

FIM4R version 2 paper

David Kelsey (STFC UK Research and Innovation)
at FIM4R22 Amsterdam 9 Feb 2026
(reused old slides from July 2018)

With thanks to the FIM4R Authors and Contributors for their collaboration on the whitepaper and the following slides.



*** Not all contributors' logos represented*

Motivation

- Research Communities provide complex use cases where federated identity can be leveraged to great effect
 - Distributed users
 - Distributed services
- The specific way of working brings specific challenges that go beyond the functionality typically offered by federations and interfederation

FIM4R provides a forum for Research Community representatives to exchange experiences of implementing AAI and by combining our voices we hope to influence the future direction of FIM in a way that meets the needs of our Users

“Every researcher is entitled to focus on their work and not be impeded by needless obstacles nor required to understand anything about the FIM infrastructure enabling their access to research services.”

FIM4R version 2

2012: FIM4R version 1

- Published a whitepaper in 2012 that guided the direction of identity federation for research
<https://fim4r.org/documents/>
- Specified a common vision together with common requirements and recommendations
- Revised (just to specify priorities) in 2013



2018: FIM4R version 2

- <https://doi.org/10.5281/zenodo.1296031>
- Representatives of more than 20 research communities have provided input
- Five face to face meetings in Europe and North America
 - Vienna (TIIME) x 2
 - Montreal (RDA)
 - Barcelona (RDA)
 - San Francisco (Internet2 TechEx)
- A new distillation of specific requirements and a set of recommendations is the result of this process



Dept. of Physics, McGill University,
Montreal (Sep 2017)

Who is represented?

Research Fields (14)

- Arts and Humanities
- Climate Science
- Earth Observation
- European Neutron and Photon Facilities
- Gamma-Ray Astronomy
- Gravitational Wave Astronomy
- High Energy Physics
- Ionospheric and Atmospheric Science
- Infectious Disease Research
- Life Sciences
- Linguistics
- Nuclear Physics
- Radio Astronomy
- Virtual Atomic and Molecular Data Centre

Others

Research Driven Services

- HNSciCloud
- ORCID

Identity Federation Projects/Communities

- AARC(2)
- GÉANT-GN4
- InCommon/Internet2
- REFEDS

Progress since 2012 (as seen in 2018)

Evolution of FIM

Aim: “Authenticate locally, authorize globally”

- deliver good user experience
- extend the reach of campus credentials
- reduce the number of credentials needed by users
- leverage campus credential management practices
 - focus more energy on their own services
- make federation a global infrastructure
 - academic collaboration, itself global, benefits

In a very substantial sense, this has been achieved (for Authentication)

- FIM now spans the national R&E federations from many countries into an aggregated whole known as eduGAIN

The more difficult part (as seen in 2018)

“Authorise Globally” is more difficult (as identified in FIM4R v1)

- Access control/Authorisation to Research SPs
 - perform checks of the attributes assigned to the user
 - user needs to get those attributes from somewhere
- Initially just a singular infrastructure
 - that operated by the national R&E federations
- But the campus IDP is not authoritative for research attributes

Concept of FIM gradually began to evolve

- Social ID gateways admitted users without waiting on their campus
- Credential providers for unaffiliated users started to pop up
- Research e-Infrastructures experimented with Proxies

What are the successes since 2012?

(As seen in 2018)

Much has changed since 2012. The FIM4R paper was taken seriously and AAI is now more mature with many successes

- European Commission funding (H2020) for the AARC/AARC2 projects
- Federations and interfederation have found their role as an Authentication infrastructure; Authorisation managed by Communities
- eduGAIN's operational support capability is now in place and maturing
- e-Infrastructures are deploying shared AAI services (EGI, EUDAT, GÉANT, EOSC-hub, ...)
- Specific successes include the Sirtfi and Snctfi trust frameworks
- Standardisation and best practices for the emerging trend of “proxy” architecture (The AARC Blue Print Architecture)

Outstanding Challenges (1)

(documented in 2018)

- Usability & User Experience
 - Considerable time spent in bilateral debugging
 - Discovery services unintuitive
- Data Privacy and EU GDPR
 - Better data access and privacy expectations need to be balanced, E.g. ELIXIR Human Data resources are potentially liable for breaches
 - Attribute release by risk averse IdPs is already problematic, this may be aggravated
- Assurance profiles
 - Frameworks defined but not well adopted or propagated

Outstanding Challenges (2)

- Interfederation and many federations do not offer an adequate level of operational support and security for Research use cases
 - eduGAIN has become recognised as a brand and those wishing to “join” experience a steep learning curve and inconsistent federation practices
- Although several generic AAI infrastructures are evolving, their respective advantages and availability are unclear

Common Requirements (documented in 2018)

Requirements Collection

(for V2 paper 2018)

- Began during 11th FIM4R Workshop in September 2017 in Montreal
- 28 individuals, presentations by research communities and cyber infrastructures
- Pooled thoughts on the outstanding requirements
 - Integrated into matrix
 - Established initial categories
 - Produced initial mapping of requirements to constituencies needed to address them
 - Identified requirements for which something entirely new needed

11 Requirements Categories

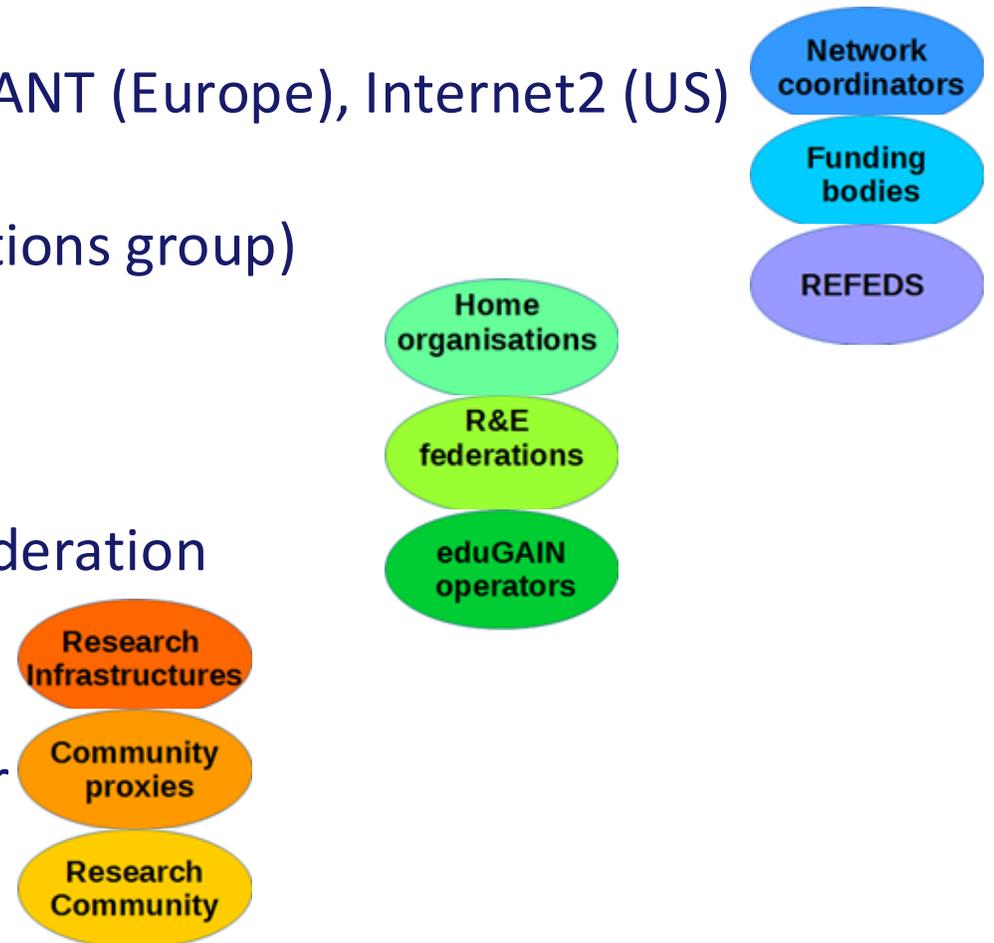
- Identity Lifecycle & Linking (2)
- Discoverability & Usability (3)
- Authorisation and (De-)/Provisioning (7)
- Attribute Release (3)
- Security Incident Response (4)
- Research Community Proxies (4)
- Assurance & Multi Factor Authentication (2)
- Interoperability (3)
- Non Web (4)
- On-Boarding & Support (5)
- Sustaining Critical Infrastructure (3)

Total: 40

Recommendations (2018 – FIM4R version 2 paper)

Nine Stakeholder Groups to address

- General Stakeholders
 - Network coordinators and operators: GÉANT (Europe), Internet2 (US)
 - Research funding bodies
 - REFEDS (Research and Education FEDerations group)
- Identity federation operators
 - Researcher's Home organisations
 - National R&E federations
 - eduGAIN operators providing the Interfederation
- Research
 - Research e-infrastructures in general
 - Research community proxies in particular
 - Research communities



Overview on recommendations

Governance & Sustainability

Research representation, funding for sustainable operation, ongoing coordination

Baseline of User Experience

Attribute release, remove interoperability barriers, non-legal status, user mobility

Security Incident Response Readiness

For federations, interfederation and organisations

Harmonisation of Proxy Operations & Practices

Reuse generic services, follow best practices for interoperability

Sensitive Research User Experience

Support multifactor authentication and publish Assurance Profiles

Acknowledgements

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Questions?

What's Next for FIM4R v3?

Let's Talk

Small and Medium Research Communities

10-100 users, too big AND too small

Proxies and Middle Things

Trust opaque or transparent, policy inheritance, Proxy for proxies

Evolving Global Federations (OIDF)

Planning for change, management and adoption

Identity Assurance

Difficult but important, more organizational than IT, who does it?

Federated Identity for Libraries

For the next 45 minutes...

Let's Talk!

Choose a lead

Choose one or more scribes

Answer the following:

- How would you define this topic?
- Why is this topic important to include (or not include) in FIM4R v3?
- If it is important, what should be in scope for FIM4R v3?

Take notes in the notes file under your topic heading

- https://sharemd.nikhef.nl/icEALV_8TI--2mZRYJCQvg#



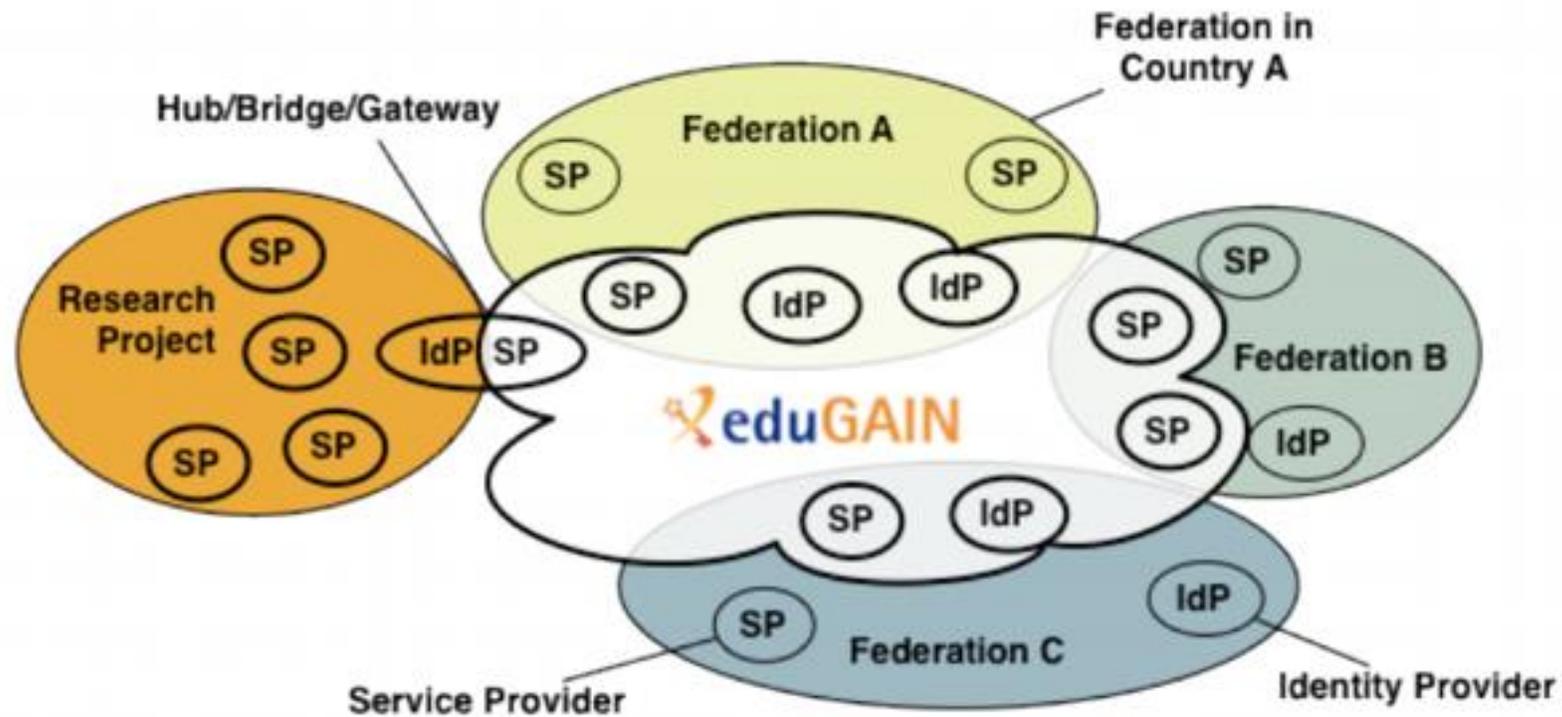
Backup slides

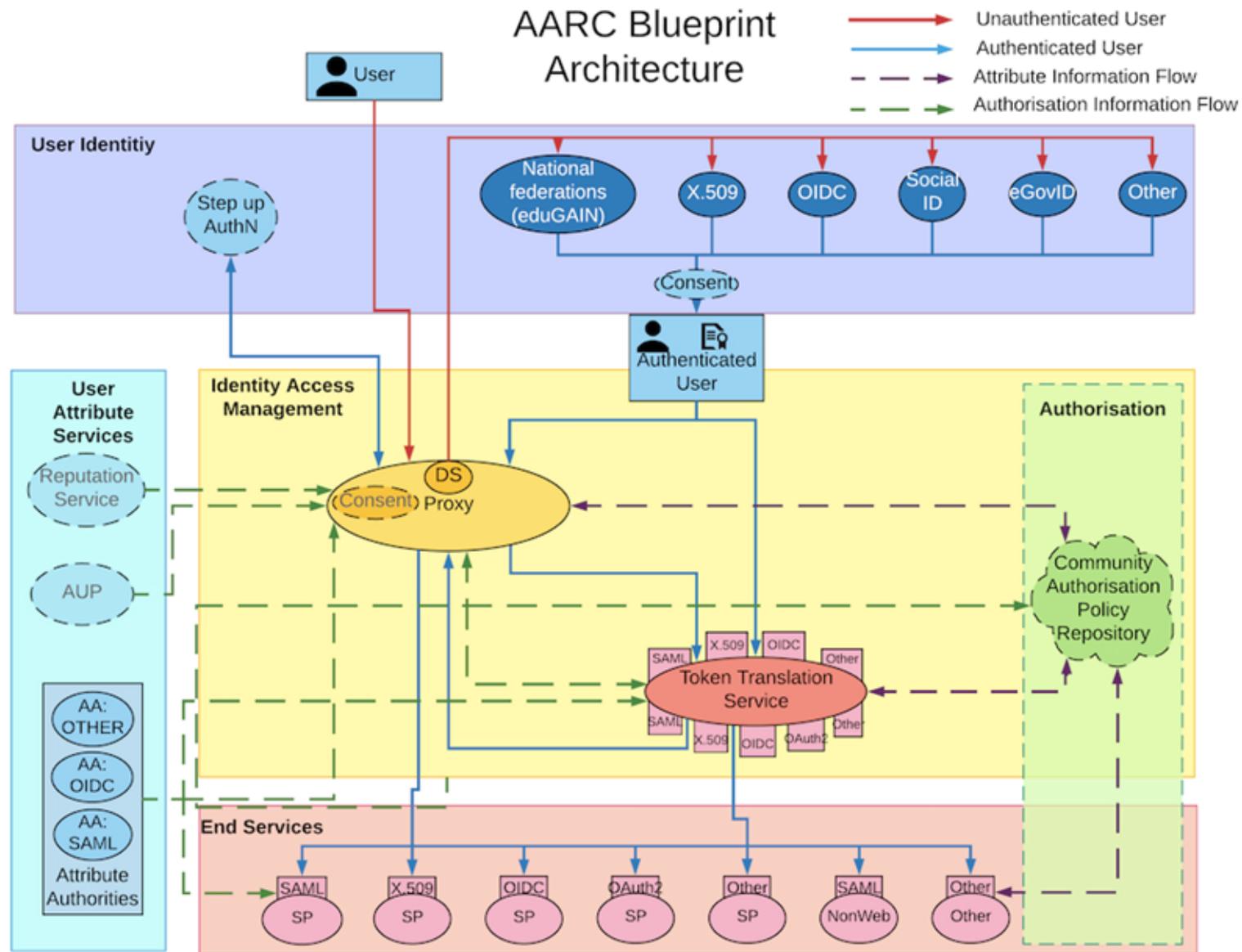
(more details)

Visit fim4r.org

The screenshot shows the FIM4R website homepage. At the top left is the FIM4R logo, followed by the text "Federated Identity Management For Research". On the top right, there is an email contact link: "Email fim4r-contact@cern.ch". Below the header is a dark blue navigation bar with links for "About", "Events", "Documents", and "Contact", along with a search icon. The main content area features a large banner image of a group of people with the headline "FIM4R v2 Whitepaper Preprint Released" and a breadcrumb trail: "Home / 2018 / June / 10 / FIM4R v2 Whitepaper Preprint Released". To the right of the main content is a search box with a "Search" button and a "Recent Posts" section. The "Recent Posts" section lists several articles with their dates: "FIM4R to be presented at TNC18" (May 3, 2018), "Final steps agreed towards the FIM4R version 2 whitepaper" (February 15, 2018), "12th FIM4R Workshop" (December 5, 2017), and "11th FIM4R Workshop" (September 21, 2017). A large group photo of the FIM4R team is visible in the background of the main content area.

The Research Community SP/IdP Proxy



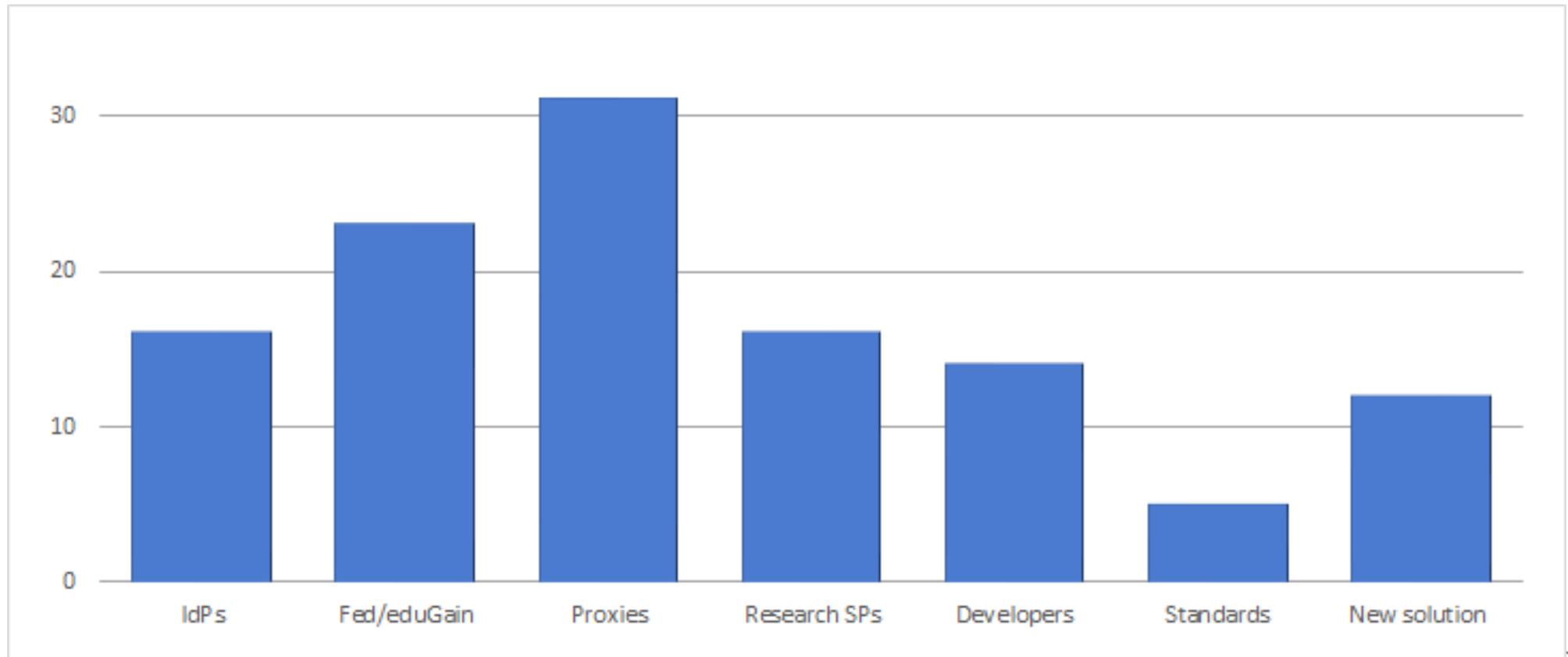


The Proxy Architecture allows Research Communities to satisfy many FIM4Rv1 requirements themselves, but comes with a large overhead

FIM Ecosystem Constituents

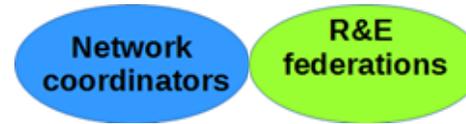
Identified specific constituencies within the FIM ecosystem who, it is believed, can best address each of the requirements that were gathered

Number of requirements to be addressed



Governance and Coordination

- Increase research representation in FIM governance



- Sustain operation of critical FIM services

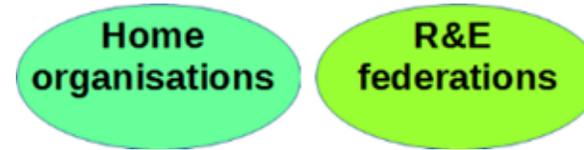


- Provide avenues for ongoing coordination

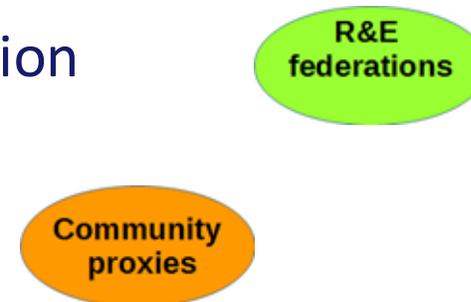


Baseline of Research User Experience

- Release Research & Scholarship attributes
- Provide usability essentials
- Remove interoperability barriers in eduGAIN metadata processes



- Admit research organisations to federation
- Enable researcher mobility



Security Incident Response Readiness

- Organisations participating in R&E federations should **apply best practices in operational security** to their federated entities



Harmonisation of Proxy Operations

- Follow the proxy model and related AARC guidelines



- Re-use shared AAI and related services



- All large-scale e-infrastructures are encouraged to make AAI services generally available to research communities

Sensitive Research User Experience



- Identity provider organisations are encouraged to **provide strong authentication credentials to their researchers**
 - implement the REFEDS MFA Profile to enable research service providers