



Enabling interoperable data and application services in a federated ScienceMesh

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CERN

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Introduction

The need for a federated mesh

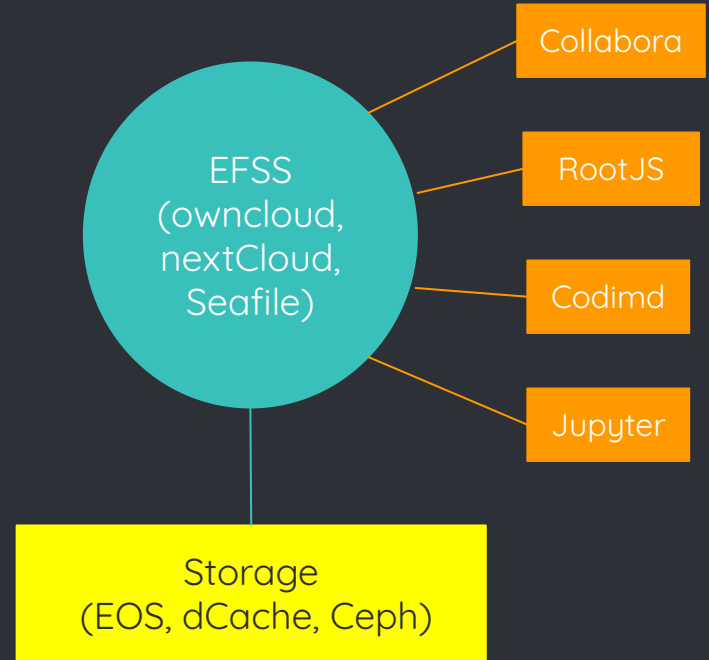
● Research

- Research is a collaborative activity in HEP
 - Involves contributions from across institutions working towards a shared goal
 - Data is a key element to uncover scientific discoveries
 - And access and sharing of this data is crucial for collaboration

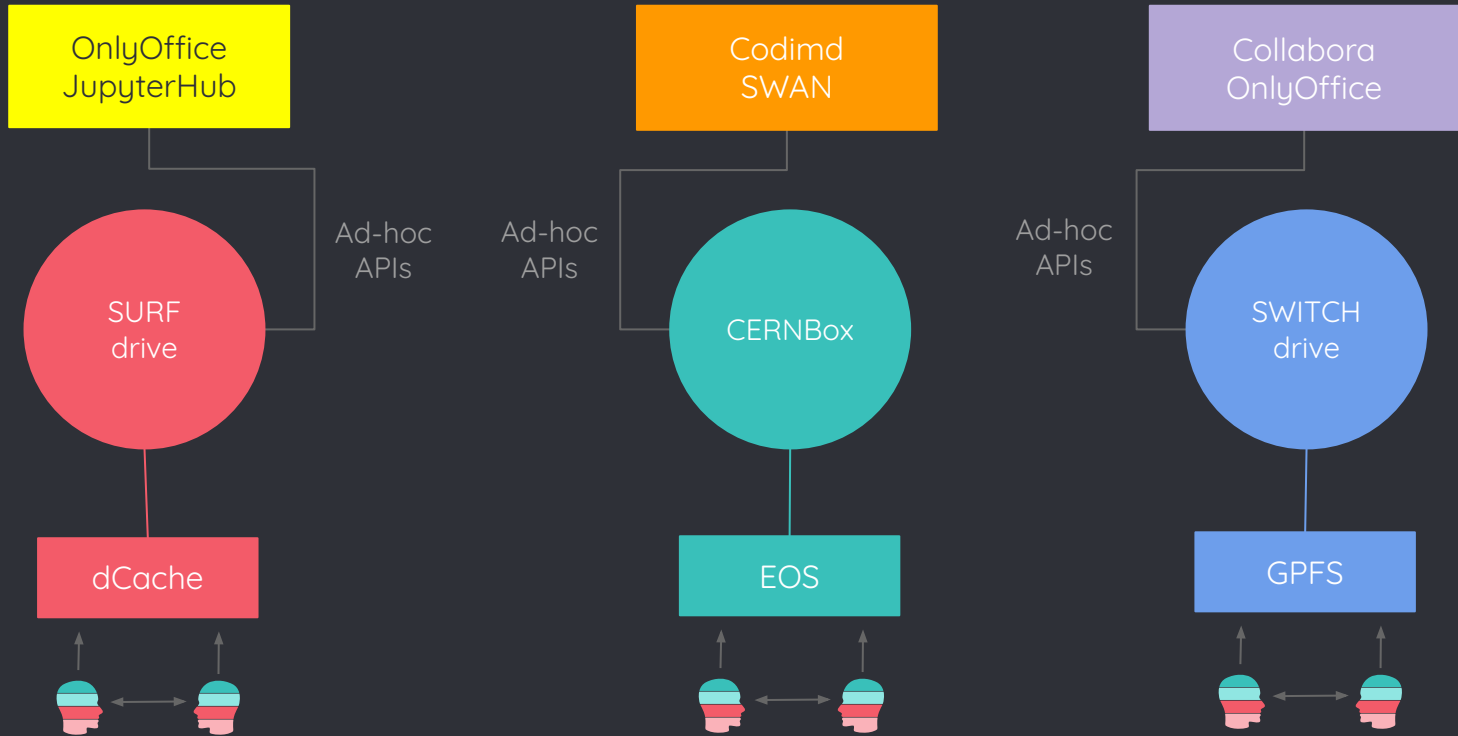


● Sync and Share

- On-prem data repositories have been extended with sync and share capabilities
- EFSS solutions include ownCloud, nextCloud, Seafile
- Bringing universal access to data: anytime, anywhere, any device



Service Fragmentation and Restricted Collaboration





CS³MESH⁴EOSC

Connecting European Data

- Enable collaboration possibilities across clouds in a federated mesh (ScienceMesh)[1]
- Real-time collaborative editing (CodiMD, Collabora, OnlyOffice)
- Data science environments (SWAN, JupyterLab)
- On-demand data transfers (Rucio, FTS, RClone)
- Digital Repositories (Zenodo)

[1] <https://sciencemesh.io>



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How to expand local use-cases to remote users

● Questions to be addressed



User Discovery

Discover remote users
in a user-privacy
compliant way

Invitation API
Mesh Provider API



User Experience

Ensure seamless
integration with
your favourite EFSS

**Integration with
vendors**



Expand local use cases

Data science envs,
Collaborative
editing, BYOA

OCM API
App Provider API



Establish trust

Ensure that the
individual clouds can
trust each other

**Access Control
functionalities**

- User discovery

- Possible approaches:
 - A central registry which enables searching for users and groups
 - Scalability issues
 - User privacy not guaranteed
 - **A distributed workflow to invite users to collaborate via any third-party communication channel [1]**

[1] <https://cs3org.github.io/OCM-API/docs.html>

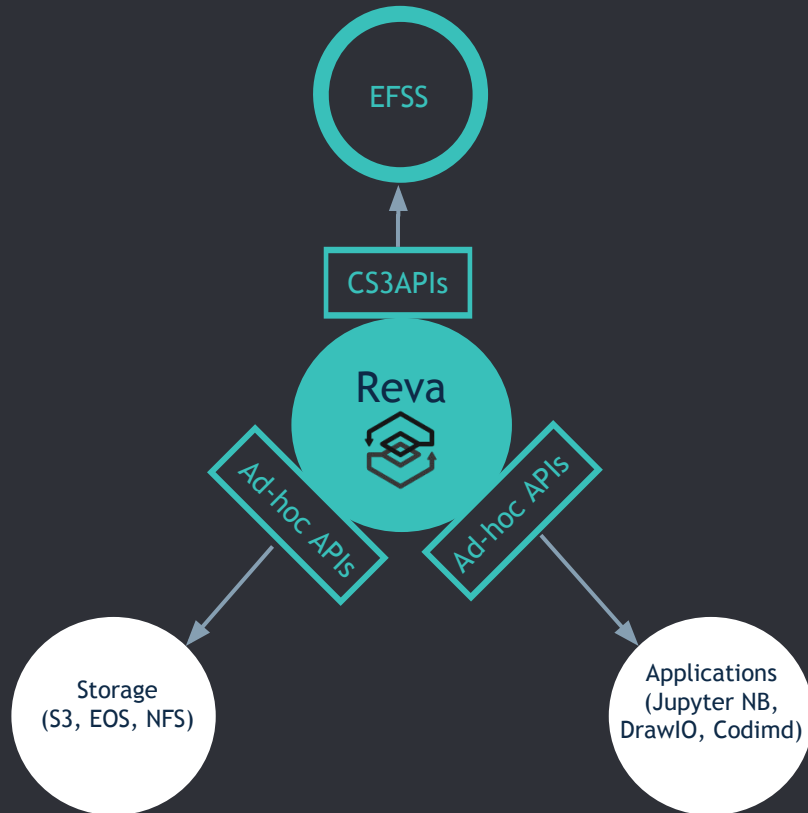
- Open Cloud Mesh: Enable local use-cases across clouds
 - A web-based protocol for universal file access beyond individual clouds
 - Vendor-neutral
 - Provides endpoints to receive and list shares from other mesh providers
 - The endpoints for individual mesh providers can be retrieved either from a local database or a central registry to which all providers must register.

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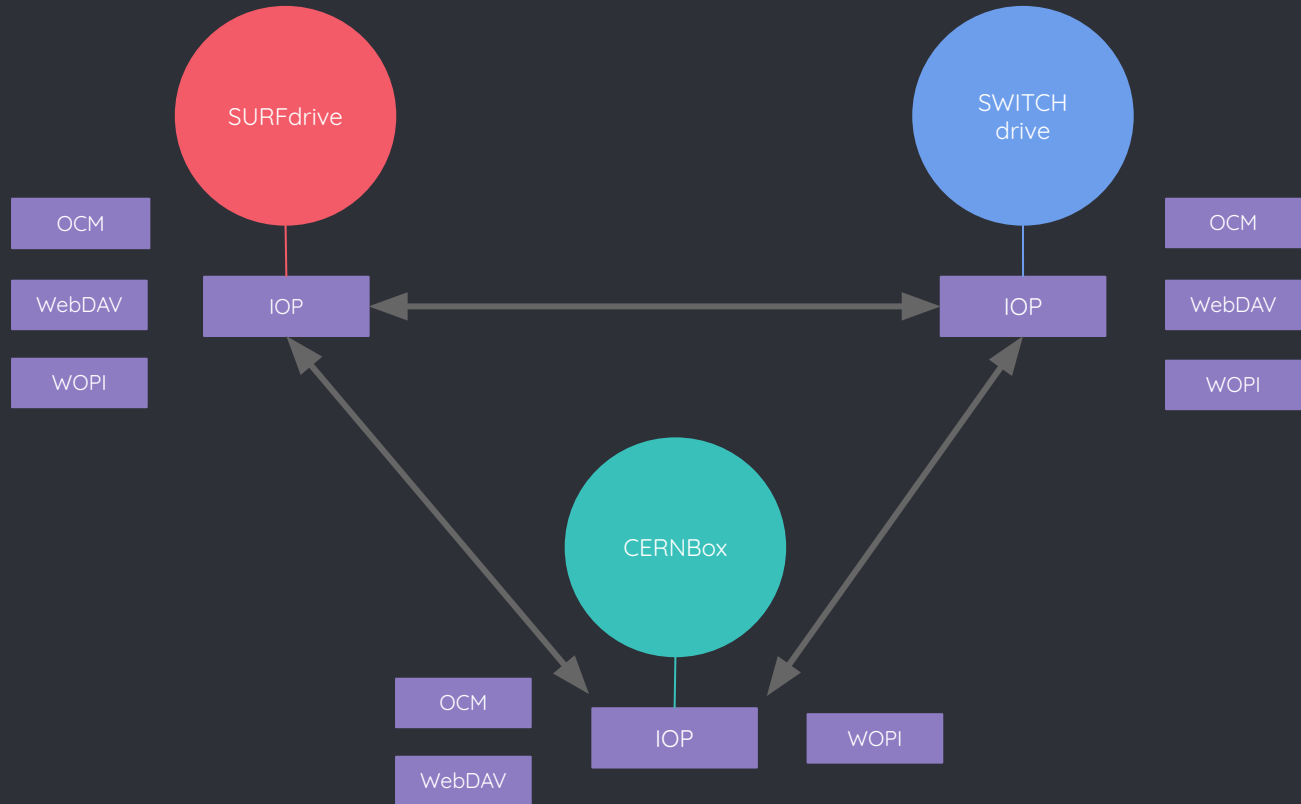
Reference Implementation

The Interoperability Platform

- The Interoperability Platform



● The ScienceMesh architecture



- Establishing trust: Access Control

- Rate limiting the number of requests to the metadata endpoints
- Shared API keys between the different providers
- Reverse lookups of the incoming request's host
 - Requires knowledge of the domains of all the registered providers

● Preliminary Tests and Conclusion

- These use cases available across the 8 partners - CERNBox, SURFdrive, PSNCBox, CloudSTOR, Sciebo, owncloud@CESNET, SWITCHdrive and ScienceData.
- Initial automated as well as manual rounds of tests across these sites covered many scenarios.
- Efforts into developing bindings for more research-oriented applications will continue

Thanks!

Questions?

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