L’infrastruttura virtuale

PhenoMeNal :

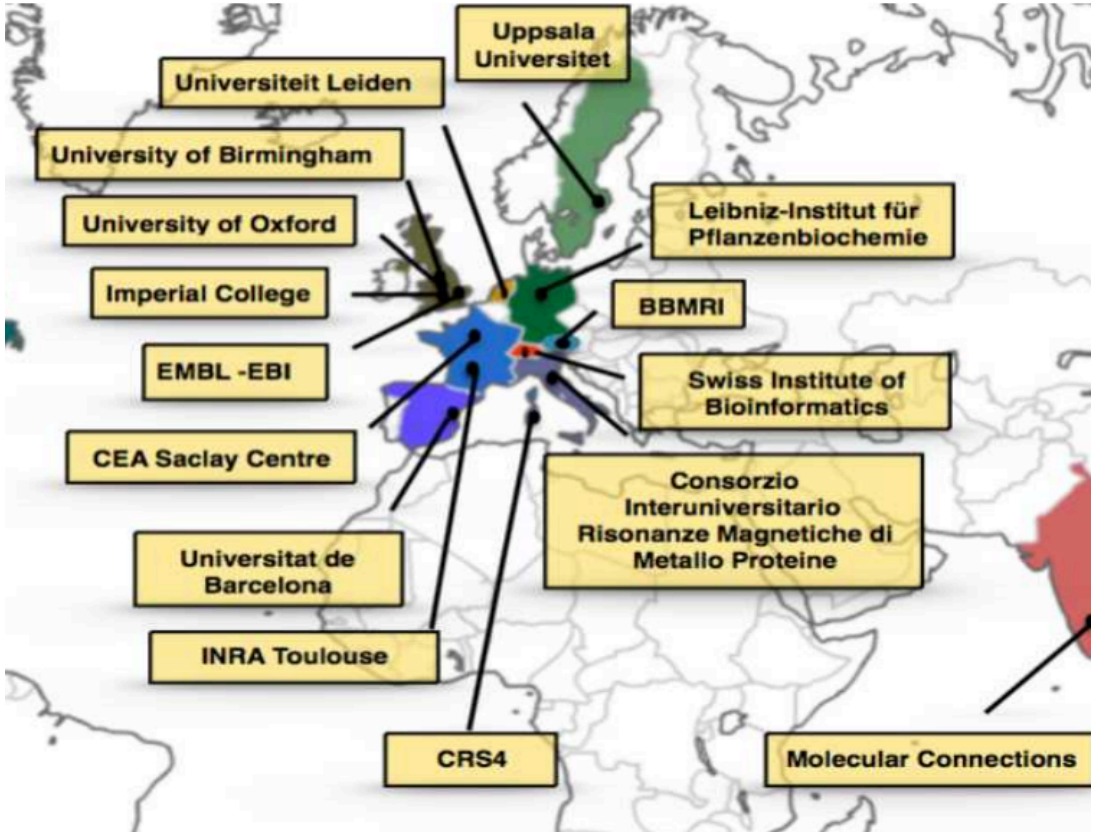
deployment on-demand *per l’analisi di dati scientifici su cloud*

Conferenza GARR 2018
DATA REVOLUTION
Cagliari, 3-5 ottobre

Marco Enrico Piras

Il progetto *PhenoMeNal*

PhenoMeNal = **Phenome** and **Metabolome** A**nal**ysis



- 3 years: 2015-2018
- 14 partners
- Led by EMBL-EBI
- EU H2020 project*

* grant agreement number 654241

Perché *PhenoMeNal* ?

- La *metabolomica*: studio del funzionamento del metabolismo cellulare attraverso i *metaboliti*

- Crescente *complessità computazionale:*
  - e.g., nuove tecnologie di acquisizione generano ingenti quantità di dati da elaborare

- Necessità di *supporto informatico avanzato:*
  1. tool per il trattamento dei dati
  2. supporto per complesse pipeline di calcolo (*scientific workflow*)
  3. *condivisibilità* e *riproducibilità* del calcolo e dei risultati
  4. scalabilità
  5. facilità di utilizzo per non informatici

PhenoMeNal

> ***PhenoMeNal*** is a *comprehensive* and *standardised* ***e-infrastructure*** that supports the *data processing and analysis pipelines*

Due componenti principali:

V*irtual* ***R****esearch* ***E****nvironment* (**VRE**)

PhenoMeNal **Portal**

PhenoMeNal Gateway
Cloud Research Environment Portal

PhenoMeNal VRE

VRE = Virtual Research Environment

Data Analysis Platforms

Tools

Over 250!

- NMR, MS
- Data transfer
- Add your own

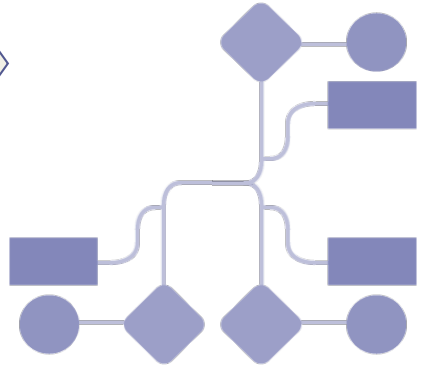
Galaxy

Luigi

jupyter

Pachyderm

Workflows

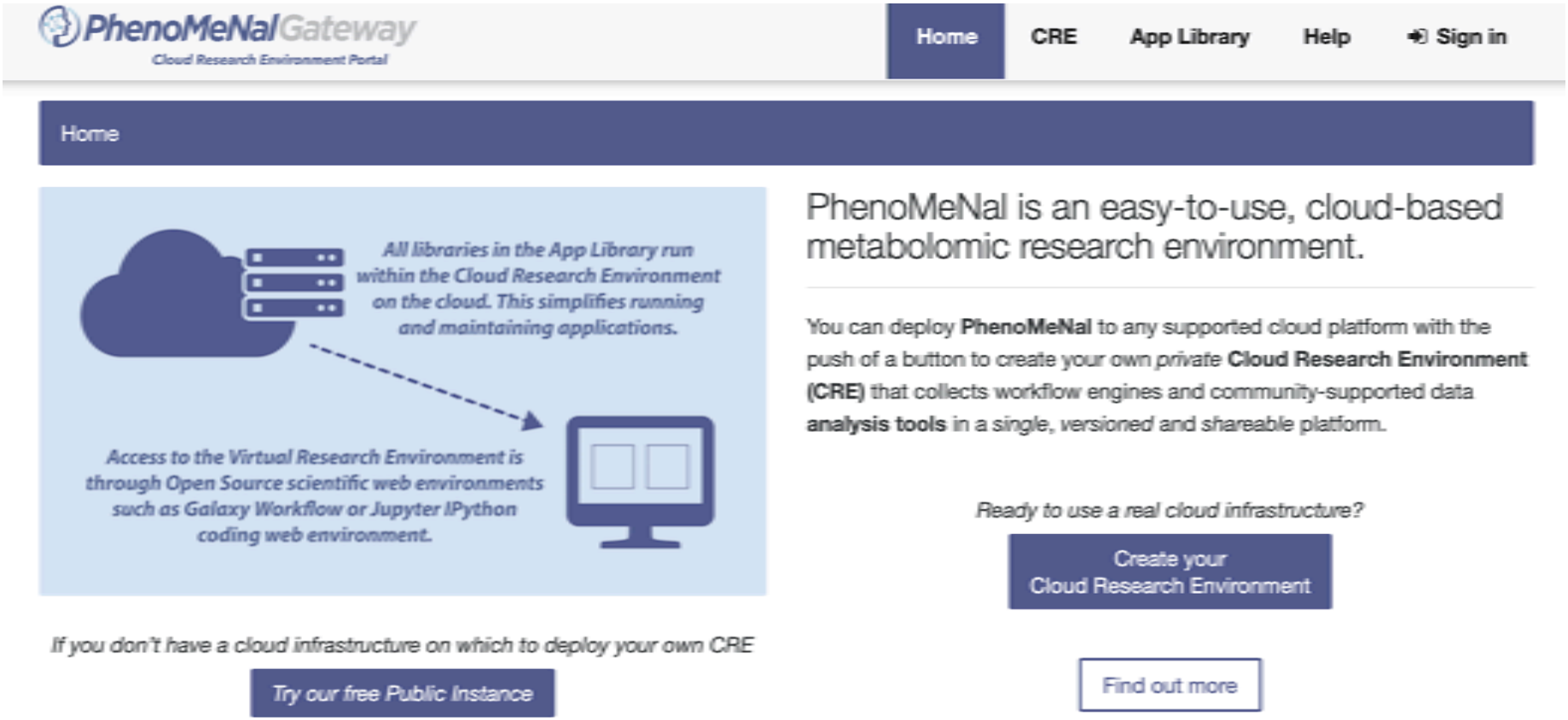


10 pre-developed workflows touching on:

- Fluxomics
- MetFrag
- ISA data
- ...

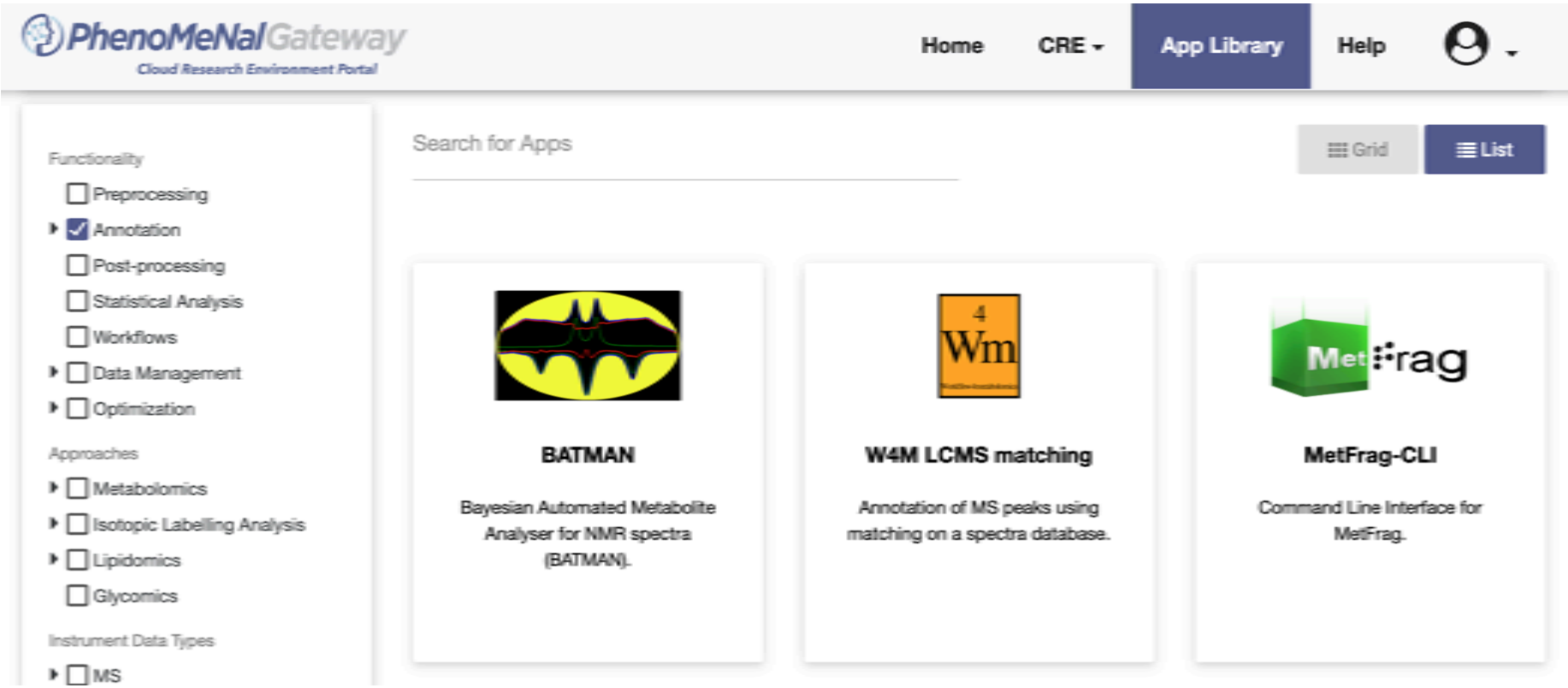
PhenoMeNal **Portal**

Documentazione



PhenoMeNal **Portal**

Esplorazione Tools: **App Library**



PhenoMeNal **Portal**

Gestione VRE

PhenoMeNal Gateway
Cloud Research Environment Portal

1 **Cloud Provider** — 2 Cloud Credentials — 3 Cloud Parameters — 4 Services Credentials — 5 Deploy

In order to deploy your CRE you need a cloud provider

Please select a cloud provider for setting up your Cloud Research Environment

PhenoMeNal Cloud

Note that this is a public instance accessible by everyone. Your data will be stored on the PhenoMeNal Cloud with computing power by PhenoMeNal partners. This is not suitable for sensitive or private data. Uploaded data will be kept for a limited amount of time only.

Free

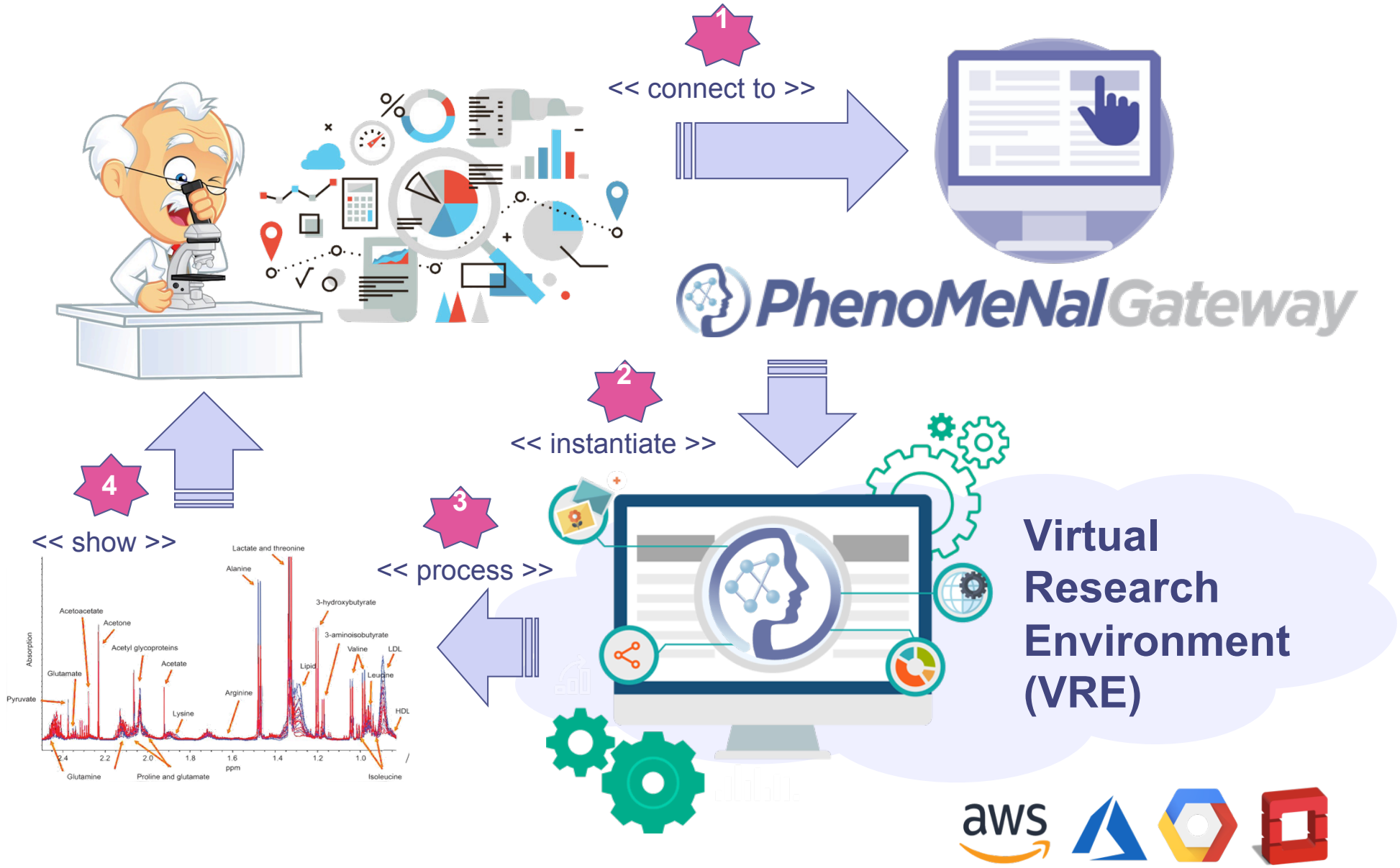
AWS

Amazon WS is a commercial cloud provider. Use this if you already have an Amazon AWS account.

Commercial

Cloud location: **Worldwide**

PhenoMeNal Use Case

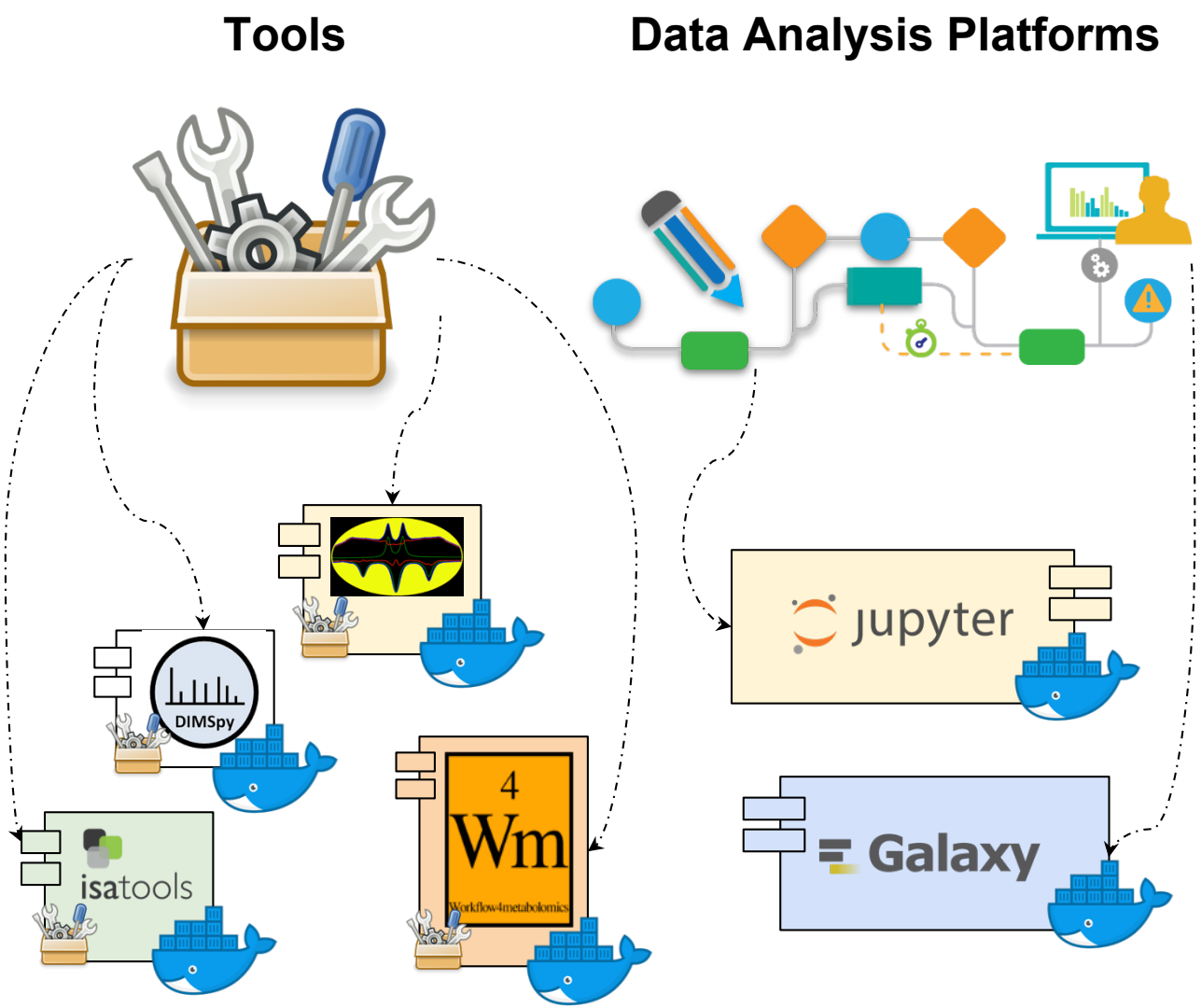


PhenoMeNal **Architecture**

PhenoMeNal Architecture

(I) microservizi

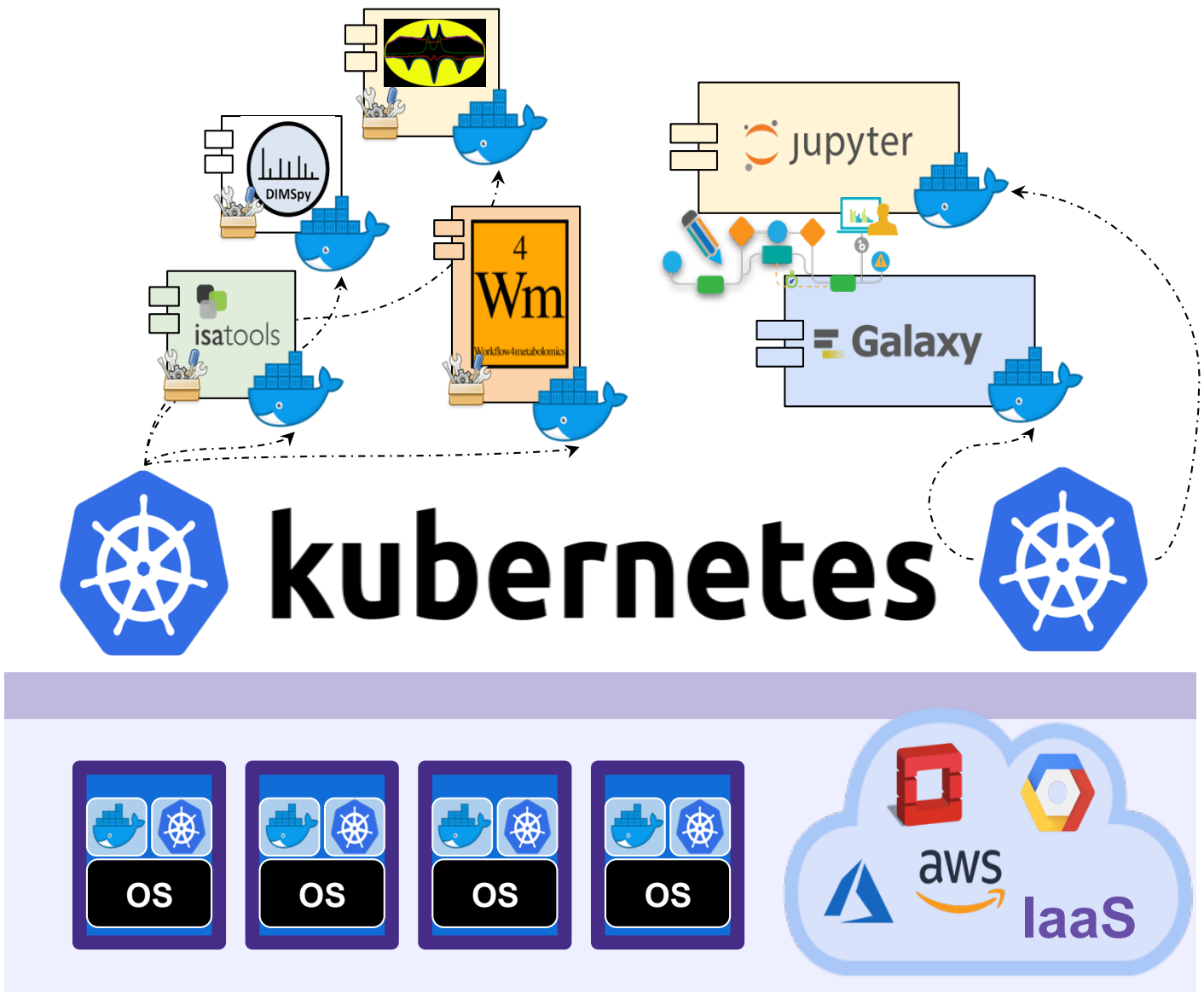
- ogni elemento dello VRE è mappato su un servizio
- service provisioning tramite **Docker** *containers*



PhenoMeNal
Architecture

(II)
orchestrazione servizi

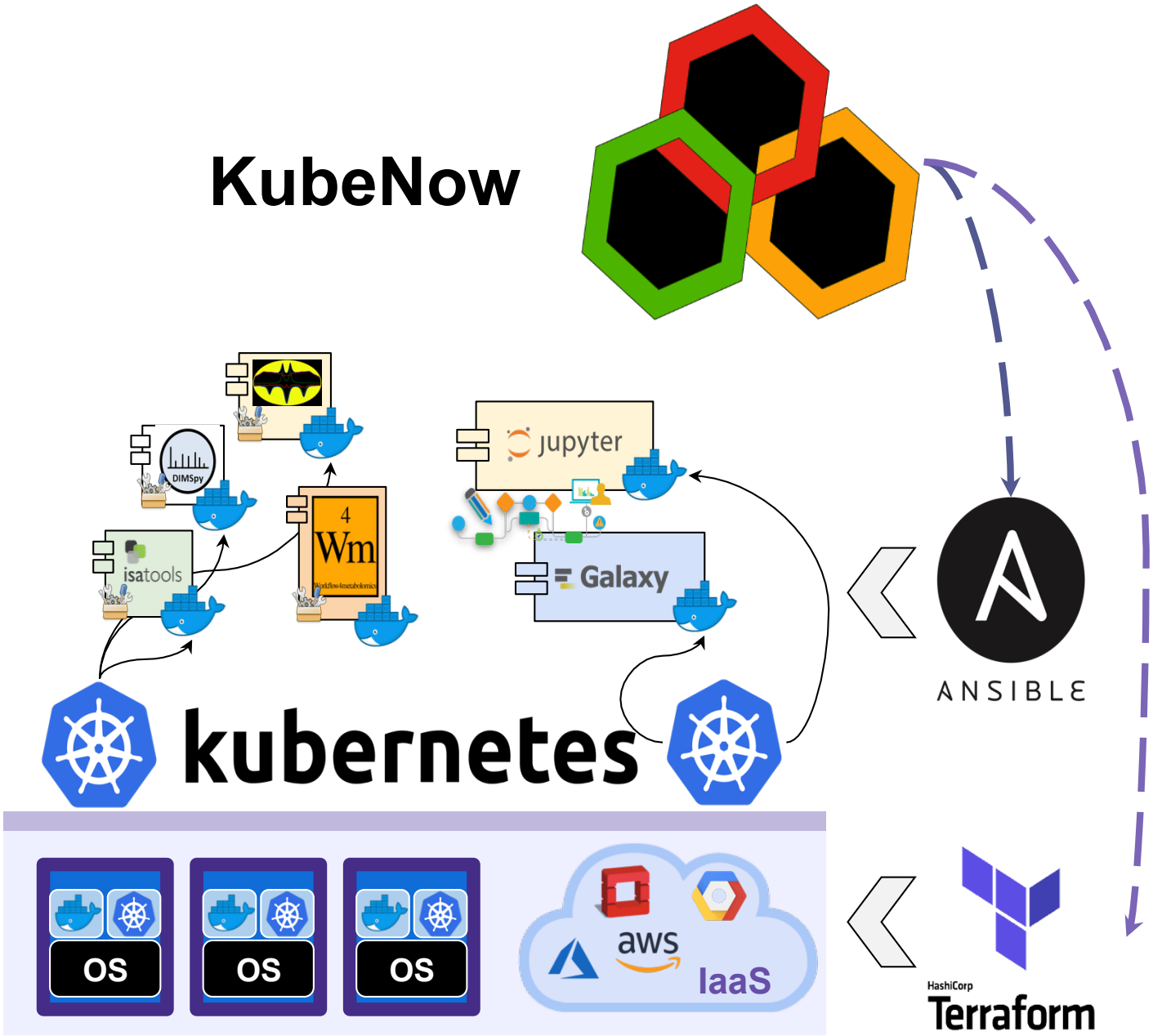
- **Kubernetes** è distribuito sulle risorse dell'**IaaS**
- **Kubernetes** gestisce l'orchestrazione dei servizi Dockerizzati



PhenoMeNal
Architecture

(III)
deployment automatizzato

- **KubeNow** automatizza la creazione dell'infrastruttura
- l'allocazione e configurazione delle risorse sull'IaaS è implementata in **Terraform**
- le componenti software sono installate su Kubernetes mediante **Ansible**



PhenoMeNal: link utili

- *PhenoMeNal* **Repositories**:

  https://github.com/phnmnl

- *PhenoMeNal* **Wiki**:

  https://github.com/phnmnl/phenomenal-h2020/wiki

- *PhenoMeNal* **Portal**:

  https://portal.phenomenal-h2020.eu/

PhenoMeNal

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Grazie per l'attenzione !

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PhenoMeNal **Portal**:

https://portal.phenomenal-h2020.eu/

CRS4
IDEAS BECOME LIFE

PhenoMeNal Consortium

- **Imperial College London:** Robert Glen, Jake Pearce, Jianliang Gao, Noureddin Sadawi, Ibrahim Karaman
- **EBI:** Chris Steinbeck, Claire O'Donovan, Namrata Kale, Kenneth Haug, Reza Salek, Sijin He, Pablo Moreno
- **Uppsala University:** Ola Spjuth, Marco Capuccini, Anders Larson.
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- **University of Leiden:** Merlijn van Rijswijk, Thomas Hankemeier, Michael van Vliet
- **INRA:** Fabien Jourdan, Benjamin Merlet
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