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## 1 M3.1 - Joint value proposition by relevant PID providers

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## 2 Versioning and contribution history

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## 4 Terminology

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Terminology/Acronym	Description
EC	European Commission
EOSC	European Open Science Cloud
EU	European Union
FAIR	Findability, Accessibility, Interoperability, and Reusability
IGSN	International Generic Sample Number
ISNI	International Standard Name Identifier
ISSN	International Standard Serial Number
ORCID	Open Researcher and Contributor ID
ROR	Research Organization Registry
PID	Persistent identifier
SP	Service Provider
RAiD	Research Activity Identifier
SRIA	EOSC Strategic Research and Innovation Agenda
SWHID	Software Heritage identifier
URN	Uniform Resource Name
URN:NBN	National Bibliographical Number
WP	Work Package
WG	Working Group

## 5 Introduction

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Persistent identifiers (PIDs) are crucial to enable and achieve the FAIR principles, which describe how research data and other entities within the research lifecycle should be made Findable, Accessible, Interoperable, and Reusable (Wilkinson et al. 2016). One of the goals of the FAIR-IMPACT project is to work with PID service providers and infrastructures to meet user needs, align with European Open Science Cloud (EOSC) PID policy, and maximize uptake.

To achieve this goal, coordination between PID service providers and EOSC is needed; where PIDs for various entities, such as research outputs, instruments, services, people, organisations and software should be covered. As a first step to establish a coordination mechanism, a common value proposition by relevant PID providers should be created and publicly shared.

The present report outlines a shared value proposition by relevant PID providers, including current alignment to the EOSC PID Policy roles, pain points that PIDs can help solve, and benefits of PIDs for EOSC users.



## 6 Description of the Milestone

The present document is a report on the achievement of milestone *M3.1 Joint value proposition by relevant PID providers* in the context of the FAIR-IMPACT project. It describes the role of the shared value proposition, the processes of its creation, as well as the verification measures linked to this achievement.

### 6.1 Role of the milestone

The creation of a common value proposition by relevant PID providers is a critical milestone to increase the impact and effectiveness of the project. The value proposition is intended to inform the FAIR-IMPACT project and the whole EOSC community of the benefits of persistent identifiers. The work will also help other tasks in FAIR-IMPACT WP3, and the overall project, by representing the PID provider perspective. The collaborative shared high level vision for PID use within EOSC will also support the FAIRCORE4EOSC project.

The shared PID value proposition is the first step towards achieving a shared-long term vision for PID service providers in EOSC (D3.1, M34).



### Task 3.1



#### Shared long-term vision for PID service providers in EOSC (M34)

2) EOSC PID providers coordination mechanism proposed (M16)



3) Align requirements for onboarding PID providers into EOSC, including emerging PIDs (M18)

1) Joint value proposition by relevant PID providers (M10)

Figure 1. Milestones to achieve a shared long-term vision for PID service providers in EOSC



### **6.1.1 Means of verification**

The means of verification for achieving this Milestone are:

- Announcement of task goals and the workshop<sup>1</sup>
- Hosting a workshop session during the EOSC Symposium 2022<sup>2</sup>
- Post-workshop review by WP3 members and PID Providers

### **6.1.2 Introduction to PIDs**

A PID is a unique and long-lasting reference to an entity, such as a dataset, paper, or person. It is a machine-readable string of characters, which conforms to a defined scheme and must be associated with one specific entity (McMurry et al 2017). Currently, the publication and dissemination of science continues to grow rapidly and science has become increasingly interconnected and global. There is a wide range of PIDs available to identify the different entities (individuals, organisations and objects) within the research landscape (Ferguson et al 2019). This ensures that each entity (individuals, organisations and objects) has a unique and unambiguous identifier, which enables the automated retrieval of it and its associated metadata. In this context, PIDs can be considered the building blocks of research information (Meadows et al., 2019). PIDs can play a central role in the Open Science framework. Persistent identifiers serve to uniquely identify the different entities of the research ecosystem, facilitate integration and interoperability, as well as contribute to the FAIRification of research processes. In other words, that the research processes are in accordance with the FAIR principles (easy to find, accessible, interoperable and reusable) of data and metadata.

In this context, PIDs are a key element for the realisation of an EOSC web of FAIR data and services. Moreover, persistent identifiers have a strategic relevance and urgency for EOSC. They can ensure that data and services are securely linked and accessible and can be used in an effective and efficient manner.

### **6.1.4 PIDs in the EOSC context**

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<sup>1</sup> Mejias, G. (2022). It takes a village to communicate the value of PIDs. DataCite. <https://doi.org/10.5438/ZF85-DA07>

<sup>2</sup><https://symposium22.eoscfuture.eu/symposium/towards-a-shared-value-proposition-for-persistent-identifiers-in-eosc/>



EOSC aims to provide an open multi-disciplinary environment to publish, find and reuse data, tools and services for research, innovation and educational purposes<sup>3</sup>. In this sense, PIDs can be considered an essential component of the EOSC, by providing reliable and persistent links to data, services, and other entities. Some previous and current EOSC community efforts around PIDs were considered and included in the discussion to contribute to this milestone.

The FREYA project (2017 - 2020), funded by the European Commission under the Horizon 2020 programme, aimed to extend the PID infrastructure as a core component of open research, in the EU and globally<sup>4</sup>. As part of their efforts, in 2018 the project delivered a Survey of Current PID Services Landscape, an assessment report of the landscape of established and emerging persistent PIDs used in the research ecosystem at the time<sup>5</sup>. The survey included PIDs for individuals, organisations and objects along with their maturity levels, and it was used as the starting source to consider and select PID providers for the value proposition exercise.

The EOSC PID policy was published in 2020 and authored by representatives of the EOSC FAIR Working Group and EOSC Architecture Working group, reviewed by the community through open consultation<sup>6</sup>. The document defines desired attributes of PID systems, roles and responsibilities in the PID ecosystem, as well as guidelines and requirements of PID service providers. The roles and responsibilities outlined in the policy were used as a starting point in the value proposition exercise.

Another community effort worth mentioning due to its relevance is the EOSC PID Policy and Implementation Task Force, established in 2021<sup>7</sup>. This task force aims to make a set of recommendations to the European Commission (EC) about the integration of PID services into the EOSC ecosystem. They will also work on the implementation, testing, and continued monitoring of any integrated PID services. Additionally, they plan to gather community feedback on the previously mentioned EOSC PID Policy and Architecture publications in order to inform and amend the next version of the EOSC Strategic Research and Innovation Agenda (SRIA)<sup>8</sup>. Currently some of the FAIR-IMPACT and its sister project FAIRCORE4EOSC partner organisations are part of the task force (CSC, CNRS, DataCite, GDWG, GRNET ).

<sup>3</sup>[https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/open-science/european-open-science-cloud-eosc\\_en](https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/open-science/european-open-science-cloud-eosc_en)

<sup>4</sup> <https://www.project-freya.eu/en/about/mission>

<sup>5</sup> [https://www.project-freya.eu/en/deliverables/freya\\_d3-1.pdf](https://www.project-freya.eu/en/deliverables/freya_d3-1.pdf)

<sup>6</sup> <https://data.europa.eu/doi/10.2777/926037>

<sup>7</sup> <https://www.eosc.eu/advisory-groups/pid-policy-implementation>

<sup>8</sup> [EOSC PID Policy and Implementation Task Force Charter](#)





### **6.1.5 Methodology**

The FREYA Survey of Current PID Services Landscape was used as the starting source to consider and select PID providers for the value proposition exercise. The proposed list was also shared for feedback with FAIR-IMPACT WP3 (Persistent identifiers) and FAIRCORE4EOSC WP2 (Compliance Assessment Toolkit for EOSC services) members. FAIR-IMPACT and FAIRCORE4EOSC PID provider partners were also selected to participate. Selected PID providers were invited to participate in a collaborative hybrid session at the EOSC 2022 Symposium. 15 PID service providers representatives and 2 other related stakeholders, together with representatives of the EOSC community worked collaboratively to discuss and provide feedback around the core elements of the value proposition.

The session began with an introduction to the work package and task goals, including a brief explanation of the EOSC PID Policy. After the introduction, participants split into break out groups to discuss various topics related to the value of PIDs in the EOSC:

- current mapping of the EOSC PID Policy roles to existing PID infrastructures
- current pain points EOSC users face across the research ecosystem that PIDs can help address
- benefits of PIDs for targeted EOSC users
- overall value of PIDs across the research ecosystem

After the workshop, the participants' feedback was reviewed and common topics and ideas were grouped together. The analyzed feedback was discussed and compiled by task members into the present report. The document was also reviewed by WP3 task members, participating PID providers and EOSC PID Policy and Implementation Task Force.

### **6.1.6 PID providers and the EOSC PID Policy**

As a first step, the selected PID service providers and stakeholders were asked to map the EOSC PID Policy defined across the PID infrastructure they enable: PID Authority, PID Service Provider, PID Manager, PID Owner, End User. The roles are defined below.

In principle, all the roles defined in the policy have some correspondence to the existing PID infrastructure. However, it is worth mentioning the heterogeneous nature of the stakeholders included in each role, as the following discussion shows.

A PID Authority is defined as “a controller responsible for maintaining the rules for defining the integrity of PIDs within a PID Scheme”. Most of the consulted PID providers have a



central/single PID Authority. However some PIDs have mixed authorities. E.g. ORCID iDs are controlled by ORCID and ISNI name allocation, IGSN IDs are regulated by IGSN and DataCite, ROR's authorities are its three governing organisations: California Digital Library, Crossref, DataCite.

A PID Service Provider is defined as “an organisation which provides PID services in conformance to a PID Scheme, subject to its PID Authority”. This role also involves some a wide range of stakeholders, as many PIDs can have multiple providers. For instance there are multiple registration agencies for DOIs, URN namespaces can have multiple providers, RAiDs can be provided by ARDC and in the future by SURF in the European context, ROR IDs are provided by ROR (which is an initiative sustained by three different legal entities), etc.

PID Managers have responsibilities “to maintain the integrity of the relationship between entities and their PIDs, in conformance to a PID Scheme defined by a PID Authority. A PID Manager will typically subscribe to PID services to offer functionality to PID Owners within the PID Manager’s services”<sup>9</sup>. Although most PID providers allocate this role within organisations (institutional member, consortia, service providers, national centers and national libraries) some PIDs like ORCID and RAiD allocate this role with both organisations and individuals.

It is also worth noting that while some PID providers offer the infrastructure **for others** to ensure the integrity of the metadata records (this is the case for DOIs, ePIC Handles, IGSN IDs, ORCID IDs, RAiDs) other PID providers share (ISSN) or own that responsibility (ROR, URN). There is also a different kind of PID provider which holds the capacity to resolve intrinsic identifiers that are computed directly from the content and can be computed locally by the users (SWHID).

The EOSC PID Policy defines a PID Owner as an "actor (an organisation or individual) who has the authority to create a PID, assign PID to an entity, provide and maintain accurate Kernel Information for the PID. A new PID Owner must be identified and these responsibilities transferred, if the current PID Owner is no longer able to carry them out"<sup>10</sup>. Most PID providers assign this role to an external organisation (preprint servers, repositories, publishers, funders, service providers, national libraries and their parties). In the case of

<sup>9</sup> European Commission, Directorate-General for Research and Innovation, Hellström, M., Heughebaert, A., Kotarski, R., et al., *A Persistent Identifier (PID) policy for the European Open Science Cloud (EOSC)*, Publications Office, 2020, <https://data.europa.eu/doi/10.2777/926037>

<sup>10</sup> European Commission, Directorate-General for Research and Innovation, Hellström, M., Heughebaert, A., Kotarski, R., et al., *A Persistent Identifier (PID) policy for the European Open Science Cloud (EOSC)*, Publications Office, 2020, <https://data.europa.eu/doi/10.2777/926037>



ORCID iDs an individual is the PID Owner (and ownership cannot be transferred) and in the case of ROR the ROR Metadata Curation Lead with the ROR Curation Board (formed by volunteers) have the ownership.

The last role is the end user, defined as “the end user of PID Services, for example researchers, or software, or services produced to support researchers”<sup>11</sup>. This role is the most diverse one including researchers, and universities, research performing organisations, libraries, publishers, funders, service providers and machines. We could conclude society as a whole are PID end users.

Overall, it seems that all the responsibilities for the roles defined in the policy exist within current PID infrastructures but may fall under a wide range of stakeholders and different PID providers have different models to perform these responsibilities.

The table below shows the results of the mapping exercise by PID service providers and related organisations.

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<sup>11</sup> European Commission, Directorate-General for Research and Innovation, Hellström, M., Heughebaert, A., Kotarski, R., et al., *A Persistent Identifier (PID) policy for the European Open Science Cloud (EOSC)*, Publications Office, 2020, <https://data.europa.eu/doi/10.2777/926037>



	<b>PID Authority</b>	<b>PID Service Provider</b>	<b>PID Manager</b>	<b>PID Owner</b>	<b>PID End User</b>
ORCID	ORCID, ISNI namespace allocation	ORCID	Researchers, ORCID member organisations	Researchers, contributors	Researchers, Contributors, Universities and Research Institutions, Publishers, associations and conferences, Funders and Facilities, Policy makers and governments, Services and vendors.
ROR	ROR, CDL, Crossref, DataCite	ROR, ROR sustaining organisations: California Digital Library, Crossref, DataCite	ROR staff & curation board (maintain the integrity of the relationship between entities and their PIDS), ROR API and dataset users (use ROR services)	ROR Curation Board (volunteers selected by ROR Curation lead)	Publishers, repository, CRIS, or RIM managers, Crossref, DataCite, and other DOI registrars, (Metascience and bibliometric) researchers.
ISSN	ISSN International Centre, Registration Authority appointed	ISSN International Centre	ISSN International Centre, 93 ISSN National Centres,	ISSN International Centre, 93 ISSN National Centres,	Libraries, Publishers, Indexing Services, Content Providers



	by ISO		Office Publications of the European Union	Office Publications of the European Union	
IGSN	IGSN, DataCite	DataCite	DataCite Member (e.g. CNRS) and Consortium Organisations (e.g. ARDC)	Repositories (e.g. Geoscience Australia)	Researcher, Curator, Laboratory or other service provider
DataCite	DOIF	DataCite	DataCite Members and Consortium Organisations	Repository (E.g. British Library Research Repository)	Researchers and other contributors, research community
Crossref	DOIF	Crossref	Crossref members and sponsoring organisations, Service providers e.g. organisations that provide services for Crossref members	Publishers, funders, institutions, preprint servers	Researchers and other contributors, Libraries, Crossref members, Tools & service providers e.g. indexing services
URN	IETF (RFC 8141 standard) IANA (URN namespace registrations) Each URN namespace (n = 80) has its own authority, specified in the	URN namespaces may have 0-n service providers. For instance, URN:DEV does not support any resolution services, whereas URN:NBN has many	URN namespace managers are specified in namespace registration requests. s IETF and its CORE working group URN:NBN registrant is	URN owner depends on the namespace. In URN:NBN, owners are national libraries and their partners. For URN:DOI, PID owners are the same as for	End users may be people or applications. Target group depends on the namespace. End users depend on the URN namespace. In URN:NBN, they are



	namespace registration. (URN:DOI = International DOI Foundation)	service providers (national libraries of several European countries).	the National Library of Finland	DOI.	people and systems who utilize systems maintained by national libraries and their partners.
DOI Foundation	DOIF	DOI Registration Agencies (RAs), Crossref, DataCite, mEDRA, JaLC, KISTI, ISTIC, CNKI, EIDR, CIIDRA	PID Owners (registrant) e.g data repositories, publishers etc; i.e. members of the Registration Agencies; there is also a role for RAs here to make sure binding is maintained	Data repositories, publishers, anyone who needs a DOI; there are providers (such a Zenodo) that allow individuals to upload content and assign a DOI; Funders (DOIs for grants)	Researchers in any field and anyone else or their machines worldwide needing to access information in the scholarly domain. Anyone working in the movie supply chain (EIDR). Anyone working in the construction industry (CIIDRA)
RAiD (SURF)	ARDC, RAiD Registration Authority	SURF, RAiD Registration Agencies	EOSC/RAiD Registration Agency member organisations, RAiD owners	Researchers, whoever registers the RAiD	Researchers, Data curation infrastructures using PID functionality for other type of analysis, Researchers working with citation data, Students and



					researchers who need to reference resources for publication purposes (Reference them properly)
URN:NBN	URN:NBN	National Library (URN:NBN)	Repository Infrastructure	Repository owner (Institution)	Repository
ePIC	ePIC	GWDG (Handle)	DARIAH (Repository)	DARIAH (Repository)	Digital Humanists (DARIAH users)
ePIC	ePIC	SURF PID Service	SURF	SURF Repository	Users of service
Handle (EUDAT)	EUDAT	B2Handle Service Providers	Members running B2SHARE + B2SAFE Service Providers	B2SHARE + B2SAFE Services	Users of B2SHARE + B2SAFE Services
ID.org (EBI)	EBI	ID.org	EBI	Repositories	Researchers
SWHID	The SWHID WG <sup>12</sup>	Software Heritage archive	Software Heritage archive (loaders components)	Software Heritage archive	Researchers, users, software developers, libraries, scholarly repositories, publishers, registries

<sup>12</sup> <https://www.swhid.org/>







### 6.1.7 Pain points for EOSC users

The second topic of discussion focused on the current challenges EOSC users face, that could be addressed by PIDs. For the purpose of this exercise four [EOSC target users](#) were selected: researchers, research performing organisations, service providers and research funding organisations.

The main pain points were formulated by participants of the EOSC workshop and can be summarized by the target user. The graphics down below<sup>13</sup> show a summary of the main pain points by target user, and are grouped based on the PID that could help address the respective pain points.

#### 1) Researchers

- Digital identity management poses challenges for researchers such as: name ambiguity, identity being often associated with an employer and these can change (e.g. using an institutional email address to access academic services or platforms), password fatigue, and administrative burden during grant submission, grant application and reporting. Researchers associated with organisations with less resources can face recognition challenges.
- Researchers often experience challenges identifying research related to their institution (e.g. bibliometricians searching for their institution's research production).
- Researchers also face name ambiguity issues to identify the outputs they produce and the resources they use. Researchers (and their software, machines!) also experience difficulties finding and identifying other peoples' outputs/objects in an accurate and consistent manner. This translates to difficulties selecting objects (research outputs, journals, services, etc.). An associated challenge is to track, link and cite an object across organisations, countries and disciplines. Last, researchers suffer with administrative burden (managing references, keeping track of their contributions, re-keying information across systems).

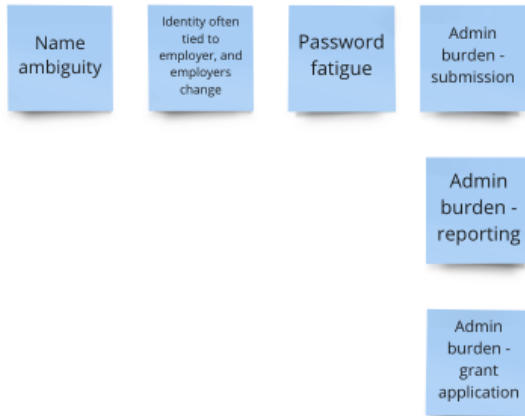
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<sup>13</sup> Not color coded.



# Researchers

## PIDs for individuals



## PIDs for organizations



## PIDs for objects



## 2) Research performing organisations

- Keeping track of their affiliated researchers and contributors can be difficult, hence incomplete reporting and administrative burden are common challenges for research performing organisations.

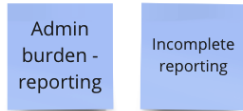


- It's challenging for research performing organisations to identify their complete research production, e.g. difficulty to meet open research targets due to difficulty assessing and tracking research outputs. This issue creates the additional challenge of having to pay for organisational output tracking tools and services.
- As mentioned before it's difficult for organisations to identify their overall research production and contributions and to connect related research outputs and resources. Additional challenges are the time spent rekeying information (asking their staff or affiliated researchers to manually enter information across systems and platforms), which also leads to lack of accurate information. Because of all these issues, accurately reporting and keeping track of the overall institutional production and its impact is a major challenge for organisations.



# Research performing organisations

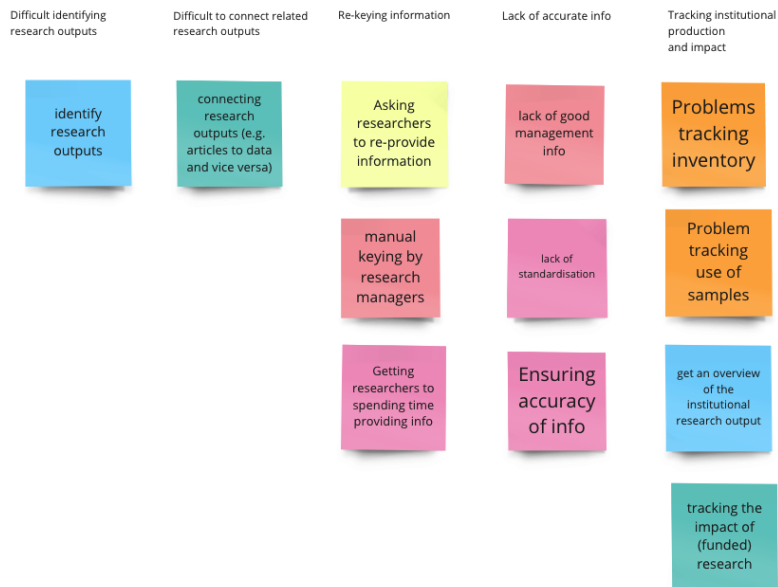
## PIDs for individuals



## PIDs for organizations



## PIDs for objects



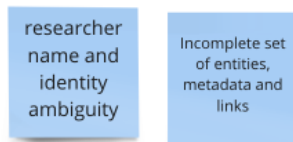
### 3) Service providers

- Managing researcher name and identity ambiguity is one of the challenges Service Providers can experience, as well as an incomplete set of entities, metadata and links describing the research process.
- It is hard for organisations to disambiguate organisations across systems and provide the organisations they serve with research activity reports.

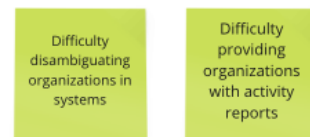
- Managing information on research outputs and resources presents many challenges. Identifying works and their associated funding is one issue in this area, as well as redirecting/linking to research outputs and connecting related research outputs and resources. Additional pain points are lack of accurate standardized metadata, the lack of interoperability between SP systems. As well as for other stakeholders reporting on research and measuring its impact is a difficulty

# Service Providers

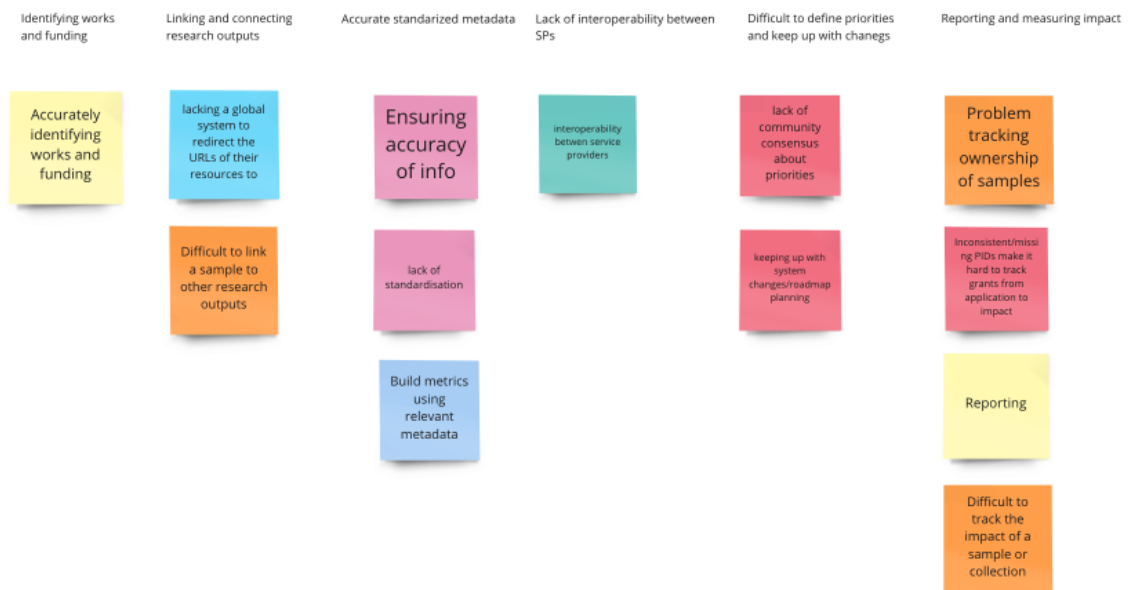
## PIDs for individuals



## PIDs for organizations



## PIDs for objects



## 4) Research funding organisations

- Managing research name identity ambiguity is a challenge for research funding organisations. There is also a lot of administrative burden (manual entering

information) for funders' staff and awardees, which can be associated with an incomplete set of entities and links between their awardees and outputs. All of these can lead to research integrity challenges.

- Name ambiguity for organisations is also a challenge research funding organisations face.
- Accurately identifying both funding and resulting research is a pain point, as well as keeping track of / linking outputs with awardees, and connecting related outputs (e.g. follow up projects). There is a lot of administrative burden both for funders' staff and researchers associated with re-keying the same information across systems and platforms. This can lead to incomplete and inaccurate information on the funded research. As a result, to get an overview of the funded research and monitor its impact remains a big challenge.

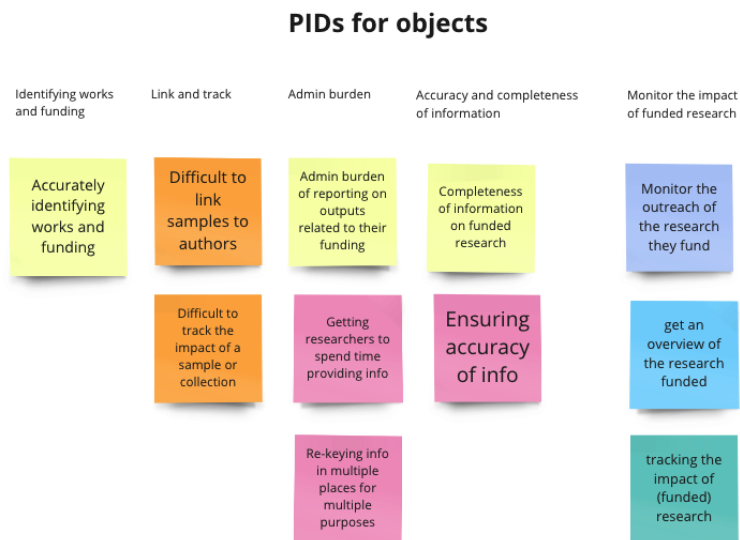


# Research funding organisations

## PIDs for individuals



## PIDs for organizations



### 6.1.8 Benefits of PIDs for EOSC users

The last discussion topic focused on benefits of PIDs for EOSC users. This can also be summarized by target user group.

#### 1) Researchers

- Persistent identifiers can enable researchers to take control of their digital identity and reduce burden by allowing single sign on, saving them time (no password fatigue).



- PIDs allow accurate attribution of research and can enable more automated career tracking (record of their activities and contributions). Reducing the need of manual reporting and repetitive administrative tasks, persistent identifiers can save time and leave researchers more time to focus on research.
- PIDs allow unique identification of all kinds of research outputs and contributions beyond journal-articles, their implementation leads to more and improved recognition of the diversity of research. More importantly, PIDs help researchers get credit for all their contributions to research.
- Thanks to their open, rich and interconnected metadata, persistent identifiers make research findable, discoverable, citable and reusable now and in the future.





# Researchers



## 2) Research performing organisations

- Persistent identifiers enable accurate affiliation attribution, allowing all research performing organisations to get credit for the outputs and contributions of their associated researchers.
- Open, rich and interconnected metadata enables improved tracking and reporting for researchperforming organisations. They can have a better overview of their researchers' activities and contributions. PIDs increase accessibility of research



performing organisations production. PIDs and their metadata allow for better and automated reporting and analytics.

- Interoperability and automation save time and can help research performing organisations workflows become more efficient.
- PIDs help reward open research practices.

# Research performing organisations

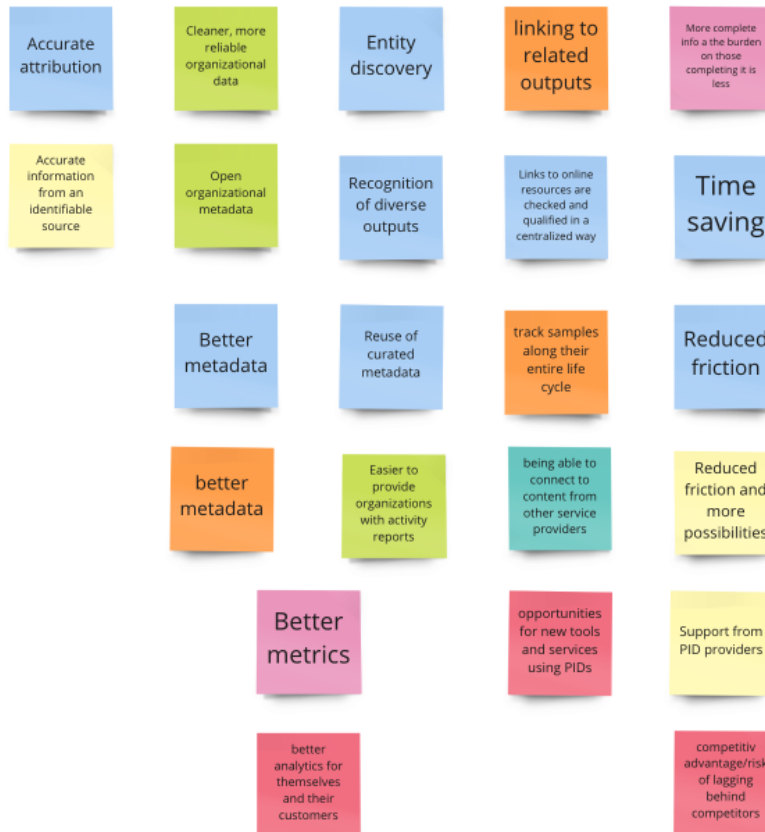


### 3) Service Providers

- PIDs enable accurate attribution and data provenance throughout SPs workflows (by solving individuals, organisations and objects name ambiguity).
- Open and rich metadata for individuals, organisations and a diverse range of outputs and contributions can help SPs provide better analytics and metrics to the community.
- PID integration in SP workflows allow the reuse of metadata, which can increase discovery of all entities involved in research.
- Persistent identifiers allow long-term linking and tracking of individuals, their organisations and contributions across the research lifecycle.
- PIDs allow SPs to connect content from other SPs bringing more interoperability and allow time saving and reduced friction in the research lifecycle, enabling more opportunities for new tools, services and innovation.
- PIDs also allow service providers to adopt and support FAIR practices.



# Service providers



## 4) Research funding organisations

- Persistent identifiers enable research funding organisations to identify and keep track of the researchers they fund and their outputs while allowing for clearer attribution of their investment.
- By identifying both their grants and grantees and allowing for those relationships/connections to be reused (via open metadata), research finding organisations can foster more transparency in research and can play their role in improving research integrity.
- PIDs and metadata integration in funding workflows saves time and relieves the administrative burden from funders staff and grant applicants/awardees. The

automated exchange of information via PIDs and metadata integration prevents errors and inaccurate information, improve reporting and contribute to a better understanding of the funded research and its impact.

# Research funding organisations



## 6.1.9 PID value proposition across the research ecosystem



The last topic of discussion during the facilitated workshop session at the EOSC Symposium was about the overall value of PIDs across the research ecosystem for the research community as a whole. The benefits can be summarized as follows:

- 1) PIDs and metadata are needed to achieve Findability, Accessibility, Interoperability and Reusability and play a crucial role in delivering the FAIR principles for the research ecosystem.
- 2) PIDs provide unique persistent identification for individuals, objects and organisations. PIDs provide unambiguous identification of entities in a standardized way. PIDs are free for end users (as they are free to resolve and will always be). Due to all the previous benefits, **PIDs enable global scaling of research.**
- 3) Persistent identifiers enable reliable linking and connections across/between entities (individuals, objects and organisations) for both humans and machines. They enable tracking and lower the administrative burden which leads to improved reporting. Hence, **PIDs can improve the overall understanding of research and its impact.**
- 4) PIDs enable open and rich metadata, which allow and improve interoperability across the research ecosystem and prevent manual re-keying of information. Because of these **PIDs can help save money and time through automation, and also allow for innovation.**
- 5) Persistent identifiers help increase findability, accessibility, discoverability and reusability of research. They allow for recognition and preservation of a diverse range of contributions beyond journal articles (such as data, software and more), and can play an important role in ensuring research integrity. Because of all the previous, **PIDs can improve trust in research.**
- 6) Because PIDs help increase recognition and understanding of contributions and trust in research, and can enable innovation, **PIDs offer significant opportunities to improve equity** across disciplines and countries.
- 7) Many PID service providers organisations are governed and sustained by the community. The **community governance** aspect can guarantee the persistence of the identifiers. Therefore, **PIDs support the long--term preservation and sustainability of research outputs.**



## 7 Conclusions and next steps

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Persistent identifiers have significant benefits both in the EOSC and wider research ecosystem. Some crucial aspects for these benefits to be delivered are open metadata (enable and improve linking, tracking, interoperability and reusability), community governance (help guarantees persistence of PID infrastructures and the outlined benefits) and community collaboration (it takes a village!).

The current report helps to better understand the existing PID infrastructure and potential integration benefits across EOSC, which will help develop and propose a coordination mechanism for EOSC PID providers (MS3.2). This output will also contribute to align the requirements to onboard both established and emerging PID providers into EOSC (MS3.3). The deliverable 3.1: "Shared long-term vision for PID service providers on PID usage in EOSC" will open up this discussion more broadly.



## 8 References

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