



**CS<sup>3</sup>  
MESH<sup>4</sup>  
EOSC**

**Connecting European Data**



# Science Mesh for site administrators: operations, security and trust

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

### # Many thanks to:

- # David Antoř, Milan Daneček, Miroslav Bauer (CESNET)
- # Holger Angenent, Daniel Müller (WWU)
- # Renato Furter (SWITCH)
- # Antoon Prins, Thirsa de Boer (SURF)

### # Remark: Still work in progress

## # Federated Infrastructure

- # Deals with all issues related to federating the infrastructure
  - # AAI
  - # Monitoring and accounting
  - # Procedures, OLAs
  - # Security
  - # Integration with EOSC
  - # Support
- # Both procedural and technical/operational
- # Keep things as lightweight as possible (but not lighter)
- # Re-use as much as we possibly can

### # AAI

- # Sharing data and apps
- # Federated Identity/Group Management is one road you can take
  - # Federated Identity and Group Management system allows users to login to various distributed systems based on their identity or group they belong to
- # The EFSS systems within the Science Mesh can work with such systems
  - # Just need source of identity and group information

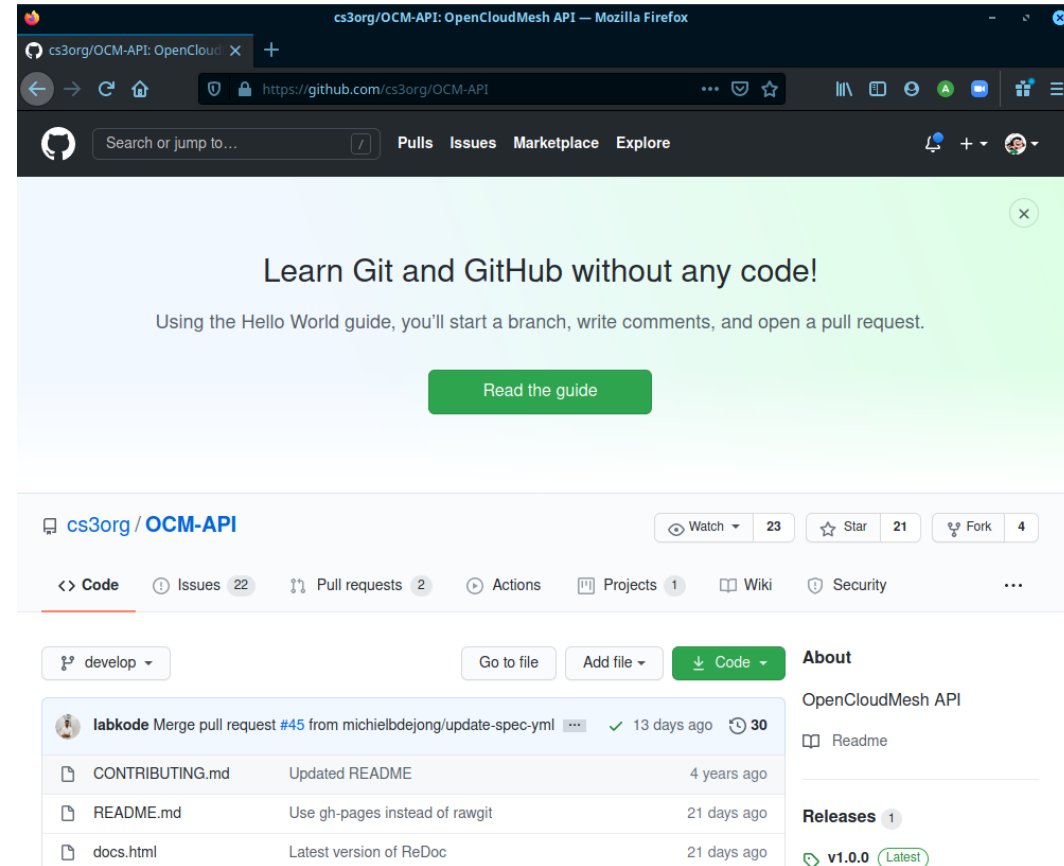
- # But for our use-cases it is not really necessary
  - # Sharing data and apps based on an invitation workflow
  - # No need to be able to login into remote systems
  - # Only need to be able to login into your own EFSS systems and being authorized to use remote data and apps. Authorisation is obtained during the invitation workflow
  
- # Bottom up approach
  - # No need to be member of a scientific community
  - # You just want to collaborate on a project with your own colleagues within your own institute and colleagues at other institutes somewhere else and share data and apps with them

## # Invitation workflow

- # Based on Open Cloud Mesh (OCM) APIs
  - # Create and receive shares
  - # Send and receive notifications
  - # <https://github.com/cs3org/OCM-API>

## # OCM

- # enables resource sharing
- # Does not solve how users know each other
- # Added discovery and identity management on top of OCM



The screenshot shows the GitHub repository page for `cs3org/OCM-API`. The browser address bar shows `https://github.com/cs3org/OCM-API`. The repository page includes a green banner for learning Git and GitHub, a navigation bar with `Code`, `Issues` (22), `Pull requests` (2), `Actions`, `Projects` (1), `Wiki`, and `Security`. The `Code` tab is active, showing a file list with `CONTRIBUTING.md` (Updated README, 4 years ago), `README.md` (Use gh-pages instead of rawgit, 21 days ago), and `docs.html` (Latest version of ReDoc, 21 days ago). The right sidebar shows repository statistics: `Watch` (23), `Star` (21), `Fork` (4), and a `Releases` section with `v1.0.0` (Latest).

## # Invitation workflow

- # At the core of the Science Mesh
- # Based on establishing trust between pairs of users without requiring them to know each others IDs or EFSS'
- # Sharing a resource regardless of what the resource is
  - # Data
  - # Applications

# Invitation workflow principle

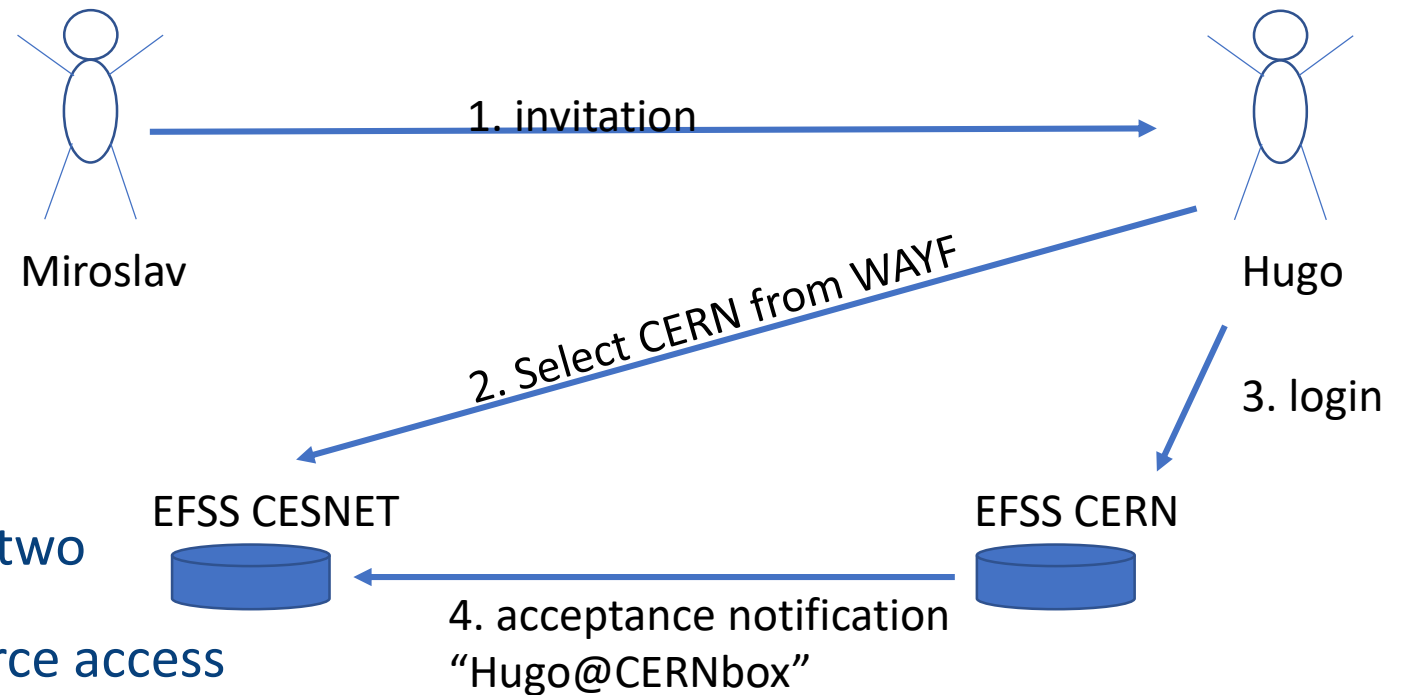
- # Send an invitation through a familiar channel
- # E.g. email, instant messaging, ...
- # No need to know what other side uses

# Invited user goes to a WAYF-like service

- # Chooses the system
- # Logs in -> reveals user ID

# This information is used

- # To establish trust between those two users
- # To send tokens for sharing/resource access





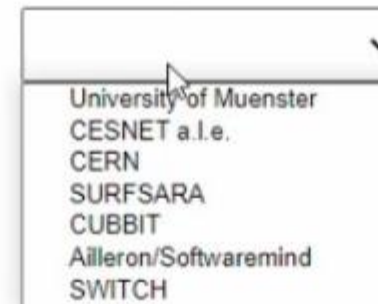
## # System Architecture

- # EFSS'
- # Central configuration database
  - # Contains the mesh sites
- # Executive Module
  - # Located with sync-and-share services
  - # Service discovery for users
  - # Sharing policy enforcement

## # Design considerations

- # Cache information locally at sites
- # GDPR

### Choose your CS3 Mesh service



A screenshot of a web interface showing a dropdown menu. The menu is open, displaying a list of service providers. A mouse cursor is hovering over the first option, 'University of Muenster'. The list includes: University of Muenster, CESNET a.l.e., CERN, SURFSARA, CUBBIT, Ailleron/Softwaremind, and SWITCH.

University of Muenster
CESNET a.l.e.
CERN
SURFSARA
CUBBIT
Ailleron/Softwaremind
SWITCH



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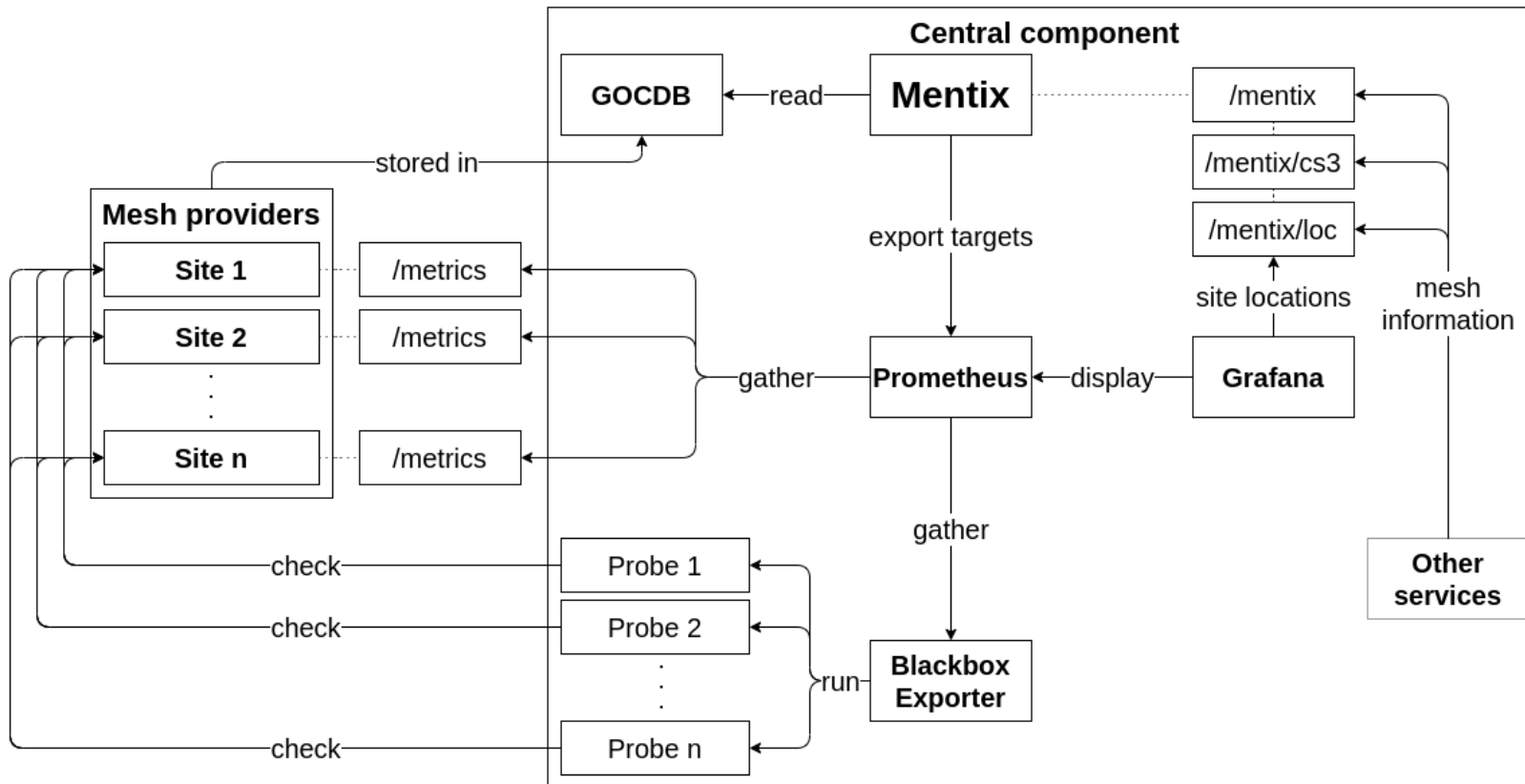
**Demo D2.1**

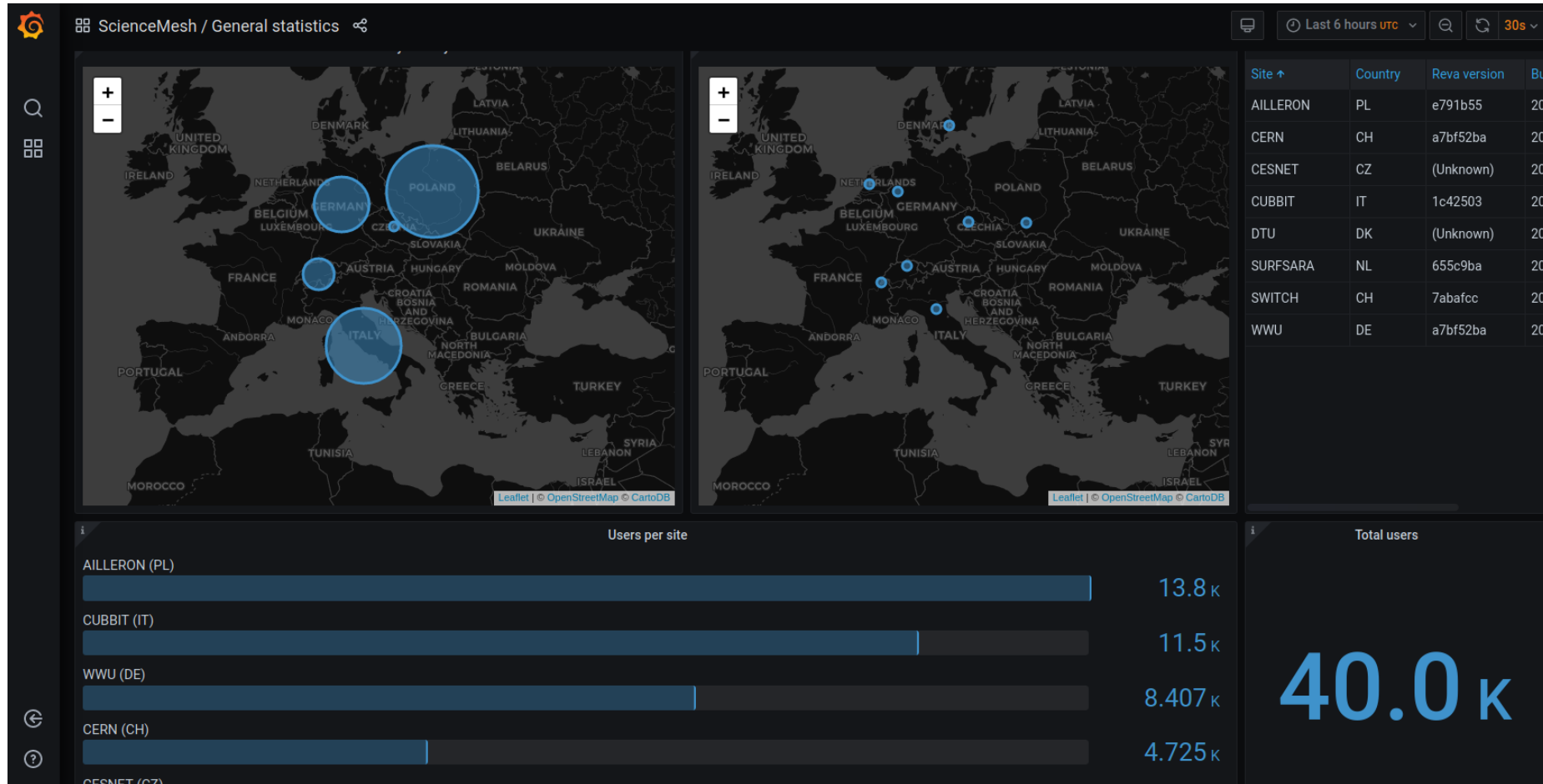


## # Groups


- # Workflow will be similar as with person to person sharing
- # Groups defined and managed at target system

## # Monitoring and accounting





ScienceMesh / Health monitoring

Site status		Service status: AILLERON		Check status: AILLERON											
Site ↑	Status	Service ↑	Status	Service ↑	Check	Output	Status								
AILLERON	HEALTHY	REVAD	HEALTHY	REVAD	<a href="#">sciencemesh-hcheck-http-ping</a>	HTTP OK: Status line output matched "HTTP" - 411 bytes in 0.038 second respo...	OK								
CERN	HEALTHY			REVAD	<a href="#">sciencemesh-hcheck-iop-login</a>	IOP login successful	OK								
CESNET	HEALTHY	Service status: CERN		Check status: CERN											
CUBBIT	CRITICAL	Service ↑	Status	Service ↑	Check	Output	Status								
DTU	CRITICAL	REVAD	HEALTHY	REVAD	<a href="#">sciencemesh-hcheck-http-ping</a>	HTTP OK: Status line output matched "HTTP" - 465 bytes in 0.079 second respo...	OK								
SURFSARA	HEALTHY			REVAD	<a href="#">sciencemesh-hcheck-iop-login</a>	IOP login successful	OK								
SWITCH	CRITICAL	Service status: CESNET		Check status: CESNET											
WWU	HEALTHY	Service ↑	Status	Service ↑	Check	Output	Status								
		REVAD	HEALTHY	REVAD	<a href="#">sciencemesh-hcheck-http-ping</a>	HTTP OK: Status line output matched "HTTP" - 528 bytes in 0.023 second respo...	OK								
				REVAD	<a href="#">sciencemesh-hcheck-iop-login</a>	IOP login successful	OK								
Site summary		Service status: CUBBIT		Check status: CUBBIT											
 <table border="1"> <thead> <tr> <th>count</th> <th>percentage</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>63%</td> </tr> <tr> <td>0</td> <td>0%</td> </tr> <tr> <td>3</td> <td>38%</td> </tr> </tbody> </table>		count	percentage	5	63%	0	0%	3	38%	Service ↑	Status	Service ↑	Check	Output	Status
count	percentage														
5	63%														
0	0%														
3	38%														
		REVAD	CRITICAL	REVAD	<a href="#">sciencemesh-hcheck-http-ping</a>	HTTP OK: Status line output matched "HTTP" - 382 bytes in 0.051 second respo...	OK								
				REVAD	<a href="#">sciencemesh-hcheck-iop-login</a>	unable to get a list of all supported login methods: listing authorization provider...	ERROR								
		Service status: DTU		Check status: DTU											
		Service ↑	Status	Service ↑	Check	Output	Status								
		REVAD	CRITICAL	REVAD	<a href="#">sciencemesh-hcheck-iop-login</a>	unable to get a list of all supported login methods: listing authorization provider...	ERROR								
				REVAD	<a href="#">sciencemesh-hcheck-http-ping</a>	HTTP OK: Status line output matched "HTTP" - 380 bytes in 0.034 second respo...	OK								
		Service status: SURFSARA		Check status: SURFSARA											

## # Procedures

- # Support (helpdesk for users and fellow sites in the mesh)
- # Security
- # Operational
  - # Downtimes
  - # Availability and Reliability
- # Ingress of new sites
  - # Sites need to fulfill some requirements
- # Removing sites from the mesh

## # Science Mesh Governance

### # Proposal

- # Science Mesh Executive board
  - # Financing centrals ops
  - # Ratification of decisions
- # Science Mesh Steering Group
  - # Making decisions
- # Operational team
  - # Running central services



- # Integration EOSC
- # See Bob Jones' talk in CS3 2021
- # Rules of Participation

## # IOP deployments

- # Ailleron
- # CERN
- # CESNET
- # Cubbit
- # SURF
- # SWITCH
- # WWU
- # Your site?????



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**Thank you!**  
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