

# Sharing phenotyping data: Deploying the open-source Phenotyping Hybrid Information System PHIS on the EGI Infrastructure

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EOSC Symposium 2022 - Prague - 17<sup>th</sup> of November 2022

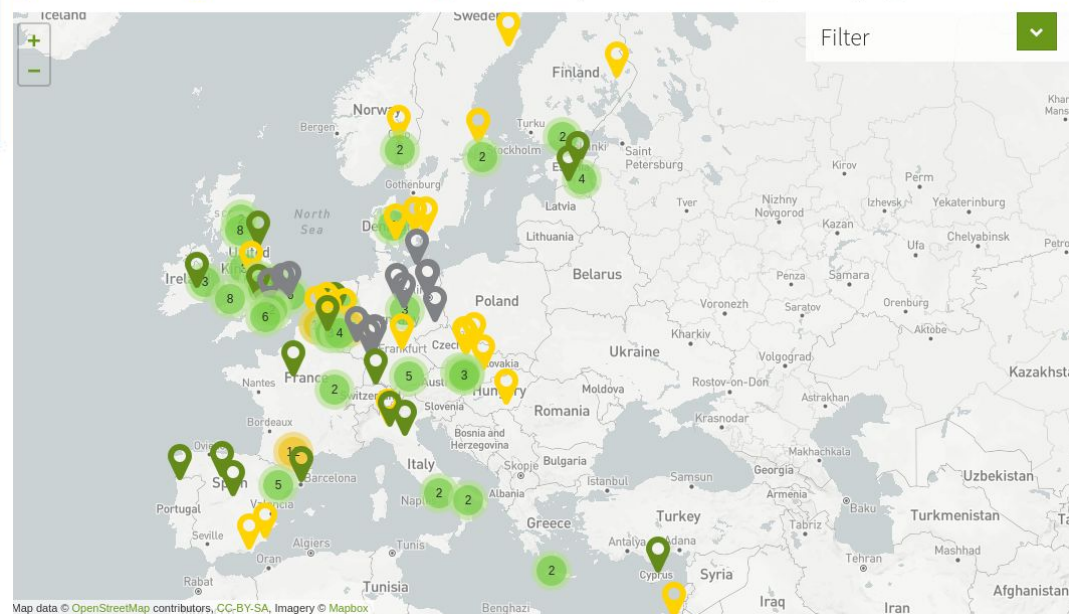
# Phenotyping communities



22 Partners  
31 Facilities



Field Installation    Controlled Environment    Data and Computational Services    Modelling    Field Site



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2022-11-17 / EOSS Symposium 2022

# Phenomics Data Challenge

## Plant Phenomics Experiments

- Expensive, require a lot of resources and often very hard
- Cannot be reproduced
- Huge and complex datasets
- Strong needs of transparency: reproducibility for data analytics

## Save time, make data valuable!

But re-analyses, meta-analyses and new analyses

→ impossible without rich metadata



# Make FAIR data, structure your data

## Identification

- Everything can be identified: plants, experiments, sensors, events, etc.
- Persistent, unambiguous, resolvable

## Semantics

- Naming Conventions
- Controlled vocabulary
- Formalized relationships between entities
- Data annotation and enrichment

## How?

PHIS, an ontology driven Information System



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**URI of plant:**  
<<http://phenome.fr/arch/2017/c17000118>>

**URI of pot:**  
<<http://phenome.fr/arch/2013/pc13001542>>

**URI of cart:**  
<<http://phenome.fr/arch/2013/ct1300123>>

**URI of cabin:**  
<<http://phenome.fr/arch/2018/ac180015>>

**URI of camera:**  
<<http://phenome.fr/arch/2018/ac180019>>

**URI of image:** <<http://phenome.fr/arch/2017/ic17002295855>>

**Variables**  
Manage and configure variables, entities, and observations.

Variables Entity Observation level

+ Add variable

Selected Variables 0

Showing 0 to 4 of 4 entries

<input type="checkbox"/>	Name
<input type="checkbox"/>	Plant_Area_ImageProcessing_Plant_Area
<input type="checkbox"/>	Plant_effectiveQuantumYield_C
<input type="checkbox"/>	Plant_maximumQuantumYield

**Interoperability References**

Add references to [http://phis.egi-demo.eu/id/variable/plant\\_perimeter\\_imageprocessing\\_millimetre](http://phis.egi-demo.eu/id/variable/plant_perimeter_imageprocessing_millimetre)

**Reference ontologies**

- AGROPORAL
- AGROVOC
- BioPortal
- Crop Ontology
- Plant Ontology
- Planteome
- Units of measurement ontology (UO)
- Units of Measure (OM)
- QUDT Ontologies (QUDT)
- XML/XSD Datatype Schemas

**Relations** ⓘ \*

Close match

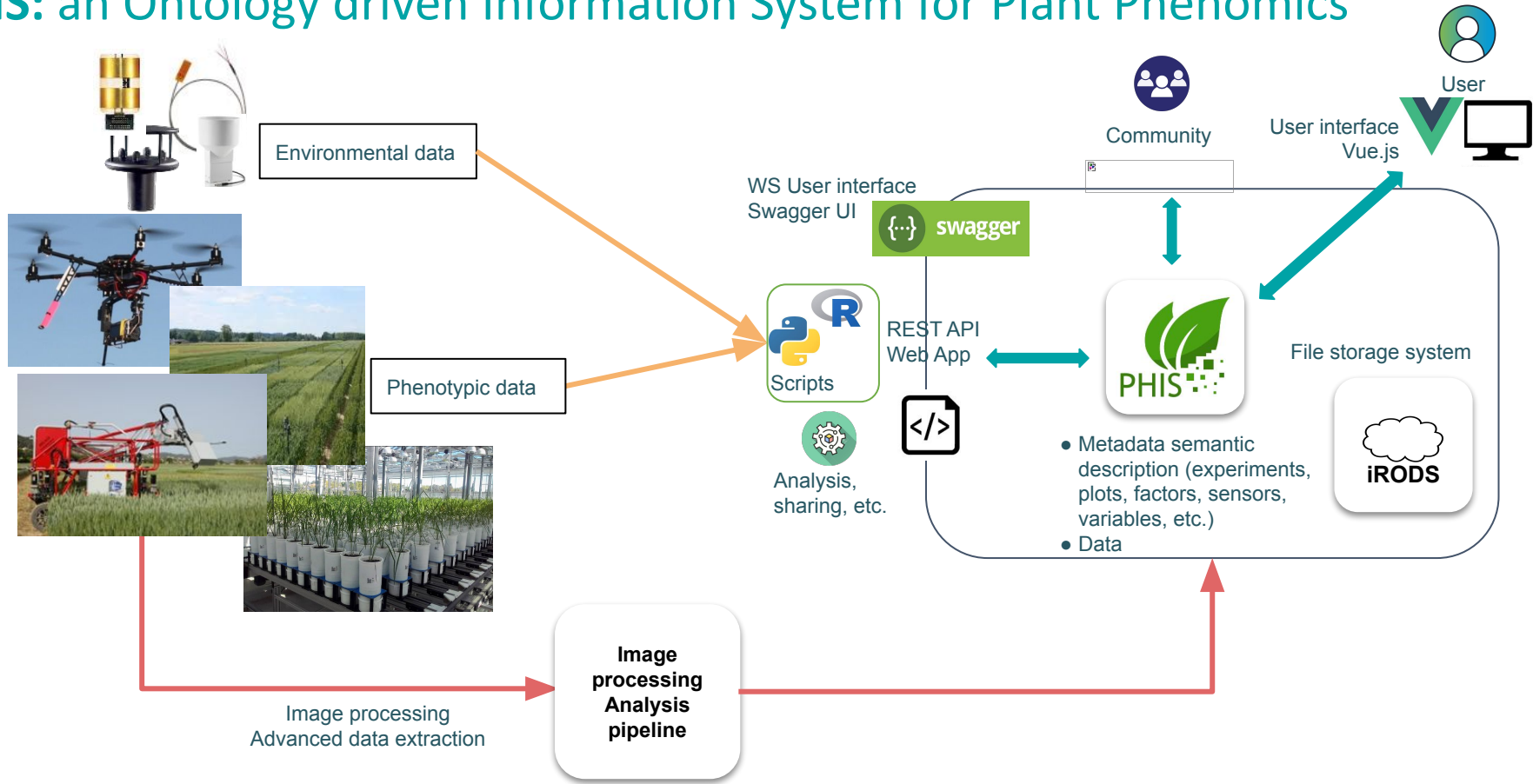
**Reference URI** ⓘ \*

[http://purl.obolibrary.org/obo/PATO\\_0001711](http://purl.obolibrary.org/obo/PATO_0001711)

Add references

No reference available

# PHIS: an Ontology driven Information System for Plant Phenomics



# EGI-ACE: PHIS Deployment on EGI Infrastructure

## Our Strategy

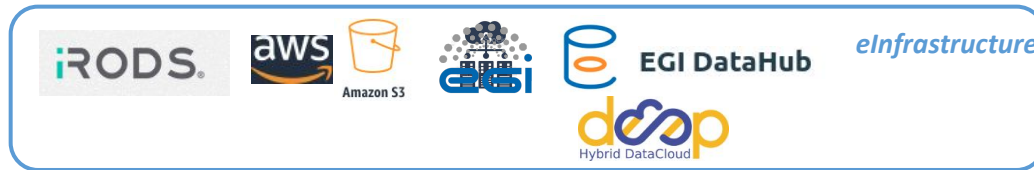
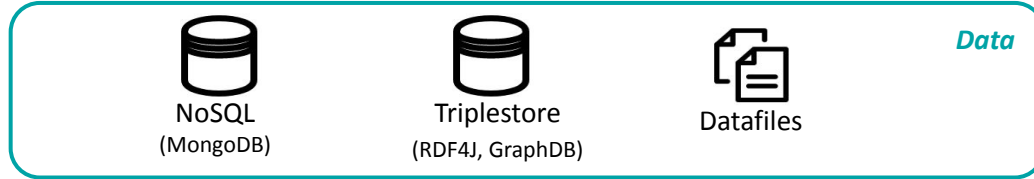
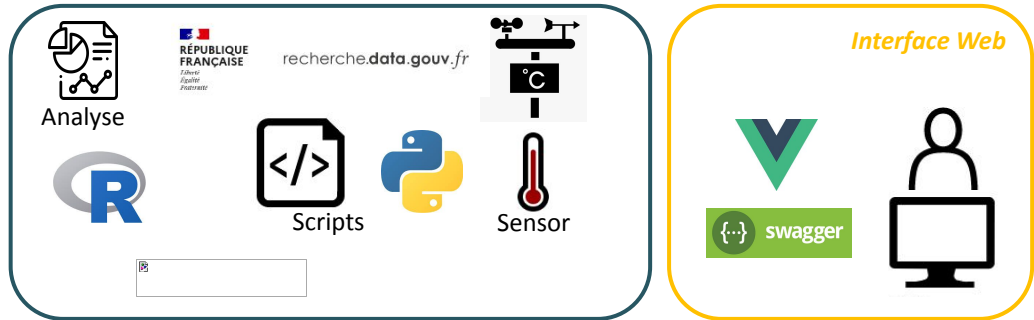
- Rely on **EGI infrastructure and services** to build a **European e-infrastructure for plant phenotyping**
- Access to these services through the **EGI-ACE call for uses program**
- Setup a **Proof Of Concept**

<https://phis.emphasis.fedcloud.eu/egi-demo/app/>

- Tested by **Early Adopter users** (University of Helsinki, University of Copenhagen, INRAE)
- **Disseminate** services to a wider audience



# PHIS and the EGI Infrastructure and Services



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## EGI Services used

### Cloud Computing

- Host our information system (CESNET-MCC provider)
- Dynamic DNS service provides a unified, federation-wide Dynamic DNS support

### Authentication

- EGI Check-in service has been integrate as the authentication system

### Storage

- Connected with the online storage service provided by IN2P3-IRES and the FranceGrilles (FG-iRODS).
- Connected with S3 storage
- *DataHub, based on OneData technology*

### Data analysis

- Deep Hybrid DataCloud portal hosts our DL models

# EGI-ACE & PHIS: Perspectives

## Next Steps

- **Data integration:** Allow interconnection of these data thanks to PHIS Web Services and BrAPI layer
- Connecting **EGI DataHub File storage system**
- Export dataset to ***recherche.data.gouv.fr***
  - EOOSC Pillar Project
  - Constitution of the dataset in PHIS
  - Deposit on *recherche.data.gouv.fr* :
    - Declaration of the dataset with the associated metadata
    - Recovery of the DOI in PHIS
- Link to DeepLearning models (hosted on the Deep Hybrid DataCloud portal)
- **Disseminate**

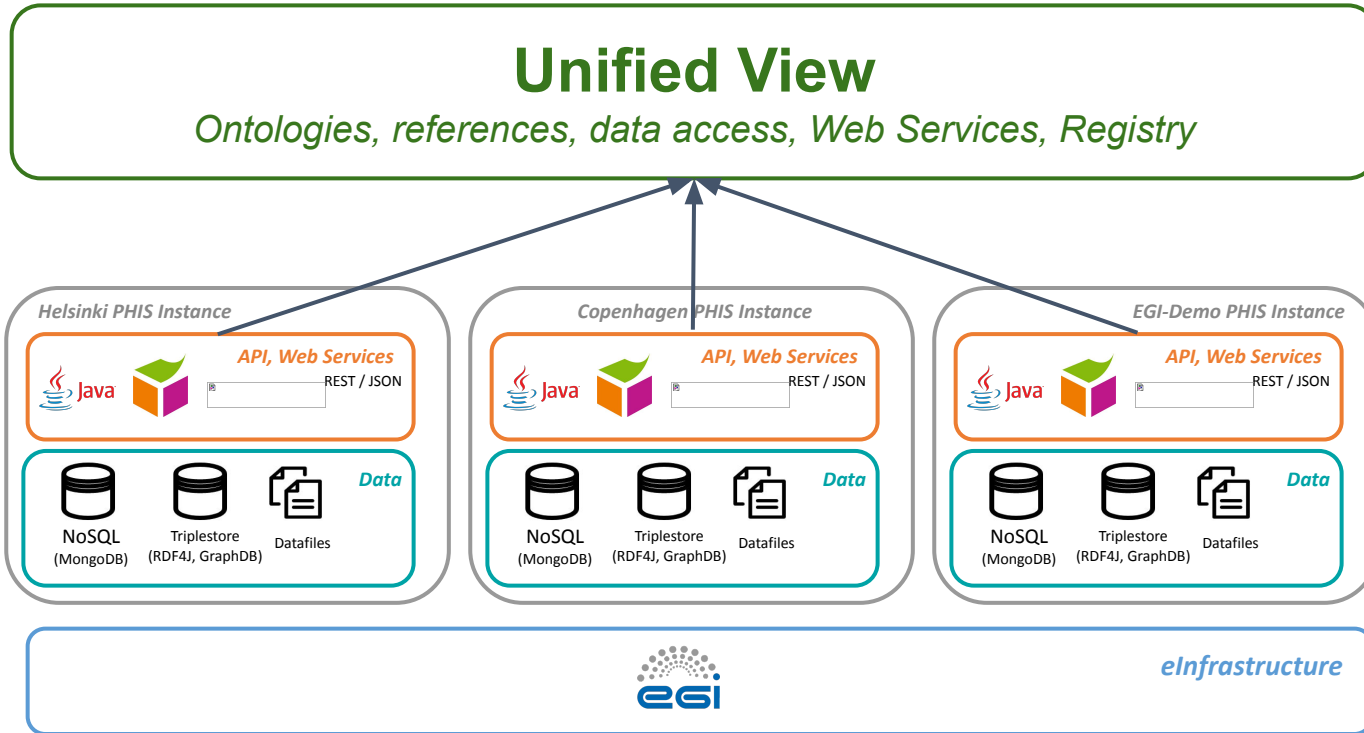


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# EGI-ACE & PHIS: Data integration



# Acknowledgements & Links

## Acknowledgements

- Vincent Negre - INRAE LEPSE
- Andrea Manzi - EGI Foundation
- Sylvain Poque, Kristiina Himanen, Tatu Polvinen - University of Helsinki
- Jesper Cairo Westergaard - University of Copenhagen
- Cyril Pommier - URGI
- Pascal Neveu, Anne Tireau, Valentin Rigolle, Renaud Colin - INRAE MISTEA

## Useful Links

- OpenSILEX website: <http://opensilex.org/>
- PHIS demonstration: <http://phis.inra.fr/>
- How to contribute to OpenSILEX?  
Github repository: <https://github.com/OpenSILEX/>
- OpenSILEX Docker: <https://github.com/OpenSILEX/opensilex-docker-compose>

