CS3 MESH4 EOSC

Connecting European Data

ScienceMesh: An Interoperable Federation of EFFS services for EOSC

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CS3 2022

CS3MESH4EOSC has received funding from the European Union's Horizon 2020 Research and Innovation programme under **Grant Agreement No. 863353**.

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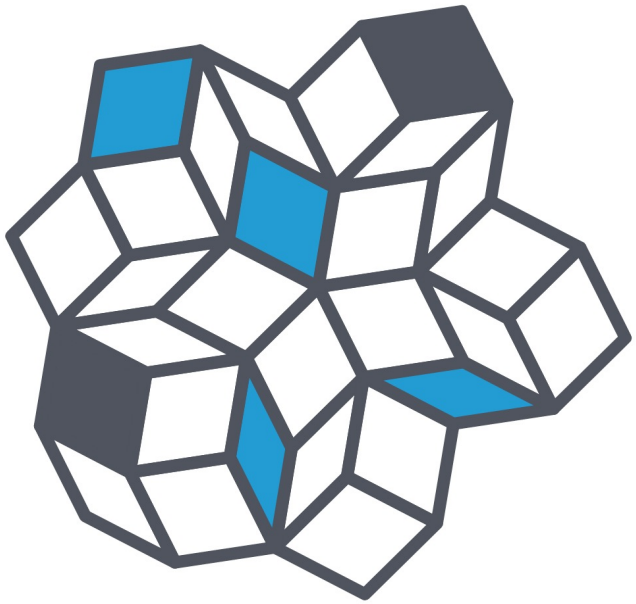

Science Mesh

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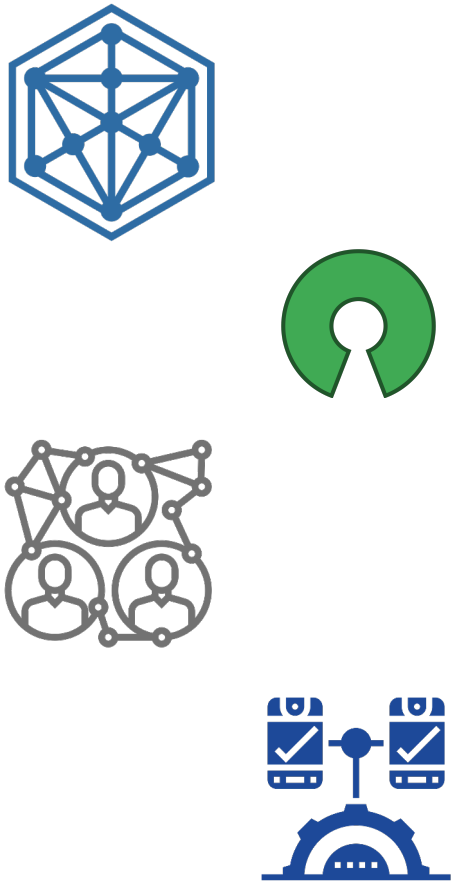
What is ScienceMesh?

- Decentralized **Mesh of EFSS nodes**
  - *Years of successful operation and established services. > 300K users*
- Based on **Open Standards** and **Open Source Software**
- **Federated** research space for Europe
  - *Promote Open Science, Collaborative Research and support Full Research Lifecycle*
- **Interoperability Platform** to develop and connect new applications
  - *Close collaboration with EFSS industry and other commercial partners*



Partners

CERN

Joint Research Centre
JRC

aarnet
Australia's Academic and Research Network

Cubbit

Trust-IT Services
Communicating ICT to markets

cesnet

esade

SURF SARA

PSNC

SWITCH

ailleron

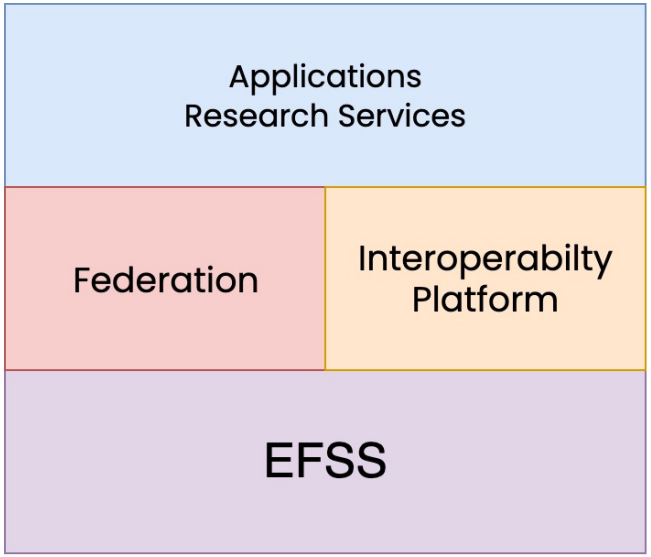
WWU
MÜNSTER

DeiC

Science Mesh

New domain-specific applications developed in the community

Build upon existing infrastructure and long-term efforts



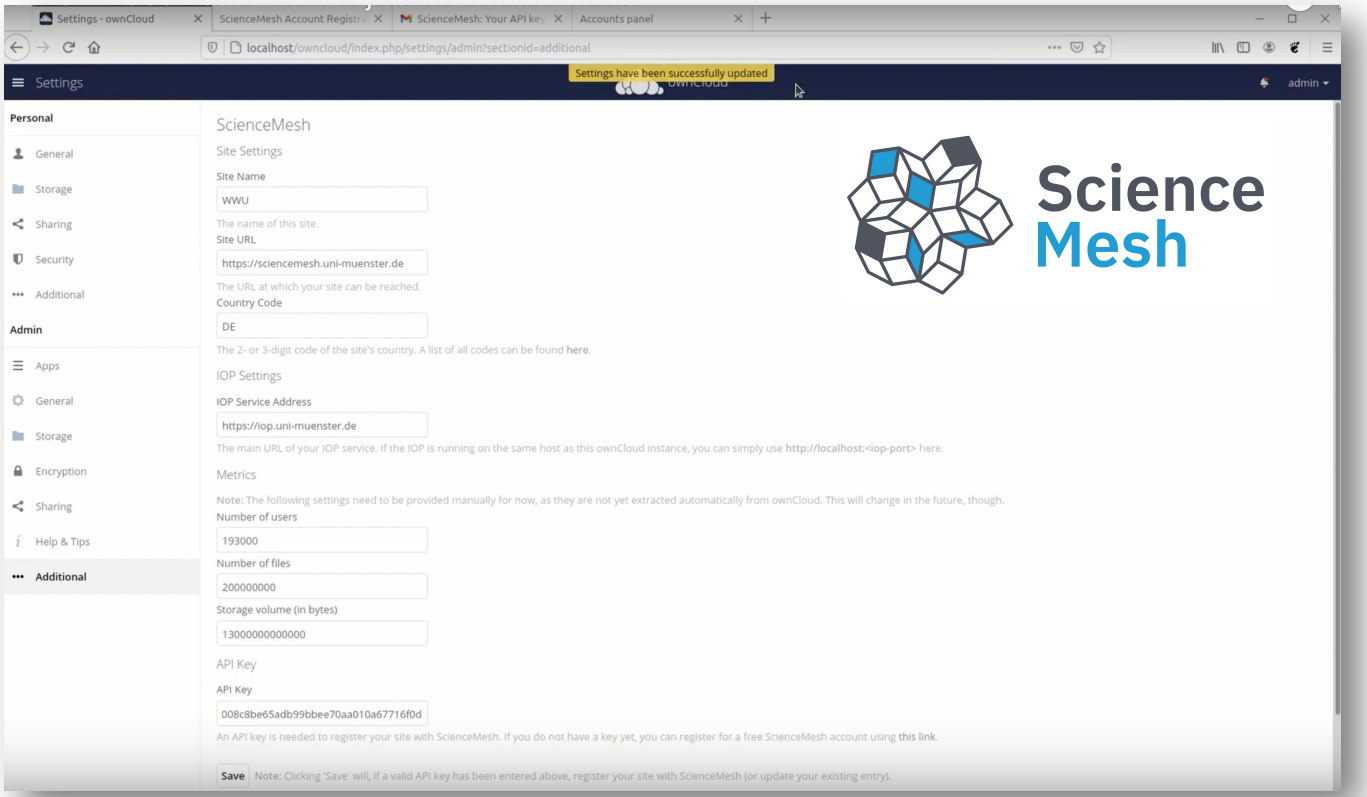
OCM, CS3APIs
REVA

ownCloud,
Nextcloud,
Seafile
...

Lightweight add-on
Easy to deploy and
install new functionality

Connect to already deployed and commercially supported products

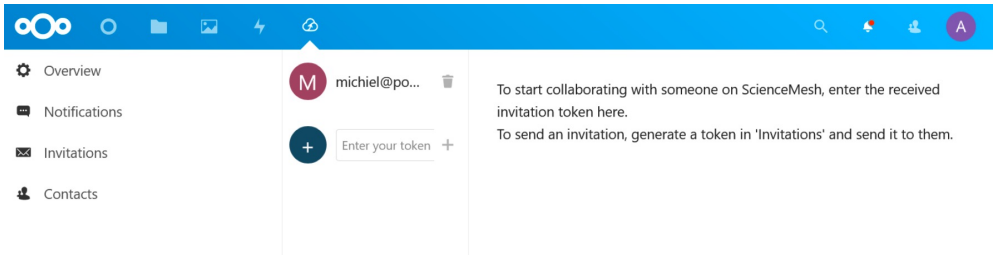
EFSS Connectors



Connectors developed by the community for **Owncloud**, **Nextcloud** and **Seafile**

Platform Support

- Nextcloud
  - outsourced to PonderSource (alpha stage);
  - UI and backend;
- ownCloud
  - OCIS - using REVA, still UI work to do;
  - version 10 - backport by PonderSource (March 2022);
- Seafile
  - *under discussion*



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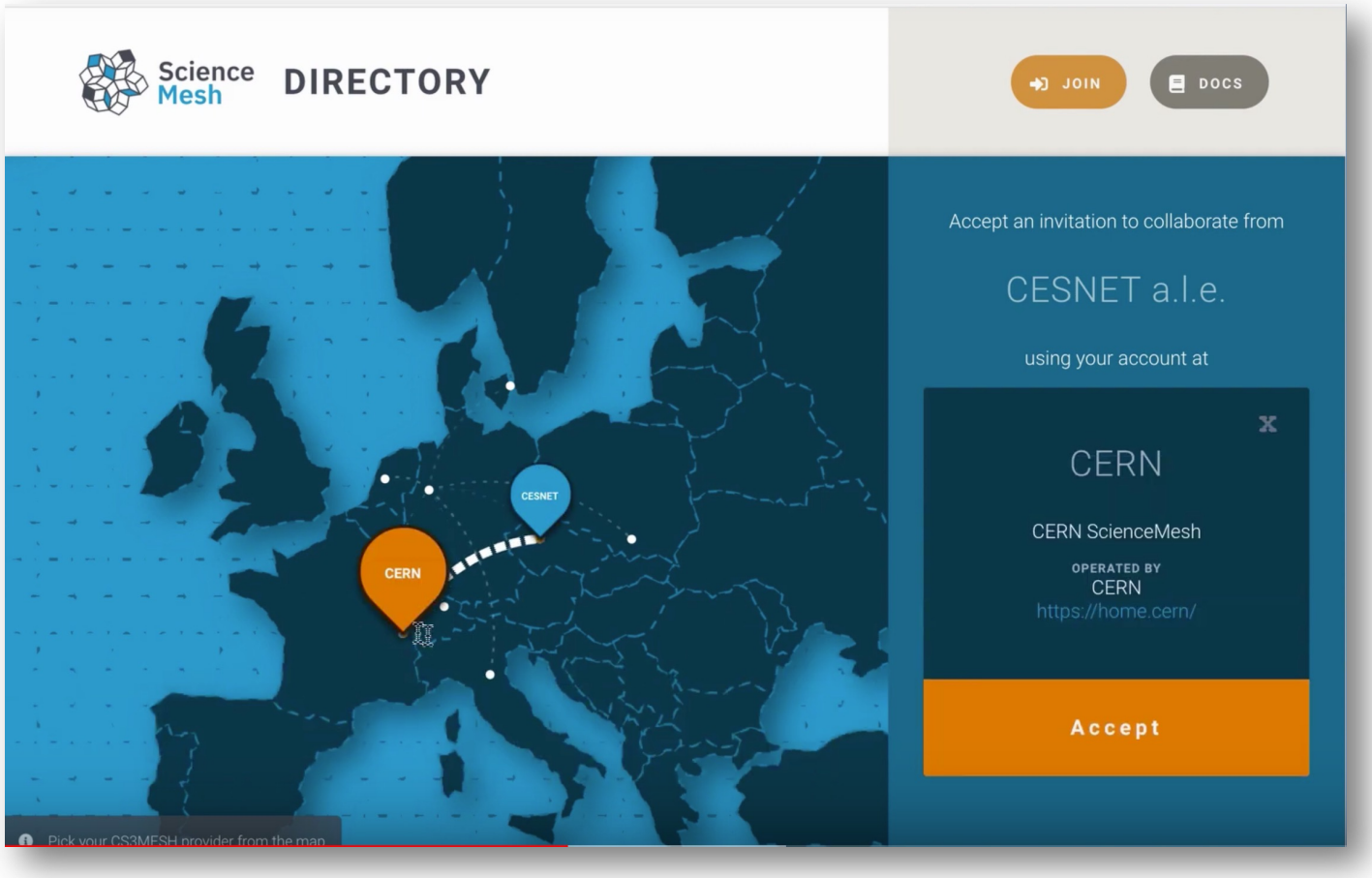
Invitation Workflow for new sites and users



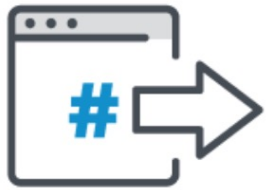
Increase service value for users...

Science Mesh

Data Science Environments

Open Data Systems

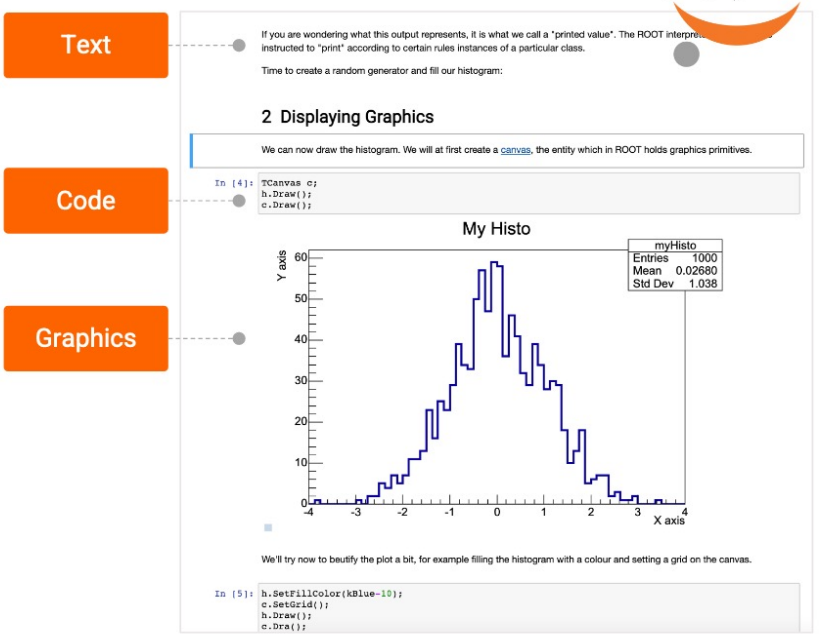
Collaborative Documents



On demand large dataset transfer

Data Science Environment

- Web-based, interactive platform that combines code, text and outputs
  - Ideal for Collaboration, Sciences, Education, Interactive Dashboards…
  - Many languages supported (Python, C++, R, Octave…)
- De facto standard for data science



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Integrating Storage, Compute, Software, ...

SWAN Service at CERN

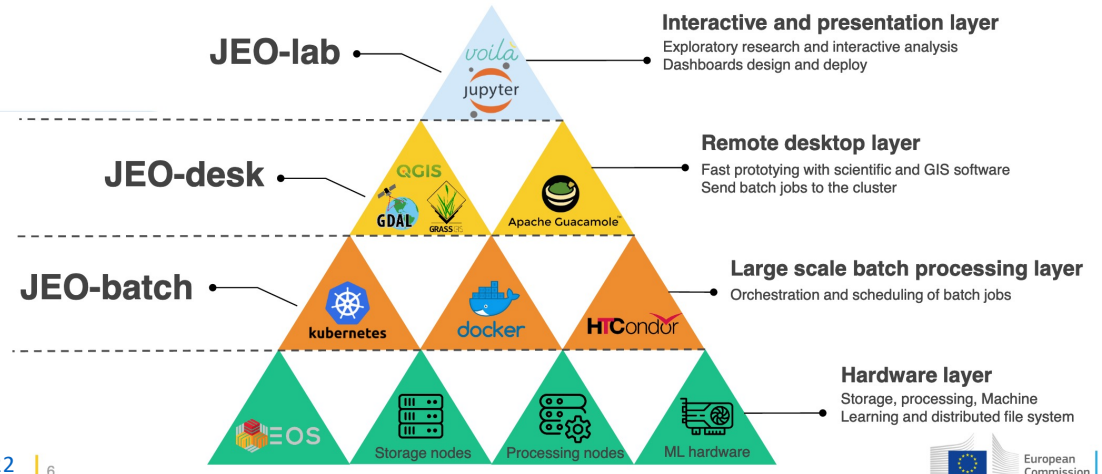
- High Energy Physics
- Interactive Data Analysis
- LHC Machine Learning
- Accelerator Logging
- ....

D.Castro, CS3 2020
https://indico.cern.ch/event/854707/contributions/3680522

Big Data Platform at JRC

- Copernicus Earth Observation
- Geo Visualization and Data Exploration
- Interactive Dashboards

D. De Marchi, CS3 2021
https://indico.cern.ch/event/970232/contributions/4158372



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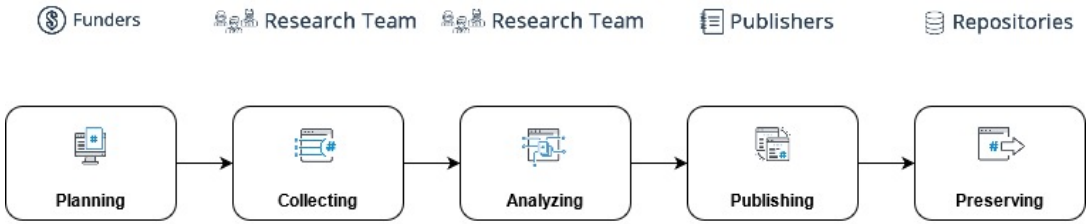
Open Data Workflow

- Integrated workflow, from creation to publishing
- Create, collaborate, annotate and publish
- Based on battle-tested tools



Researcher

Describo

zenodo

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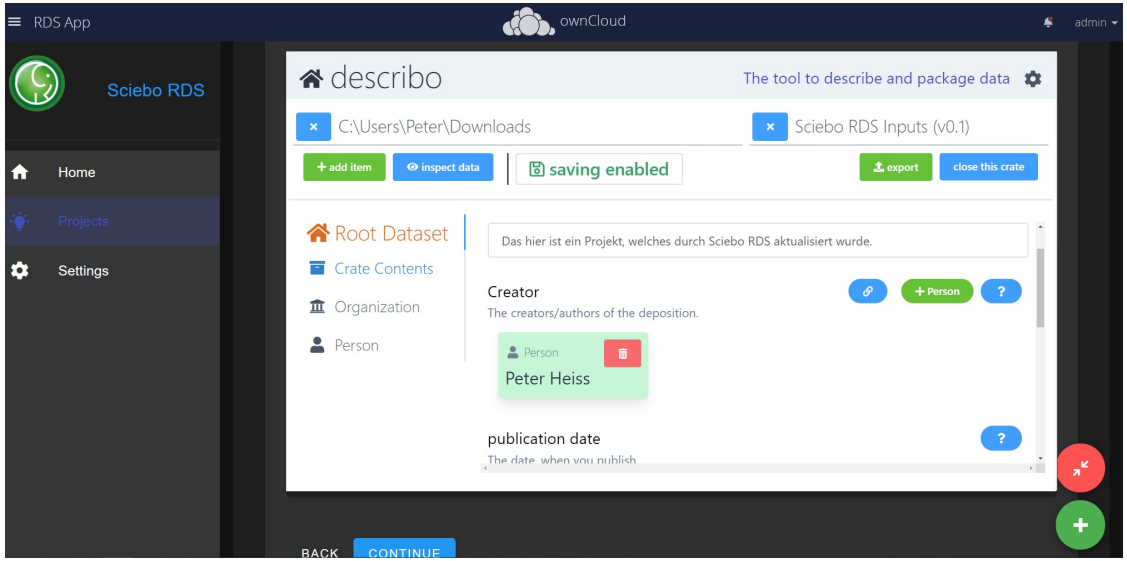
Open Data Workflow

- Proof of Concept successful
- Working on bringing it to test users
- Beta version: March 2022



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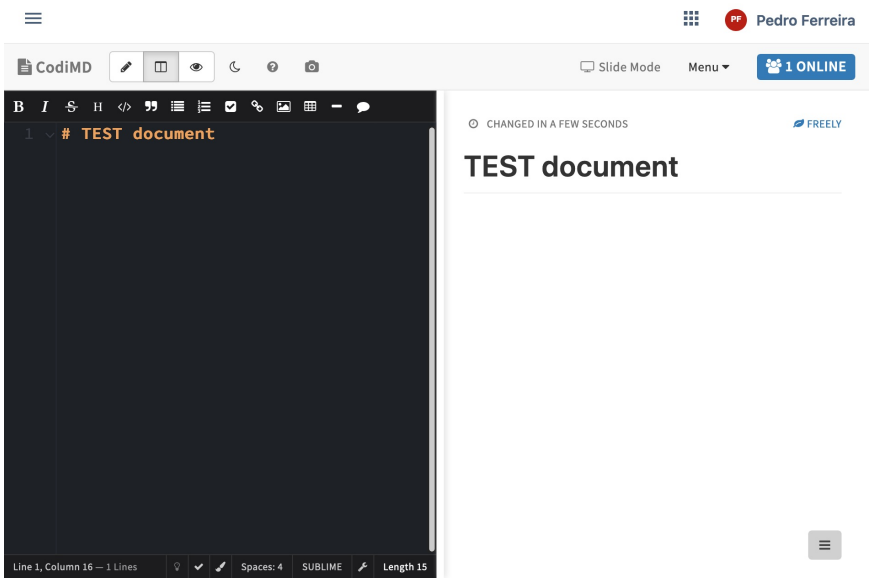
Markdown Editor

- Open-source product (CodiMD)
- Collaborative editing within teams
- EFSS-centric storage of notes
- beta: April 2022



Dataset transfer between research groups

Data Transfers

Data stored at SURF and FZJ.
Initially processing (64x reduction).

LOFAR

On demand large dataset transfer

Science Mesh

RCLONE

FTS

RUCIO

Data shipped to Kraków
for creating science quality images

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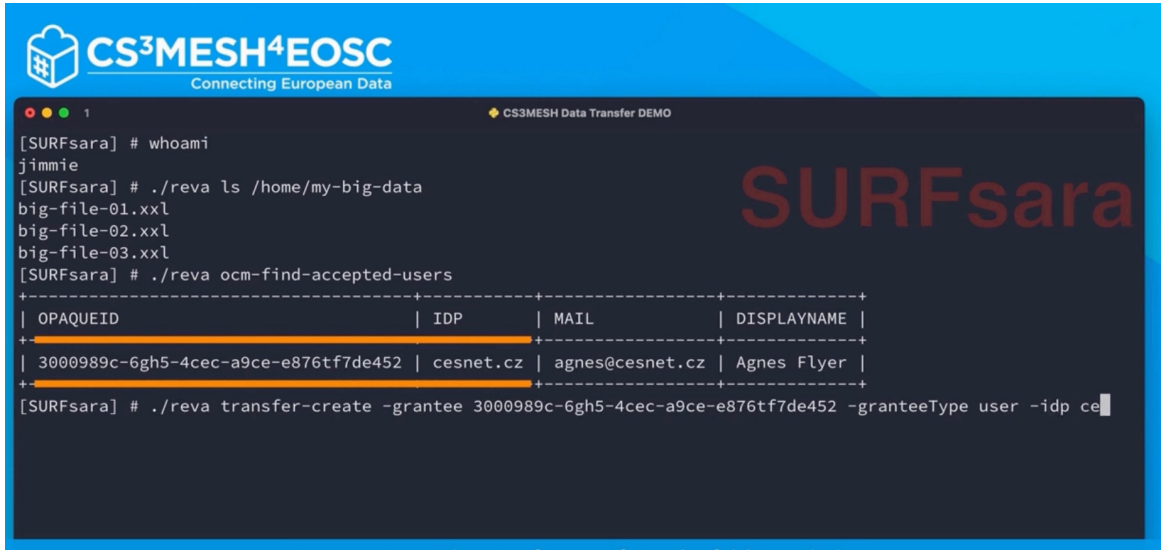
Data Transfers

- Proof of Concept successful
  - Rclone use case
- Direct contribution to Rclone
- Working on user interface
- MVP: April 2022



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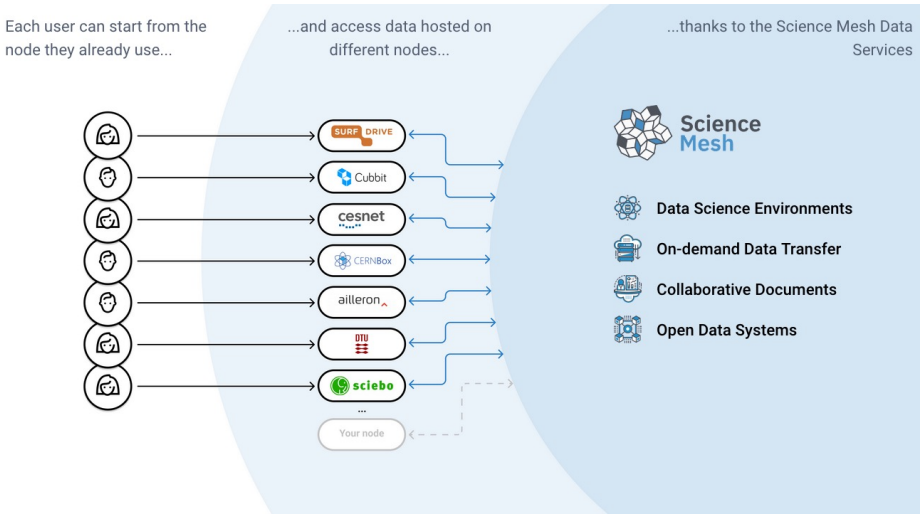
What now?

- Bringing applications to user groups
  - Some identification work done, more to be done
- Onboarding of first “early adopters”
- ScienceMesh as a federated data + application layer for EOSC

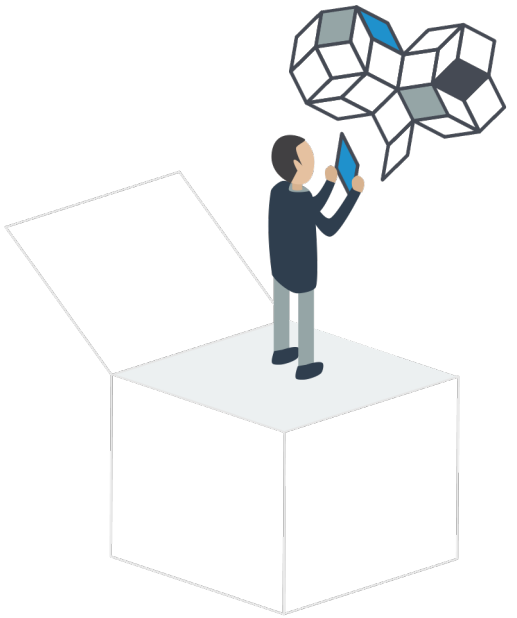


- Looking into ways of bringing the federated layer into EOSC
- Providing a service node to researchers with no institutional access
- Representatives in several TFs
  - Interoperability: CS3 standards and protocols
  - Long-term preservation of data
  - Quality Infrastructure for Research

EUROPEAN OPEN SCIENCE CLOUD

- EGI-ACE – integration of compute resources on ScienceMesh nodes
- Discussions with Research Infrastructures
  - ENVRI-FAIR, SSHOC, PANOSC, EOSC-Life, …
- HIFIS – bridging the two federations

- Essential part of the **CS3MESH4EOSC** initiative
- **Leveraging on the community**
- **Everyone** is welcome to join this collective effort!
- For the **CS3 community**: a **gateway** to EOSC
- For **EOSC**: new tools for Research Infrastructures, new and existing communities



Join our testbed!

How to join Science Mesh

The steps to join the Science Mesh

To join the Science Mesh, there are several formal and technical steps. If you enco
problems during this process or have some general questions, feel free to contact

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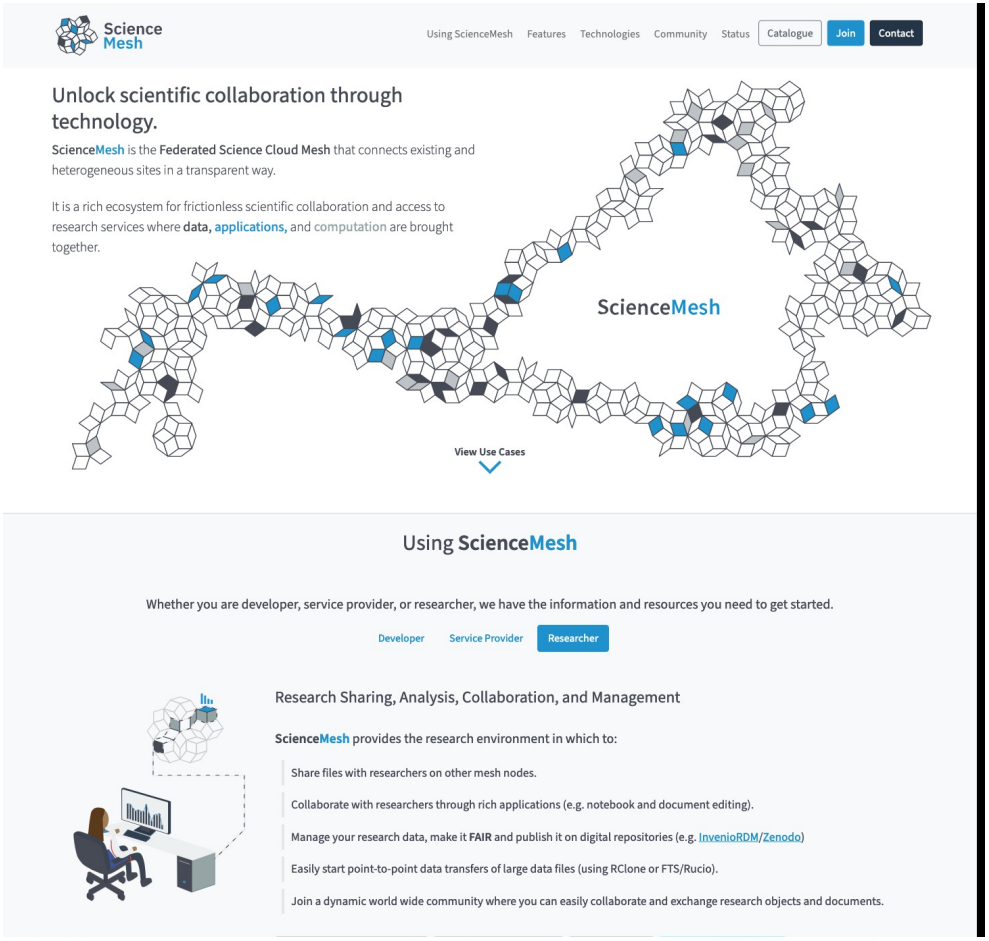
https://sciencemesh.io

- General information about platform
  - *for different audiences*
- Application Catalogue
- Documentation resources
  - *e.g. how to set up?*



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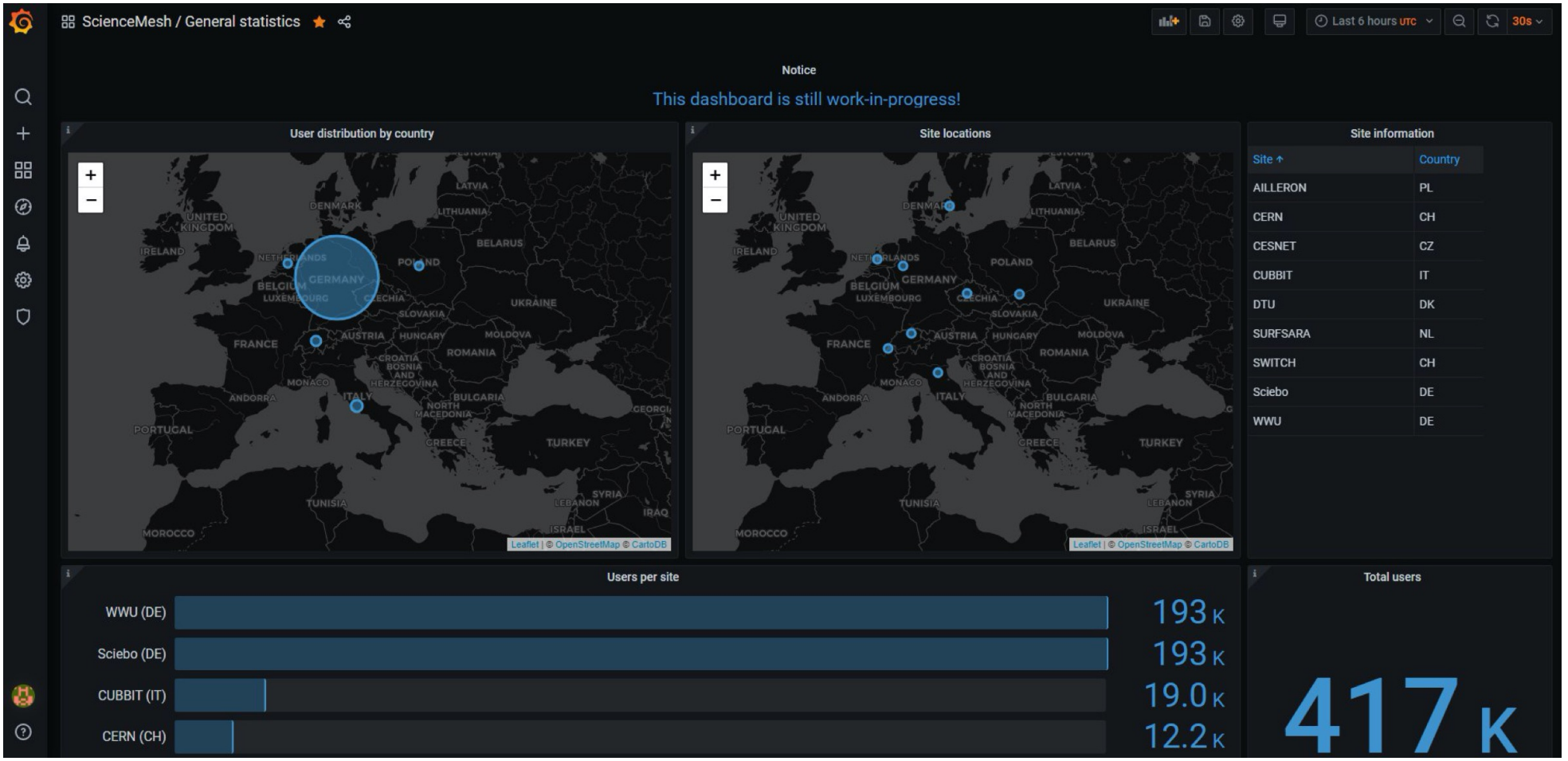
ScienceMesh Dashboard (beta)



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Summary

- Open, practical, bottom-up approach
  - working closely with user communities we take existing best practices, services and technologies, improve them and open up for other scientific communities
- Leverage open-source community effort
  - Build and extend existing services and infrastructures

Expected outcome of Science Mesh

- **Enable frictionless collaboration on research objects for users**
- **Increase the value of each individual service node for providers**

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Want to know more?

Let's talk!

https://sciencemesh.io

https://gitter.im/sciencemesh/community

https://github.com/sciencemesh

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Thank you!

Discover more on...

cs3mesh4eosc.eu

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Acknowledgements

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