Measuring the Economic Value of the Australian Access Federation

A Lateral Economics report to the Australian Access Federation

September 2025

LateralEconomics

CAPABLE, INNOVATIVE, RIGOROUS

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Glossary

AAF	Australian Access Federation
ACNC	Australian Charities and Not-for-profits Commission
ARDC	Australian Digital Research Commons
AURIN	Australian Urban Research Infrastructure Network
CAGR	Compound annual growth rate
CAUDIT	Council of Australasian University Directors of Information Technology
CBA	Cost-benefit analysis
CIO	Chief Information Officer
CISO	Chief Information and Security Officer
FTE	Full-time equivalent
HPC	High Performance Computing
IP	Intellectual property
LE	Lateral Economics
MFA	Multi-factor authentication
NCRIS	National Collaborative Research Infrastructure Strategy
NIH	National Institutes of Health
NPV	Net present value
SAML	Security Assertion Markup Language
SSO	Single Sign On
T&I	Trust and Identity
TERN	Terrestrial Ecosystem Research Network
UQ	University of Queensland
WTP	Willingness to pay

Key points

AAF's role and purpose

Established in 2009, the Australian Access Federation (AAF) provides a trusted, national identity and access framework for Australia's research and education sector. It connects almost all Australian universities, major research agencies, NCRIS facilities, government organisations, and international federations (via eduGAIN), enabling secure, seamless access to digital networks and resources for both research and learning.

Economic and social value

Lateral Economics' analysis demonstrates that AAF generates substantial net benefits for the Australian community:

- In the central case, AAF delivers around $58 million in gross annual benefits, compared with costs of only $6.8 million, producing net benefits of $51 million and a benefit–cost ratio of 8.5.
- In an optimistic scenario, benefits rise to $84 million annually, with net benefits of $78 million and a benefit–cost ratio of 12.3.
- Even in our pessimistic scenario, there are net benefits of $30 million and a benefit-cost ratio of 5.4.
- **Put simply, for every dollar spent on AAF, the community gains between $5.40 and $12.30 in benefits.**

The value of AAF is derived from multiple sources. Universities and research organisations save on IT staffing and account management, equivalent to $8–17 million annually.

Students benefit from easier access to resources such as journals, ebooks and learning resources, saving $14–32 million worth of time each year.

Researchers and teachers save a further $5–8 million annually, and the sector avoids $1–6 million of duplicated research activity.

Legal and administrative cost savings, along with a wide range of "long tail" benefits (for instance enabling researchers to find better collaborators), further enhance the value created.

Fiscal return to the Government

With benefit cost ratios this high, for every dollar governments invest in AAF they earn between $1.20 and $4.50 back in additional tax revenue through AAF's contribution to economic growth.

Executive Summary

Scope of work

The Australian Access Federation (AAF) has commissioned Lateral Economics (LE) to quantify and demonstrate the economic value and broader impact of its federated identity services. Specifically, AAF seeks analysis highlighting infrastructure-related savings, efficiency improvements through scalable identity management, enhanced cybersecurity benefits, and the facilitation of research collaboration nationally and internationally. Additionally, AAF desires an evaluation explicitly aligned with Australia's NCRIS framework, focusing on the direct economic benefits to the higher education and research sectors, ultimately supporting their strategic funding and policy goals.

About AAF

The Council of Australasian University Directors of Information Technology (CAUDIT) established AAF in 2009 to provide a national framework for identity and access management across the research and education sector. AAF has the goal of "transforming Australia's research, teaching and learning communities by delivering innovative solutions that provide secure access to high-value digital resources and infrastructure."[1]

The AAF initially connected a small number of universities and research institutions with selected trusted service providers, including academic journals and NCRIS facilities, among other services. Over time, AAF has expanded its membership to include most Australian universities, major research organisations, government agencies, and commercial partners, while also integrating with international identity federations such as eduGAIN to support global research collaboration (Box 1). As noted in its 2024 Annual Report, AAF "is part of a global network of over 87 federations."[2] This growth has made the AAF a critical enabler of secure, seamless access to global online resources, with the number of authentications it facilitates increasing significantly over time. In 2024, it supported over 10.6 million authentications.[3]

A wide array of services is accessible via AAF, ranging from scholarly resources to accessing computing through the ARDC Nectar Research Cloud (Figure 1). AAF is also collaborating with

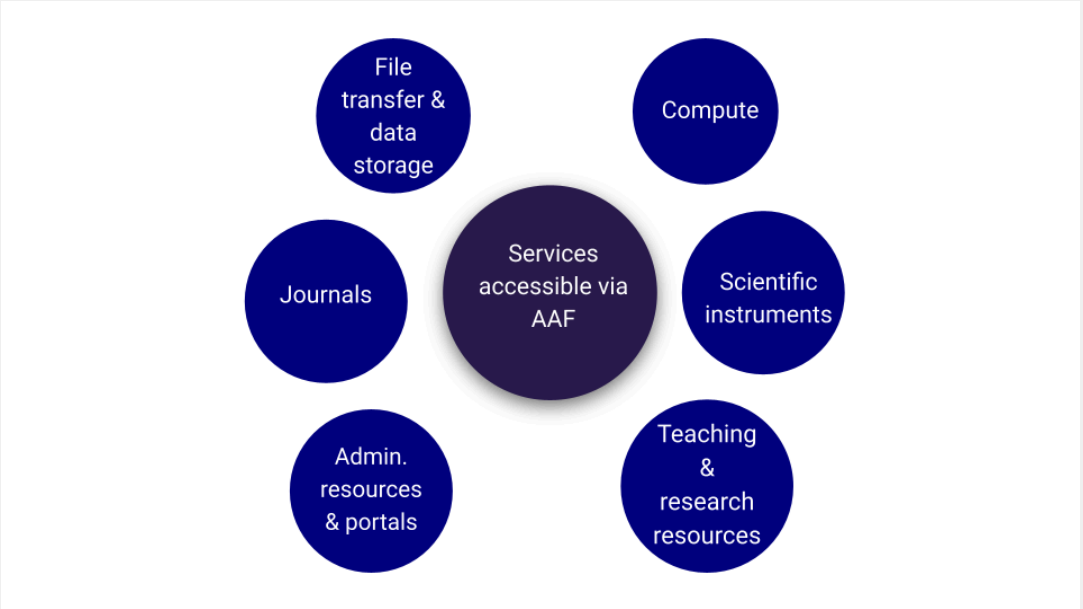
[1] https://aaf.edu.au/about/
[2] AAF (2025) Annual Report 2024, p. 12.
[3] Ibid.

the Pawsey Supercomputing Research Centre to allow access to high-performance computing (HPC).[4]

Box 1. AAF and eduGAIN

eduGAIN is a global interfederation service operated by GÉANT in Europe that connects more than 80 national research and education identity federations, enabling secure access to thousands of online services across over 70 countries. It works by aggregating and exchanging identity metadata between member federations so that a user from one federation can log in to services in another without needing to create new credentials. As a full member of eduGAIN, the Australian Access Federation (AAF) allows its subscribers to authenticate seamlessly to services provided by other federations and, in turn, enables international researchers to access AAF-connected services. In addition to streamlining Australian researchers' access to digital networks, this connection greatly expands their reach, supporting participation in global collaborations, use of specialised infrastructure overseas, and secure sharing of data and resources, all underpinned by standard protocols such as SAML to ensure interoperability and trust.

Figure 1. Services accessible using AAF



Source: Adapted from AAF (2024) Annual Report 2023, p. 7.

[4] https://aaf.edu.au/pawsey-supercomputing-research-centre/

The increasing returns to trust and scale within networks

At the heart of any functioning network lies trust. Without it, users cannot have confidence in using the network to make connections. They may be unsure that the connection will take place without further effort or that information will be handled with integrity. Integrity can be compromised in numerous ways. Connections may not be secure, information may be corrupted when sent through the network. Unauthorised users may be able to use the network and so on.

The AAF addresses this by providing a national trust framework. Through common technical standards such as SAML and OpenID Connect, and agreed policy frameworks, AAF establishes trusted relationships between universities, research organisations, and service providers. Its single sign-on (SSO) capability allows researchers, educators, and staff to use their home institution credentials to access a wide range of external services. This reduces administrative overheads, strengthens cybersecurity, and ensures that identity attributes are transmitted securely with user consent.

In other words, AAF does not merely add users to a network: it transforms potential connections into usable and trusted connections. This distinction is crucial, because the well-known 'laws' of network value all assume that connections are live, reliable and accessible without undue further cost, delay or inconvenience. Without trust, scale is meaningless. Once trust is in place, networks can be expected to generate value as an increasing function of scale. The simplest intuition is captured by Metcalfe's Law, which holds that the value of a communications network is proportional to the square of the number of its users. One fax machine or phone is useless; two enable one connection; three enable three; four enable six, and so on. The logic is clear: each additional node increases the number of potential links more than proportionally.

But scholars have long noted that Metcalfe's Law is an idealisation. It assumes every possible connection is equally valuable, which is rarely the case in real networks. Many potential links are never activated, or are only weakly used. Briscoe, Odlyzko, and Tilly argue that actual network value tends to grow closer to n log(n), reflecting the uneven intensity of use across connections.[5] This more modest growth law better matches observed behaviour in telecommunications and the internet. While the value of networks grows faster than linearly, it does not usually grow quadratically.

[5] Briscoe, B., Odlyzko, A. and Tilly, B., 2006. "Metcalfe's law is wrong-communications networks increase in value as they add members-but by how much?", IEEE spectrum, 43(7), pp.34-39.

Other formulations illustrate the range of possibilities. Sarnoff's Law, suited to broadcast media, suggests value grows linearly with audience size. Reed's Law, by contrast, highlights that when networks enable group formation (e.g. email lists, online communities), the number of possible subgroups grows exponentially (2^n). Reed's insight about subgroup value is important, but in practice his law overstates growth, since it implies implausibly vast increases in value from small additions of users.

Critics have also pointed out that, in some circumstances, Metcalfe's Law may underestimate returns. Once a network crosses a threshold, new forms of collaboration can suddenly become feasible. The internet, for example, showed that lowering connection costs to near zero allowed serendipitous innovations like Wikipedia to emerge. In research networks, small additions of connectivity — such as those enabled by AAF — can unlock disproportionate gains: new collaborations, joint funding bids, or novel projects that would not otherwise have occurred[OBJ].

Taken together, the lesson is that while mathematical "laws" of networks provide useful heuristics, their power rests on the prior existence of trust. AAF's federated identity framework supplies precisely this condition. By reducing friction and ensuring secure, reliable authentication, it allows Australian researchers to access services efficiently, to realise the latent value of network growth and to form new collaborative groups. The result is not just incremental efficiency, but the possibility of serendipitous, transformative returns that simple scale laws alone do not capture.

AAF seamlessly connects researchers to critical national research infrastructure, including AURIN, TERN, and the National Imaging Facility. Globally, AAF facilitates connections with major research institutions, including CERN and the US National Institutes of Health (NIH).[6] By providing a secure federated identity management service, AAF enables researchers to use their institutional credentials to seamlessly and efficiently connect with these facilities. This simplifies collaboration, reduces administrative burdens, and accelerates research workflows, allowing researchers to focus on their scientific pursuits rather than securely managing multiple access credentials.

Consequently, the AAF's infrastructure significantly contributes to productivity and innovation across Australia's research community by lowering the transaction costs for collaboration, which is expected to generate serendipitous gains (Box 2). The possibility of serendipitous gains supports the case for significant net benefits of AAF, possibly larger than even in our

[6] AAF (2024) Annual Report 2023, p. 7.

optimistic case. In this study we have not explicitly modelled the serendipitous gains arising from network effects, but we acknowledge their potential importance.

Box 2. The serendipitous gains from lowering network transaction costs

The internet has dramatically illustrated the extraordinary and often unanticipated benefits of lowering the costs of connection and collaboration in networks. Perhaps most dramatically moving from dedicated connections to the internet's packet-switching architecture reduced the transaction costs of connection to near zero. The 'permissionless' nature of the internet produced extraordinary, unexpected and highly valuable innovations like Wikipedia.[7]

This "permissionless" environment demonstrates network effects in their most powerful form. Research consistently shows that a shorter distance in the co-authorship network is key for starting research collaborations, and that establishing research networks and collaborations enables shared learning, new research opportunities, establishing new research projects, joint applications for funds, and technology transfer.[8] Studies reveal the multiplicative effects of reduced connection costs. Collaboration network effects can also explain a large proportion of the productivity and prominence advantages held by researchers at prestigious institutions.[9] Knowledge spills over directly to co-authors... as well as indirectly to the broader network.[10]

[7] As Weller and Woodcock explain, the packet switching technology of the internet meant that the suppliers of connection on the internet operated in a 'perfectly competitive' environment - whereas on a traditional network they would be monopolists or monopolistic competitors. This generated extraordinary reductions in the price of carriage. Weller, D. and B. Woodcock (2013), "Internet Traffic Exchange: Market Developments and Policy Challenges", OECD Digital Economy Papers, No. 207, OECD Publishing, Paris, https://doi.org/10.1787/5k918gpt130q-en.

[8] Essers, D., Grigoli, F., & Pugacheva, E. (2020). Network Effects and Research Collaborations. IMF Working Papers, 2020(144), p. 42, Available at: https://www.imf.org/en/Publications/WP/Issues/2020/07/24/Network-Effects-and-Research-Collaborations-49596 and Marusic, A., et al. (2013). Significance of research networking for enhancing collaboration and research productivity. Croatian Medical Journal, 54(3). Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC4049205/.

[9] Liang, G., Lou, Y., Ke, Q., Fortunato, S., & Wang, D. (2022). Untangling the network effects of productivity and prominence among scientists. Nature Communications, 13(1). Available at: https://www.nature.com/articles/s41467-022-32604-6.

[10] Essers, D., Grigoli, F., & Pugacheva, E. (2020). Network Effects and Research Collaborations. IMF Working Papers, 2020(144). Available at: https://www.imf.org/en/Publications/WP/Issues/2020/07/24/Network-Effects-and-Research-Collaborations-49596.

Transaction cost economics research demonstrates that when organisations reduce coordination costs, entirely new forms of productive activity become feasible. Digital transactions help us probe the boundary conditions of transaction cost economics, showing how reduced friction can enable new organisational forms and collaborative structures.[11]

Networks exhibit threshold effects – once connection costs drop below critical levels, collaboration patterns shift dramatically. Technologies or systems subject to strong network effects tend to get off to a slow start and, then, on reaching "critical mass" exhibit explosive growth.[12]

Stakeholder views on AAF

LE consulted with a range of stakeholders to gather information and data to help quantify the benefits of AAF. Stakeholders included Chief Information Officers (CIOs) and Chief Information Security Officers (CISOs) of universities, representatives of NCRIS organisations, and the CEO of CAUDIT. Key insights from the stakeholder consultations, elaborated in Section 3, include:

- **IT Cost Savings:** AAF significantly reduces administrative overhead for universities by minimising the need for additional staff to manage user accounts (e.g., 1-2 FTE for large universities, 0.5-0.75 FTE for smaller ones). It also saves IT costs related to the hosting of user accounts (e.g., TERN saves $5,000-$6,000 annually).
- **Legal and Administrative Cost Savings:** AAF means that universities do not have to negotiate access arrangements with multiple institutions to access research services. This avoids the cost of negotiating and preparing legal agreements, saving administration and legal costs. Administration cost savings could include those related to senior officials, such as directors of research at universities.
- **Efficiency and Scalability:** AAF streamlines user authentication and enhances trust for service providers, allowing them to focus on core services rather than identity management. It also improves operational efficiency for researchers reducing time spent on managing multiple accounts or resetting passwords.

[11] Nagle, F., Seamans, R., & Tadelis, S. (2025). Transaction cost economics in the digital economy: A research agenda. Strategic Management Journal. Available at: https://journals.sagepub.com/doi/abs/10.1177/14761270241228674.
[12] Shapiro, C., & Varian, H. R. (1999). Information Rules: A Strategic Guide to the Network Economy. Harvard Business School Press.

- **Cybersecurity and Fraud Prevention:** AAF enhances security by preventing unauthorised account arrangements and credential theft. It also mitigates risks by enforcing Multi-Factor Authentication (MFA) as a standard practice.
- **Collaboration Enablement:** AAF acts as a crucial "business enabler" and "original glue for NCRIS", fostering collaboration among universities and researchers, particularly for multi-participant projects (Box 3). It enables seamless access to shared services and broadens the availability of data services (e.g., TERN supporting single sign-on for 40 universities).
- **Strategic Alignment and Economic Impact:** AAF serves as a crucial cross-cutting underpinning capability for trust and identity services, supporting research infrastructure and maximising government investment by preventing redundant efforts. It ensures global alignment and interoperability (e.g., through eduGAIN) and enhances consistency in authentication services for sector-level reporting.

Box 3. NCRIS and AAF

NCRIS is an Australian Government program established in 2004 to build and maintain a national-scale research infrastructure to provide researchers with access to cutting-edge facilities, data, and services, while minimising duplication of effort across institutions. By funding shared infrastructure, NCRIS strengthens collaboration (including by facilitating serendipitous connections), boosts efficiency, and improves Australia's capacity to participate in international research.

Today, NCRIS supports more than 25 national projects spanning diverse fields, including health, environmental monitoring, astronomy, materials science, and digital platforms. These projects are designed to be cross-institutional and open to the entire Australian research community. Independent evaluations consistently show that NCRIS delivers strong economic returns, with high benefit–cost ratios, and that it plays a critical role in underpinning Australia's research productivity, innovation, and commercialisation.

AAF is essential to the success of NCRIS. Without AAF, many collaborations supported by NCRIS would face substantial technical and administrative barriers, reducing both their efficiency and their global reach.

Net benefits of AAF

Methodological approach

When assessing the net benefits of AAF, it is important to consider both benefits and costs. AAF will deliver benefits, but also has a range of costs that are not present in the counterfactual scenario or base case of no-AAF. Indeed, various IT innovations bring both significant benefits and costs and it is important to weigh them up–e.g. in the case of two-factor authentication or MFA (Box 1.3). Briefly, our methodology is to compare the cost of AAF with the suite of benefits of AAF, comprising several avoided costs that would occur in the base case as well as broader benefits from fostering greater collaboration.

Box 4. The costs and benefits of 2FA/MFA

Two-factor (2FA) and multi-factor authentication (MFA) provide strong security advantages, but their overall cost impact depends on the organisational context.

Benefits

- **Reduced Breach Incidents**: Empirical evidence shows MFA can reduce the risk of account compromise by nearly 100%, with dedicated MFA apps outperforming SMS-based methods.[13] This translates into significant savings on financial, reputational, and operational losses from breaches
- **Long-Term Operational Savings**: Cloud-based or passwordless MFA systems streamline authentication processes, lowering IT overhead and reducing the volume of password-reset help desk tickets.
- **Productivity Gains**: By reducing user lockouts and password fatigue, user-friendly MFA can improve employee efficiency and limit costly downtime.

Costs

- **Upfront and Ongoing Costs**: Introducing MFA involves licensing, implementation, and maintenance. Studies suggest these can add 15–25% to annual authentication costs compared with password-only systems.[14]
- **User Friction and Support Load**: Forgotten tokens, device problems, or poor digital literacy increase help desk demands, particularly in early rollout phases.

[13] https://www.eftsure.com/en-au/statistics/two-factor-authentication-statistics/
[14] https://guptadeepak.com/the-economics-of-authentication-why-passwordless-pays/

- **Workflow Disruption**: In high-velocity environments (e.g., trading floors, public kiosks), additional authentication steps may slow operations and raise per-transaction costs unless solutions are carefully tailored.

Context Matters

MFA offers the greatest net benefits where security and compliance risks are high, or in large-scale organisations where integration costs are small relative to the overall benefits. By contrast, in low-risk or high-speed workflows, costs may outweigh benefits.

Economic modelling results

In Section 3, we present our economic modelling of the benefits and costs of AAF. Our central case estimates are that AAF generates gross benefits to the Australian community of around $58 million annually and net benefits of $51 million, with a benefit-cost ratio of 8.5 (Table 1).

Table 1. Net benefits of AAF, annual, $ million

	Pessimistic	Central	Optimistic
Benefits ($ million)			
Avoided costs of negotiating access and contracting	2.3	4.1	7.0
IT department savings	8.0	12.0	17.4
Student time savings	14.4	22.3	31.5
Researcher time savings	4.6	6.2	7.9
Avoided research duplication	0.6	3.1	6.3
Long-tail	6.8	10.1	14.2
Total benefits	*36.8*	*58.0*	*84.4*
Costs ($ million)			
Annual costs of AAF	6.4	6.4	6.4
Marginal cost of public funds	0.4	0.4	0.4
Total costs	6.8	6.8	6.8
Net benefits ($ million)	**30.0**	**51.1**	**77.6**
Benefit-cost ratio	5.4	8.5	12.3

Note: The estimated annual cost of AAF is based on AAF's 2024 financial statement estimate for 2024 adjusted up to account for nominal growth between 2024 and 2025 based on the growth rate between 2023 and 2024.

That is, for every dollar spent on AAF, the community gains $8.50 of benefits. In our optimistic scenario, the benefit-cost ratio is 12.3, meaning $12.30 of benefits are generated for every

dollar spent. Even in our very pessimistic lower-bound scenario, AAF still generates a return to the community of $5.40 for every dollar spent.

Our central case estimate is very likely a conservative estimate given the unquantifiable benefit that arises from AAF's contribution to the reduction of cybercrime, which has a large cost to the Australian community–estimated at $42 billion in 2021.[15] Further research and documentation of how AAF prevents cybercrime would be necessary to attribute any reduction in cybercrime to AAF. Still, the magnitude of the cost suggests the benefit from the avoided cost of cybercrime due to AAF could be substantial.

The net benefits of AAF could be even greater than estimated. Even in our optimistic scenario, we have not allowed for some important serendipitous breakthrough that could be brought about by connections between two researchers or bodies of research or other valuable connections–e.g. to intellectual property (IP) or IP services of some kind–that would not have otherwise been made.

In conclusion, AAF generates significant net benefits to the Australian community, as would be expected given its essential role as the 'glue' connecting our universities and research institutions domestically and globally to critical learning and research services.

[15] Cybercrime an estimated $42 billion cost to Australian economy

1. Introduction

1.1. Scope of work

The Australian Access Federation (AAF) has commissioned Lateral Economics (LE) to quantify and demonstrate the economic value and broader impact of its federated identity services. Specifically, AAF seeks analysis highlighting infrastructure-related savings, efficiency improvements through scalable identity management, enhanced cybersecurity benefits, and the facilitation of research collaboration nationally and internationally. Additionally, AAF desires an evaluation explicitly aligned with Australia's NCRIS framework, focusing on the direct economic benefits to the higher education and research sectors, ultimately supporting their strategic funding and policy goals.

1.2. AAF's operations and financial performance

1.2.1. Revenue

AAF is a medium-sized non-profit organisation with approximately 27 FTE employees in 2024.[16] Its total revenue was $6.76 million, while its total expenses were $6.11 million, giving it a surplus of $0.65 million in 2024. Around 66% of its revenue, or $4.43 million, comes from subscribers to its services (Box 1.1), 30% from the government, and 4% from investment earnings.

[16] AAF's 2024 Annual Information Statement for ACNC. Note the ABS defines medium-sized businesses as those employing between 20 and 199 people. Note that according to ACNC definitions, the AAF would qualify as a large charity, as it has annual revenue above $3 million.

Box 1.1. AAF's subscription revenue

AAF generates revenue primarily through the sale of services to its subscriber base. Its main source of operational income is subscriptions in which organisations pay annual fees to access AAF's federated identity and access management solutions. Revenue is also generated from related professional services, workshops, and participation in projects or consortia. AAF's customers or subscribers include:

- All Australian universities;
- CSIRO and other major research agencies;
- National research infrastructures such as AURIN and ARDC; and
- Service providers to the education and research community, including commercial providers in teaching, learning, and research sectors.

These customers pay fees determined by the AAF's board, and failure to pay can result in deregistration from the federation.

1.2.2. Expenses

AAF's expenses are predominantly employee expenses, which comprised 72% of total expenses in 2024, according to its Annual Information Statement lodged with the Australian Charities and Not-for-profits Commission (ACNC). This includes expenses on both its core operating staff–i.e. the 27 FTE employees noted above-and an unspecified number of people employed on trust and identity (T&I) projects it funds. This can be inferred from its 2024 financial statements, which report 'Employee benefits expense' at $2.8 million or 46% of its total expenses (Table 1.1). If we grossed up the reported FTE numbers of 27 FTEs, so employee expenses were 72% of total expenses (assuming the same average salaries), it can be estimated that AAF could effectively employ around 42 FTE employees.

Table 1.1. AAF expenses, 2024 compared with 2023, $ million

	$ million	$ million	% of total	% of total
	2024	2023	2024	2023
Employee benefits expense	$2.80	$2.61	45.8%	44.8%
Project operating expenses	$2.07	$2.10	33.9%	36.0%
General operating expenses	$0.62	$0.53	10.2%	9.2%
Hosting expenses	$0.43	$0.43	7.1%	7.4%
Meeting and events	$0.15	$0.10	2.4%	1.8%
Depreciation and amortisation	$0.02	$0.03	0.3%	0.5%
Accounting fees	$0.01	$0.01	0.2%	0.1%
Legal services	$0.01	$0.02	0.1%	0.3%
Audit fees	$0.00	$0.00	0.0%	0.1%
Total	**$6.11**	**$5.83**	**100.0%**	**100.0%**

Source: AAF (2025) Financial Report for the year ended 31 December 2024, p. 11.

It has over $430,000 of web hosting expenses, comprising over 7% of total expenses, which is consistent with its role as a digital services organisation. Depreciation and amortisation expenses account for 0.3-0.5% of AAF's total expenses, suggesting a relatively small level of capital investment.

1.2.3. Balance sheet

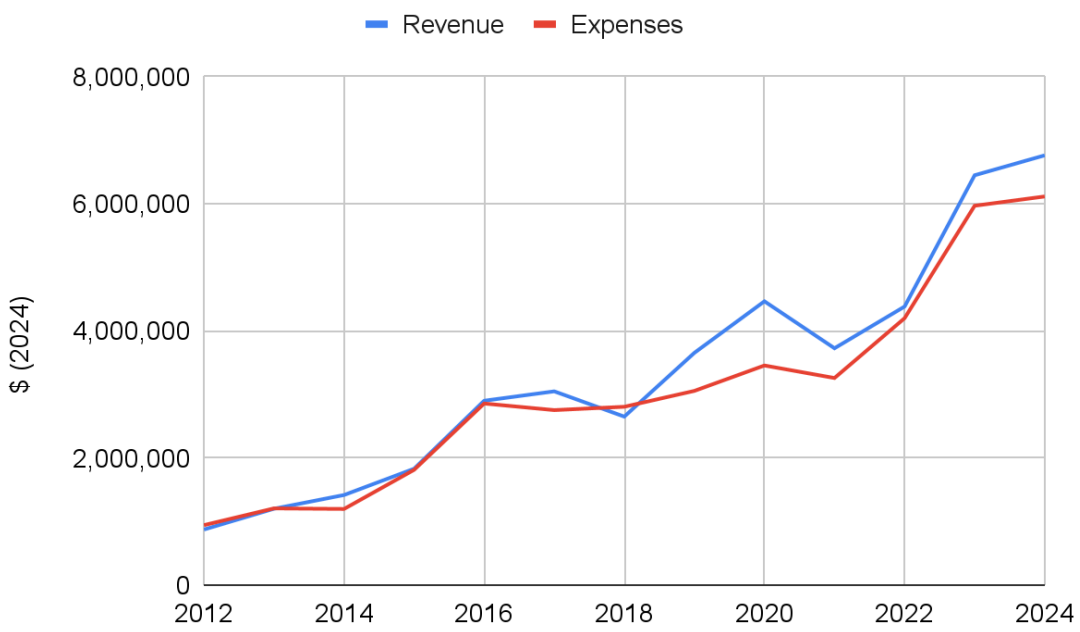
AAF's most significant assets are financial, with $14.7 million in cash and cash equivalents, comprising prepaid subscriptions and prepaid project revenue, and $1.8 million in accounts receivable. Its liabilities are mostly the liabilities for the prepaid subscriptions and project revenue–i.e. the fact that it has to provide the relevant services and deliver the projects. Overall, AAF appears to have a relatively strong balance sheet with $3.67 million of equity at the end of 2024, up from $3.01 million in 2023.

1.2.4. Financial performance trends

AAF has run a surplus every year since 2019 (Figure 1.1). Before that, its largest deficit in relative terms was in 2012, when it had a deficit of nearly 8% of revenue. Since 2012, AAF's revenue has grown strongly: 674% in real terms at a compound annual growth rate (CAGR) of 18.6%. Over the same period, expenses increased by 549% at a CAGR of 16.9%. In other

words, AAF has grown rapidly as its subscriber numbers and connected services have increased strongly over the last decade and a half.

Figure 1.1. Revenue versus expenses, AAF, constant 2024 dollars

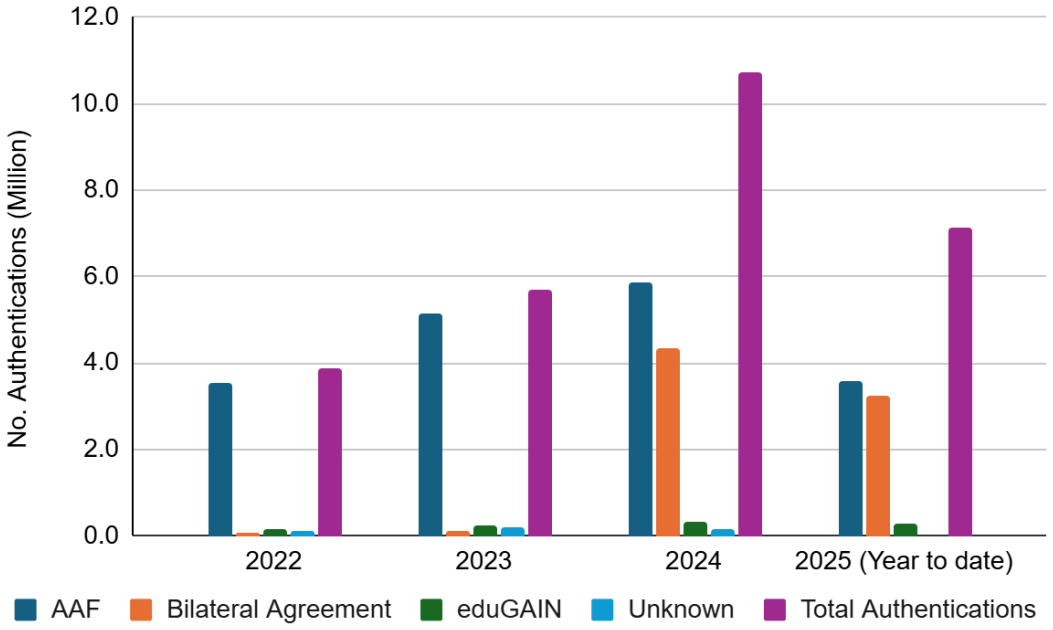


Source: LE calculations using AAF's ACNC Annual Information Statements and ABS CPI data.

1.3. AAF authentications

AAF authentications have grown strongly in recent years (Figure 1.2). The most relevant authentication type is the domestic service (or AAF), with 50.5% of total authentications in 2025 (year to date), followed by the bilateral agreements, which is a direct integration with the identity provider without going via the federation, with around 45.6%, and eduGAIN, which is an international service offered by another federation, with 4.0%.

Figure 1.2. Authentications by type



Source: AAF data.

The largest universities are the major users of AAF (Table 1.2). The University of Canberra has the most authentications because it relies internally on AAF for signing on to its systems. The top ten organisation users of the AAF account for 82.9% of total authentications and 65.2% of around 1.1 million total users in 2025 (year to date).

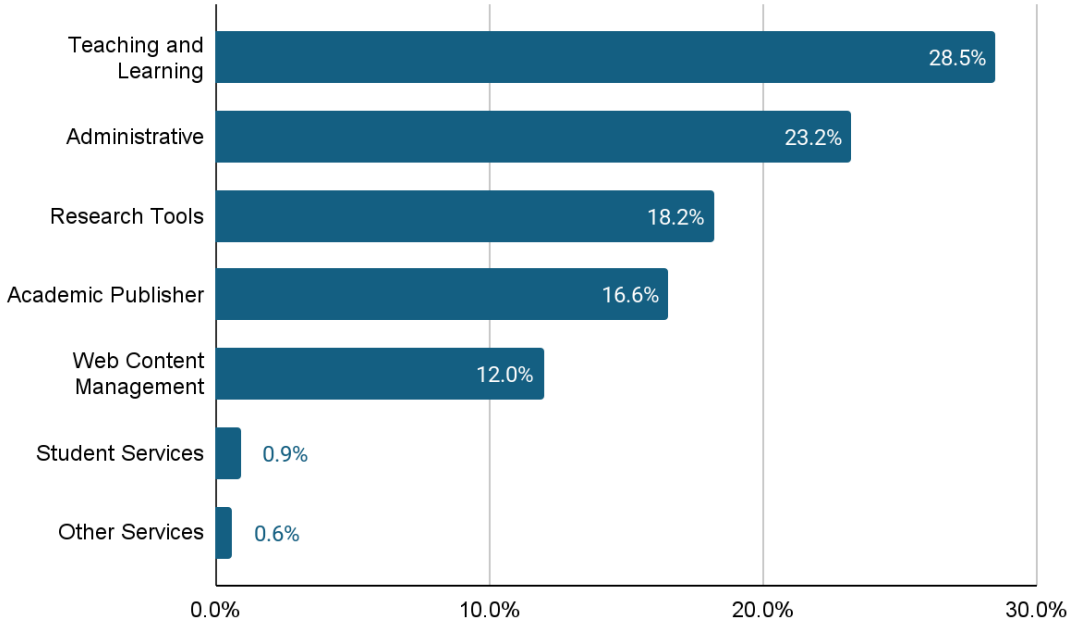
Table 1.2. Top 10 organisation users of AAF, 2025 (year to date)

Home organisations	No. Authentications	No. Users (*)	Authentications per user
University of Canberra	3,247,088	173,028	18.8
Victoria University	480,979	35,926	13.4
The University of Sydney	452,599	48,635	9.3
The University of New South Wales	364,757	99,410	3.7
The University of Melbourne	361,536	103,908	3.5
Deakin University	259,298	10,030	25.9
Monash University	229,055	64,232	3.6
University of Technology Sydney	206,907	54,768	3.8
Macquarie University	186,208	62,391	3.0
Griffith University	123,276	49,535	2.5
Other organisations	1,216,589	374,820	3.2
Total	**7,128,292**	**1,076,683**	**6.6**

Source: AAF data. Notes: The Top ten users are sorted by the number of authentications. (*) These are not unique users. People can be counted multiple times because the user numbers provided by AAF were for the different services each organisation is connected to. The total user figure reflects everyone who accessed any service—such as the university portal, journals, or research tools—rather than the institution's overall population.

The most accessed service category was Teaching and Learning (28.5%), Administrative (23.2%), Research Tools (18.2%), Academic Publisher (16.6%), and Web Content Management (12.0%), collectively accounting for almost all authentications (99.4%). As we would expect, universities are the largest users of each of these services. The University of Canberra is the major user of several services, given its internal use of AAF (Table A1 in Appendix B).

Figure 1.3. Accessed services using AAF by category, 2025 (year to date)



Source: AAF data. Notes: LE has classified the accessed services based on its criteria.

AAF allows Australian researchers to connect not only to academic journals and various university services but also to leading (but lower volume) research services, institutions and facilities, domestically (e.g. ALA, ARDC Nectar Research Cloud, TERN) and internationally (e.g. CERN). ARDC's Nectar Research Cloud, providing access to computing resources using advanced CPUs and GPUs, is prominent among these high-value specialised research applications relying on AAF for authentication (Table 1.3).

Table 1.3. Top 10 accessed services of specialised, high-value research infrastructure (number of authentications, 2022 to 2024)

No.	Services	2022	2023	2024	Top five users
1	Research Cloud	34,324	40,497	42,673	The University of Melbourne (17,616); Monash University (11,091); University of Tasmania (4,155); Swinburne University of Technology (1,383); Intersect Australia Ltd (1,304)
2	Characterisation Virtual Laboratory	36,075	31,562	21,621	Monash University (15,939); The University of Melbourne (1,719); The University of Queensland (1,002); Australian Catholic University (509); The University of Western Australia (427)
3	ARDC NeCTAR SSO	9,529	11,941	12,672	The University of Melbourne (3,961); The University of Queensland (2,022); University of Tasmania (1,270); Monash University (1,235); University of Southern Queensland (638)
4	figshare	1,559	2,311	9,756	The University of Melbourne (9,035); The University of Adelaide (600); Federation University Australia (76); The University of Sydney (11); Macquarie University (6)
5	QCIF QRIScloud Services Portal	1,986	9,899	9,623	Unknown (4,876); The University of Queensland (4,113); James Cook University (245); Australian Access Federation (121); Intersect Australia Ltd (90)
6	AURIN ADP ID Provider		2,159	4,706	The University of Melbourne (1,764); Australian Access Federation (461); The University of Sydney (445); Monash University (315); The University of New South Wales (295)
7	auth.tern.org.au	3,754	4,743	4,678	The University of Queensland (2,820); The University of Sydney (283); Commonwealth Scientific and Industrial Research Organisation (CSIRO) (223); The University of Adelaide (168); Central Queensland University (122)
8	Stash 3 Research Data Catalogue	1,110	3,446	3,879	University of Technology Sydney (2,042); Unknown (1,836); The University of Queensland (1)
9	galaxy_australia (Australian Biocommons)	1,431	1,945	2,387	The University of Queensland (584); Griffith University (362); The University of Melbourne (243); La Trobe University (196); Australian National University (149)
10	EcoCommons Australia	1,736	3,608	2,001	The University of Adelaide (576); James Cook University (254); The University of Queensland (240); Charles Darwin University (174); Western Sydney University (89)
	Rest of services	13,802	11,298	6,849	
	Total	**105,306**	**123,409**	**120,845**	

Source: AAF data. Note: The selected specialised, high-value services are based on LE's judgment.

2. Stakeholder consultations

2.1. Overview

LE consulted with a range of stakeholders to identify the benefits of AAF and gather information and data to help quantify the benefits. Stakeholders included Chief Information Officers (CIOs) and Chief Information Security Officers (CISOs) of universities, representatives of NCRIS organisations, and the CEO of CAUDIT. A full list of stakeholders consulted is presented in Appendix A.

2.2. Enabling Collaboration and Research

The AAF is recognised as a crucial "business enabler" and a "real business proposition" that fosters collaboration among universities and researchers, as noted by David Stockdale from the University of Queensland (UQ). It facilitates collaborative research that might otherwise be deemed 'too challenging' or simply would not occur in an *ad hoc* fashion, particularly for projects involving multiple participants needing access to shared services, a sentiment echoed by both Stockdale and Jac Charlesworth from UTAS. Additionally, Andrew Janke from QUT and Heath Marks from AAF describe it as the "original glue for NCRIS," which supports a multi-nodal research ecosystem that aligns with government expectations for interconnected research initiatives. For the Nectar Research Cloud, AAF enhances its viability, enabling researchers to traverse different institutions and access resources without the obligation of funding, provided their project has national backing, according to Charlesworth. Moreover, Siddeswara Guru from TERN highlights how AAF supports single sign-on access for 40 universities, thereby broadening the availability of their data services to a larger educational research community.

Views expressed in stakeholder consultations regarding the importance of AAF in fostering collaborative research are consistent with the perspective of academia and research as 'an ecology of public and private goods" (Box 2.2). AAF is an important public good that promotes greater collaboration, and hence serendipitous discoveries, by lowering the transaction costs of connections.

Box 2.2. Academia as an Ecology of Public and Private Goods

Modern academia can be thought of by analogy with the economy itself as an intricate ecology of both private goods and public goods. Private goods can be provided competitively: individual researchers or research teams competing for grants, prestige, and citations. This competitive dimension has intensified over recent decades.

Yet as in the case of the market for goods, academia depends fundamentally on public goods—the shared infrastructure, conventions, and norms according to which the competition takes place. These include the frameworks through which merit is judged (such as peer review and citation counts), the repositories that store and disseminate knowledge, and the collaborative platforms and rules that allow researchers to share data, tools, and results.

Gruen argues that while modern economic and educational reformers have deliberately intensified competition, they have often neglected these public goods of research. The systems we rely on to sort and recognise merit—peer review and citation counting—are increasingly criticised as ineffective. Meanwhile, the prospects of 'open science' were not particularly enticing to reformers.

In this context, the AAF represents a rare success story in building the public goods of academia. By providing federated identity management and a trusted access framework, it allows researchers to connect seamlessly to shared infrastructure, datasets, and services—whether across universities within Australia or with partners worldwide. In doing so, AAF lowers the transaction costs of collaboration, reduces duplication, and supports the kind of serendipitous research encounters that are hard to plan for but vital to discovery.

AAF shows that while researchers can and should compete in generating new knowledge, they need robust, shared foundations—trusted protocols, interoperable systems, and open pathways to intellectual assets—to maximise their productivity.

There are many significant examples of networks connecting remote researchers and achieving extraordinary outcomes, including the following.

- **Murchison Widefield Array (MWA)** – Australian radio astronomers and international partners collaborated on MWA research via AAF and eduGAIN. This "borderless login" model makes it seamless for overseas teams to join, share, and analyse MWA data. By obviating otherwise complex arrangements–technically, legally and

organisationally–the MWA reduced duplication, improved the matching of researchers within projects and catalyses new science that would otherwise not have occurred.[17]

- **Laser Interferometer Gravitational-Wave Observatory (LIGO)–Virgo**– The 2017 neutron star merger (GW170817) was identified by gravitational-wave detectors and confirmed by over 90 observatories worldwide. eduGAIN, of which AAF is the Australian node, allowed fast, secure cross-institution data access and coordination. This enabled the first multi-messenger detection (waves and light), a discovery kicking off a new era in astronomy.[18]
- **Galaxy Project during COVID-19** – Bioinformatics groups in Germany, Belgium, Australia, and the U.S. used the Galaxy research platform's federated nodes to stand up shared, reproducible SARS-CoV-2 workflows in the pandemic's opening weeks. The platform let previously unconnected teams pool data and publish reusable analyses rapidly. Hence, within weeks of the pandemic starting, bioinformaticians in Europe, the US, and Australia were jointly running reproducible SARS-CoV-2 pipelines, generating insights that would have been delayed or duplicated without the shared platform.[19]

2.3. Trust and identity (T&I)

The AAF provides trusted and seamless interconnectivity for collaborative work both nationally and internationally, fostering a robust framework for authentication and authorisation across organisational boundaries. Stakeholders often take for granted the significant level of trust in AAF, as it effectively "just works" to ensure immediate compliance. By acting as a trusted third-party provider, AAF elevates the digital T&I maturity of distributed research organisations to a common standard, thereby averting the risk of Australia becoming an "identity island" and promoting the adoption of global standards. Additionally, according to TERN, its utilisation of AAF for sign-on enhances its CoreTrustSeal Certification, further bolstering its reputation as a reliable repository (Box 3.1).

[17] https://aaf.edu.au/project/international-researchers-can-now-map-the-universe-with-murchison/
[18] https://www.ligo.caltech.edu/page/press-release-gw170817
[19] https://rcc.uq.edu.au/article/2022/05/galaxy-australia-contributes-global-research-effort-covid-19

Box 3.1. CoreTrustSeal Certification

CoreTrustSeal is an internationally recognised, community-based certification for trustworthy data repositories.[20] It is awarded by the CoreTrustSeal Standards and Certification Board to organisations that meet 16 rigorous requirements covering organisational infrastructure, digital object management, and technical infrastructure. Achieving certification demonstrates that a repository adheres to best practices for preserving and providing reliable, long-term access to digital data. It reassures stakeholders—such as researchers, funders, and policymakers—that the repository is sustainable, transparent, and capable of safeguarding valuable datasets against loss, corruption, or obsolescence. CoreTrustSeal certification is valid for three years, after which repositories must reapply, ensuring ongoing compliance and continuous improvement in data stewardship.

2.4. Avoided Costs and efficiencies

The implementation of the AAF significantly reduces administrative overhead for universities by minimising the need for additional staff to manage user accounts. For instance, institutions like a Group of Eight university may require 1-2 extra staff members, while smaller institutions may need 0.5-0.75, to handle the complexities of user management manually. AAF alleviates the (often underestimated) expenses associated with managing external users and individual accounts for collaborative research, as each project would otherwise be tasked with establishing its own trust levels and identity management. Additionally, organisations such as AURIN benefit from the AAF by offloading user authentication responsibilities, including cybersecurity measures like multifactor authentication, to university IT departments. Without AAF, universities like QUT would face the logistical challenge of managing visitor and guest IDs, further complicating access to essential services.

From a financial perspective, AAF presents notable cost savings in both infrastructure and time. For example, TERN reports an annual saving of approximately $5,000 to $6,000 in infrastructure costs due to AAF's federated authentication. Similarly, UniSQ invests in a RapidIDP package, costing between $35,000 and $45,000 yearly, which equates to 0.3 full-time equivalent (FTE) staff, thereby facilitating connections with federated entities and saving about 10% of FTE time annually. Moreover, significant capital expenditure at UTAS, estimated at around half a million dollars per year for cloud computing, is supported through the Nectar program, which relies on AAF. AAF's advantages extend to enhanced operational

[20] https://www.coretrustseal.org/

efficiency, allowing researchers to focus on their work rather than managing access, saving time on tasks such as signing up for different services or resetting passwords. The ability to access scholarly resources such as journals without additional costs through AAF also generates financial benefits for institutions.

2.5. Reduced Cybersecurity Risks

The adoption of AAF significantly enhances security by preventing unauthorised account arrangements and credential theft. This critical framework plays a vital role in maintaining identity security and reducing breach risks, as highlighted by experts like Flinders University's Karl Sellman, Chair of the Australasian Higher Education Cyber Security Service. Additionally, AAF mitigates the risks associated with credential theft that can be exploited for accessing costly resources, using bandwidth unlawfully, or enabling targeted phishing and data exfiltration, according to David Stockdale from UQ. Furthermore, AAF fosters a genuine benefit in risk reduction and the provision of trust authenticity, as noted by Andrew Janke from QUT, while also enforcing Multi-Factor Authentication (MFA) as a standard practice. Notably, organisations like AURIN experience significant savings by alleviating the cybersecurity burdens related to authentication, as this responsibility is effectively transferred to organisations equipped to manage it.

2.6. Strategic Importance and Future Directions

The AAF serves as a crucial cross-cutting underpinning capability for T&I services, fundamentally supporting research infrastructure. By maximising government investment, AAF fosters a cohesive strategy across various facilities, effectively preventing redundant efforts. The organisation employs incubator projects to tackle complex T&I challenges in collaboration with partners such as the National Imaging Facility, NCI, and Pawsey, enabling scalable solutions that benefit the broader federation.

Additionally, AAF seeks to expand its brokering services beyond academia to encompass government and industry partners, including the development of its authorisation layer. Its commitment to global alignment is evident in its role in working with the global T&I community in establishing international standards for research and education to ensure interoperability, as seen in initiatives like eduGAIN, which facilitate cross-collaboration among researchers globally, including compliance with specific standards required by organisations like CERN. Furthermore, AAF enhances consistency in authentication services across institutions, which significantly aids in sector-level reporting.

2.7. Summary of benefits to different stakeholder groups

One CIO noted that CIOs might only see the cost of AAF without fully understanding its underlying benefits, making it important to communicate its value. This value accrues to various stakeholders, including:

- **Researchers/Students**: Benefits include access to international journals and services, and personal time savings from managing multiple identities.
- **IT Departments**: AAF provides a sector-leading architecture for identity and access management, potentially reducing dependence on specialised identity teams.
- **Service Providers (e.g., TERN, AURIN)**: AAF streamlines user authentication and enhances trust, allowing them to focus on their core tasks rather than identity management.

3. Economic modelling

3.1. Overview

Based on our stakeholder consultations and desktop research, LE has identified several benefits of the AAF that can be quantified based on existing data and reasonable assumptions to generate dollar value estimates of benefits. These can be compared with the cost of running AAF outlined in Section 1.2.2. We calculate annual net benefits and the benefit-cost ratio (BCR) by comparing annual benefits and costs. This is a defensible approach because AAF does not involve significant capital costs. It is reasonable to estimate the net benefits of AAF based on the expected benefits and costs in a representative year.

The benefits we model are avoided costs. Economists consider avoided costs as benefits because they represent resources that no longer need to be spent, thereby freeing up funds or reducing burdens that would otherwise diminish overall welfare. These avoided costs are estimated in ways consistent with well-established methodologies for estimating costs (Box 3.1).

Box 3.1. The Standard Cost Model: an introduction

The cost of an activity–and conversely the avoided costs if an activity is eliminated or takes less time–can be calculated using the formula below:

Activity Cost = Price x Quantity

where:

- *Price = tariff x time; and*
- *Quantity = population x frequency*
- *Tariff is the opportunity cost of time spent–e.g. wage costs (plus overhead, non-wage costs) for activities done internally or hourly cost for external service providers*
- *Time is the amount of time required to complete the activity*
- *Population is the number of people or businesses affected*
- *Frequency is the number of times that an activity must be completed each year*

Source: LE adaptation of UK Cabinet Office Better Regulation Executive (2006) Administrative Burdens–Routes to Reduction, p. 4.

Given the uncertainty around important values for many of the assumptions in the valuation, we provide a likely case, based on our best estimates or expectations of likely parameter values and both a pessimistic case which includes lower-bound estimates of AAF's impacts and an optimistic case which takes into account the possibility we have underestimated benefits via conservative assumptions.

In our modelling, we distinguish between three different sizes of AAF subscribers: large, medium and small. The correspondence between the categories used in the modelling and AAFs membership tiers is presented in Table 3.1.

Table 3.1. Correspondence between AAF subscription tiers and categories used in the economic modelling

Category	AAF Subscription tiers	Description	Number
Large	Tiers 1 to 3	Major universities with research income > $75 million	21
Medium	Tiers 4 and 5	Universities with research income from $10 million to < $75 million	18
Small	Tier 6, Researcher and Starter*	Research institutes and other organisations	21
			60

*This category also includes the 'N/A' and 'Unknown' categories.
Source: AAF (September 2025).

3.2. Expected benefits of AAF

Significant benefits of AAF include the following: quantifiable, difficult to quantify or unquantifiable benefits.

3.2.1. Quantifiable benefits

Efficiency for organisations

Connecting to a federated identity network, rather than numerous individual institutions, significantly enhances scalability and reduces complexity for institutions and service providers.

Federated identity management saves resources across the higher education and research sector by significantly reducing service provisioning and account management efforts.

Time savings for researchers and students

AAF generates significant time savings for researchers and students by providing a streamlined federated identity management system that allows users to access multiple online resources with a single set of credentials. By utilising SSO, AAF eliminates the need for researchers and students to remember and manage numerous passwords for various services, thereby reducing the time spent logging in and retrieving information.

This seamless access enables them to focus more on their research or studies rather than on administrative tasks associated with managing multiple accounts. Additionally, the rapid authentication process facilitated by AAF allows for quicker collaboration across institutions, ultimately enhancing productivity and efficiency in academic and research pursuits.

3.2.2. Difficult to quantify or unquantifiable benefits

Cybersecurity and Fraud Prevention

The federated identity protects against unauthorised access and compromised credentials through robust verification and management processes. Hence, potential savings arise from decreased instances of security failures, particularly fraud and unauthorised access.

Collaboration Enablement

Economic and practical benefits are expected from facilitated national and international collaboration. AAF plays a pivotal role in enabling seamless and secure collaboration by allowing researchers and educators to access a wide variety of services through a single, trusted digital identity. This removes barriers that would otherwise slow down or prevent collaboration, particularly for multi-institutional or cross-border projects.

By connecting Australian institutions to the international inter-federation service eduGAIN, AAF ensures that researchers can access specialist facilities, datasets, and tools worldwide without needing to manage multiple logins or credentials. This has been especially important for Australia's participation in global collaborations with CERN, NIH, and other international research infrastructures. It also allows international researchers to access Australian teaching, learning, and research services connected to the AAF federation.

Finally, it helps different NCRIS organisations connect, helping foster the collaboration that was the objective of NCRIS from the beginning.

3.3. Estimated benefits

3.3.1. Avoided costs: Access negotiation and contracting

Based on our stakeholder consultations, we identified a significant cost saving from organisations not having to negotiate separate access arrangements with every provider of research services. Given the number of institutions and services noted above, this cost could be substantial. We model this cost saving by making plausible assumptions regarding the time savings for different staff members in organisations in Australian institutions relying on AAF–based on a comparison with the assumed counterfactual or no-AAF case. We convert the assumed one-off cost into a yearly benefit by calculating an annual equivalent cost over 10 years based on a 5% real discount rate (Table 3.2). In Table 3.2 and the following tables, the individual line items are labelled with a letter. Where the figures are calculated based on data or parameters in the table, the formula for the calculation, based on the item labels, is presented in parentheses in the item description in the second column.

3.3.2. Avoided costs: IT departments

Based on our stakeholder consultations, we assume that AAF significantly reduces the administrative load on universities and research institutions–i.e. from reducing the need to set up and manage accounts for external users. As noted in Section 3, institutions like a Group of Eight university may save 1-2 FTE staff members, while smaller institutions may save 0.5-0.75 FTEs. Using this information, and an assumed annual cost of an FTE IT professional of $267,400, based on a $152,800 salary for a graduate and 75% additional on-costs, including superannuation, workers' compensation and office accommodation, we estimate avoided costs of $21.0 million per annum in our central case (Table 3.3).[21] In our central case, we estimate savings of 45 FTEs.

[21] The assumed salary is based on the average annual salaries for IT staff at Australian and New Zealand universities (in Australian dollars). We extrapolated from the last available estimate for 2023 of $139,529 to 2025 using the average annual growth rate over 2018 to 2023 of 3.56%. The 75% on-cost assumption is consistent with advice from the Australian Government Office of Impact Analysis, Department of Prime Minister and Cabinet (2024) Regulatory Burden Measurement Framework, p. 12.

Table 3.2. Estimation of avoided costs of negotiating access and contracting

		Pessimistic	Central	Optimistic
	Assumptions			
A	Large organisations	21	21	21
B	Medium-sized organisations	18	18	18
C	Smaller organisations	21	21	21
	Average hourly salary			
D	- Senior administrator	$125	$125	$125
E	- Legal adviser/administrator	$100	$100	$100
F	On-costs	75%	75%	75%
	Hours devoted to arranging each agreement			
G	- Senior administrator	0.75	1	2
H	- Legal adviser/administrator	18	24	32
	Agreements to arrange			
I	- Larger organisations	45	60	75
J	-Medium-sized organisations	30	40	50
K	- Smaller organisations	15	20	25
	Calculations			
	Hourly costs (incl. on-costs)			
L	- Senior administrator (D x (1 + F))	$219	$219	$219
M	- Legal adviser/administrator (E x (1 + F))	$175	$175	$175
N	Cost of arranging each agreement ((G x L) + (H x M))	$3,314	$4,419	$6,038
O	Total costs, $ million ((A + B + C) x (I + J + K) x N)	17.9	31.8	54.3
P	Annuity factor (5% discount rate, 10 years)	7.7	7.7	7.7
	Equivalent annual costs, $ million (M / N)	**2.3**	**4.1**	**7.0**

Notes: Hourly rates for senior administrators and legal advisers are based on annual salary ranges on Indeed.com divided by the number of hours in a work year (assumed to be 38/hrs per week x 52 weeks). The 75% on-cost assumption is consistent with advice from the Australian Government Office of Impact Analysis, Department of Prime Minister and Cabinet (2024) Regulatory Burden Measurement Framework, p. 12. Other assumptions are based on consultations with stakeholders.

Table 3.3. Estimation of avoided costs for IT departments

		Pessimistic	Central	Optimistic
	Assumptions			
A	Large organisations (No.)	21	21	21
B	Medium-sized organisations (No.)	18	18	18
C	Smaller organisations (No.)	21	21	21
D	FTE saving - large organisation, IT department	0.75	1	1.5
E	FTE saving - medium-sized organisation, IT department	0.5	0.75	1
F	FTE saving - small organisation, IT department	0.25	0.5	0.75
G	Salary	$152,800	$152,800	$152,800
H	On-costs	75%	75%	75%
	Calculations			
I	Total cost per FTE (G x (1 + H))	$267,401	$267,401	$267,401
J	Avoided cost - large organisations ($ million) (A x D x I)	4.2	5.6	8.4
K	Avoided cost - medium-sized organisations ($ million) (B x E x I)	2.4	3.6	4.8
L	Avoided cost - small organisations ($ million) (C x F x I)	1.4	2.8	4.2
	Total avoided cost ($ million) (J + K + L)	**8.0**	**12.0**	**17.4**

Source: LE calculations based on stakeholder consultations and desktop research.

3.3.3. Avoided costs for teachers, researchers and students

We also calculate avoided costs for researchers and students based on reasonable assumptions.

Students

We estimate time savings for students from easier access to educational resources, including ebooks and journals (Table 3.4). The underlying population of students is assumed to be 1.56 million university students based on Universities Australia figures for 2023.[22] Furthermore, we assume the average student who benefits from AAF (assumed to be one-third of undergraduates) saves 20 minutes per year because of AAF. This is a reasonable and indeed

[22] https://universitiesaustralia.edu.au/stats-publications/student-data-hub/

conservative assumption, given that AAF means that students do not have to register with external services or remember multiple passwords individually. Students' time is valued at $38/hour. The Department of Prime Minister and Cabinet's Office of Impact Analysis recommended a default value for 'non-work related labour costs' of $37/hour in 2024, which we have adjusted to $38/hour to account for inflation of 2.1% between the June quarters of 2024 and 2025.[23]

Table 3.4. Estimation of avoided costs for students, annual

		Pessimistic	Central	Optimistic
	Assumptions			
A	Undergraduate students (No.)	1,039,700	1,039,700	1,039,700
B	Postgraduate students (No.)	525,000	525,000	525,000
C	Value of time saved ($/hr)	38	38	38
D	Average time saved - undergraduate students (minutes)	15	20	25
E	Average time saved - postgraduate student (minutes)	45	60	75
F	Proportion benefiting from AAF - undergraduates	25.0%	33.3%	40.0%
G	Proportion benefiting from AAF - postgraduates	80.0%	90.0%	100.0%
	Calculations			
H	Total time saved, hours - undergraduates (A x F x D / 60)	64,981	115,522	173,283
I	Total time saved, hours - postgraduates (B x G x E / 60)	315,000	472,500	656,250
J	Total time saved, hours - all students (H + I)	379,981	588,022	829,533
	Total value of time saved ($ million) (J x C)	**14.4**	**22.3**	**31.5**

Source: LE calculations based on stakeholder consultations and desktop research.

Note: the number of students is based on the headcount measure, given that all students, full-time and part-time can benefit from AAF's activities.

Teachers and researchers

Our estimates of time savings for researchers are based on the underlying populations of teaching and research staff at universities plus an assumed population of researchers

[23] See Office of Impact Analysis (2024) Regulatory Burden Measurement Framework, February 2024, https://oia.pmc.gov.au/sites/default/files/2024-02/regulatory-burden-measurement-framework.pdf, p. 13 and https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/latest-release.

accessing AAF at non-university research institutions (Table 3.5). There are around 57,800 university academic staff who teach or undertake research and hence may benefit from AAF's services. The majority of academic staff, around 30,500, teach and conduct research, while the remainder either only conduct research (19,800) or teach (7,600). Additionally, there are researchers outside of universities, in other research institutions, who benefit from AAF. We have estimated this based on an estimate of total non-university researchers in Australia of around 143,100, with the conservative assumption that 5% of them would benefit from AAF.

Table 3.5. Teaching and research staff, Australia

	Value
Universities (a)	
Teaching only	7,560
Research only	19,799
Teaching and research	30,454
Sub-total	57,813
Outside universities (b)	
Researchers	143,076
Assumed proportion benefiting from AAF	5%
Non-university researchers benefiting from AAF	7,154

Source: (a) Australian Government Department of Education, Higher Education Statistics, 2023 Staff Pivot Table; (b) the global estimate of total non-university researchers is based on information from Universities Australia (see Research workforce – Universities Australia). Note these figures are headcount figures, rather than FTE or equivalent full-time student load figures.In addition, the FTE number of researchers outside universities (excluding PhD students) was adjusted to reflect the number of heads, using the headcounts to FTE ratio of university researchers (1.44) in 2020. Our assumptions regarding the value of time for teachers and researchers are set out in Table 3.6.

Table 3.6. Value of time for teachers and researchers

	Value
Average annual salary	
- Teachers (A)	$120,000
- Researchers (B)	$100,000
Average annual hours (based on 38 hrs/wk)	
- Teachers (C)	1,976
- Researchers (D)	1,976
Total on-costs (E)	75%
Hourly labour cost	
- Teachers (F = (A / C)*(1 + E))	$106
- Researchers (G = (B / D)*(1+E))	$89

Source: LE calculations and desktop research. Note: On-cost assumption is consistent with Australian Government Office of Impact Analysis, Department of Prime Minister and Cabinet (2024) Regulatory Burden Measurement Framework, p. 12.

Based on the estimated hourly values of time for teachers and researchers in Table 3.4, we use assumptions informed by our consultations to estimate the magnitude of time savings and the value of those time savings for teachers and researchers generated by AAF (Table 3.6). We use the estimated values of total teachers and researchers relying on AAF in Table 3.5 and the value of time savings calculated in Table 3.7. We assume higher average time savings for researchers than teachers, given that they are more likely to access external resources requiring authentication via AAF and also be heavier users. In our central case, the total value of time savings for teachers and researchers is $6.2 million annually.

Table 3.7. Estimated value of time savings for teachers and researchers as a result of AAF

		Pessimistic	Central	Optimistic
	Assumptions			
A	University teaching only staff	7,560	7,560	7,560
B	University researchers	50,253	50,253	50,253
C	Non-university researchers benefiting from AAF	7,154	7,154	7,500
	Value of time saved (per hour)			
D	- Teachers	$106	$106	$106
E	- University researchers	$106	$106	$106
F	- Non-university researchers	$89	$89	$89
	Average time savings (annual, minutes)			
G	- Teachers	10	15	30
H	- University researchers	45	60	75
I	- Non-university researchers	45	60	75
	Value of time savings ($ million)			
J	- Teachers (A x (G / 60) x D)	0.1	0.2	0.4
K	- University researchers (B x (H / 60) x E)	4.0	5.3	6.7
L	- Non-university researchers (C x (I / 60) x F)	0.5	0.6	0.8
	Total value of time savings (J + K + L)	**4.6**	**6.2**	**7.9**

Avoided cost of research duplication

A further benefit of AAF is the reduction of duplicated research effort. Because AAF provides a trusted, federated identity framework, researchers can more readily discover, access, and use existing data and tools across institutions. This makes it less likely that parallel teams will unknowingly repeat the same work, or that valuable datasets will be recreated in isolation. By lowering the technical and administrative barriers to sharing, AAF not only facilitates collaboration but also channels researchers toward building on one another's outputs rather than re-inventing them, thereby avoiding wasted effort and cost. We estimate the likely value of this avoided duplication at $3.1 million with an optimistic case estimate of $6.3 million, based on reasonable and conservative assumptions regarding the scale of the benefit–i.e. 50 cents to $1 of avoided duplication per $1,000 of R&D funded by government or the non-profit sector

(Table 3.8). In our pessimistic case, we assume a reduction of only 10 cents for every $1,000 of R&D, reducing the estimated annual benefit to only $0.6 million.

Table 3.8. Estimated value of avoided research duplication as a result of AAF

		Pessimistic	Central	Optimistic
	Assumptions			
A	Total government expenditure on R&D ($ million)	4,604	4,604	4,604
B	Private non-profit resources devoted to R&D ($ million)	1,690	1,690	1,690
C	Proportion of avoided duplication	0.010%	0.05%	0.10%
	Calculation			
D	Total R&D in scope ($ million) (A + B)	6,294	6,294	6,294
	Avoided research duplication ($ million) (C x D)	**0.6**	**3.1**	**6.3**

3.4. Net benefits of AAF

We now estimate the net benefit annually of AAF by comparing the estimated annual benefits with the annual costs of AAF (Table 3.7). Note that, consistent with previous CBAs by LE, such as the 2019 valuation of the Census for the Australian Bureau of Statistics, we:

- Assume a range of unquantifiable benefits comprises 20% of the benefits from the remaining 80% of uses (the 'long tail') of AAF that we have not quantified–a heuristic known as the Pareto principle; and
- Assume a marginal cost of public funds of 20% for the government-funded component of AAF (i.e. approximately $2.1 million of government funding annually, which gives a marginal cost of public funds of $0.4 million).[24]

Our central case estimates are that AAF generates gross benefits to the Australian community of around $58 million annually and, taking into account its costs of operation, net benefits of $51 million, with a benefit-cost ratio of 8.5. That is, for every dollar the community spends on AAF, it generates $8.50 of benefits. In our more optimistic upper-bound scenario, the benefit-cost ratio is 12.3, meaning $12.30 of benefits are generated for every dollar spent. Even in our very pessimistic lower-bound scenario, AAF is still 'in the black', generating $5.40 in benefits to the community for every dollar spent.

[24] This is based on Australian Treasury estimates of the marginal excess burden of income tax and GST of 21 and 19 cents per dollar of revenue, respectively. See https://treasury.gov.au/sites/default/files/2019-03/TWP2015-01.pdf, p. 53.

Table 3.7. Net benefits of AAF, annual, $ million (2025 dollars)

	Pessimistic	Central	Optimistic
Benefits ($ million)			
Avoided costs of negotiating access and contracting	2.3	4.1	7.0
IT department savings	8.0	12.0	17.4
Student time savings	14.4	22.3	31.5
Researcher time savings	4.6	6.2	7.9
Avoided research duplication	0.6	3.1	6.3
Long-tail	6.8	10.1	14.2
Total benefits	*36.8*	*58.0*	*84.4*
Costs ($ million)			
Annual costs of AAF	6.4	6.4	6.4
Marginal cost of public funds	0.4	0.4	0.4
Total costs	6.8	6.8	6.8
Net benefits ($ million)	**30.0**	**51.1**	**77.6**
Benefit-cost ratio	5.4	8.5	12.3

Note: The estimated annual cost of AAF is based on AAF's 2024 financial statement estimate for 2024 adjusted up to account for nominal growth between 2024 and 2025 based on the growth rate between 2023 and 2024.

These benefit-cost ratios suggest that for each dollar governments invest in AAF it generates economic gains sufficient to generate at least $2.70 of tax revenue in the central case and up to $4.50 in the optimistic case (through its contribution to economic growth generally) (Table 3.8). Note that to be conservative in the estimated fiscal return, we have excluded any potential GDP uplift from time savings by students (owing to uncertainty regarding whether they would take leisure or work additional hours as a result of the time savings) or long-tail benefits. Assuming tax is around 30 percent of the Australian economy, even with the benefit cost ratio at the lower bound of 5.4, each dollar spent by government returns up to $1.20 cents back in tax revenue, with the community enjoying the other $4.20 of benefit after tax.[25]

[25] Taxation Revenue, Australia, 2023-24 financial year | Australian Bureau of Statistics.

Table 3.8. Fiscal return from the Australian Government's funding of AAF

		Pessimistic	Likely	Optimistic
	Potential GDP impact			
	Avoided costs of negotiating access and contracting	2.3	4.1	7.0
	IT department savings	8.0	12.0	17.4
	Researcher time savings	4.6	6.2	7.9
	Avoided research duplication	0.6	3.1	6.3
	Less subscription fees	*-4.4*	*-4.4*	*-4.4*
	Less government funding	*-2.1*	*-2.1*	*-2.1*
	Less marginal cost of public funds	*-0.4*	*-0.4*	*-0.4*
A	Estimated potential GDP impact	8.7	18.6	31.8
B	Tax-to-GDP ratio	30%	30%	30%
C	*Potential additional tax revenue, $ million (C = A x B)*	*2.6*	*5.6*	*9.5*
D	Government funding for AAF, $ million	2.1	2.1	2.1
	Fiscal return per $ of government spending on AAF (E = C / D)	**1.2**	**2.7**	**4.5**

Note: To calculate the GDP impact we have excluded time savings by students and long-tail benefits owing to large uncertainty regarding how they would impact GDP. We also subtract AAF funding because in the base we assume it would otherwise be deployed in productive activities that would increase GDP. Finally, we subtract the marginal cost of funds because it represents an efficiency loss that detracts from GDP.

Our central case estimate is very likely a conservative estimate given the unquantifiable benefit that arises from the network effects described above and AAF's contribution to the reduction of cybercrime, which has a large cost to the Australian community–estimated at $42 billion in 2021.[26] Further research and documentation of how AAF prevents cybercrime would be necessary to attribute any reduction in cybercrime to AAF, but the magnitude of the cost suggests the benefit from the avoided cost of cybercrime due to AAF could be substantial.

[26] Cybercrime an estimated $42 billion cost to Australian economy

Appendix A. Stakeholders consulted by LE

- Simon Brennan (Flinders University)
- Loren Bruns Jr (AURIN)
- Jac Charlesworth (University of Tasmania)
- Adrian Dillon (AAF Board)
- Wojtek Goscinski (National Imaging Facility)
- Siddeswara Guru (TERN)
- Andrew Janke (Queensland University of Technology)
- Heath Marks (AAF)
- Kerry Mora (AAF)
- Beryl Morris (TERN)
- Greg Sawyer (CAUDIT)
- Karl Sellman (Flinders University)
- Scott Sorely (University of Southern Queensland)
- David Stockdale (University of Queensland)
- Sarah Thomas (AAF)

Appendix B. Additional information

Table A1. Who's accessing what? Accessed services by category, 2025 (year to date)

Category Service	No. Authentications	Top User	Top user's authentications	Share (%)
Teaching and Learning	2,031,427	University of Canberra	1,520,423	74.8%
Administrative	1,655,823	University of Canberra	709,737	42.9%
Research Tools	1,297,843	The University of Sydney	398,650	30.7%
Academic Publisher	1,180,567	The University of New South Wales	195,372	16.5%
Web Content Management	853,851	University of Canberra	849,245	99.5%
Student Services	65,102	University of Canberra	49,423	75.9%
IT Services	36,115	University of Canberra	34,228	94.8%
Telecommunications	5,358	University of Canberra	5,358	100.0%
Media and News	2,156	TAFE NSW	652	30.2%
Network Services	47	Australian Access Federation	27	57.4%