Input	Description
Input images	The Landsat-8 or Sentinel-2 images to process, one or more F-TEP URIs.
Input image processing order	The order in which the input images should be processed as a comma-separated list of F-TEP URIs, e.g. sentinel2:///S2A_MSIL1C_...,landsat:///LC08_L1TP_... This is needed to ensure the correct processing order of the images as the platform does not necessarily process the images in the order they were specified in the 'Input images' parameter.

Outputs

The output of the Sen2Like processing services is images in either .SAFE or GeoTiff format. In .SAFE format each output image will be in its own Zip file, named with the .SAFE folder name with suffix .zip. In GeoTiff format each output image will be a multiband GeoTiff image containing the bands shown in Table 4 or a subset of those if processing was not requested for all of them. The table also shows their corresponding bands in the input Sentinel-2 or Landsat-8 images.

Table 4 Bands in the output

Output GeoTiff band	Sentinel-2 band	Landsat-8 band
B1	B1	B1
B2	B2	B2
B3	B3	B3
B4	B4	B4
B8A	B8A	B5
B11	B11	B6
B12	B12	B7

The services can produce both harmonized (L2H) and fusion (L2F) output versions.

Coin consumption

The Sen2Like services consume processing coins. When a job is launched its coin consumption is estimated based on the input parameters. Launching a job fails if the user does not have the estimated number of coins available. The estimates are calculated as follows:

- Sen2LikeSingleTile:
Length of the time interval in days * 0.67, rounded to the next larger integer, or the value of the 'Maximum product count' parameter if it has been specified and is smaller than the day count based estimate.
There is no cost in 'Only check data availability' mode.
- Sen2LikeProduct:
The number of input images.

The coins are charged from the user wallet after the processing is finished and it is based on the number of images that were processed. The processing cost is one coin per processed image regardless of whether only L2H or both L2H and L2F outputs are produced.