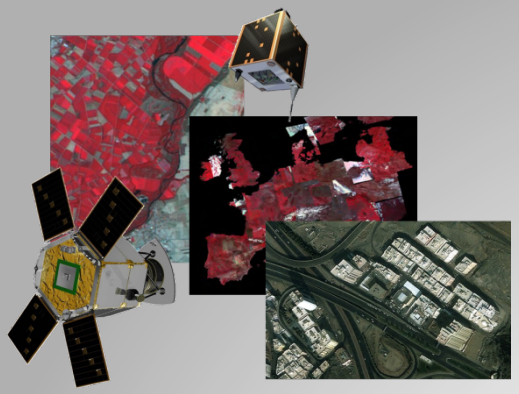


FED4FIRE

elecnor deimos

Validation of an experimental on-demand cloud infrastructure for Earth Observation Web Services

J. Becedas, R. Pérez, G. González, F. Pedrera, M. J. Latorre

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 318389

Félix Pedrera, Manuel José Latorre

FOSS4G-Europe July 17th 2014

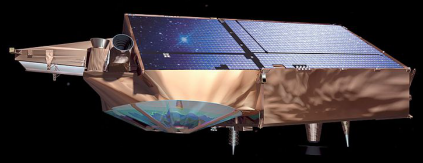
FOSS4G EUROPE BREMEN2014


MARKETS
AEROSPACE
AERONAUTICS
DEFENSE
ENERGY
ENVIRONMENT
TRANSPORT
BUILDING & INDUSTRY
SECURITY
TELECOMUNICATIONS
elecnor
deimos
Staff: 500
Offices: Spain, Portugal, UK, Rumania.
Sales (2013): 48 M€ (77% International)

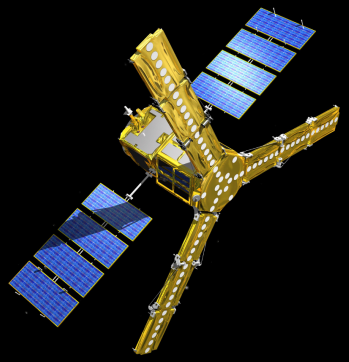
Aerospace Software

- Ground segment
- Flight segment
- Air and coasting navigation

Aerospace Software

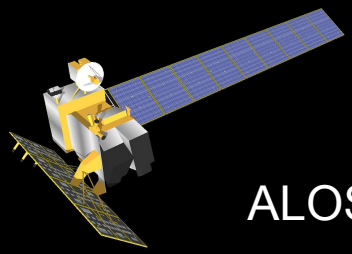


Cryosat

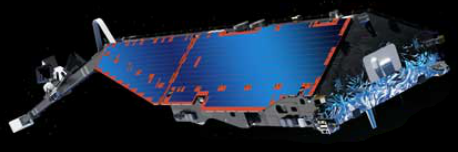


SMOS

Aeolus



ALOS



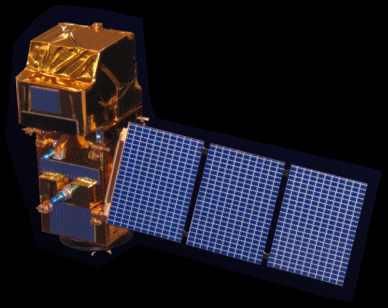
Swarm

EarthCare

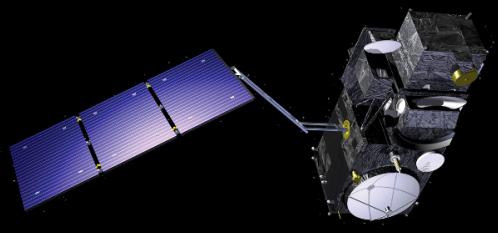
Envisat

Goce

Sentinel-1

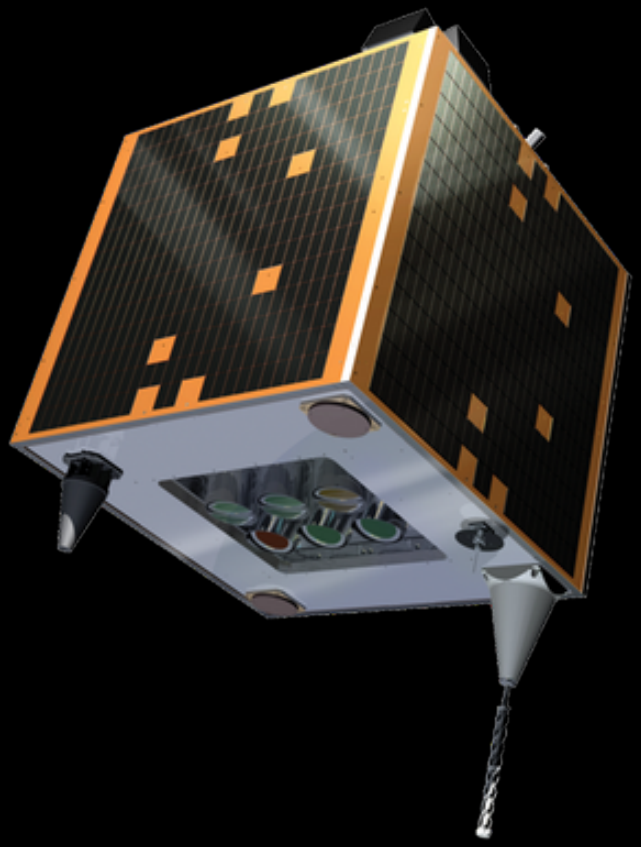


Sentinel-2



Sentinel-3

DEIMOS-1



> Launched: 29 July 2009

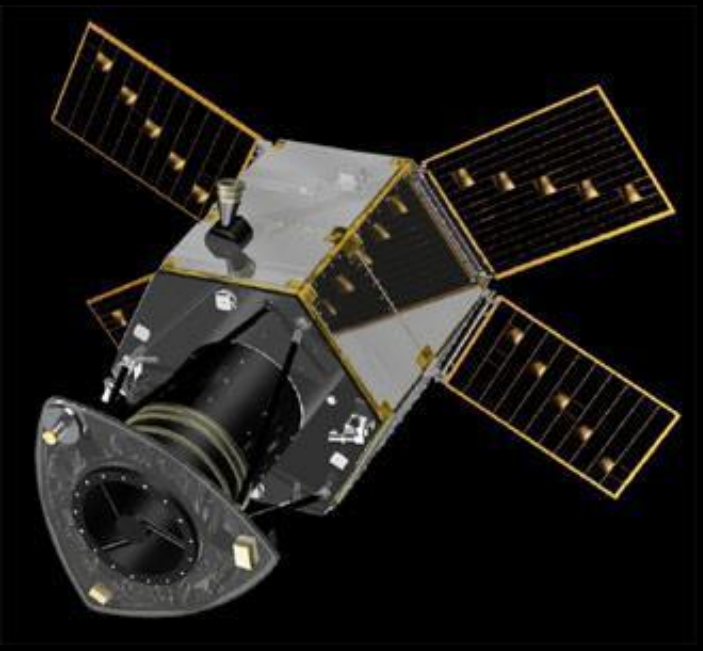
> Orbit: 663 km, Sun-synchronous near-circular.

> Mode & Resolution: Multispectral, 22 m (GSD).

> Spectral bands: NIR: 0,77 – 0,90 µm, RED: 0.63 – 0.69 µm, GREEN: 0.52 – 0.60 µm.

> Swath: Up to 600 km width, 1000 km lenght.

DEIMOS-2



> Launched: 19 June 2014

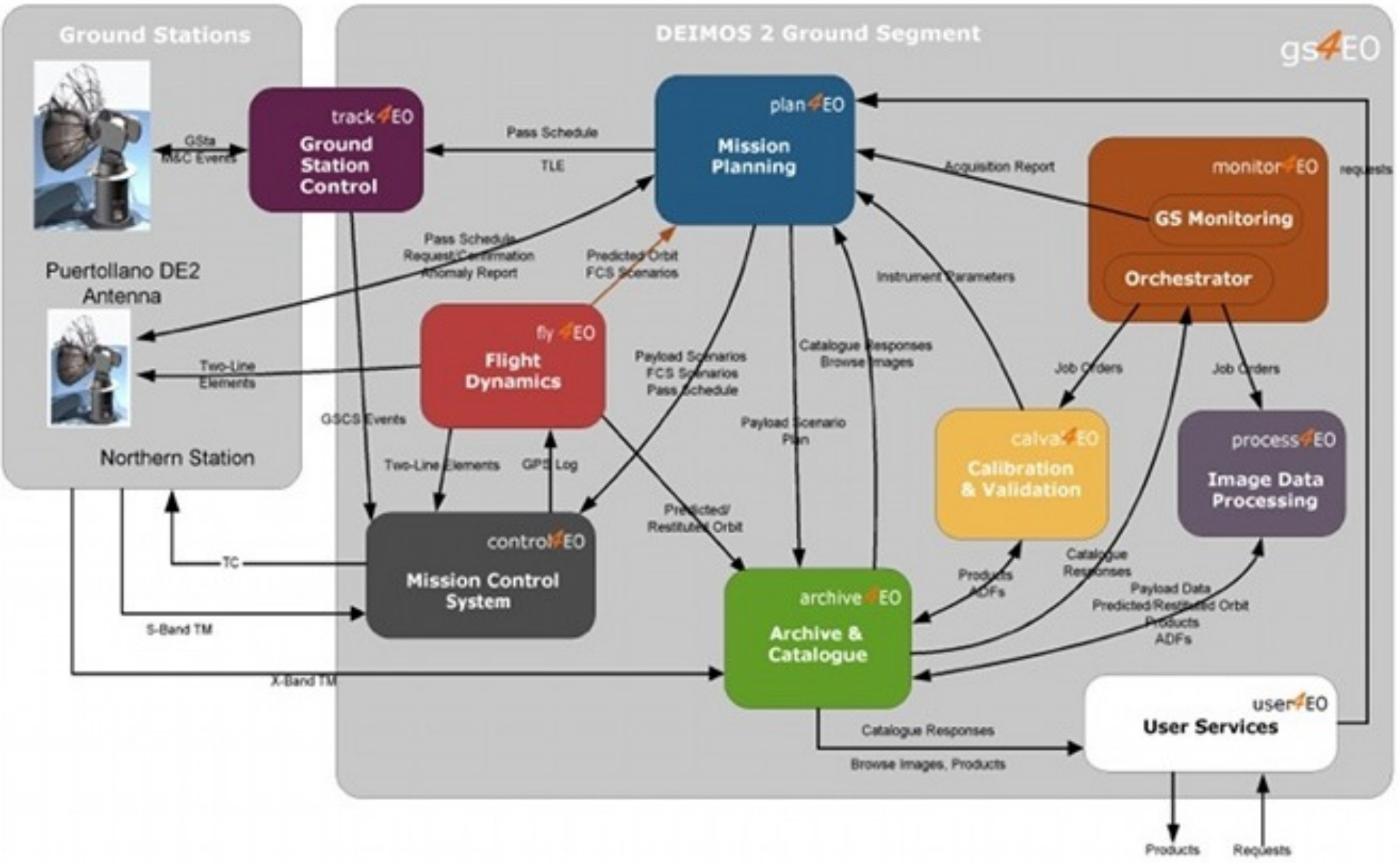
> Orbit: 620 km, Sun-synchronous near-circular.

> Mode & Resolution: Multispectral 4m, Panchromatic 1 m (GSD).

> Spectral bands: Pan: 450-900 nm, MS1: 420-510 (blue), MS2: 510-580 (green), MS3: 600-720 (red).

> Swath: Up to 12 km width.

DEIMOS-2 Ground Segment

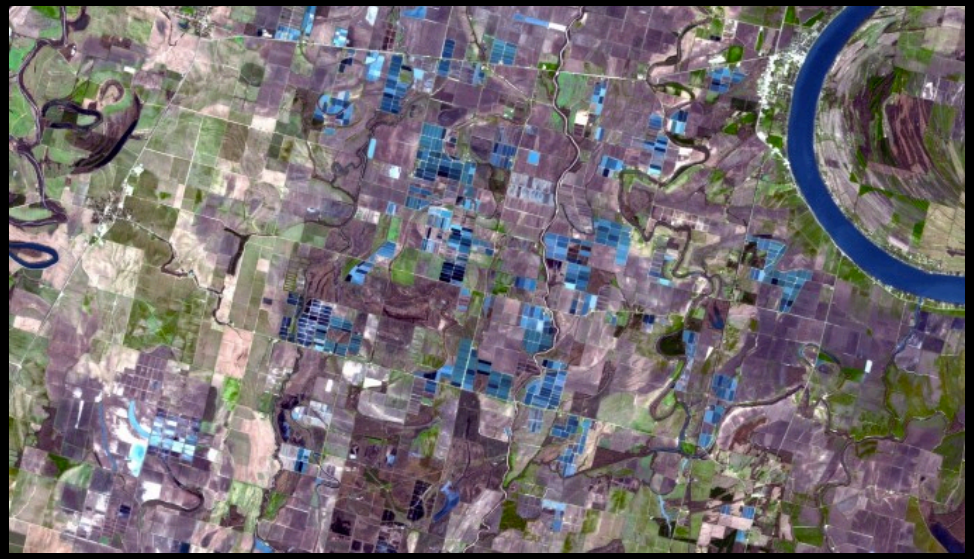


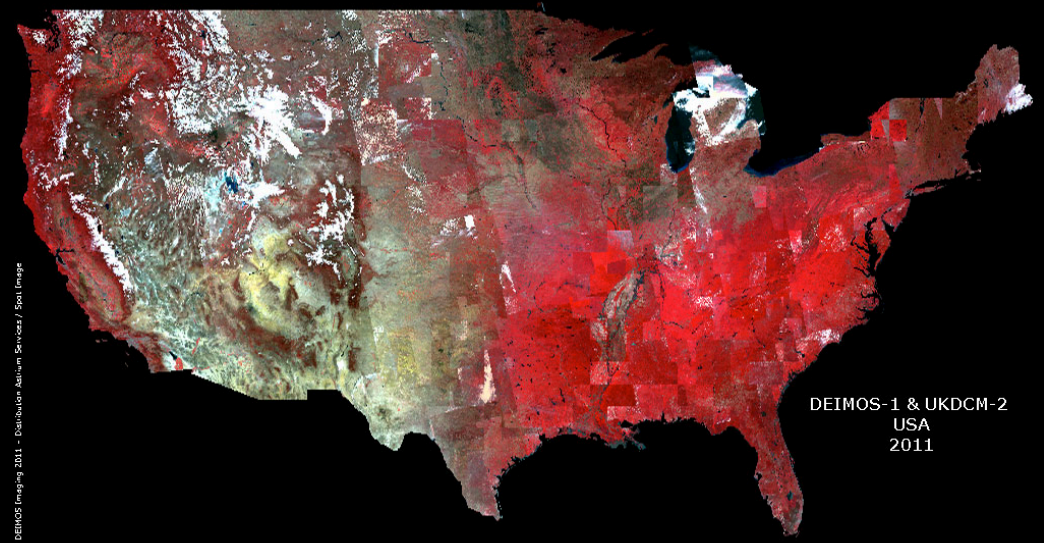
DEIMOS-1 & DEIMOS-2 Applications

Agriculture

Natural Disasters Management

Land Management

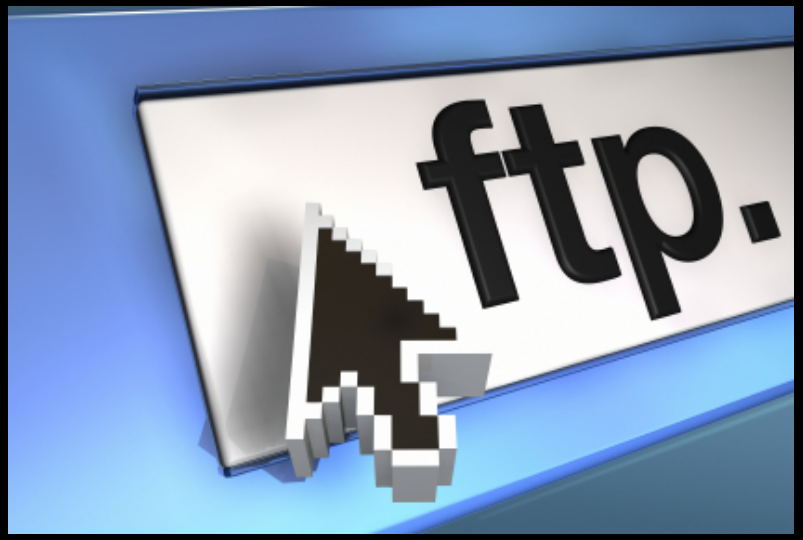




Security

...

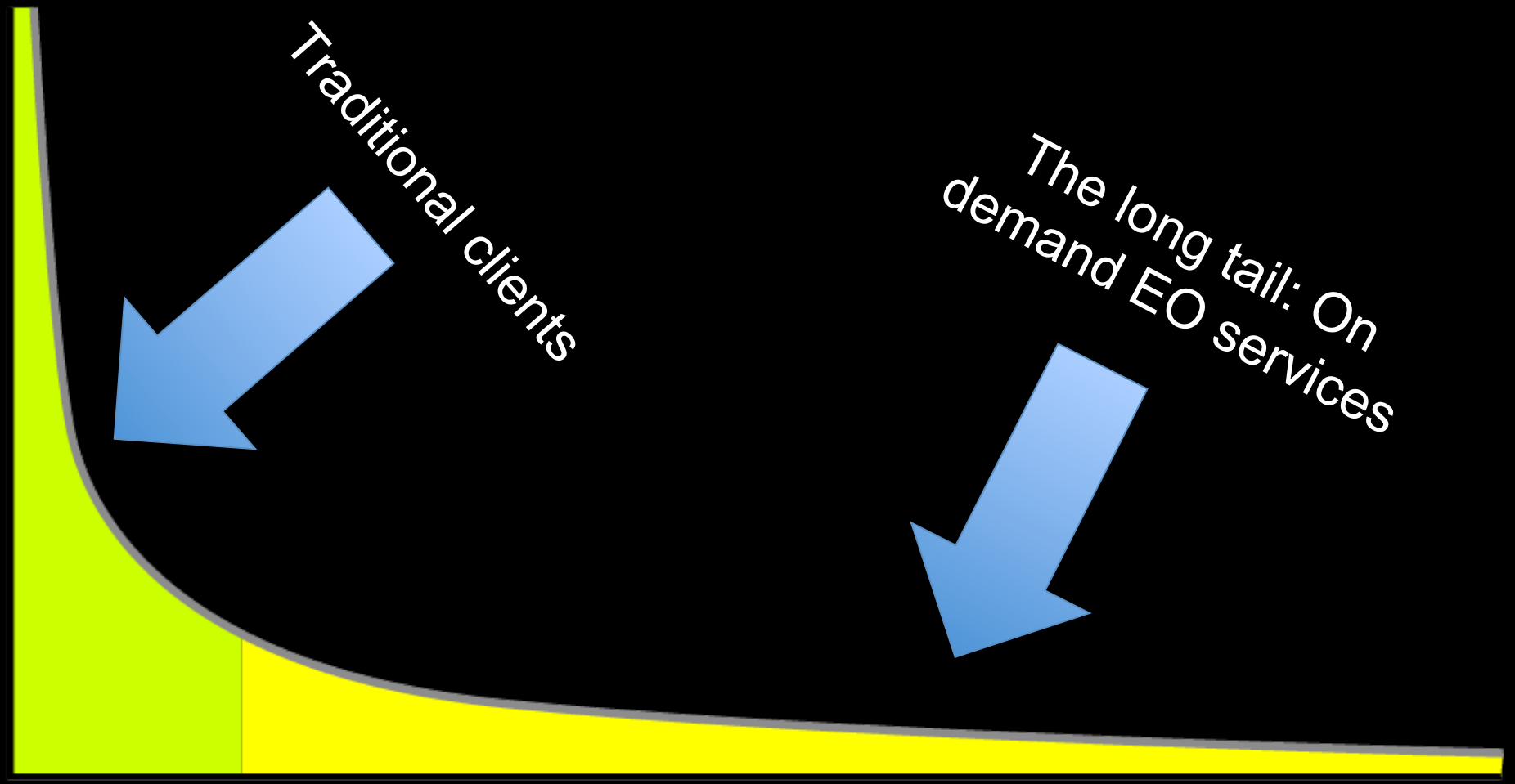
Current typical imagery distribution channels



Minimum request: 6,000 km².

Price: From 350 €.

On demand EO services



about Fed4FIRE

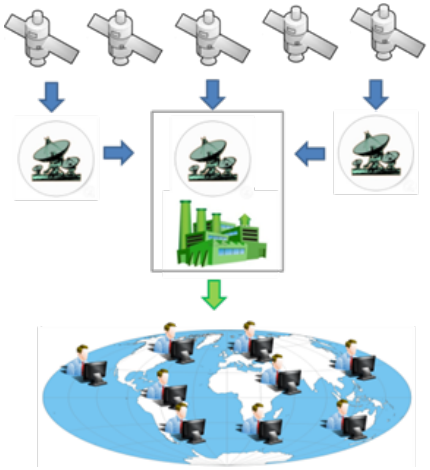
> Federation for FIRE
> IP project
> 10/2012 - 09/2016

> Project coordinated by iMinds
> Total budget: 7.75 M€

iMinds
iT innovation
UPMC SORBONNE UNIVERSITÉS
Fraunhofer FOKUS
berlin
epcc
Inria informatiques mathématiques
NICTA
Atos
University of Thessaly
National Technical University of Athens
University of BRISTOL
i2cat FUNDACIÓ
EURESCOM
DANTE
UC UNIVERSIDAD DE CANTABRIA
NIA

About the Geo-Cloud Experiment

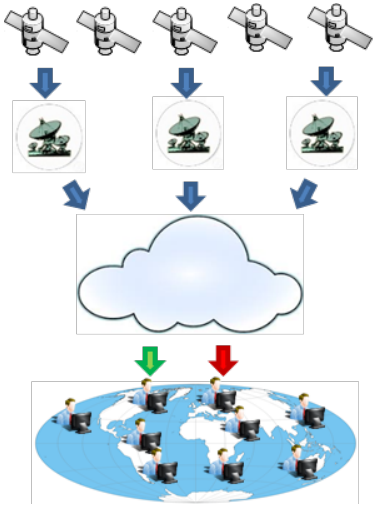
Traditional Data Centers on Premises



Earth Observation Big Data

- ✓ *Difficult to Process*
- ✓ *Difficult to Store*
- ✓ *Difficult to Distribute*
- ✓ *Not Flexible*
- ✓ *Applications Limited*
- ✓ *Expensive*
- ✓ *Completely Controlable*

Complete EO System in Cloud

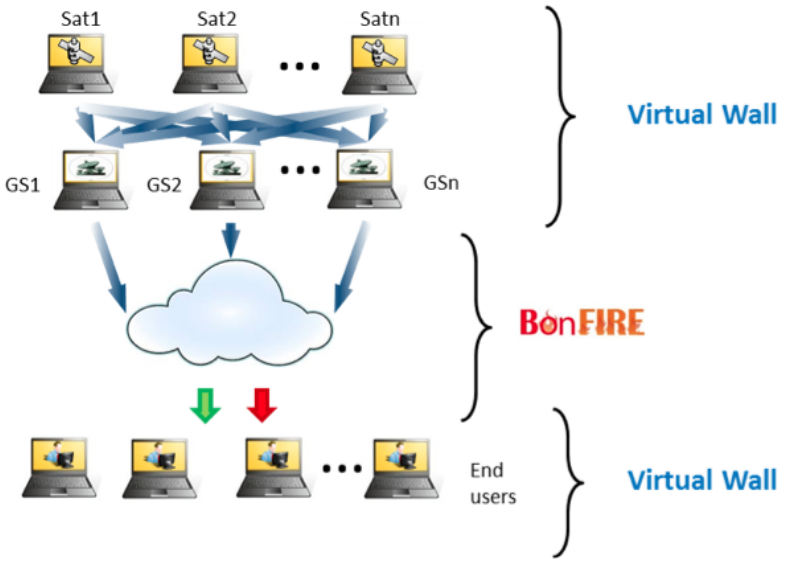


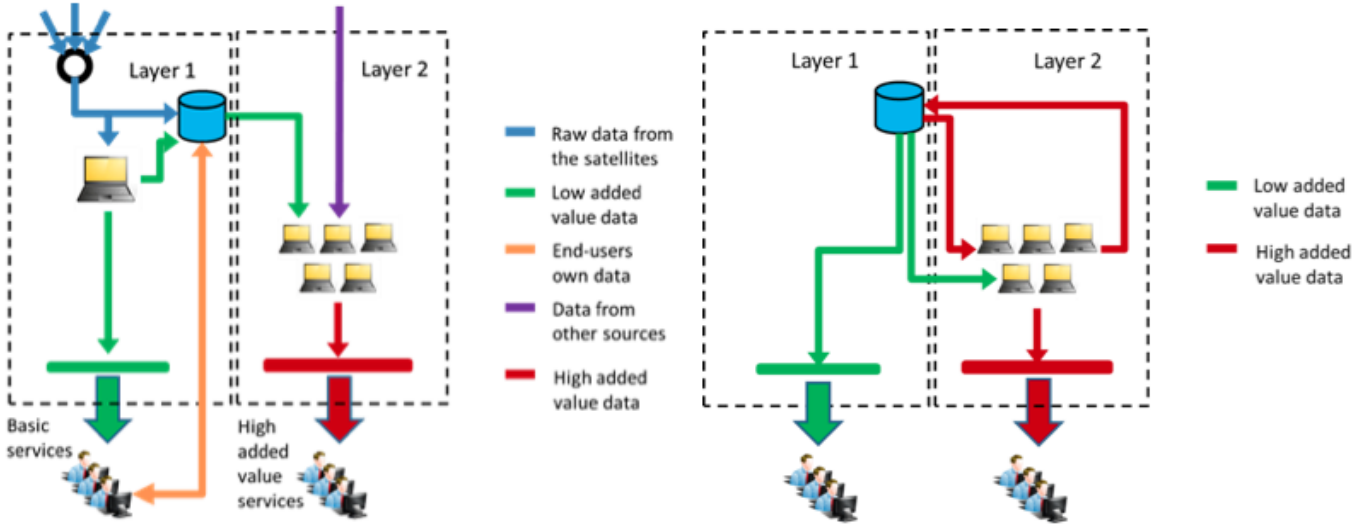
Earth Observation Big Data

- ✓ *Flexible*
- ✓ *Scalable*
- ✓ *On Demand*
- ✓ *Globally Accesible*
- ✓ *Data Fusion*
- ✓ *New Applications*
- ✓ *High Added Value*

Viable Solution?

About the Geo-Cloud Experiment

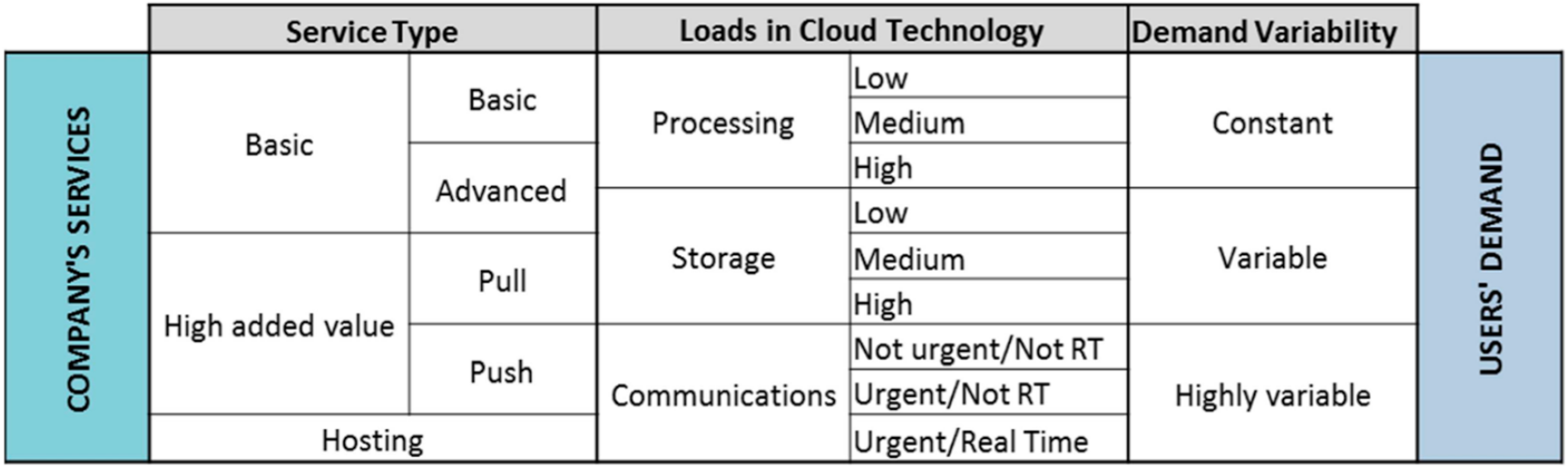




about BonFIRE

- Multiple client tools
- Infrastructure sites & resources
- On-request compute resources
- VM and instance types
- Storage
- Networking
- Monitoring
- Elasticity
- Notifications
- Contextualisation
- Advanced features

Services & Scenarios



COMPANY'S SERVICES	Service Type		Loads in Cloud Technology		Demand Variability	USERS' DEMAND
	Basic	Basic	Processing	Low	Constant	
				Medium		
		Advanced		High		
			Storage	Low	Variable	
	High added value	Pull		Medium		
				High		
		Push	Communications	Not urgent/Not RT	Highly variable	
	Hosting			Urgent/Not RT		
				Urgent/Real Time		

> Emergencies: Lorca Earthquake

> Infrastructure monitoring: affection in railway infrastructures by sand movement in desert areas

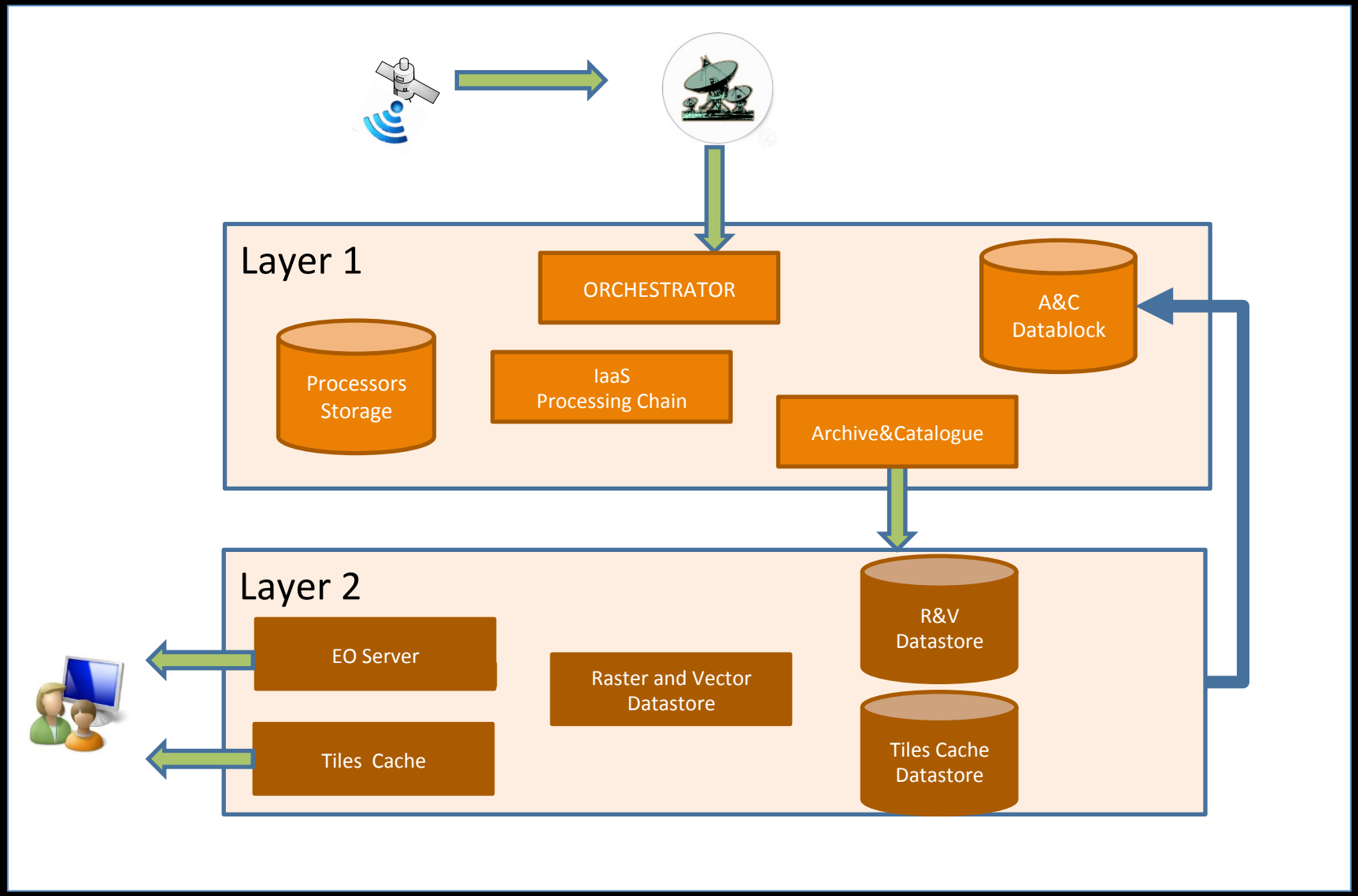
> Land Management: South West of England

> Precision Agriculture: Argentina

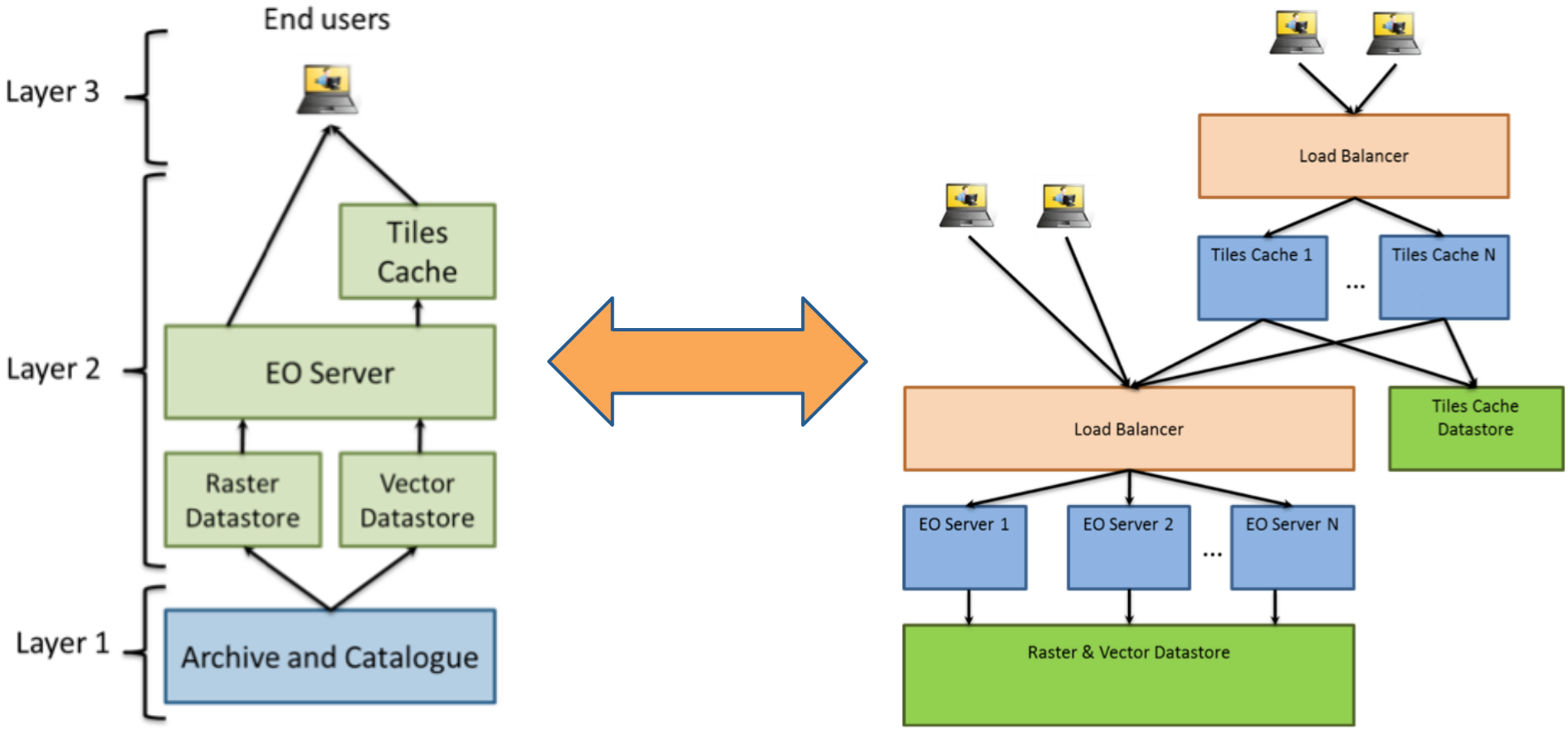
> Basemaps: Worldwide

> Online Catalogue: Worldwide

Imagery Distribution & Visualization (IDV)



Imagery Distribution & Visualization (IDV)



Imagery Distribution & Visualization SW

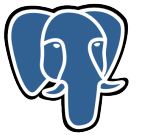
EO Server

Marlin Vector Rasterizer

Java Advanced Image API

Tiles Cache

Vector Datastore



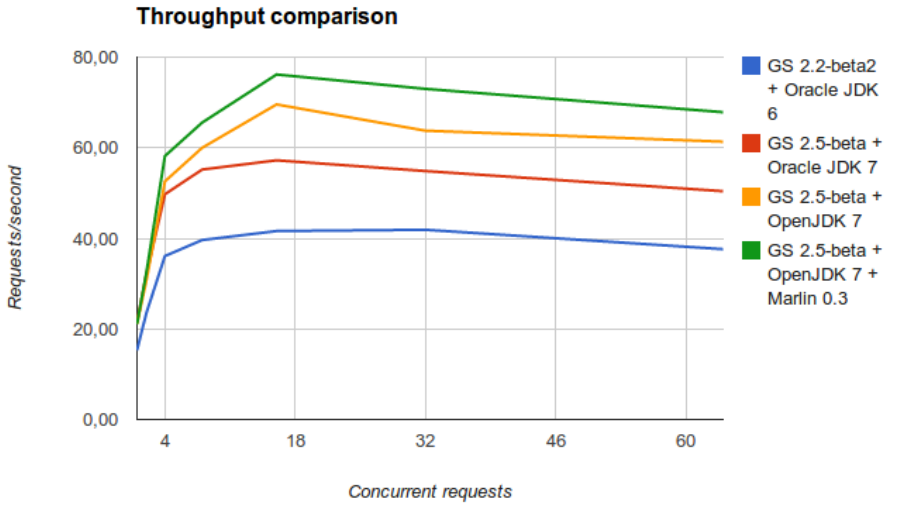
PostgreSQL

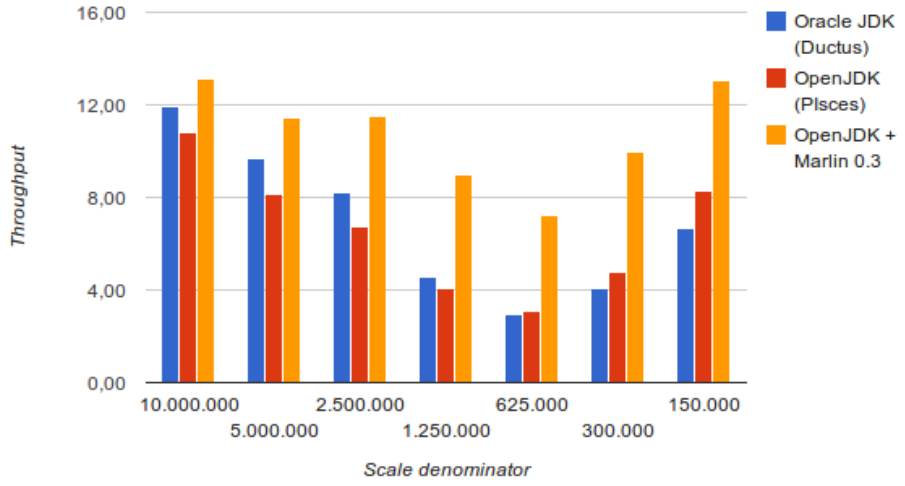
Others

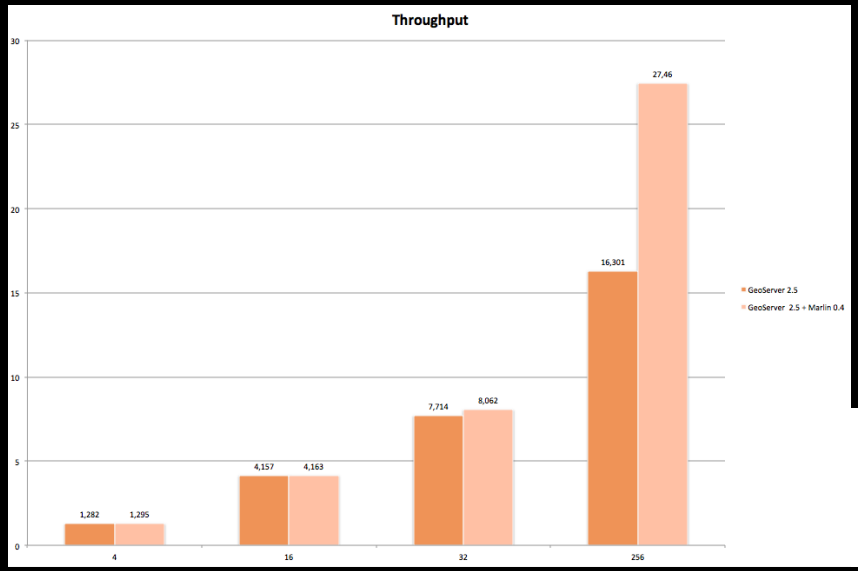
GDAL - Geospatial Data Abstraction Library

Marlin Vector Rasterizer

GeoSolutions
your one-stop-shop for geospatial open source software







BonFIRE

Actual IDV Implementation

- EaaS BonFIRE feature still not available 
- IDV Components connection 
- Automatic layers publishing 

Next Steps

> Add EaaS feature to the IDV.

> Run benchmarks for the different defined scenarios

> Test other stacks: Mapserver, MapCache, MapProxy, etc…

Challenges

> A viable solution for conventional EO systems?

> Check if Fed4FIRE is appropriate for this experiment

Acknoledgments

> This work was carried out with the support of the Fed4FIRE-project (“Federation for FIRE"), an Integrated project receiving funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement no 318389

Thanks!

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