



# Earth Observation Data to build a value chain from science to business

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HEPTech Academia Meets Industry  
on Big Data ICT1, Budapest, 31  
March 2015

# The Helix Nebula Initiative



## 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

EMBL



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

Additional Users:



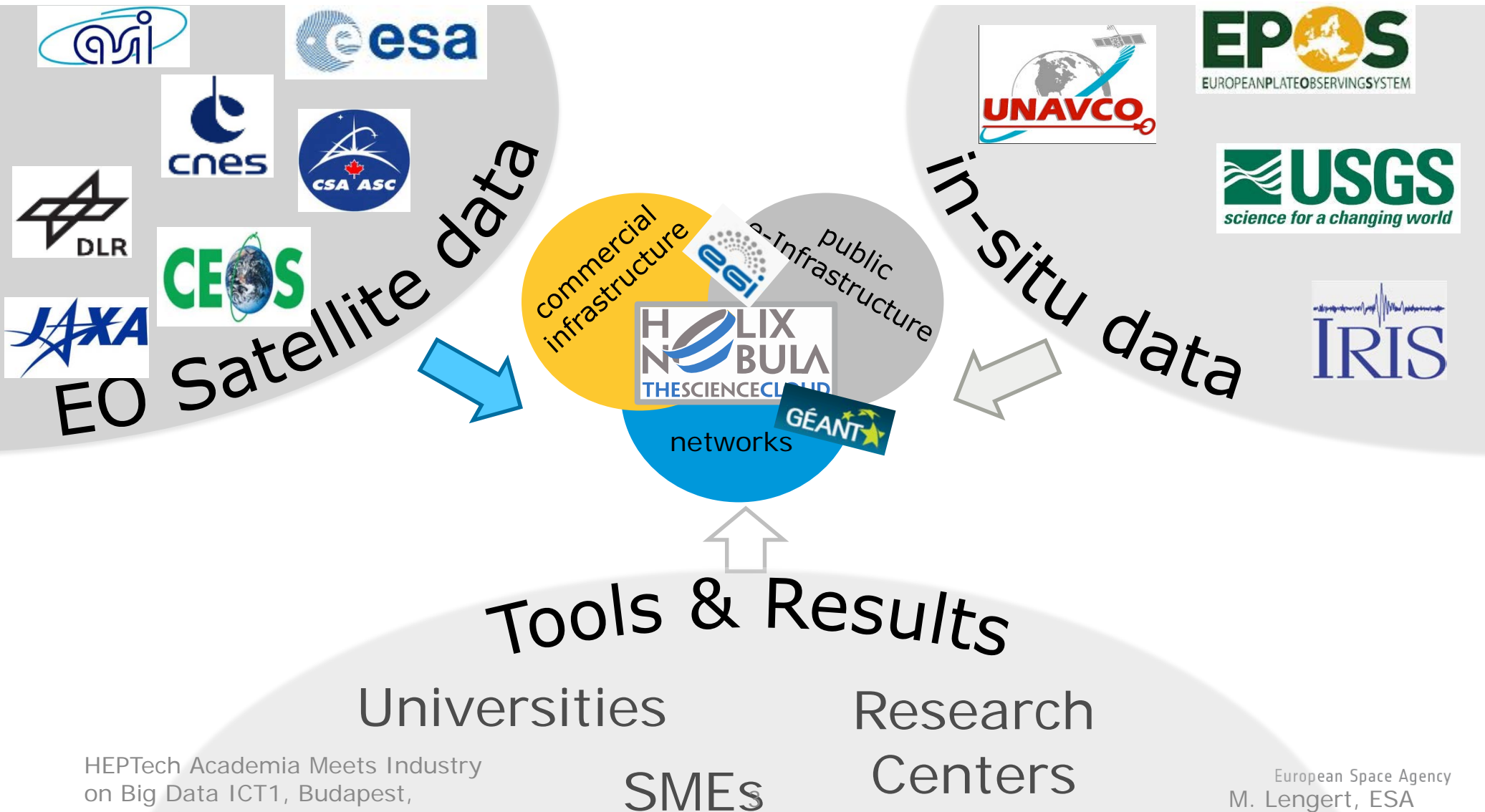
## Suppliers



## Adopters

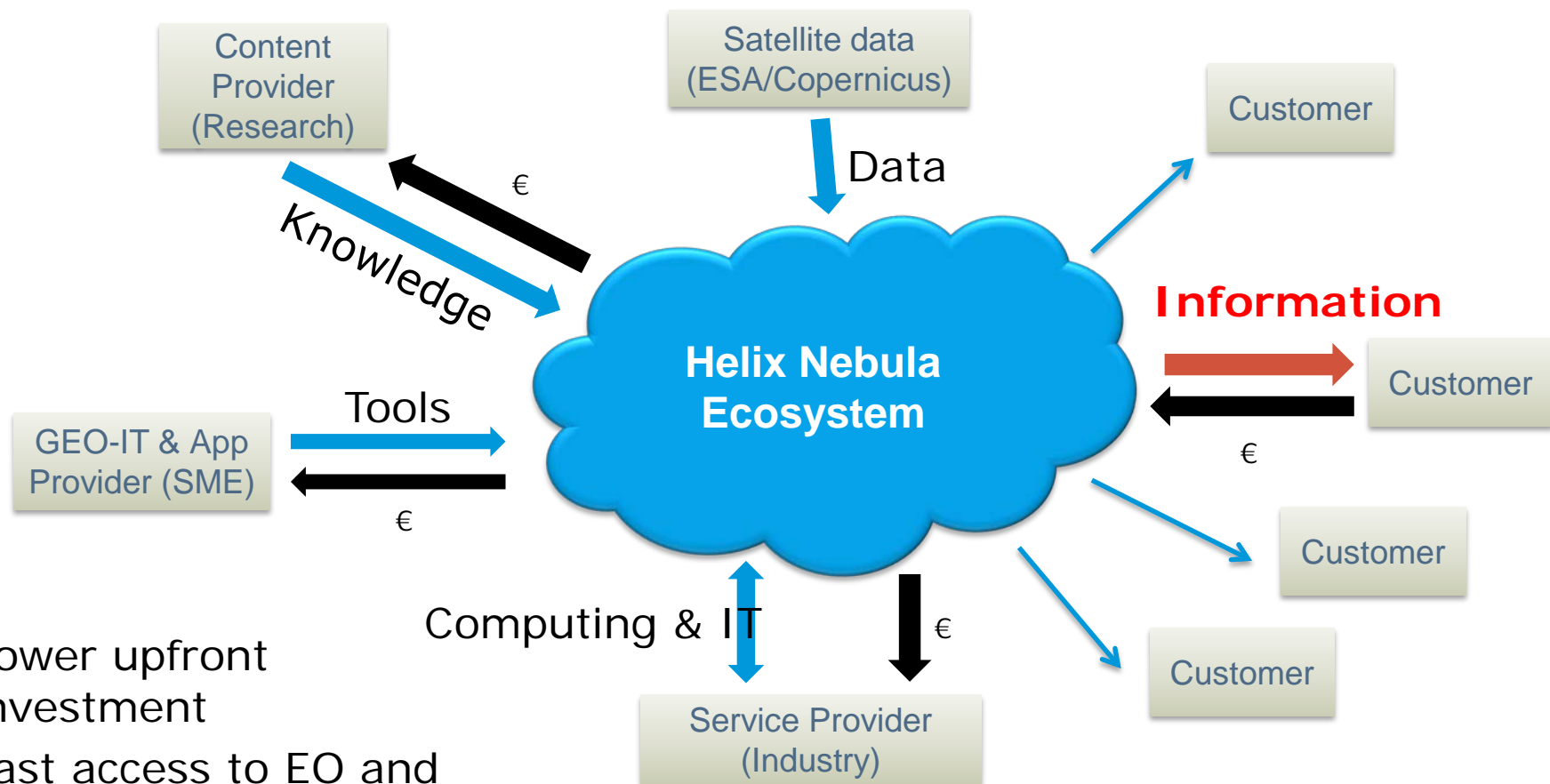


# Supersites Exploitation Platform: Infrastructure concept for science use



# HN derived business model:

## Information as a Service: Science interfacing with private sector



- Lower upfront investment
- Fast access to EO and other geodata resources
- Disruptive technology

- **Risk and profit**
- **sustainability**

# How to establish the ecosystem?

1. Starting with several classical demand – supplier approach (one-to-one relationship with a defined value chain) validating the HN business model
2. Elaborating, based on the classical contractual value chains, a common market place. Participants are agreeing mutually on a (i) common architecture, (ii) contributing with bits & pieces they consider essential to be adopted by their partners and performing a gap analysis

# Building the Value Chain

## Value Chain 1

ATOS

with IPR from **CNR/IREA** (Italian R&D)





HeliX Nucleus  
THE SCIENCE CLOUD



## Geohazard Supersites and Natural Laboratories

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Found 89776 results in 17 digital repositories 

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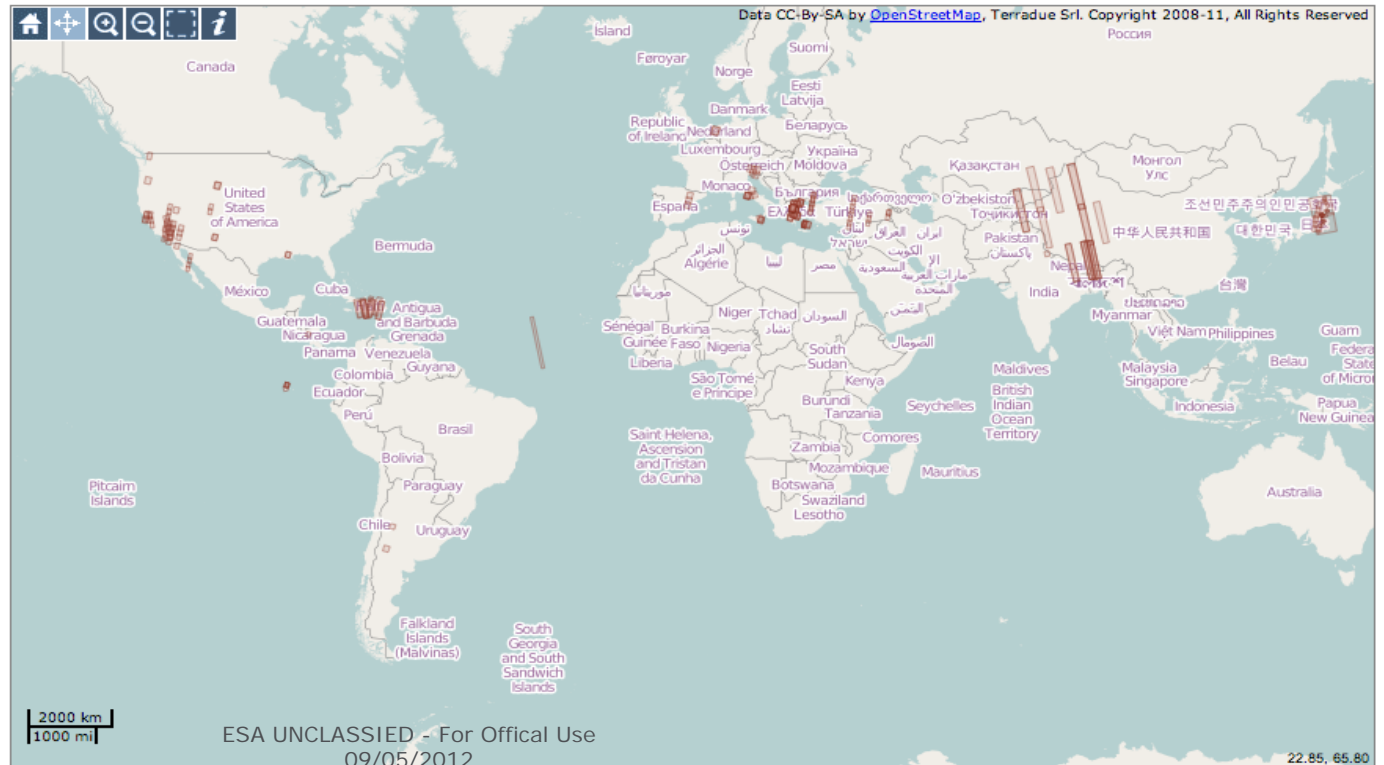
ERS-2 SAR Image SAR Annotated Raw Data  
Product Level 0 (ER02\_SAR\_RAW\_0P)

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first next last

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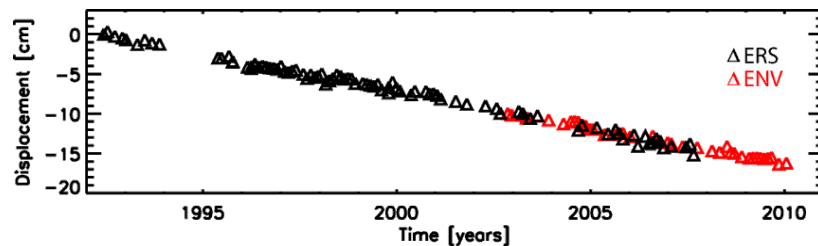
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# Rome: Integration of SBAS-InSAR results and digital catalogues of buildings



SBAS-InSAR results

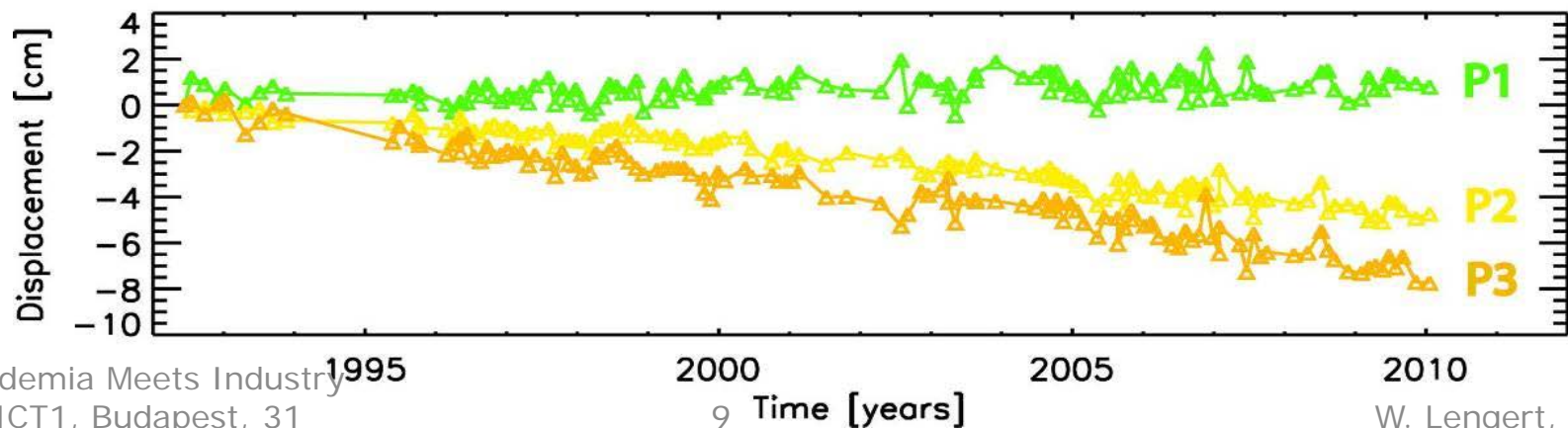
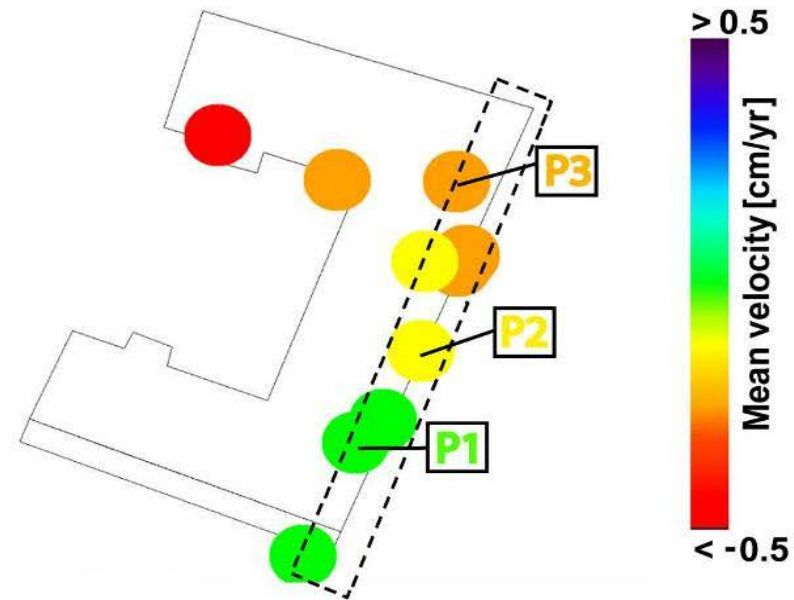


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W. Lengert, ESA

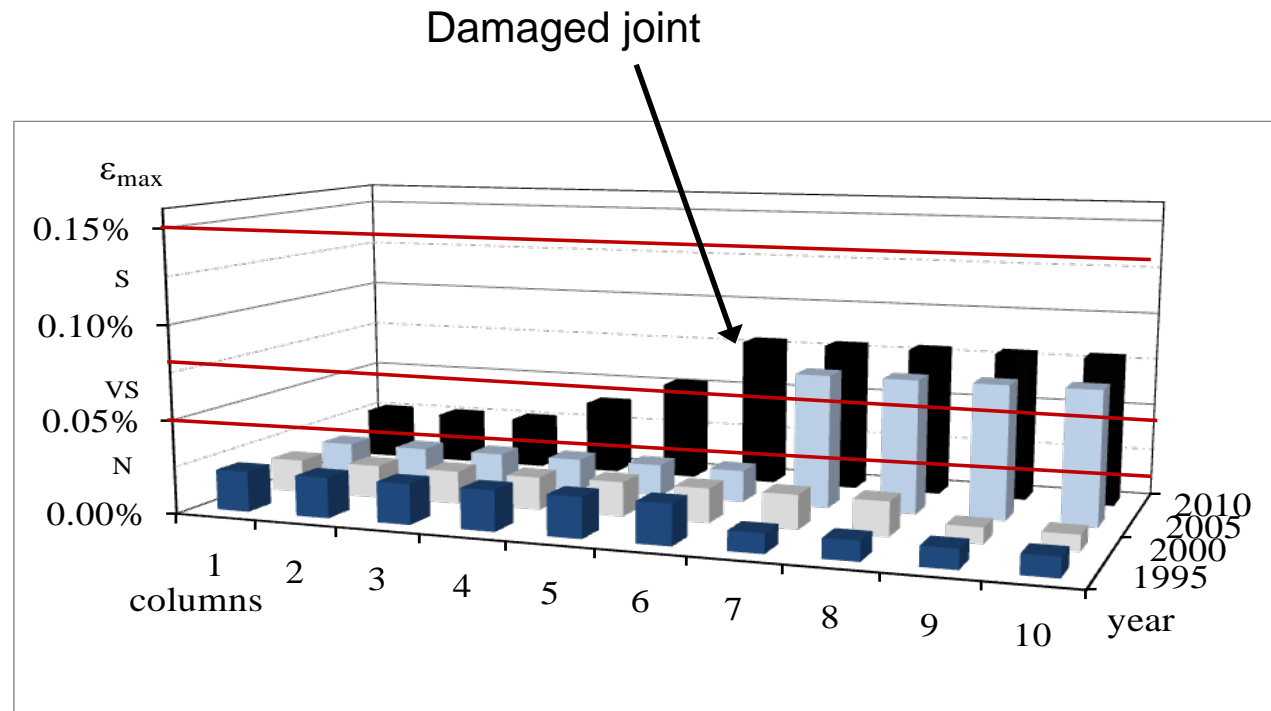
# Rome: Integration of SBAS-InSAR results and digital catalogues of buildings



# Rome: large scale damage assessment of buildings



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Information  
Store  
INFOaaS

- ✗ Service 1
- Service 2
- Service 3

Service 1 is: 3vGeomatics Displacement Map



**3VGEOMATICS DISPLACEMENT MAP**



3VGEOMATICS | ASAR | 2003-2010 | 25KM

- 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

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☆☆☆☆☆

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## Value Chain 2

T-System  
with IPR from **VISTA** (SME)

..T..Systems..



# InfoaaS stimulus example: Provision of Hydropower Information Facing the renewable energy challenge



## European Facts

- Hydroelectric power is the most efficient and planable renewable energy source
- Around 16 % of Europe's electricity comes from hydroelectric power
- Annual turnover in the EU in 2011: more than € 137 billion
- Hydroelectric power production is highest in the Northern and Alpine countries
- Optimizing the design and management of the energy grid as challenge

Apps4Gmes

VISTA  
HydroSense

fabianvista (Organisationsadministrator) | Einstellungen | Hilfe ▾ | Abmeldung

InputDataPortal  
**OPTICAL**  
Satellite Data

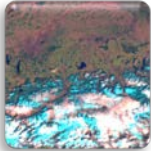
InputDataPortal  
**SAR**  
Satellite Data

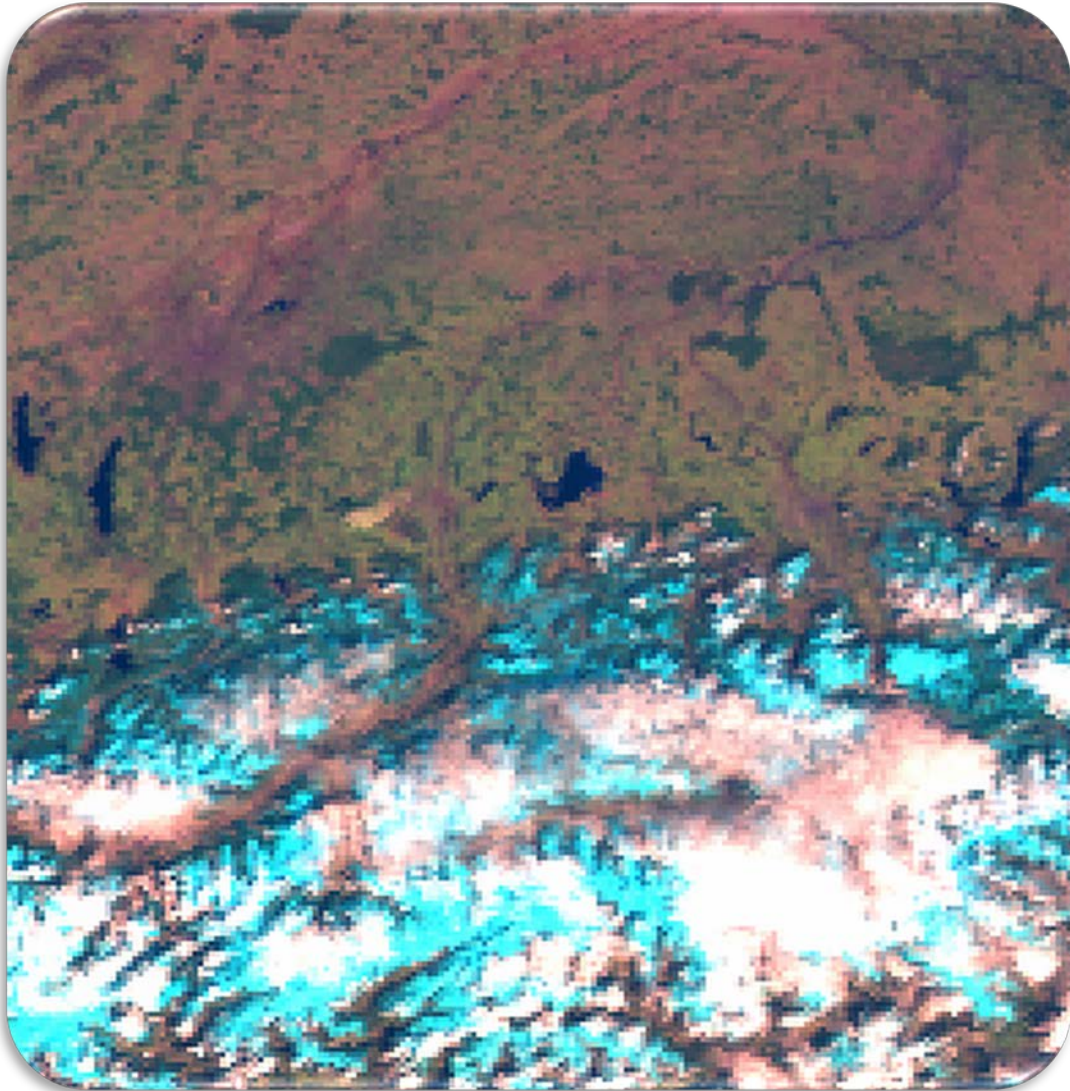
Snow Cover



SnowWater  
Equivalent


RUNOFF


HYDROPOWER





 0 Wird ausgeführt  0 Fehlgeschlagen

 T-Systems Dynamic Services for Infrastructure with vCloud Datacenter Services

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VISTA  
HydroSense

fabianvista (Organisationsadministrator) | Einstellungen | Hilfe | Abmeldung

InputDataPortal  
OPTICAL  
Satellite Data

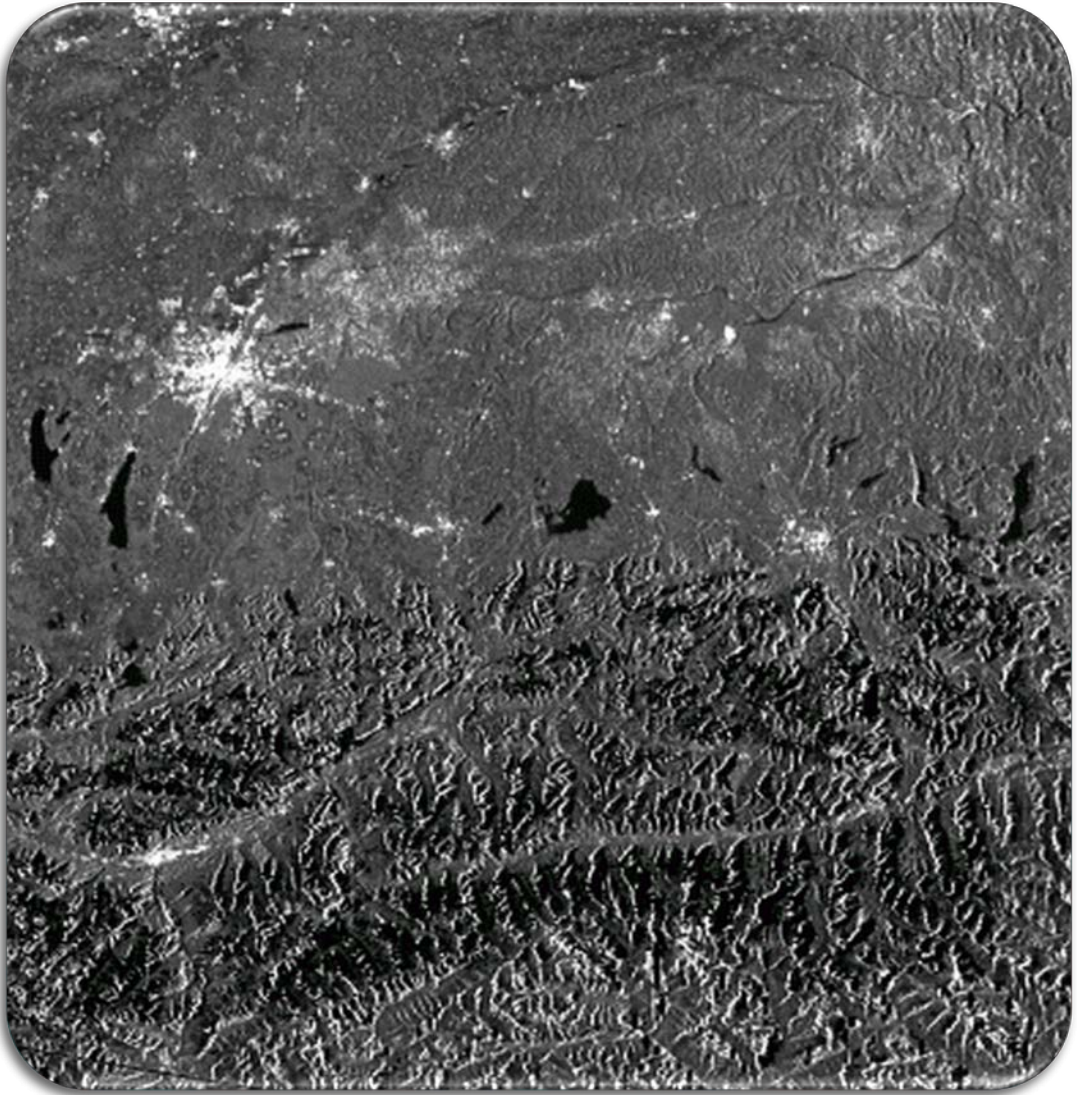
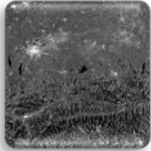
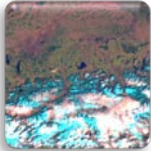
InputDataPortal  
SAR  
Satellite Data


Snow Cover


SnowWater  
Equivalent


RUNOFF


HYDROPOWER

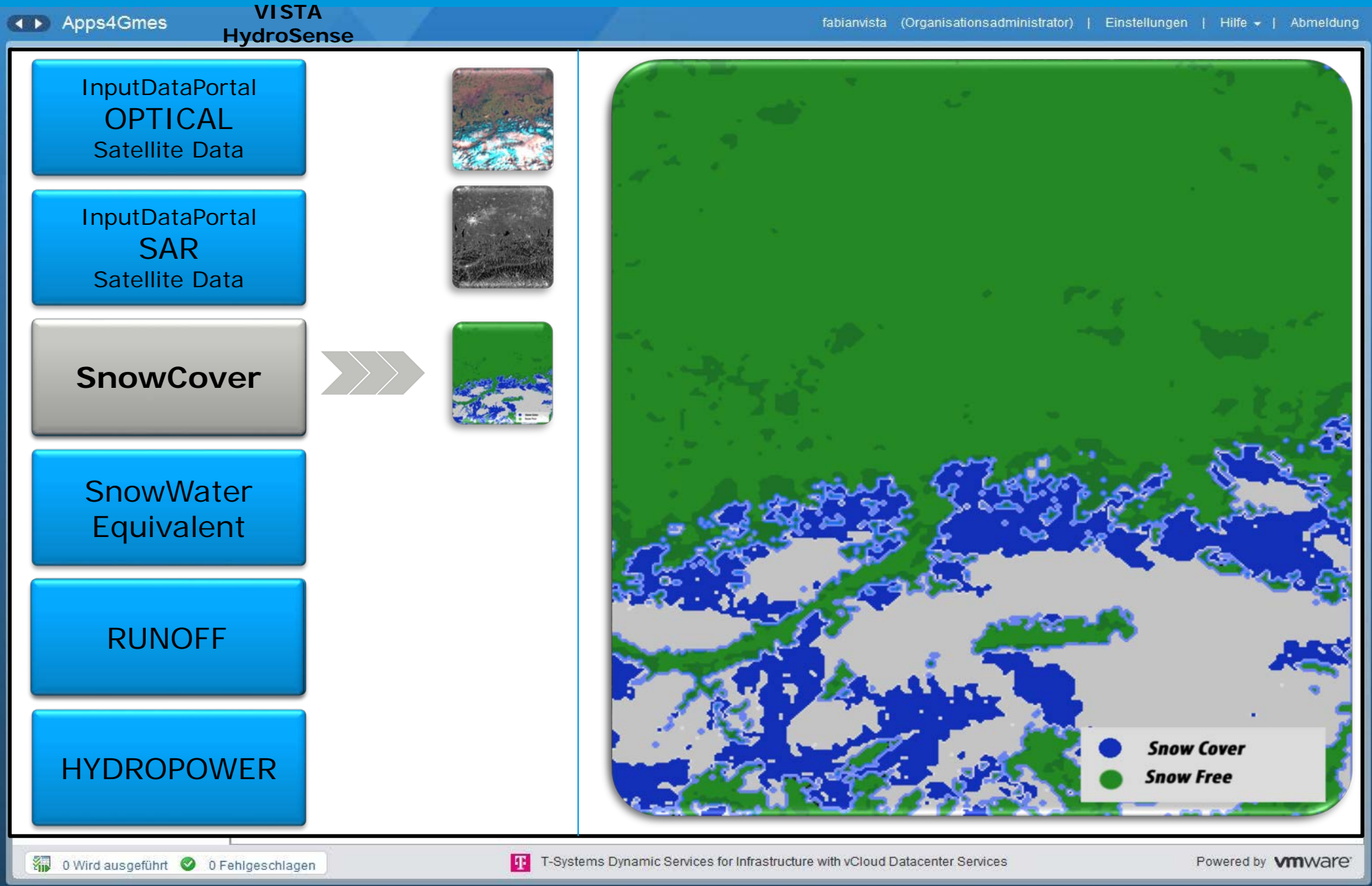


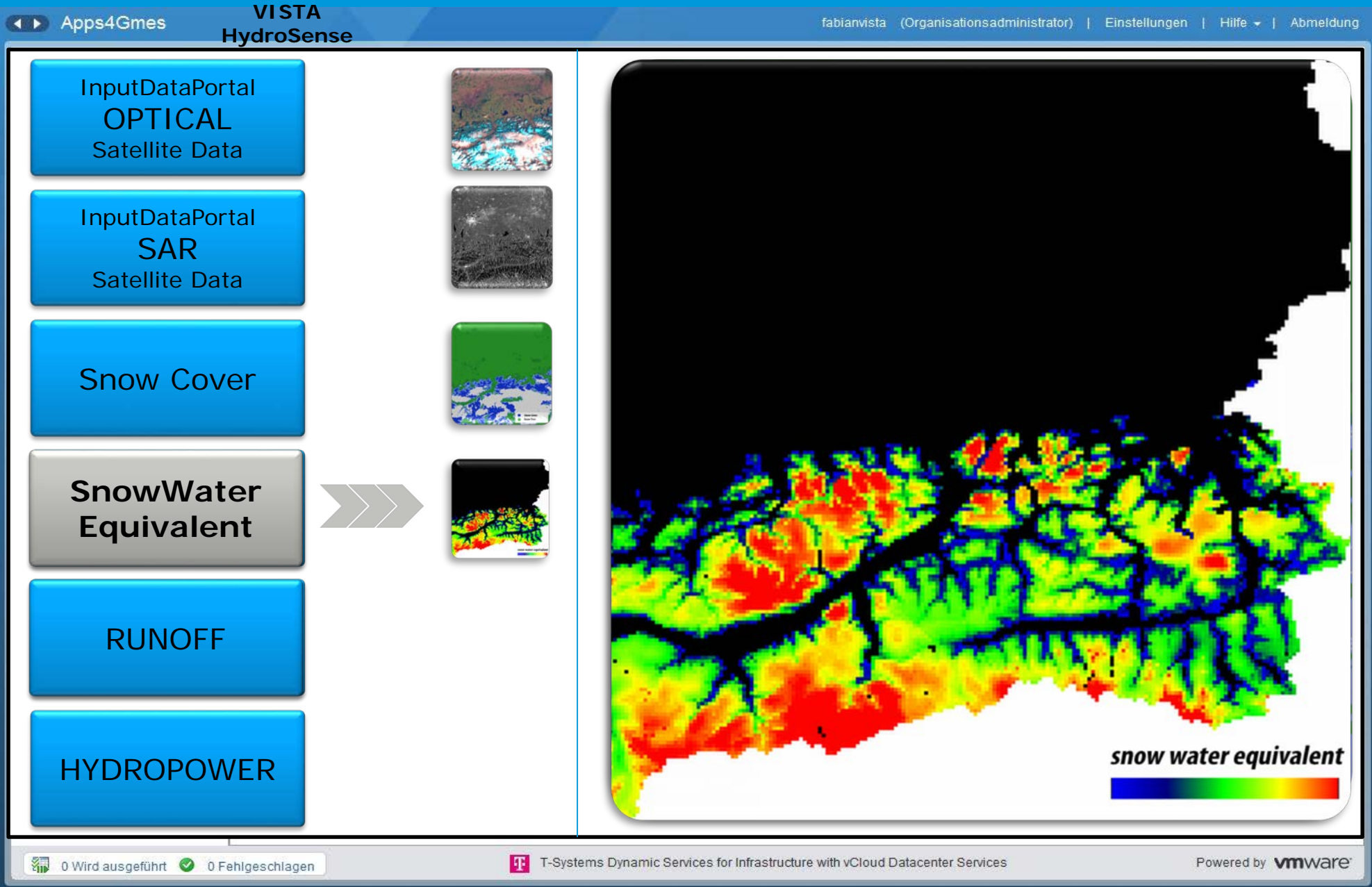
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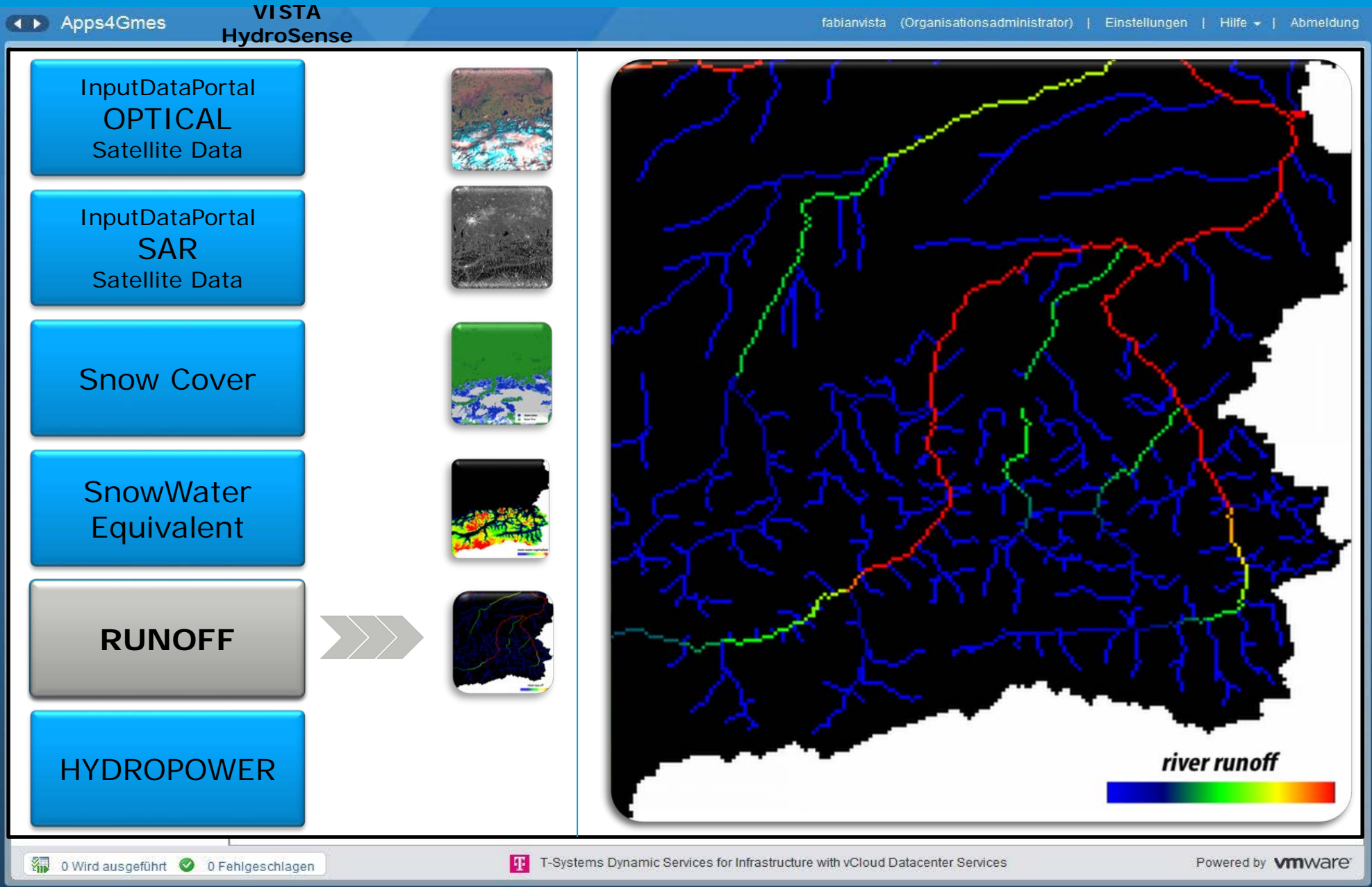
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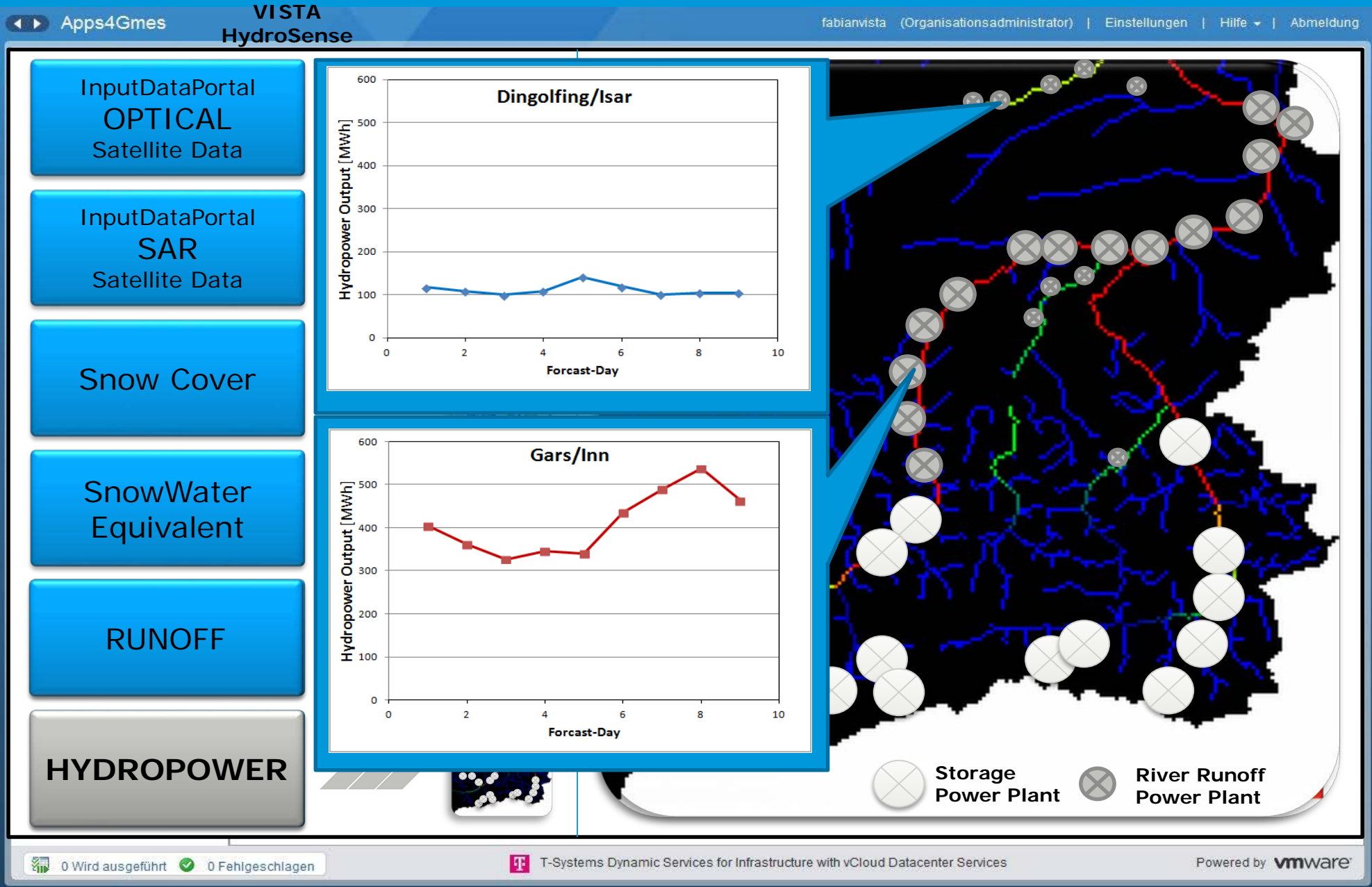
 T-Systems Dynamic Services for Infrastructure with vCloud Datacenter Services

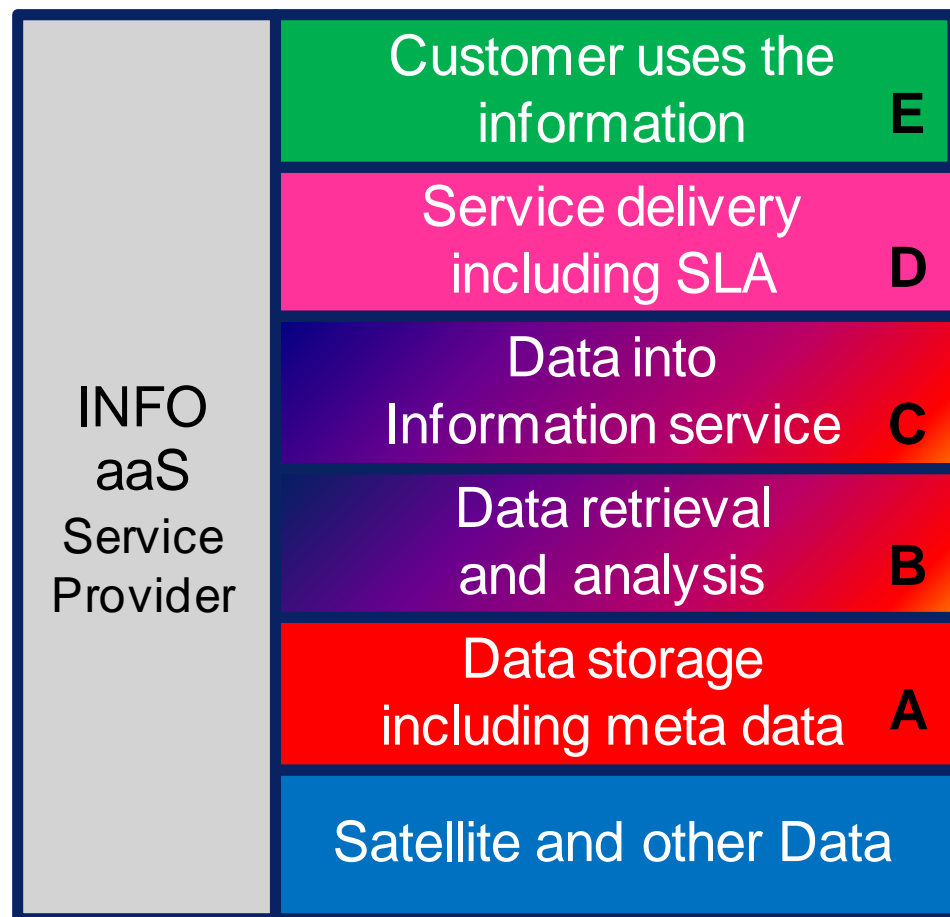
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Challenge:  
Contracting and liability  
throughout the value  
chain



# InfoaaS will be successful only if:

The partners are:

- supporting the structural characteristics of the market
- sharing IPRs and tools ensuring creation of a homogenous marketplace (e.g. accounting, invoicing, payments, ...), beyond the contractual commitments
- Recognize R&D community as their innovation engine, pushing new IPRs on the marketplace to be used (commercialized) by private sector (recognition in terms of € and/or support for R&D environment)

The Helix Nebula ecosystem 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 ESA approach is to use HN for **a seamless integration of science output into a business environment**, ensuring a constant innovation push coming from the earth science domain.

# BACKUP slide



Now in 2015 "Helix Nebula - The science cloud" Initiative has created a pan-European ecosystem providing following globally unique assets via the R&D / Industry set-up:

- **Overarching architecture** => one that fits all large scale R&D agencies building on national R&D, Industry and SMEs
- **Business model** => Information as a Service (InfoaaS), tailored to HNI, allowing a seamless integration of science into the private sector
- **Governance** => signed by most European Intergovernmental R&D agencies, EC R&D bodies, large scale industry and SMEs (lots of them EO related). This governance is giving strong emphasis on innovation, hence always having the Chairmanship with the R&D demand side.
- **Public procurement** => is being addressed via an EC PCP action (PICSE) under the lead of CERN.

# Dynamic value chain creation using “InfoaaS” Stimulus

→ filling up the shop

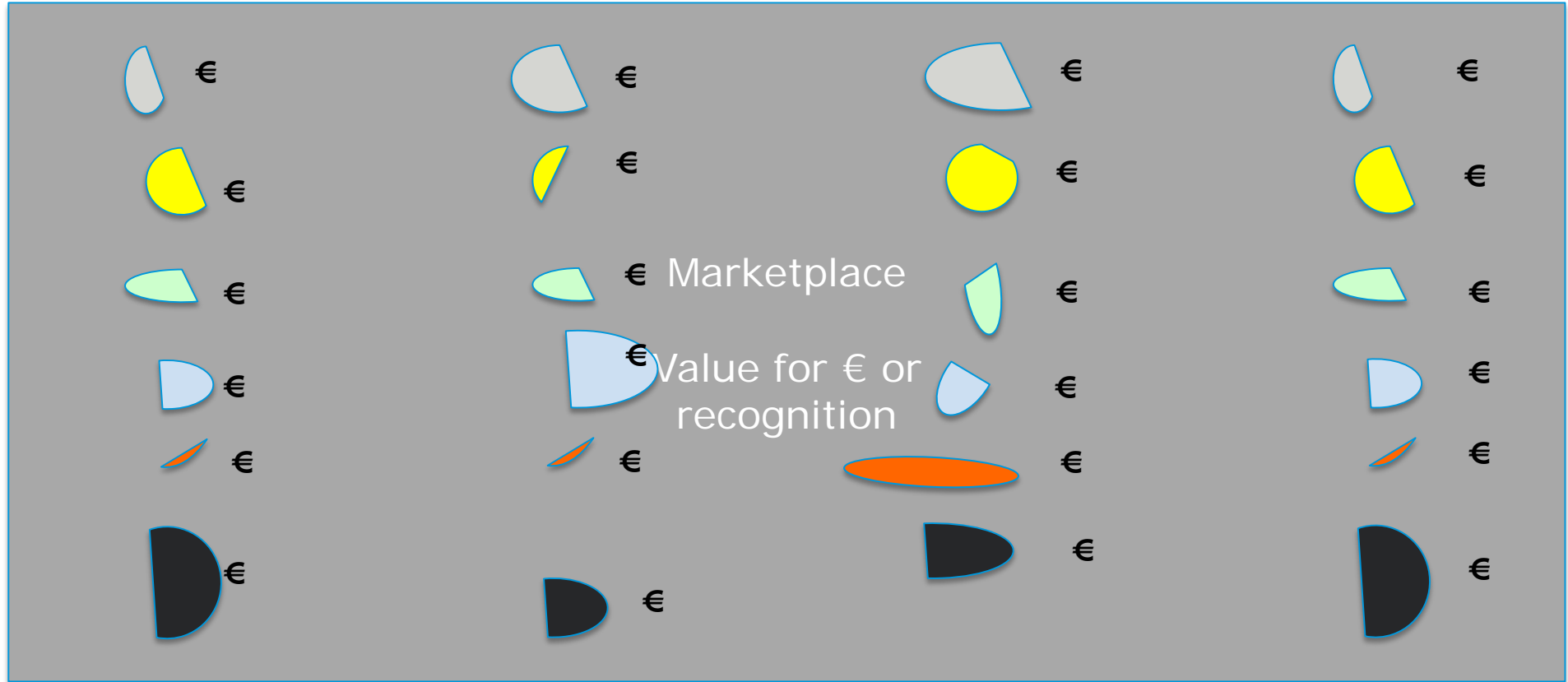


Demand €

Demand €

Demand €

Demand €



Supplier €

Supplier €

Supplier €

Supplier €

# Dynamic value chain creation using “InfoaaS” Stimulus

→ filling up the shop

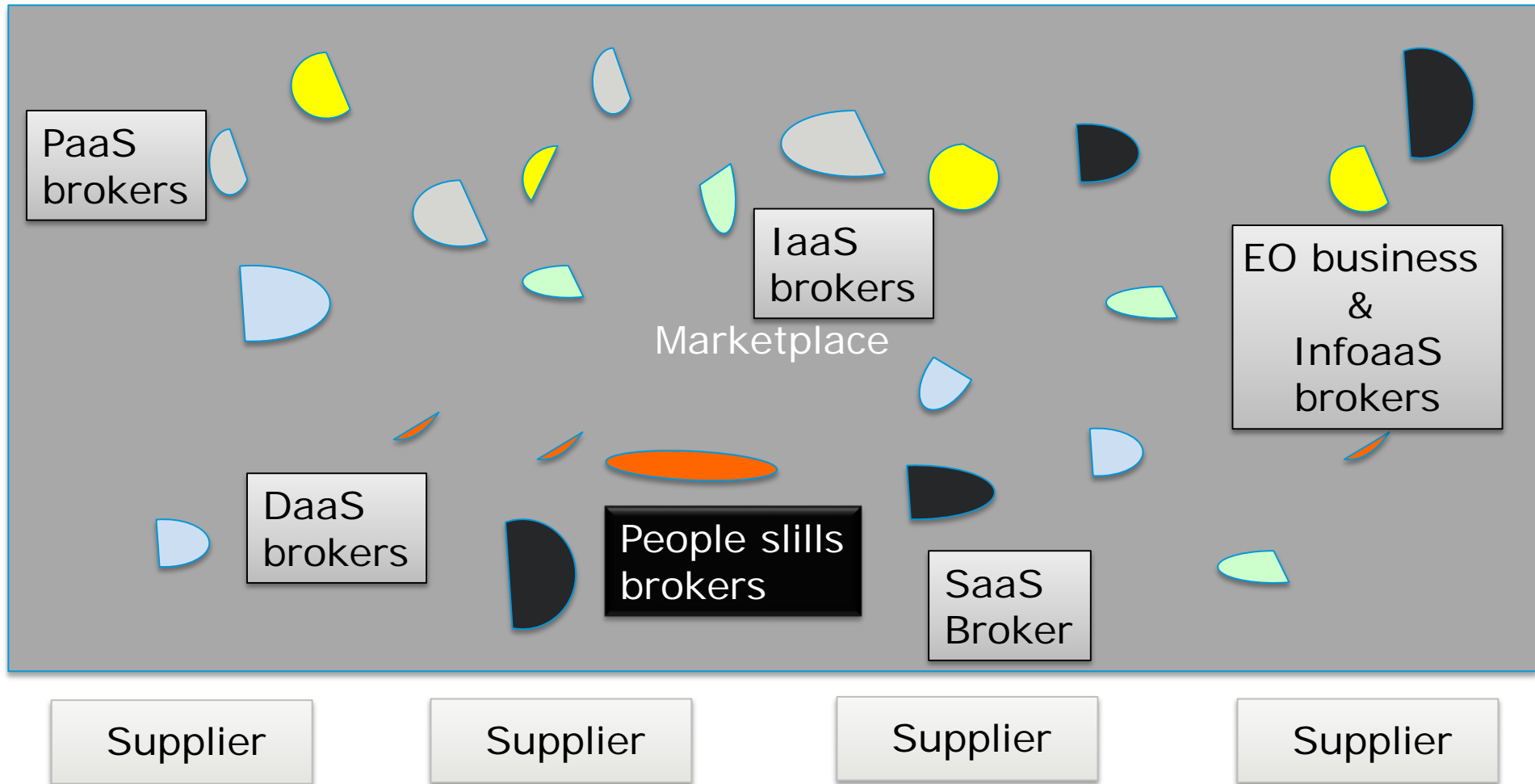


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# Dynamic value chain creation using “InfoaaS” Stimulus

→ filling up the shop

