

# Getting the users in:

- the Puhuri solution for AAI,  
Allocation, and Reporting



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# Project Idea

*Seamless access to pan-European compute and HPC adjacent services for researchers and industrial users*

The project contributes to **reduced administration costs** and **better usability** by implementing federated services for AAI and resource allocation.

The project will ensure a **long-term availability** by providing sustainable operations with well-defined processes for service providers with a need for the services provided by Puhuri.

The project will provide a **trusted AAI solution** with available level of assurance information.

The project will **offer the solutions and results** of Puhuri to National, Nordic and pan-European initiatives thereby providing the initiatives with the added benefits provided by the Puhuri system.

# Cross-Border access is HARD

- Multiple jurisdictions and regulations
- Differing regulations on economy (VAT)
- Access restrictions
- National policies
- Needs to be secure
- Needs to be convenient

At problemstillinger vedr. GDPR-regler beskrives med det formål at drøfte, hvorledes deling af forskningsdata på tværs af institutioner og landegrænser bliver så smidig og agil som muligt. Arbejdet kan afvente Datatilsynets offentliggørelse af nye vejledninger med fortolkning af GDPR-reglerne inden for forskningsområdet.

*Session: Opfølgning på implementeringen af den Nationale Strategi for Data Management baseret på FAIR Principperne på universiteterne fra FAIR Følgegruppen og FAIR Arbejdsgrupperne*

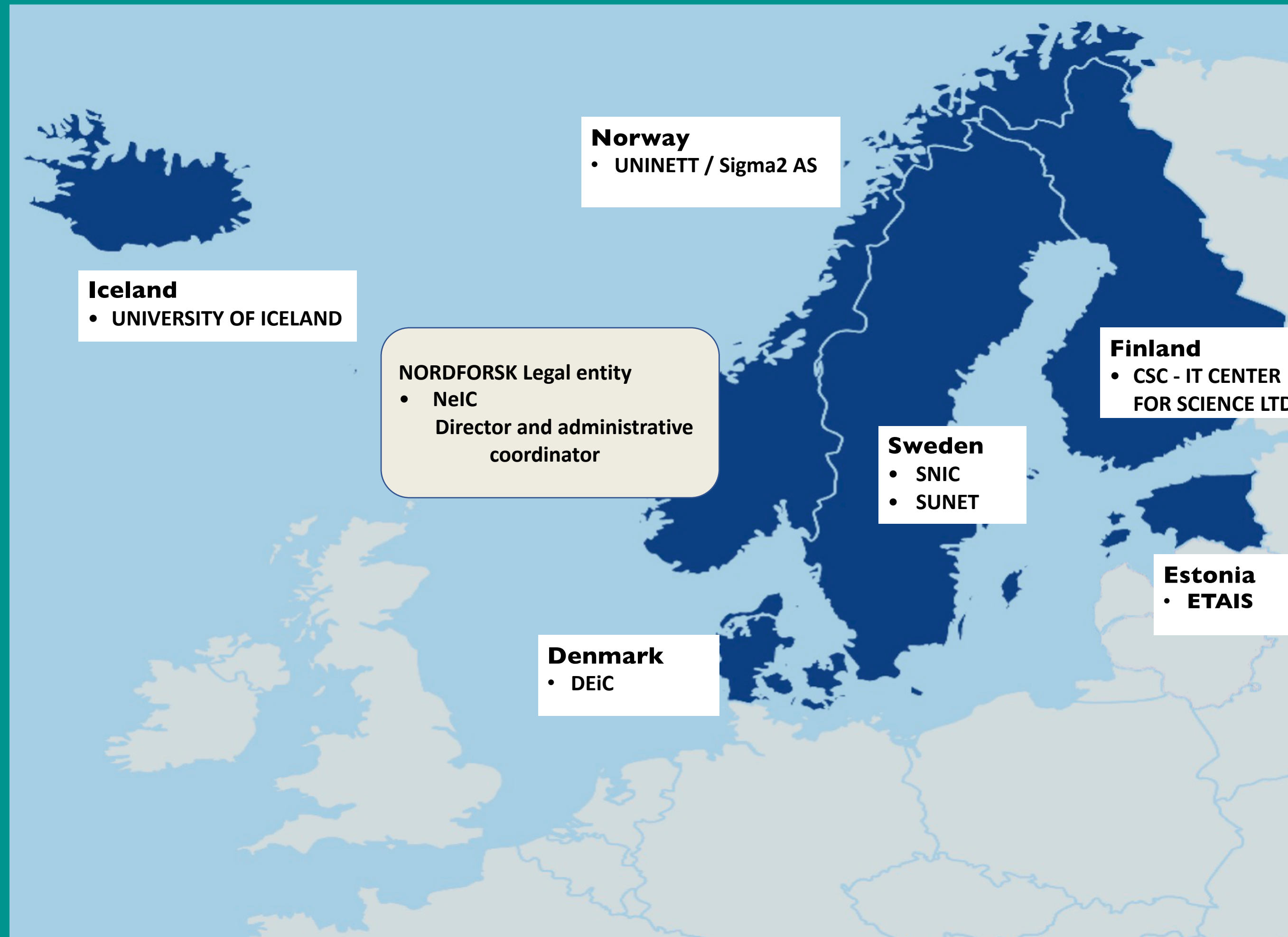
# Puhuri

Project named after the spirit of cold and winter

*Kalevala (Finnish mythology):  
**Puhuri**, the north-wind, the father of  
Pakkanen (frost) is sometimes  
personified as a gigantic eagle.*



# Puhuri Project partners



4.5 FTE/year

19 actively participating persons

Activities (teams):

- AAI
- National integration
- Resource allocation
- Service integration

# NeIC

Part of Nordforsk

Budget in 2022: 74 MNOK ~ 7,5 M€

*Provides funding, management, a framework and a network for projects that improve digital infrastructure and research in the Nordic-Estonian region*

One operational activity, several development projects and pre-studies working on various fields of science

Health, Climate and biodiversity  
Atmospheric sciences  
High-energy physics  
Software development  
Authentication & Authorization  
Infrastructure  
Architectures  
User interfaces

6 member countries  
~45 partners  
~230 persons

# Stakeholder interaction

The Puhuri **Reference Group** is composed of representatives from user communities and e-infrastructure operations, and advice the project on functional and operational requirements on deliverables.

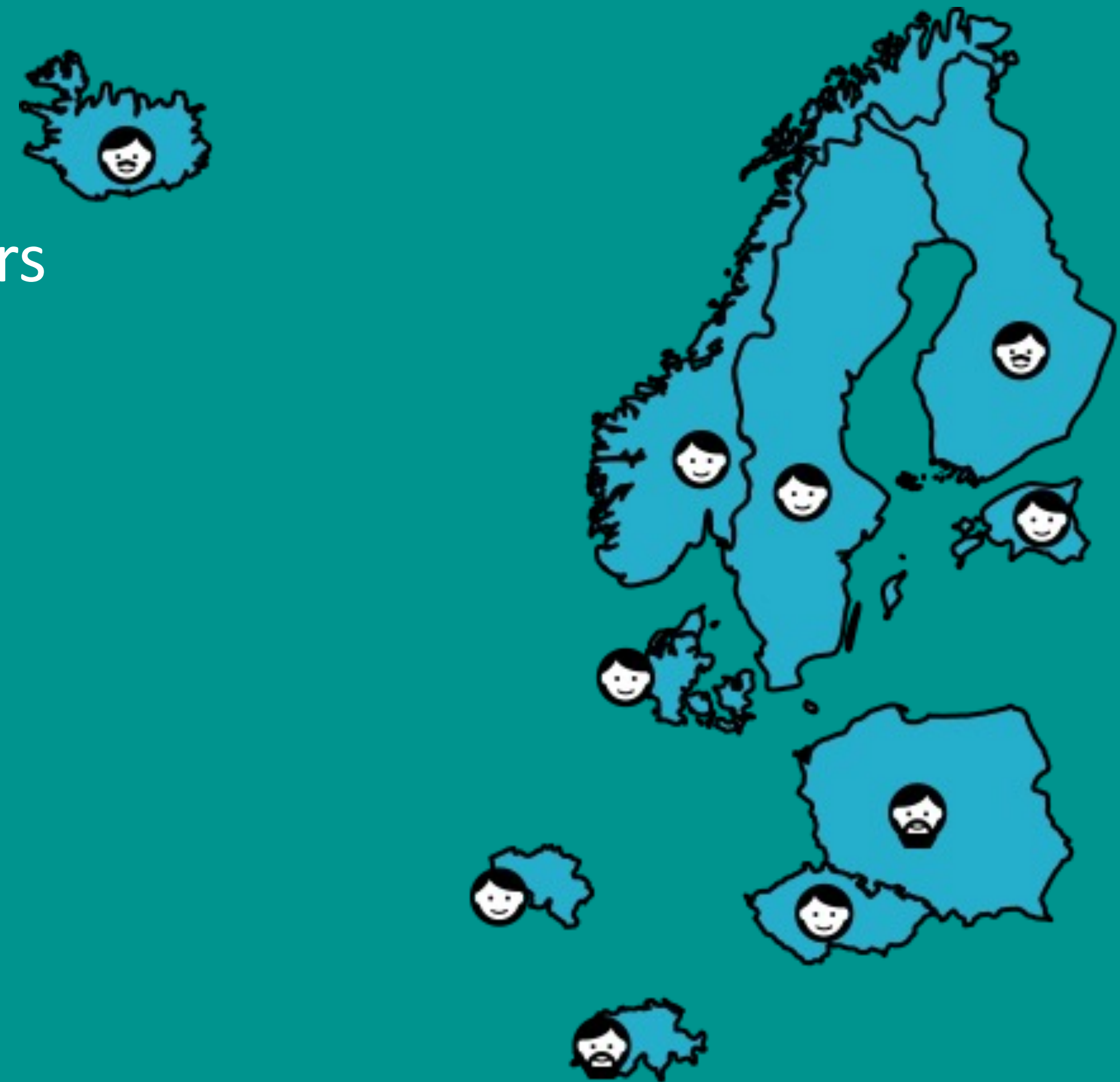
Zoom meetings every 3 months. Other focused interaction on demand. Mailing list.

# Puhuri Project's scope

Single system multiple service owners  
Unified allocation, project, and user  
management system

Handles:

- Authentication
- Authorisation
- Identification
- Resource allocation
- Project management
- Etc.



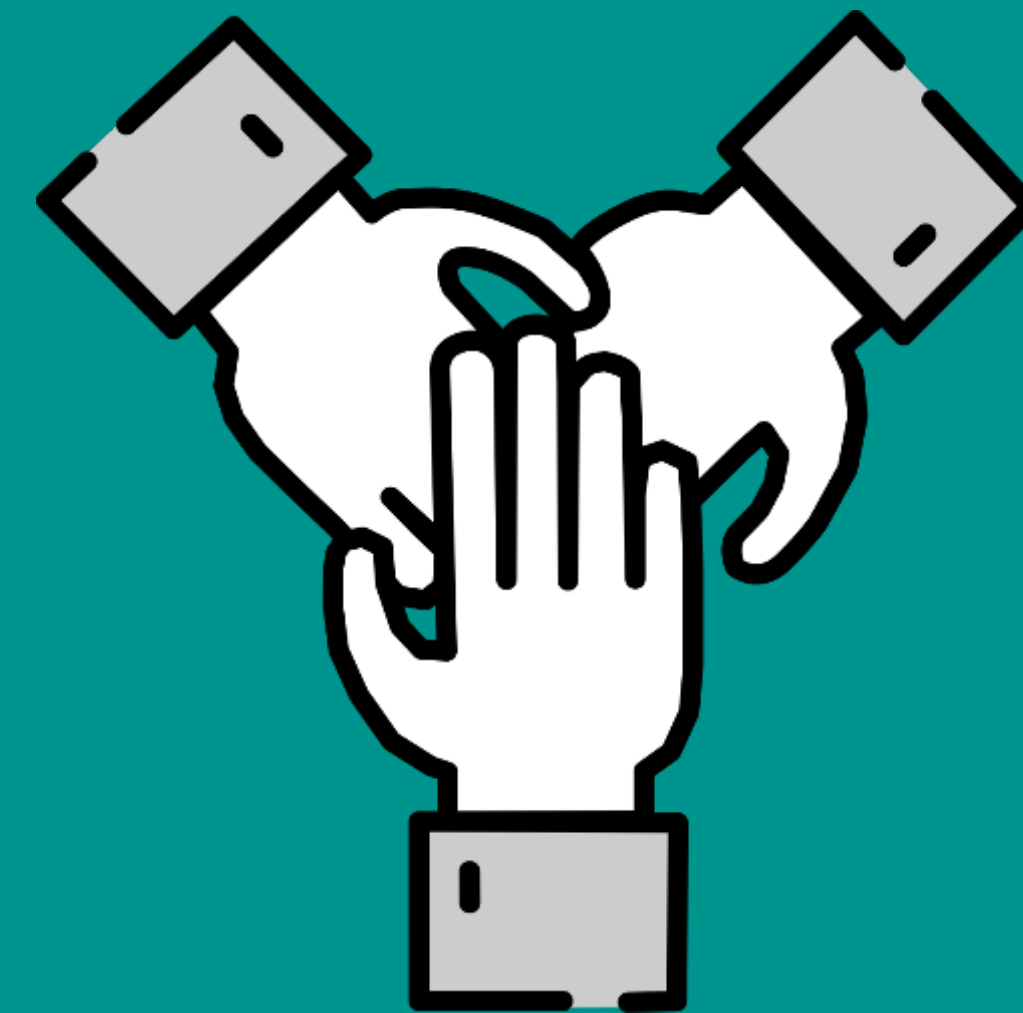


# Origin: NeIC Dellingr 2017-2020

A lightweight framework for sharing High Performance Computing (HPC) resources implemented between countries

Conclusion:

*The technical solutions are available  
Legal, economic, and policy issues remain*



# NeIC Puhuri 1 & 2 2020-2025

Seamless access to HPC resources

Services for:

- Resource allocation

- Usage tracking

- Federated group management



# Activities in Puhuri 2

**Activity 1:** Governance, policy and sustainability

Lead: Emma-Lisa Hansson (SE, SNIC)

**Activity 2:** Business development and support.

Lead: Jarno Laitinen (FI, CSC)

**Activity 3:** Product Management and Development

Lead: Ilja Livenson (EE, ETAIS)

# Puhuri roadmap

**First year's priority** was the LUMI use case.

To have the necessary functions ready when LUMI launches

Puhuri's **second year** was focussing enhancing and widening of activities

Organising operations and sustainability

**AAI operations** by GEANT: European collaboration under discussion to use common AAI

**Puhuri Portal and Puhuri Core** by University of Tartu

Setting up **GDPR** contracts

**Policies e.g. for security** for the Portals and Resources



# Puhuri Roadmap 2021

## Jun-Dec/2020:

- Requirements collection from LUMI (February)
- Planning the APIs
- Puhuri Core implementation on-going

## Implementing the APIs and User registration flow

- Project API defined (v1.0), Central AAI registration and Idp Proxy piloting for developers Deliverable 2 on setup. (March).
- GDPR contracts (March-April)
- Resource allocation process development (Feb-Apr)
- Implementation of Puhuri Portal (Feb-May)

## Project creation possible:

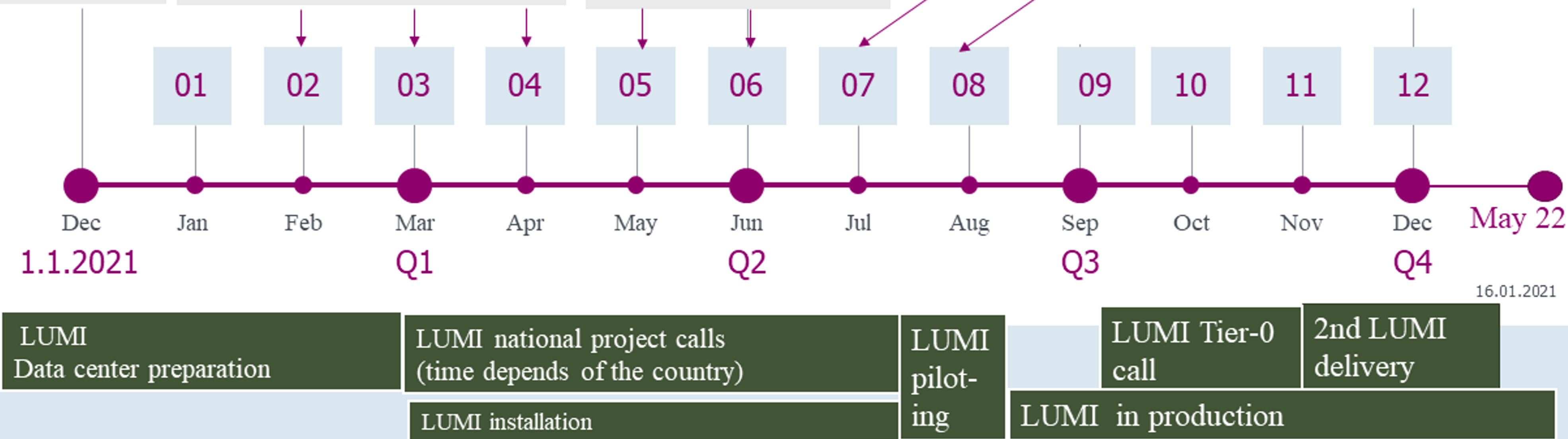
- Ability create a Projects via a Portal to Puhuri Core v. 1.0 (May)
- User and Project synced between Puhuri Core and LUMI (June)

## LUMI Production:

- Users can login to LUMI (July)
- Accounting information exported to Puhuri Core (August)

## Advanced features:

- Quota management via portal
- Advanced reporting



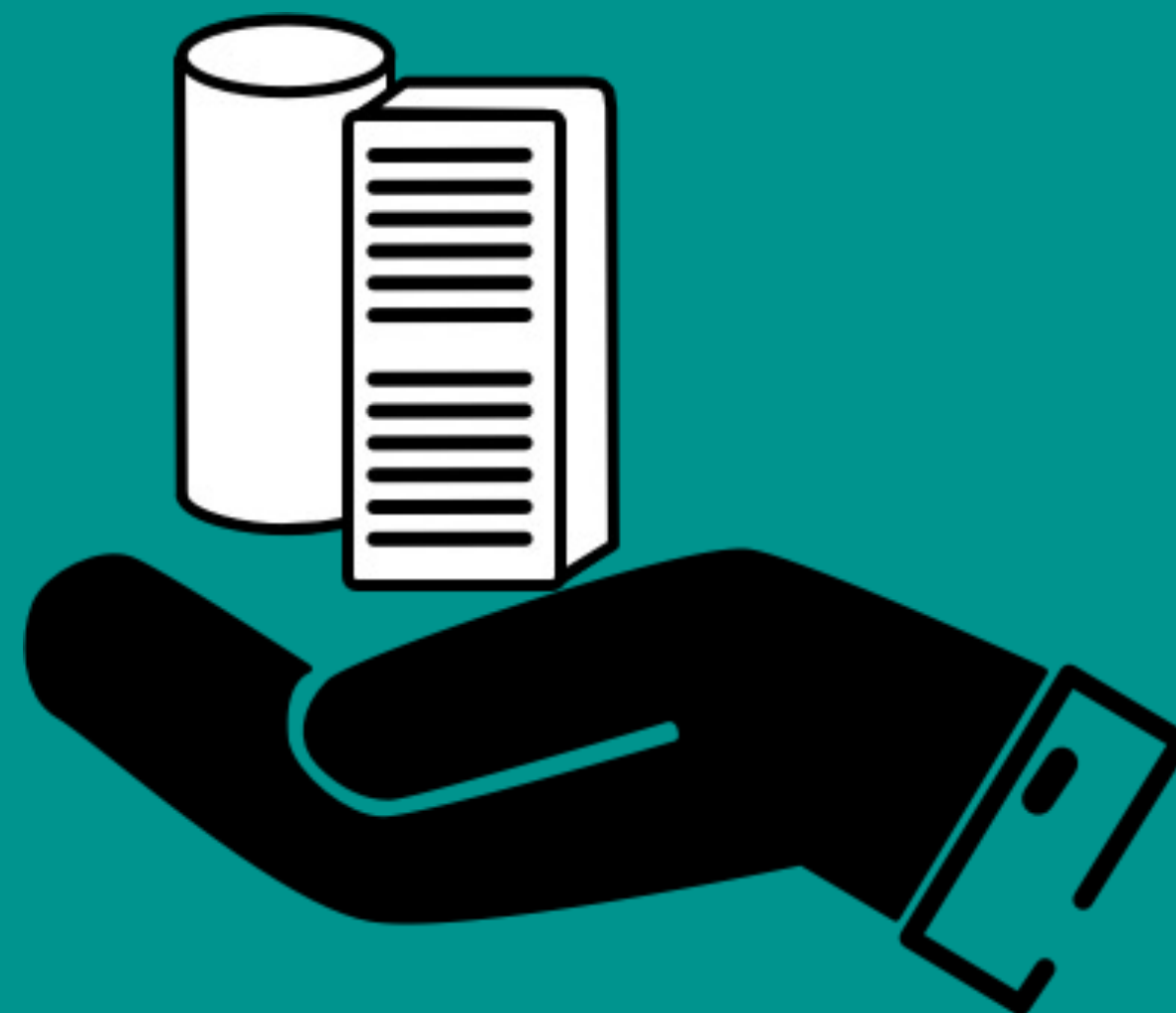
# Puhuri roadmap cont'd

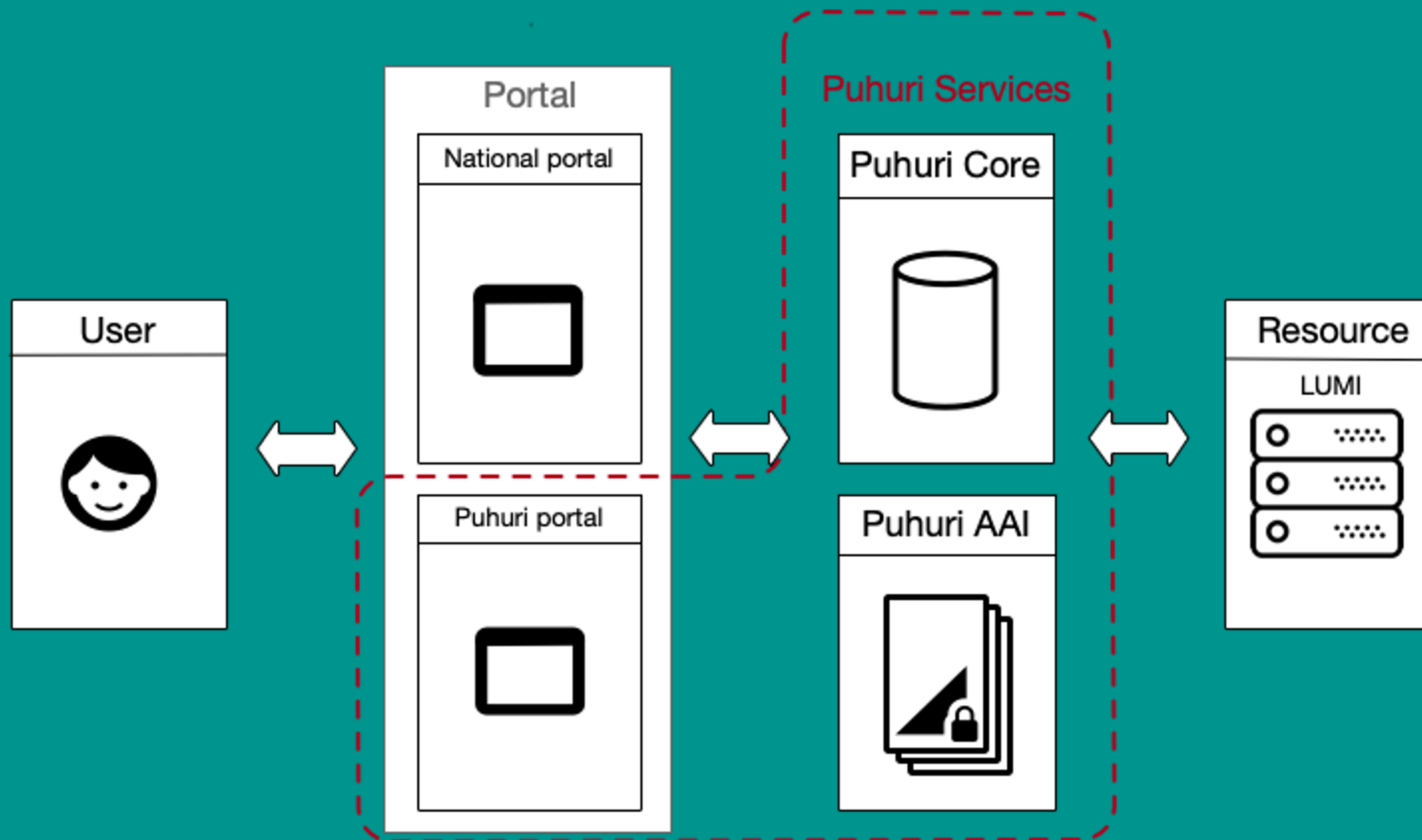
Puhuri 2 is the continuation of Puhuri  
New project manager (Anders Sjöström)

Focussing on

- Expanding and improving the user base and the service
- Ensuring the sustainability of Puhuri
- Strengthening international collaboration with research infrastructures, HPC centres, and other stakeholders
- Furthering the federation of European computational resources
- Collaborating and aligning with other infrastructures and AAI systems

# Design







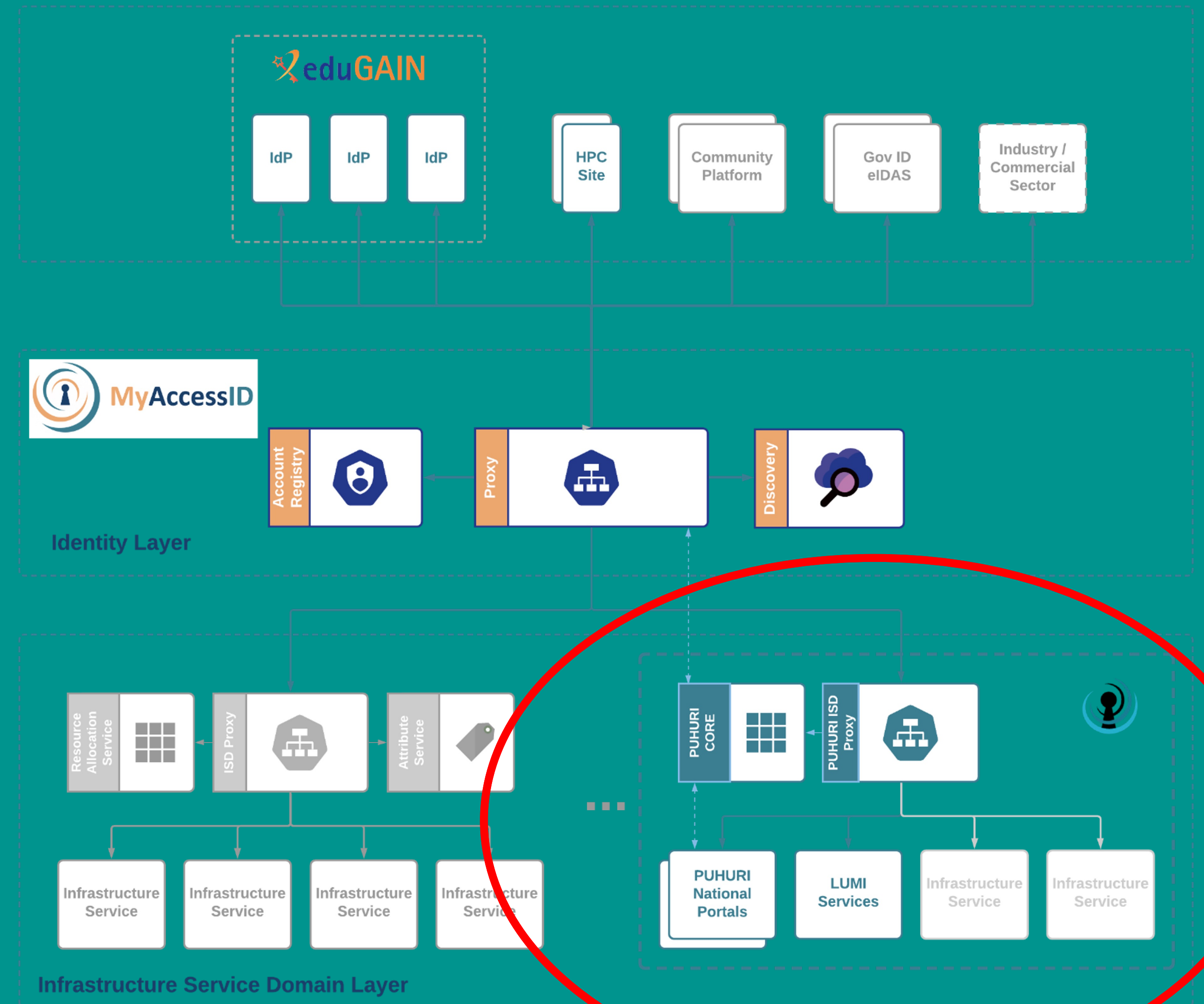
# Puhuri Architecture

## Identity Layer

responsible for delivering consistent identity information across clients and services of Puhuri.

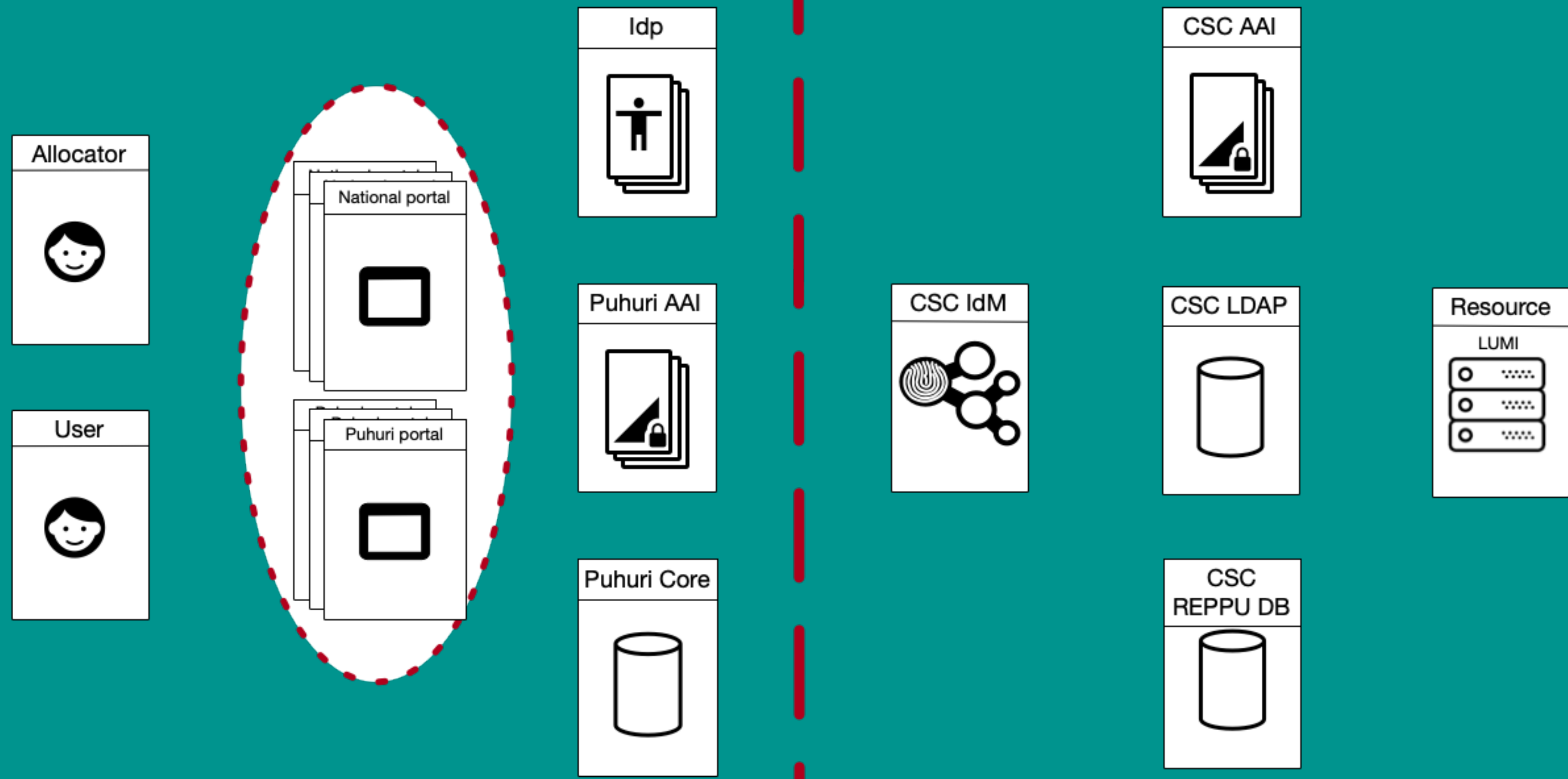
## Infrastructure Service Domain layer

Puhuri Core, is the resource allocation service exposing API to Resource Allocators and Service Providers

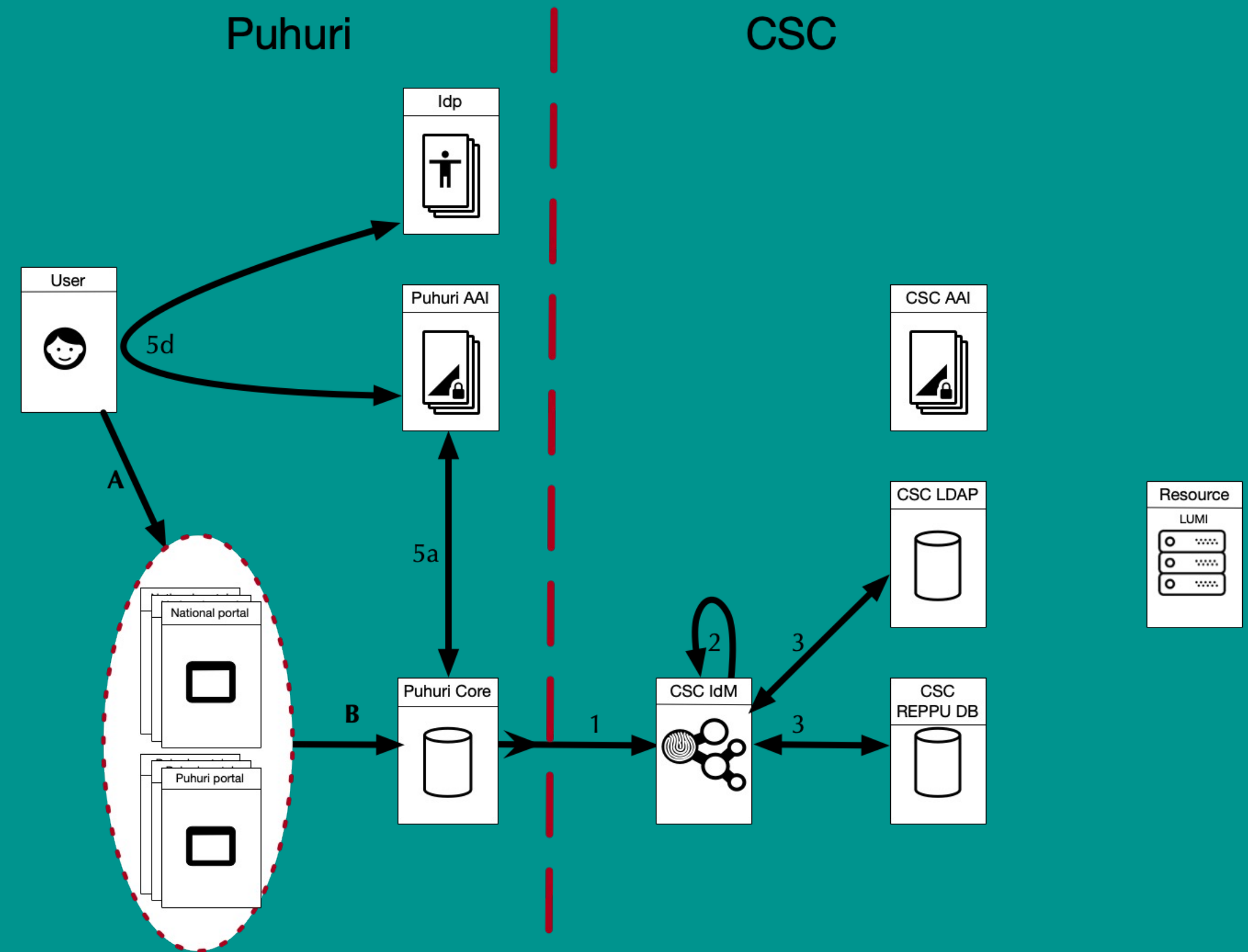


# Puhuri

# CSC



# Registration Flow



A) User register, requests, and is granted resources

5)

5a) Authenticate User (initiation of the authentication workflow)

5d) User uses own IdP to authenticate (information returned to Puhuri Core)

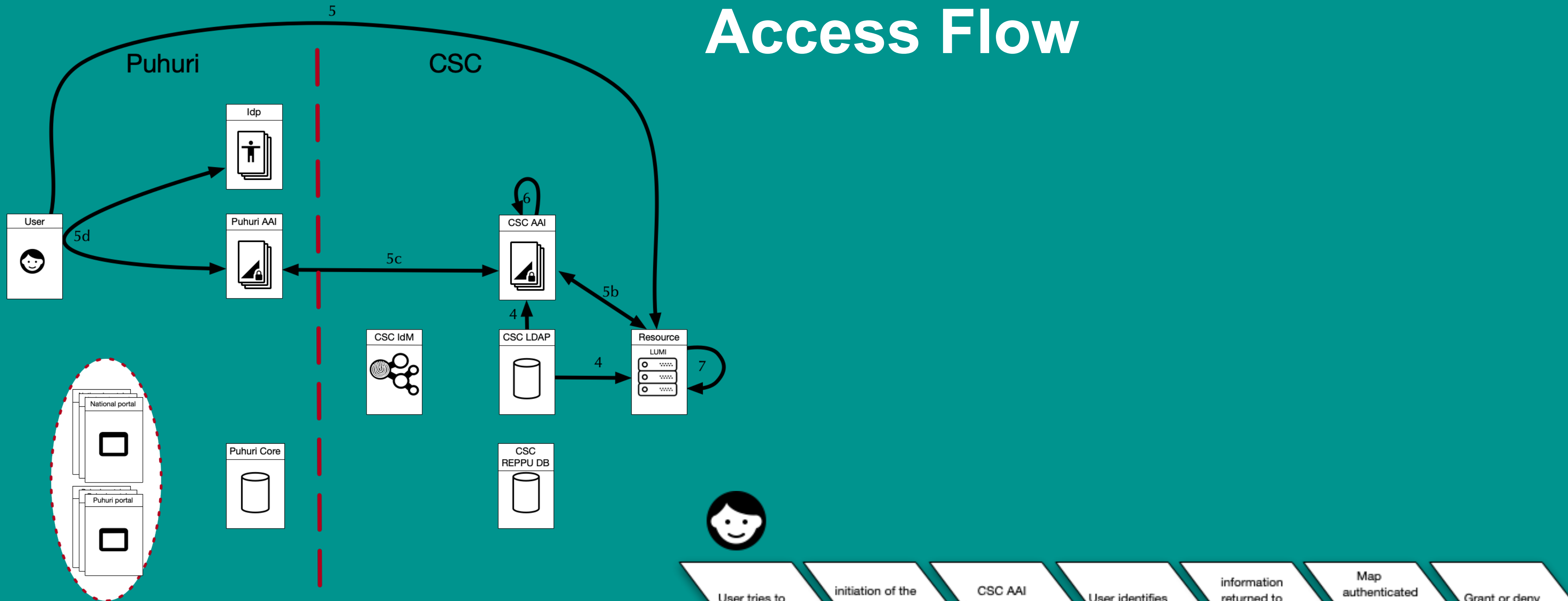
B) Information on user and allocation is propagated to Puhuri Core

1) Pull in Puhuri Users, Projects and Allocations

2) Preprocess and transform imported data to comply with CSC's internal data model creates local instances of User and Project

3) Provision data

# Access Flow



4) Consume data  
5) User logs in to LUMI

(If no ssh-keys are present)

5b) Authenticate User (initiation of the authentication workflow)

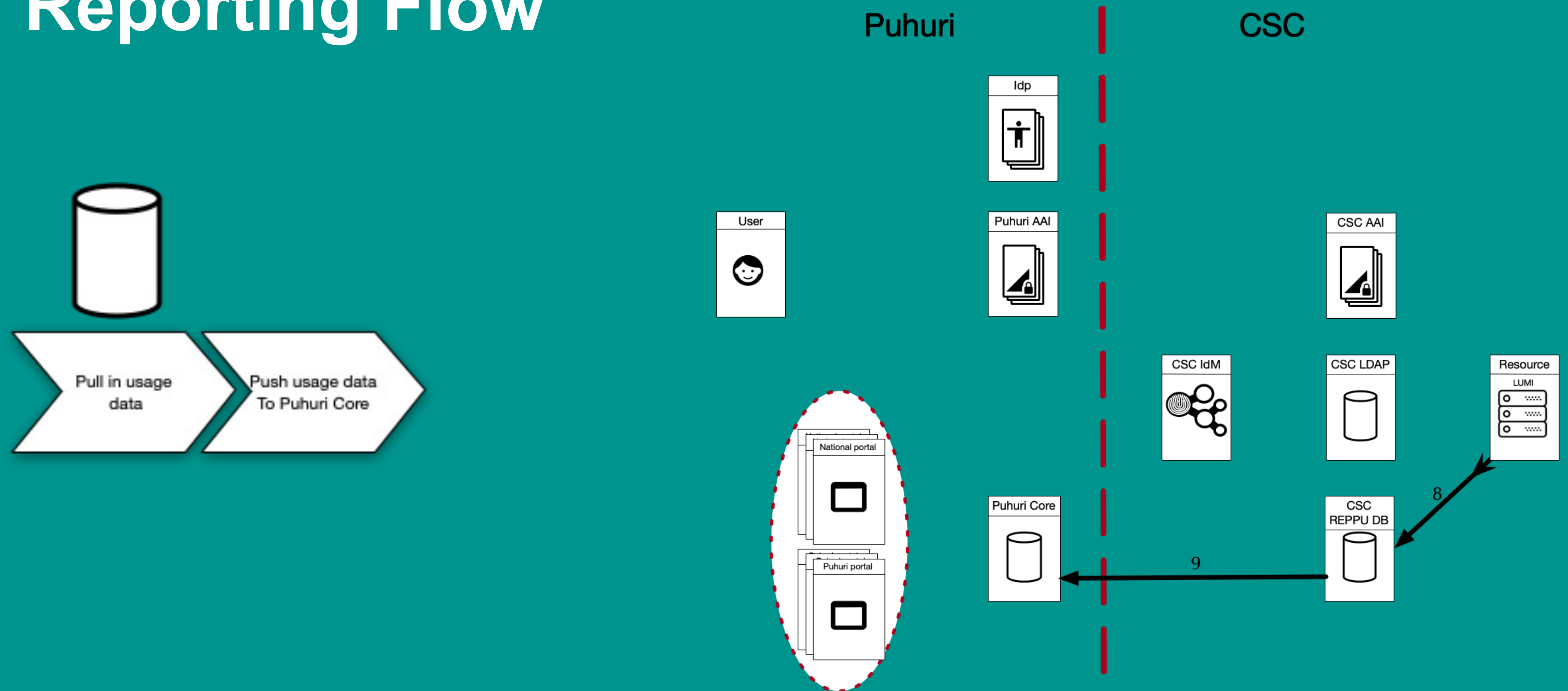
5c) Authenticate User (CSC AAI forwards User to Puhuri AAI)

5d) User uses own IdP to authenticate (information returned to CSC AAI, OIDC flow)

6) Map authenticated remote User to local CSC identity, if possible matches local User in CSC LDAP using remote Users CUID

7) Grant or deny access based on AAI authentication result and LDAP data (OIDC device flow) Grant or deny access based on LDAP data (ssh-key based auth)

# Reporting Flow

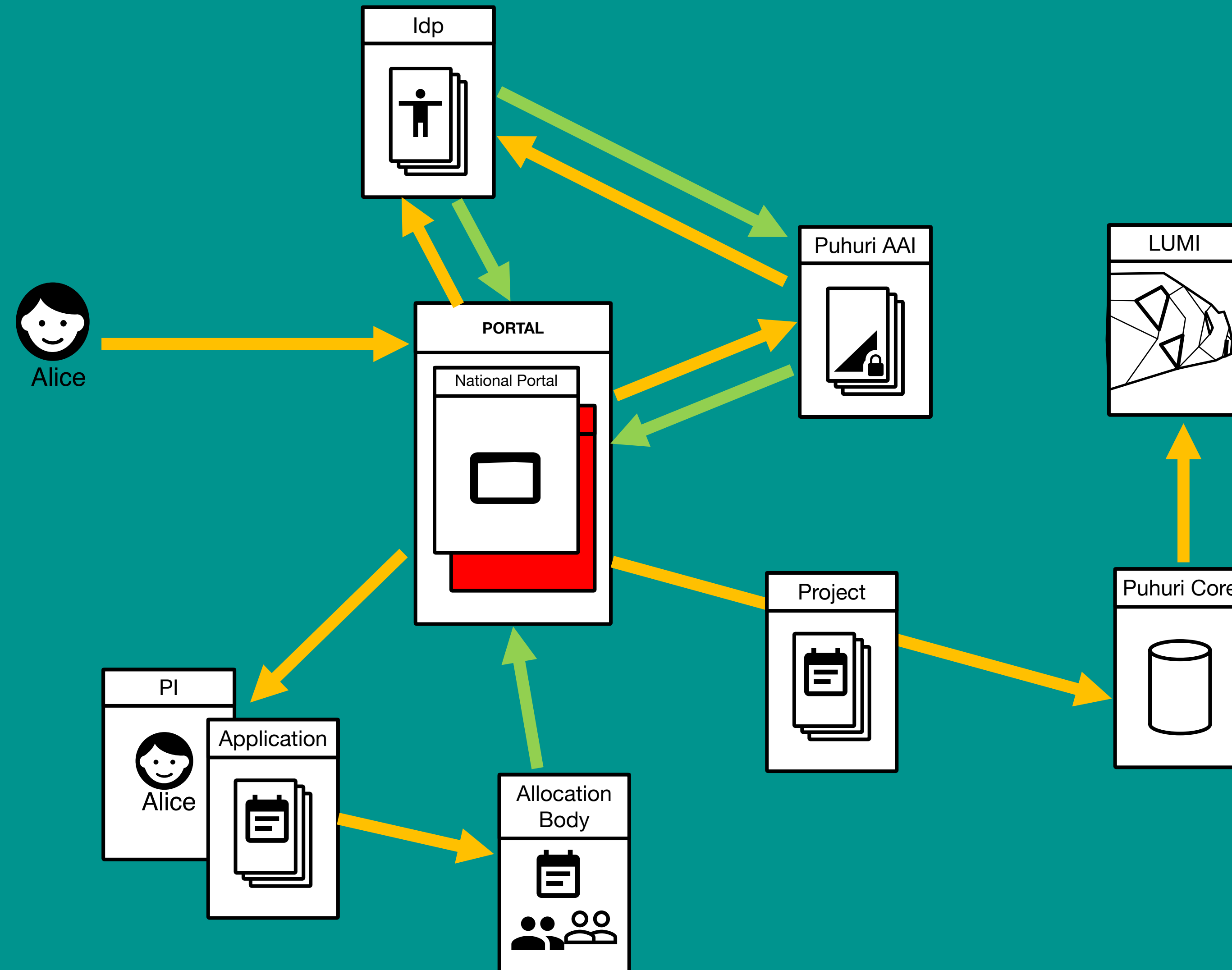


8) Pull in Resource usage data from LUMI Resource(s)

9) Push Resource usage data from CSC to Puhuri Core matches Projects using Puhuri Project UUID

# Puhuri PI registration and Project creation

- National Portal
- Register
  - Idp
- Has CUID?
  - Puhuri AAI
  - Idp
  - Create CUID
- Apply for project
  - Self assigned PI
- Allocation body
  - Approve
- Send to Puhuri Core
- Using API
- Propagate to LUMI



# What does national portal integration mean?

- User can use the familiar portal to apply for resources provided through Puhuri
- Project application management for Puhuri resources
- Note: your existing services does not have to use Puhuri.

# National portal integration in Puhuri

- Defined **common terminology** for the entities used at the various LUMI consortium countries (users, projects, allocations etc.)
  - Do we all speak the same language? Do the words we use mean what we think they mean to others? An information model for each participating country will be created from the terminology.
- Nomenclature ([v1.0](#))
- Defined **data objects for APIs** based on the terminology and information models above
- Inventory of **requirements from each national service** provider towards automated allocation of LUMI resources
  - In essence we asked about:
    - Existing portals for user management & resource allocation
    - Existing AAI technology components and interfaces
    - Accounting and reporting needs
    - Best practices, what are the experiences of the existing portals
- Designed an **API for synchronizing** the portals with the Puhuri database/middlelayer



# What do the integrating organisation need to do?

- **Push updates** on people, projects, and allocations into Puhuri Core
  - Mapping of the local user and Puhuri User ID is done locally
- **Pull the accounting information** from Puhuri Core and report it to users as best fit the national portal

# National portals and Puhuri

- **Uniqueness**  
Where is authoritative information retained and stored
- **Correctness**  
Who can change what data
- **Data integrity**  
Policies for data entry; who can do what when and where
- **Availability**  
What data do the national portals need/want

# Puhuri Portal

- Puhuri provides a reference **resource allocation portal**, which integrates with Puhuri Core through the same APIs as the National Portals
- Principal Investigator (PI) will apply for a Project
- Resource Allocators can manage the applications (outside the Portal)
- Users have a web portal to
  - **Register** with and without eduGAIN Idp
  - For Project Manager to manage projects and groups (invite and remove members)
  - See the **usage statistics** (reporting)

# LUMI integration into Puhuri

- LUMI Services are integrated to Puhuri via CSC's identity management systems, which communicate to Puhuri interfaces
  - API integration for user/group info
  - API integration for resource allocation
  - AAI integration for logins
  - API integration for reporting
- Users will be able to login via
  - using their registered ssh key (attribute of a user)
  - eduTEAMS Idp Proxy (SAML2 and OpenID Connect)
  - if necessary with password managed via CSC platform
- Accounting data are also sent to Puhuri database for reporting

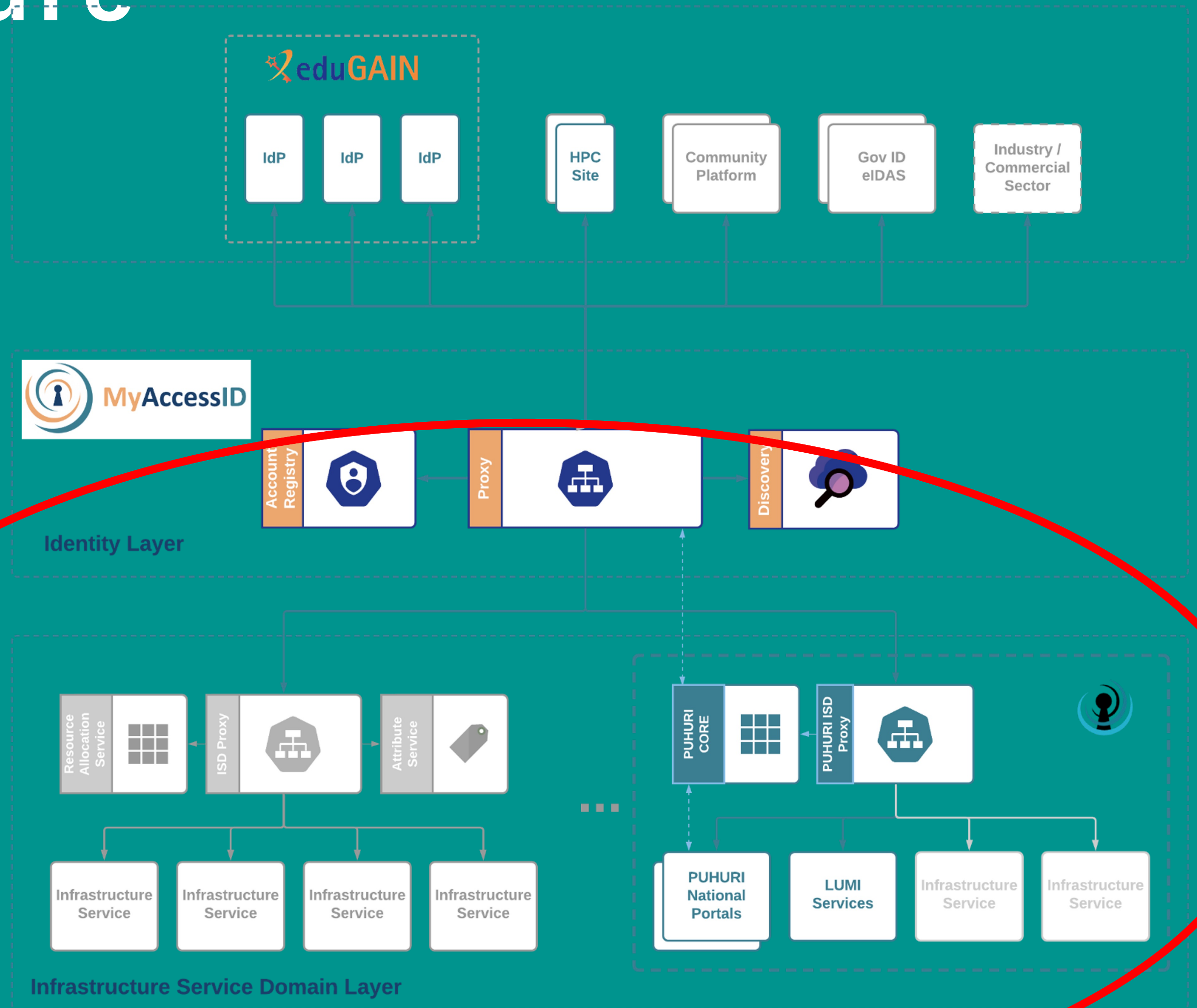
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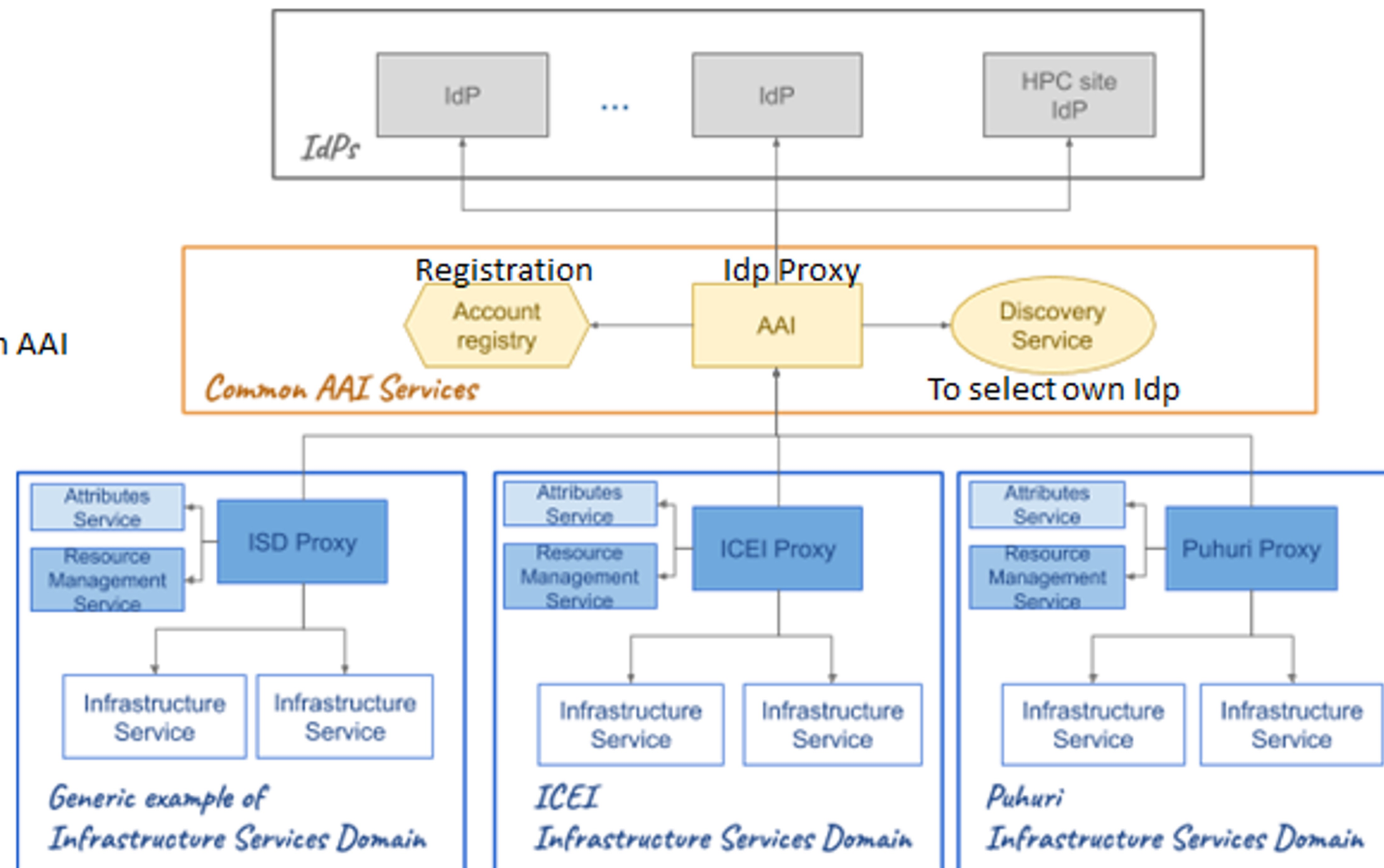
Puhuri Core, is the resource allocation service exposing API to Resource Allocators and Service Providers



# Other infrastructures can exist parallel to Puhuri

E.g. Fenix/ICEI under common AAI services

GEANT  
eduTEAMS  
operates common AAI  
and ISD Proxies



# Puhuri AAI – the IdP side

- IdPs that LUMI Countries wish to connect to AAI
  - Mostly IdPs from Identity Federations available in eduGAIN
  - Few cases of HPC centers IdPs
  - Need for a solution for industry users (we have a PoC working soon)
- Release of attributes
  - Mostly Yes: mail, givenName, sn, eduPersonScopedAffiliation, identifiers
  - Mostly No: eduPersonAssurance
  - No: Nationality
- Level of assurance frameworks
  - Limited adoption of RAF and locally defined frameworks (Puhuri and LUMI will require LoA attribute after Q1 2023)
- Support for Multi Factor Authentication
  - Limited support by IdPs

# Users without federated identities

Identity vetting alternatives with status

- eIDAS in MyAccessID - limited to certain countries only, seems to be working fine

eduID.se

eduID.se is available and ready to use

Releases Refeds values for assurance

Digital passport / national identity cards vetting integration is ongoing, to elevate user's LoA attribute

eIDAS integration is ongoing, to elevate user's LoA attribute

Manual vetting - currently on hold



# Level of Assurance

LoA-date set and agreed between Geant, Puhuri and Lumi

Dates:

**Idp deadline; Dec. 01th 2022**

**User info (message when logging in) Jan 15th 2023**

**Cutoff date: March 01th 2023**

Ongoing calls between GEANT and Federations

Biweekly calls with Federations regarding several topics, including assurance

To ensure “good reach” an endorsement letter has been sent to the Identity Providers

Requirements and information

Documentation for the attributes

Test service to check if Idp releases LoA attributes

# Performed activities

## Improvements to statistics and accounting

- Additional data exporters created to cater for dynamic permissions for SPs and RAs

- More aspects exported - linking with OECD science code and industry flags

## Improvements to UX

- Larger refactoring is in progress, taking into account feedback received so far.
- Delays in refactoring, but planning to roll-out first updates in Summer + update documentation and instructions

## Security

- Core access has been limited to provided networks

- Analysing scenarios for active-active operations in different countries

## Support for industry tags

- Added, enabled in ETAIS and Demo portal

# Planned activities

## Reference implementation of SLURM integration

- A demo of quick integration of SLURM-based service provider with Puhuri allocation service

- A demo of basic job management from Puhuri portal

  - Based on CSCS FirecREST

## Improvements to UX

### Reporting

- Target cases for multiple RAs per country better

- Automate permission management of puhuri-stats and link with Puhuri core

### Security

- Core access has been limited to provided networks

- Analysing scenarios for active-active operations in different countries

# Thank you for your attention!



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# Links

- Puhuri at NeIC: <https://neic.no/puhuri/>
- Puhuri general information: <https://puhuri.io>
- Puhuri Documentation: <https://puhuri.neic.no>