



A federated European Cloud Marketplace for Science leading to Information as a Service

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A European cloud computing partnership: big science teams up with big business



Strategic Plan

- ▶ Establish multi-tenant, multi-provider cloud infrastructure
- ▶ Identify and adopt policies for trust, security and privacy
- ▶ Create governance structure
- ▶ Define funding schemes



To support the computing capacity needs for the ATLAS experiment



Setting up a new service to simplify analysis of large genomes, for a deeper insight into evolution and biodiversity



To create an Earth Observation platform, focusing on earthquake and volcano research



To improve the speed and quality of research for finding surrogate biomarkers based on brain images

Suppliers



Adopters

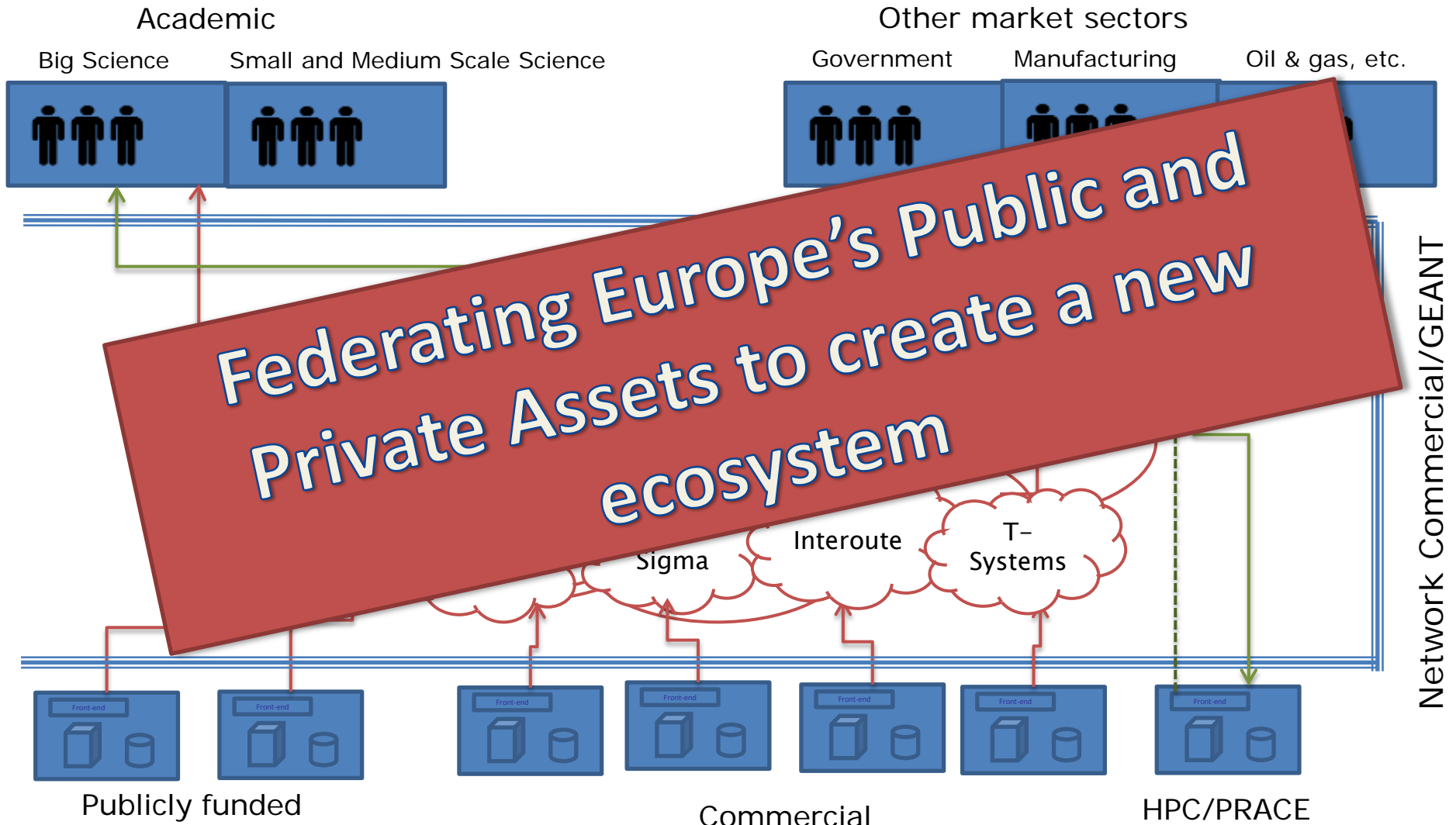


Building on existing European e-Infrastructures

- Existing European e-infrastructure *long-term* projects
 - GEANT, EGI, PRACE, EUDAT
- Many “pathfinder” initiatives have prototyped aspects of what will be needed in the future
 - Includes much of the work in the existing e-Infrastructure projects
 - Thematic projects / infrastructures such as BioMedBridges/ CRISP/ DASISH/ ENVRI, EMSO as well as CORIOLIS / GEOWOW / DORIS and many others
- Future service infrastructure and tools must be fully based on **open standards, open software**, and enable **open data access**

Hybrid Public-Private Cloud Model

Federation of partners

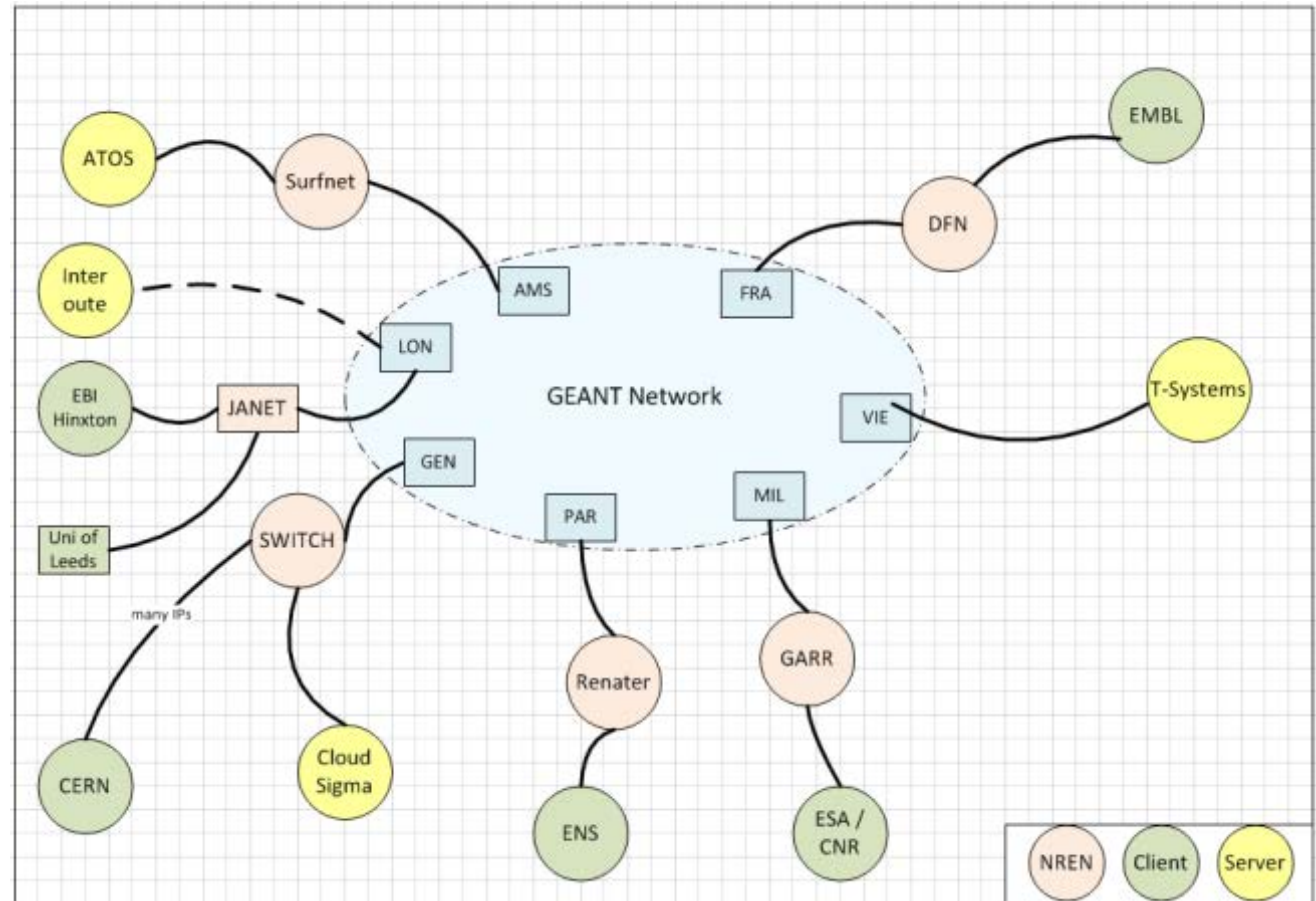


Building the hybrid cloud

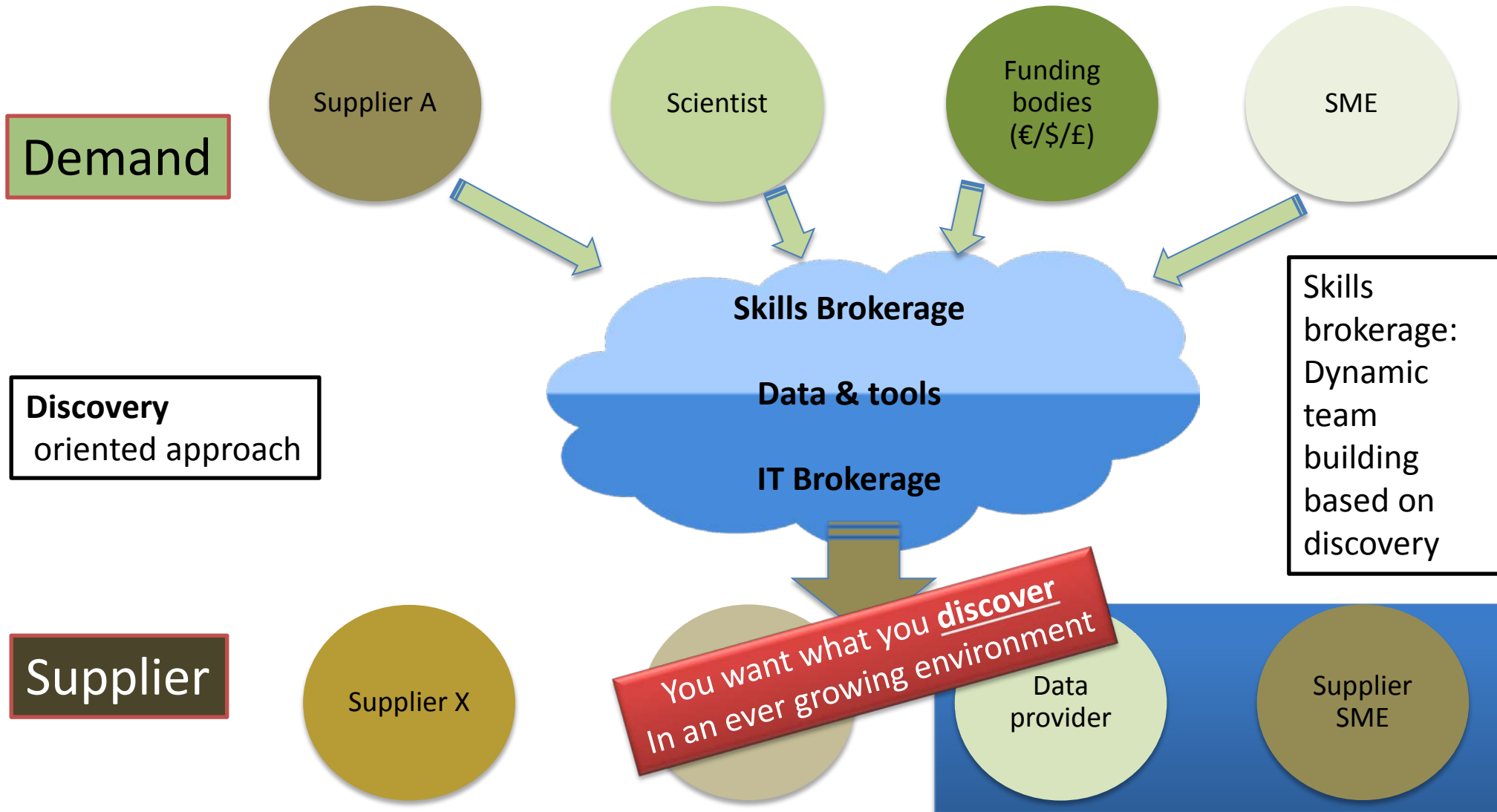
Connecting commercial providers to the GÉANT/NRENs

DANTE offering free IP connectivity in GÉANT for research traffic during the pilot phase

NRENs have different commercial agreements (usually they apply a fee)

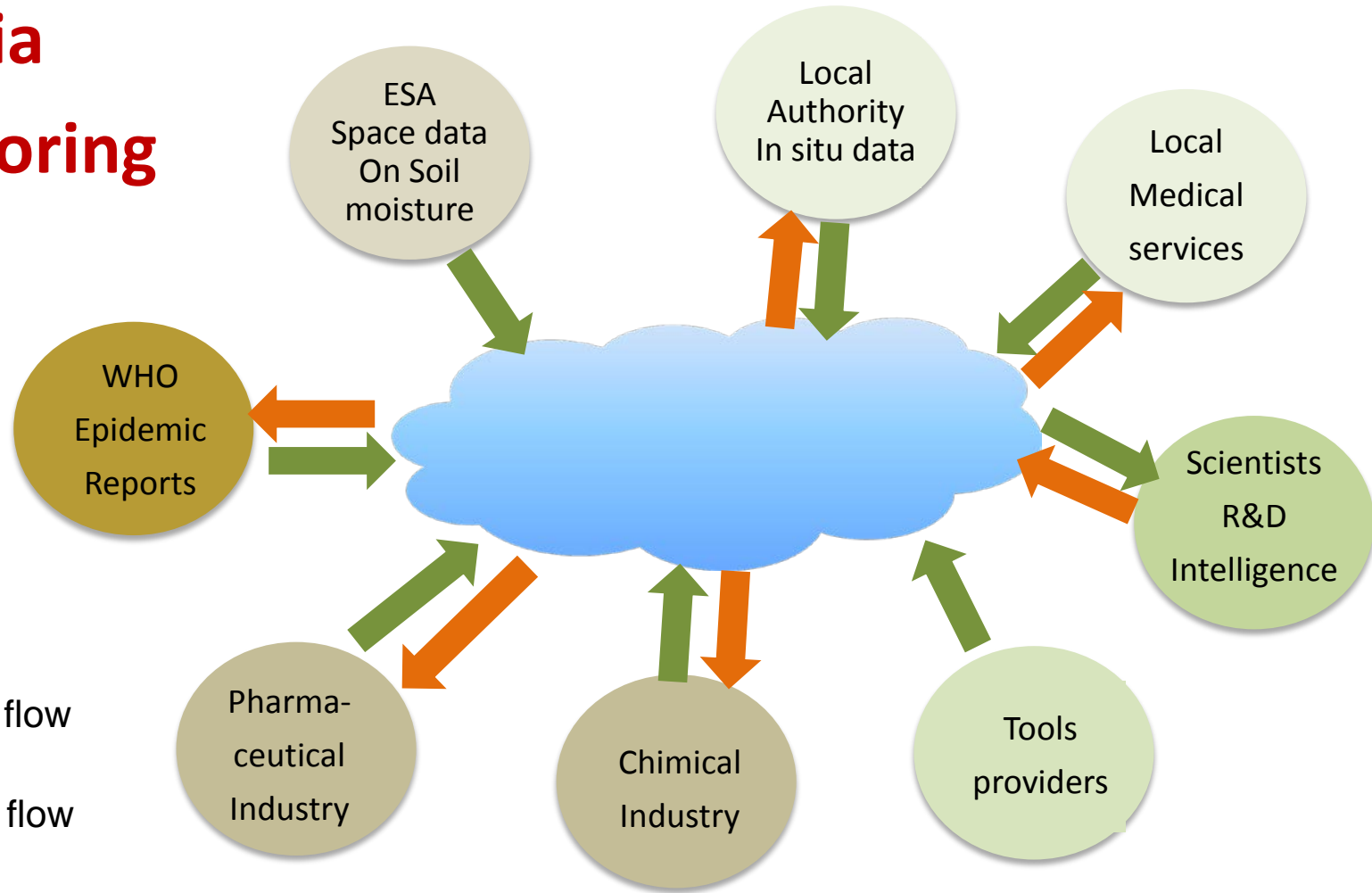


InfoaaS: Discovery driven ecosystem



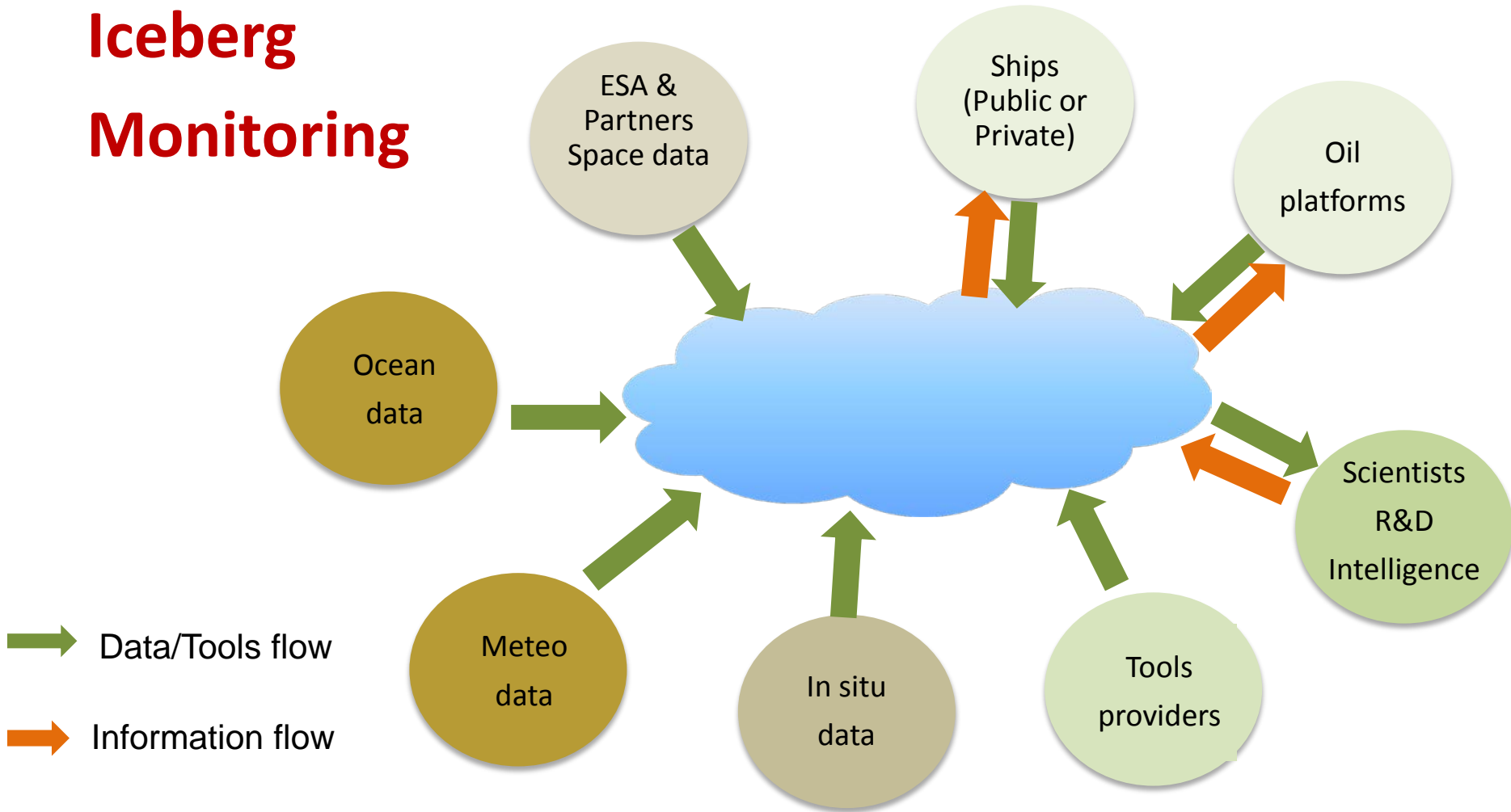
Many-to-many relationships

Malaria Monitoring

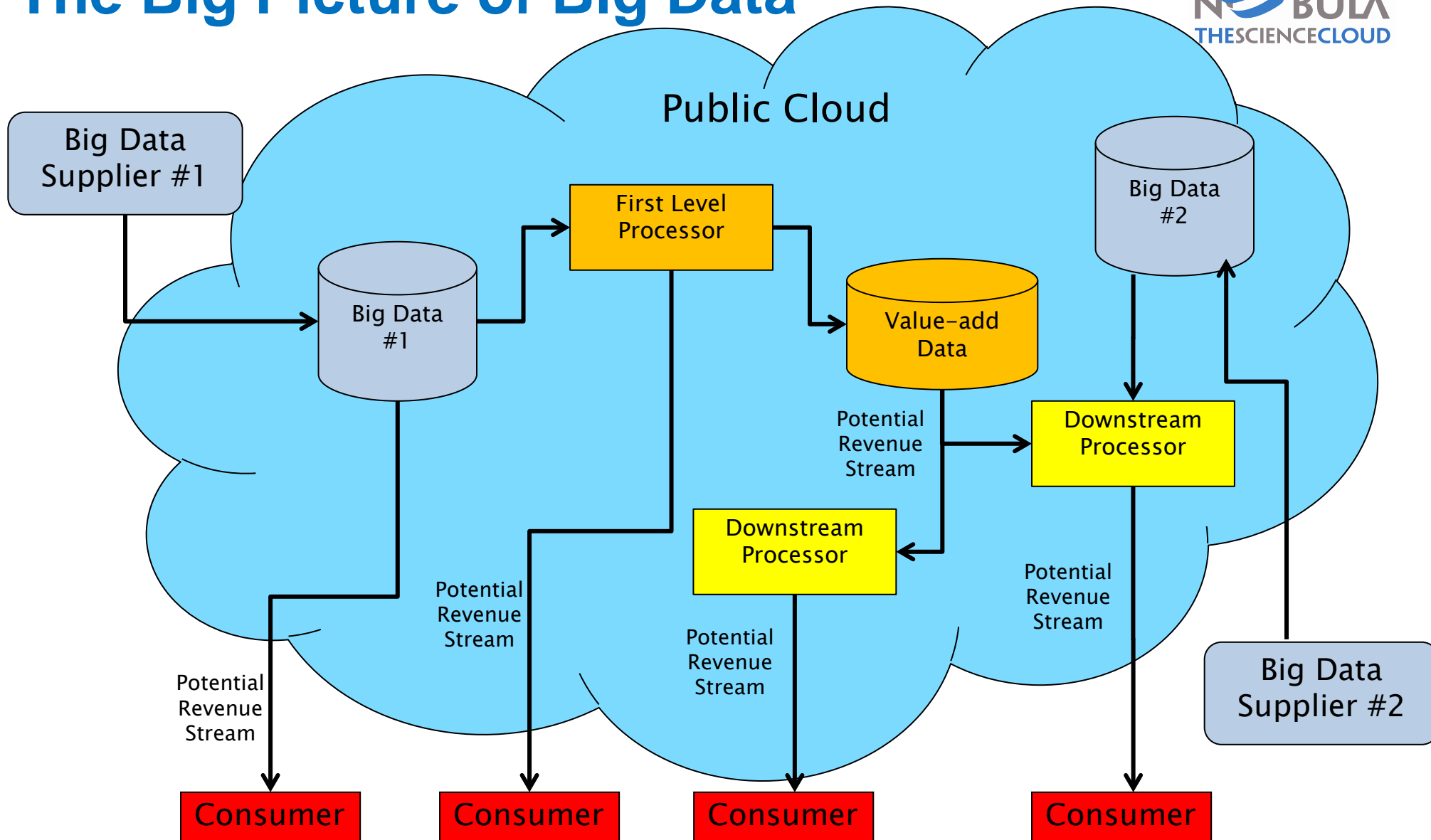


Many-to-many relationships

Iceberg Monitoring



The Big Picture of Big Data



The Power of Federation

Each data provider remains
**fully in control of the implementation of its data policy and
of its IPRs**

Helix Nebula

Federation of Assets &
competences, open

Exploitation of data, tools
from all the federation

Versus

US Providers

Centralization one
platform, one provider

Analytics using only data &
tools available on their own
platform

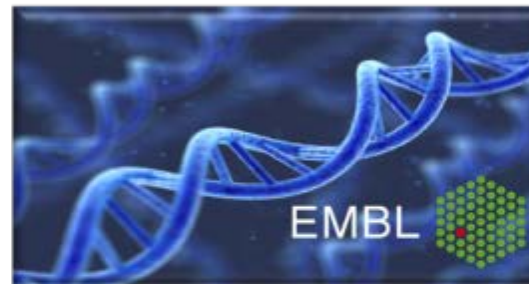
Initial Flagship Use Cases

ATLAS High Energy Physics Cloud Use



To support the computing capacity needs for the ATLAS experiment

Genomic Assembly in the Cloud



A new service to simplify large scale genome analysis; for a deeper insight into evolution and biodiversity

SuperSites Exploitation Platform



To create an Earth Observation platform, focusing on earthquake and volcano research

- Scientific challenges with societal impact
- Sponsored by user organisations
- Stretch what is possible with the cloud today

ESA Pilot

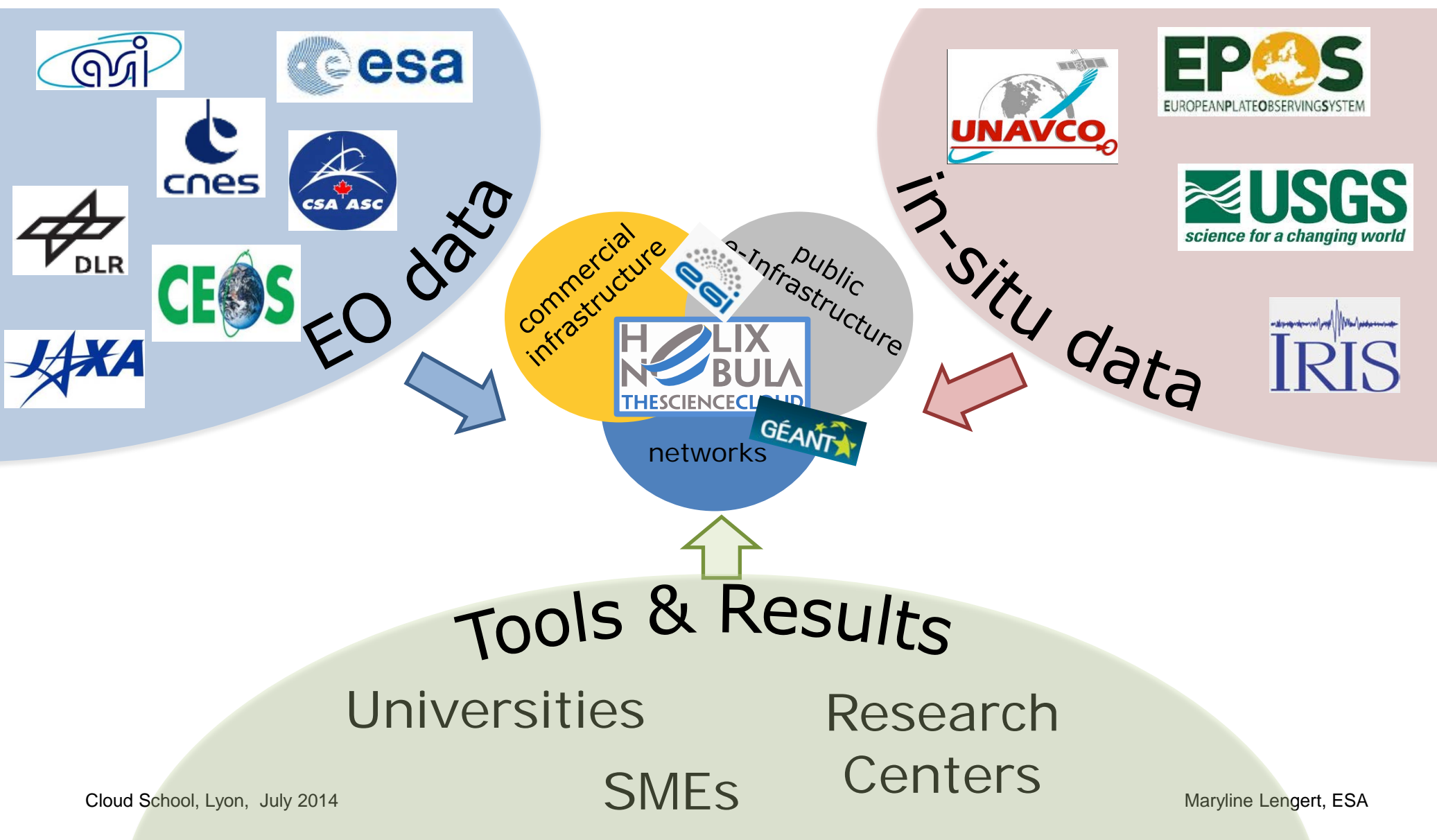
InfoaaS using satellite data

Helix Nebula ensure generic IaaS provisioning , starting with the data source, e.g satellite - processing, -dissemination and –archiving.

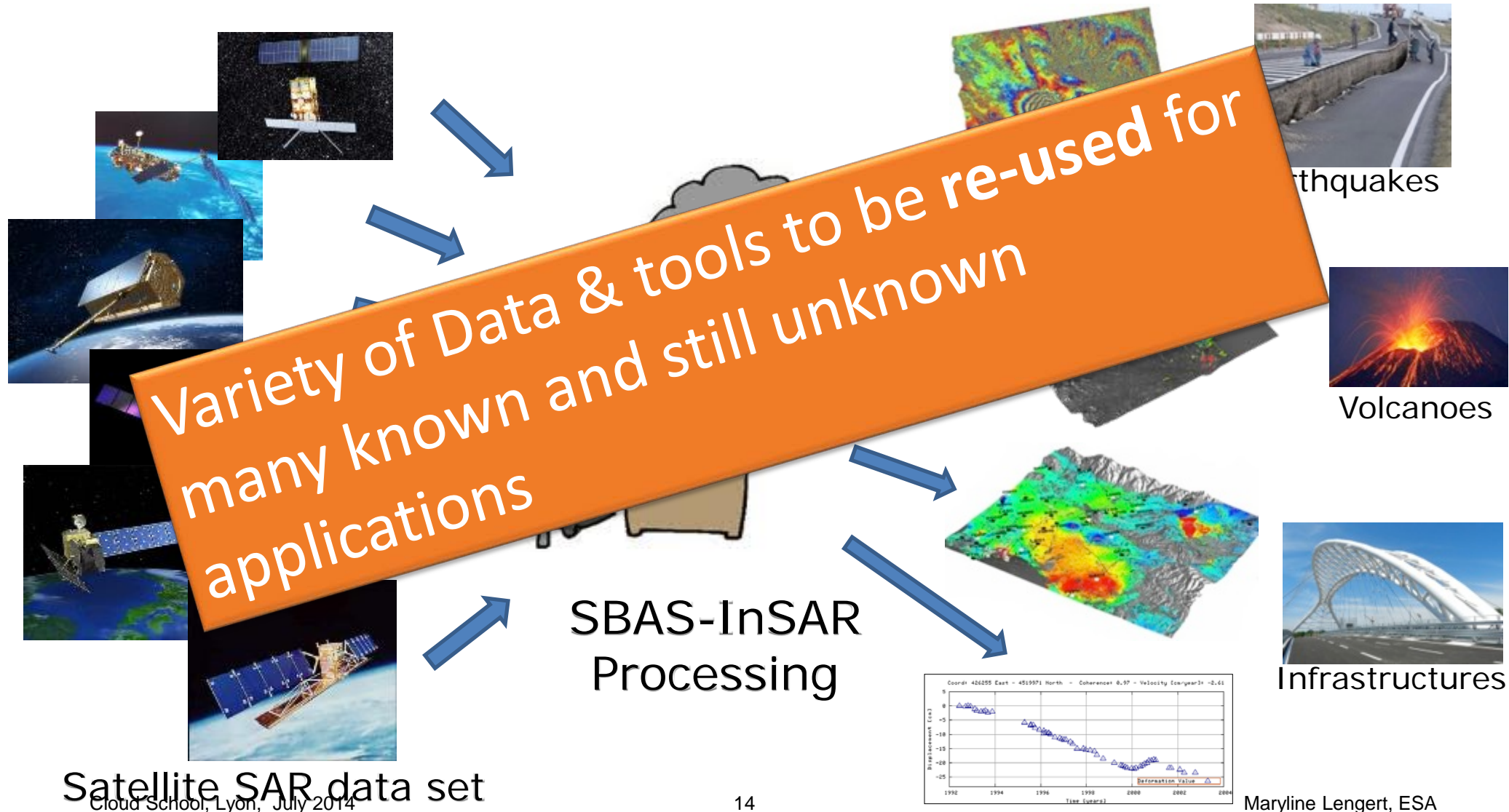
Within HN, ESA focussed on stimulating a balanced development of science, public utility and commercial applications consistent with ESA obligations and objectives



Supersites Exploitation Platform: Infrastructure concept for science use

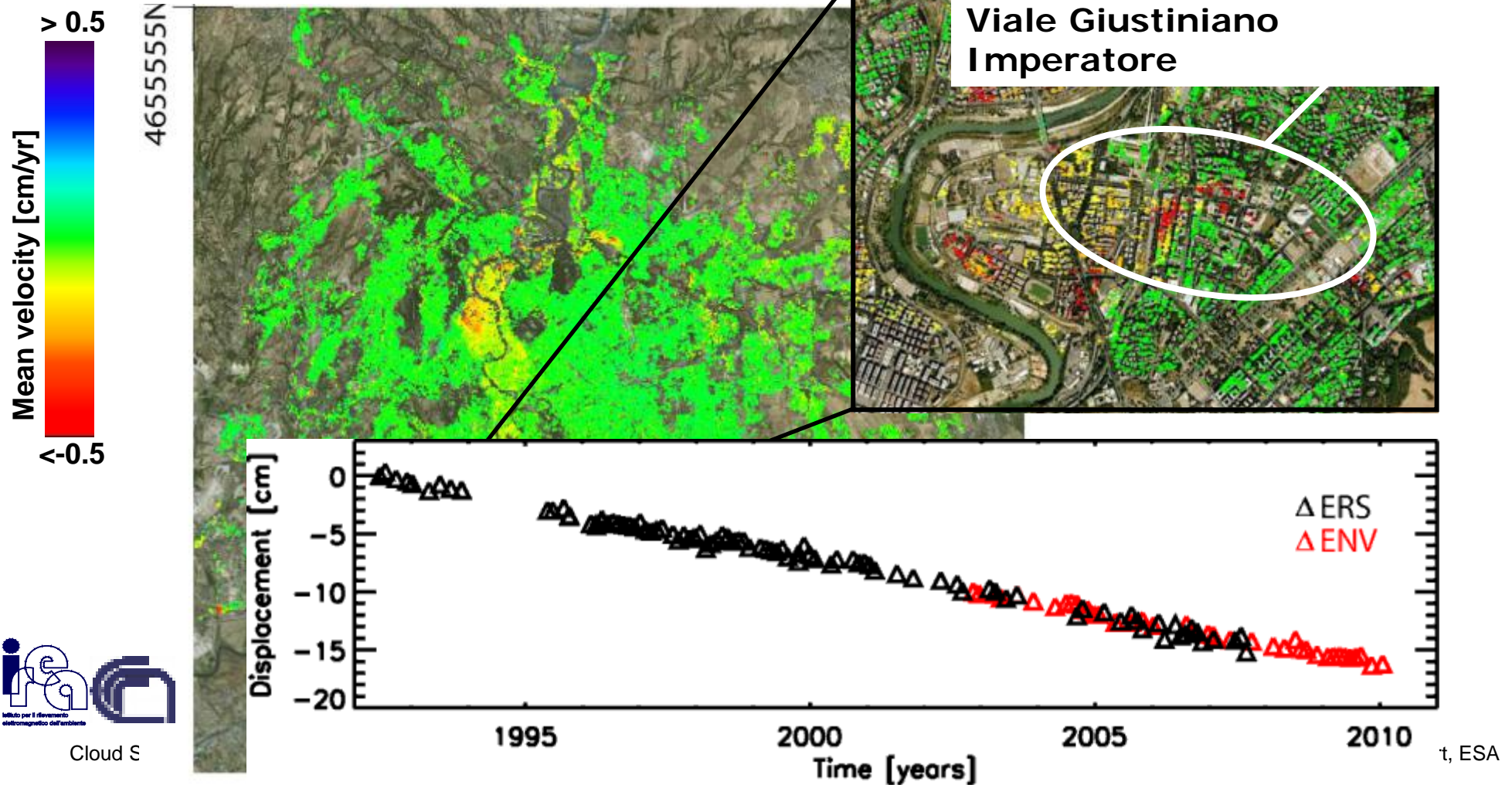


Ground displacement monitoring: using IPR developed by CNR Naples (IREA)

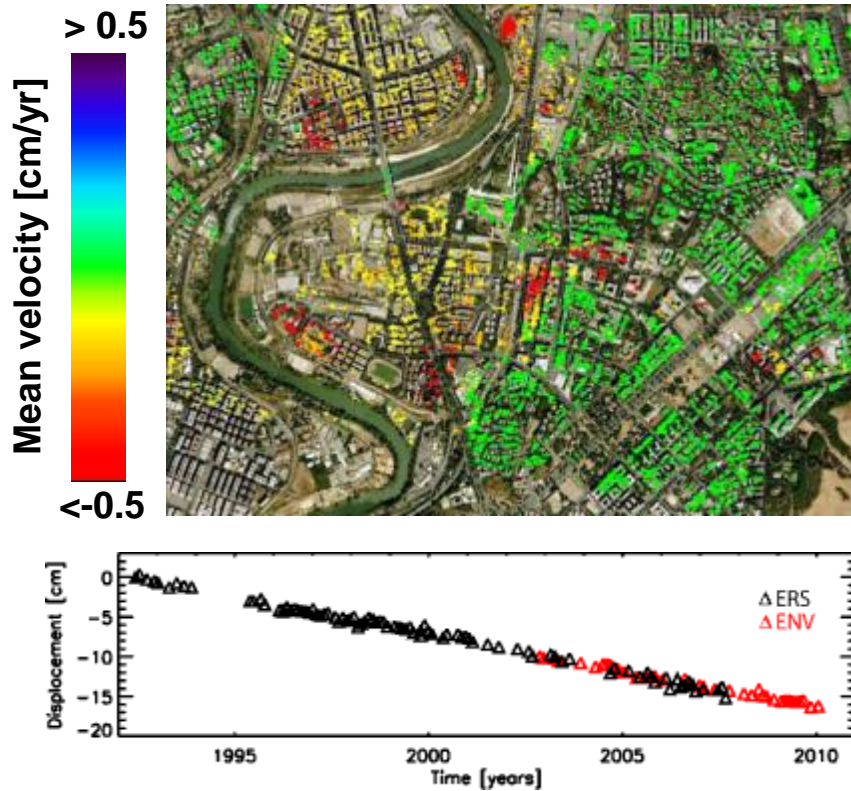


Subsidence in Rome SBAS-InSAR results

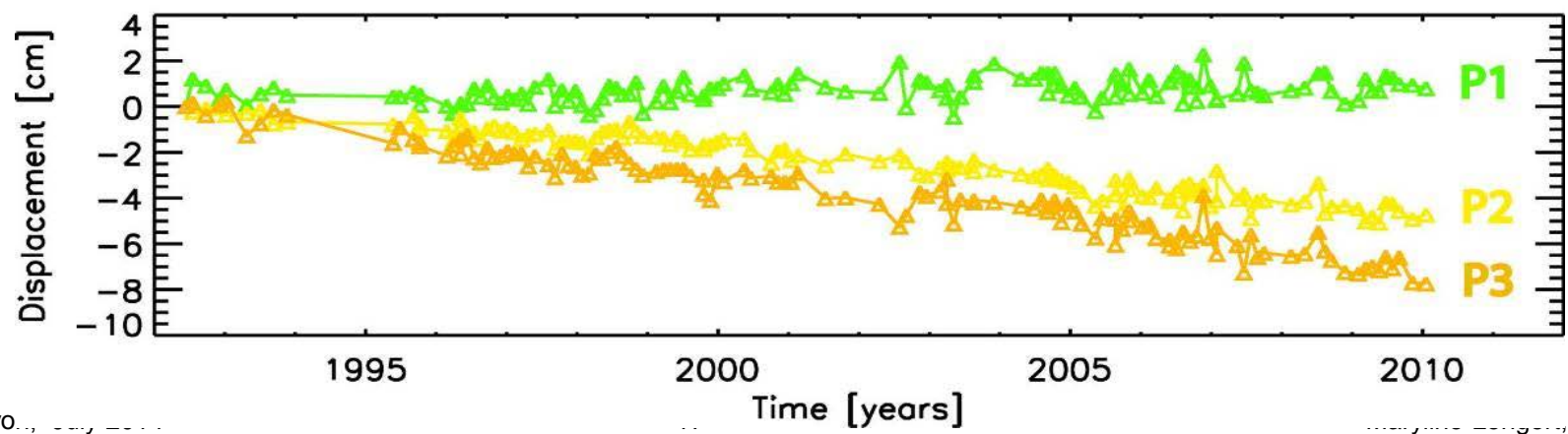
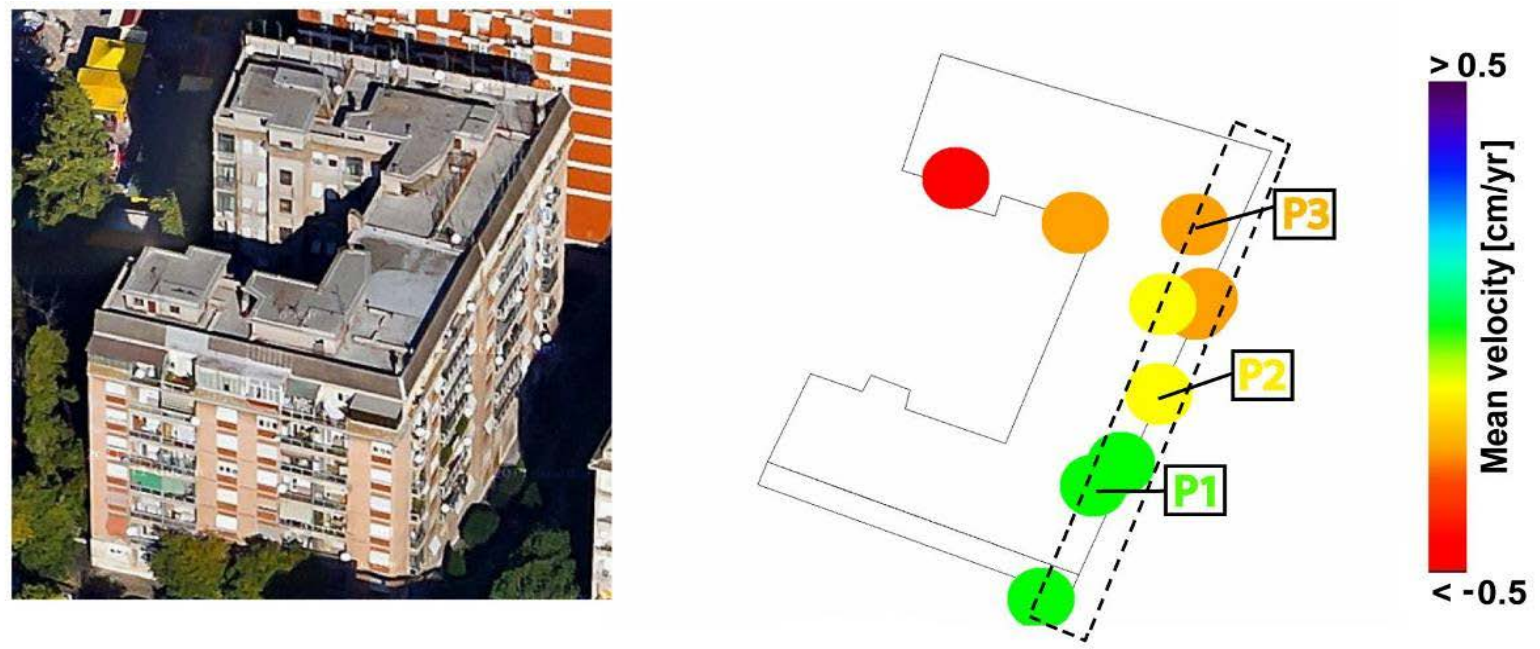
130 ERS/ENVISAT scenes acquired by descending
orbits between 1992 and 2010



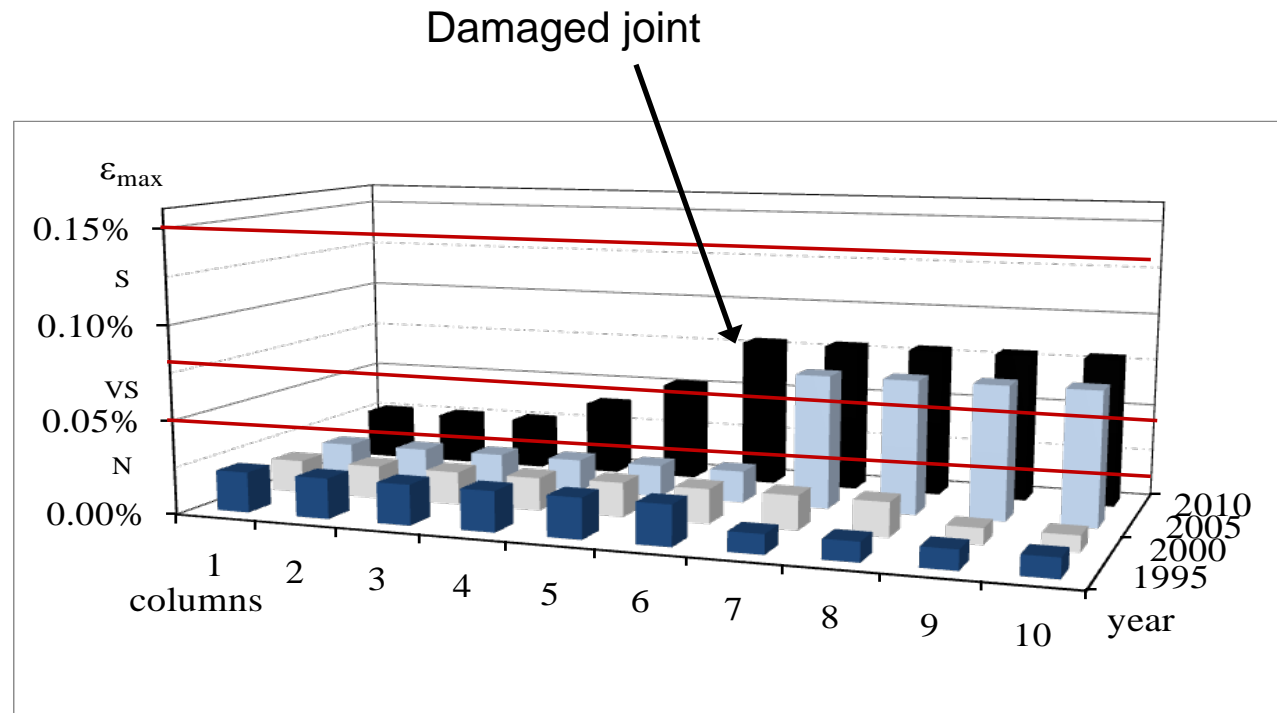
Rome: Integration of SBAS-InSAR results and digital catalogues of buildings



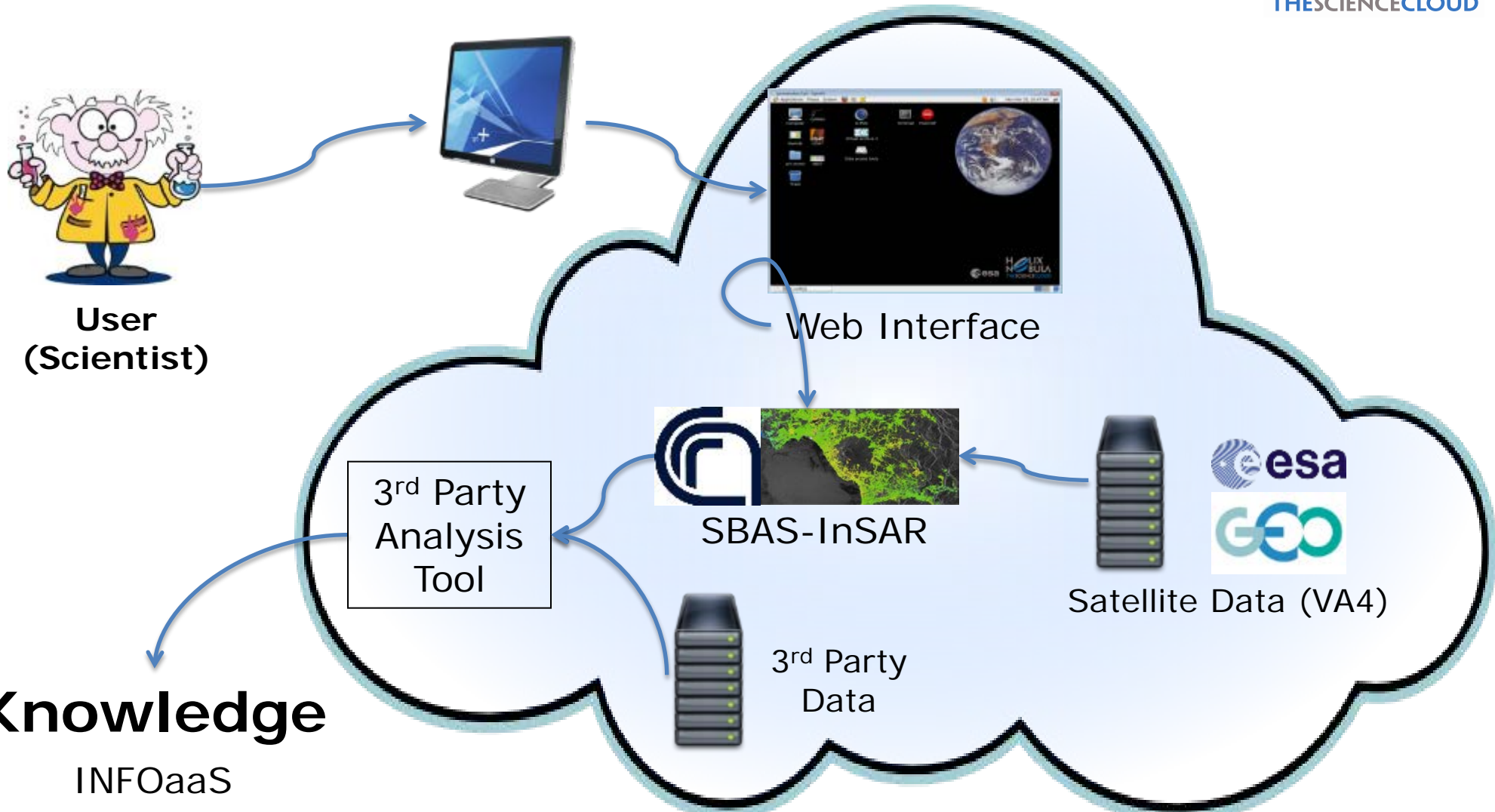
Rome: Integration of SBAS-InSAR results and digital catalogues of buildings



Rome: large scale damage assessment of buildings



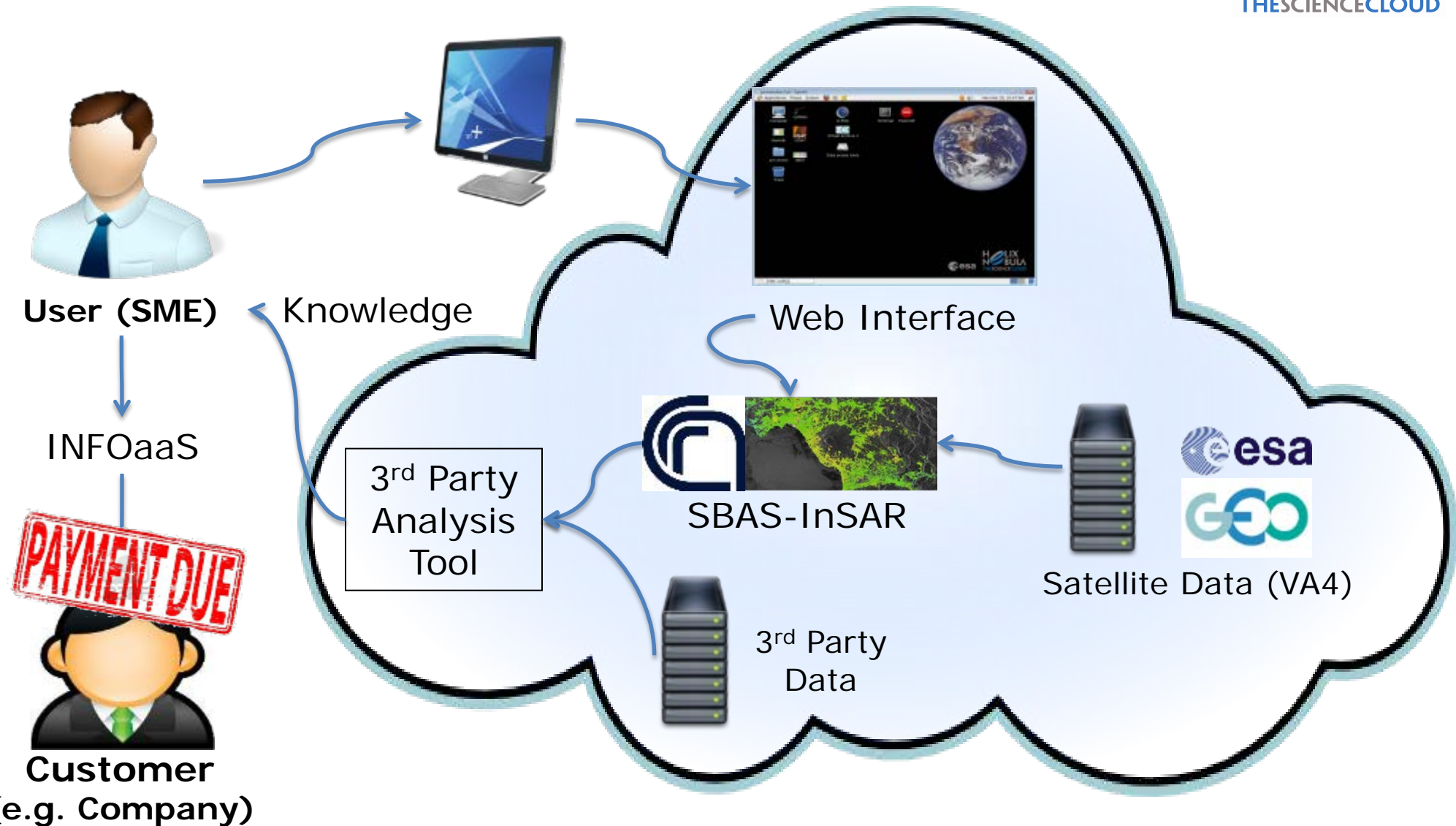
SBAS-InSAR: scientific use case



INFOaaS

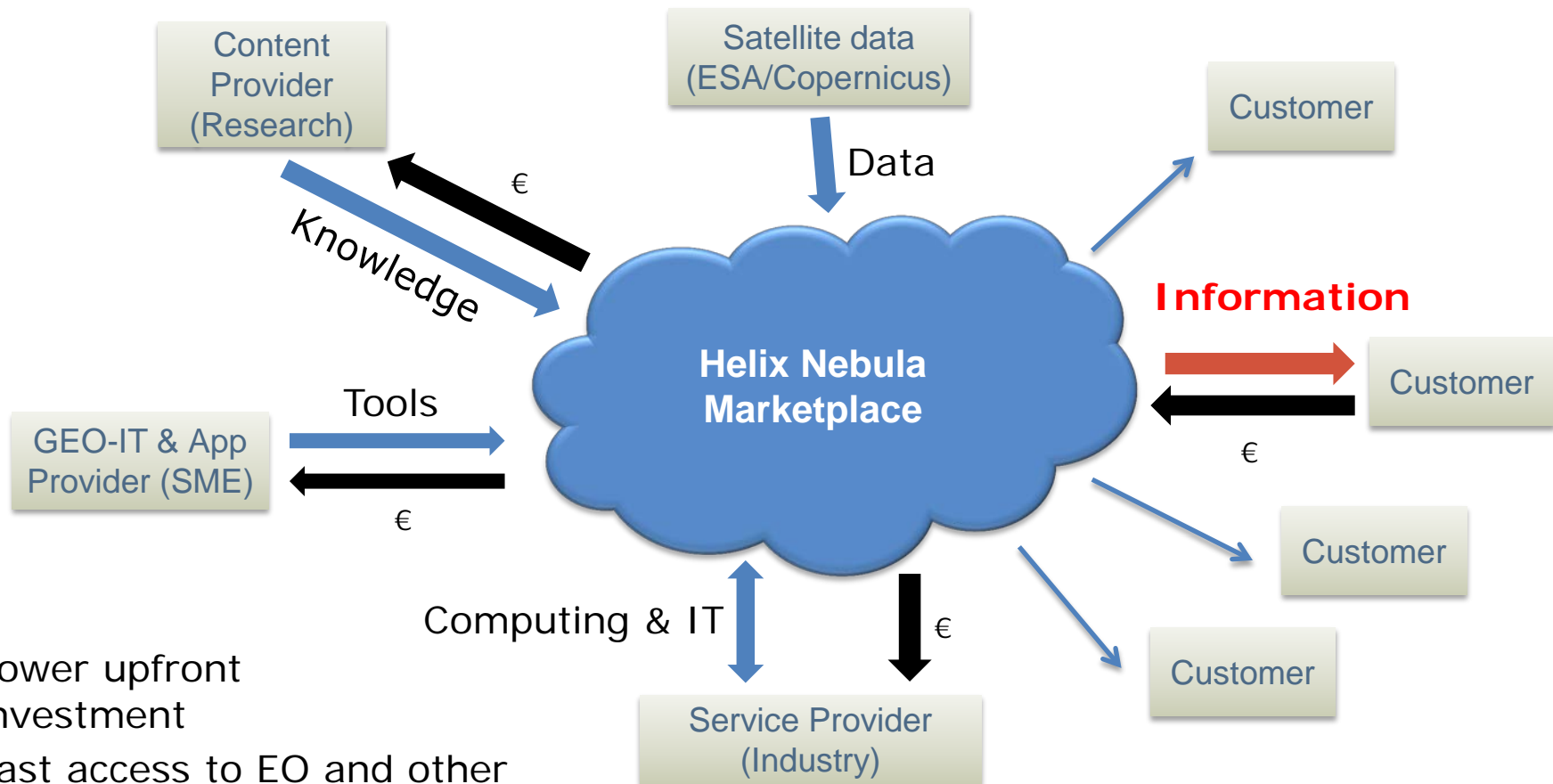
Scientists support Tools, Interested parties (Public and/or Private Entities) covers computational costs

SBAS-InSAR: commercial use case



Every actor keeps control of its IPR - Customer pays for accessing the service provided

Information as a Service: Science interfacing with private sector



- **Risk and profit sharing**
- **Sustainability**

Summary

Helix Nebula Marketplace 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 Helix Nebula ecosystem implements many-to-many relationships, quickly being established, to transform data into valuable information

www.helix-nebula.eu



Thanks!



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