



Supersite Exploitation Platform (SSEP) providing Information as a Service (INFOaaS)

Presenter on behalf of a Earth Observation INFOaaS team



Wolfgang Lengert - ESA
Antonio Cuomo - CGI
Francesco Casu - CNR-IREA
Emmanuel Mondon - CloudEO

Agenda



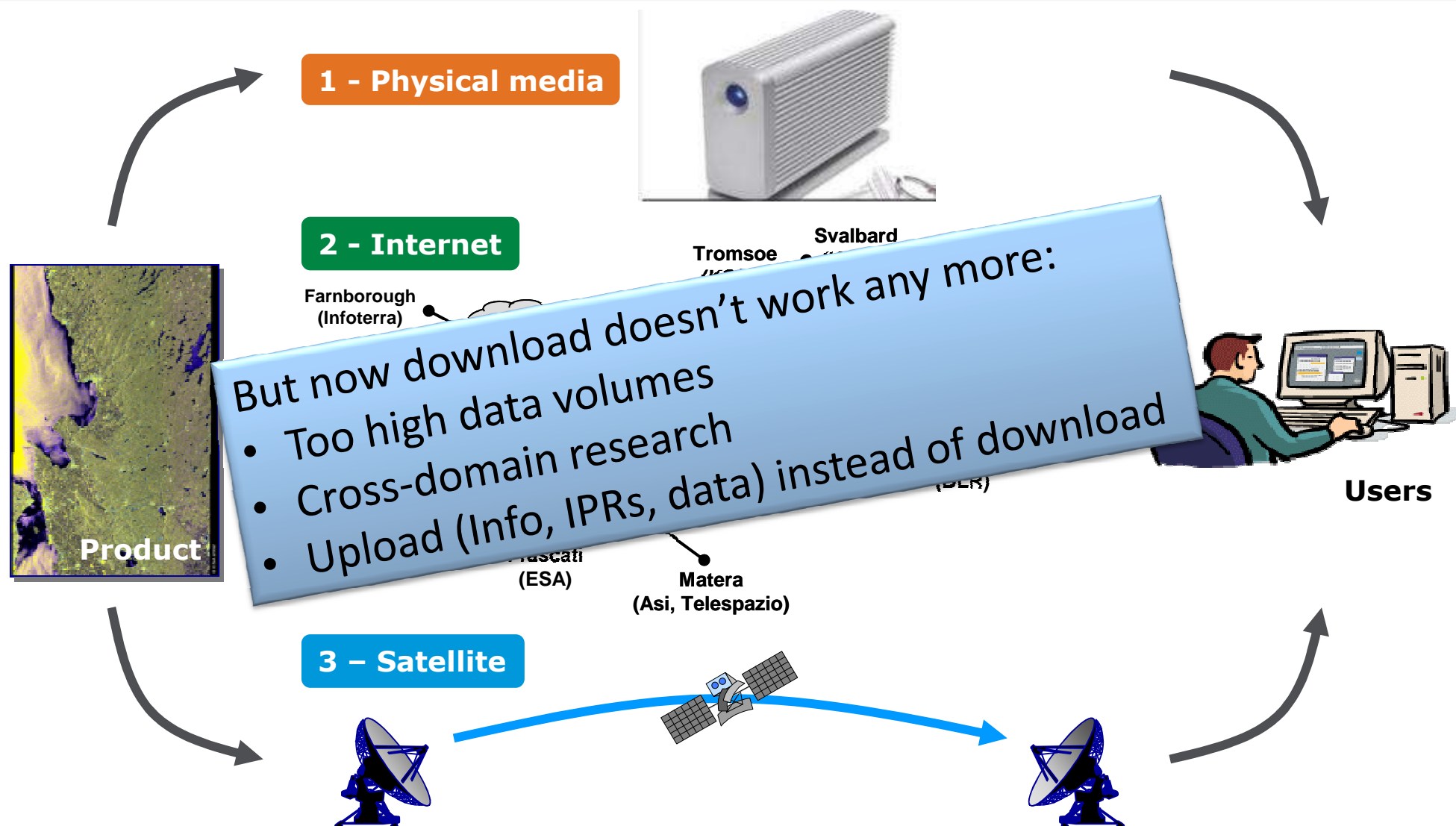
- **ESA:** why do we need the Helix Nebula Marketplace (HNX)?
- **Enterprise / SME:** presentation of HNX competitive work environment
- **Scientist:** large scale access to data, computing, tools, visibility of peers to transform data to knowledge
- **Commercial SME:** showing value creation chain from science to business; Science is HNX innovation engine
- **ESA:** summary

Satellite control, data reception, -processing, -dissemination and -archiving to maximise the beneficial use of ESA and partner satellite data

To stimulate a balanced development of science, public utility and commercial applications consistent with ESA obligations and objectives

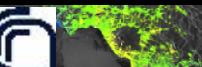


DATA DISSEMINATION



ESA GROUND SEGMENT: COMPONENTS

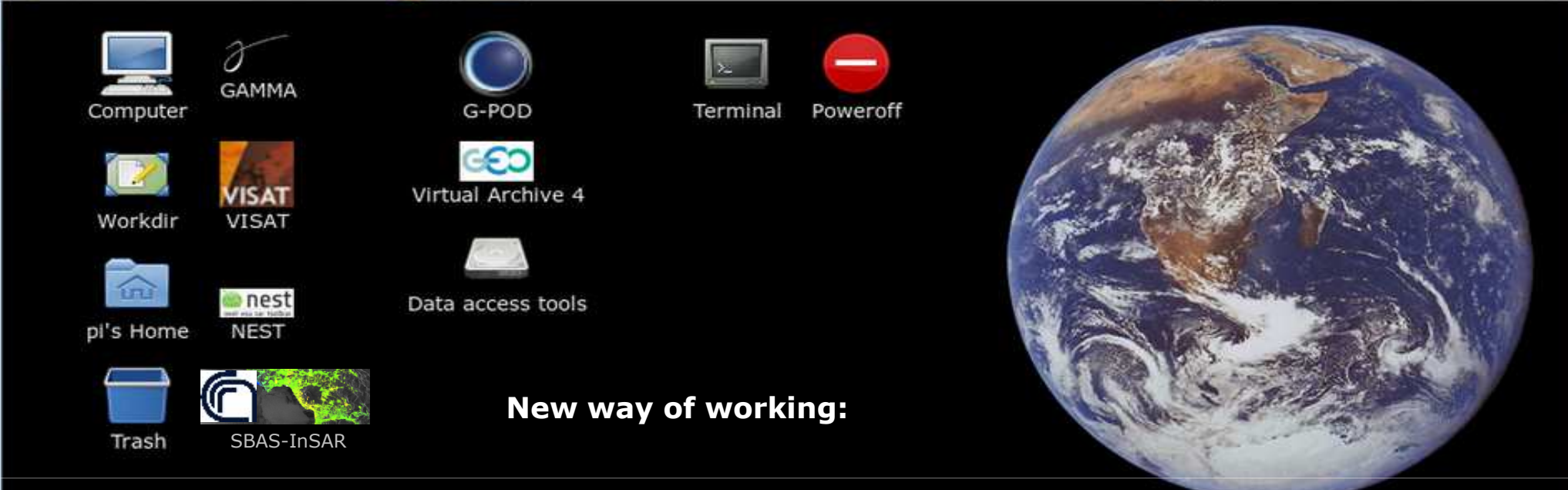
European Space Agency



gammatoolbox:2 (pi) - TigerVNC

Applications Places System

Mon Mar 25, 10:47 AM pi





The desktop environment features a dark background with a large image of Earth on the right. On the left, there are several application icons: Computer, GAMMA, G-POD, Terminal, Poweroff, Workdir, VISAT, Virtual Archive 4, Data access tools, pi's Home, NEST, Trash, and SBAS-InSAR. The icons are arranged in a grid-like fashion.

New way of working:

Virtual workbench powered by Helix Nebula Marketplace shall provide:

- Visibility of all ESA data
- Seamless data access to ESA but also all other data (globally space & *in-situ*) being on the marketplace via "federation of partners" approach
- Visibility and access to IPRs (scientific & commercial) of partner, who define the conditions for participation to the value creation
- Visibility and interaction with scientific peers also across-domain
- Visibility and interaction with people being in demand of information
- Visibility and interaction with funding bodies (science is funding driven)
- Visibility of R&D outcome ready to be picked up by the business environment
-

[VNC config]

Data	ESA SuperSites Data (as available pre-SSEP) Over 90,000 SAR scenes (>18TB) related to Geohazards SuperSites.
Batch Processors	Gamma, NEST, PF-ASAR, SBAS-InSAR
Cloud Appliances	System Appliances <ul style="list-style-type: none">- Virtual Archive 4 + Data Repository- GRID CE (Processing Engine) User Appliances <ul style="list-style-type: none">- CloudToolbox (incl. Gamma cloud license)
Info & Support Tools	Join&Share portal <ul style="list-style-type: none">- Wiki pages- User Forum

ESA SSEP Services

Data	ESA SuperSites Data (as available pre-SSEP) Over 90,000 SAR scenes (>18TB) related to Geohazards SuperSites.
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ESA Virtual Archive 4 (VA 4)



Geohazard Supersites and Natural Laboratories GEO - Group on Earth Observations

Search

Search

Found 89776 results in 17 digital repositories

From 1 Jan, 1992 to Apr 29, 2014

Orbits from to

Tracks from to

Frames from to

Paths

About

Search

My Data

ASAR Image Mode source packets Level 0
(ASA_IM_OP)

[Found 38041 results]

[Showing from 0 to 19]

first next last

ASA_IM_OCNPDF20120407_182038_000000173113_00257_52857_6356.N1
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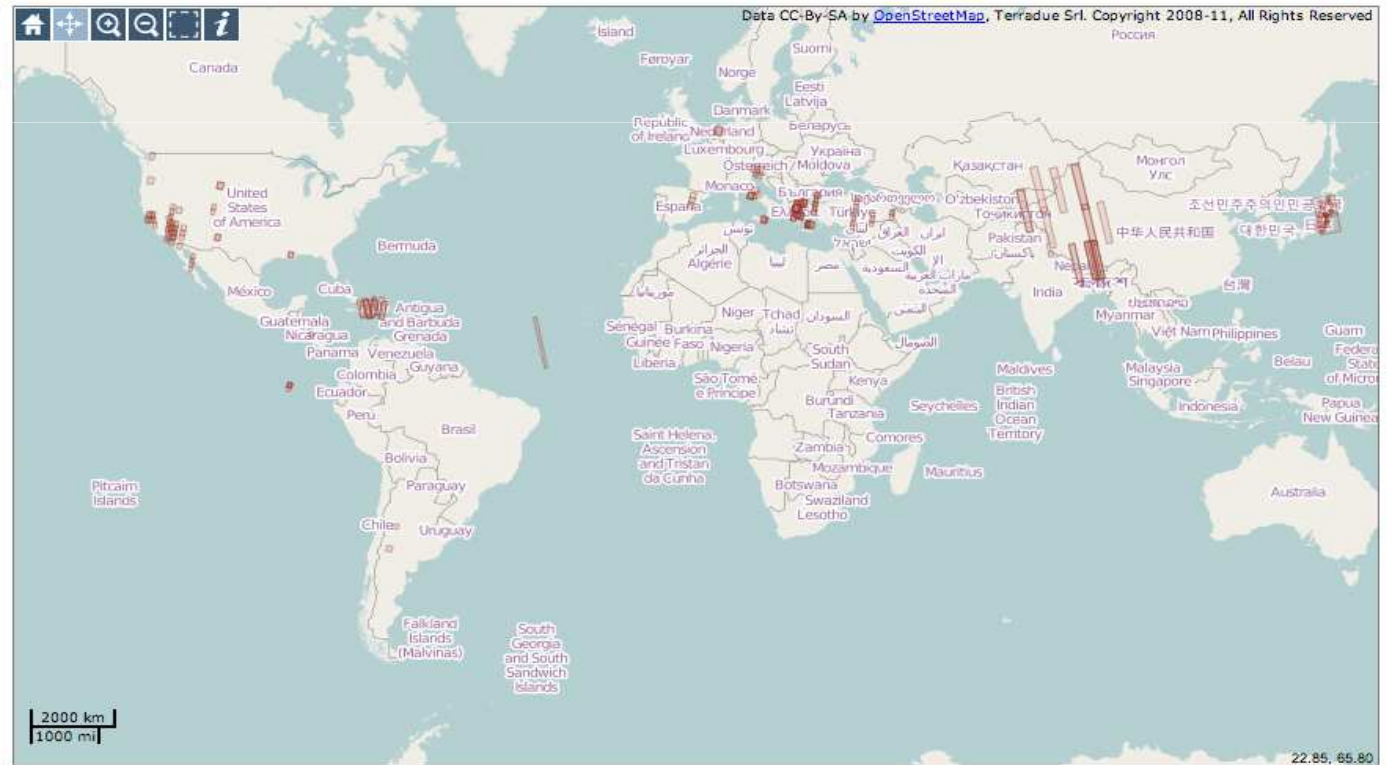
ERS-2 SAR Image SAR Annotated Raw Data
Product Level 0 (ER02_SAR_RAW_OP)

[Found 17746 results]

[Showing from 0 to 19]

first next last

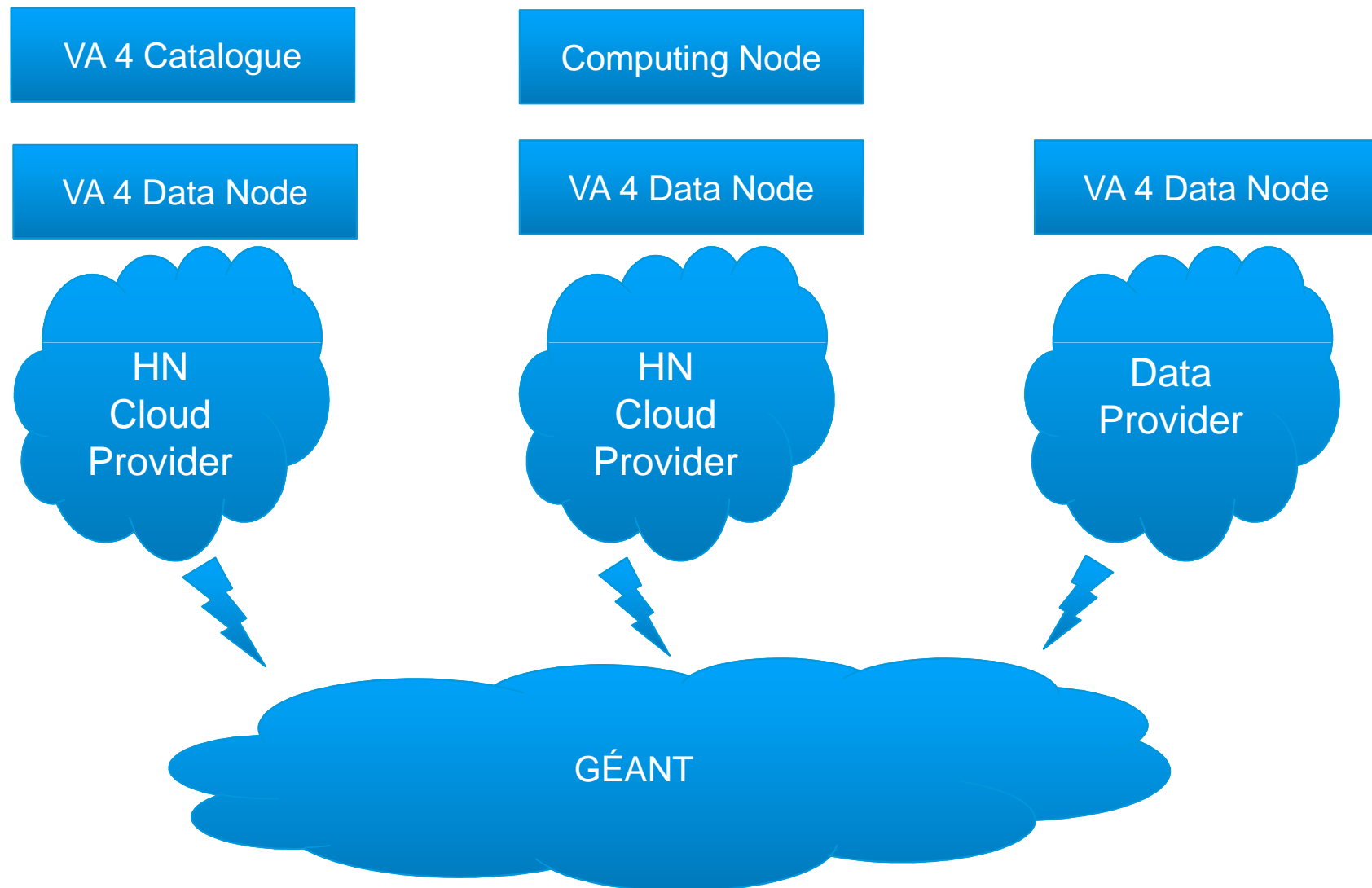
ER02_SAR_RAW_OP_20101221T175534_20101221T175552_ESR_81930
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ER02_SAR_RAW_OP_20100906T182931_20100906T182949_ESR_80413
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ER02_SAR_RAW_OP_20100628T182901_20100628T182919_ESR_79411



The download of products requires a EO Single Sign On username/password.
You can login when accessing the data. To register go [here](#).

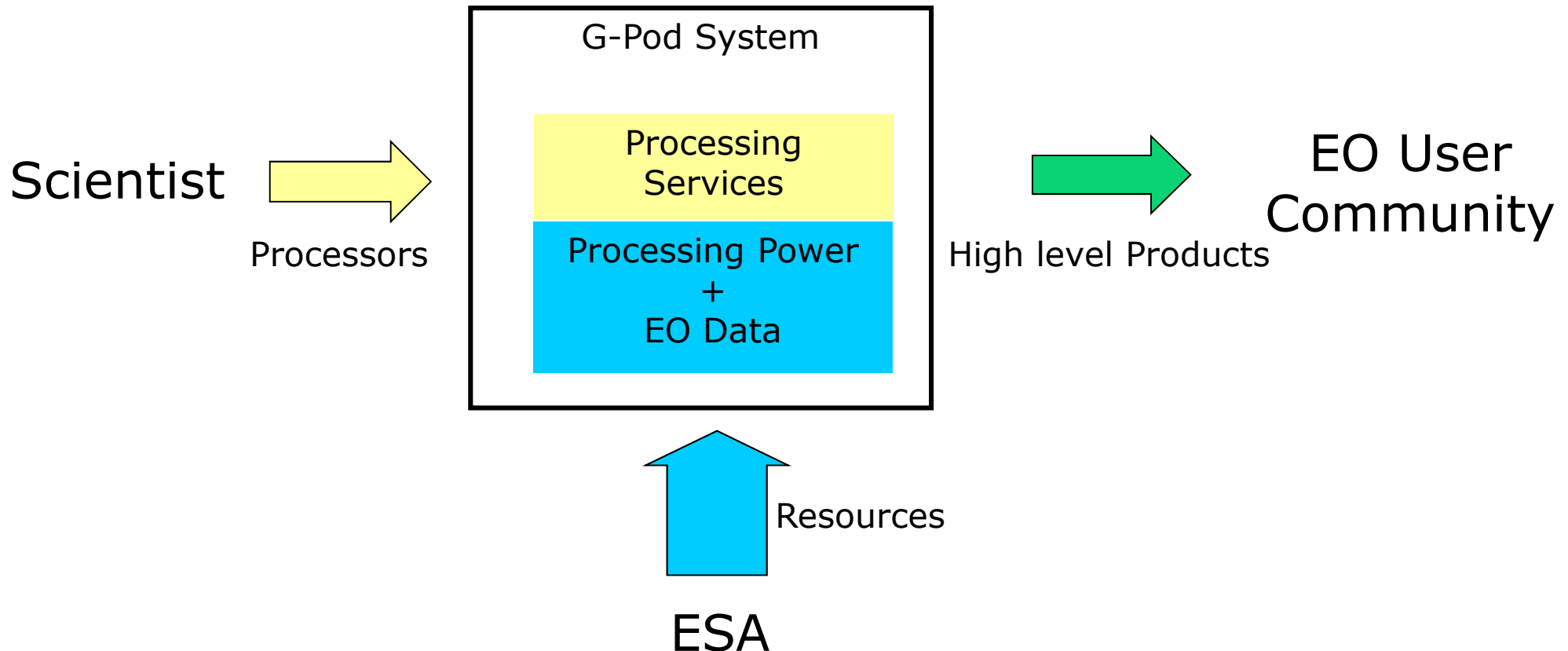
powered by [gridify](#)
© 2006 - 2013 Terradue srl.

The VA 4 GÉANT-enabled Federation



G-Pod System: Objective and Concept

Promotion of the access and use of EO mission data available at ESA, offering on-line access to products with attached computing infrastructure and tools to assist the generation of "scientific added value products"



The HelixNebula Bluebox approach



Services

Build custom VMs

Deploy multiple,
coordinated VMs

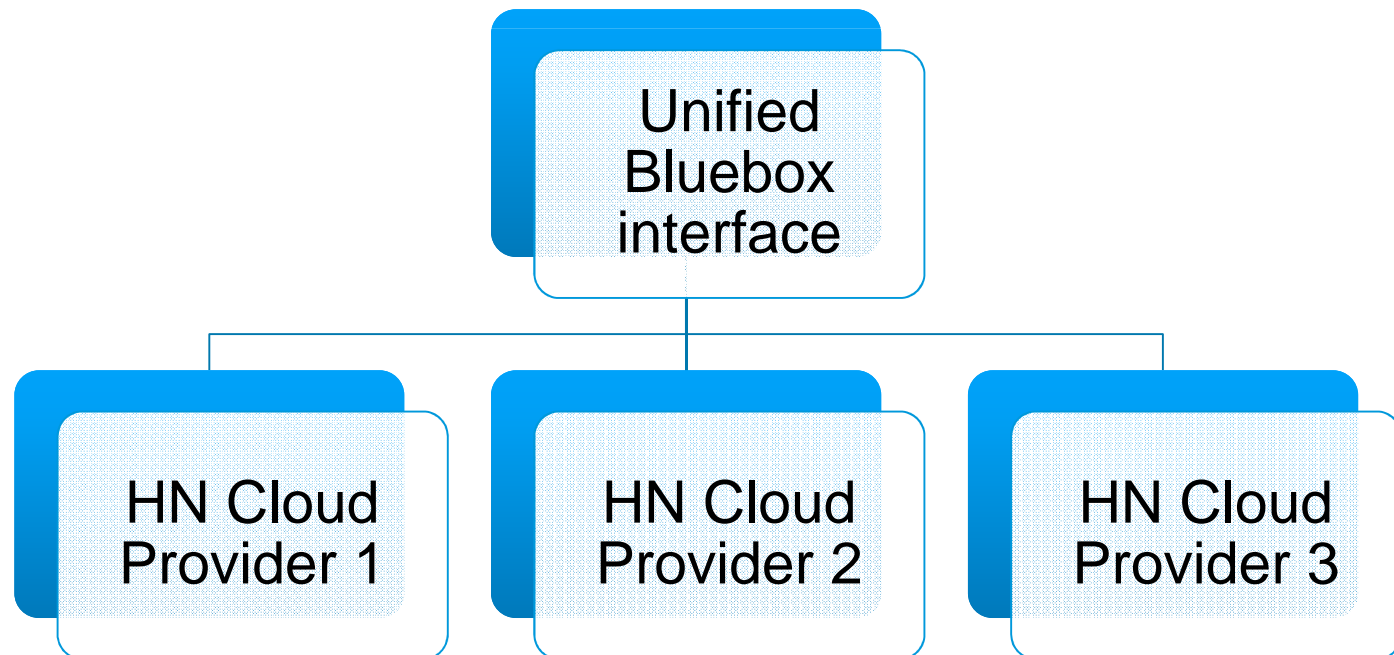
Infrastructure

Unified
Bluebox
interface

HN Cloud
Provider 1

HN Cloud
Provider 2

HN Cloud
Provider 3



ESA SSEP inside HNX



Welcome to Helix Nebula Market Place

Multi-cloud automated provisioning and image creation

The welcome page provides you with all currently published modules and root modules, including yours and the ones shared with you.



New Project

App Store

Shared Projects

	Name	Description	Owner	Version
	ESA-SSEP		rssteam	258
			sixsq	1
		testing	ec2bridge	154

Services

The ESA SSEP Project lives inside the Helix Nebula Market Place

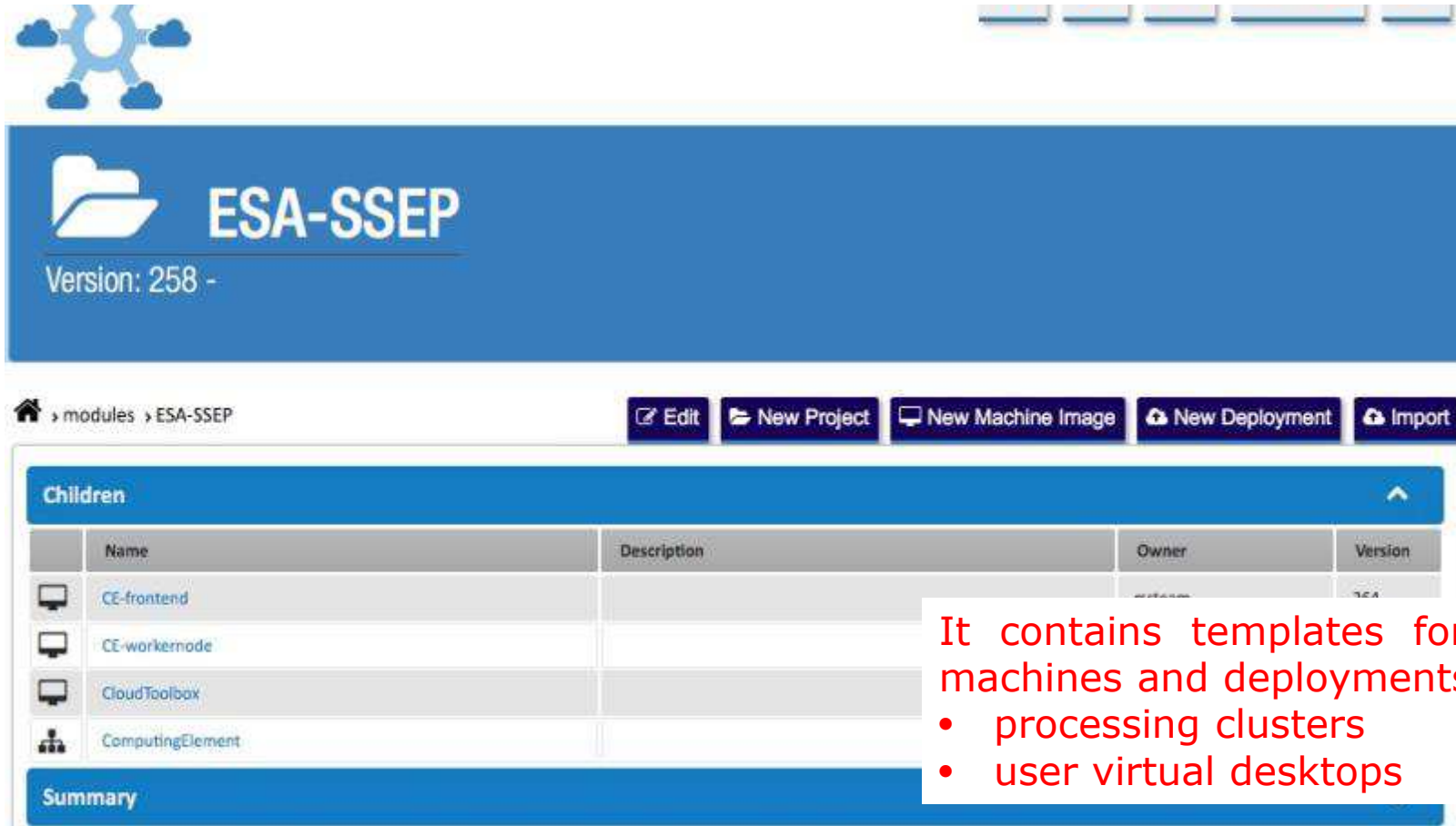
New Project

The Helix Nebula project is co-funded by the European Community Seventh Framework Programme (FP7/2007-2013) under Grant Agreement no 312301.



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The SSEP infrastructure ecosystem



The screenshot displays the ESA-SSEP web interface. At the top, there is a blue header with a folder icon and the text "ESA-SSEP" and "Version: 258 -". Below the header, a navigation bar shows a home icon, a breadcrumb "modules > ESA-SSEP", and several action buttons: "Edit", "New Project", "New Machine Image", "New Deployment", and "Import". The main content area is titled "Children" and contains a table with the following data:

	Name	Description	Owner	Version
	CE-frontend			
	CE-workernode			
	CloudToolbox			
	ComputingElement			

Below the table is a "Summary" section.

It contains templates for the machines and deployments of:

- processing clusters
- user virtual desktops

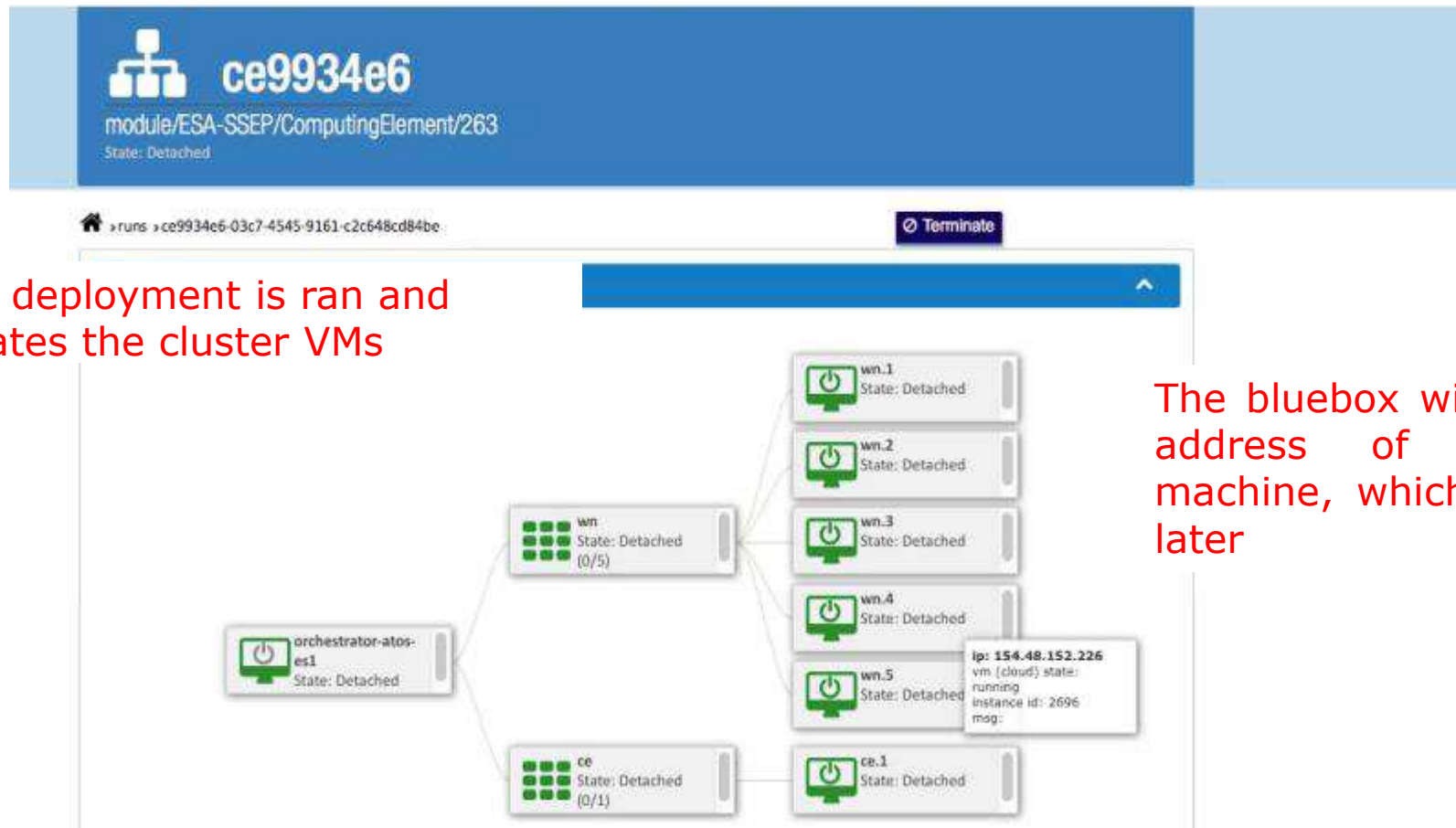
Multi-cloud coordinated deployment

The screenshot shows a software interface for deploying a 'ComputingElement'. At the top, there's a header bar with a tree icon, the text 'ESA-SSEP/ComputingElement', and 'Version: 263 -'. Below this is a dark blue bar with a server rack icon. The main area is titled 'Execute Deployment' and contains two deployment entries. The first entry, 'wn', has a multiplicity of 5 and is assigned to the 'atos-es1' cloud service. The second entry, 'ce', has a multiplicity of 1 and is also assigned to the 'atos-es1' cloud service. At the bottom right, there are 'Cancel' and 'Run' buttons.

Component	Multiplicity	Cloud service
wn	5	atos-es1
ce	1	atos-es1

We can deploy a Computing Element on multiple clouds, dynamically choosing its size

Deployment monitoring



The deployment is ran and creates the cluster VMs

The bluebox will report the IP address of the frontend machine, which will be useful later

Integrating inside ESA processing services

Computing resource

Name: Antonio Cuomo
Credits: 10
Logout

g-pod
grid processing on demand

Availability: All authorized users

Current usage: Status unavailable

Name: HNX Computing Element

Description: Computing Element created by HelixNebula Marketplace

Domain: Admin-Domain

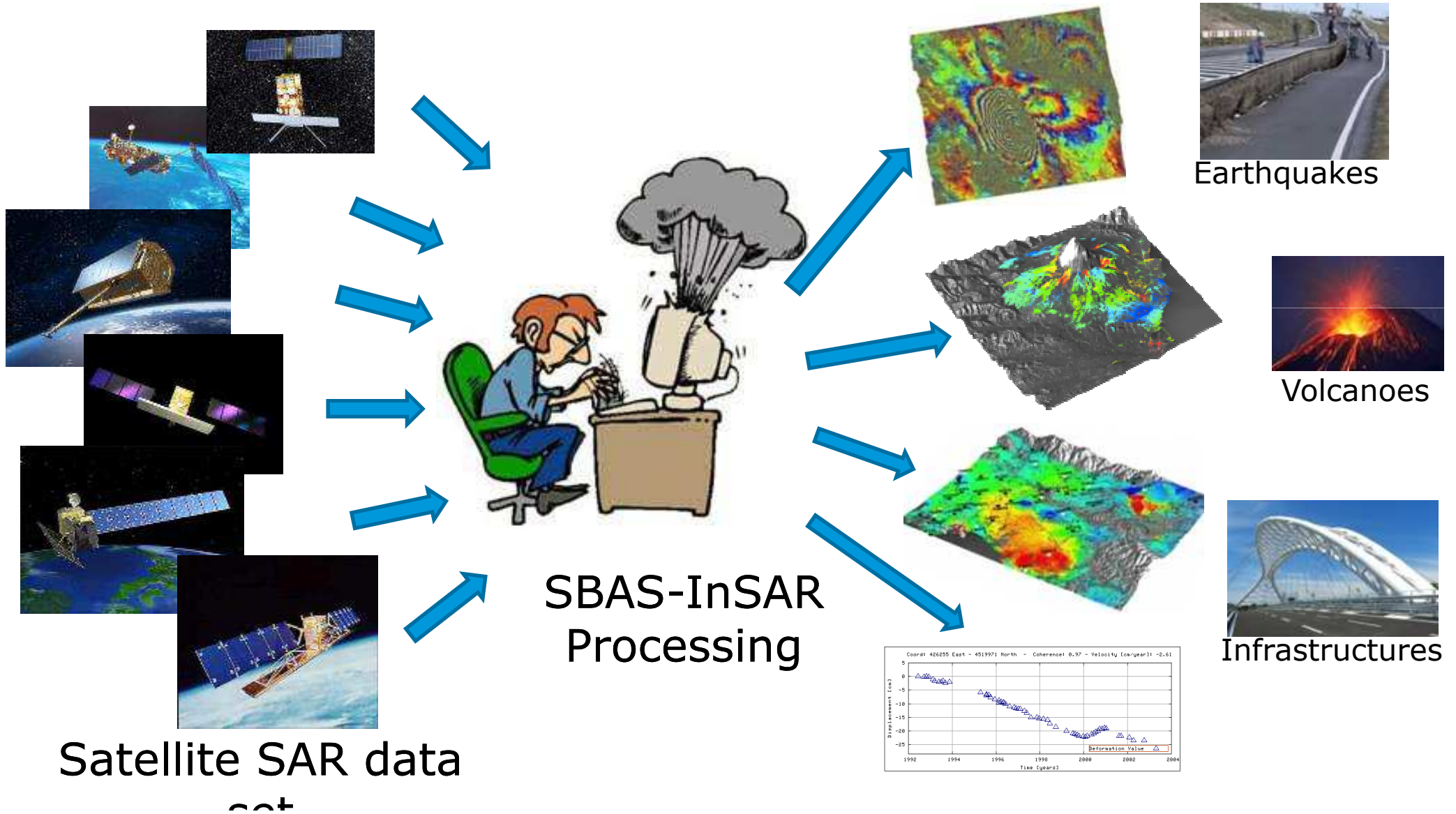
Hostname: 154.48.152.226

We can use the IP address to integrate the new cluster inside ESA processing infrastructure

Virtual desktops on the cloud



Ground displacement monitoring: the SBAS-InSAR technique



SBAS-InSAR within the ESA SSEP flagship

grid processing on demand - Services

gpod.eo.esa.int/services/

Apple Yahoo! Google Maps YouTube Wikipedia Notizie I più conosciuti

esa grid processing on demand European Space Agency






esa Home Services Workspace Catalogue Products Schedulers My profile Documentation Help

Search
Showing the 3 results found. [more...](#)

Name: Francesco Casu
Credits: 2
[Logout](#)

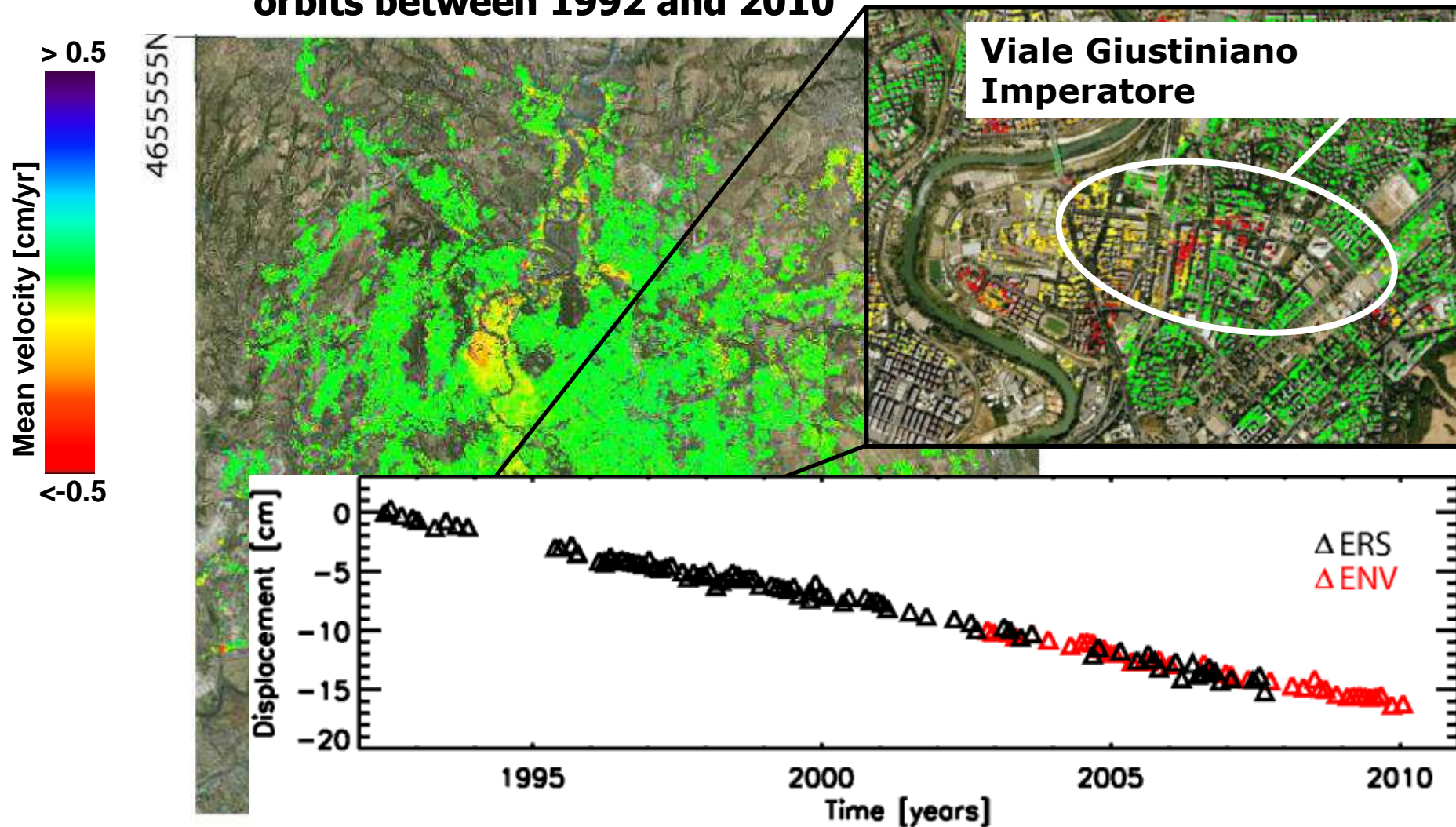
g-pod
grid processing on demand

Services list

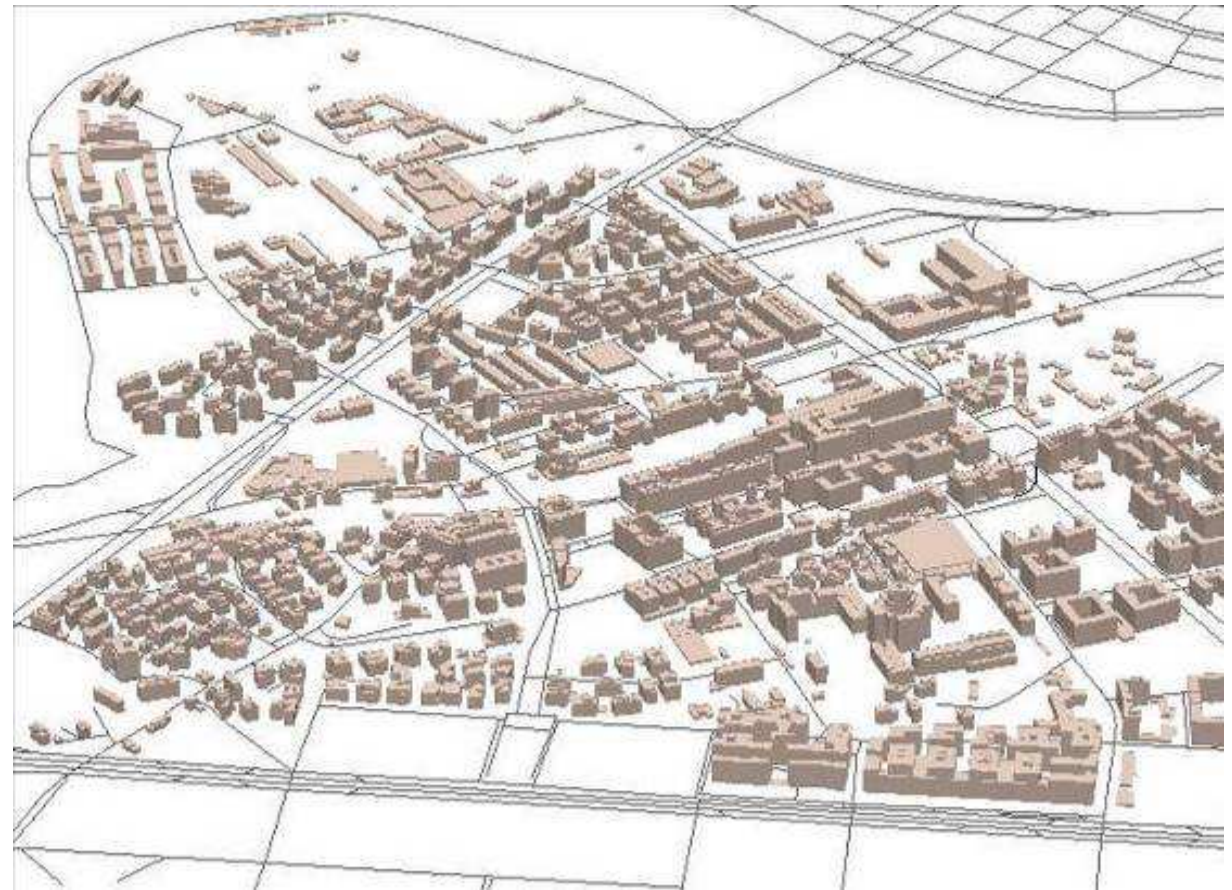
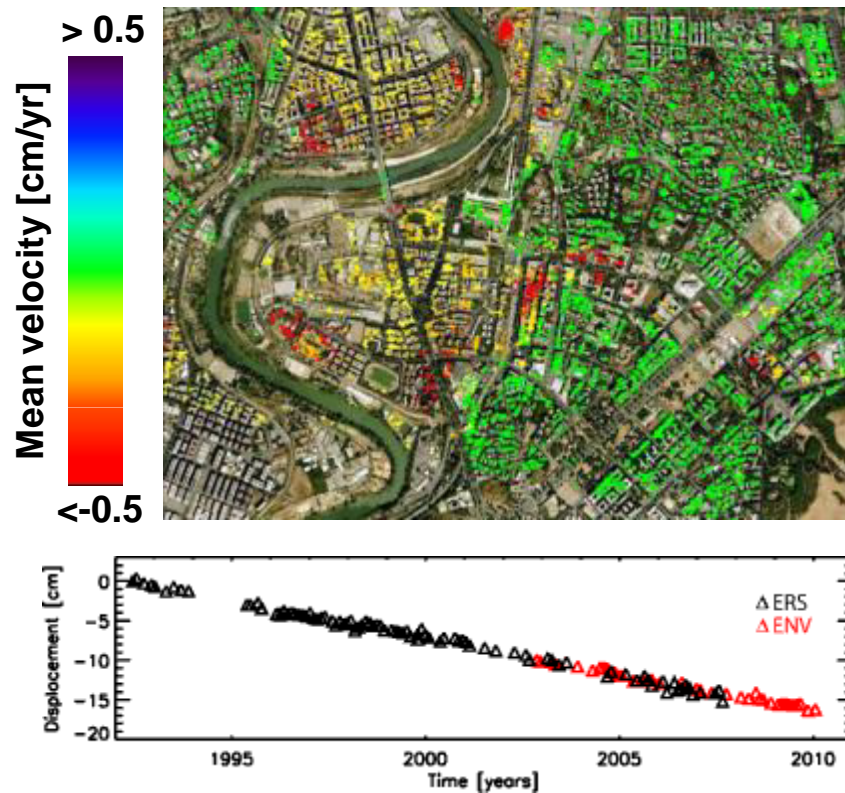
- Land

- Marine

- Atmosphere

- Security

- Emergency Response


Subsidence in Rome: SBAS-InSAR results

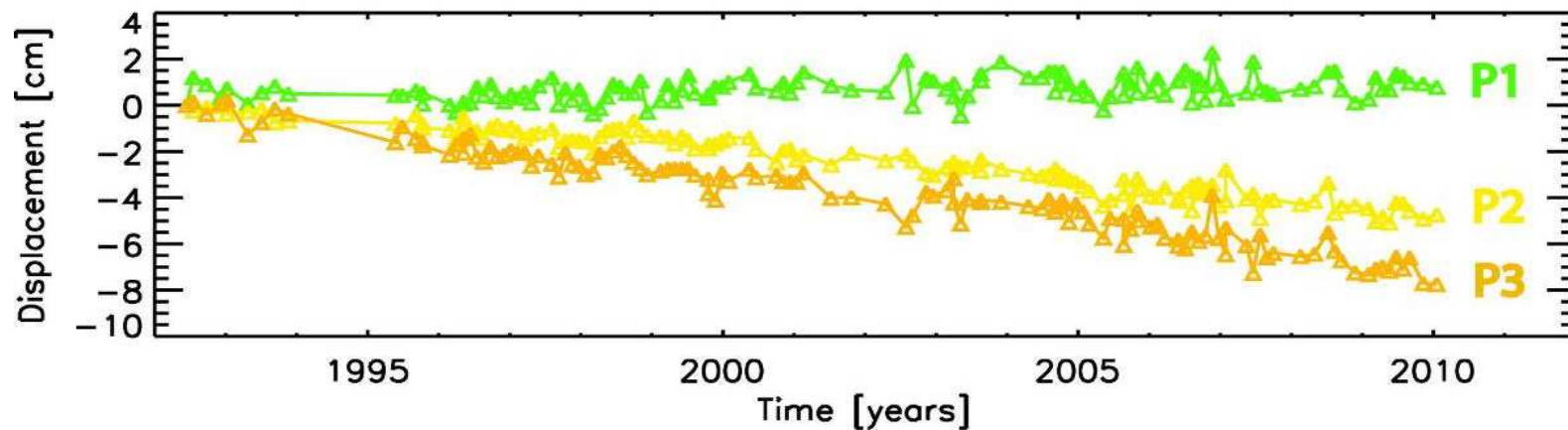
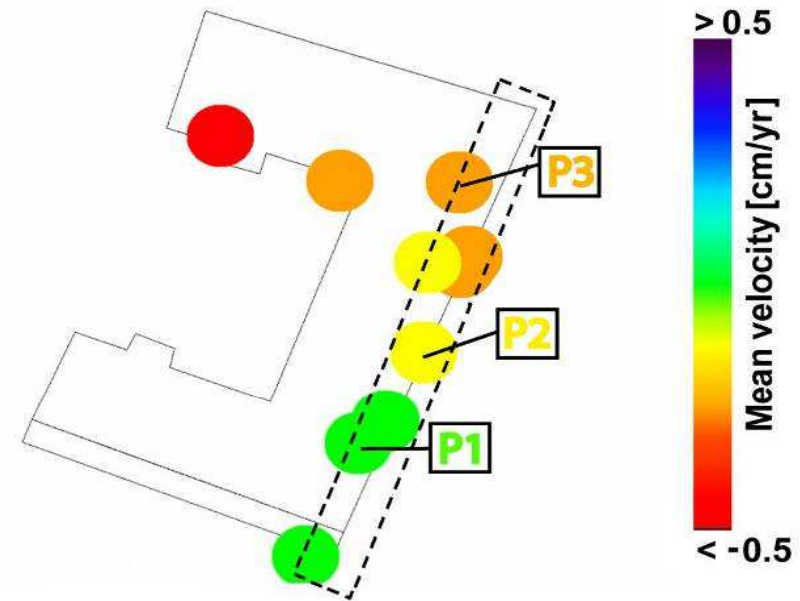
130 ERS/ENVISAT scenes acquired by descending orbits between 1992 and 2010



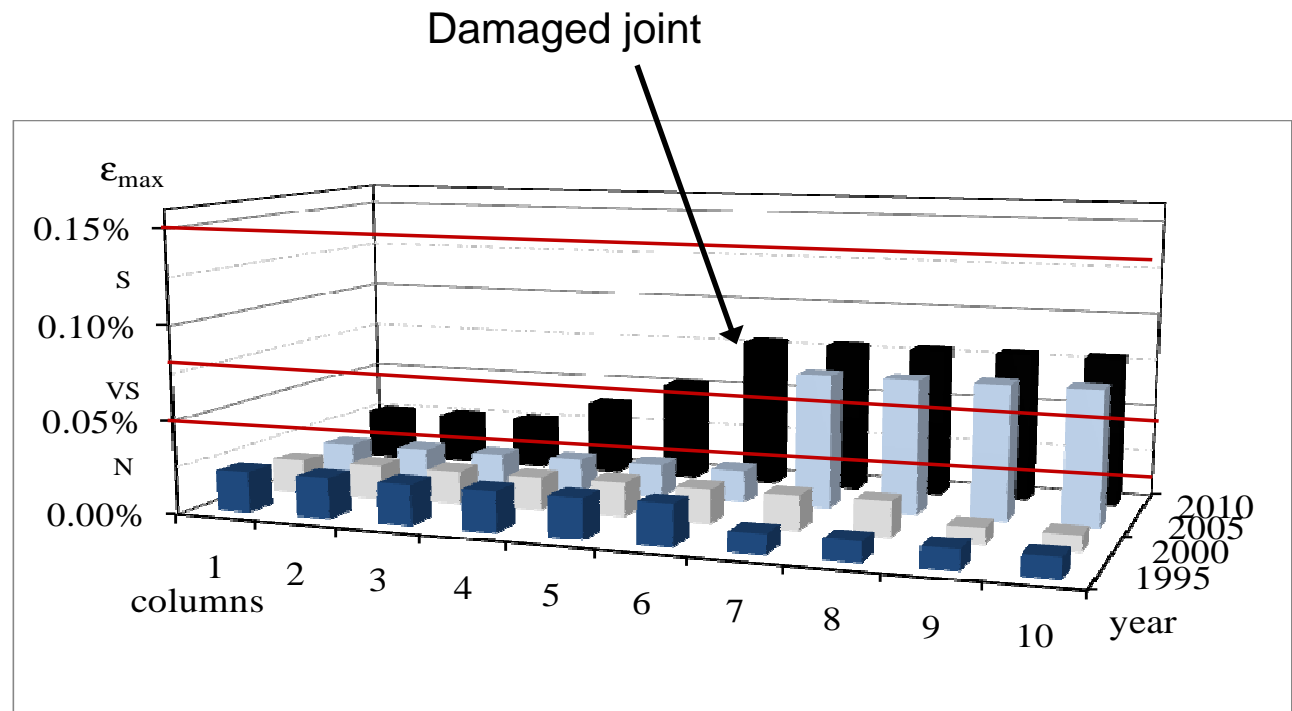
Rome: Integration of SBAS-InSAR results and digital catalogues of buildings



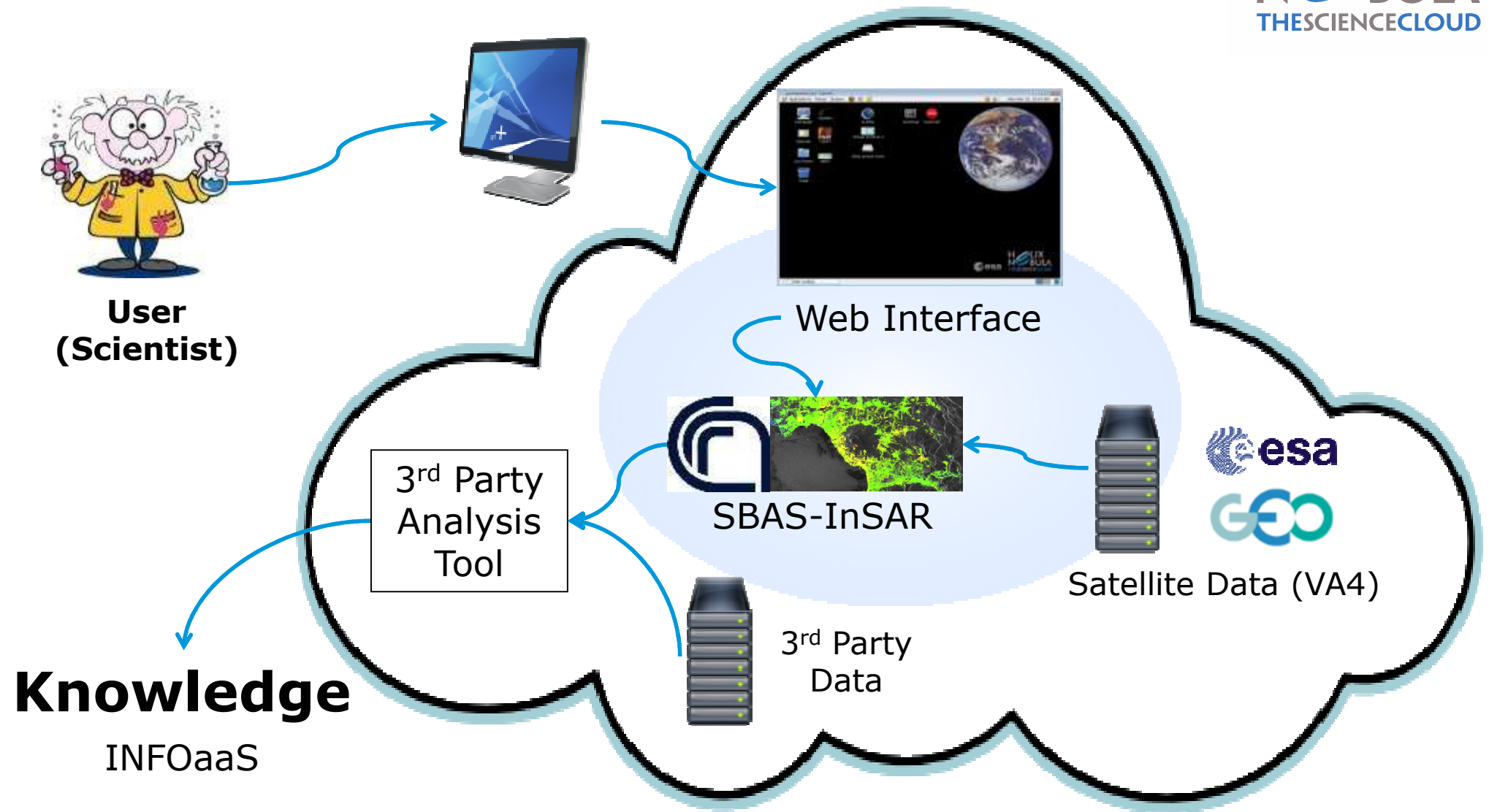
Rome: Integration of SBAS-InSAR results and digital catalogues of buildings



Rome: large scale damage assessment of buildings

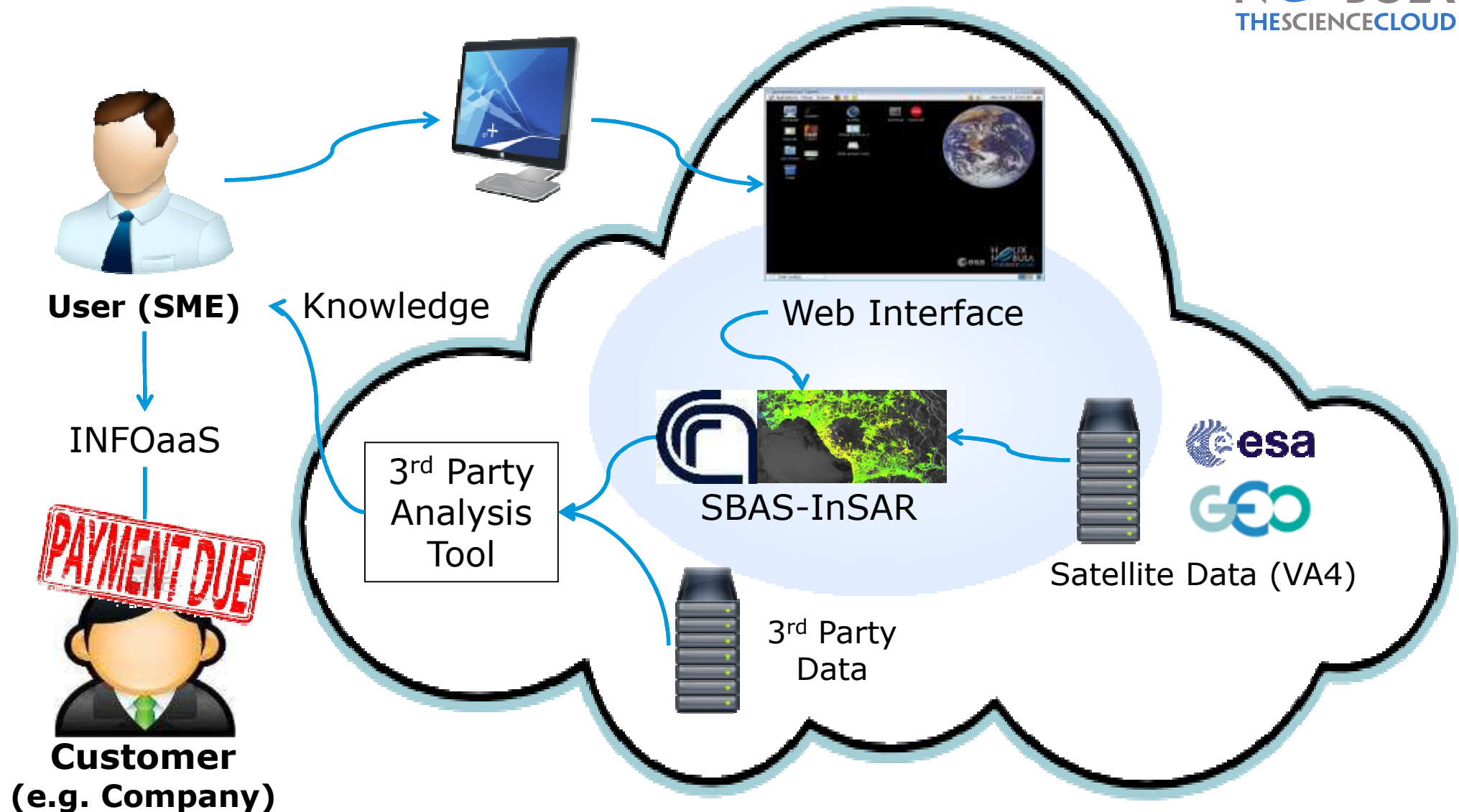


SBAS-InSAR: scientific use case



Scientists support Tools, Interested parties (Public and/or Private Entities) covers computational costs

SBAS-InSAR: commercial use case



Every actor keeps control of its IPR

Customer pays for accessing the service provided by the SME

Step 1: Subscription Service



Step 2: Satellite Image



Step 3: Image Processing



Step 4: Deliver results

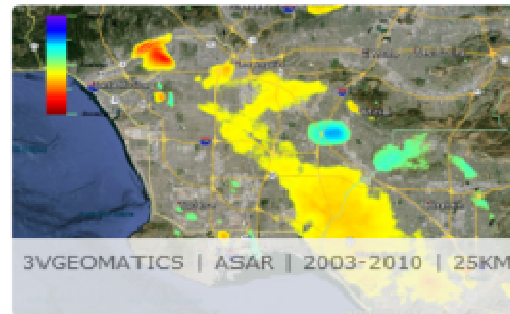


Information
Store
INFOaaS

- x Service 1
- o Service 2
- o Service 3

Service 1 is: 3vGeomatics Displacement Map

3VGEOMATICS DISP



- High vertical accuracy < 5mm
- High spatial resolution up to 2m
- Time series analysis
- Historical analysis available
- Monitoring in difficult environments
- Results from multiple sensors
- Distributed and point targets

Rating:

★★★★★
Too few votes yet

Contact Us:
sales@cloudeo-ag.com

Order Options

Description

Details

Licensing & Pricing

Downloads

Subscription type

- ☒ Monthly
- ☐ Quarterly
- ☐ Annually

Subscription Starting Date

Date

16.05.2014

E.g., 09.06.2014

Earliest starting date is in 7 days.

Subscription Renewal

☐ Automatic renewal

Price

4500 €

ADD TO CART



Information
Store
INFOaaS

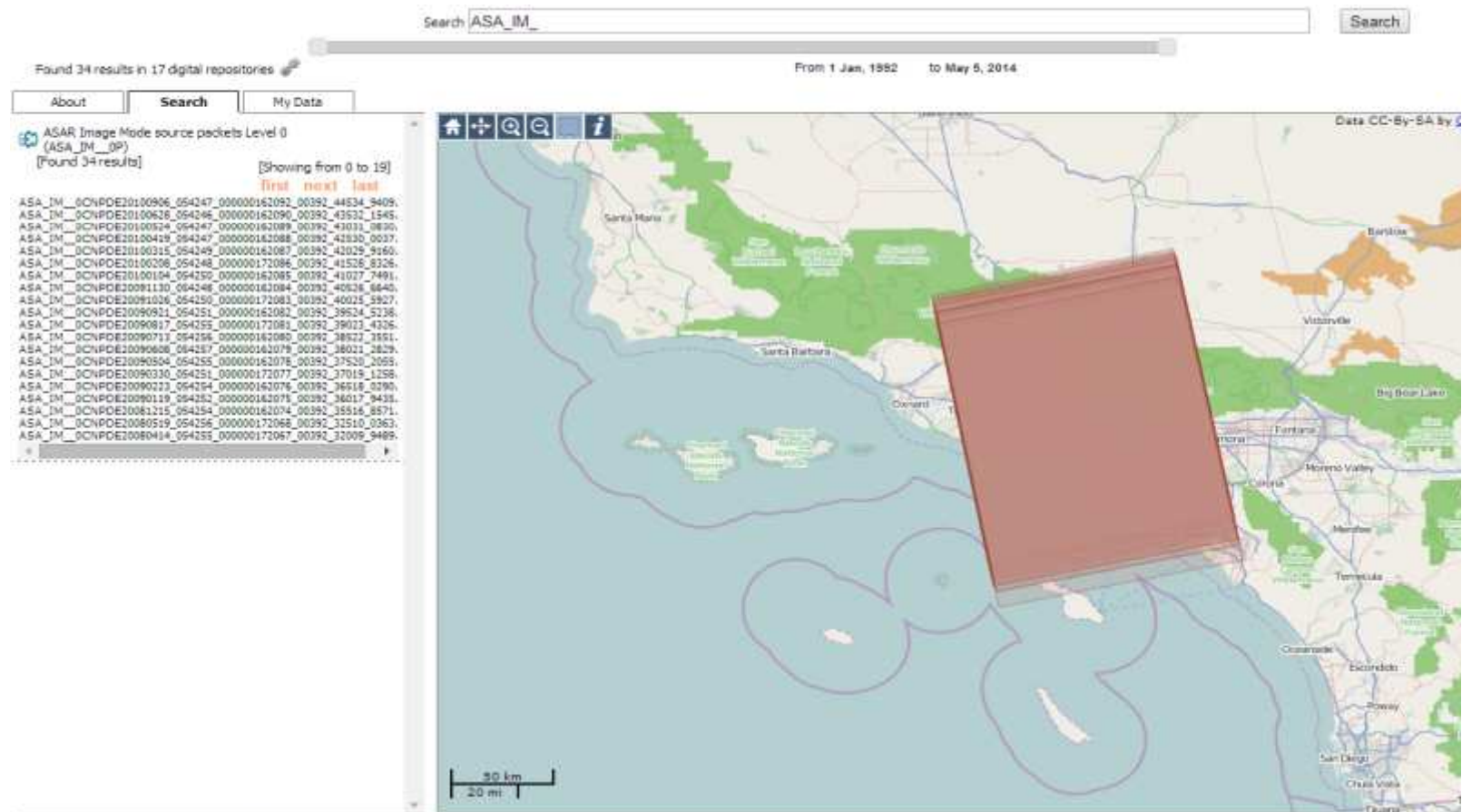
- x Service 1
- o Service 2
- o Service 3

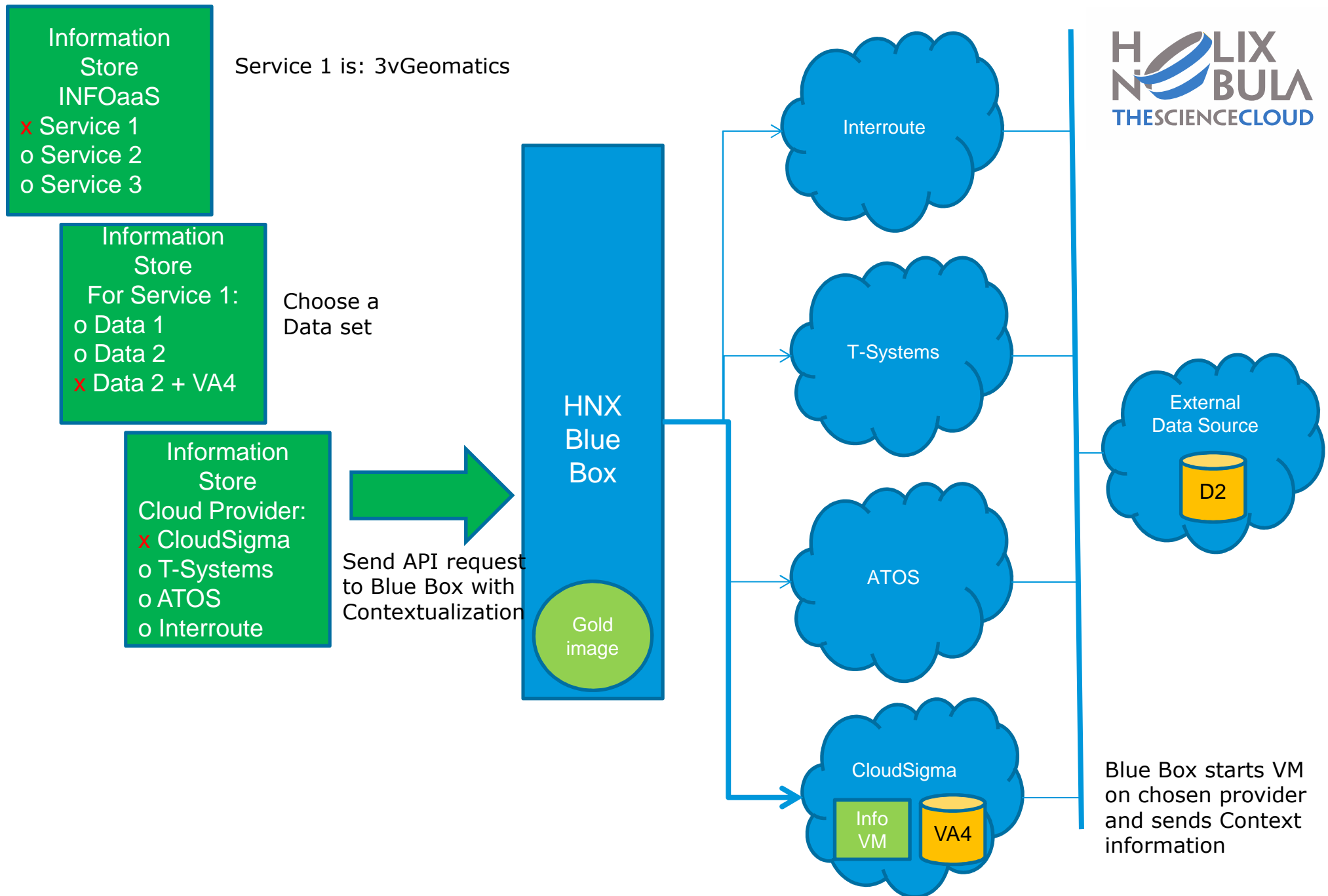
Service 1 is: 3vGeomatics

Information
Store
For Service 1:

- o Data 1
- o Data 2
- x Data 2 + VA4

Choose a data set from
VA4





Automated
Processing

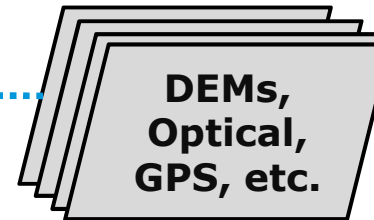


SLC Processing (Lvl 1)

Pre-Processing
(Geocoding, co-
registration)

Low Res InSAR
processing

Baseline Correction



Manual
Processing
(QA Required)

Motion Reconnaissance

Target Selection

Phase Unwrapping

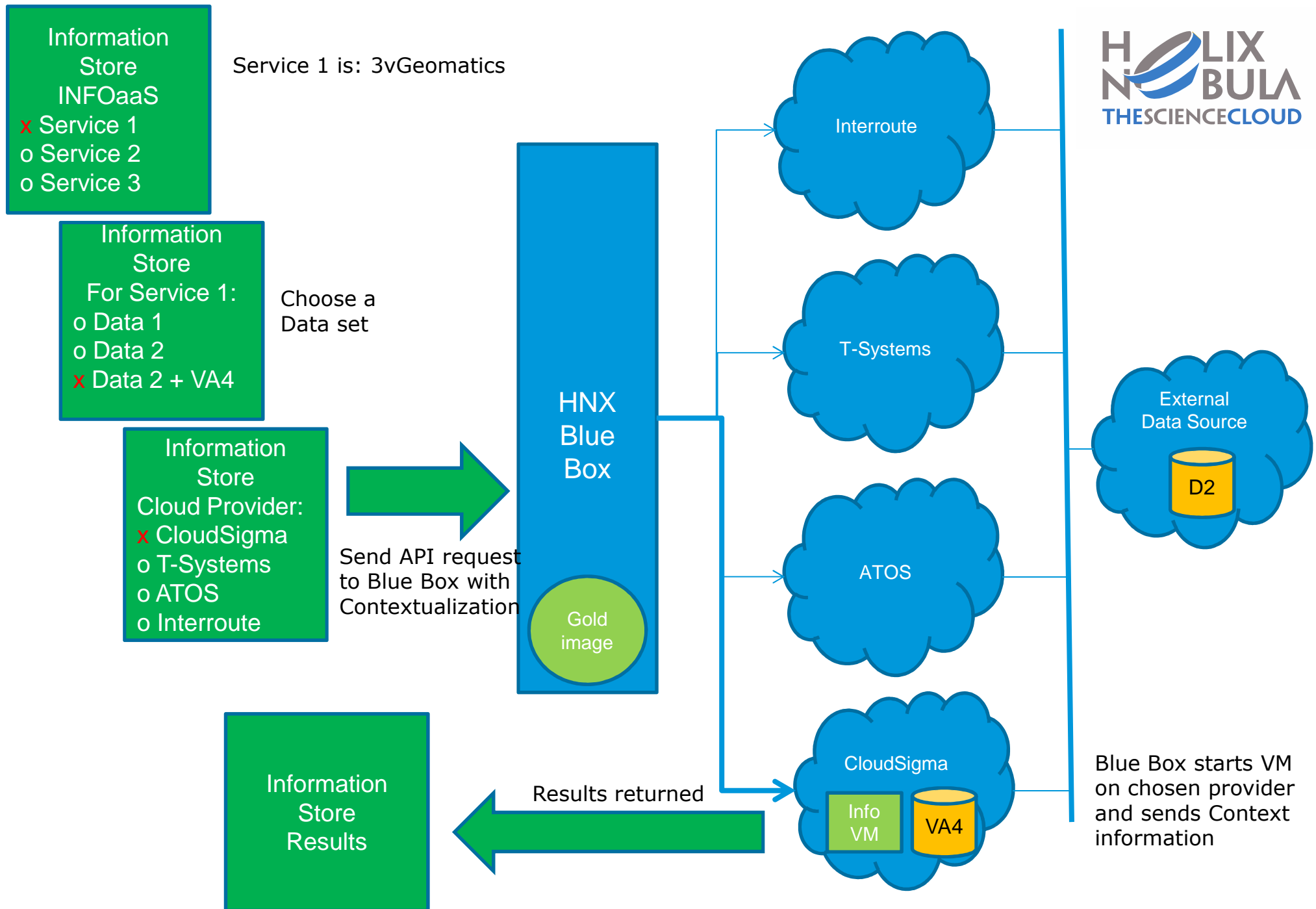
Noise Removal

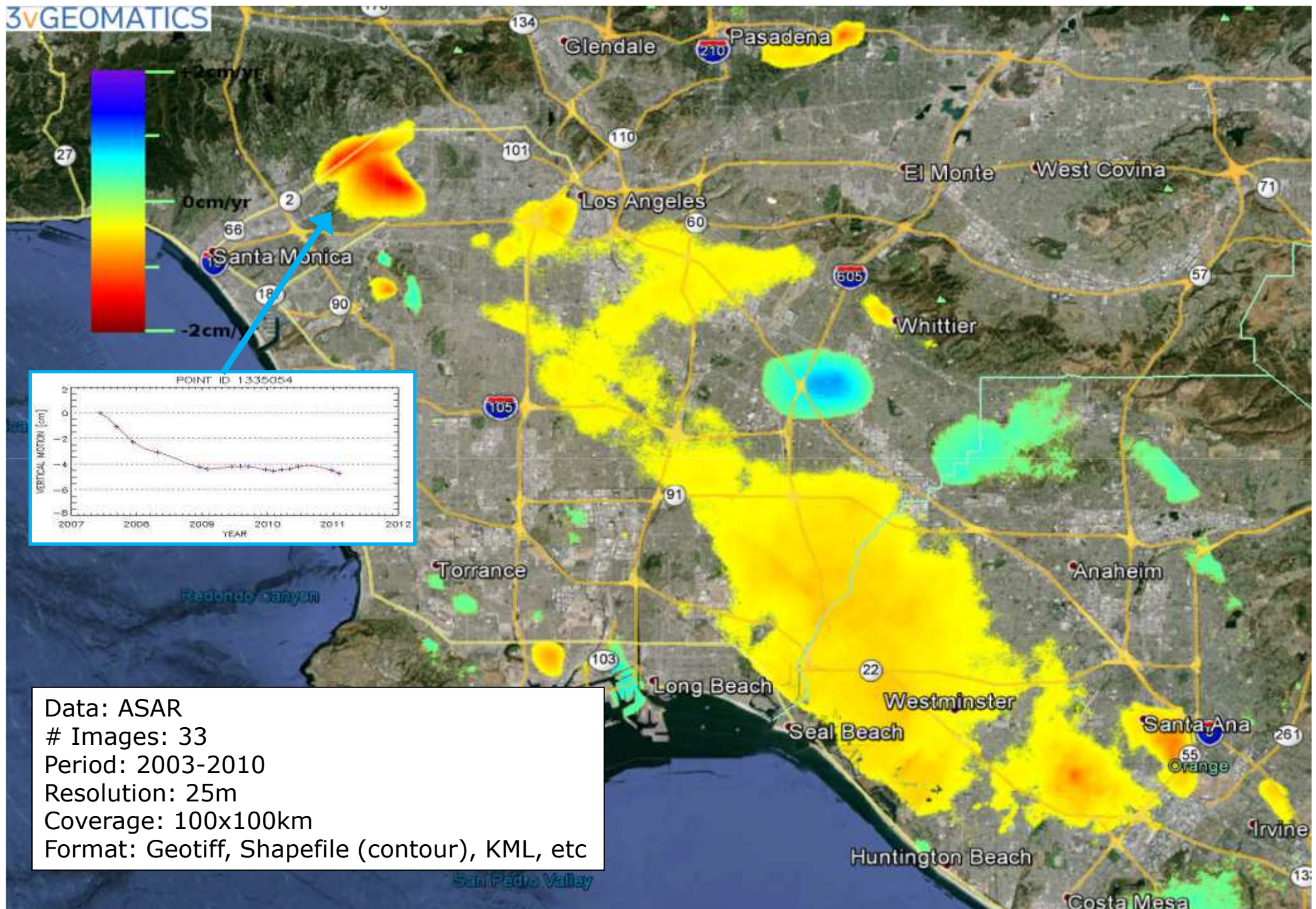
Product Generation

Displacement
Maps

Interactive processing on virtual desktop provided by HN Cloud provider







Data: ASAR

Images: 33

Period: 2003-2010

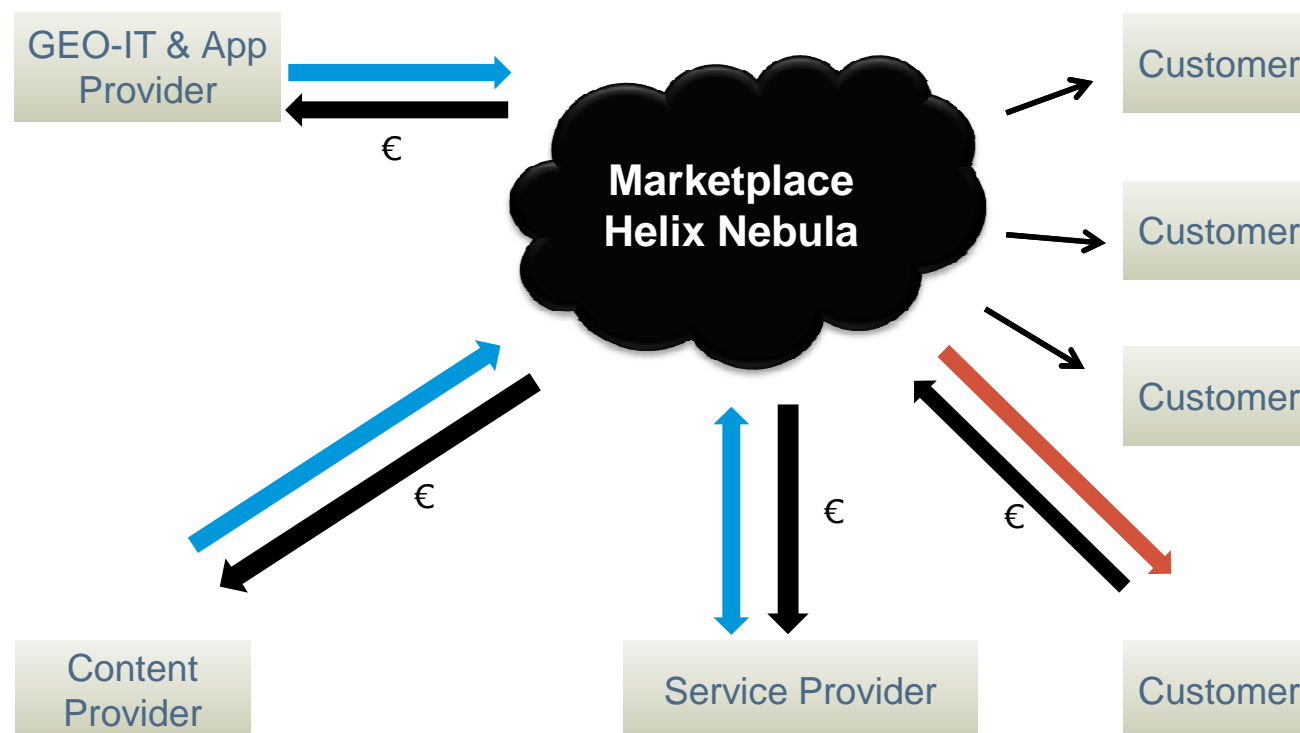
Resolution: 25m

Coverage: 100x100km

Format: Geotiff, Shapefile (contour), KML, etc

Business Model

- Risk and profit sharing
- Lower upfront investment
- Fast access to EO and other geodata resources
- Disruptive technology
- Sustainability



Summary



HNX provides a multi-tenant '**Open Market Place for Science**', where data providers, scientists, funding bodies, SMEs and downstream industry can meet to work along common interests.

The HNX ecosystem implements many-to-many relationships, quickly being established, to transform data into valuable information