Nikhef

Maastricht University

How trust and identity enable
global infrastructures for distributing computing

In Infrastructures … we Trust!

ISGC 2025
David Groep, March 2025

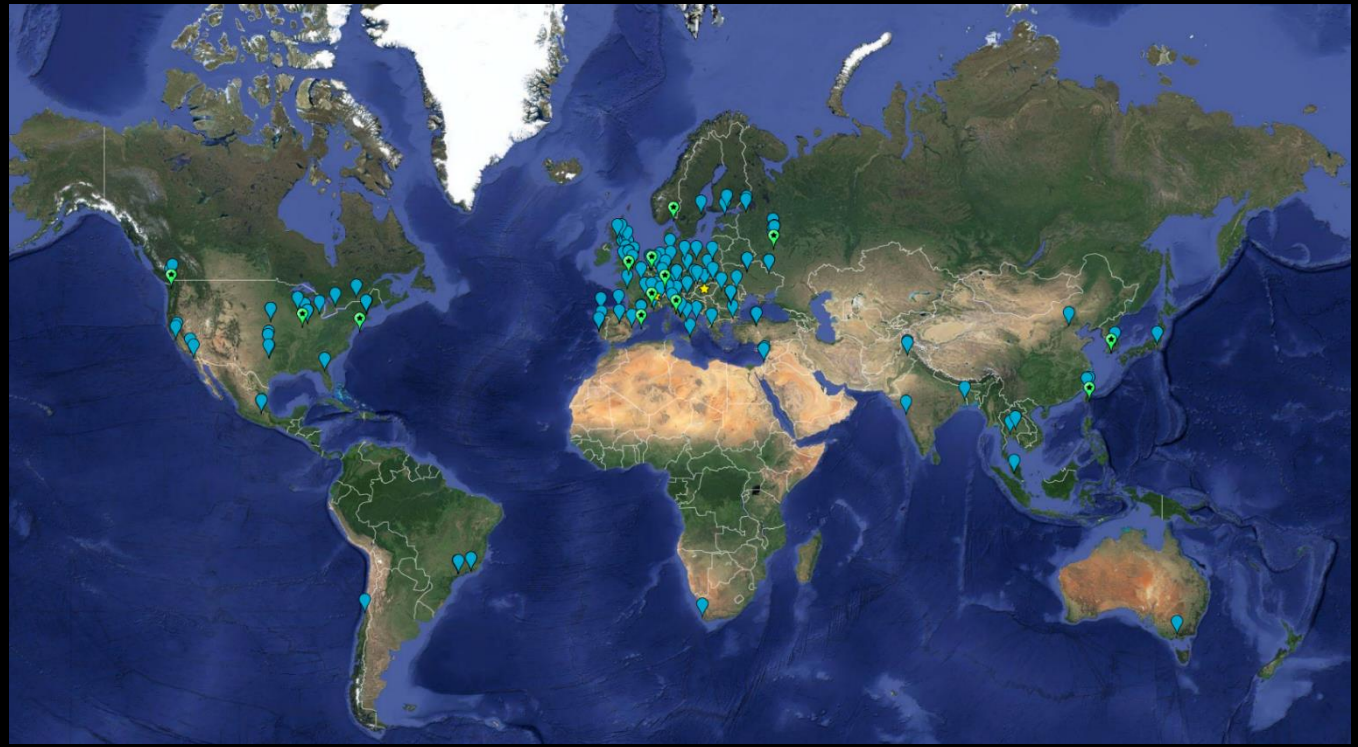
Collaborations: from small …

Nikhef user room H1.37 – terminal stations in the early 1990's – image source: Nikhef

… to large collaborations (and shown here is a subset …)

a small part of the CMS collaboration in 2017, photo credit CERN on behalf the CMS collaboration, CMS-PHO-PUBLIC-2017-004-3

How many interactions? And just how many logins?



Worldwide LHC
Computing Grid (~ 2024)
~ 1.4 million CPU cores
~ 1500 Petabyte
disk + archival

170+ institutes
42+ countries
13 'Tier-1 sites'
some multi-community:
NL-T1 @ SURF & Nikhef

Earth background: Google Earth; Data and compute animation: STFC RAL for WLCG and EGI.eu; Data: https://home.cern/science/computing/grid ;
LHC Computing Grid: wlcg.web.cern.ch, EGI: www.egi.eu; ACCESS CI: https://access-ci.org/, NL-T1 and FuSE: fuse-infra.nl, https://www.surf.nl/en/research-it

Do we ask for ~ 12 000 x 170+ passwords for everyone?

Of course not!

But 12 000 people is still a lot,
and many more than you would trust with your bank PIN …

Yet we have found mechanisms to collaborate beyond the canonical ~150 people (“Dunbar’s number”)

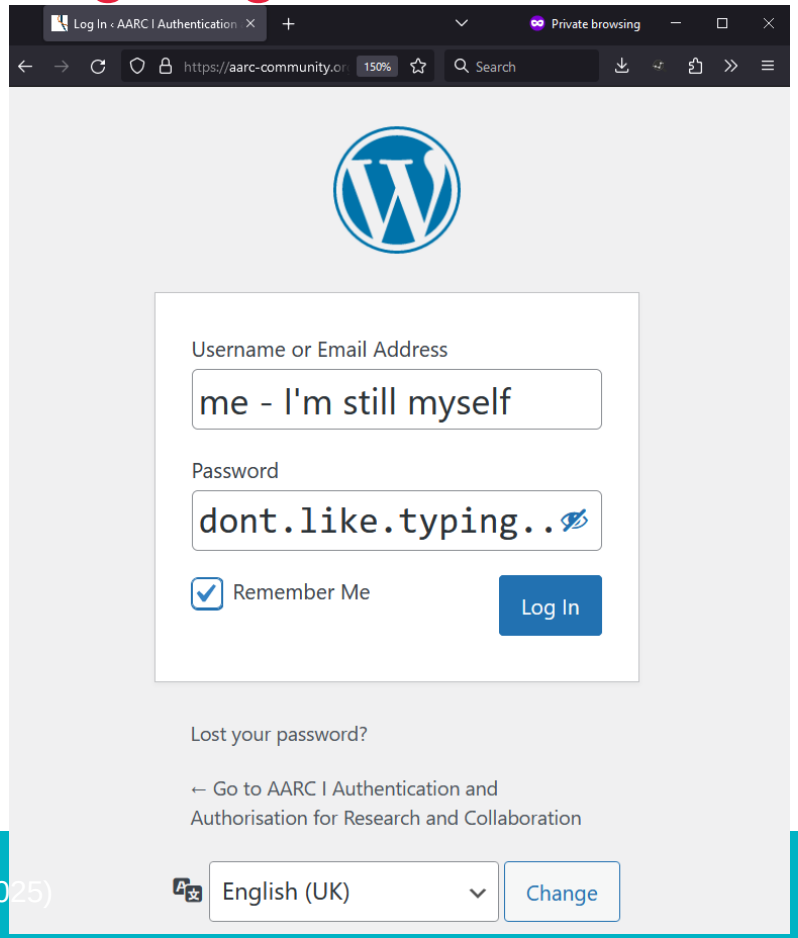
but what we built, may both be unique for our ‘high-trust’ research community … and be an example for others

When you are asked to login again …

Authentication

demonstrating ‘you are you’

- ***authenticator***
  ‘you’ remains same ‘you’
- **vetted *identity***
  ‘you’ can be pseudonymous
  ‘you’ can be a vetted person



Self-asserted or ‘pseudonymous’ often not enough

state of EU DataGrid and HEP computing in ~2000

NIKHEF
NATIONAAL INSTITUUT VOOR KERNFYSICA EN HOGE-ENERGIEFYSICA

Guest / students form (pleas

1. This form is completed in connection with:

☐ work experien
☐ otherwise, vis

CERN/User Registration

CERN COMPUTER CENTRE - US

http://cern.ch/it/documents/ComputerUsage/CompA

To be returned to the User Registration box at the en
completed by a user who requires a computer accou
Department, and is not yet registered in another grou

To be completed by the User :

It is **MANDATORY** to provide the following infor
treated confidentially and only be used for ensuring
Supply name as registered by the Users' Off
FAMILY NAME(S): ……
FIRST NAME(S) : ……
SEX [M] [F] BIRTHDATE: Day …… Month …… Year ……
HOME INSTITUTE/FIRM: ……
NATIONALITY: ……..*CERN SUPERVISOR……
*CERN DEPARTMENT: . . . . . *CERN ID NUMBER (as on CERN card)……..

To be completed by the Group Administrator:

Fermilab

For Office Use Only

ID:	Action:	ID Exp:	
Insurance:	Medical:	Safety:	
Computer:	Stkrm:	Family:	
NON-473:	Sensitive:	Verifier:	Date:

Name:

Last	First	Middle
SWIETZER	JOHN	JAMES

University or Institution Name: Telephone:

FLORIDA STATE UNIVERSITY	850-644-XXXX

Experiment/Department:

Exp. / Dept.	Spokesperson	Home Institution Contact	Contact Telephone
D0	WOMERSLEY/WEERTS	SHARON HAGOPIAN	850-644-4777

Scaling credentials: per service per user

Many start with *credentials* dedicated
to each service where you need access

- In a multi-organizational system becomes

  $\mathcal{O}(n_{services}) * \mathcal{O}(n_{users})$

- usually creates a strong link to authorization:

  different accounts for different roles,
  multiplying the number of credentials per user

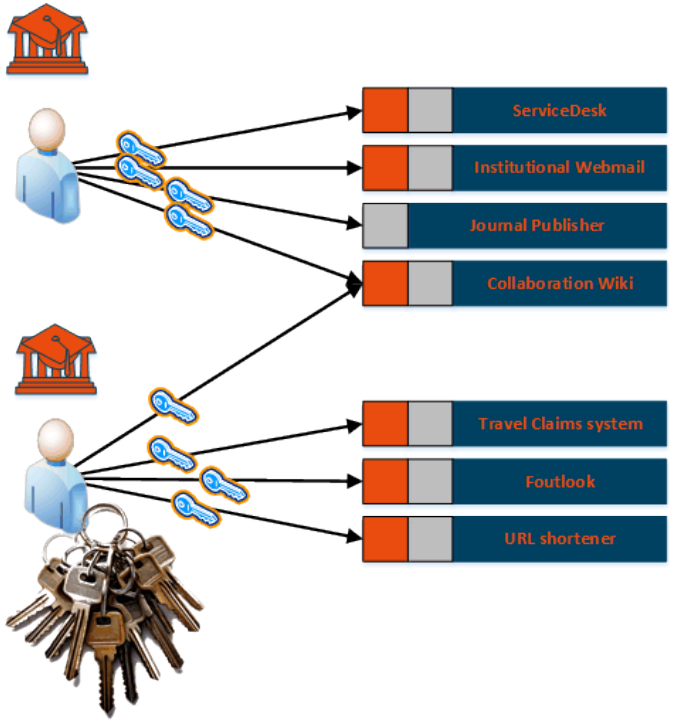


Image imspired by AARC NA2 training module “Authentication and Authorisation 101” – keychain image created by generative AI

bilateral ‘SSO’: a single service, or a single identity source

#credentials required?

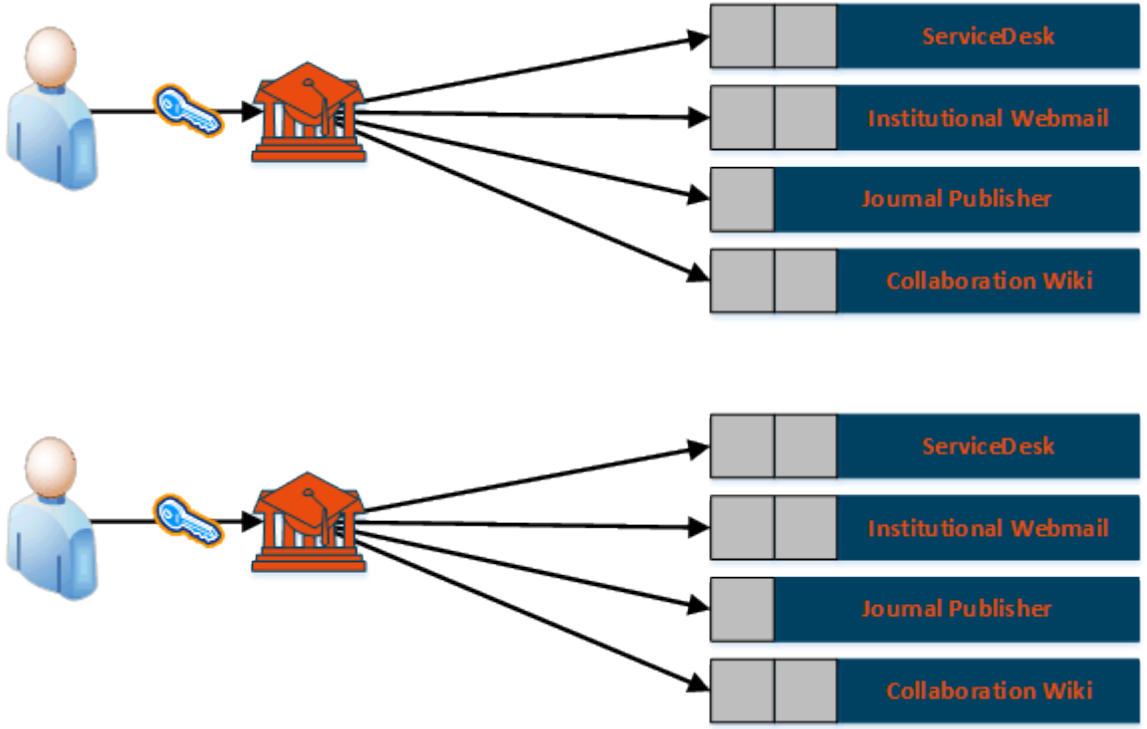
from previously

$\mathcal{O}(n_{services}) * \mathcal{O}(n_{users})$

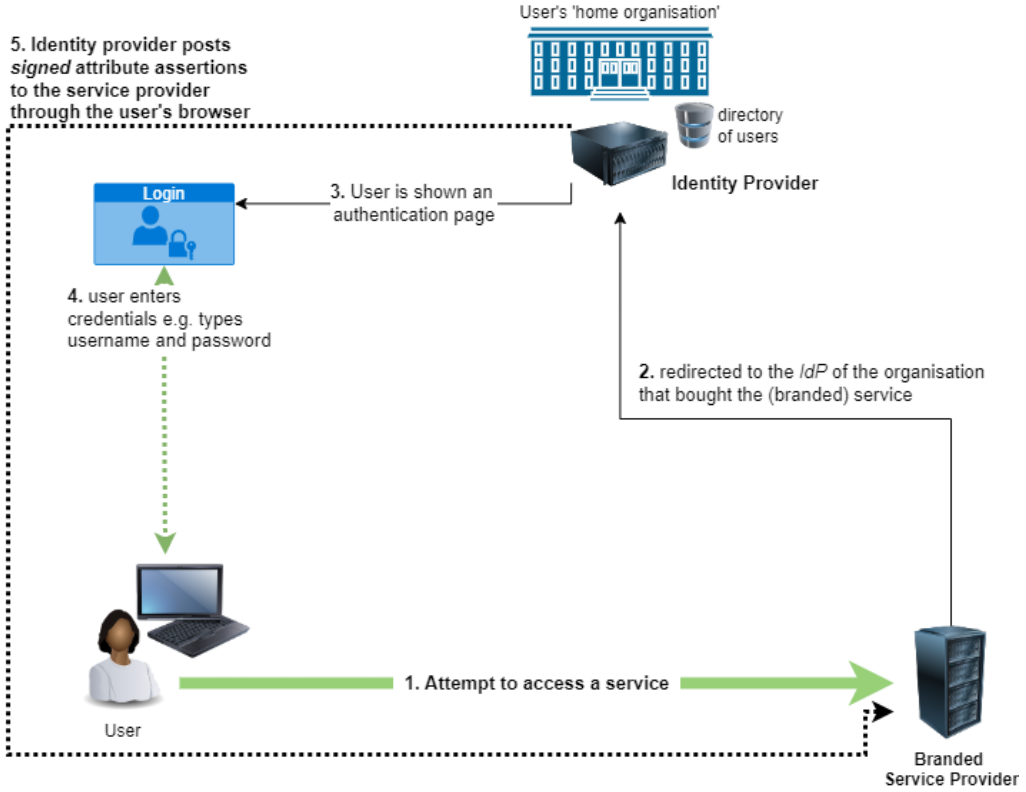
to

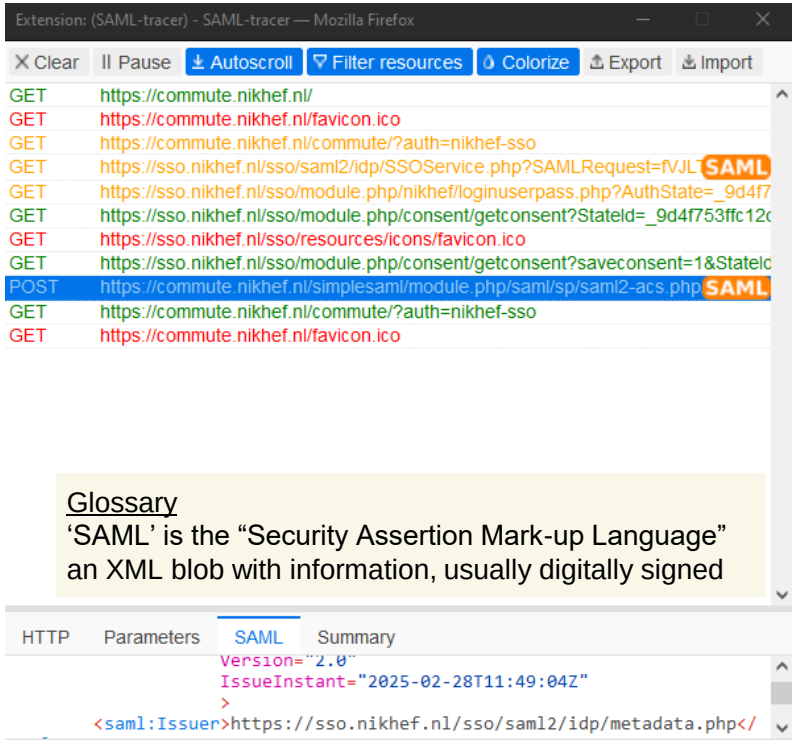
$\mathbf{\mathcal{O}(n_{users})}$
$+ \mathcal{O}(n_{services} * n_{home\text{-}orgs})$

in first order at least



Single sign-on – why your browser keeps loading things





Glossary

'SAML' is the "Security Assertion Mark-up Language"
an XML blob with information, usually digitally signed

SAML-tracer plugin by Tim van Dijen (SSC-ICT) *et al.*
https://github.com/simplesamlphp/SAML-tracer

User-centric identity: ‘I take my passport anywhere by myself’

Your ‘home organisation’ does not have to be in the loop …

user-centric trust: you yourself hold a credential from a trusted third party and can use it *without having to ask ‘home’ each time:*

- Public Key Infrastructure client certificates (“X.509”)
- Verifiable credentials in wallets
- *and who remembers CardSpace?*

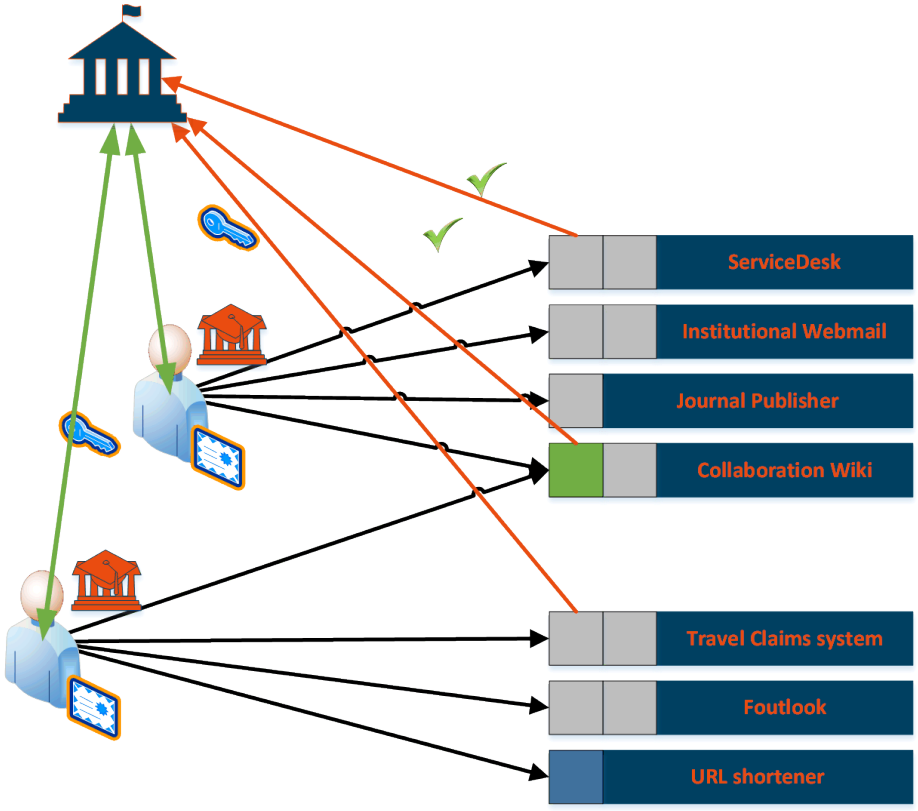
Passport image: cropped from original by Jon Tyson on Unsplash https://unsplash.com/photos/Hid-yhommOg

User-centric AAI

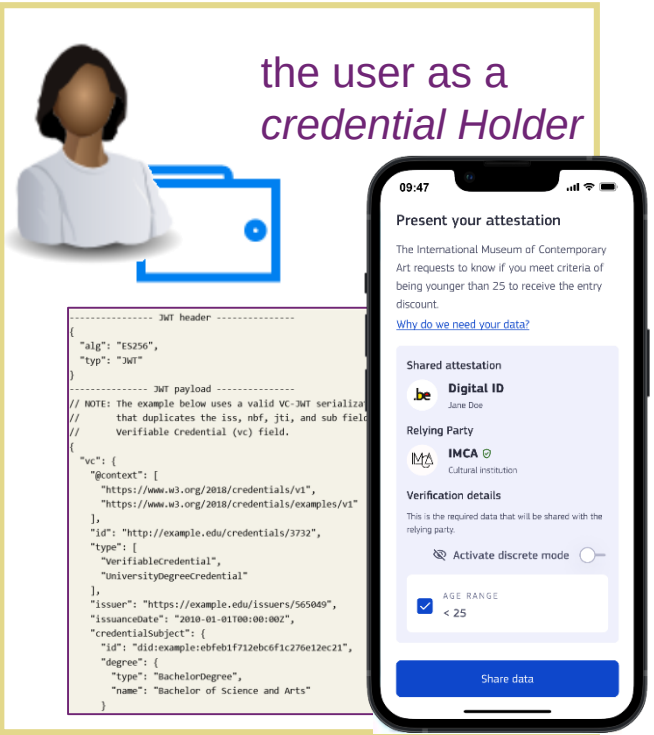
A **trusted authority** giving the user
a ‘self-managed’ credential, like a passport

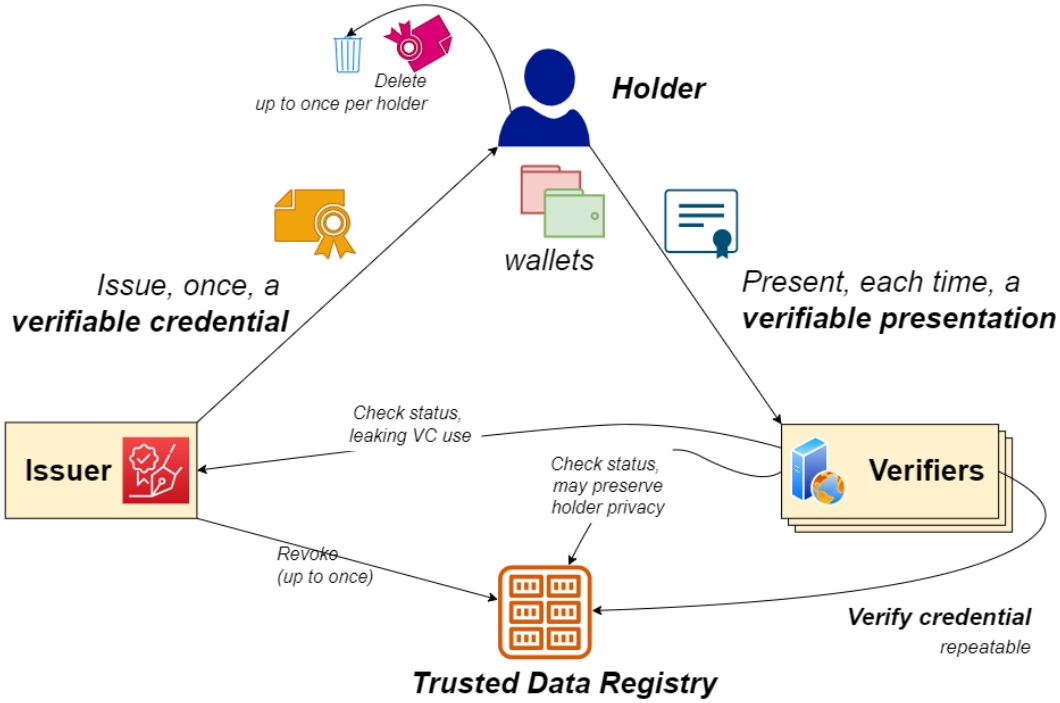
- a personal authentication digital certificate
- a verifiable credential in a wallet
- …

verified (on-line and also offline)
at the original trusted issuer
or at an independent trusted verifier



Identity wallets, held by the user, are another





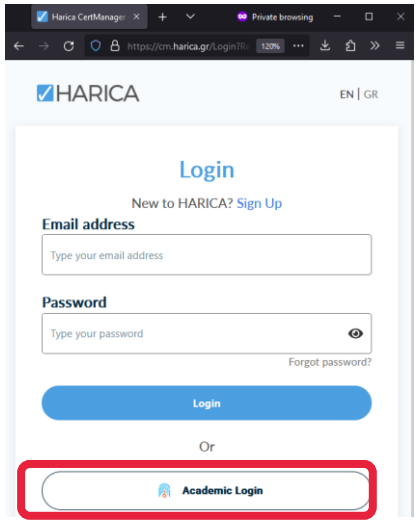
Flow diagram inspired by: Lifecycle Details (5.1), Verifiable Credentials Data Model v1.1, W3C Recommendation 03 March 2022, https://www.w3.org/TR/vc-data-model/
EU eID Wallet from https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-digital-identity_en
Appimage: European Commission, at https://ec.europa.eu/digital-building-blocks/sites/display/EUDIGITALIDENTITYWALLET/Security+and+Privacy

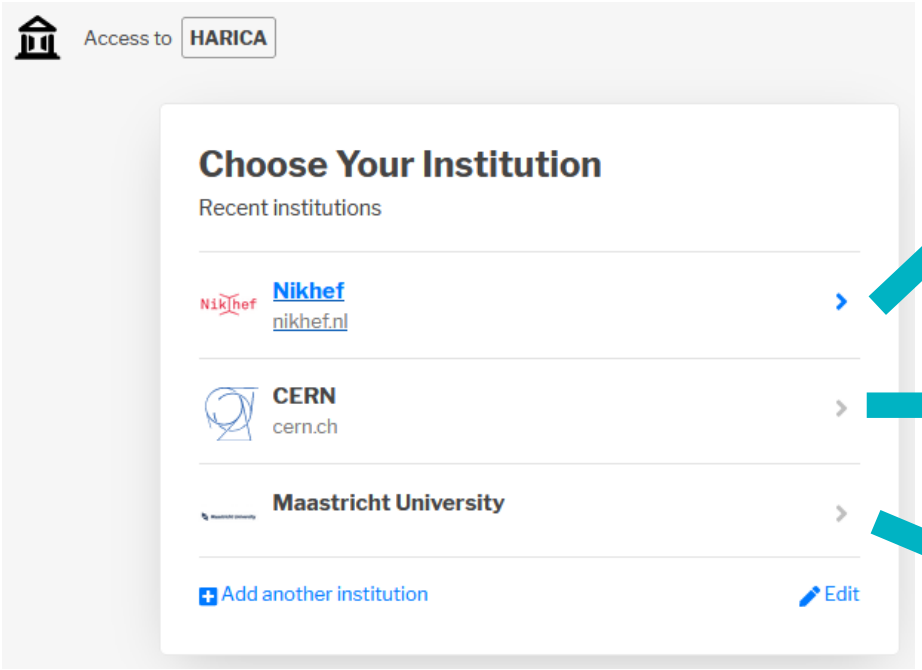
Can we scale better with an ‘federated’ Authentication and Authorisation Infrastructure (‘AAI’)

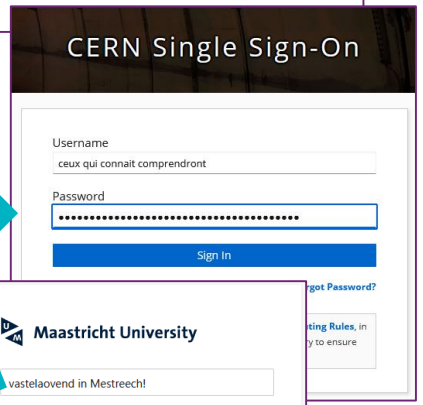
with one service provided to several organisations (universities)

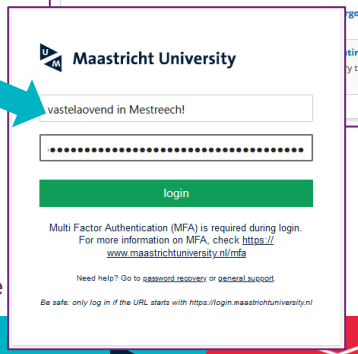
we will get to authorisation in a bit …

Where are ‘you’ in the federated space – discovery!









An example cross-institutional service by HARICA, the GEANT TCS G5 provider, presenting a SeamlessAccess.org discovery page

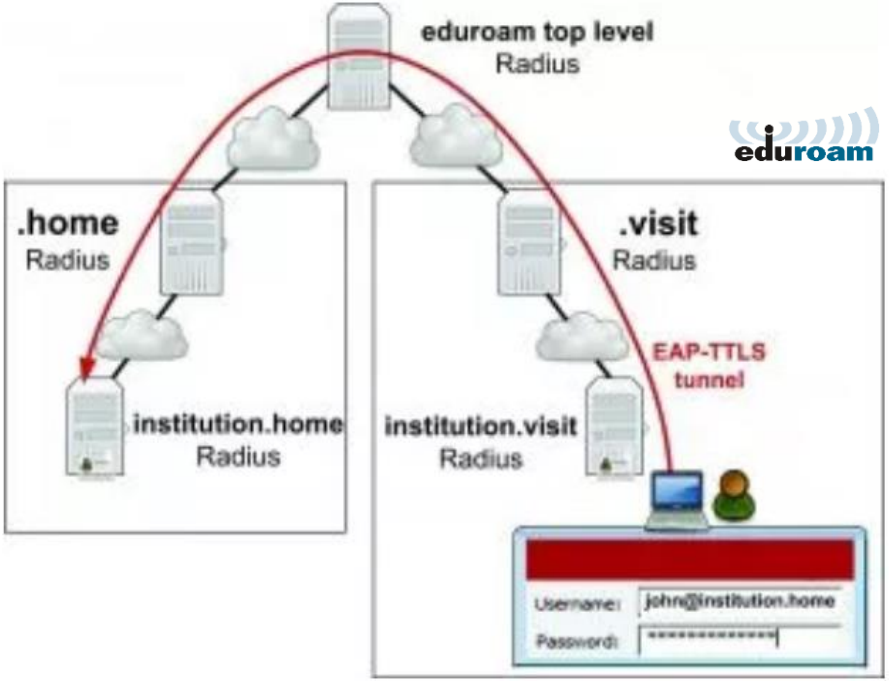
The federation you most likely know …

service-specific trust
between organisations

hierarchical server path, based on
a network-specific secure exchange

sending your credentials back
to *only* your home institution

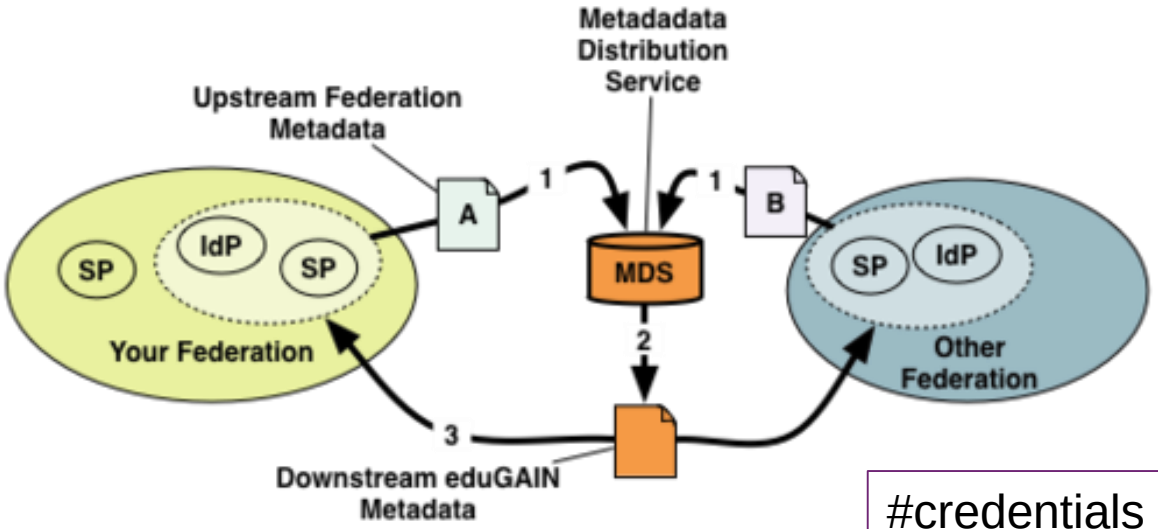
found via <anon**@domain.name**>



eduroam image from https://eduroam.org/how/, GEANT ; RADIUS: RC2865 https://www.rfc-editor.org/rfc/rfc2865; see also freeradius.org

We live in a federated world!

Meta-data and trust in IdP-SP ‘multi-lateral’ federations



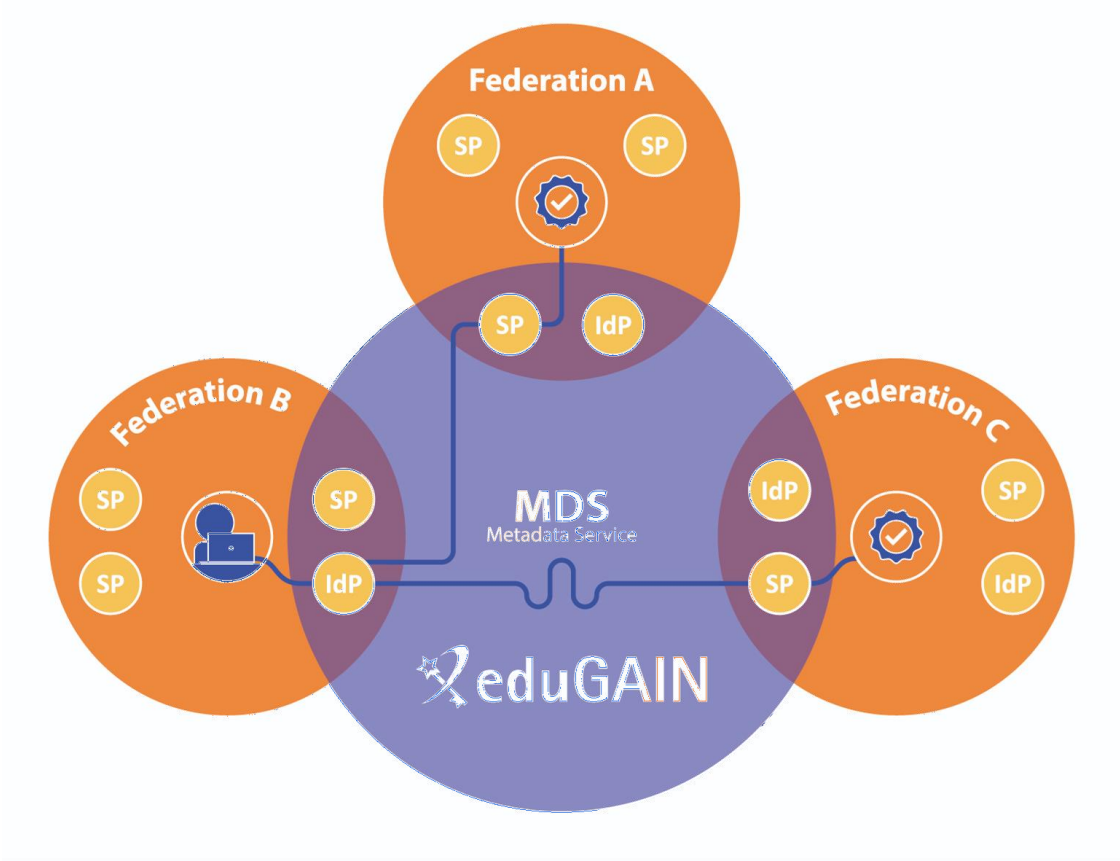
	Listing of all entities (1572), 42 federations		
1	IdP 29 Mayis University Entity ID: https://kimlik.29mayis.edu.tr/simplesaml/saml2/idp/metadata.php Entity categories: Data Protection Code of Conduct v1; REFEDS Research and Scholarship Registrar: YETKİM Org: Istanbul 29 Mayis University	ECCS	Entity details
2	IdP A*STAR - Agency for Science, Technology and Research Entity ID: https://a-star.singaren.net.sg/simplesaml/saml2/idp/metadata.php Entity categories: REFEDS Research and Scholarship Registrar: Singapore Access Federation - SGAF Org: A*STAR - Agency for Science, Technology and Research	ECCS	Entity details
3	IdP AAF Virtual Home Entity ID: https://vho.aaf.edu.au/idp/shibboleth Entity categories: REFEDS Research and Scholarship SIRTFI: asserted Registrar: AAF Org: AAF Virtual Home	ECCS	Entity details
4	IdP AARNet Entity ID: https://shibboleth.aarnet.edu.au/idp/shibboleth Entity categories: REFEDS Research and Scholarship SIRTFI: asserted Registrar: AAF Org: Australian Academic and Research Network (AARNet)	ECCS	Entity details
5	IdP ACCESS CI Entity ID: https://access-ci.org/idp Entity categories: REFEDS Research and Scholarship; http://id.incommon.org/category/registered-by-incommon SIRTFI: asserted Registrar: InCommon Org: National Center for Supercomputing Applications	ECCS	Entity details
6	IdP ACOnet staff Entity ID: https://idp.aco.net/idp/shibboleth Entity categories: Data Protection Code of Conduct v1; REFEDS Research and Scholarship Registrar: ACOnet Identity Federation Org: ACOnet staff	ECCS	Entity details
	IdP AIRCentre Entity ID: https://idp.aircentre.org/idp/shibboleth	ECCS	

#credentials required?

from $\mathcal{O}(n_{users}) + \mathcal{O}(n_{services} * n_{home\text{-}orgs})$

to ~ $\mathcal{O}(n_{users}) + \mathcal{O}(n_{home\text{-}orgs}) + \mathcal{O}(n_{services})$

MDS meta-data flow: https://wiki.geant.org/display/eduGAIN/Metadata+Flow+in+eduGAIN
eduGAIN meta-data https://mds.edugain.org/edugain-v2.xml ; table excerpt from https://technical.edugain.org/entities showing only R&S IdPs, i.e. those supporting research …



78

Identity Federations

5100+

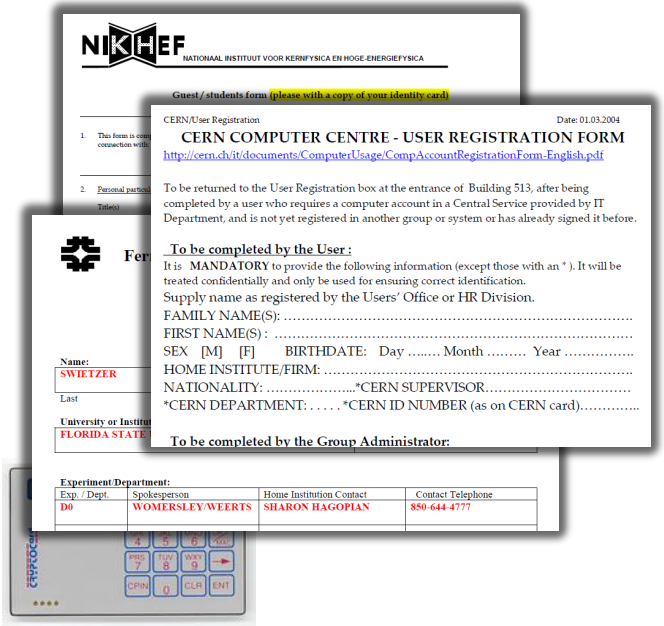
Identity Providers

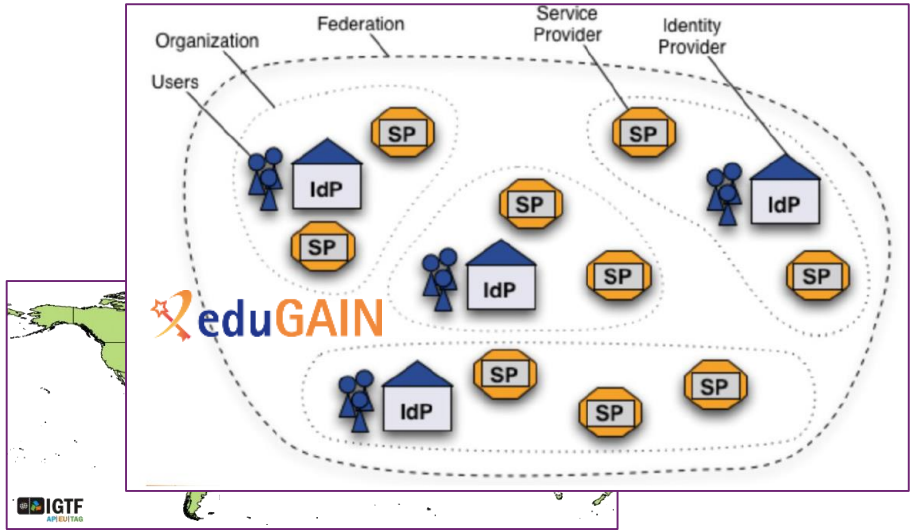
3600+

Service Providers

eduGAIN image: Davide Vaghetti, GARR for GN*-*

We progressed a lot since 2003 with identity federation





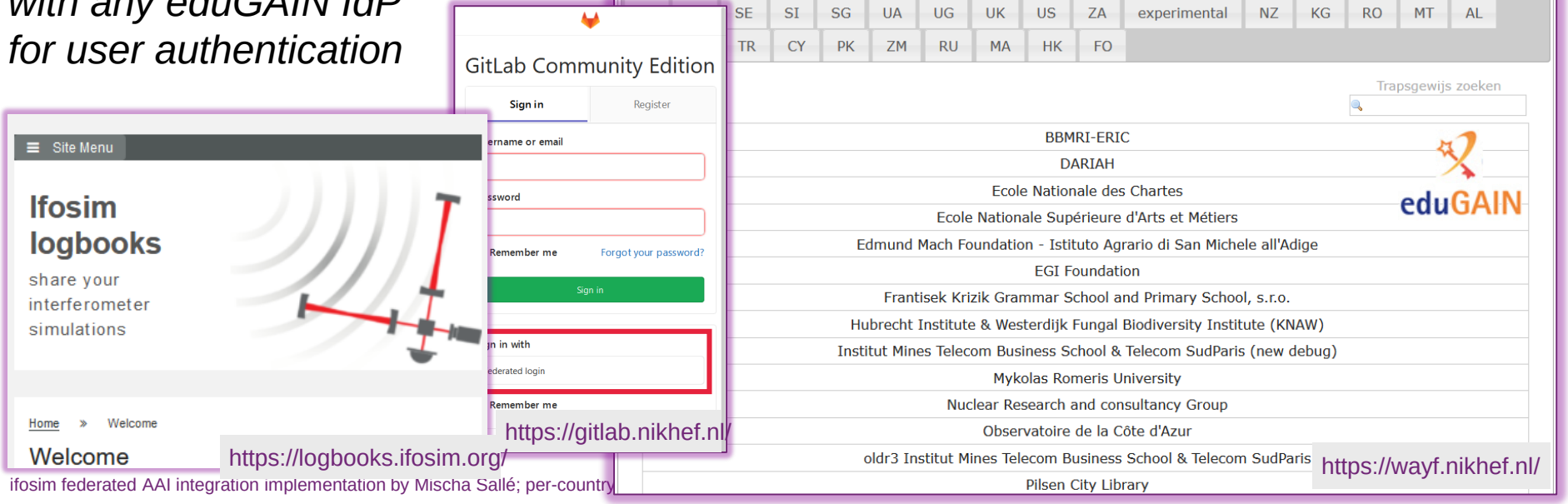
For eduGAIN federation the IdPs provide **authentication** from the home organisation, for the user-centric PKIX IGTF trust fabric, the CAs do.
Then **Service providers** perform **authorization**,
… maybe using attributes provided by the IdP. But do they get them??

Right-hand image: Shibboleth IdP federation, Lukas Hammerle, SWITCH (CH), user-centric PKI credentials: Interoperable Global Trust Federation, https://igtf.net/

Federated Success!

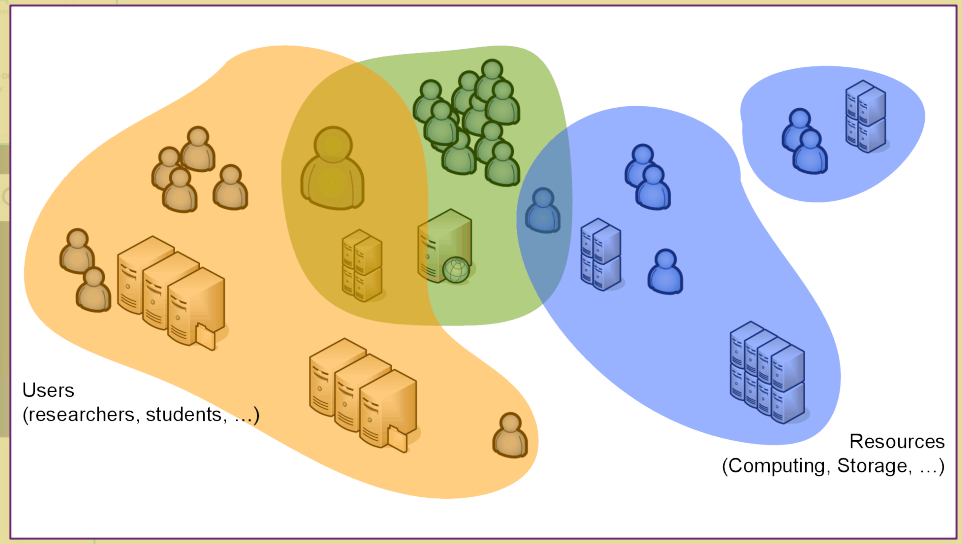
Login to GW's ifosim.org, to gitlab, or … via the service proxy

with any eduGAIN IdP for user authentication



ifosim federated AAI integration implementation by Mischa Sallé; per-country

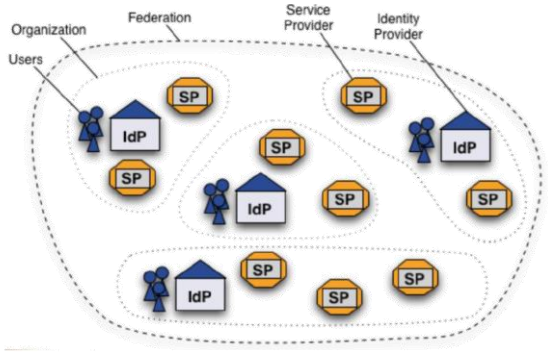
Science infrastructures using our R&E ‘federated access’



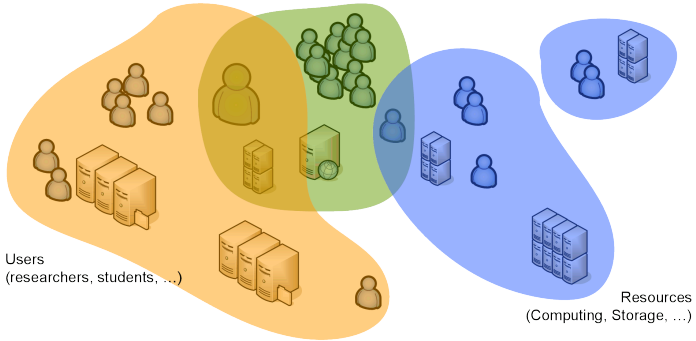
Images: CERN https://wlcg.web.cern.ch/; HADDOCK, WeNMR, @Bonvinlab https://wenmr.science.uu.nl/; Virgo, Pisa, IT; artist impression Einstein Telescope EMR region; EOSC portal in 2023, EGI catalogue https://www.egi.eu/

They look similar, yet they are not …

In the **Identity federation** picture, the source of authority is the *home organisation* via its IdP



In the **Community** picture, the source of authority is *the community itself*

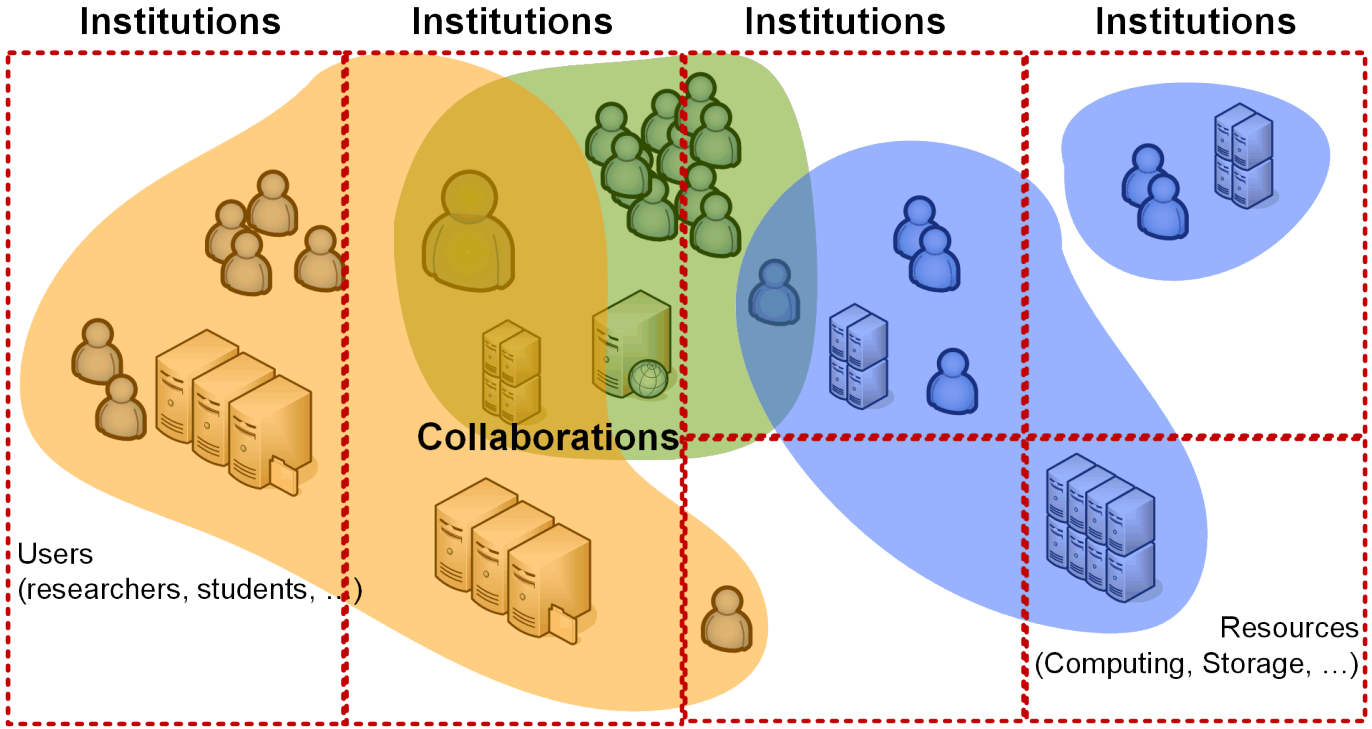


the AuthN-AuthZ separation is fundamental

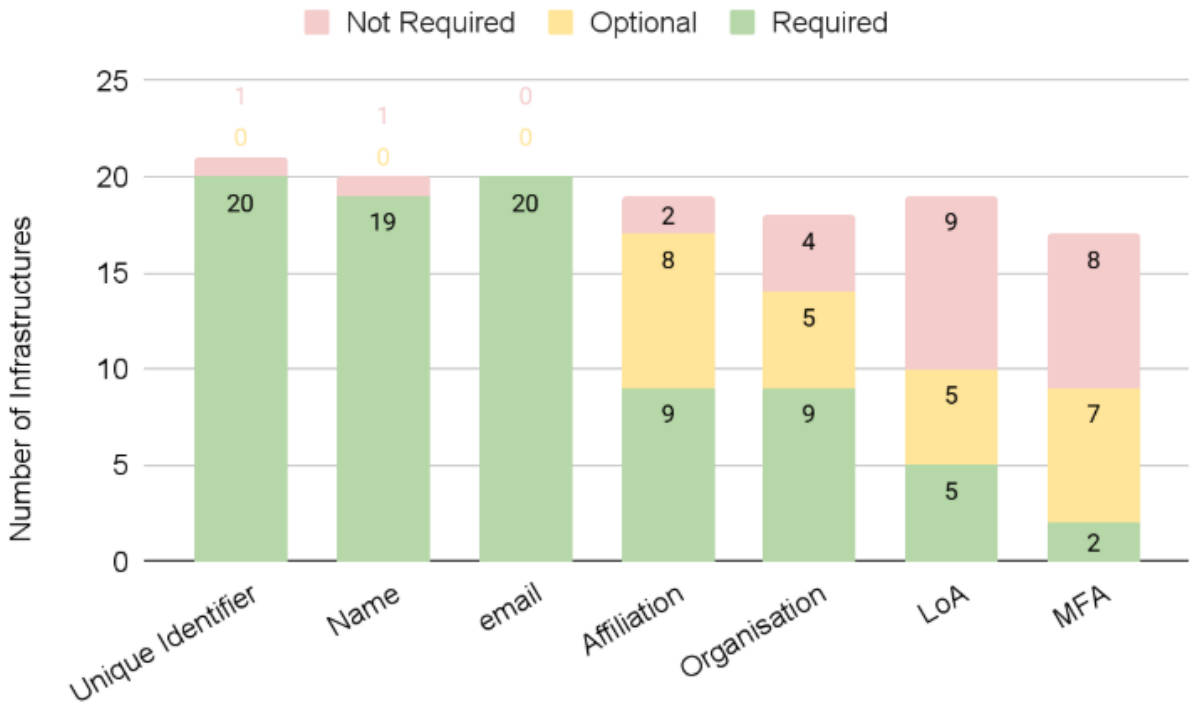
to the Federated (R&E) AAI, global IGTF PKI, VOMS, 'AARC BPA' AAI architecture …

Right-hand image: Shibboleth IdP federation, Lukas Hammerle, SWITCH (CH)

Since collaborations and institutions slice in different ways



Research Infrastructures: what they *actually* need from ‘home’



Glossary

Affiliation: what *type* of entity are you (student, faculty, alumnus, …)

LoA: level of authentication assurance (like passport identity vetting and ‘freshness’ of data)

MFA: multi-factor authentication (password, 6-digit code, SMS, fingerprint)

Source: Marina Adomeit, Janos Mohasci, *et al.* AARC TREE Use-case collection and analysis (D3.2), 2025 (under review)

The one infra that did ‘not need a unique identifier’ actually stated: “<our infra> assingns own identifier upon registration” – so the unique identifier is *still* there!

For starters: sharing good user identifiers is non-trivial ☹

For IdP Operators

What attributes should be released by an R&S IdP?

The Research & Scholarship specification defines a bundles of attributes that Identity Providers are encouraged to release to R&S services:

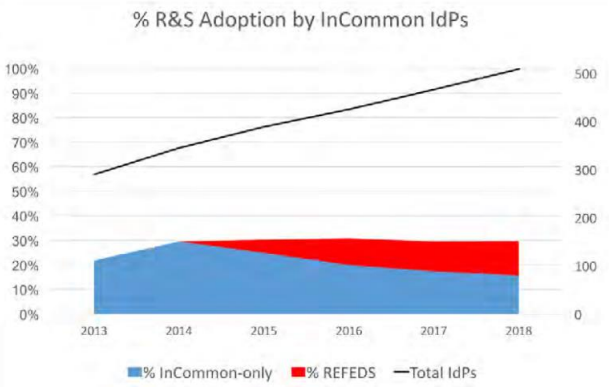
- personal identifiers: email address, person name, eduPersonPrincipalName
- pseudonymous identifier: eduPersonTargetedID
- affiliation: eduPersonScopedAffiliation

Category support is defined as follows:

> An Identity Provider indicates support for the R&S Category by exhibiting the R&S entity attribute in its metadata. Such an Identity Provider MUST, for a significant subset of its user population, release all required attributes in

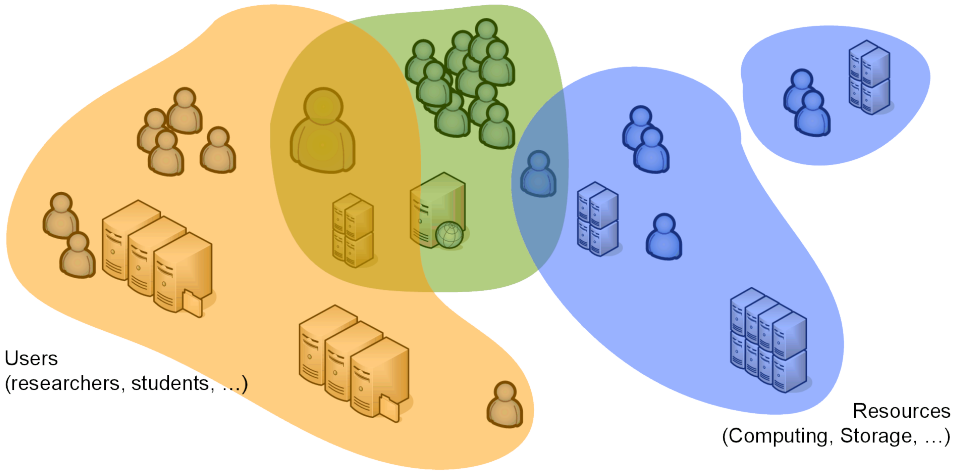
of 6019 identity providers
in 77 federations, **33%**
only 1994 support R&S or Personalised access

~ constant since 2018 ☹

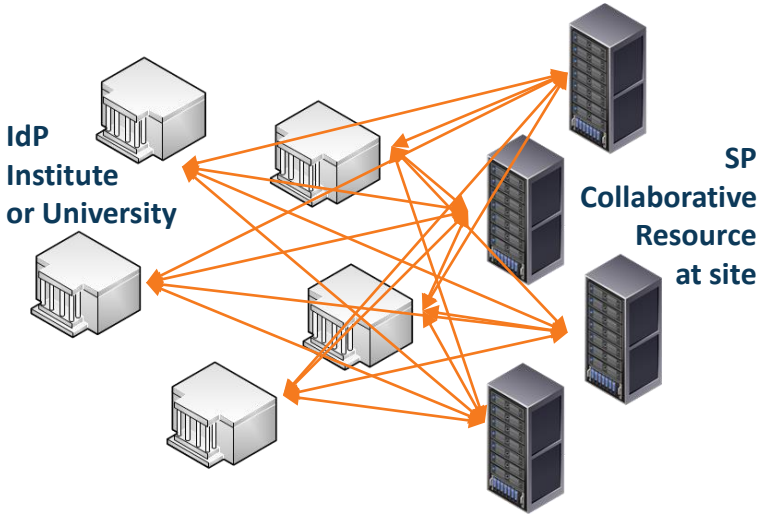


Graph: InCommon: Attributes-WG-Recommendations-May2018.pdf; Entity Category stats as per 2025-03-03, from https://technical.edugain.org/entities

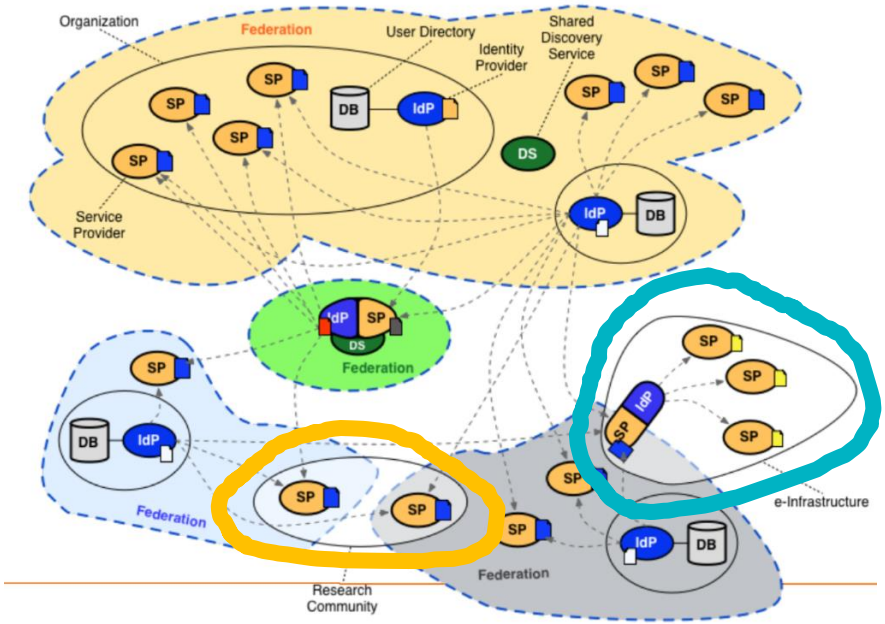
A fundamental scaling issue remained unique to research



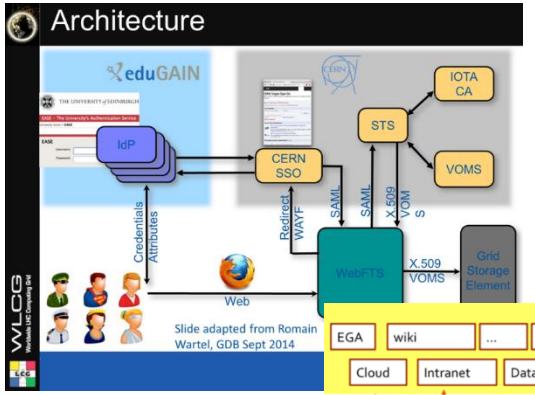
for identity and user data
‘n x m’ agreements remain(ed)



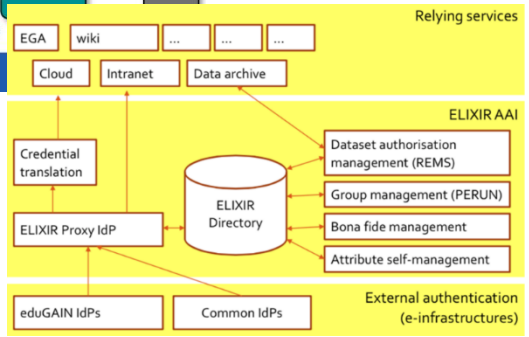
Managing complexity: distributed diverse identity sources



they were composed of many services
each of which had to manage federation complexity



WebFTS prototype
'FIM4R' in wLCG
Romain Wartel et al.



ELIXIR reference architecture
Mikael Linden et al.

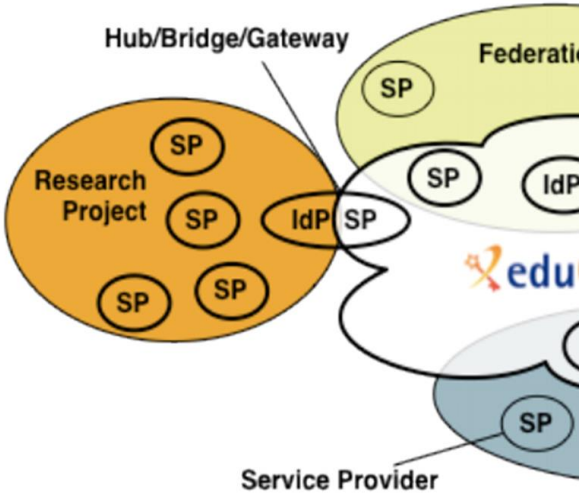
but most communities had started to invent
their own 'proxy' model to abstract complexity

Community images: Romain Wartel, CERN; Mikael Linden, CSC; Federation image (R): Lukas Hammerle, SWITCH

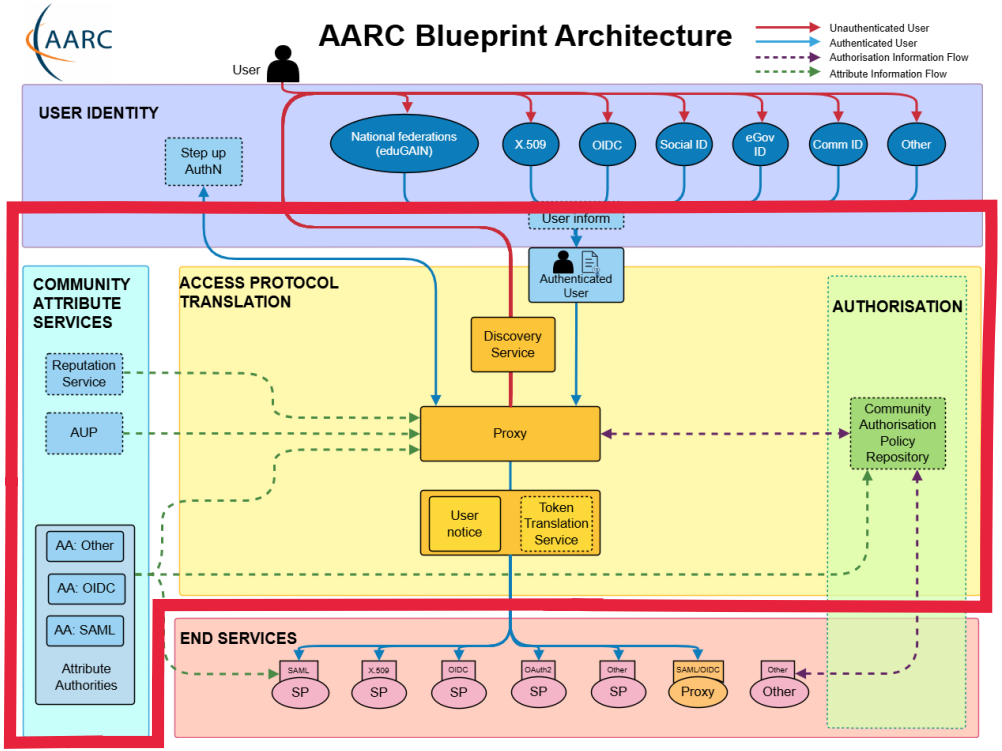
The IdP-SP bridge

- Access services using **identities from users' Home Organizations**,
- but **hide complexity** of multiple IdPs, federations,
  and different technologies for authentication and authorisation
- **One persistent identity**
  across all the community's services through **account linking**
- **Access** services
  based on role(s) users have **in the collaboration**.
- For both **web** and **non-web** resources
- Integration of **guest identity solutions**
- **Support for stronger authentication assurance** mechanisms

often known as proxy!



AARC Blueprint – making the bridge a first-class citizen



AARC BPA 2019 'Community First'
https://aarc-community.org/guidelines/aarc-g045/

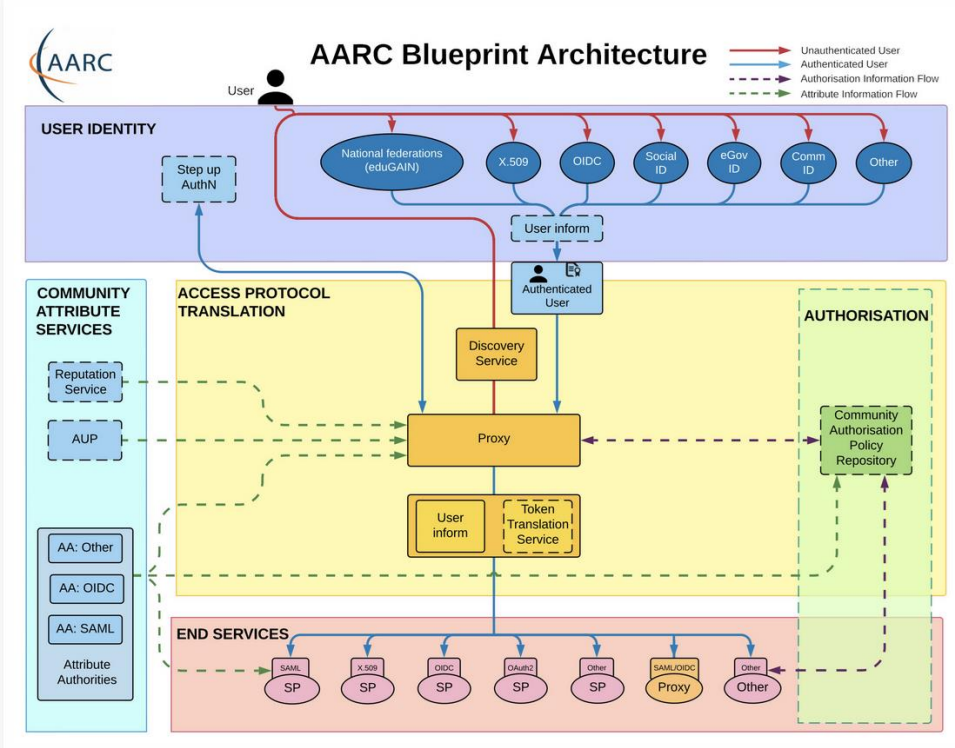
Manage users and access rights

with interoperable **building blocks for 'AAI infrastructure' architects**

that are

- technology-agnostic
- have multiple implementations
- come with policy templates & good practice guides

More than just nice colours



Not sure how to begin with the AARC Blueprint Architecture? There are plenty of guidelines available but it can be a minefield at first. You probably want to start by designing the high level approach of your infrastructure based on the AARC Blueprint Architecture. There are several general topics you should consider, such as Data Protection (AARC-G042) and Federated Security Incident Response (AARC-I051). Here you can find common questions matched to the relevant Blueprint Architecture component, along with links to guidelines that can help.

Community Attribute Services:

- How should attributes from multiple sources be aggregated? AARC-G003
- How should I express the home institute of a user? AARC-G025
- How should I express the identifier of a user AARC-G026
- What are the best practices for running my Attribute Authorities securely? AARC-G071
- Which Acceptable Use Policy should I use to facilitate interoperability? AARC-I044
- How should I infer the affiliation of a user? AARC-G057

Authorisation:

- How should I manage authorisation information from multiple sources? AARC-G006
- How should group and role information be expressed to facilitate interoperability? AARC-G002
- How should resource capabilities be expressed? AARC-G027

End Services:

- My service needs to act on behalf of the user – how should I handle credential delegation and impersonation? AARC-G005
- My services are not web based, how can I use identities from the proxy? AARC-G007
- How should Services hint which IdP they would like users to use? AARC-G049
- Which Security practices should I follow? AARC-G014

User Identity:

- How should I integrate Social Media Identity Providers? AARC-G008
- How should users link accounts, and how does that affect Assurance? AARC-G009
- How should services indicate that they would like users to authenticate with multifactor authentication, and how should my proxy forward that information? AARC-G029

Assurance:

- How should assurance information of external identities be calculated? AARC-G031
- What can I say about assurance of identities from social media accounts? AARC-G041
- How is assurance impacted by account linking? AARC-G009
- How should assurance information be shared with other infrastructures? AARC-G021
- Which Assurance Profiles should I use, there are so many! AARC-I050

Access Protocol Translation:

- Which best practices should I follow for my Token Translation Services? AARC-G004
- How should I translate from Identity Federation information to X.509 certificates? AARC-G010

Proxies:

- How can I ensure that my proxy is able to accurately claim that it supports best practices in Identity Federation? AARC-G015
- How should I express the home institute of a user? AARC-G025
- How should I express the identifier of a user AARC-G026
- How should I express assurance information for users when interacting with another proxy? AARC-G021
- How can my proxy simplify the discovery process for end-users? AARC-G061
- How can my proxy route the user to the correct discovery service? AARC-G062

What next? Are you looking for a kick start with your policies? Take a look at the Policy Development Toolkit which provides a set of templates.

policy) & services (for service specific policies)			Infrastructure and its participants. Each service in the infrastructure, as well as the infrastructure itself, should complete the template.	
Service Operations Security Policy	Infrastructure Management	Services (abide by)	This policy defines requirements for running a service within the Infrastructure.	Google Doc
Acceptable Use Policy	Infrastructure Management (for baseline) & Research Communities (for community specific restrictions)	Users (abide by)	This is a template for the acceptable policy that users must acc Research Infrastructure. It d augmented by the Research C	Google

Showing 1 to 9 of 9 entries

Previous Next

PDK

https://aarc-community.org/guidelines/

“Your attention to detail is appreciated”

Even a simple challenge …

“How to communicate
affiliation of a user with the community”

needs standards for interoperability!

- AARC-G025 –
  Guidelines for expressing affiliation information
- AARC-G057 –
  Inferring and constructing voPersonExternalAffiliation

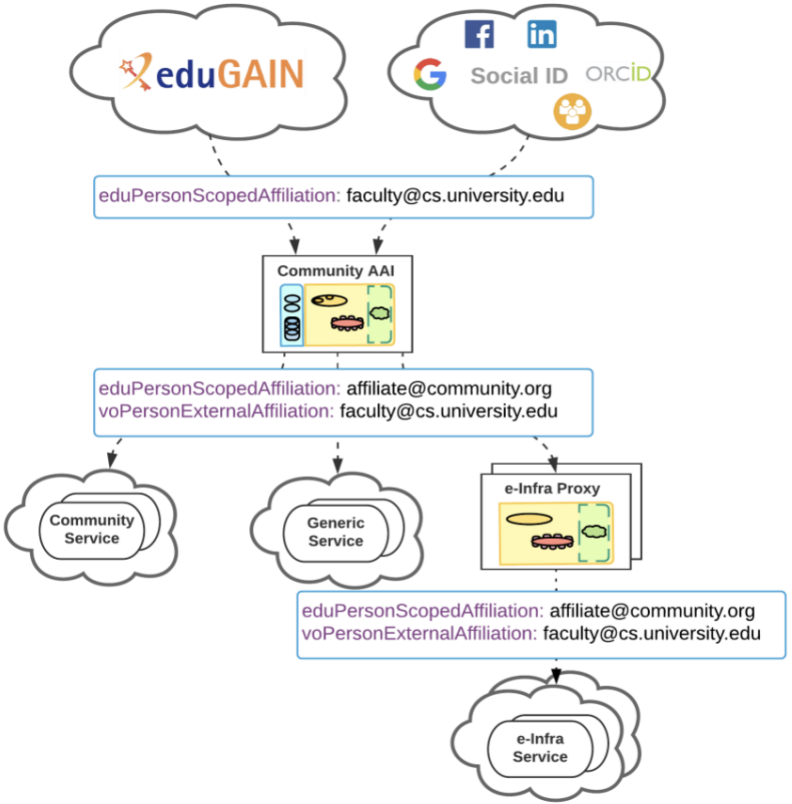
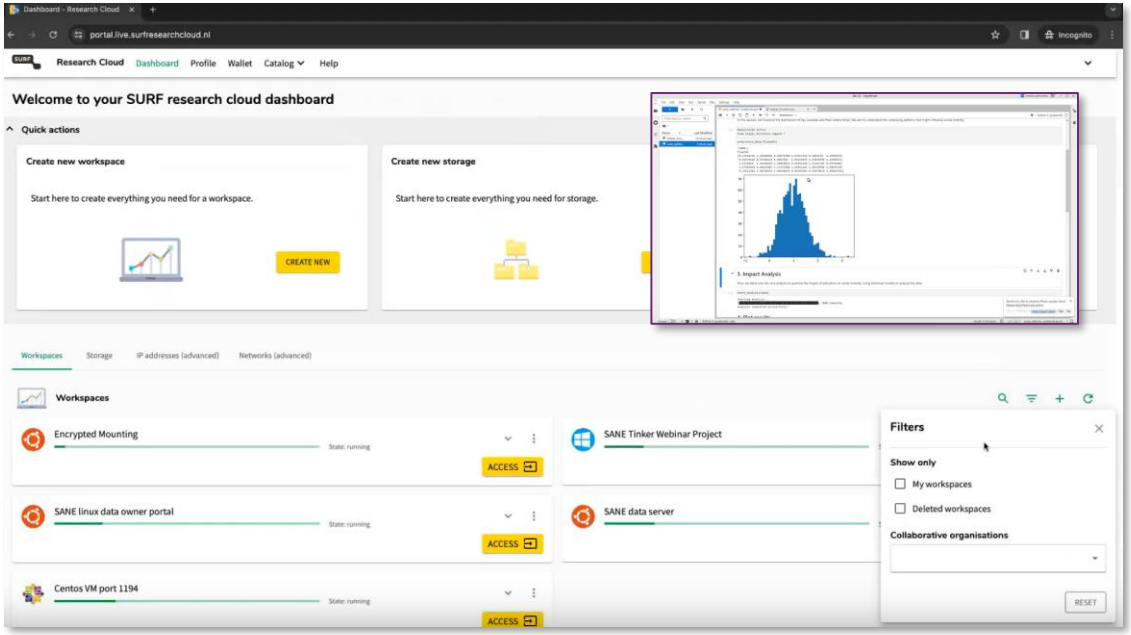
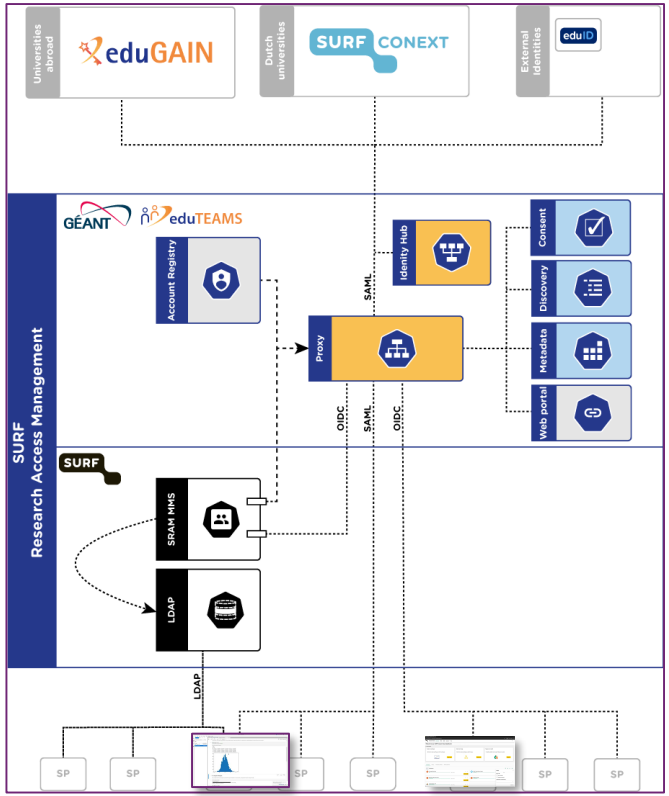


Image: Guideline AARC-G025 (AARC community); quote from the MoinMoin wiki software

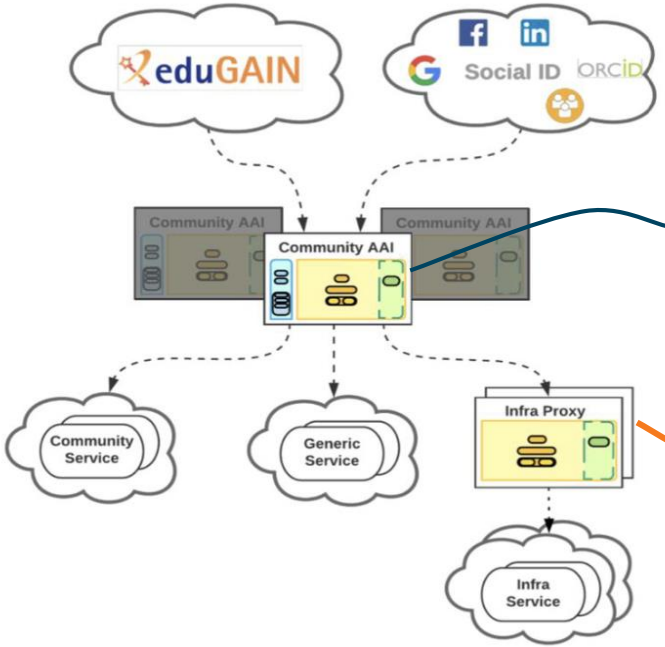
Example: SURF Research Cloud Secure Supercomputing





SURF SRAM architecture, Raoul Teeuwen *et al.* from
https://servicedesk.surf.nl/wiki/display/IAM/Dienstbeschrijving+SURF+Research+Access+Management
SURF Research Cloud capture: from Introduction to SANE (Secure ANalysis Environment)
webinar February 2024, by Martin Brandt et al., SURF
https://www.surf.nl/themas/onderzoeksinfrastructuur/sane-veilige-omgeving-voor-analyse-van-gevoelige-data

… but one proxy is not enough in a research cloud



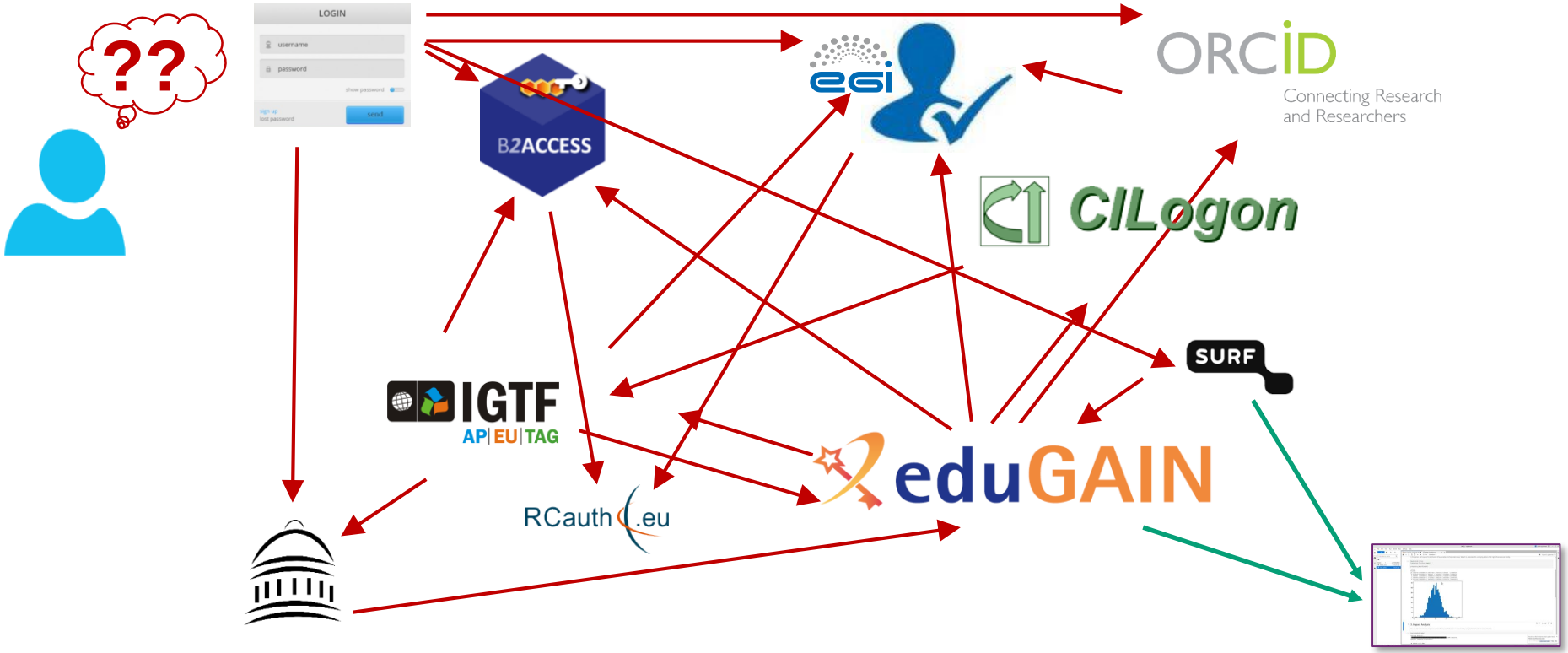
Community AAI

streamline researchers' access to services,
both those provided by their own infrastructure
as well as the services provided
by shared infrastructures from other communities.

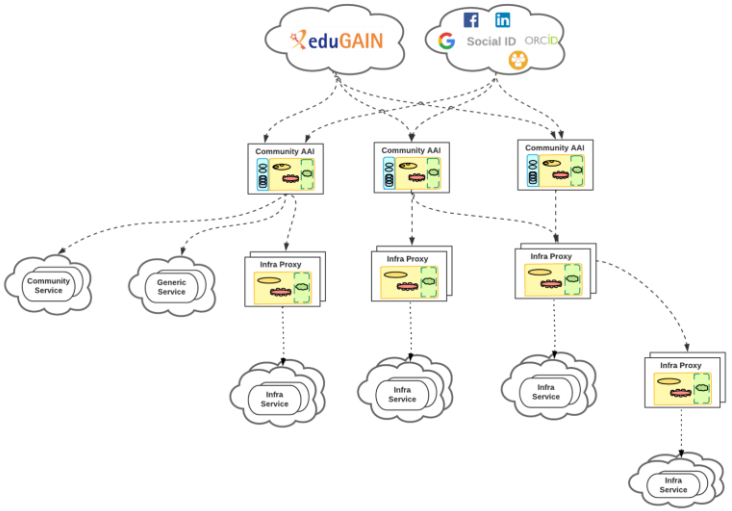
Infrastructure Proxy

enables Infrastructures with large number of resources,
to provide them through a single integration point,
where the Infrastructure can maintain centrally
all the relevant Policies and business logic
for making available resources to multiple communities

Identity spaghetti: 1-loop, 2-loop and higher order diagrams

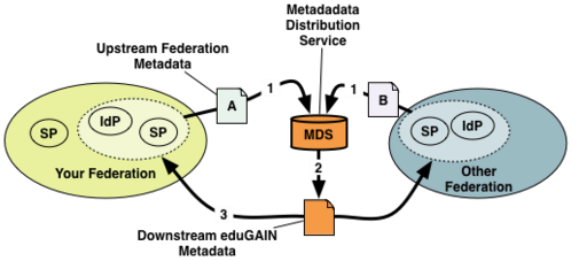


We have seen many arrows before … it needs federation!



Identity, community, infrastructure proxies and services form a ***federation of proxies***

- bilateral registration
  but then you have a scalability issue again
- meta-data distribution of trust paths
  - **OpenID Federation**
  - **SAML** meta-data



- discovery and identity provider hinting

European Open Science Cloud federation (2023 edition)

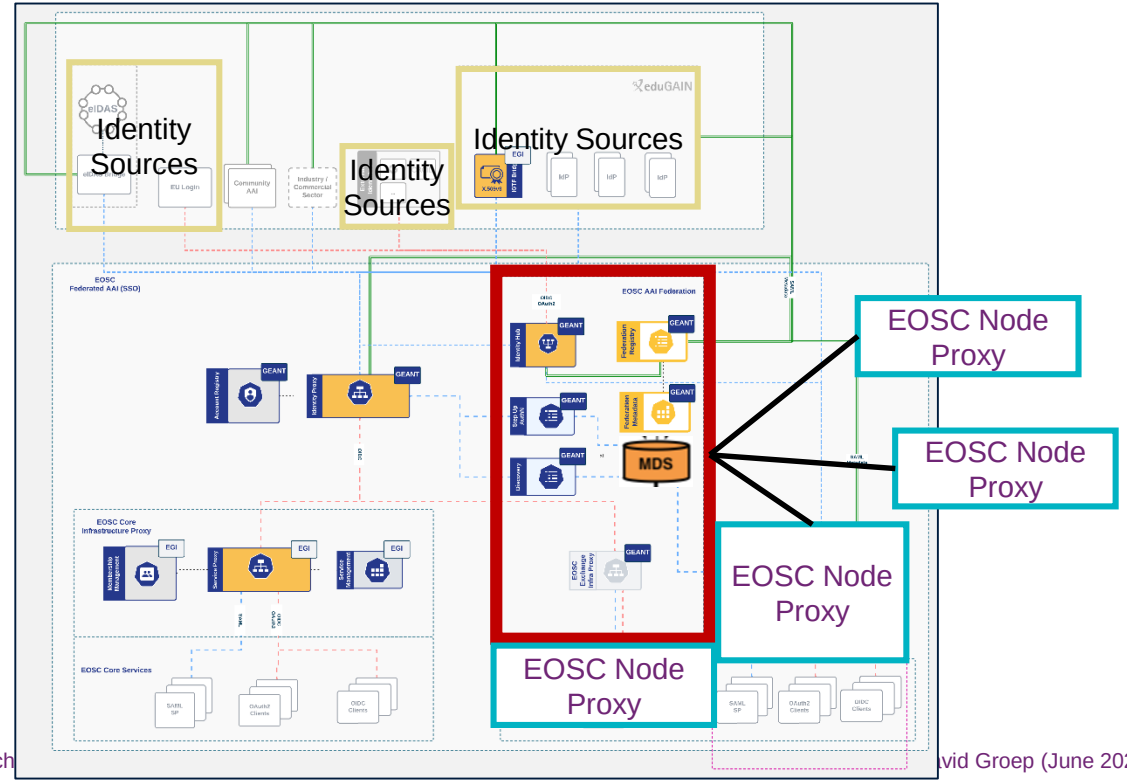
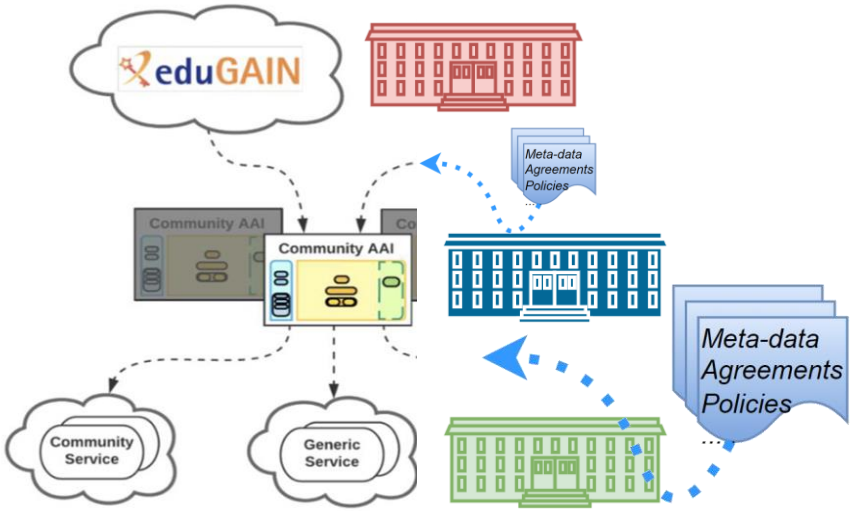


Image: EOSC AAI for the EOSC Core and Exch … vid Groep (June 2023)

And we need to ‘decorate’ the arrows with trust

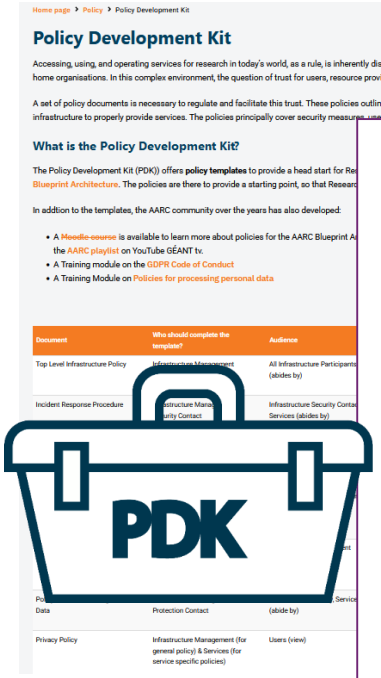


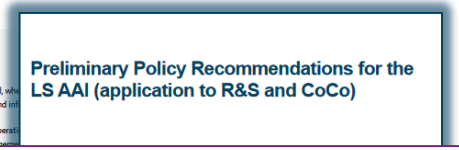
Each side of each arrow has *independent* parties

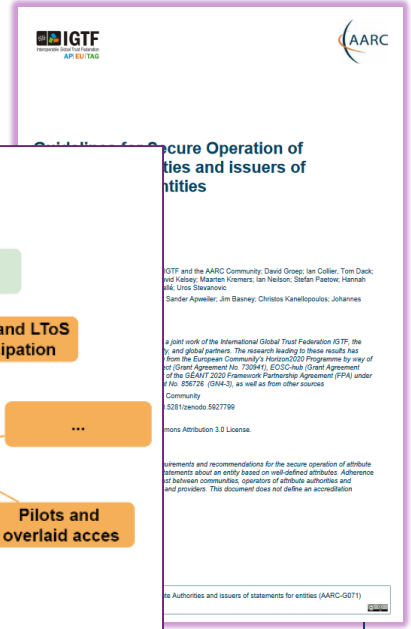
- we allow *them* to do part of the work *we* would otherwise do
- to make it easier and faster for users to perform their research
- but **we relinquish some control** beyond our organisation, our own policies, our own jurisdiction

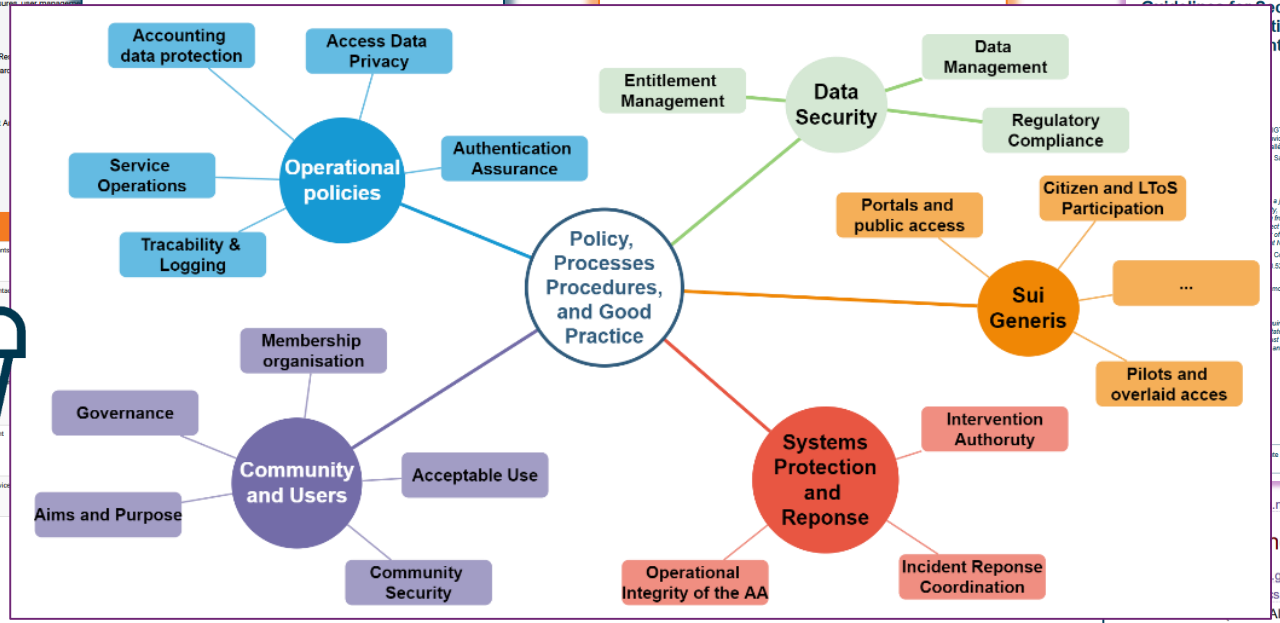
***Why* would we trust them to do that?**

Structuring trust ‘between boxes and arrows’ is complex!



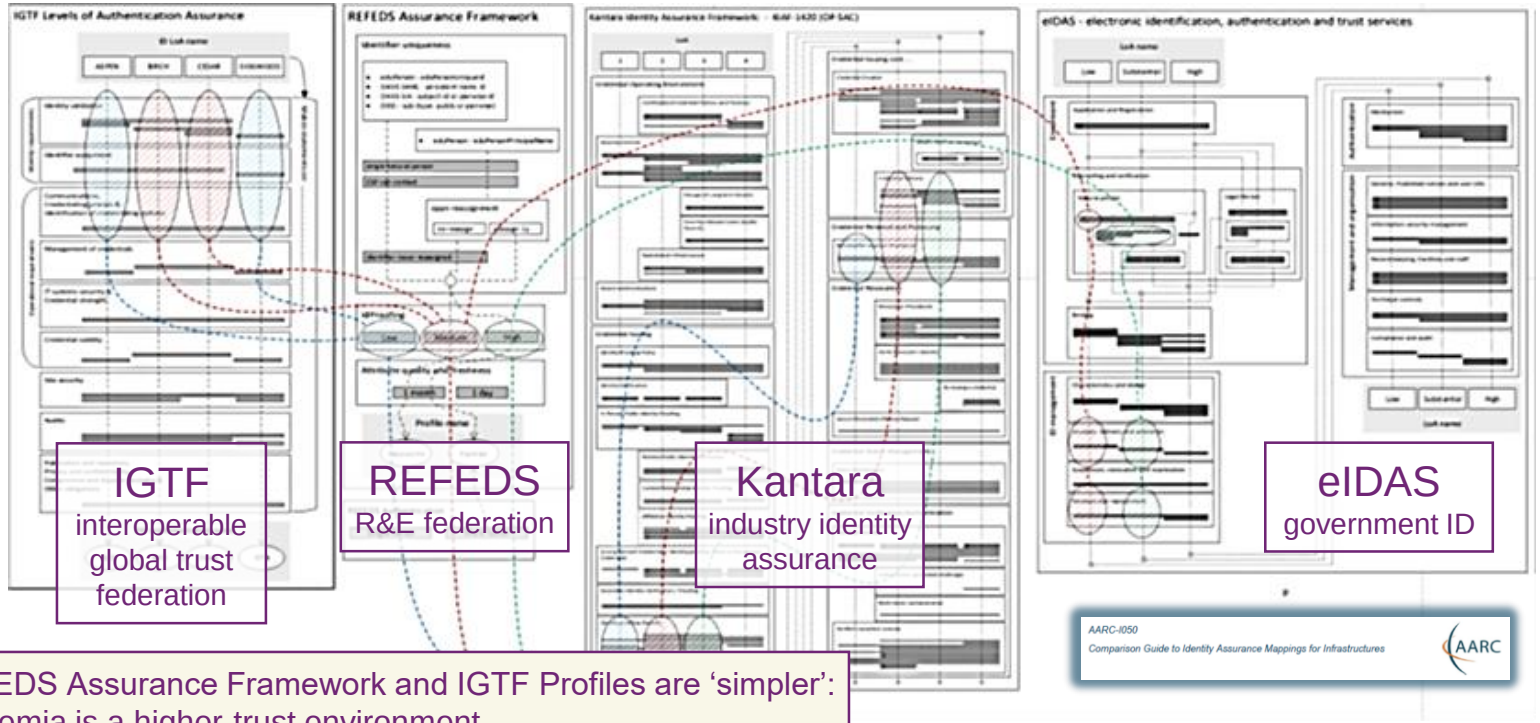






https://aarc-community.org/policies/policy-development-kit/

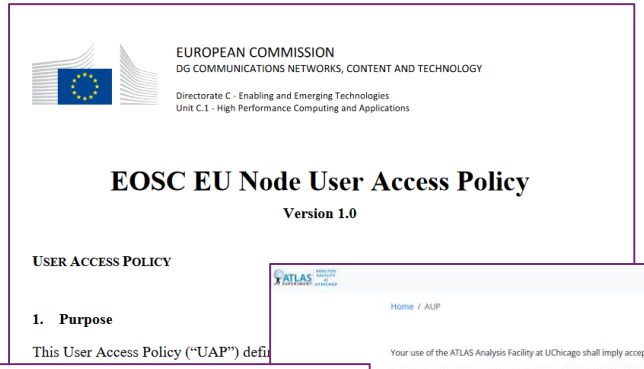
And even a simple ‘Who are you?’ is not always easy …



REFEDS Assurance Framework and IGTF Profiles are ‘simpler’:
academia is a higher-trust environment,
leveraging self-assessed peer review

Source: https://aarc-community.org/guidelines/aarc-i050, Ian Neilson et al.

Helping community and users: how much clicking through?



EUROPEAN COMMISSION
DG COMMUNICATIONS NETWORKS, CONTENT AND TECHNOLOGY

Directorate C - Enabling and Emerging Technologies
Unit C.1 - High Performance Computing and Applications

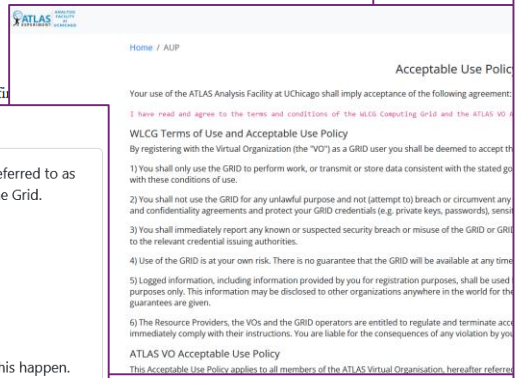
EOSC EU Node User Access Policy

Version 1.0

USER ACCESS POLICY

1. Purpose

This User Access Policy ("UAP") defi



Home / AUP

Acceptable Use Polic

Your use of the ATLAS Analysis Facility at UChicago shall imply acceptance of the following agreement:

I have read and agree to the terms and conditions of the WLCG Computing Grid and the ATLAS VO A

WLCG Terms of Use and Acceptable Use Policy

By registering with the Virtual Organization (the "VO") as a GRID user you shall be deemed to accept th

1) You shall only use the GRID to perform work, or transmit or store data consistent with the stated go with these conditions of use.

2) You shall not use the GRID for any unlawful purpose and not (attempt to) breach or circumvent any and confidentiality agreements and protect your GRID credentials (e.g. private keys, passwords), sensi

3) You shall immediately report any known or suspected security breach or misuse of the GRID or GRI to the relevant credential issuing authorities.

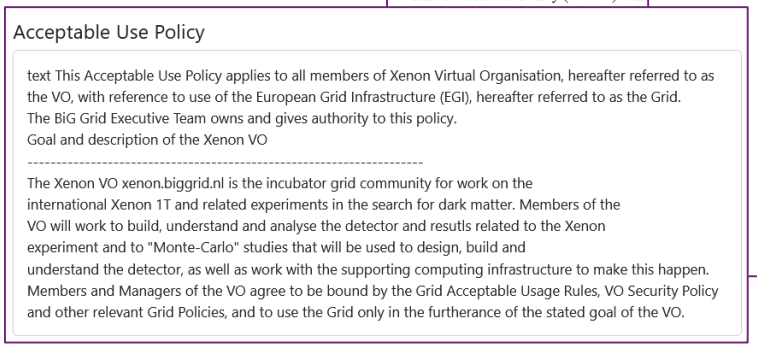
4) Use of the GRID is at your own risk. There is no guarantee that the GRID will be available at any time

5) Logged information, including information provided by you for registration purposes, shall be used purposes only. This information may be disclosed to other organizations anywhere in the world for th guarantees are given.

6) The Resource Providers, the VOs and the GRID operators are entitled to regulate and terminate acc immediately comply with their instructions. You are liable for the consequences of any violation by yo

ATLAS VO Acceptable Use Policy

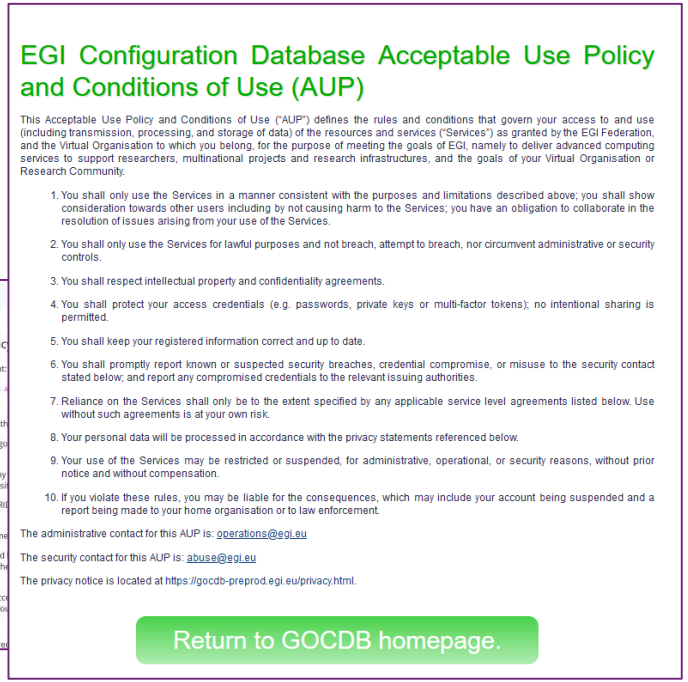
This Acceptable Use Policy applies to all members of the ATLAS Virtual Organisation, hereafter referr



Acceptable Use Policy

text This Acceptable Use Policy applies to all members of Xenon Virtual Organisation, hereafter referred to as the VO, with reference to use of the European Grid Infrastructure (EGI), hereafter referred to as the Grid.
The BiG Grid Executive Team owns and gives authority to this policy.
Goal and description of the Xenon VO

The Xenon VO xenon.biggrid.nl is the incubator grid community for work on the international Xenon 1T and related experiments in the search for dark matter. Members of the VO will work to build, understand and analyse the detector and resutls related to the Xenon experiment and to "Monte-Carlo" studies that will be used to design, build and understand the detector, as well as work with the supporting computing infrastructure to make this happen. Members and Managers of the VO agree to be bound by the Grid Acceptable Usage Rules, VO Security Policy and other relevant Grid Policies, and to use the Grid only in the furtherance of the stated goal of the VO.



EGI Configuration Database Acceptable Use Policy and Conditions of Use (AUP)

This Acceptable Use Policy and Conditions of Use ("AUP") defines the rules and conditions that govern your access to and use (including transmission, processing, and storage of data) of the resources and services ("Services") as granted by the EGI Federation, and the Virtual Organisation to which you belong, for the purpose of meeting the goals of EGI, namely to deliver advanced computing services to support researchers, multinational projects and research infrastructures, and the goals of your Virtual Organisation or Research Community.

1. You shall only use the Services in a manner consistent with the purposes and limitations described above; you shall show consideration towards other users including by not causing harm to the Services; you have an obligation to collaborate in the resolution of issues arising from your use of the Services.
2. You shall only use the Services for lawful purposes and not breach, attempt to breach, nor circumvent administrative or security controls.
3. You shall respect intellectual property and confidentiality agreements.
4. You shall protect your access credentials (e.g. passwords, private keys or multi-factor tokens); no intentional sharing is permitted.
5. You shall keep your registered information correct and up to date.
6. You shall promptly report known or suspected security breaches, credential compromise, or misuse to the security contact stated below; and report any compromised credentials to the relevant issuing authorities.
7. Reliance on the Services shall only be to the extent specified by any applicable service level agreements listed below. Use without such agreements is at your own risk.
8. Your personal data will be processed in accordance with the privacy statements referenced below.
9. Your use of the Services may be restricted or suspended, for administrative, operational, or security reasons, without prior notice and without compensation.
10. If you violate these rules, you may be liable for the consequences, which may include your account being suspended and a report being made to your home organisation or to law enforcement.

The administrative contact for this AUP is: operations@egi.eu

The security contact for this AUP is: abuse@egi.eu

The privacy notice is located at https://gocdb-preprod.egi.eu/privacy.html.

Return to GOCDB homepage.

Good common practice: the WISE Baseline AUP

Acceptable Use Policy and Conditions of Use

This Acceptable Use Policy and Conditions of Use ("AUP") defines the rules and conditions that govern your access to and use (including transmission, processing, and storage of data) of the resources and services ("Services") as granted by {community, agency, or infrastructure name} for the purpose of {describe the stated goals and policies governing the intended use}.

<To further define and limit what constitutes acceptable use, the community, agency, or infrastructure may optionally add additional information, rules or conditions, or references thereto, here or at the placeholder below. These additions must not conflict with the clauses 1-10 below, whose wording and numbering must not be changed.>

1. You shall only use the Services in a manner consistent with the purposes and limitations described above; you shall show consideration towards other users including by not causing harm to the Services; you have an obligation to collaborate in the resolution of issues arising from your use of the Services.
2. You shall only use the Services for lawful purposes and not breach, attempt to breach, nor circumvent administrative or security controls.
3. You shall respect intellectual property and confidentiality agreements.
4. You shall protect your access credentials (e.g. passwords, private keys or multi-factor tokens); no intentional sharing is permitted.
5. You shall keep your registered information correct and up to date.
6. You shall promptly report known or suspected security breaches, credential compromise, or misuse to the security contact stated below; and report any compromised credentials to the relevant issuing authorities.
7. Reliance on the Services shall only be to the extent specified by any applicable service level agreements listed below. Use without such agreements is at your own risk.
8. Your personal data will be processed in accordance with the privacy statements referenced below.
9. Your use of the Services may be restricted or suspended, for administrative, operational, or security reasons, without prior notice and without compensation.
10. If you violate these rules, you may be liable for the consequences, which may include your account being suspended and a report being made to your home organisation or to law enforcement.

<Insert additional numbered clauses here>

The administrative contact for this AUP is:
{email address for the community, agency, or infrastructure name}
The security contact for this AUP is:
{email address for the community, agency, or infrastructure security contact}
The privacy statements (e.g. Privacy Notices) are located at: {URL}
Applicable service level agreements are located at: <URLs>

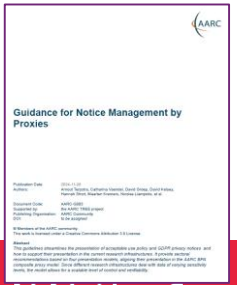
Purpose binding
ensure use is as intended for access grant

Terms and Conditions
research data access conditions, permits, grant conditions

WISE Baseline AUP
common 10 commandments that allow seamless cross-sectoral user movement

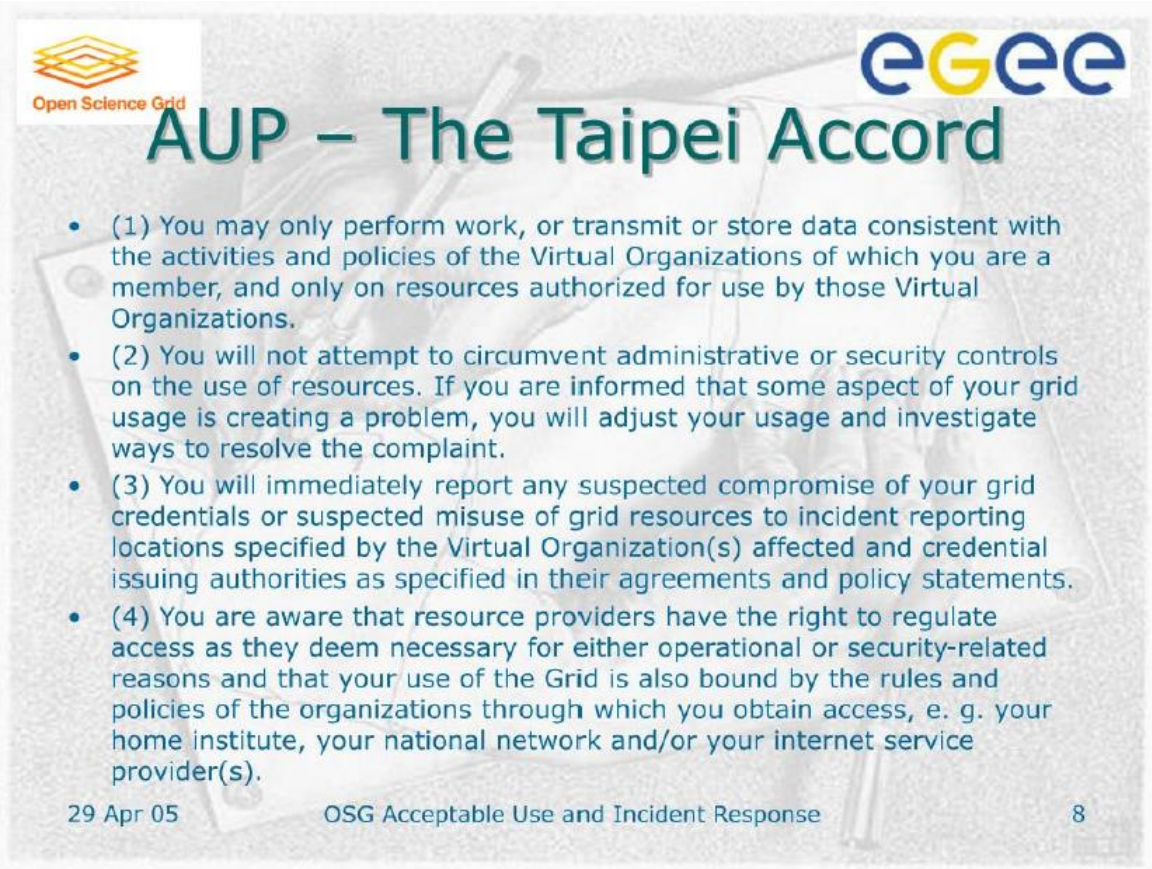
Service level agreements
promises and recourse

Privacy notice references
for *access* personal data policies



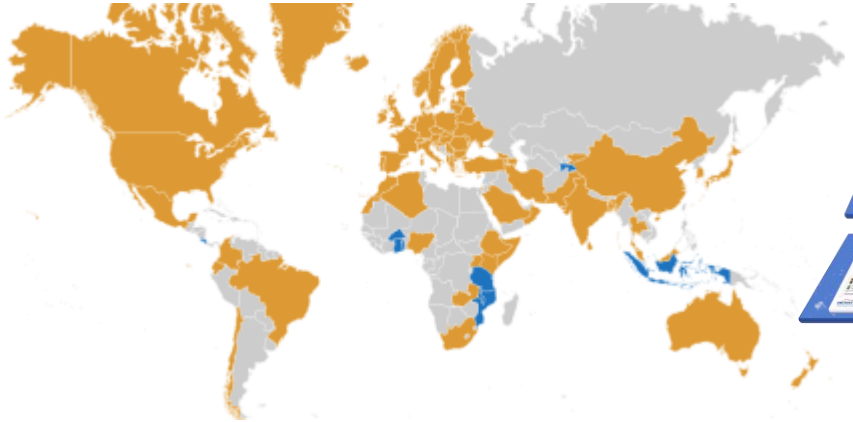
https://wise-community.org/wise-baseline-aup/

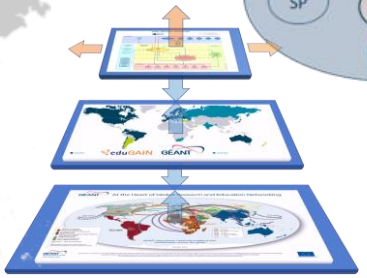
It all started here!

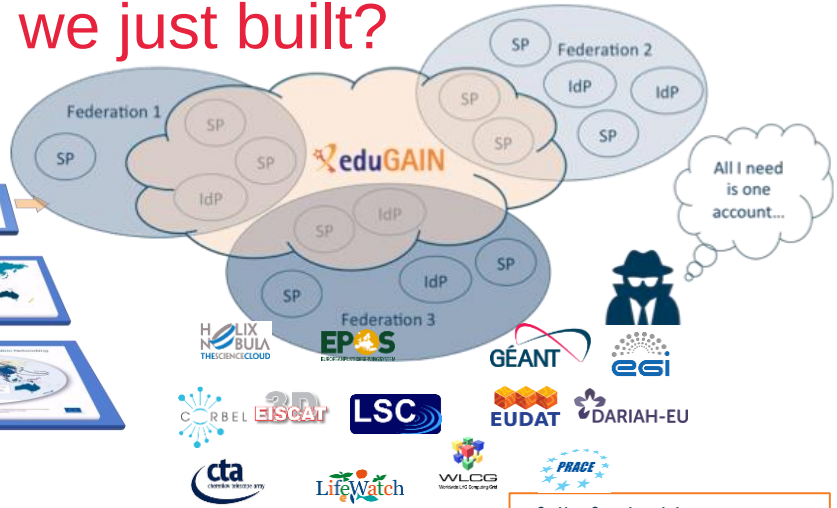


Bob Cowles *Acceptable Use Policy and Security Incident Response Strategy in the Open Science Grid* – ISGC, 29 April 2005

What about *unacceptable* use? “who dunnit” essential for incident response, but *what* have we just built?







full of valuable resources (data, network, services)

So we have federation and single sign-on …
… but can we respond if something goes haywire?
… can we share security incident information when needed?
… timely and confidentially, protecting everyone’s reputation?

left: eduGAIN interfederation in 2025 (https://technical.edugain.org/status); logos on the right from the European e-Infrastructures and ESFRIs; center graphic: AARC

‘Sirtfi’ – what makes federated security different?

SIRTFI
Security Incident Response Trust Framework for Federated Identity

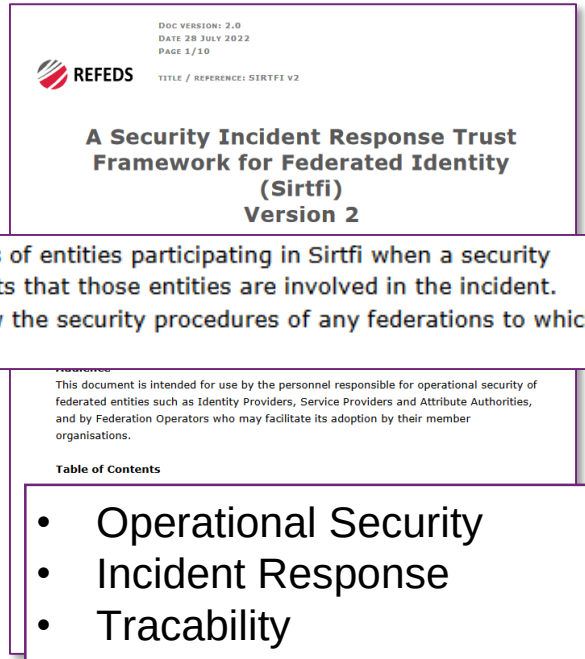
Organisations probably do ‘something reasonable’ for their own security ... but may not realise the implications for others

Sirtfi targets coordinated **response in a federated context**:

1. Enable **communication** and coordination in managing federated security incidents
2. Relevant **event data** is available to help collaborating incident responders.
3. **Security protections are applied** to federated transactions

Define capabilities for security incident response an IdP or SP **organisation can self-asserts** in federation meta-data

https://refeds.org/sirtfi


Doc version: 2.0
Date 28 July 2022
Page 1/10

REFEDS

Title / Reference: SIRTFI v2

A Security Incident Response Trust Framework for Federated Identity (Sirtfi) Version 2

- [IR3] Notify security contacts of entities participating in Sirtfi when a security incident investigation suggests that those entities are involved in the incident. Notification should also follow the security procedures of any federations to which your organisation belongs.

This document is intended for use by the personnel responsible for operational security of federated entities such as Identity Providers, Service Providers and Attribute Authorities, and by Federation Operators who may facilitate its adoption by their member organisations.

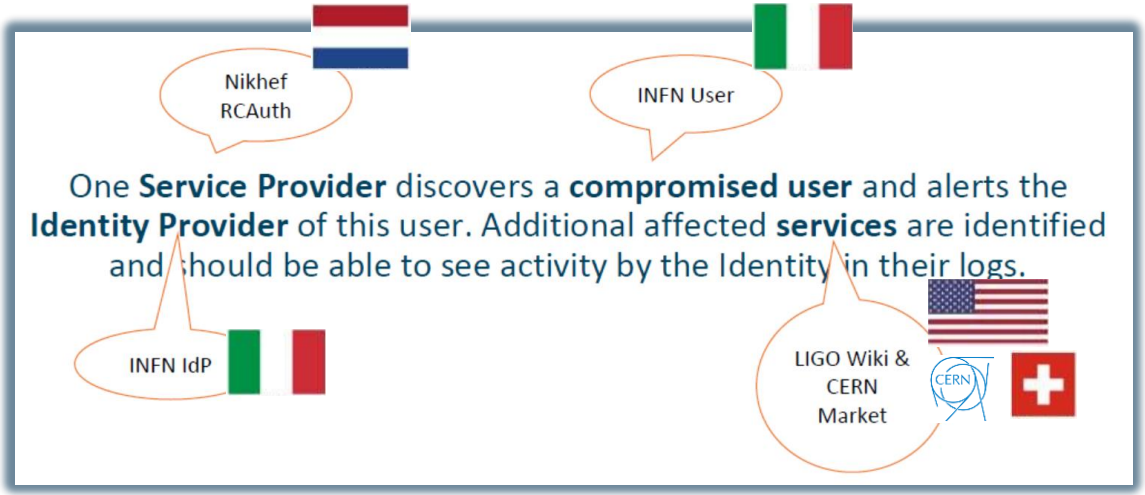
Table of Contents

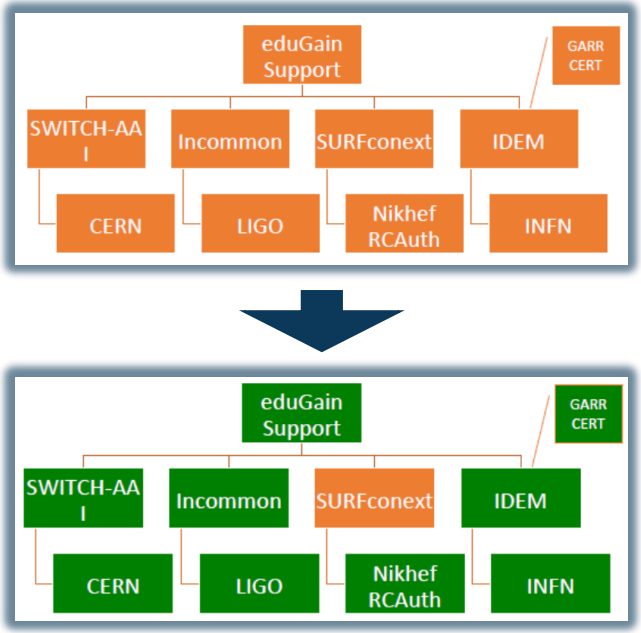
- Operational Security
- Incident Response
- Tracability
- User Rules & Conditions

A federated community security challenge

Can we coordinate our collective R&E response?

‘security challenges’ based on the *Sirtfi* contact model

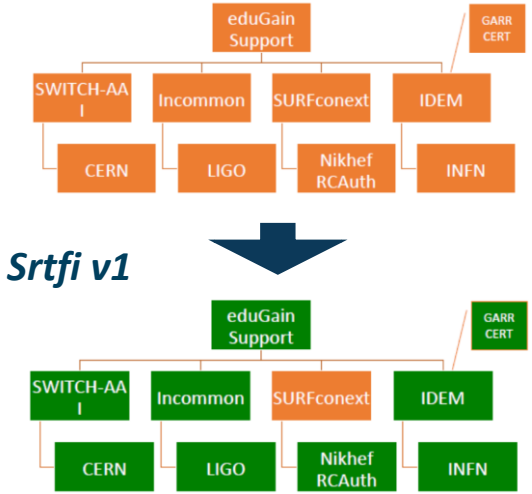


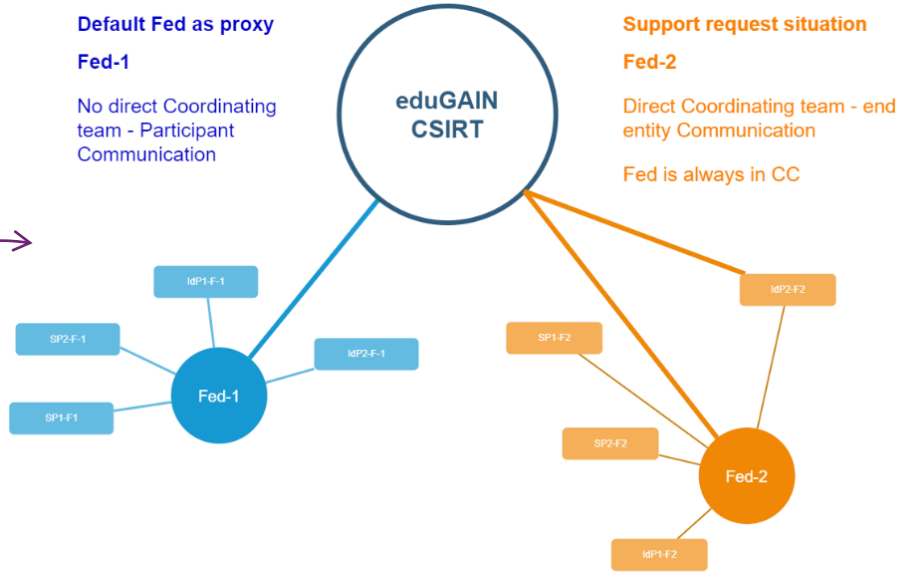


parties involved in response challenge

Report-outs see **https://wiki.geant.org/display/AARC/Sirtfi+Communications+Challenges%2C+AARC2-TNA3.1**

Response across IdP-SP Proxies: the limits of Sirtfi version 1

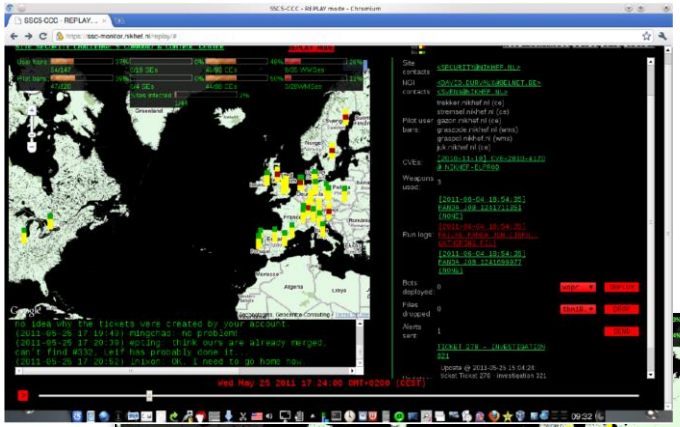




GÉANT | eduGAIN | CSIRT

joint work with GN5 EnCo and eduGAIN CSIRT

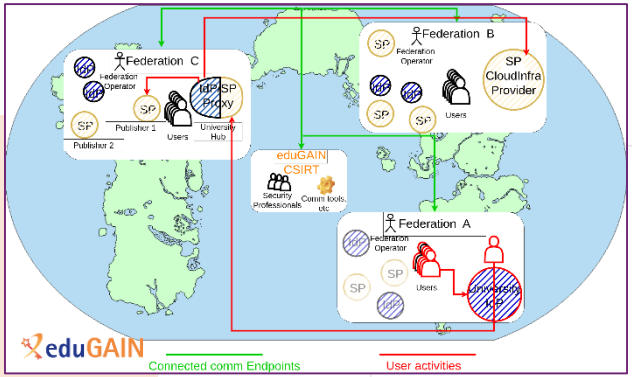
Trust … but verify



Communication:
- Endpoints valid?
- Form/Content OK ?

Containment
- Ban ”malicious” users
- Find/Stop malicious processes
- Find submission IP

Forensics
- Basic Forensics on binary
- Network traffic



Nikhef

WLCG

EGI

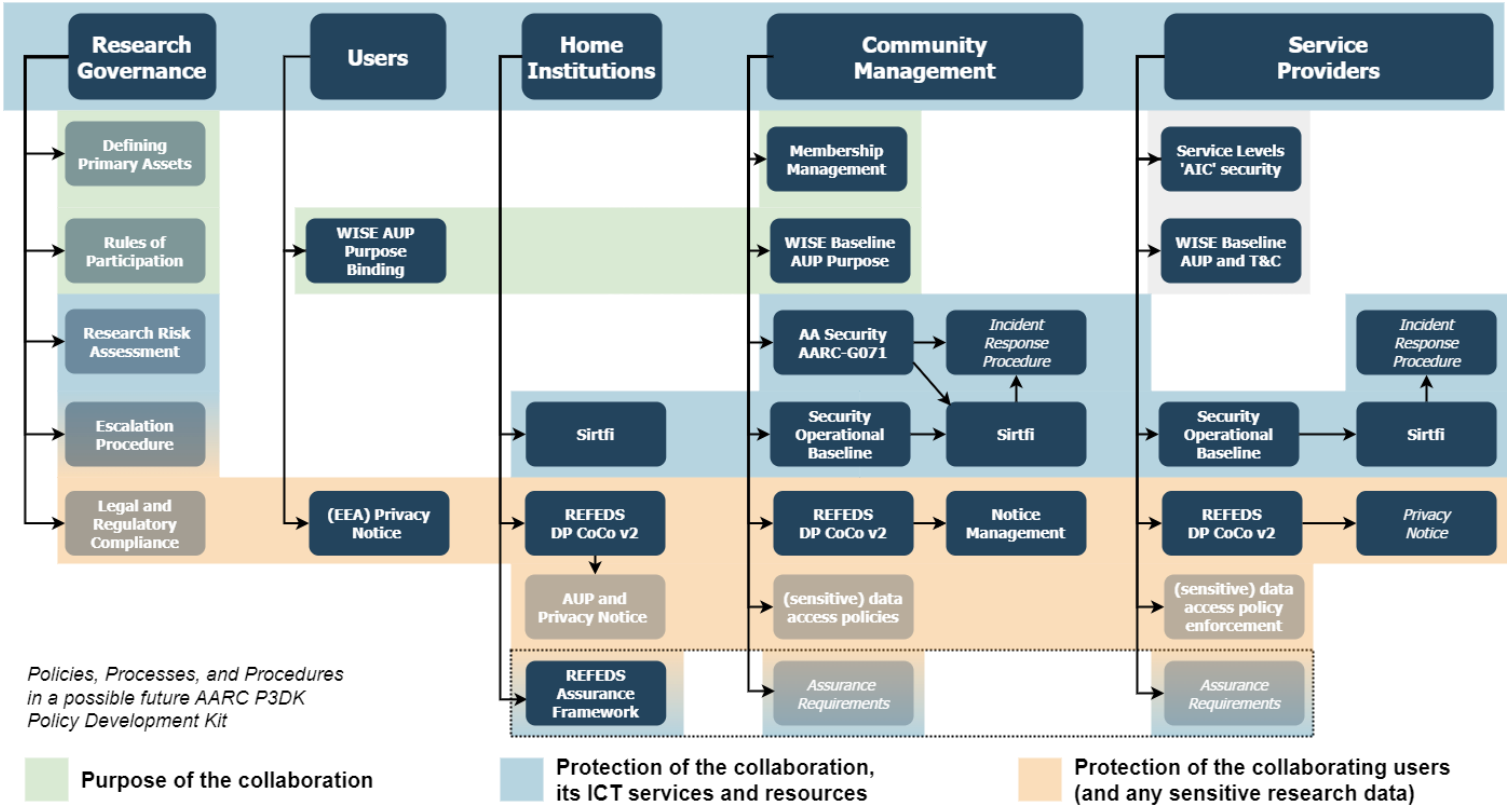
Nikhef CSIRT Traceability Challenge

Introduction

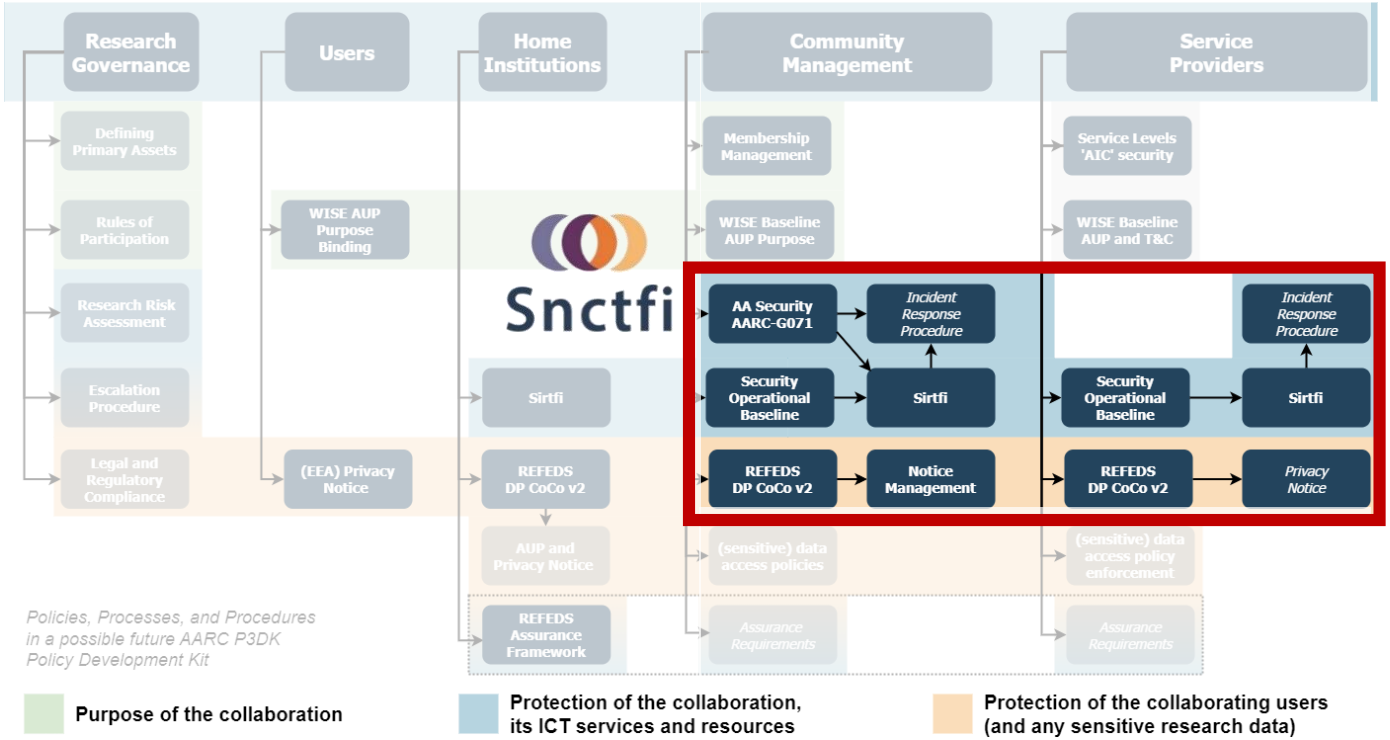
Deze Traceability Challenge bestaat uit drie onderdelen, in (naar verwachting) oplopende moeilijkheidsgraad. Iedere challenge begint met een externe 'trigger' – aan het eind van dit document staan de hints en de goede (of in ieder geval: de 'gewenste') oplossing.

Veel plezier!

Policy Development Kit: simplify by re-using good practice



Providers manage complexity for research communities



communities sourcing 'well-operated' community platforms

eduTEAMS

B2ACCESS

SURF (SRAM)

CILogon

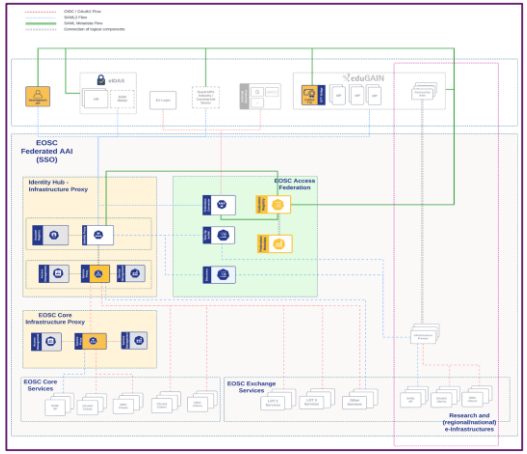
and a few more …

through their scale gets federations to trust our AARC 'middle boxes'

Enabling research: using the ‘EOSC’ with federated login

AARC compliant federation of ‘national’ and ‘thematic’ nodes in the European Open Science Cloud

linked with other ‘data spaces’ and infrastructures



eosc | Federation

The organisations invited to join the March 2025 kick-off workshop for the build-up phase of the EOSC Federation. All of the organisations are among the membership of the EOSC Association.

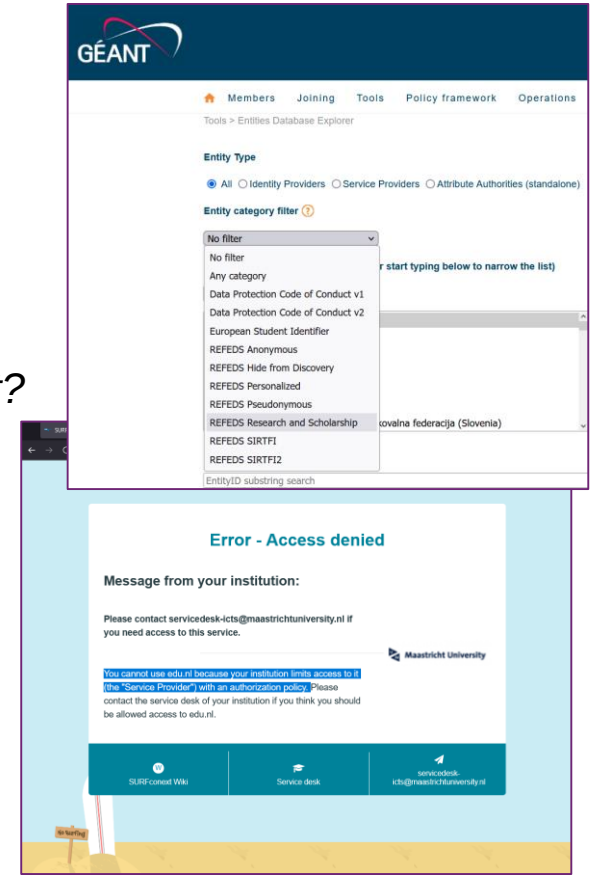
https://eosc.eu/eosc-about/building-the-eosc-federation/contributing-to-the-build-up-phase-of-the-eosc-federation/; See also https://wiki.geant.org/display/AARC/EOSC+AAI

And it needs everyone to work together

To scale trust in research infrastructures,
we need to keep challenging ourselves …

- *for eduGAIN: do we choose more trustworthiness and target baseline assurance, or more inclusiveness, but maybe less trust?*
- *for your university IT department: prioritize the primary mission of education and research, as both are now globally connected*
  - ‘we can *use* existing services from outside’
  - ‘we can *contribute* in collaborations in education and research’
  - ‘we teach our students to understand, study, and work with interconnected services and systems that are globally connected’

  … rather than get stuck in an enterprise egg-shell approach?
- *do our networks support a perimeter ‘fit for collaboration’?*



Images: https://technical.edugain.org/entities, Maastricht University blocking access to … a privacy-friendly URI shortener ☹,

Make and treat computing as the research instrument it is today – institutionally and globally

Institutional:
Nikhef “Stoomboot”
Analysis Facility

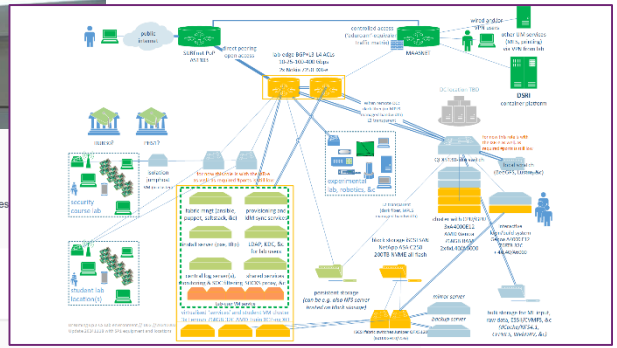
National Infrastructure
SURF Snellius HPC

as well as JP’s HPCI,
US’s AccessCI, &c of course!

There are today as much part of science as detectors are to physics
and: users should move seamlessly between tiers

Photos: Nikhef NDPF, DelftBlue/TUDelft, SURF Data Repository, Snellius, SURF @ DigitalRealty; EuroHPC images: EuroHPC, LUMI Consortium, Jules Verne consortium

And education labs are much like ad-hoc research collaboration



SRAM API 1.0

/swagger_api/apispec.json

Documentation for the public APIs of SURF Res

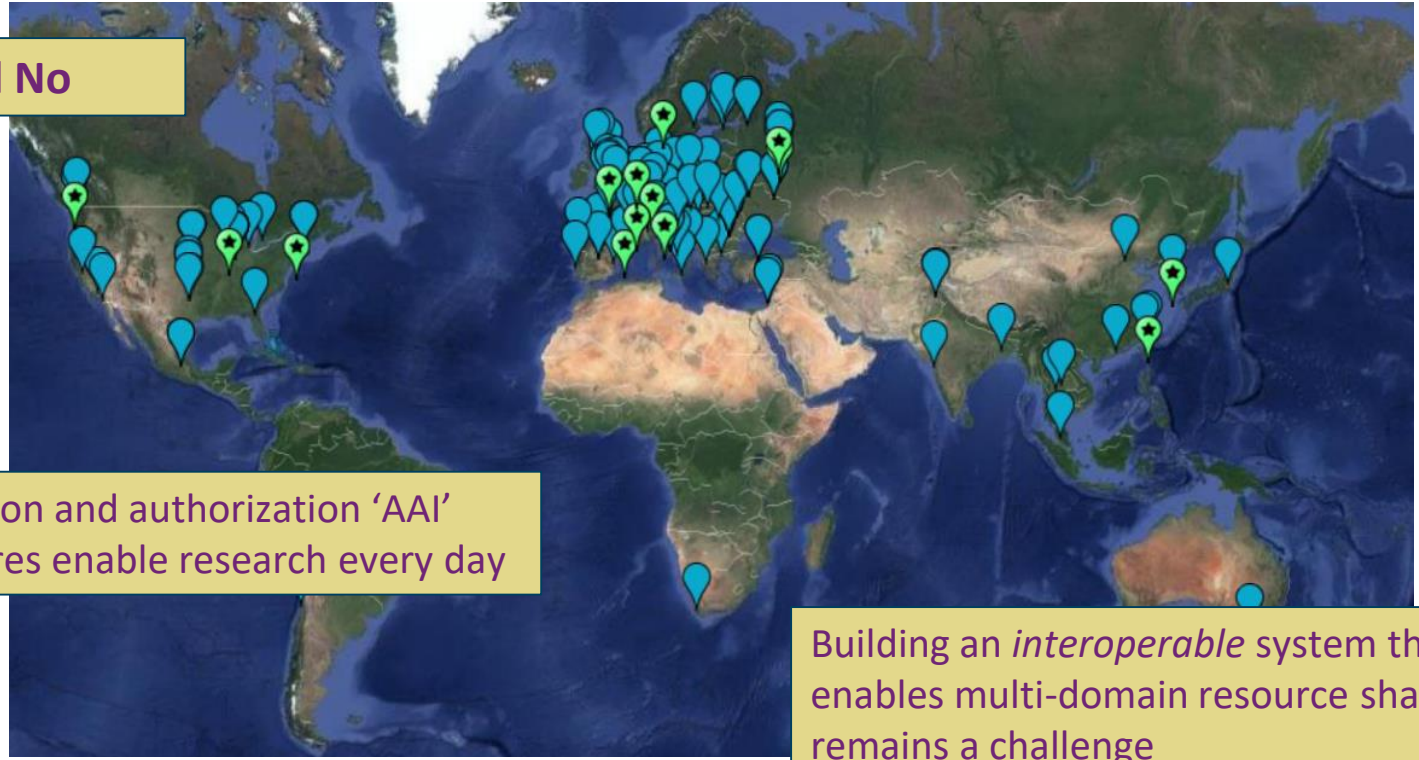
Organisation All endpoints for organisations using an organisation API token

POST	/api/collaborations/v1	Post a new collaboration.	post_api_collaborations_v1
DELETE	/api/collaborations/v1/{co_identifier}	Delete collaboration.	delete_api_collaborations_v1__co_identifier_
PUT	/api/collaborations/v1/{co_identifier}/members	Update collaboration membership.	put_api_collaborations_v1__co_identifier__members
DELETE	/api/collaborations/v1/{co_identifier}/members/{user_uid}	Delete collaboration membership.	delete_api_collaborations_v1__co_identifier__members__user_uid_
PUT	/api/collaborations/v1/{co_identifier}/units	Update collaboration units.	put_api_collaborations_v1__co_identifier__units
PUT	/api/collaborations_services/v1/connect_collaboration_service	Connect service to collaboration.	put_api_collaborations_services_v1_connect_collaboration_service
PUT	/api/collaborations_services/v1/disconnect_collaboration_service	Disconnect service from collaboration.	put_api_collaborations_services_v1_disconnect_collaboration_service

Photo by sunrise University on Unsplash; network diagram: FSE CSLab, Maastricht University; SRAM API: https://sram.surf.nl/apidocs/

So: did we solve this inherently-cross-domain issue … ?

Both Yes and No



Authentication and authorization ‘AAI’ infrastructures enable research every day

Building an *interoperable* system that enables multi-domain resource sharing remains a challenge

site map: WLCG sites 2021, visualization: CERN IT

The AARC Blueprint – a very digestible architecture … so

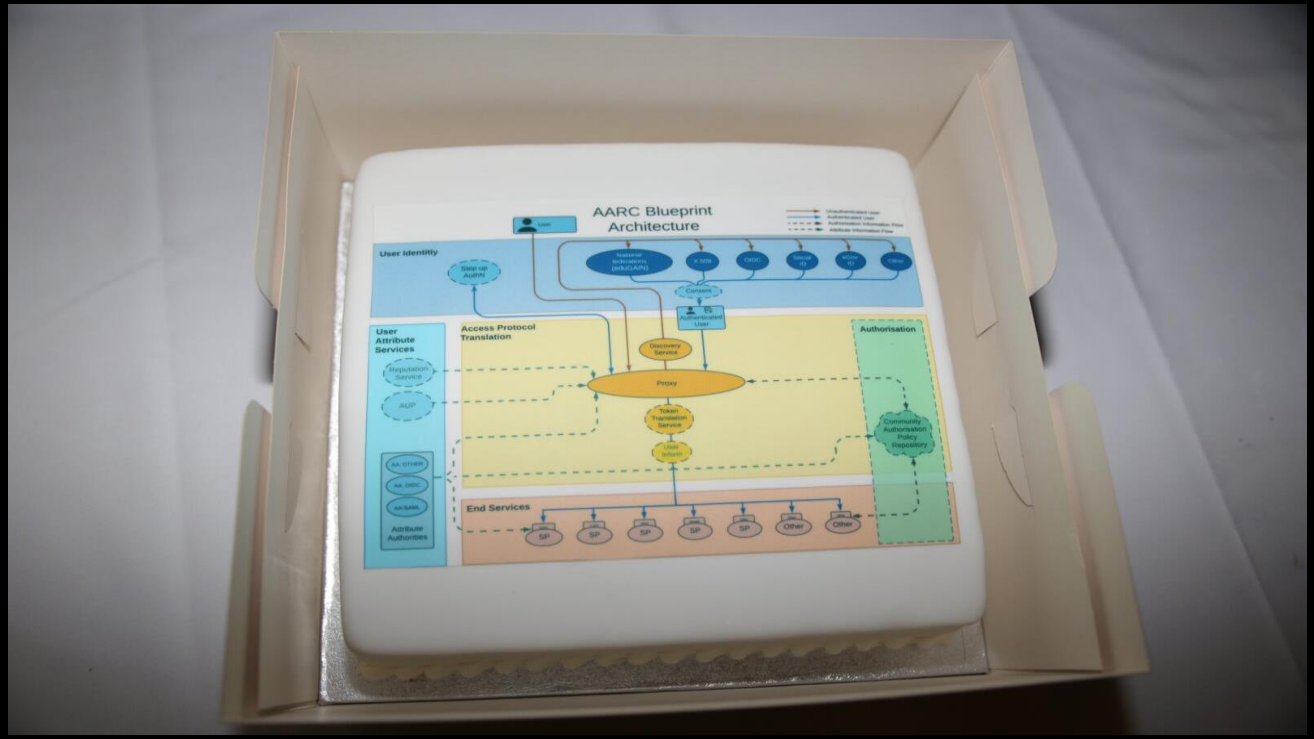


Photo credit: Marcus Hardt

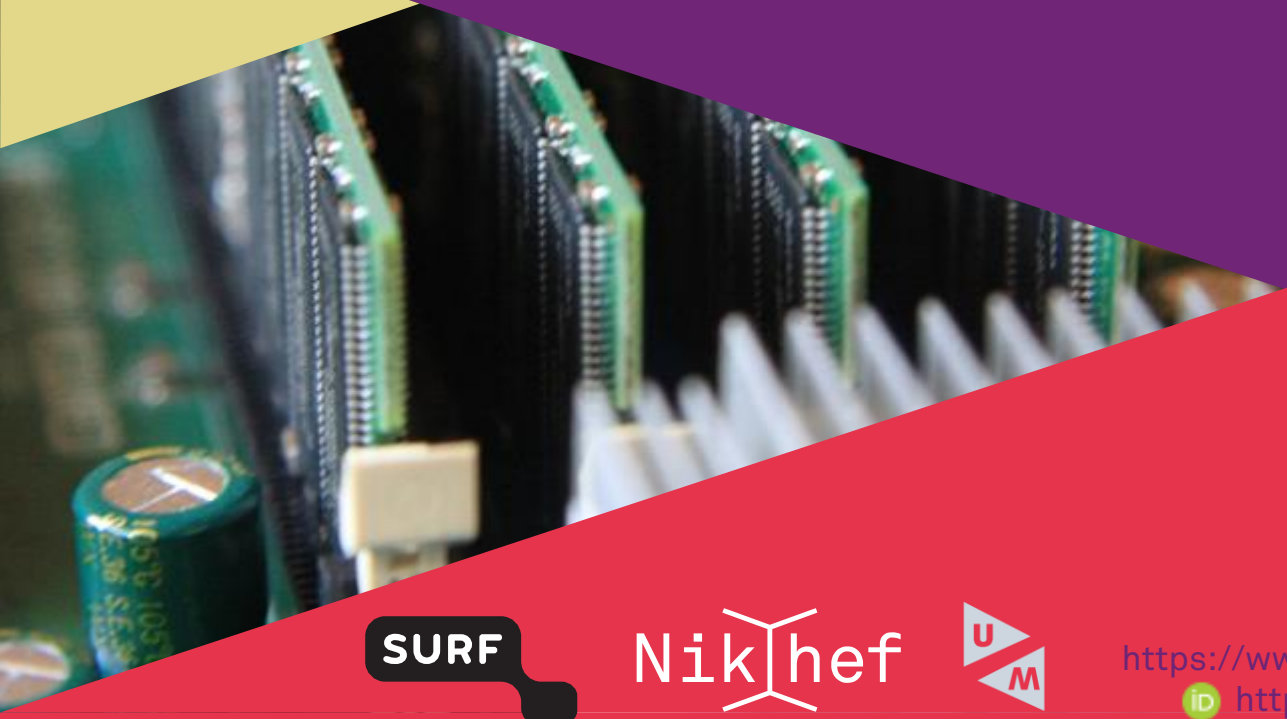
The AARC Blueprint – take a piece and feed collaboration!

Photo credit: Marcus Hardt

This work has also been co-supported by projects that have received funding from the European Union's Horizon programmes through grants AARC TREE and GEANT 5-2

Thanks to the AARC and global T&I Community, including folk from whom I re-used graphics in this overview. In random order: Licia Florio, Nicolas Liampotis, Christos Kanellopoulos, Marina Adomeit, Janos Mohacsi, Slavek Licehammer, Dave Kelsey, Ian Neilson, Marcus Hardt, Mischa Salle, Oscar Koeroo, Jouke Roorda, Davide Vaghetti, Floris Fokkinga, Sven Gabriel, Hannah Short, Maarten Kremers, and many others!

So let's digest all this ...



David Groep
davidg@nikhef.nl
https://www.nikhef.nl/~davidg/presentations/
https://orcid.org/0000-0003-1026-6606

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