→ THE ESA EARTH OBSERVATION Φ-WEEK

EO Open Science and FutureEO

12–16 November 2018 | ESA–ESRIN | Frascati (Rome), Italy

16/11/2018

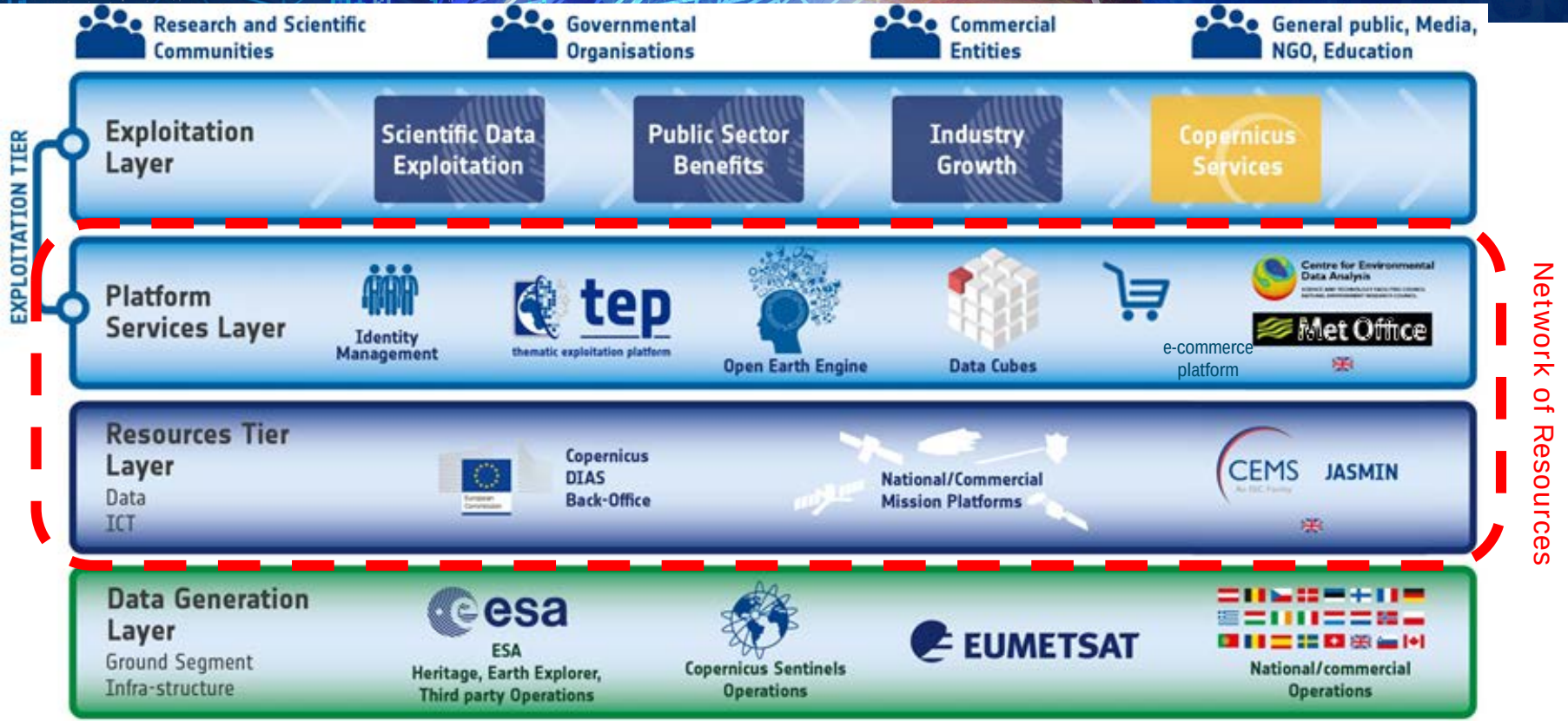
Federating the C-TEP with DAME Platform using WPS

Authors: Drimaco, D.; Ceriola, G.; **Amodio, A.**; Coletta, F. (1); Clerc, S. (2); Tuohy, E. (3); Craciunescu, V. (4); Aspetsberger, M. (6); Campbell, G.; Leone, R.; Mougnaud, P. (5); Vingione G. (7)

Organisations: **1: Planetek Italia**; 2: Acri-st; 3: Ucc; 4: Terrasigna; 5: ESA/ESRIN; 6: Catalysts: 7: Serco

planetek italia

Simplifying the complexity of space


Research and Scientific Communities
Governmental Organisations
Commercial Entities
General public, Media, NGO, Education
EXPLOITATION TIER
Exploitation Layer
Scientific Data Exploitation
Public Sector Benefits
Industry Growth
Copernicus Services
Platform Services Layer
Identity Management
tep
thematic exploitation platform
Open Earth Engine
Data Cubes
e-commerce platform
Centre for Environmental Data Analysis
Met Office
Resources Tier Layer
Data
ICT
Copernicus DIAS Back-Office
National/Commercial Mission Platforms
CEMS
JASMIN
Data Generation Layer
Ground Segment
Infra-structure
esa
ESA
Heritage, Earth Explorer, Third party Operations
Copernicus Sentinels Operations
EUMETSAT
National/commercial Operations
Network of Resources

Wouldn't it be nice if...

...all my data, tools and resources were available in one place?

...I didn't spend 50% of my project resources trying to access the data I need?

...I didn't need to be an ICT wizard or instrument expert to integrate different data into my research or project?

Coastal TEP

In 2014, ESA launched the Thematic Exploitation Platforms, or TEPs, to address precisely these concerns.

- Coastal
- Forestry
- Hydrology
- Geohazards
- Polar
- Urban themes
- Food Security

A shared virtual environment for finding and using Earth Observation data!

Coastal TEP - Objectives

- **The C-TEP is a data exploitation framework dedicated to coastal areas**
  - Principally EO data from the Copernicus program
  - From other EO missions (third party)
  - From in-situ measurements
  - Targeting value-added information relevant to coastal areas
- **The C-TEP is the animator of a thematic community**
  - Fosters R&D and scientific collaboration
  - Promotes new services and applications
  - Collects users' needs and feedbacks
- **The C-TEP is a service provider for derived services ("child-TEPs")**
  - Data storage, processing and dissemination services
  - Data mining tools (fusion, extraction…)

Coastal TEP - Mother and Child TEPs

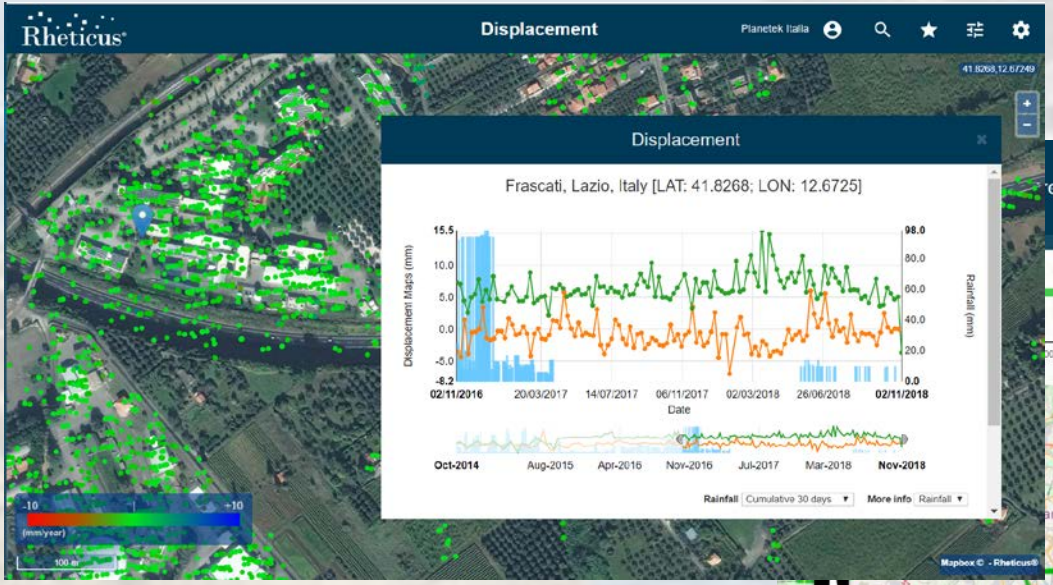
- **The C-TEP as a federation of Children TEPs**
  - A Child TEP is a portal dedicated to
    - ✓ Specific community (e.g. aquaculture users), with *ad-hoc* interfaces
    - ✓ Specific regions s(e.g. the Black or Adriatic seas)
  - The Child TEP concept ensures flexibility for the long-term maintenance and evolution
- **Mother TEP roles**
  - Manages the common catalogue of products
  - Data provision (processing and storage)
  - Development and validation environment
  - Common tools:
    - ✓ Web interface components including data manipulation (trend, change detection)
    - ✓ User account management

DAME - *Data Intensive Technologies for Multi-mission Environments*

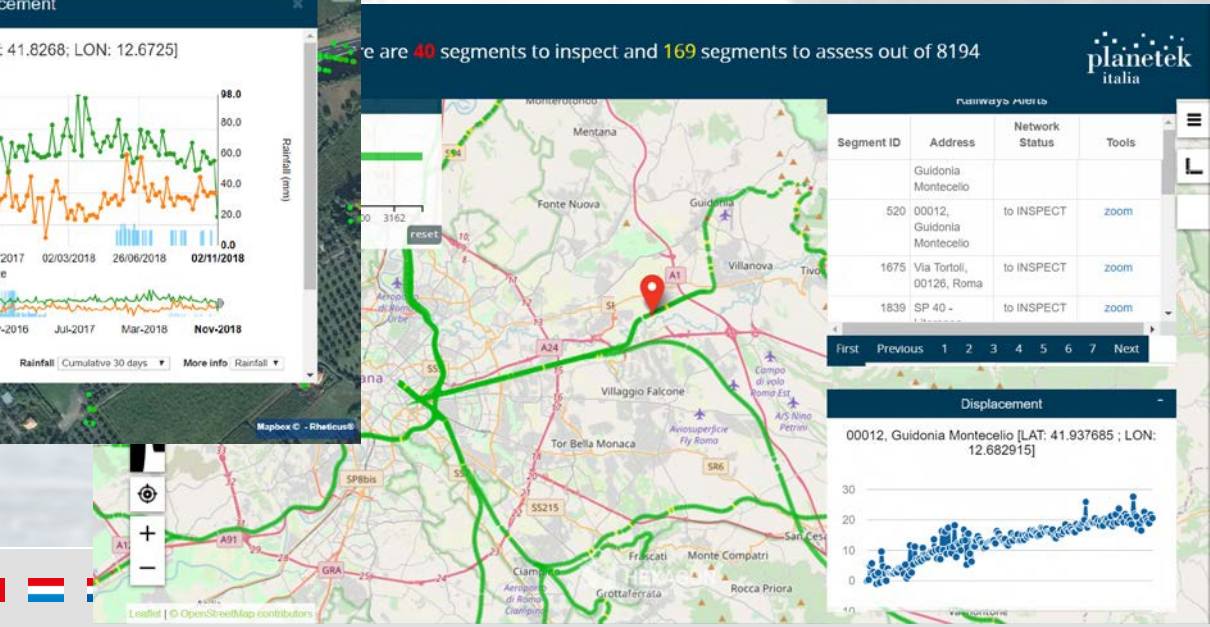
- is an ESA GSTP project, led by Planetek
- Serco in the team for
- aims to proof the concept of a software platform designed to increase capabilities of the Italian Collaborative Segment in terms of EO data access and exploitation

Rheticus®

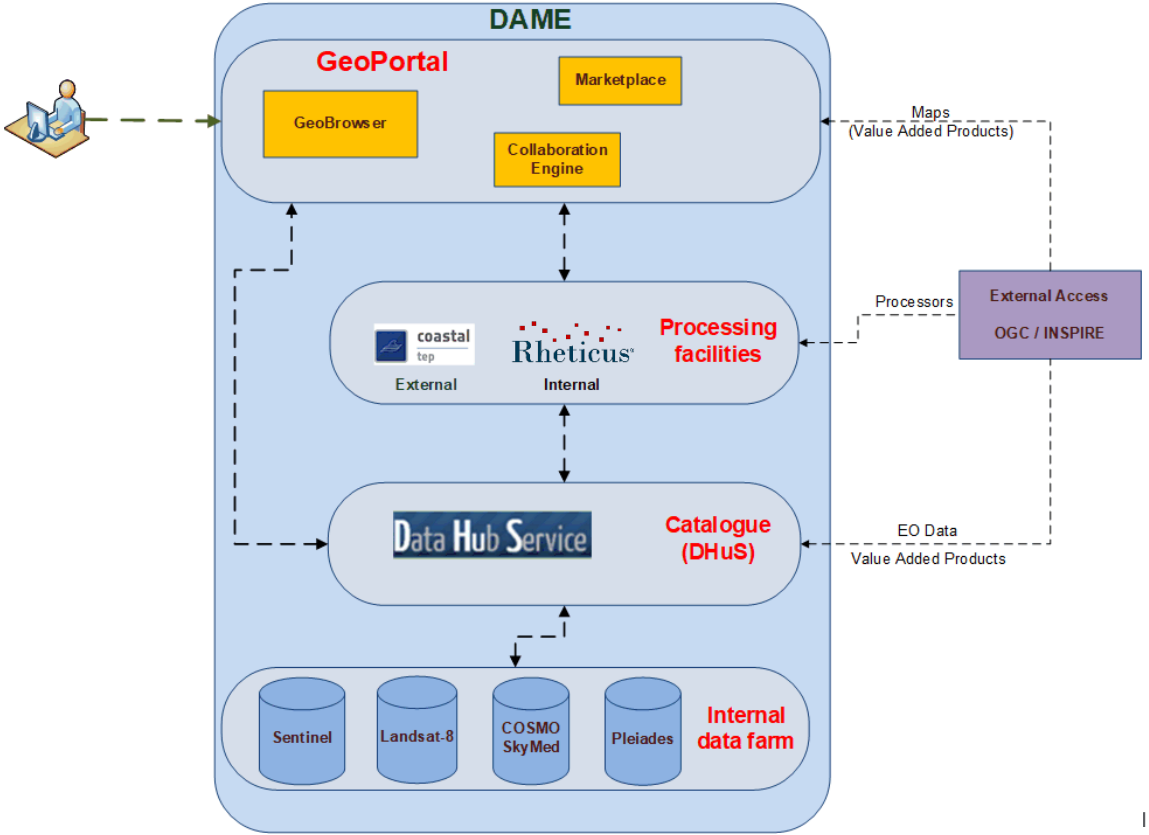
Planetek owns and operates Rheticus®, its cloud infrastructure to deliver services to its customers and clients



Rheticus®

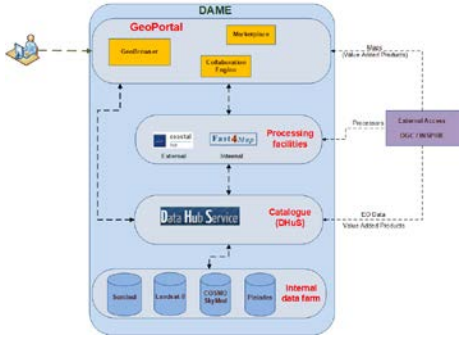


Architecture



Standards and solutions adopted for development

- Architecture based on Docker technology
- Use of OGC standards: WPS, WMS, OWS Context, ...
- Processors → as WPS → as Docker containers
- Support of INSPIRE

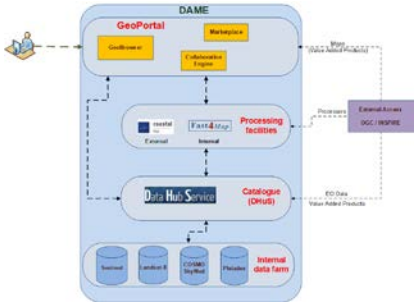


Deployment of a processor on C-TEP and invoked within DAME through WPS

➢ *To develop the prototype of a software system for the exploitation of EO data*

Functionalities

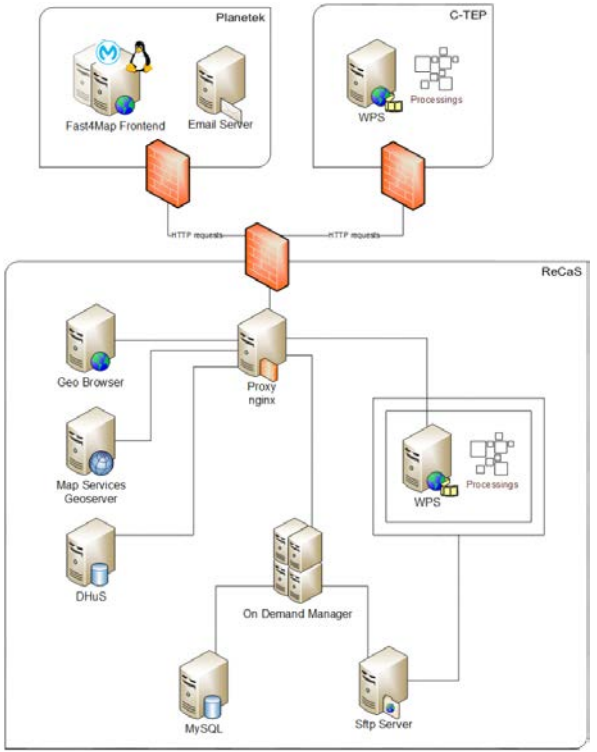
- DHuS improvement (add-ons) for Landsat8, COSMO SkyMed, Pléiades and VAPs
- 11 coastal thematic processors available to the users
- Easy-to-use Geobrowser
- Collaborative functionalities
- Marketplace for processors exchange



➢ *To setup this system in the context of the Italian Collaborative Ground Segment infrastructure*

Deployment

- Deployment at ReCaS facilities, where temporary Coll-IT is deployed
- DAME portal accessible at:
  http://dame-geoportal.planetek.it
- Non-registered users can search and display EO data and VAPs
- The Coll-IT (Matera) is based on DHuS



GeoBrowser

Access the DAME GeoBrowser..

Oil Spill

Detection of oil spill using SAR images.

Coastal subsidence

Earth surface displacement in coastal areas. Demonstration/allowed areas for the Coastal Subsidence processor are the coastal areas of: Crotone, Genova, Trieste (courtesy of Friuli Venezia Giulia Region), Napoli and Fiumicino

Pleiades WQ

VHR Water Quality: Water quality at very high resolution.

Coastline

Coastline: coastline delineation using SAR data.

Sentinel-2 WQ

HR Water Quality: Water quality at high resolution.

Sentinel-3 WQ

Medium resolution water quality: Large scale water quality at medium resolution.

Marketplace

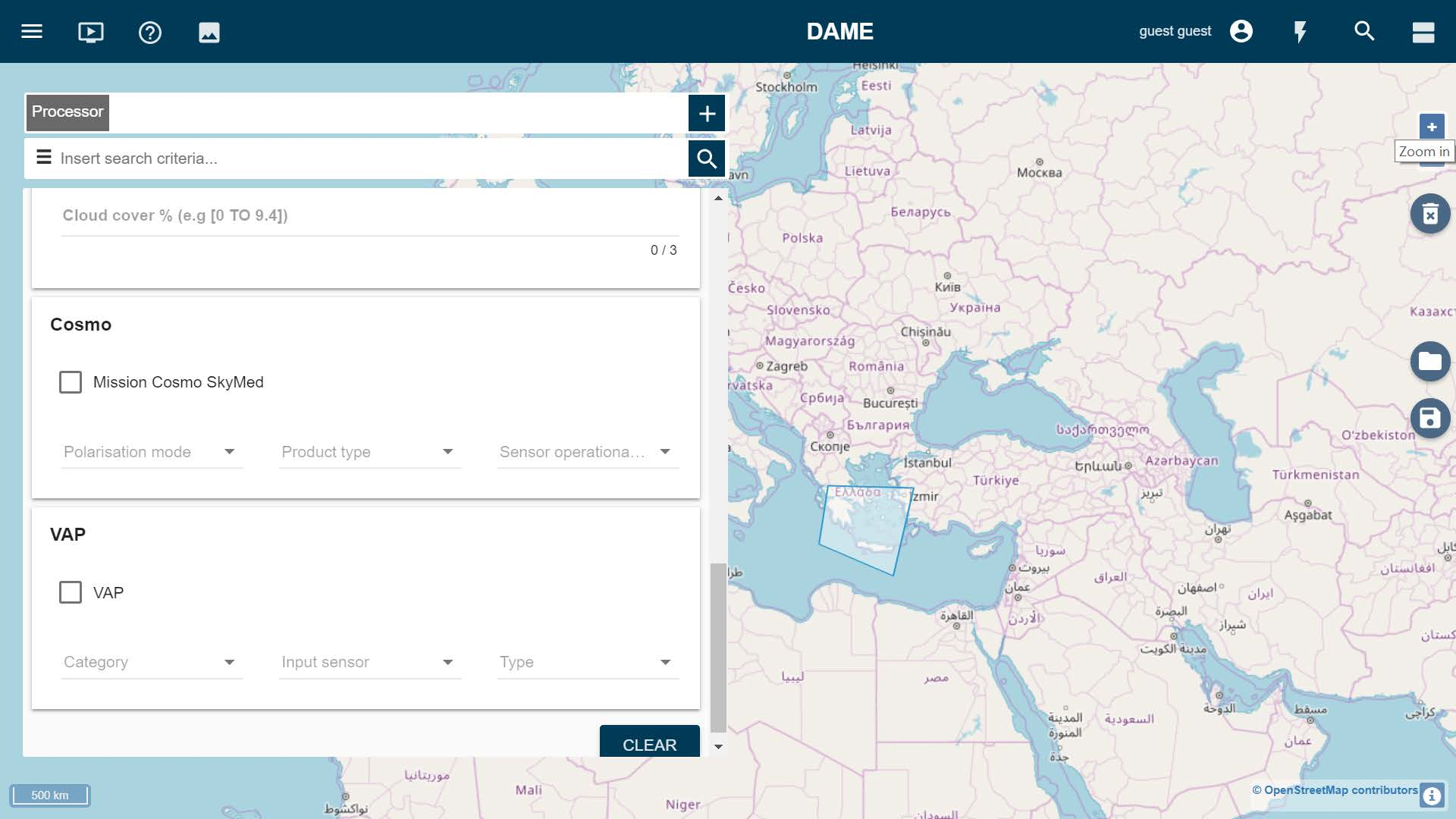
Access the DAME marketplace, browse and download processors, submit your processor.

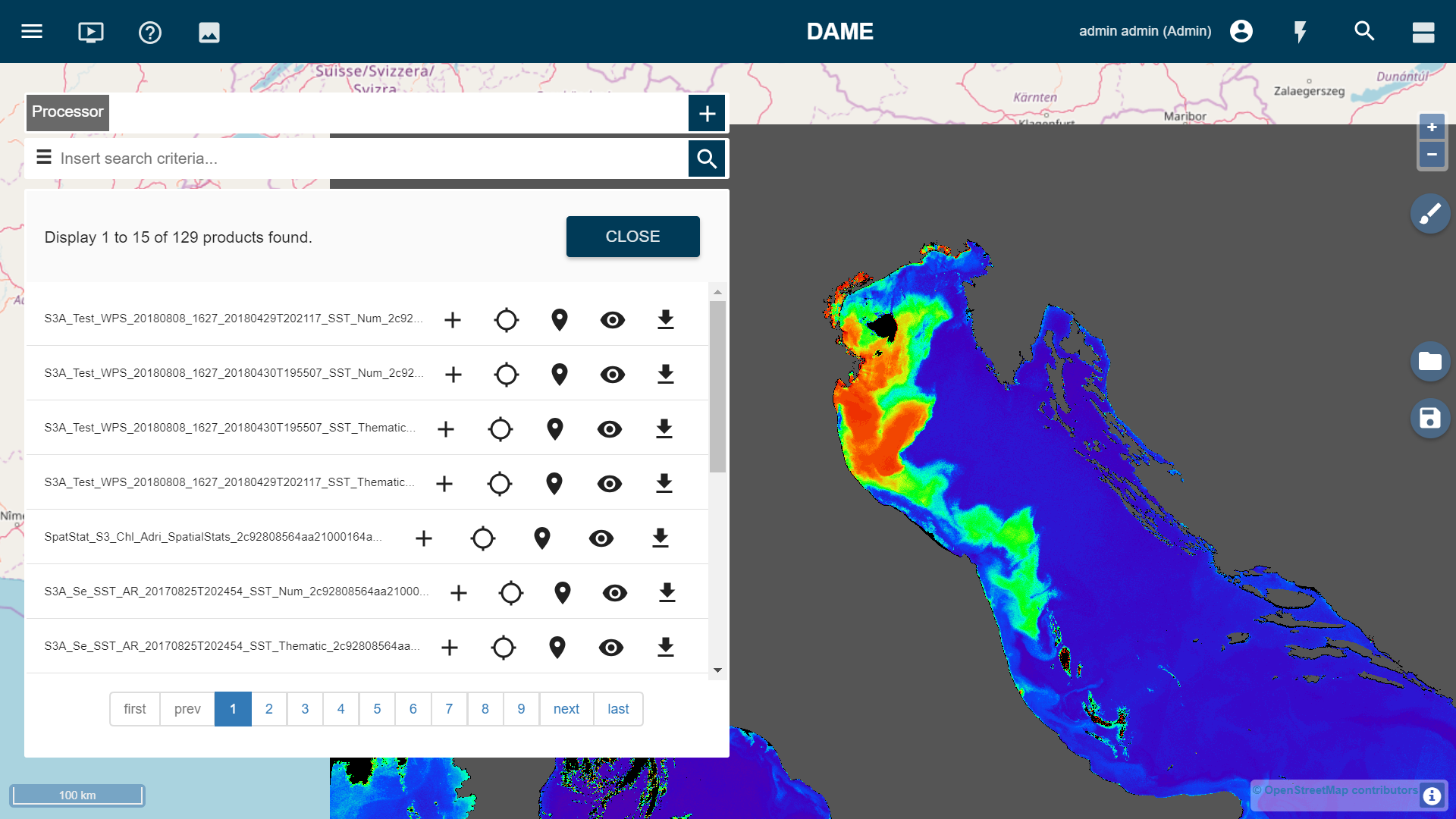
Collaboration

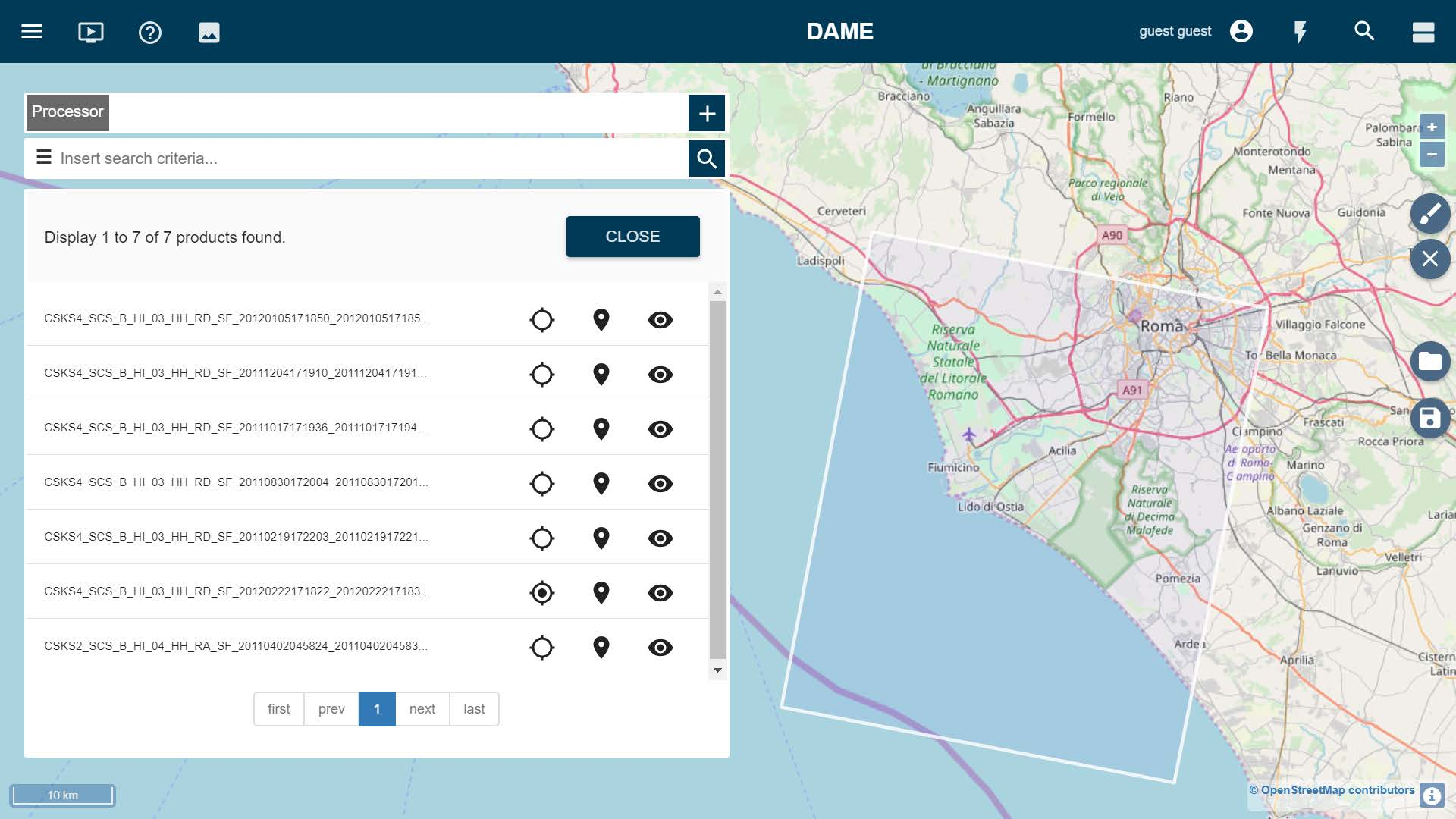
Access the collaboration area and share your workspace.

Info & Contacts

Info & contacts


DAME
guest guest
Processor
Insert search criteria...
Cloud cover % (e.g [0 TO 9.4])
0 / 3
Cosmo
Mission Cosmo SkyMed
Polarisation mode
Product type
Sensor operationa...
VAP
VAP
Category
Input sensor
Type
CLEAR
Zoom in
500 km
© OpenStreetMap contributors


DAME
admin admin (Admin)
Processor
Insert search criteria...
Display 1 to 15 of 129 products found.
CLOSE
S3A_Test_WPS_20180808_1627_20180429T202117_SST_Num_2c92...
S3A_Test_WPS_20180808_1627_20180430T195507_SST_Num_2c92...
S3A_Test_WPS_20180808_1627_20180430T195507_SST_Thematic...
S3A_Test_WPS_20180808_1627_20180429T202117_SST_Thematic...
SpatStat_S3_Chl_Adri_SpatialStats_2c92808564aa21000164a...
S3A_Se_SST_AR_20170825T202454_SST_Num_2c92808564aa21000...
S3A_Se_SST_AR_20170825T202454_SST_Thematic_2c92808564aa...
first
prev
1
2
3
4
5
6
7
8
9
next
last
Kärnten
Maribor
Zalaegerszeg
Dunántúl
100 km
© OpenStreetMap contributors


DAME
guest guest
Processor
Insert search criteria...
Display 1 to 7 of 7 products found.
CLOSE
CSKS4_SCS_B_HI_03_HH_RD_SF_20120105171850_2012010517185...
CSKS4_SCS_B_HI_03_HH_RD_SF_20111204171910_2011120417191...
CSKS4_SCS_B_HI_03_HH_RD_SF_20111017171936_2011101717194...
CSKS4_SCS_B_HI_03_HH_RD_SF_20110830172004_2011083017201...
CSKS4_SCS_B_HI_03_HH_RD_SF_20110219172203_2011021917221...
CSKS4_SCS_B_HI_03_HH_RD_SF_20120222171822_2012022217183...
CSKS2_SCS_B_HI_04_HH_RA_SF_20110402045824_2011040204583...
first
prev
1
next
last
Roma
Fiumicino
Lido di Ostia
Ciampino
Frascati
Marino
Albano Laziale
Genzano di Roma
Velletri
Lanuvio
Pomezia
Aprilia
Ardea
Ladispoli
Cerveteri
Bracciano
Anguillara Sabazia
Formello
Riano
Monterotondo
Mentana
Fonte Nuova
Guidonia
Villaggio Falcone
Bella Monaca
Rocca Priora
Acilia
A90
A91
Riserva Naturale Statale del Litorale Romano
Parco regionale di Veio
Riserva Naturale di Decima Malafede
10 km
© OpenStreetMap contributors

Products details

Attributes

Cloud cover percentage:
2.5327

Datatake sensing start:
2017-04-24T10:10:31.026Z

Degraded MSI data percentage:
0

Degraded ancillary data percentage:
0

Footprint:
<gml:Polygon srsName="http://www.opengis.net/gml/srs/epsg.xml#4326" xmlns:gml="http://www.opengis.net/gml"> <gml:outerBoundaryIs> <gml:LinearRing> <gml:coordinates>41.551844670066835,8.99976018083659 41.54431153543986,10.316200425412891 40.5554731412015,10.29663734616134 40.56274991351036,8.99976374656679 41.551844670066835,8.99976018083659 41.551844670066835,8.99976018083659</gml:coordinates> </gml:LinearRing> </gml:outerBoundaryIs> </gml:Polygon>

Format:
SAFE

Quicklook

DOWNLOAD PRODUCT

Processor List

Water Quality for Sentinel-3 L2 (Chl, WT, Tur)

it.planetek.wps.extension.wq_s3

Version 0.1

Spatial statistics

it.planetek.wps.extension.StatsSR

Version 0.1

Water Quality for Sentinel-2 L1 (Chl, WT, Tur)

it.planetek.wps.extension.wq_s2

Version 0.1

Water Quality from Landsat8

urn:ctep:processor:129

Version 1.0

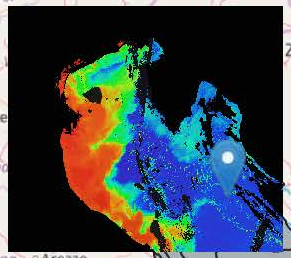
DAME

Processings

Press F11 to exit full screen

Processor

Insert search criteria...



Zone_Type: 1

Id: 17

AOI: 17

Area: 46804.6

Tot_pix: 19035

done

it.planetek.wps.extension.StatsMR

Launched: 18 July 2018 10:02

Last updated: 18 July 2018 10:04

INPUTS

analysisType: Chl

idText: NAdri_TStats

GENERATED VAP

NAdri_TStats_ArithmeticMean_Thema...

NAdri_TStats_GeometricMean_Num_2c...

NAdri_TStats_P90Stats_Thematic_2c...

NAdri_TStats_GeometricMean_Themat...

NAdri_TStats_ArithmeticMean_Num_2...

NAdri_TStats_P90Stats_Num_2c92808...

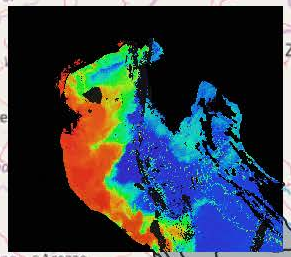
done

it.planetek.wps.extension.wq_s3

200 km

Processor

Insert search criteria...



Drag from the handle to reorder layers.

:::

NAdri_TStats_P90Stats_Thematic_2c...

REMOVE CENTER

:::

NAdri_TStats_GeometricMean_Num_2c...

REMOVE CENTER

:::

NAdri_TStats_ArithmeticMean_Thema...

REMOVE CENTER

:::

200 km

2 available processors

All processors

Sort by

Submission date

Titolo del processore

accepted

by **Giulio Ceriola** on 2018-07-18 14:36:51

Calcolo del indice di vegatazione

DOWNLOAD

Processore XXXX

accepted

by **Giulio Ceriola** on 2018-05-21 11:25:01

Ho implmentato un processorre per genera...

DOWNLOAD

Select a processor on the left side

saved workspaces

shared

Sort by

Creation date

Area_Trieste

by **Giulio Ceriola** created on 2018-07-18 12:55:25

Demo funzionalita workspace

DOWNLOAD

2o_workspace

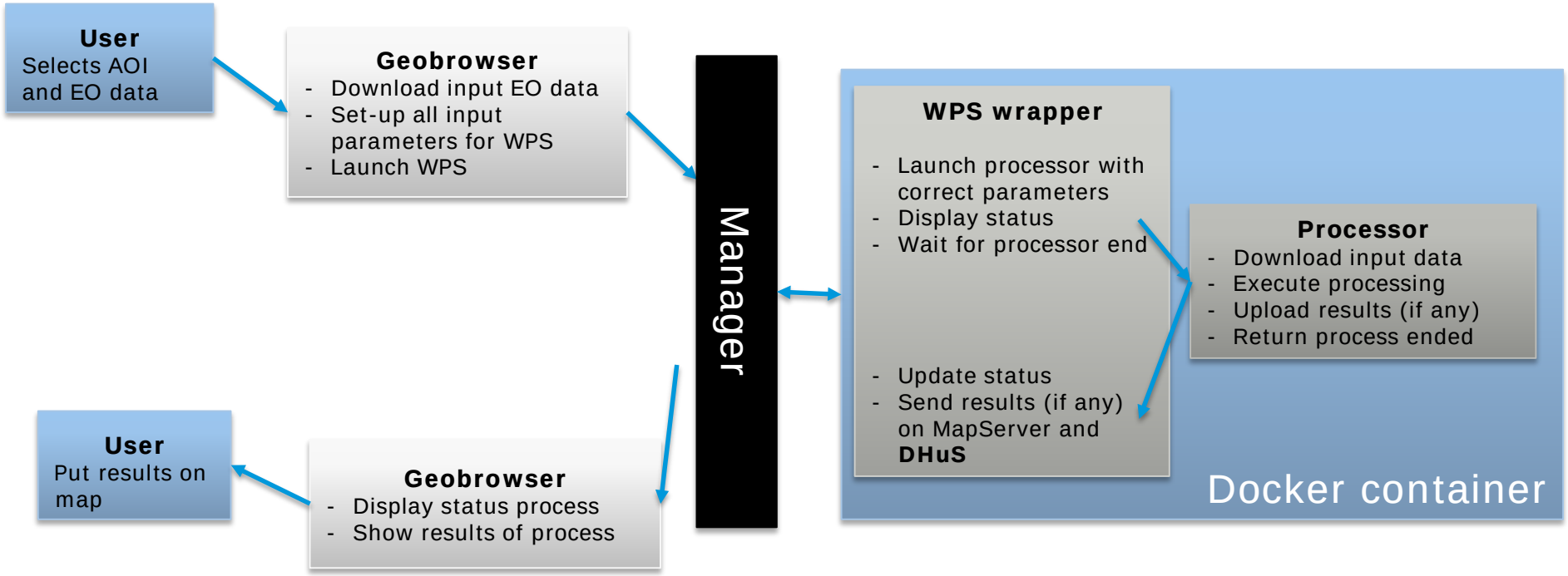
by **Giulio Ceriola** created on 2018-05-21 11:12:46

Salvataggio con evoluzione temporale !

DOWNLOAD

Select a workspace on the left side

Processors as WPS



All the processor are handled using WPS, deployed both on the C-TEP and Rheticus®

Processing platforms

coastal tep

Rheticus®

WPS

Processing request

Processing Status

Data upload (L8)

VAP Download

SFTP

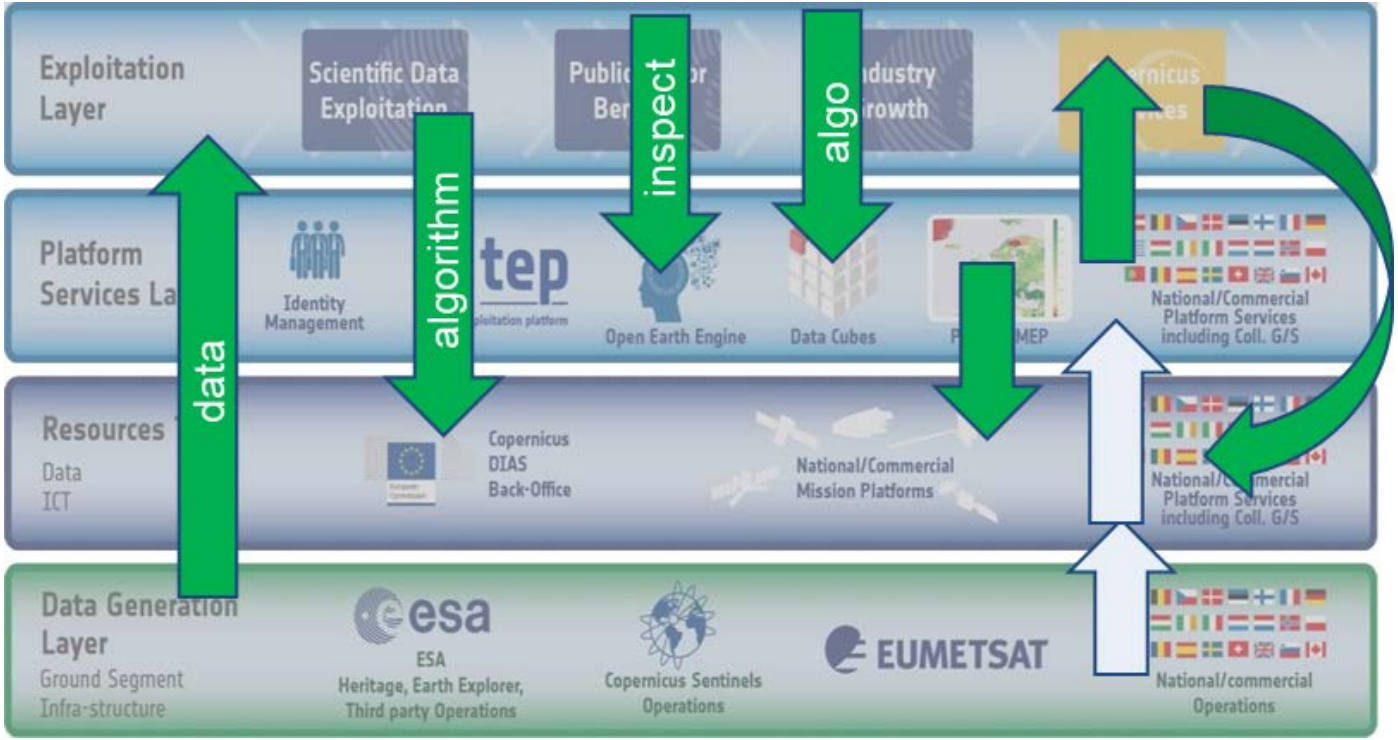
DAME

- Process manager
- GUI – geobrowser
- Marketplace
- Collaboration

C-TEP / DAME

- Landsat data are required; C-TEP does not provide them. The workflow foresees as first step the transfer of input data from DAME to C-TEP, using FTP
- DAME acts data provider for the C-TEP
- C-TEP acts as processing (cloud) provider for DAME
- The operating workflow is transparent to the user

DAME in the EO Ecosystem



Thank you for your attention

Angelo Amodio

Planetek Italia - SpaceStream SBU
amodio@planetek.it