

EOSC United

Demonstrate EOSC EU Node capabilities through scientific use cases

Jonathan Tedds (ELIXIR Hub, EOSC Life Sciences Connect node)

Programme Manager for Scientific Computing

jonathan.tedds@elixir-europe.org

on behalf of ELIXIR, EOSC-A, Trust-IT, IACS, Blue Cloud, FZ Juelich and University of Freiburg



EOSC United WP1 in a nutshell

- The uptake and evolution of the EOSC EU Node through 4 use cases initially
 - Testing and demonstrating the federating capabilities and deployment for compute, storage, data transfer, scalability
- Deploy federated services across disciplines
 - Test Node services with the EU Node
 - Advance the EOSC Federation
- Showcase multidisciplinary resource sharing/processing
- Evaluate long-term sustainability

Partners:

ELIXIR Hub (lead), EOSC-Association, Trust-IT, IACS, FKZ Julich, UFR (Freiburg)

WP1: Demonstrate the capabilities of the EOSC EU Node through scientific use cases

Lead: ELIXIR

Tasks:

- Task 1.1 Demonstrate the EU Node core services for hosting Node Services, led by ELIXIR and Galaxy (University of Freiburg) – multi domain
- Task 1.2 Thematic community cloud platforms on the EOSC EU Node;
 - ELIXIR On-Cloud in the de.NBI Cloud (German Network for Bioinformatics Infrastructure), led by FZ Juelich - life sciences
 - BlueCloud - marine sciences
- Task 1.3 The European Health Data Space and the EOSC EU Node
 - Led by IACS, life sciences



WP1: Demonstrate the capabilities of the EOSC EU Node through scientific use cases

Use Cases

A) **Galaxy** (Graphical Workflow Execution Services)

- 138,000 users
- Bring Your Own Compute (BYOC)
- Bring Your Own Storage (BYOS)
- supported by ELIXIR, EOSC-Life and EuroScienceGateway projects

B) **ELIXIR On Cloud and de.NBI National Cloud** (Life Sciences)

- ELIXIR On-Cloud modular interoperable cloud infrastructure
- Build on GA4GH standards (Global Alliance for Genomics & Health)
- Used in Genomic Data Infrastructure (GDI) project (Digital Economy)
- SimpleVM based
- EOSC Life-Science AAI integrated for thousands of distributed users

WP1: Demonstrate the capabilities of the EOSC EU Node through scientific use cases

Use Cases

C) **Blue-Cloud Virtual Research Environment (VRE)**

- Marine science research
- Analytic engine (DataMiner and Cloud Computing Platform)
- RStudio
- JupyterLab
- 1,700 registered members.

D) **Sensitive data analysis and European Health Data Space compliance**

- BY-COVID, TEHDAS, and TEHDAS2
- Pilot using SARS-CoV-2 vaccine data (Galaxy Server)
 - mimicking potential nodes of the EOSC Federation
 - public domain, anonymised or synthetic health data

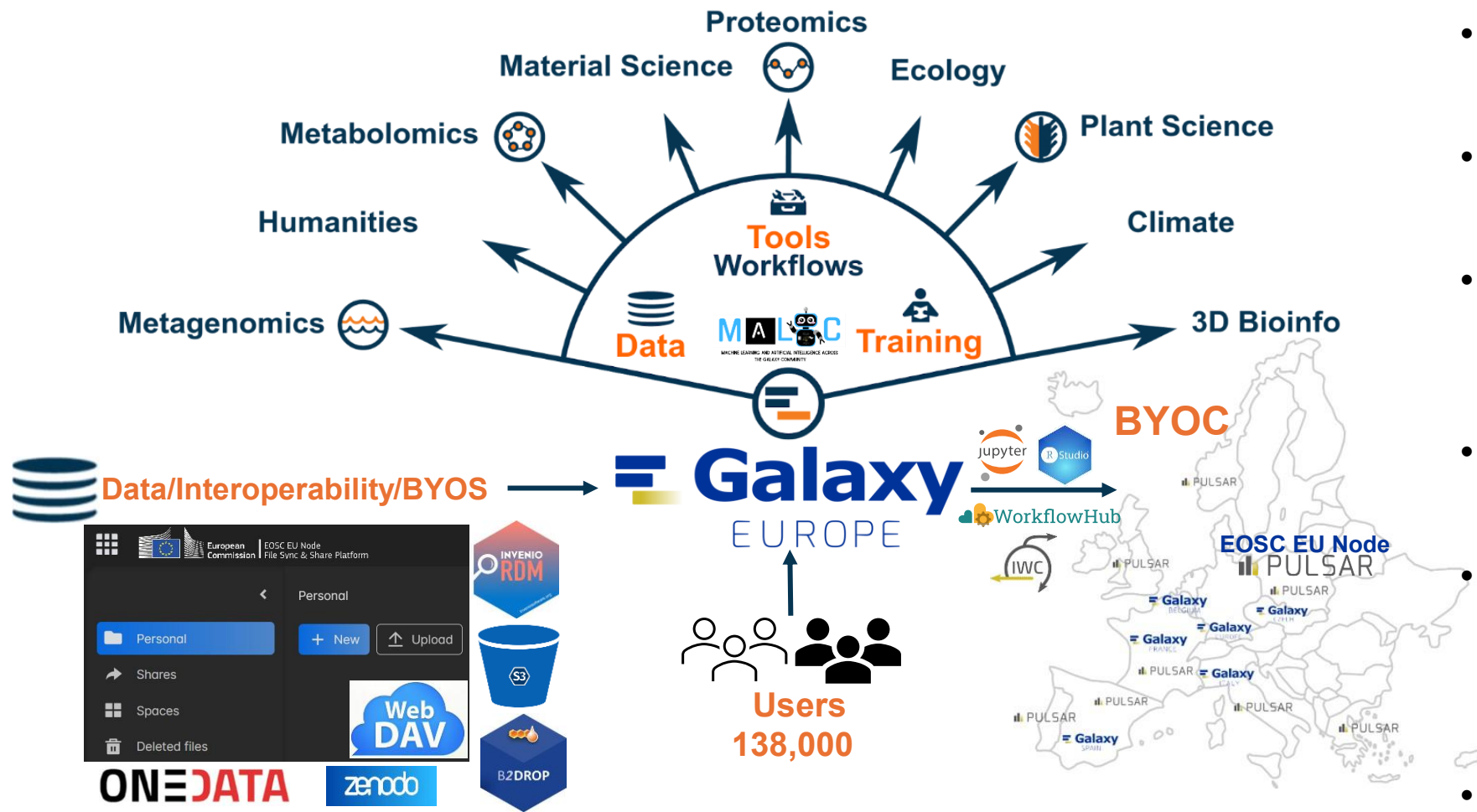
EOSC UNITED objectives

Tasks (WP1 leading or participating)

- **1.1** Demonstrate the added value and promote the use of the EOSC Federation services provided by the EOSC EU Node (WP1, 2, 4)
- **1.2** Promote the offerings of the EOSC EU Node to end-user communities (WP1, 2, 4)
- **1.3** Assess the EOSC EU Node offerings and identify gaps to enhance and evolve the EOSC EU Node (WP1, 2, 3, 4)
- **2.1** Develop an enhanced operational framework that considers legal and security aspects, interoperability, Rules of Participation (RoP), and incentive models (WP1, 2, 3, 4)
- **2.2** Evolve the EOSC Interoperability Framework into a practical framework that can be implemented by the first EOSC Nodes (WP 1, 2, 3)
- **3.1** Support the growth of the EOSC Federation by empowering new contributors (EOSC Nodes and resource providers) with necessary tools and guidelines (WP1, 2, 3, 4)
- **3.2** Establish a critical mass of EOSC-Association Members in the EOSC Federation (WP1, 2, 3, 4)

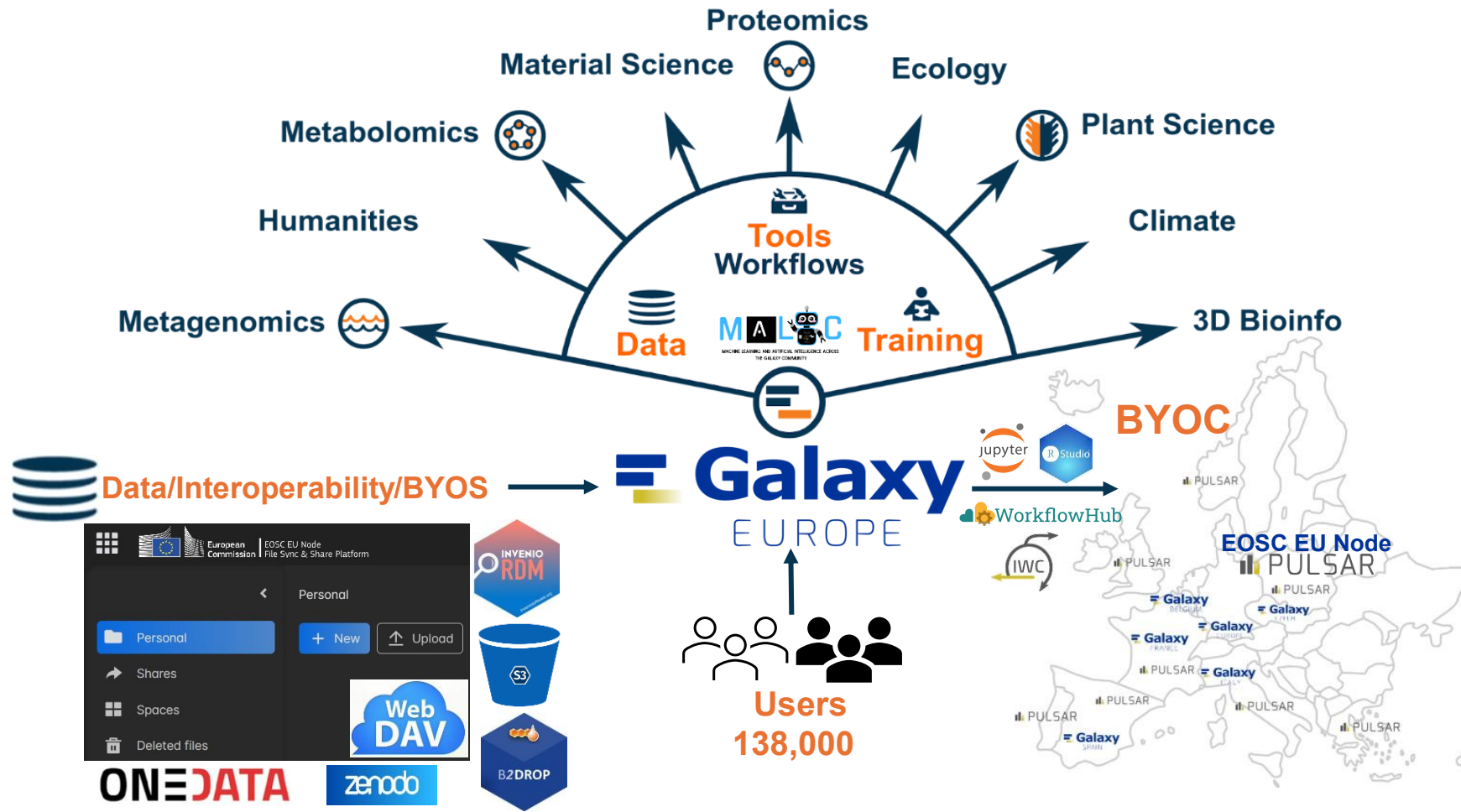


Use Case A: The EuroScienceGateway Galaxy Graphical Workflow Execution Services (U Freiburg, multi domain)



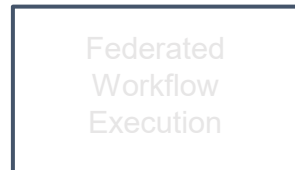
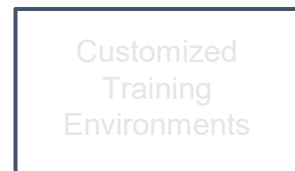
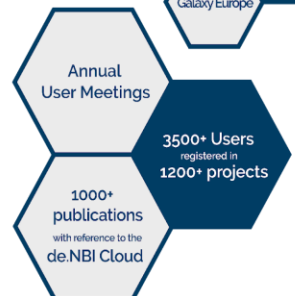
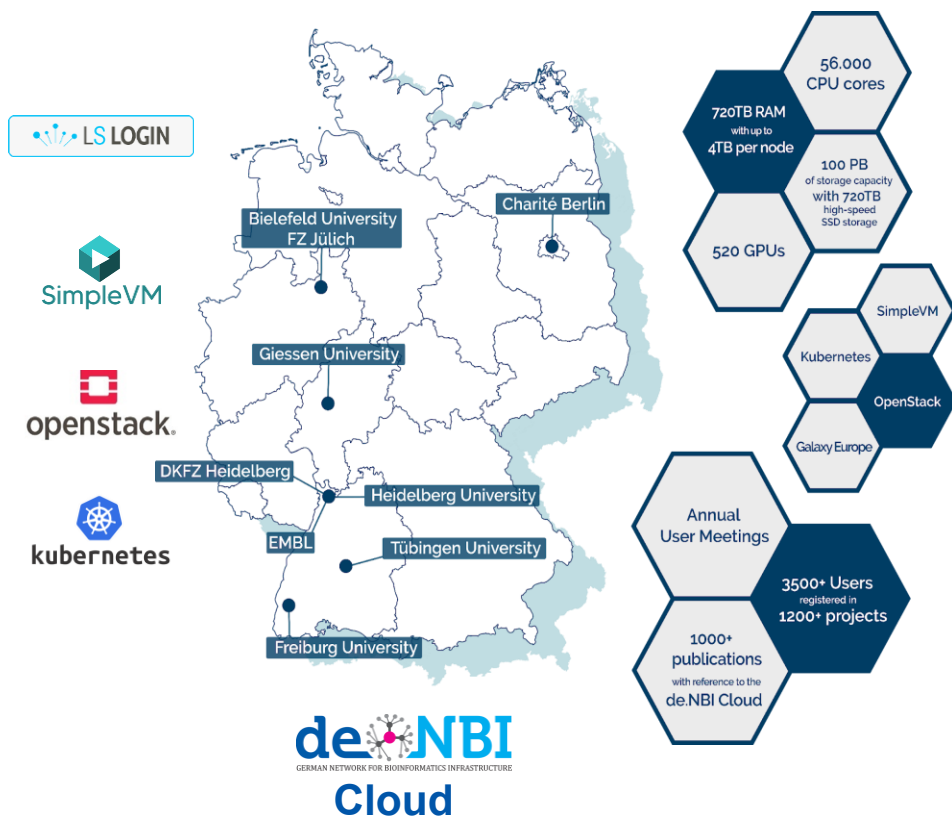
- **Galaxy**, a multi-domain data analysis platform.
- Over 138K users in Galaxy Europe alone.
- Seamless distributed job execution via **Pulsar** (Bring Your Own Compute (**BYOC**)).
- 50+ **VREs** for interactive analysis.
- Extensive, high-quality peer-reviewed Galaxy **workflows** in **WorkflowHub** and Galaxy's IWC workflow repository.
- Data interoperability via Bring Your Own Storage (**BYOS**).

Use Case A: The EuroScienceGateway Galaxy Graphical Workflow Execution Services (U Freiburg, multi domain)



- you can start a single-user instance in the EU Node
- you will have a button in the EU node that brings you to usegalaxy.eu
- we will hopefully have some workflows listed that brings you to usegalaxy.eu with the workflow ready to start
- usegalaxy.eu could sent jobs to the EU node
- usegalaxy.eu could include the storage from the EU node

Use Case B: ELIXIR On Cloud and de.NBI National Cloud (FKZ Julich, Life Sciences)

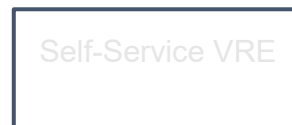
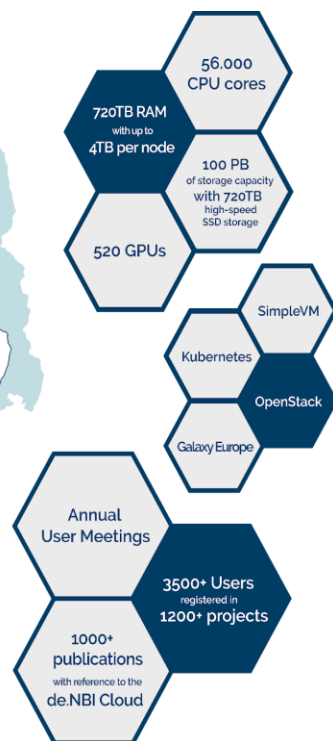
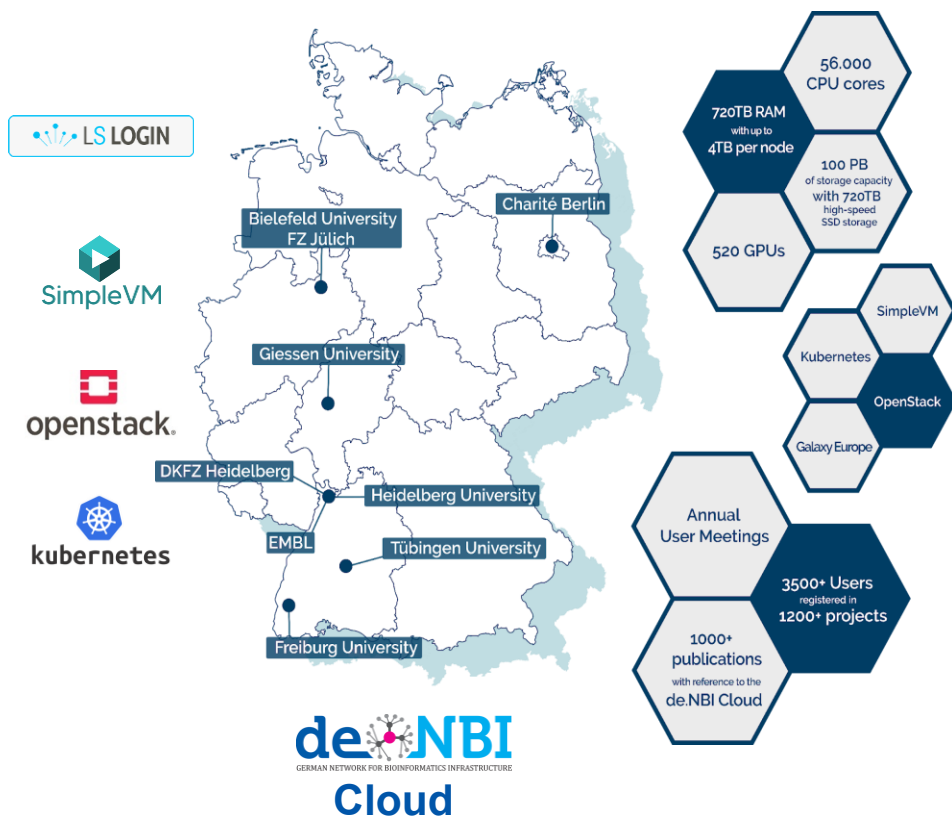


Goal: Simplify availability of SimpleVM Virtual Research Environments for short term projects via EOSC EU Node

- Currently deployed at 4 de.NBI Cloud sites & at Bielefeld University
- Deploy SimpleVM site operation stack on EOSC EU Node (OpenStack project integration)
- Provide access to VREs (extensible via Ansible & Packer)
- Integrate with EOSC EU Node Data Storage and Transfer
- Option a)
 - Adapt login integration with EOSC EU Node Login
 - Integrate as project type into node dashboard
 - Requires integration and programming effort with resource management, authorization etc.
- Option b)
 - Provide fast-track access via de.NBI Cloud Portal
 - Login via LS-AAI (can federate to EOSC EU Node AAI?)
 - Integrate with existing simplevm.denbi.de Portal
 - Use EOSC EU node as 5th SimpleVM site

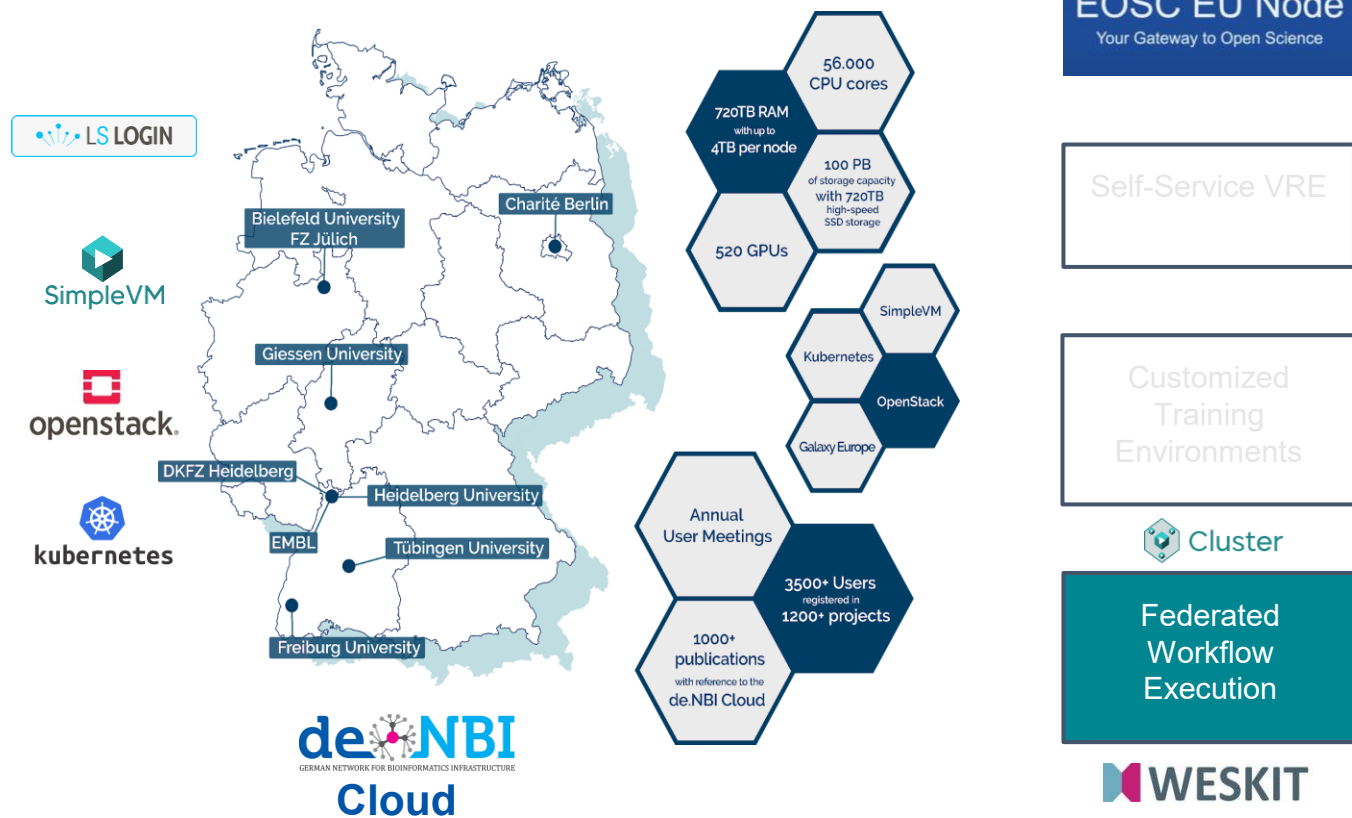
<https://www.uni-bielefeld.de/einrichtungen/bits/services/wuf/simplevm/>
<https://simplevm.github.io/>

Use Case B: ELIXIR On Cloud and de.NBI National Cloud (FKZ Julich, Life Sciences)



- Goal: Simplify availability of SimpleVM for Workshops & Trainings via EOSC EU Node
- Based on SimpleVM Deployment
 - Used in production during annual Cloud User Meeting and de.NBI partner on-line and on-site trainings
 - Provide Training Environments based on
 - a) Pre-defined VREs
 - b) Custom VM Snapshots
 - Streamlined Workshop VM management
 - Participants receive invitation links
 - VMs are linked via LS AAI ID to participant
 - Workshop trainers can receive selective access to participant VMs

Use Case B: ELIXIR On Cloud and de.NBI National Cloud (FKZ Julich, Life Sciences)



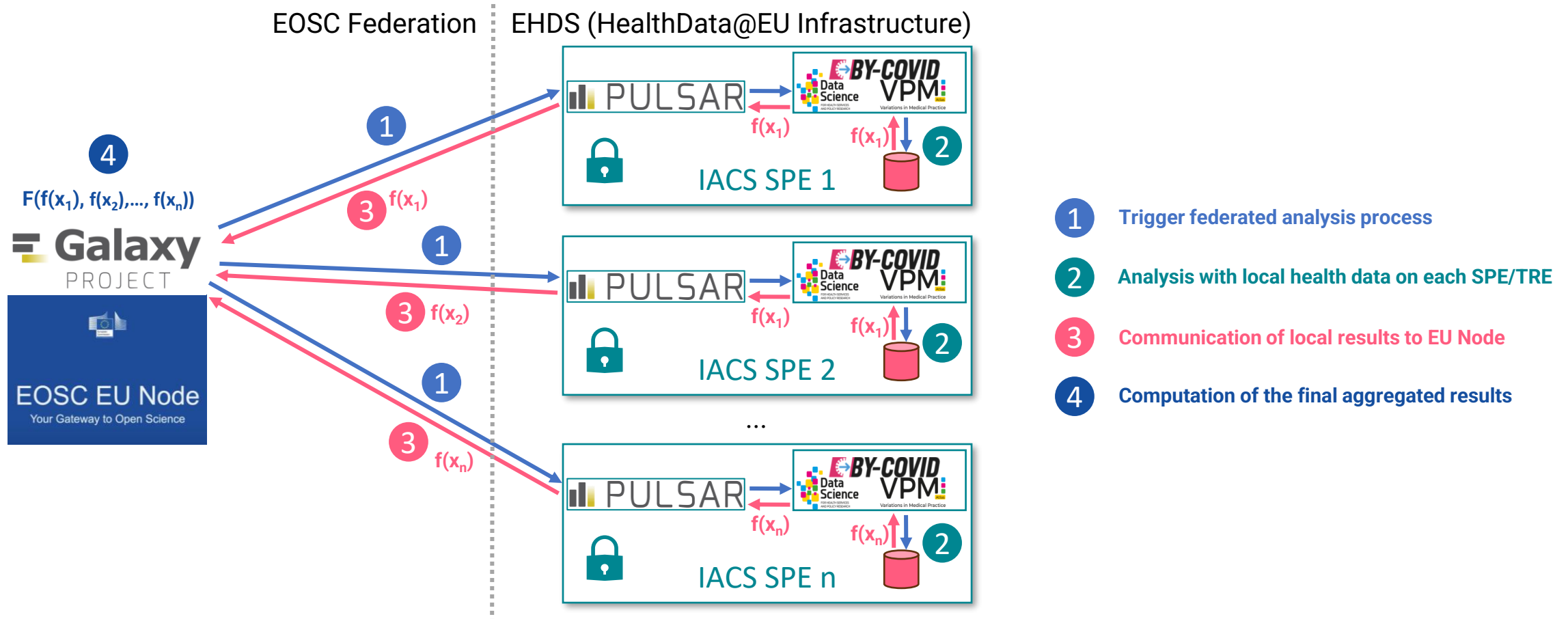
Goal: Federated Workflow Execution

- Based on
 - SimpleVM Cluster Deployment
 - ELIXIR On-Cloud & WESKIT Deployment (in OpenStack / Kubernetes)
 - Galaxy Pulsar Deployment (with SimpleVM Cluster)
- Allows integration into federated compute workflows
- Demonstrate scalability
- Combination with EOSC EU Node Data Storage and Data Transfer Services
- Cross connection to other WP1 use cases to provide federated compute

Use Case D: European Health Data Space and the EOSC EU Node (IACS, Life Sciences)

- **Concept:** pilot an interoperability between EOSC Federation and European Health Data Space (secondary use premises)
- **Objectives:**
 - Use of sensitive data in the EOSC Federation
 - Demonstrate EOSC EU Node orchestrating capabilities
 - Exemplify federated TRE analysis approach (SPEs @ EHDS regulation)
 - Test interoperability between data spaces
 - Inform the Health Data Task Force with an "actual hands-on" exercise

Use Case D: European Health Data Space and the EOSC EU Node (IACS, Life Sciences)



- 1 Trigger federated analysis process
- 2 Analysis with local health data on each SPE/TRE
- 3 Communication of local results to EU Node
- 4 Computation of the final aggregated results

Galaxy PROJECT + PULSAR

Federated analysis orchestration and results summarisation
Aggregated Data



Local analysis platform (BY-COVID vaccination use-case)
Sensitive data

Key Challenges for EOSC United use cases

- Aligning workplan of EOSC United with the plan of the EOSC EU Node to synchronise implementation, promotional and user engagement activities
 - Advance planning including EU Node representatives during WP1,2 Breakout on day 2
 - Map across WPs – do we just join each other's WP meetings when we can or should we consider cross WP Task Forces?
- Which EOSC Node services have already tested integration of part or all of their services with the EOSC EU Node?
- What is the current status of AAI integration with our various solutions (mostly LS Login)?
- What catalogue technology is being used to register the services?
- What is the process to obtain more credits for our demonstrator projects?
- How to build meaningful links between EOSC United and the DSSC, partners?