GeoLabs

ZOO-Project : bloc de base de traitement de la plateforme EOEPCA

Rencontre Plateformes & Innovations #5

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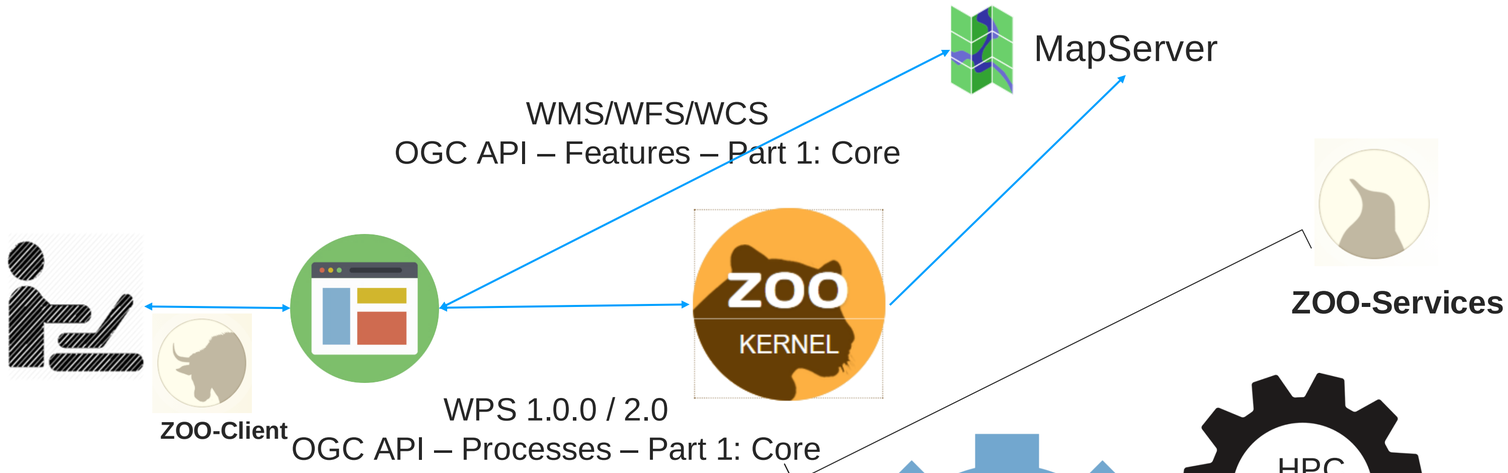
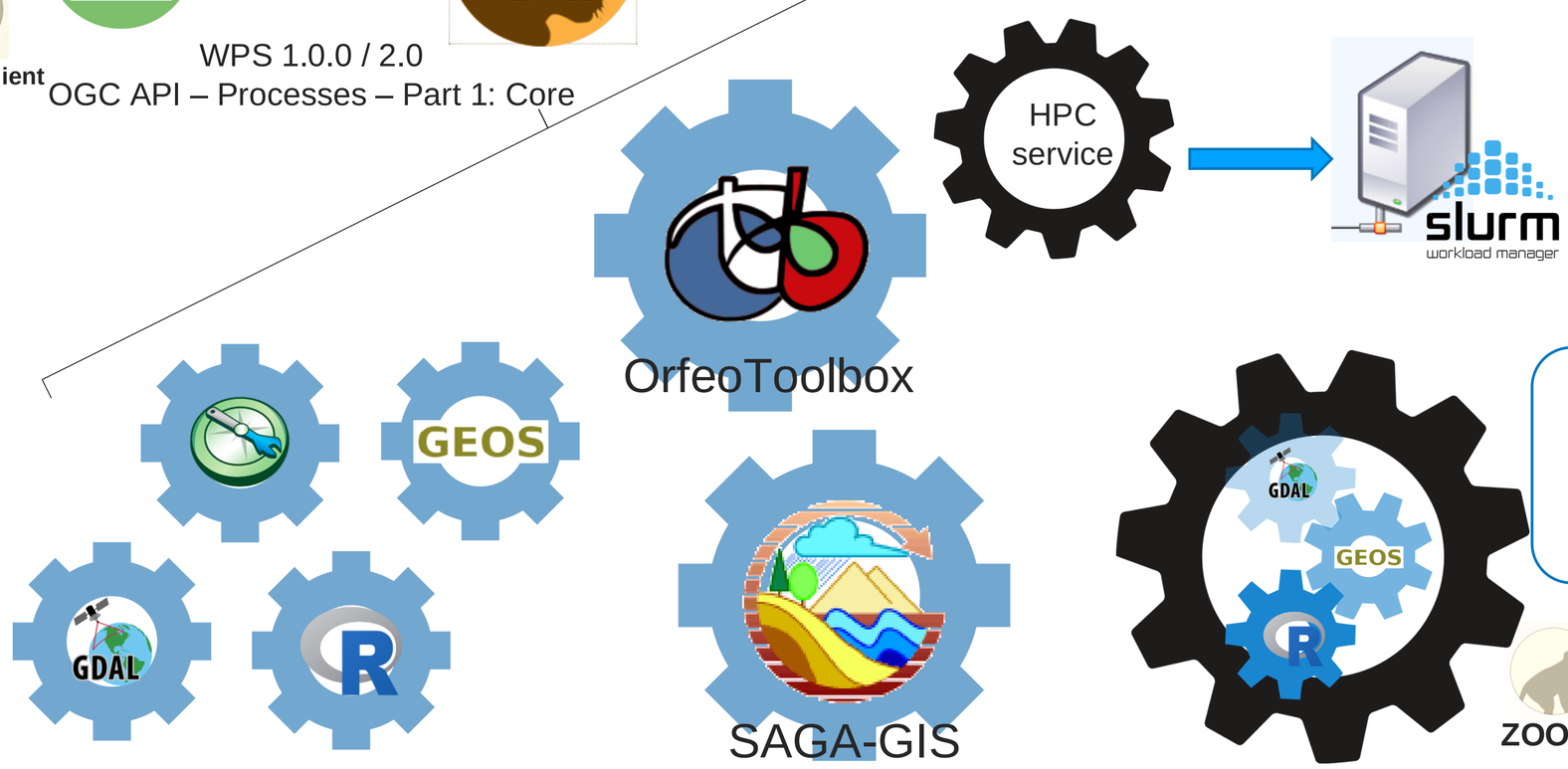
ZOO-Project vue d'ensemble





ZOO-Project

http://www.zoo-project.org OSGeo Incubation

Implémentation Seveur Open Source (MIT/X11) des standards :

- OGC WPS (1.0.0, 2.0.0) standards
- OGC API – Processes – Part 1: Core

ZOO-Kernel

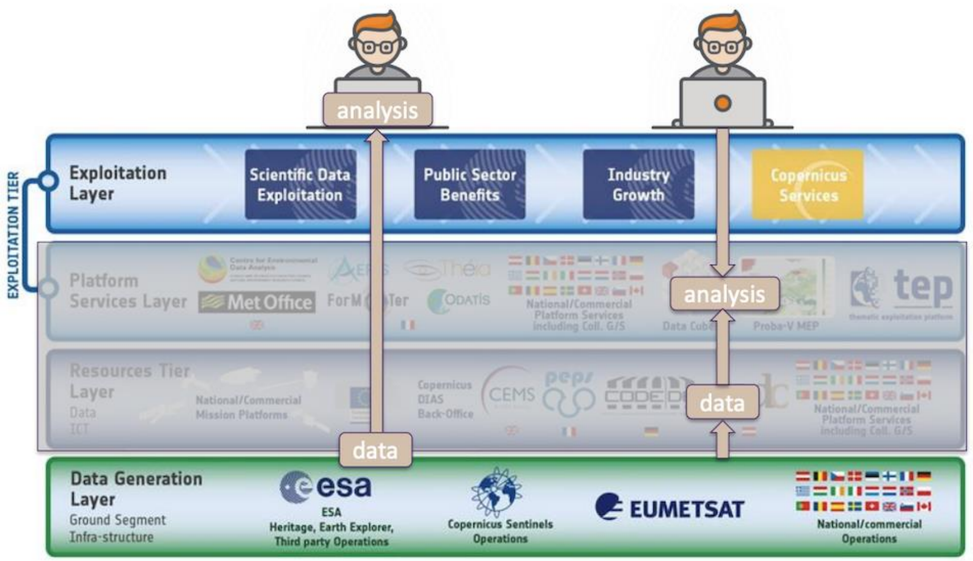
- ZOO-Kernel supporte les standards suivants de l'OGC :
  - Web Processing Service 1.0.0
  - Web Processing Service 2.0.0 

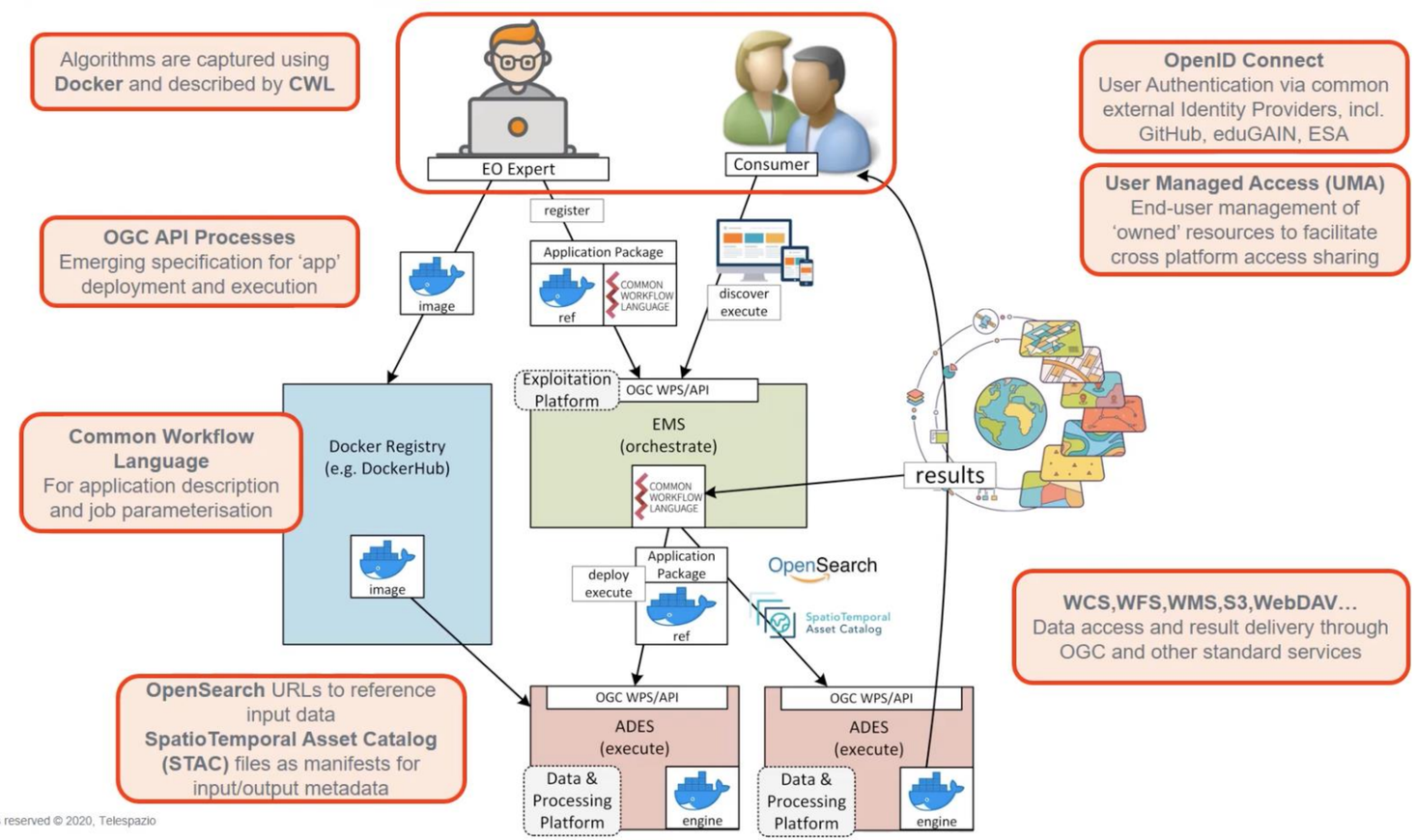
  - OGC API - Processes - Part 1: Core 

  - OGC API – Processes – Part 2: Deploy, Replace, Undeploy

- ZOO-Kernel supporte le chargement dynamique de services écrits en : C/C++, Fortran, Java, PHP, Perl, Ruby, Python, C#, JavaScript et R. NodeJS disponible depuis GSoC 2022.
- ZOO-Kernel est capable d'interagir directement avec des applications telles que OTB et SAGA-GIS, en exposant leurs applications sous forme de services WPS.

Changement de paradigme



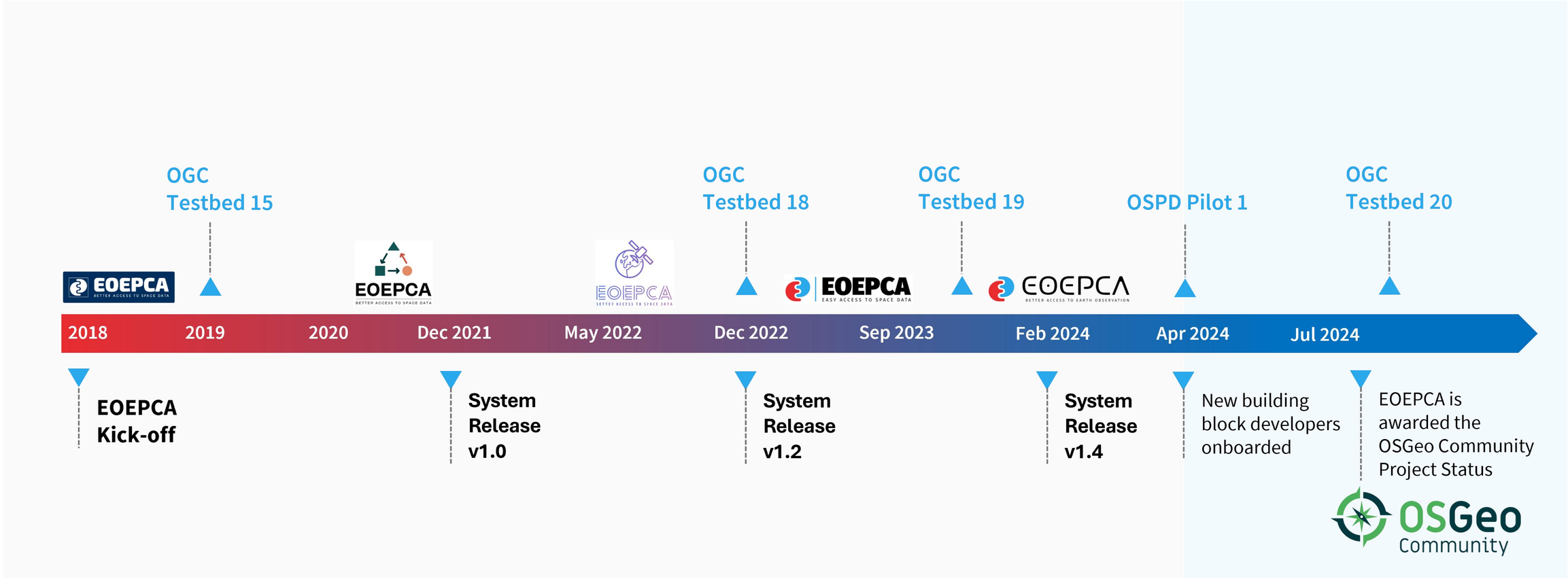


Plateforme EOEPCA financée par l'European Spatial Agency

ZOO-Kernel (ADES) supportant le déploiement d'applications où se trouvent les données (OGC API - Processes - Part 2: Deploy, Replace, Undeploy en cours de développement)

- ADES: Application Deployment and Execution Service -

Historique du projet EOEPCA



Architecture Commune

esa Project

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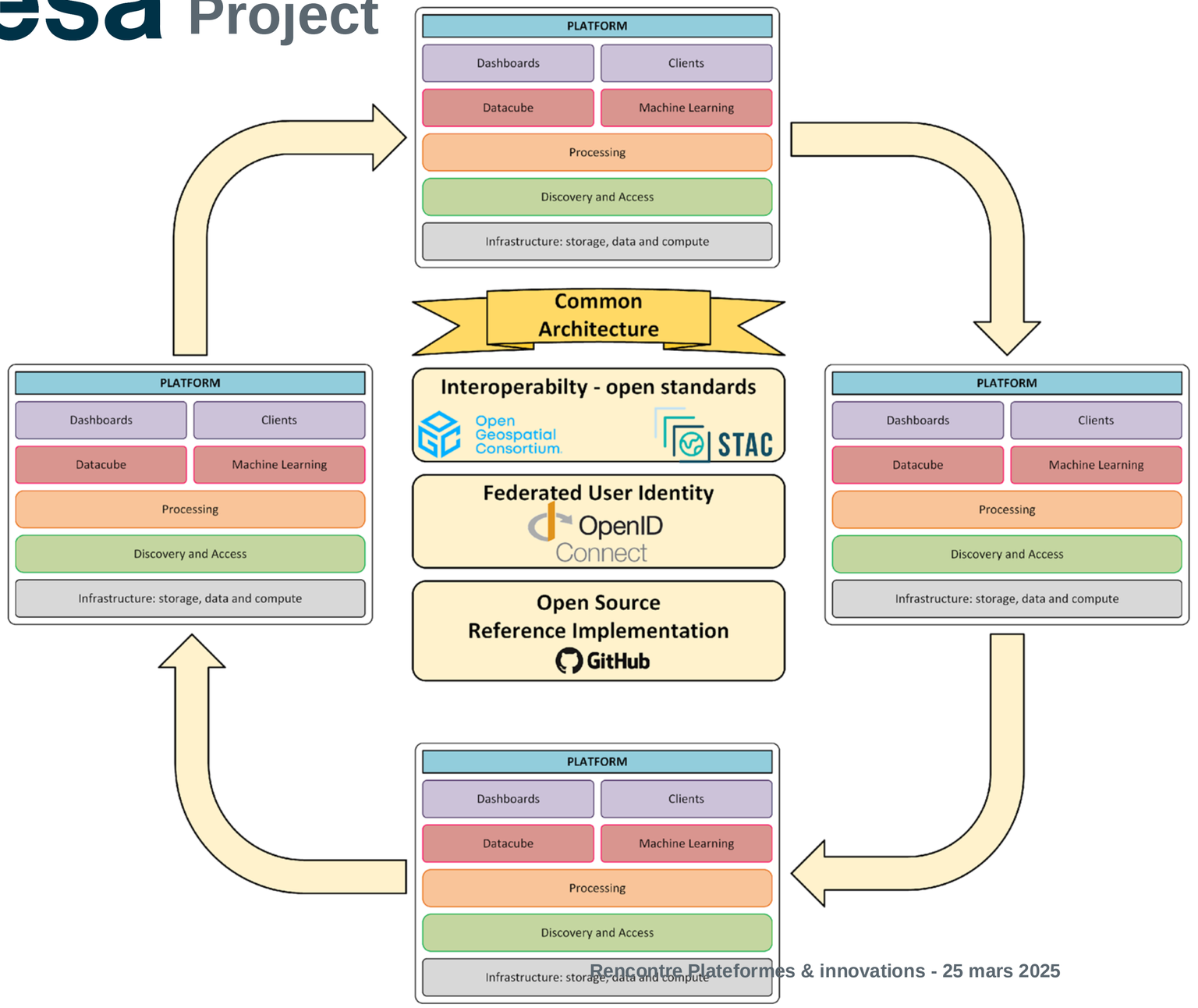
EOEPCA
EARTH OBSERVATION
EXPLOITATION PLATFORMS
COMMON ARCHITECTURE

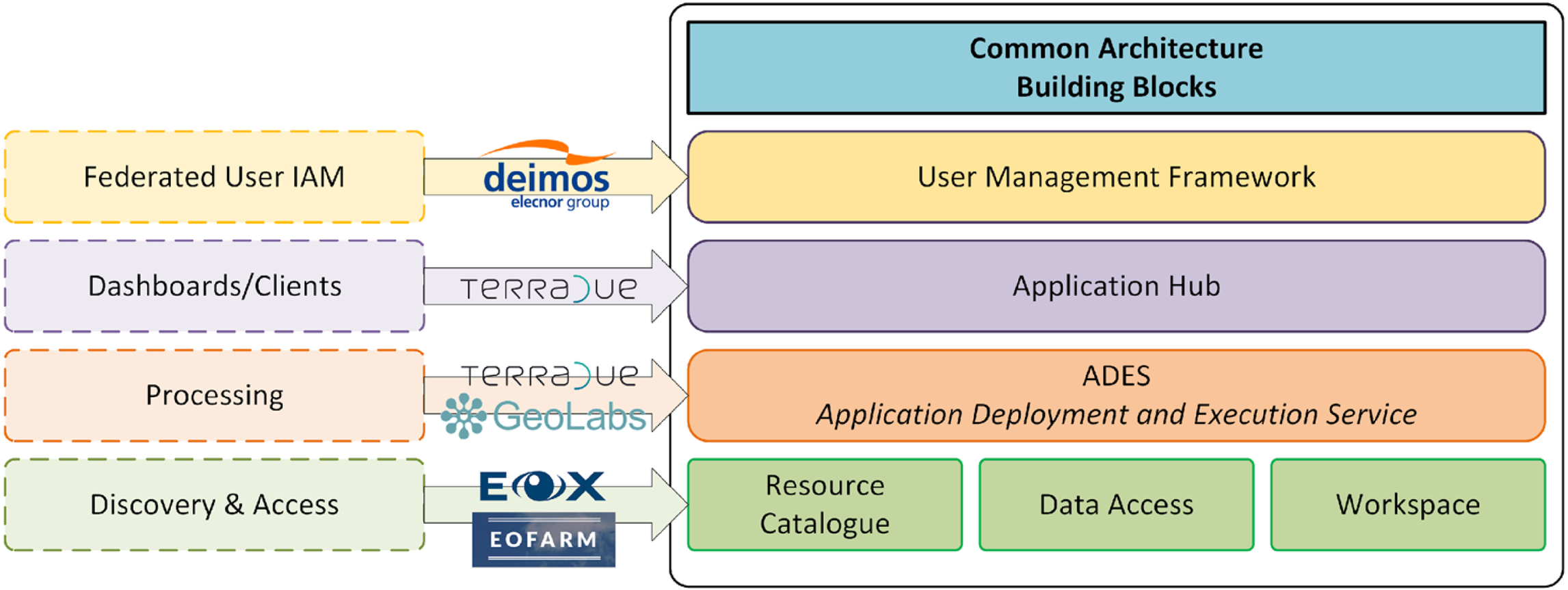
Définir et s'accorder sur une architecture de plateforme d'exploitation (PE) réutilisable en identifiant un ensemble de blocs de bases communs qui fournissent des services via des interfaces ouvertes.

Encourager la fédération des PEs via une architecture basée sur le consensus ouvert pour les PEs dans les resources du réseau

Fournir une implementation open-source de reference de l'architecture.



Approche – Blocs de base (Building Blocks)



Application Package – OGC Best Practice

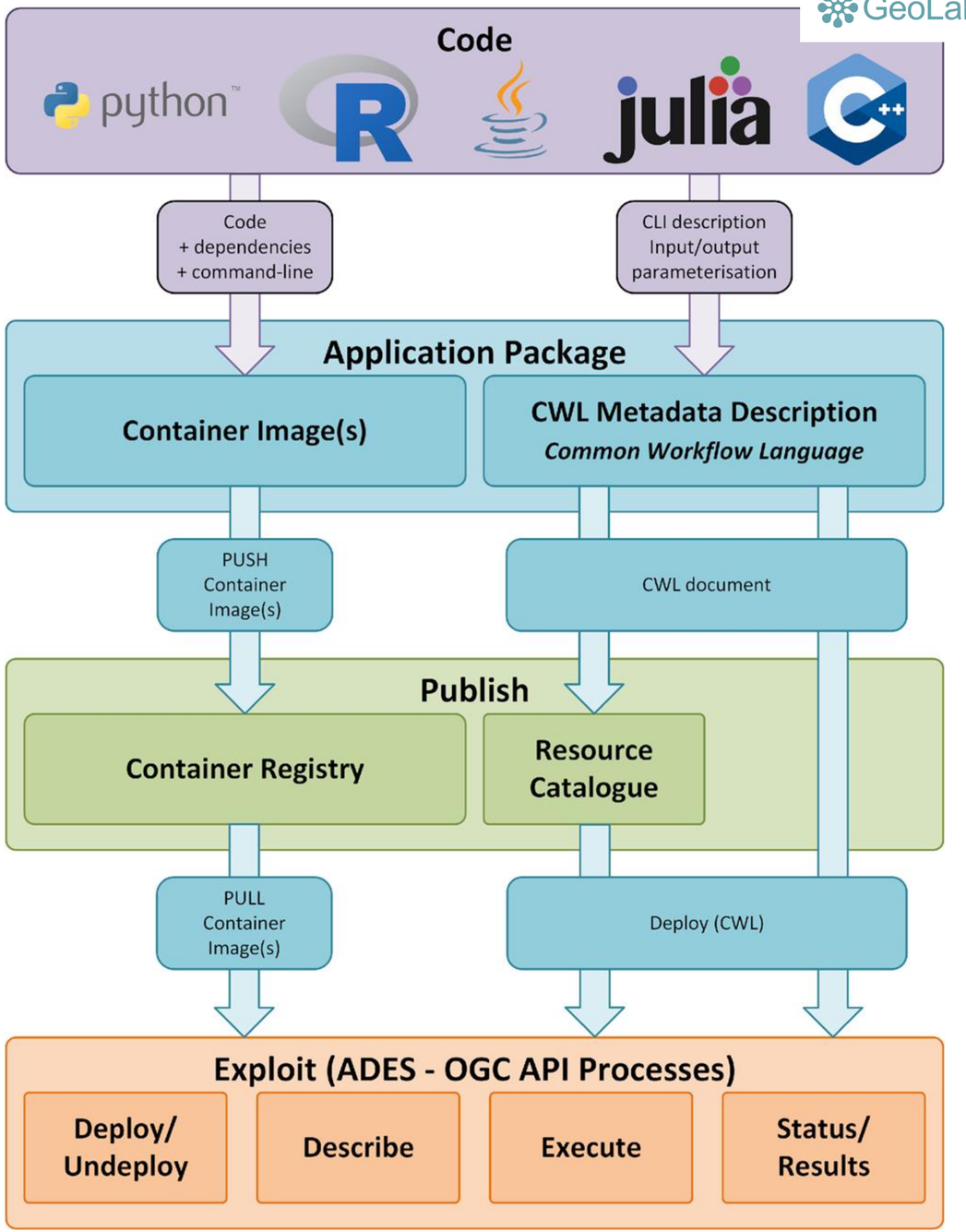
Application Package – Portable User-defined Processing
"A platform independent and self-contained representation of an Application, providing executables, metadata and dependencies such that it can be deployed to and executed within an Exploitation Platform"
…OGC Best Practise for EO Application Packages

Portable Applications
CWL (Common Workflow Language), Container Images, STAC

Container Image(s) for application 'steps'
Application code + dependencies with a command-line entry-point
Language independent and self-contained

CWL Document
Describes the steps (one or more) of the processing (workflow)
Describes input/output parameterisation
Supports various approaches to parallelise steps – Scatter Patterns
Deploy to ADES for processing (OGC API Processes)

OGC Best Practise for EO Application Packages
Provides profile of CWL for application packages
Describes use of STAC for data stage-in/out



OGC Application Package - Adoption

- adwäisEO: Luxembourg Space Agency Data Center (LSA DC)
- Eox: Euro Data Cube (EDC), Polar TEP
- NASA: ESA-NASA Joint Multi-Mission Algorithm and Analysis Platform (MAAP)
- SpaceApplications: Automated Service Builder Platform (ASB)
- Terradue: International Charter Mapper, Geohazards TEP, Urban TEP
  Copernicus LAC Platform, FLEX Data Innovation and Science Cluster
- Iliad Digital Twin of the Ocean
- IRIDE Satellite constellation digital marketplace
- UK STFC: JASMIN HPC platform
- VTT: Forestry TEP
- Wasdi: Wasdi Platform

Traitement – ADES

Execution de traitements définis par l'utilisateur

OGC API Processes (ZOO-Project)

Part 2 (DRU): Deploy, Replace, Undeploy
OGC Best Practice for Application Packages

Cycle de vie de l'application géré par l'utilisateur

STAC pour les données stage-in/out

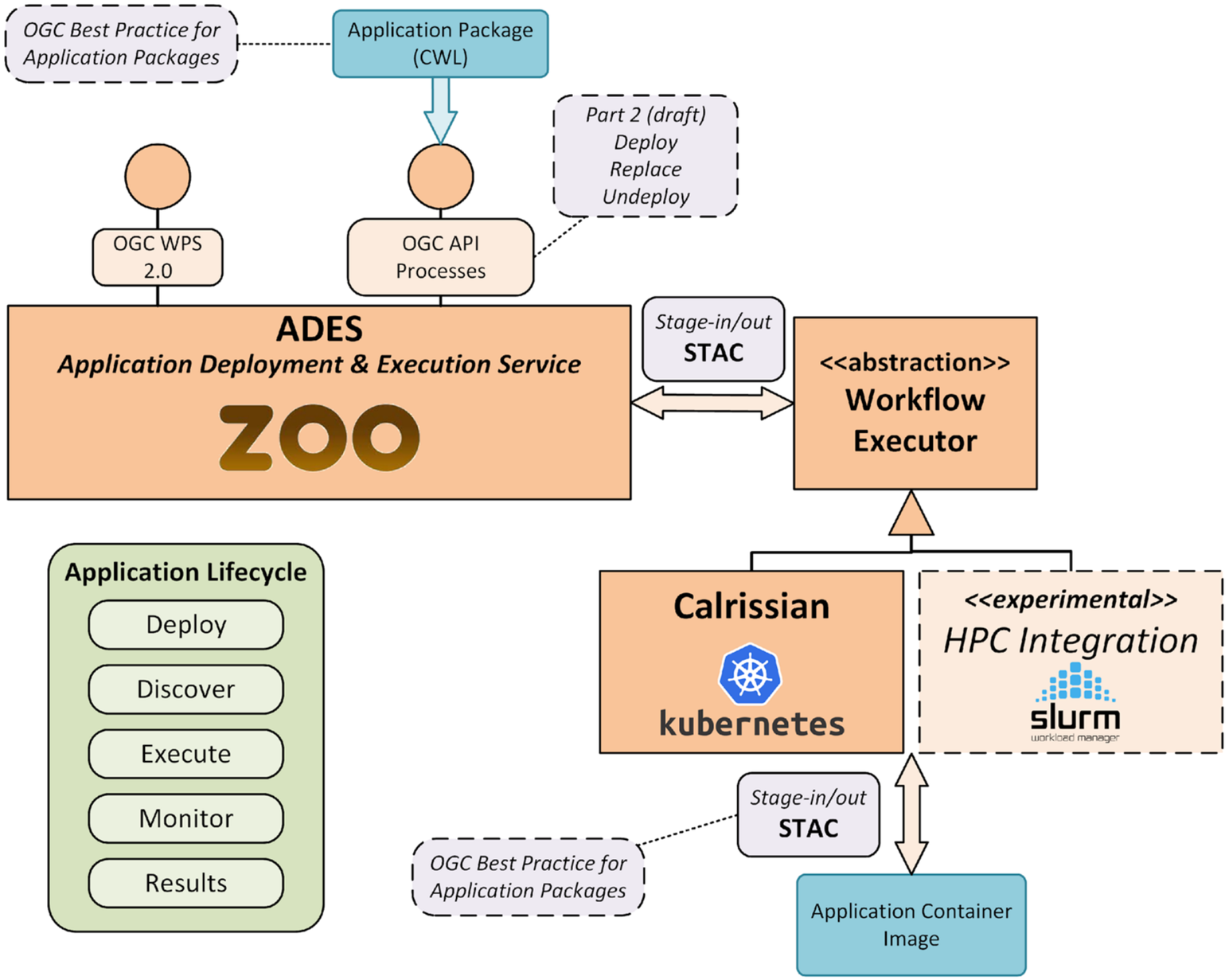
Interface données pour l'application
STAC -> portabilité de l'application

Entrées optimisées pour le Cloud

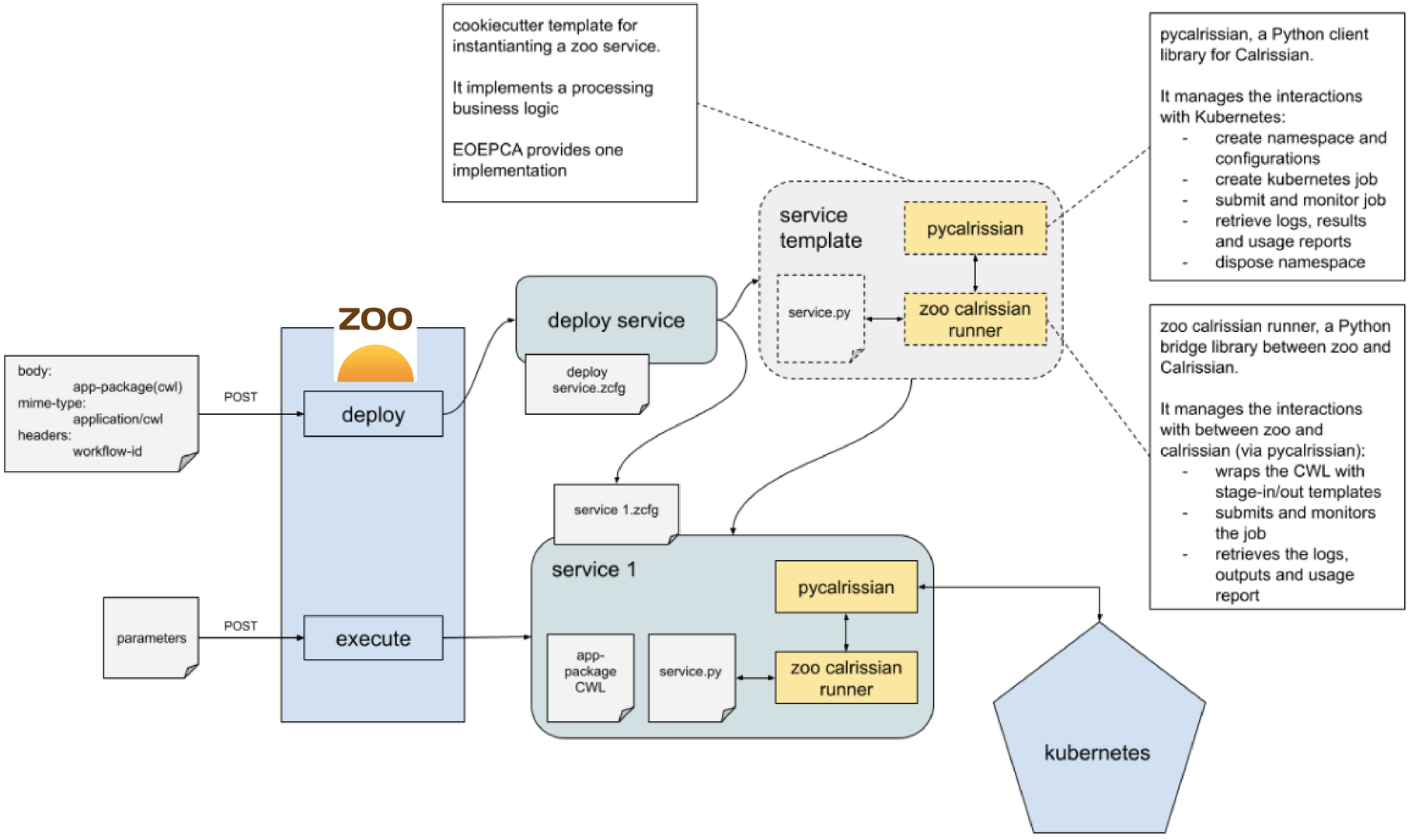
L'application met en place ses propres données
Accès performants aux formats optimisés pour le cloud

Moteurs d'exécution

L'abstraction permet d'utiliser differents environnements d'execution
E.g. Docker, Kubernetes, Slurm HPC, …



ZOO-Calrissian-Runner

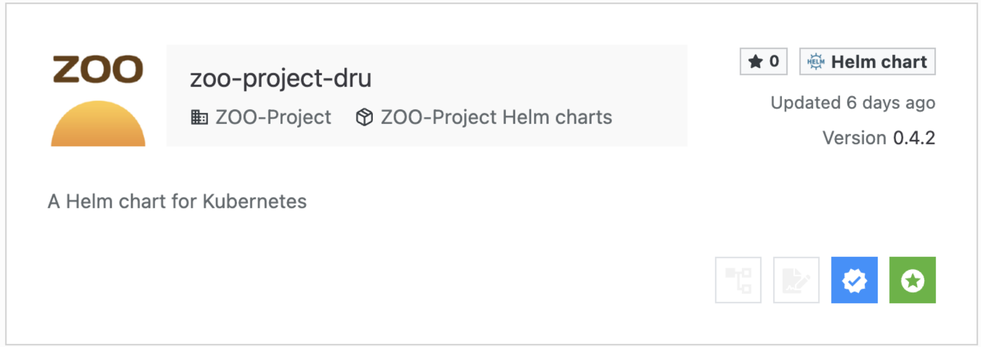


ZOO-Project-DRU avec support CWL

La version du ZOO-Project-DRU, disponible sous la forme d'un Helm chart, facilitant son déploiement sur un cluster kubernetes, permet le déploiement d'applications packages via OGC API - Processes - part 1: Core.

La version ZOO-Project-DRU contient le support pour l'exécution sur :

- un cluster kubernetes via l'utilisation de module ZOO-Calrissian-Runner,
- HPC avec Slurm via l'utilisation du module ZOO-WES-Runner,
- Argo Workflow via le module ZOO-ArgoWF-Runner.



https://artifacthub.io/packages/helm/zoo-project/zoo-project-dru

EOEPCA Operators

Commercial Platform Operators integrating EOEPCA Building Blocks into their platforms

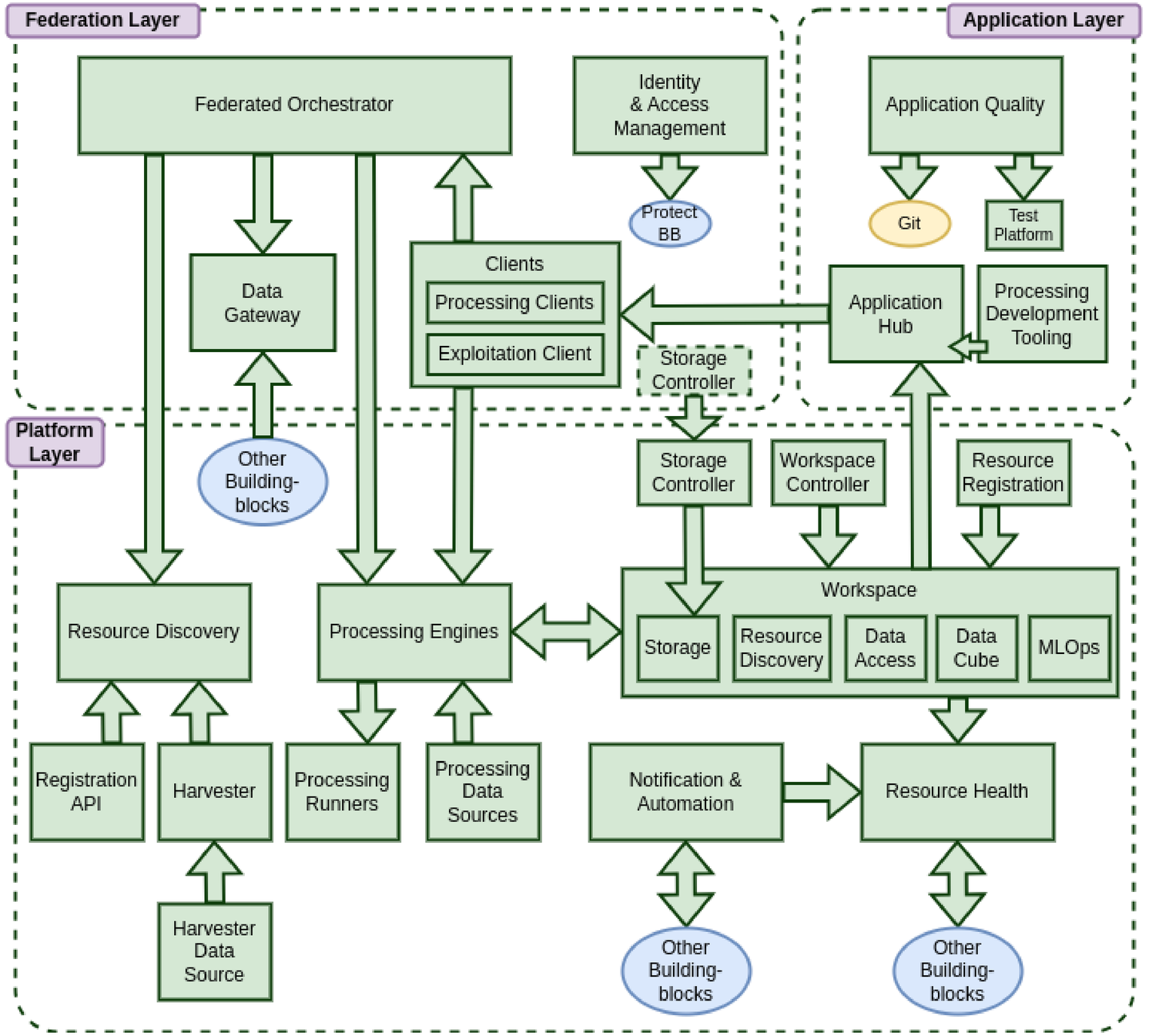
- **Terradue**
  *EOEPCA system integrated with Terradue's **Ellip Platform** + ADES deployments in CREODIAS and Mundi platforms for targeted processing*
- **SpaceApplications**
  *EOEPCA system integrated with SpaceApplications's **Automated Service Builder Platform (ASB)** + ADES deployments in CREODIAS, OTC and Terrascope platforms for targeted processing*
- **adwäisEO/Wasdi**
  *EOEPCA system integrated with **Luxembourg Space Agency Data Centre***
  *ADES integrated with **Wasdi Marketplace** for user-defined processing*
- **Petabite**
  ADES integrated into p:scout service
- **UK Science and Technology Facilities Council**
  *EOEPCA system deployment on JASMIN platform at STFC **Centre for Environmental Data Analysis***
  Experimental ADES integration with HPC cluster
- **VTT**
  *EOEPCA system powering **Forestry Thematic Exploitation Platform (F-TEP)***
- **EOX**
  *ADES integrated with **EOxHub Bring Your Own Algorithm (BYOA)***

EOEPCA+ RI

The **Platform Layer** comprises capabilities for discovery of data and other resources, execution of processing workflows, and management/exploitation of added-value assets.

The **Federation Layer** comprises capabilities that operate across a set of distributed platforms, and attempt to consolidate their combined offerings towards a more homogenous consumable experience.

The **Application Layer** provides capabilities for development and publishing of applications for exploitation of platform services, and for showcasing research outcomes through information dashboards - applicable for both Platform and Federation use cases.



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Processing

Hosted execution of processing workflows
*Supporting **OGC API Processes** and **openEO***
Modular approach for extensibility

Processing Engines

Service API through which processing workflows are submitted for execution.

Processing Runners

Execution environment for the processing execution.

Processing Data Sources

Integration with a data sources to make the dataset available as a processing workflow input

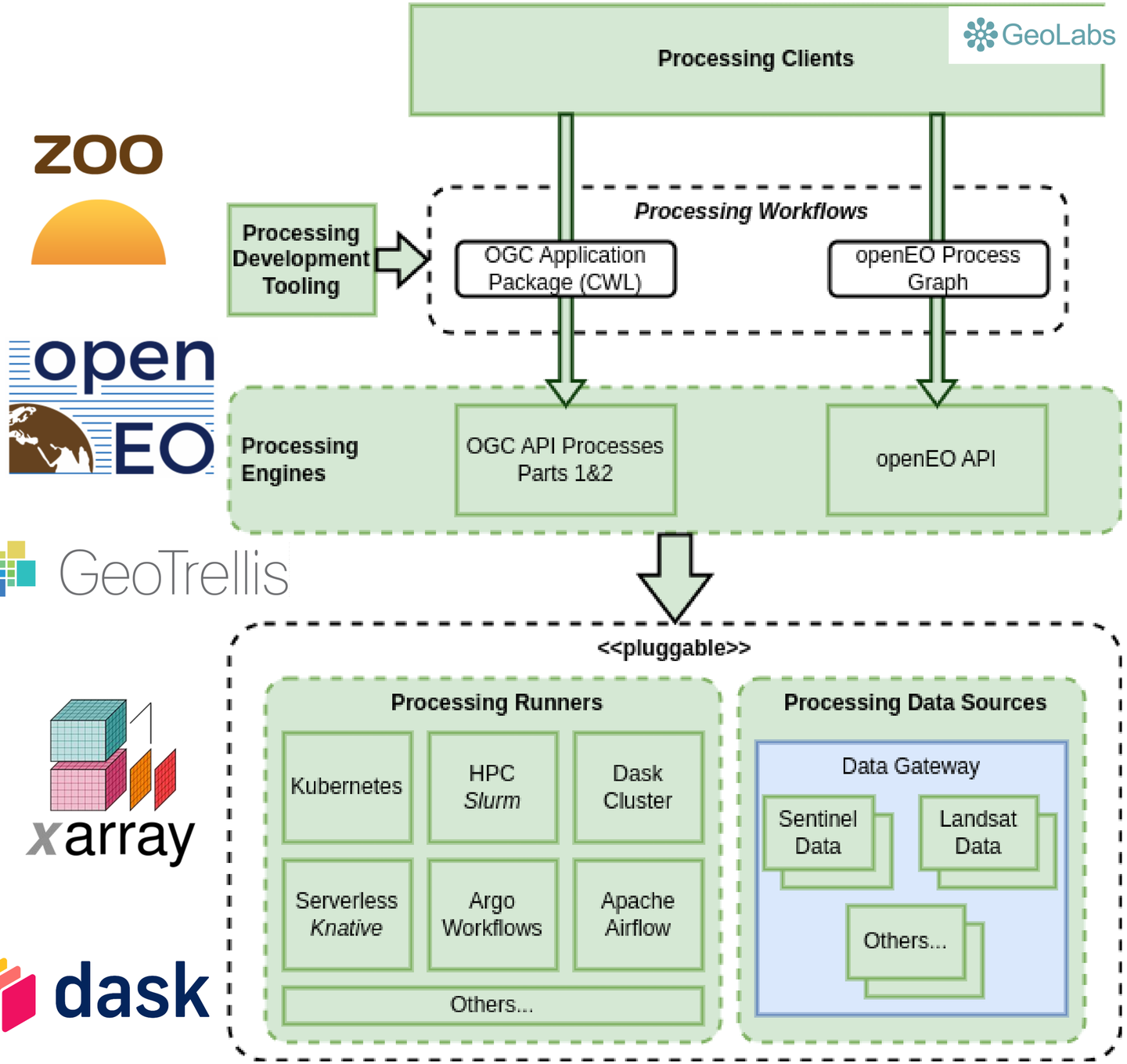
Processing Client

Programmatic access to the processing engine services via its API.

Development Tooling

Web-enabled tooling to aid creation of processing workflows and use of the service API.

Consolidation of existing processing workflow approaches
E.g. integration of OGC Application Packages with openEO UDFs



Organisations Partenaires

esa

TELESPAZIO
a LEONARDO and THALES company

TERRADUE

DLR

CS
a Sopra Steria company

werum
SOFTWARE & SYSTEMS

vito

EOX

spaceapplications
SERVICES

eurac
research

development SEED

GeoLabs

EOFARM

SENSmetry

Matthias Mohr
Softwareentwicklung

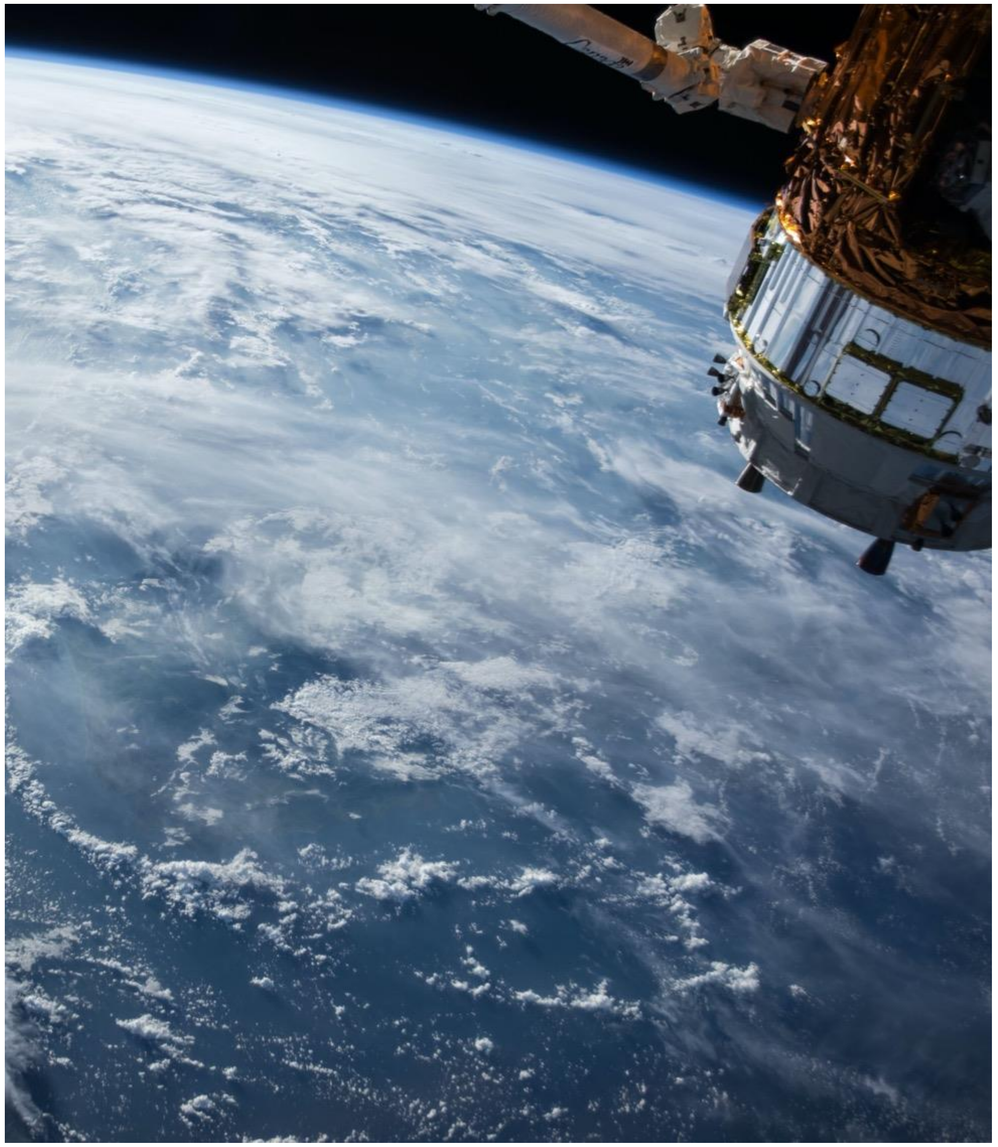
Où nous trouver

EOEPCA
BETTER ACCESS TO EARTH OBSERVATION

Portail Web
https://eoepca.org/

GitHub
https://github.com/EOEPCA

Documentation
https://eoepca.readthedocs.io/



Merci

Community

500+ International Members
110+ Member Meetings
60+ Alliance and Liaison partners
50+ Standards Working Groups
45+ Domain Working Groups
25+ Years of Not for Profit Work
10+ Regional and Country Forums

Innovation

120+ Innovation Initiatives
380+ Technical reports
Quarterly Tech Trends monitoring

Standards

65+ Adopted Standards
300+ products with 1000+ certified implementations
1,700,000+ Operational Data Sets
Using OGC Standards

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