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

HELIX NEBULA THESCIENCECLOUD

Strategic Plan

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

CERN

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

esa

cnes DLR

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

PIC port d'informació científica

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

Additional Users: ECMWF ESRF

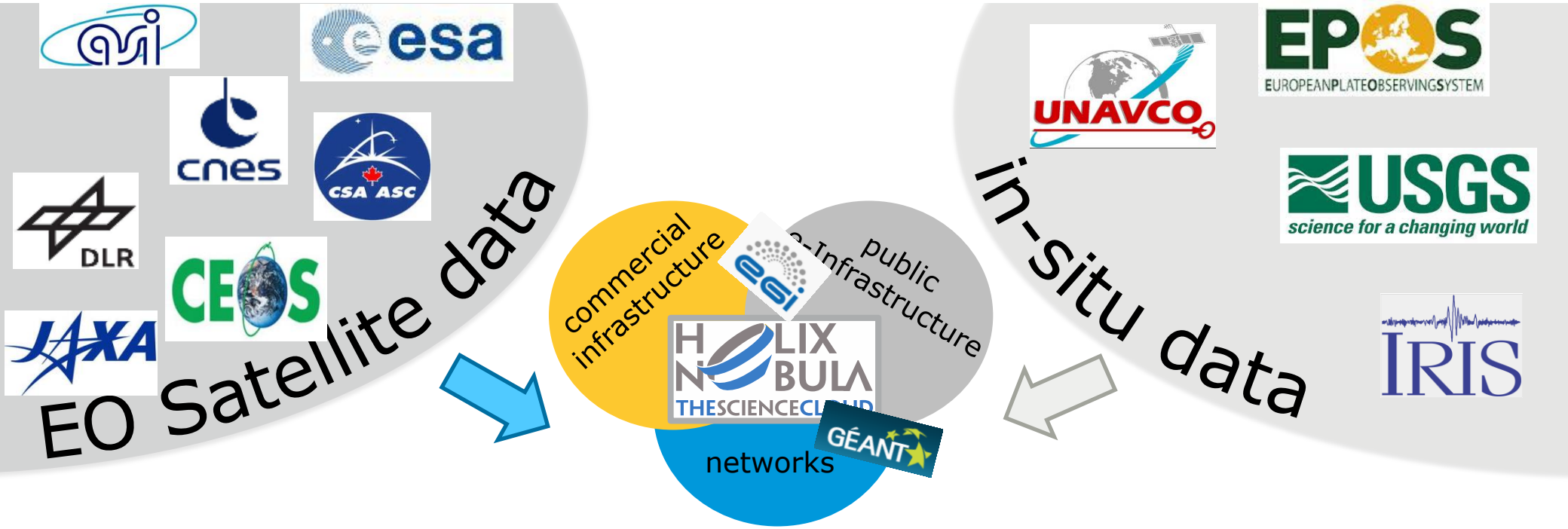
Suppliers

Atos CGI CloudSigma CSA cloud security alliance DANTE www.dante.net egi indra interoute MEMSET HOSTING SAP sixsq SWITCH T-Systems the SERVER LABS the IT architects ultimum technologies

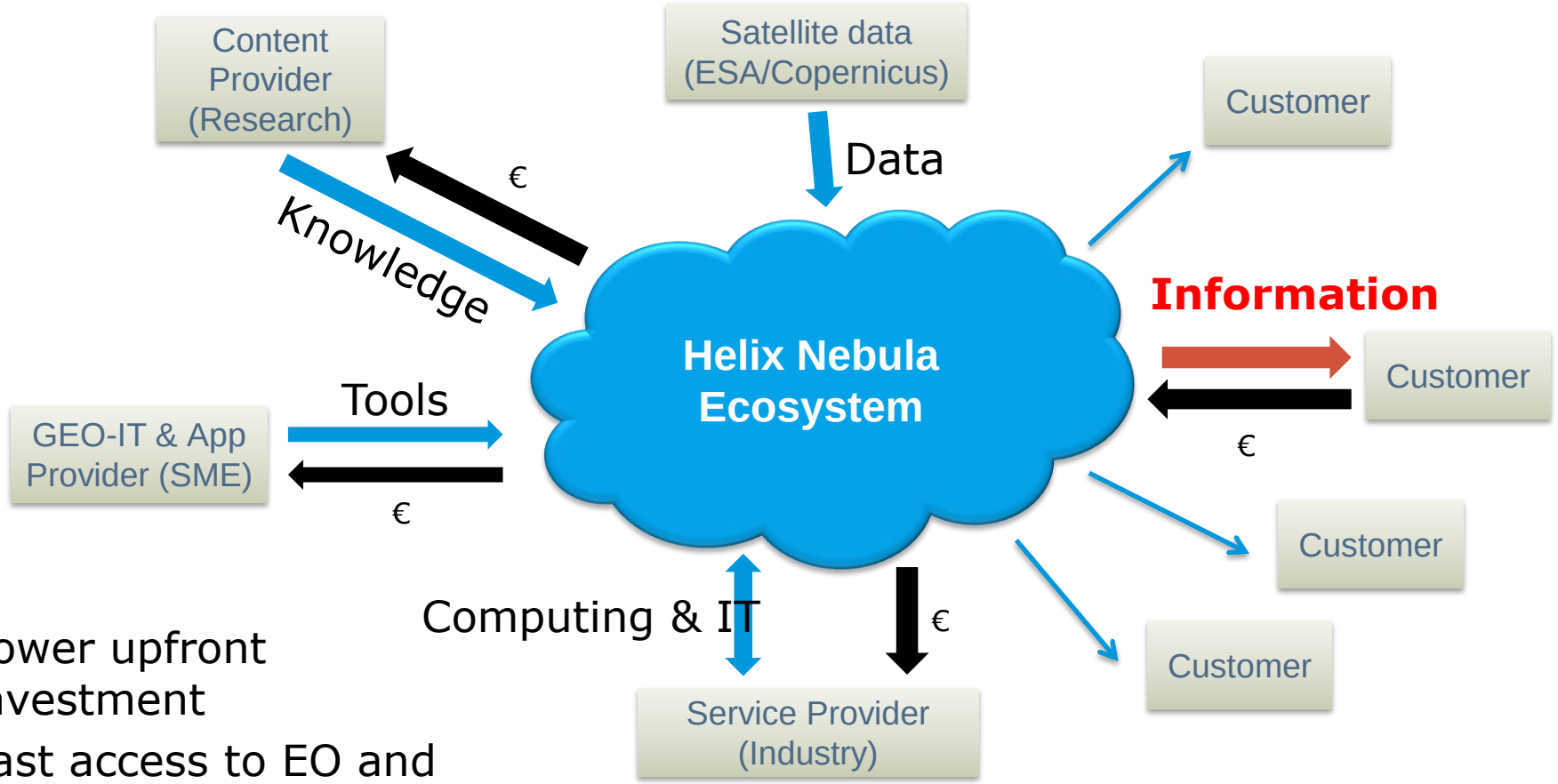
Adopters

AWST Capgemini CLOUDEO cnrs DataCentred deac Ifremer NEPHOS TECHNOLOGIES orange Business Services Prologue. Telefónica terradue 2.0 THALES vito Yandex

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 sharing**
- **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

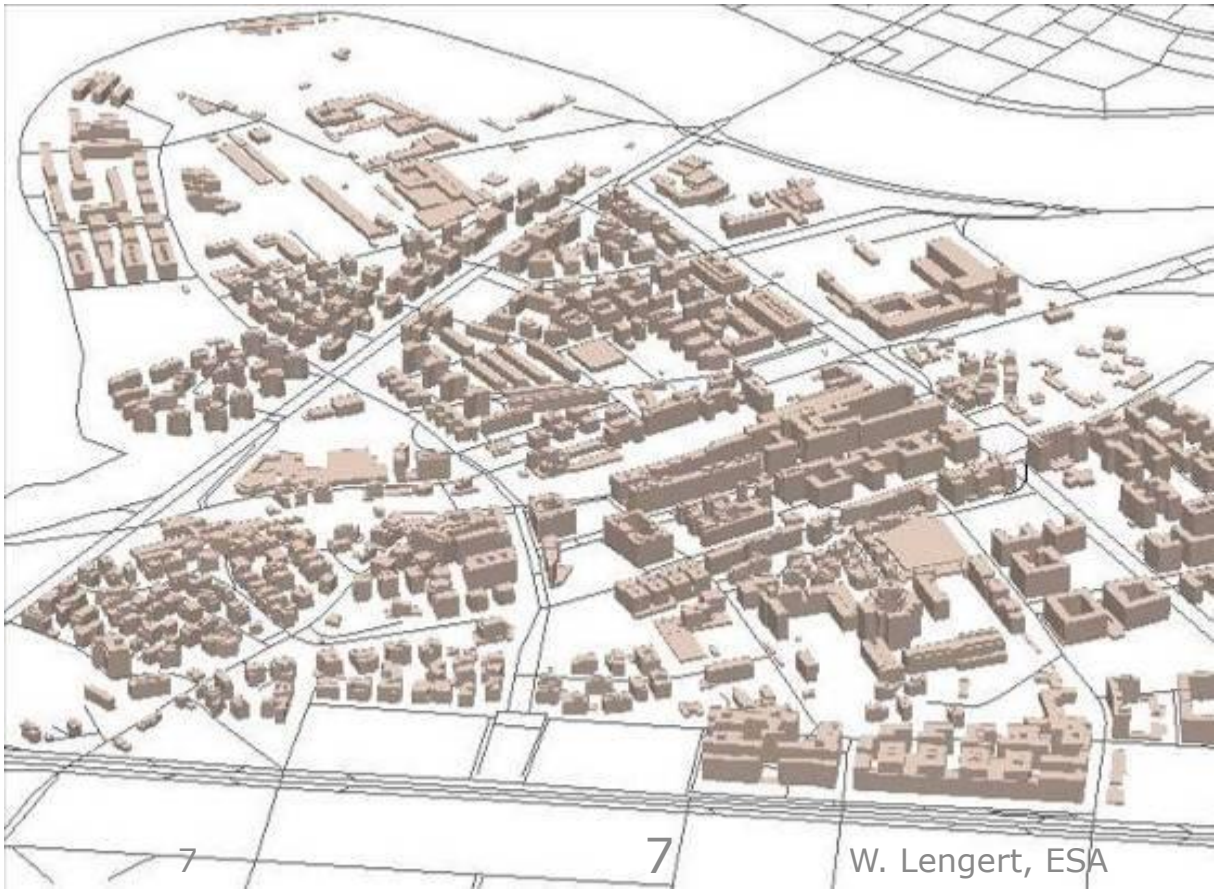
Building the Value Chain

Value Chain 1

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

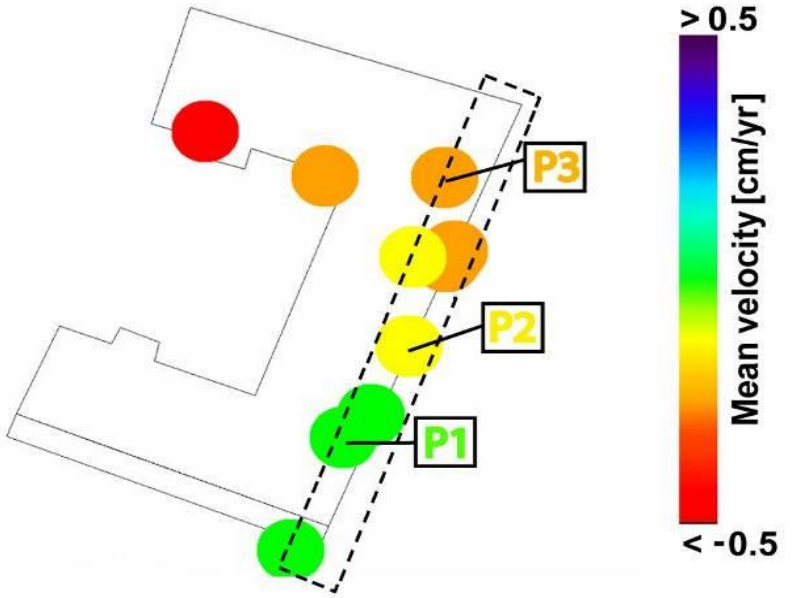
Rome: Integration of SBAS-InSAR results and digital catalogues of buildings

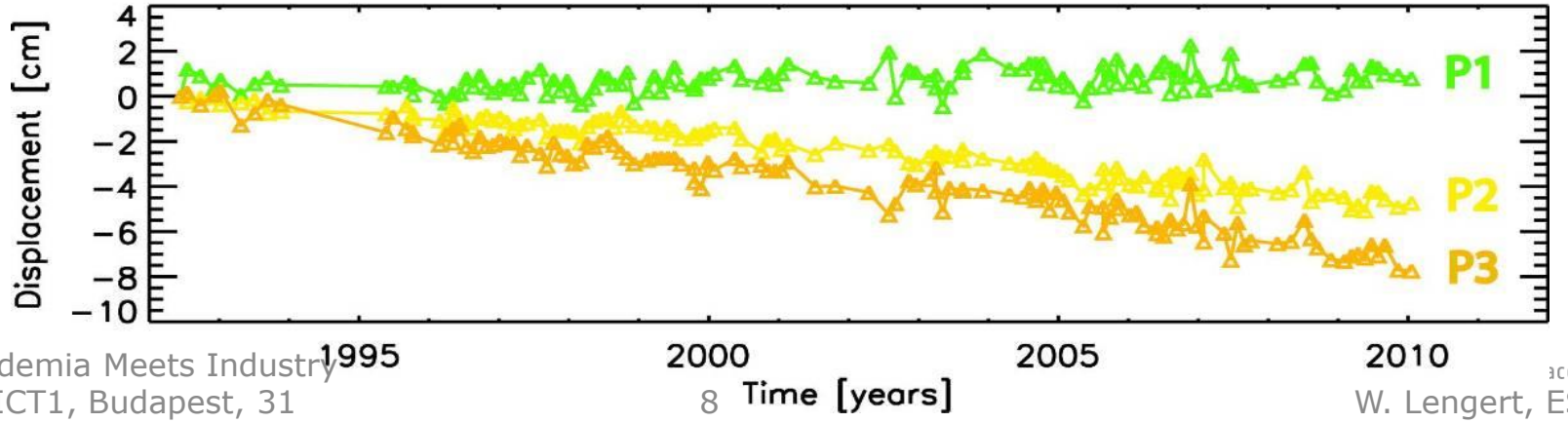
SBAS-InSAR results



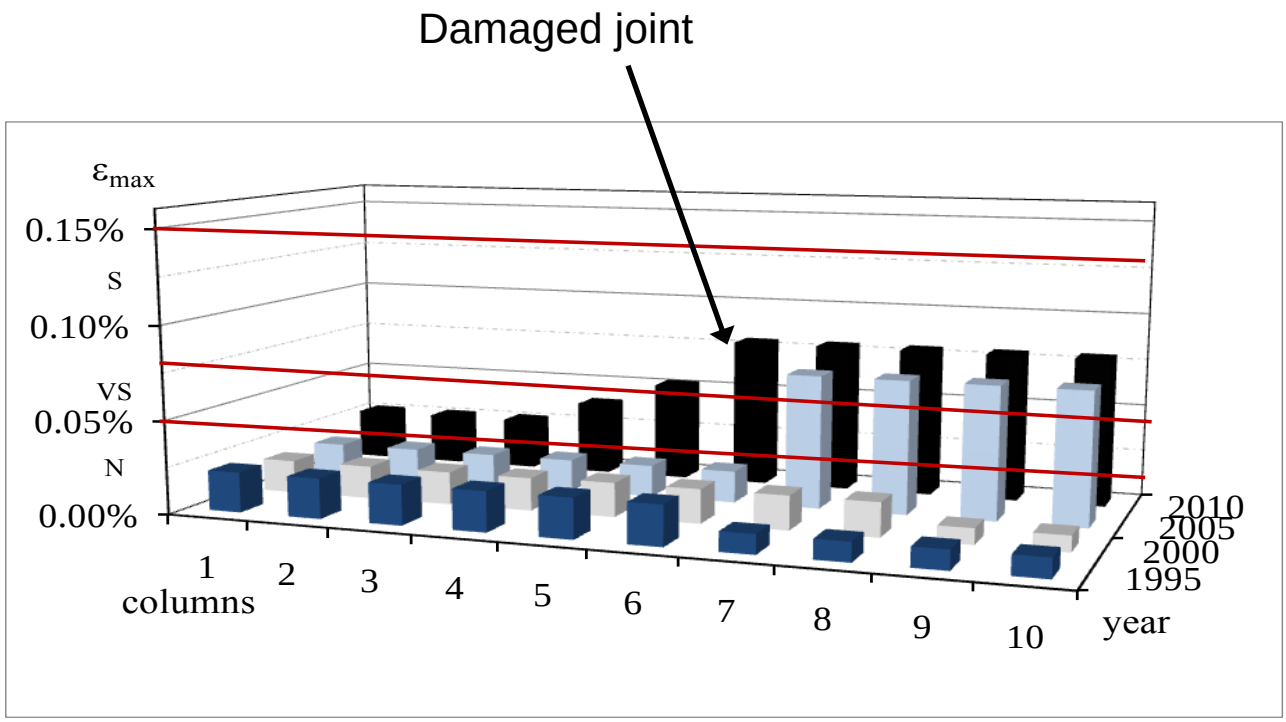
SAPIENZA UNIVERSITÀ DI ROMA

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





Rome: large scale damage assessment of buildings



Information Store
INFOaaS
x Service 1
o Service 2
o Service 3

Service 1 is: 3vGeomatics Displacement Map

3VGEOMATICS DISPLACEMENT MAP

- 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: ☆☆☆☆☆
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Earliest starting date is in 7 days.

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[ ] Automatic renewal

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4500 €

ADD TO CART

Value Chain 2

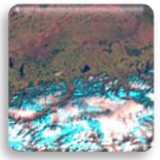
T-System
with IPR from VISTA (SME)

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

InputDataPortal
OPTICAL
Satellite Data



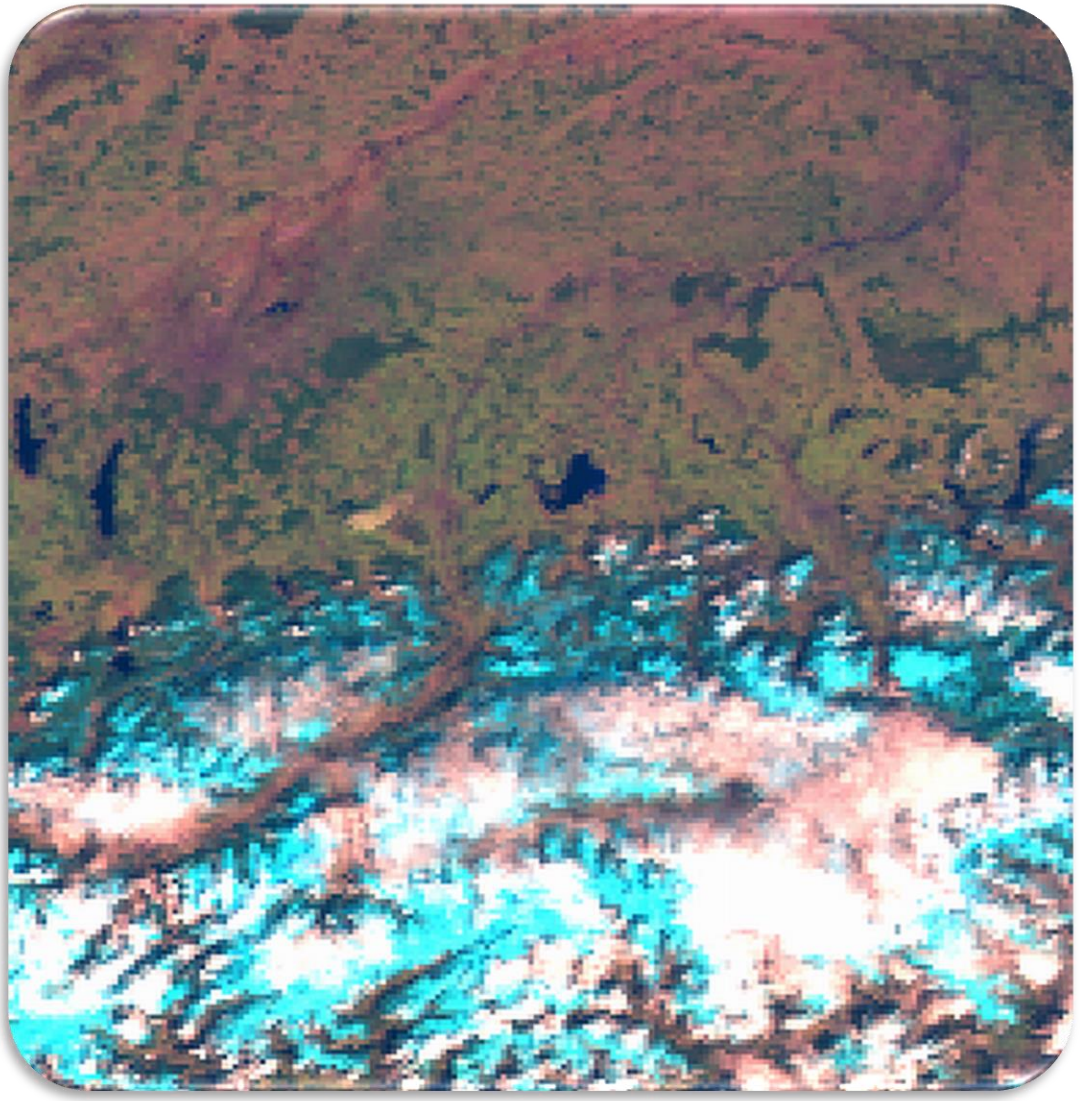
InputDataPortal
SAR
Satellite Data

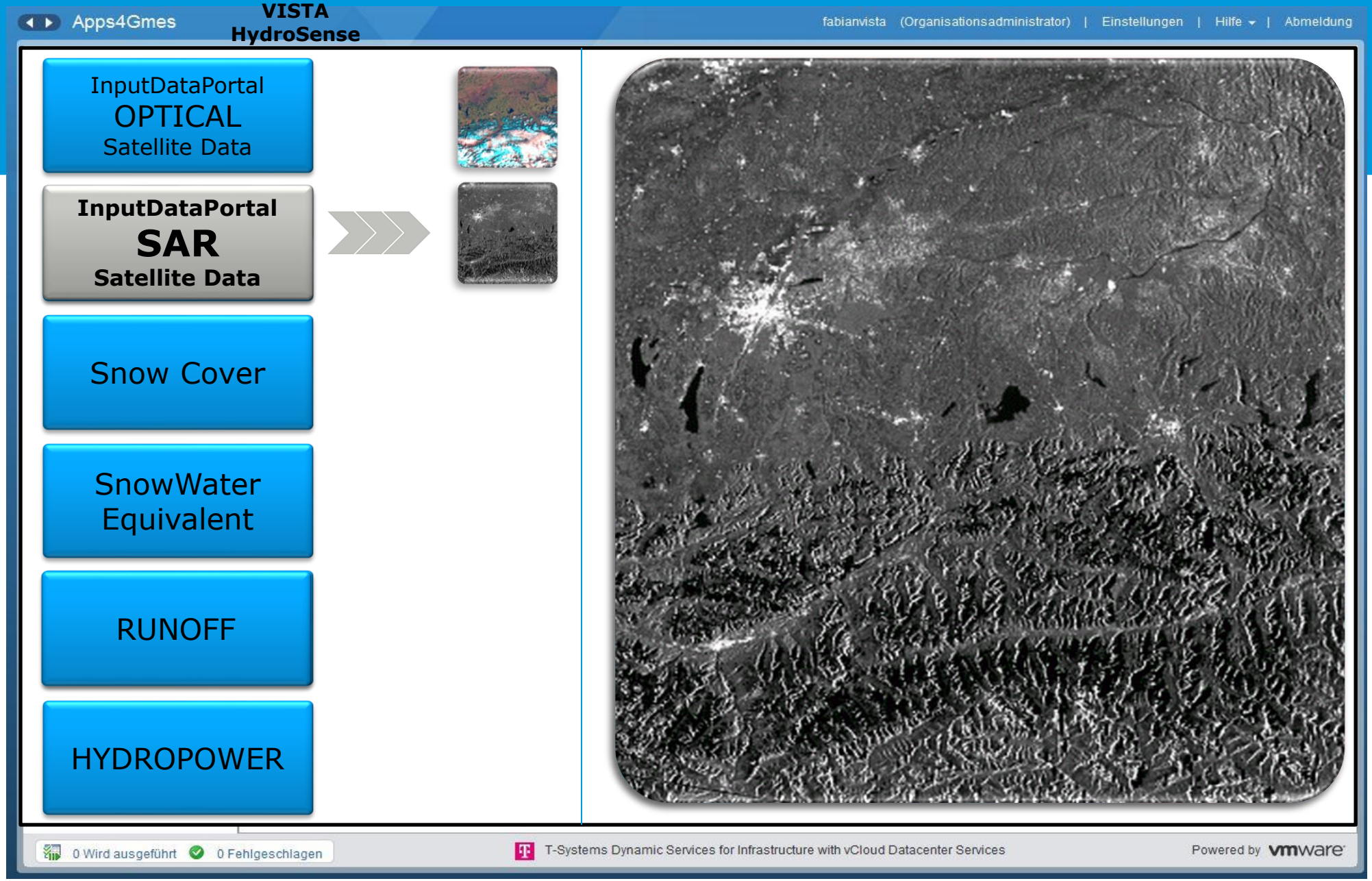
Snow Cover

SnowWater Equivalent

RUNOFF

HYDROPOWER




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
Powered by vmware

Apps4Gmes
VISTA HydroSense
fabianvista (Organisationsadministrator) | Einstellungen | Hilfe | Abmeldung
InputDataPortal OPTICAL Satellite Data
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SnowCover
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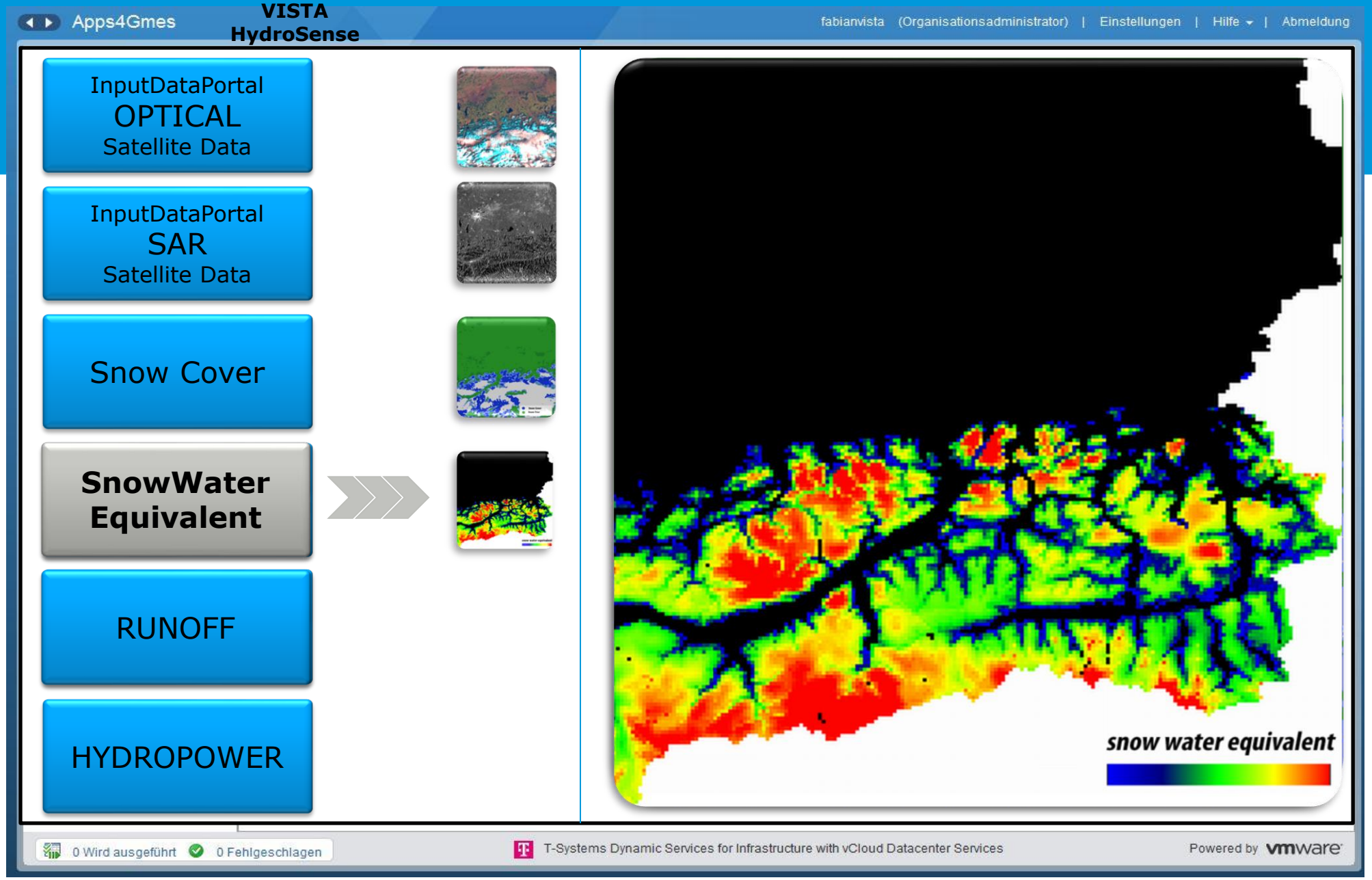
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fabianvista (Organisationsadministrator) | Einstellungen | Hilfe | Abmeldung
InputDataPortal OPTICAL Satellite Data
InputDataPortal SAR Satellite Data
Snow Cover
SnowWater Equivalent
RUNOFF
HYDROPOWER
snow water equivalent
0 Wird ausgeführt
0 Fehlgeschlagen
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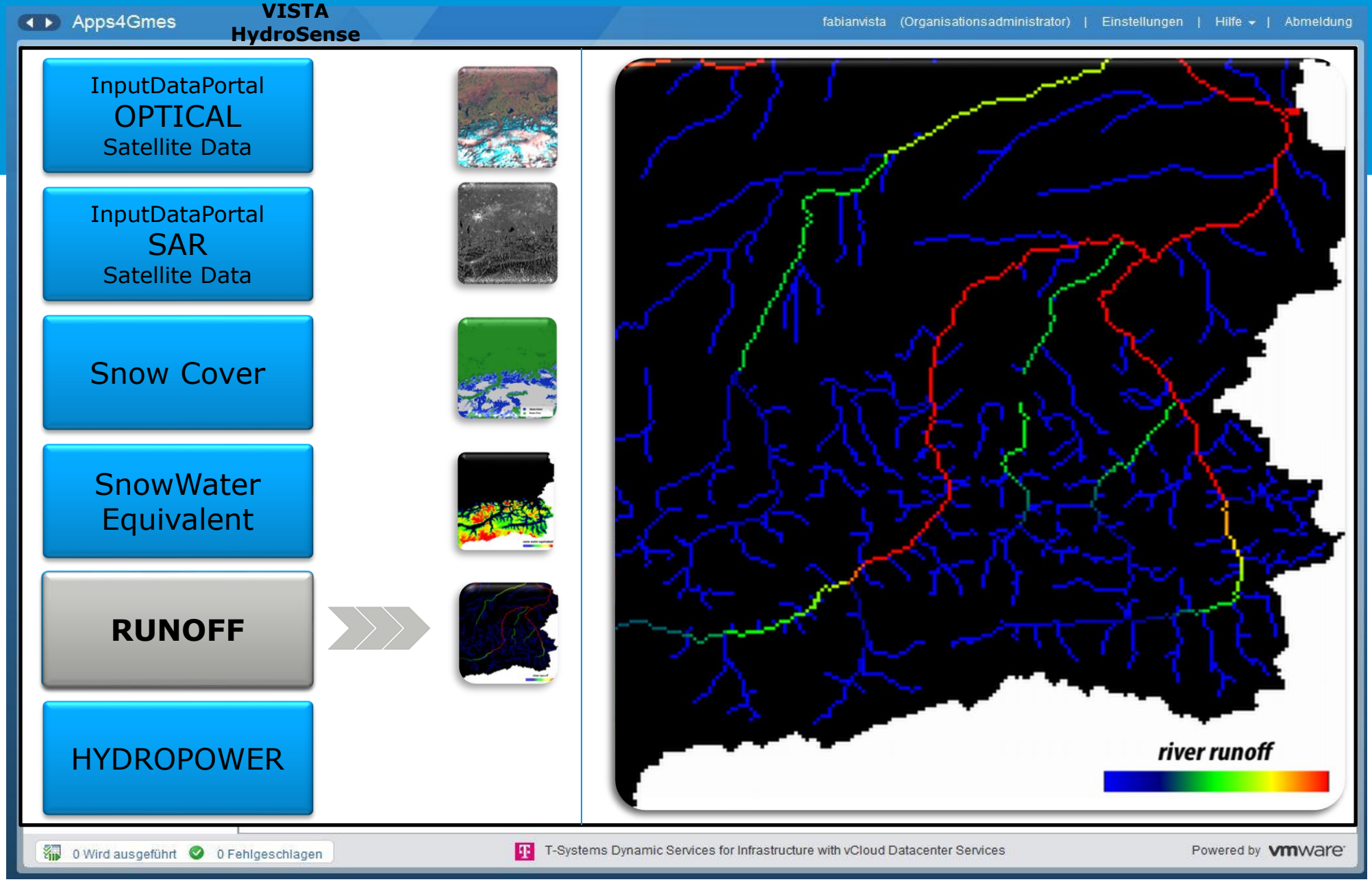
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fabianvista (Organisationsadministrator) | Einstellungen | Hilfe | Abmeldung
InputDataPortal OPTICAL Satellite Data
InputDataPortal SAR Satellite Data
Snow Cover
SnowWater Equivalent
RUNOFF
HYDROPOWER
river runoff
0 Wird ausgeführt
0 Fehlgeschlagen
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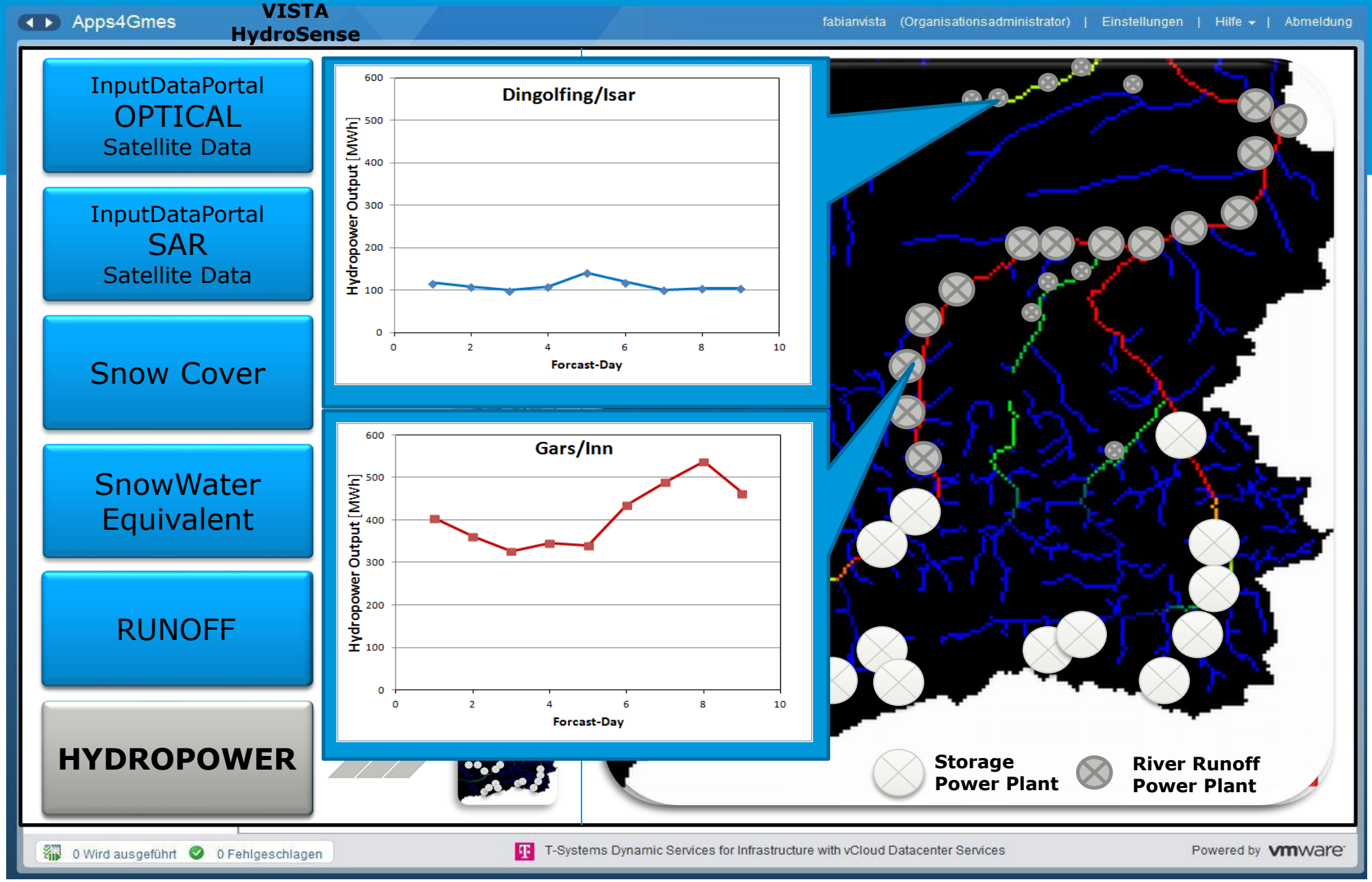
Apps4Gmes
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InputDataPortal OPTICAL Satellite Data
InputDataPortal SAR Satellite Data
Snow Cover
SnowWater Equivalent
RUNOFF
HYDROPOWER
Dingolfing/Isar
Hydropower Output [MWh]
Forcast-Day
Gars/Inn
Hydropower Output [MWh]
Forcast-Day
Storage Power Plant
River Runoff Power Plant
0 Wird ausgeführt
0 Fehlgeschlagen
T-Systems Dynamic Services for Infrastructure with vCloud Datacenter Services
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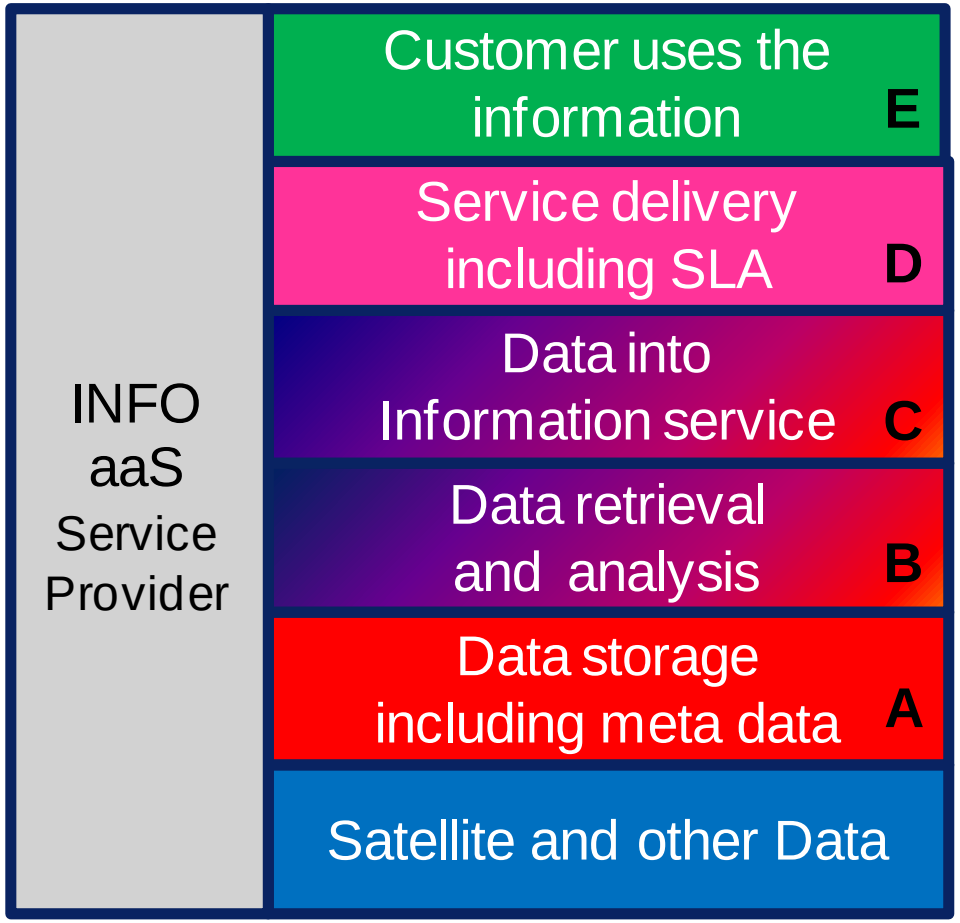
InfoaaS Overall Model



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)

Conclusion

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.