

IMPLEMENTATION

STORIES



FAIRSFAR
Fostering Fair Data Practices in Europe



THEME
5

**DEFINING DATA
INTEROPERABILITY FRAMEWORKS**

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Developing the B2INST service for registering and persistently identifying instruments

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From an interview with

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Introduction

B2INST is a community-driven solution for global and unique identification of instruments operated within science. Measuring instruments, such as sensors used in environmental science, DNA sequencers used in life sciences or microscopes used in medical domains, are widespread in most fields of applied sciences. B2INST will be offered as a public service which can be used by research communities and researchers to describe, register and reference instruments. The service is a joint development between EUDAT¹, DataCite² and ePIC³. It all started from the discussions ongoing in the RDA PIDINST working group session in the 14th Plenary in Helsinki in October 2019. This was at a time when the development of the metadata schema for the description of and attaching PIDs to instruments was already at a fairly advanced stage, as the working group had already been active for two years. At that point, the working group was close to finalising the metadata standard, but an essential part in the ecosystem was missing – a service for registering and assigning PIDs to instruments. From this point onwards, the idea of developing a service for this purpose started to crystallize. Several communities were already involved in this working group and also saw the clear need for a service like this. SURF, GWDG, DataCite and CSC are the partners co-developing the service. Mark van de Sanden is the Technical Coordinator in EUDAT and has been involved in this work since the very start, i.e. since early 2020. In this implementation story, Mark shares the experiences of developing the B2INST service and the future ambitions of the service.

FAIRsFAIR recommendation

"Build a culture of data citation."

FAIRsFAIR Recommendations on practice to support FAIR principles

1. <https://www.surf.nl/>

2. <https://www.gwdg.de/>

3. <https://www.csc.fi/>

■ Approach taken

At the time when the B2INST service first set off, DataCite and ePIC were already involved in the PIDINST working group. At DataCite they tested how they could map the metadata schema from the PIDINST with the DataCite DOI metadata schema and ePIC tested how they could create the data types supporting the metadata schema. This got Mark van de Sanden thinking that it is not enough to only have the schema in place - there also needs to be a service, in which you can easily register instruments and receive a PID. While presenting the work on the B2INST for the PIDINST working group, Mark noticed that most of the communities (as members of the working group) were already in the process of integrating PIDs for instruments in their own databases within their own services. There was clearly a need for a service like B2INST!

The technology used and development done

The service is built on the B2SHARE technology offered by EUDAT, but is slightly modified to serve the purposes of B2INST. The B2SHARE technology has a flexible model that supports different kinds of communities and their corresponding different metadata schemas. Currently the B2SHARE service supports 28 communities. The communities supported by B2SHARE represent various parts of life, environmental and medical sciences, but also e.g. social sciences and linguistics. Communities can easily set up their own repositories based on the B2SHARE technology. Due to the flexibility with which the metadata schema can be adapted, one can easily set up a service to support the PIDINST metadata schema⁴ - it only requires changes to the root schema. For all the other elements involved, everything was already available, because it was already possible to assign PIDs to data objects within B2SHARE, and also to assign DOIs and thus already register PIDs for the uploaded metadata and landing page of the instrument. However, there was a need to make some modifications to the UI layout, as in the data repositories the focus is on the data and metadata, while in the registry for instruments the focus is on the metadata of the instruments. It was decided to keep the functionality to upload data to the registry, because this data is purposed for supporting the registrations for the instruments. It is possible to upload a picture of the instrument to show what it looks like, or a user manual for an instrument, along with other types of information relevant to the instrument.

DataCite are at the moment reviewing how they can support instrument registration with their metadata schema. EUDAT can follow their footpath and update and modify accordingly within the B2INST service so that EUDAT can make full use of how best to register DOIs for instruments, which allows us to easily map additional fit-for-purpose items on top of what DataCite can provide.

Members involved and current status of the service

GWDC and SURF have two roles; members of both ePIC and EUDAT. Initially a proof-of-concept was set up for this service in the cloud at SURF. To operate the production service, there was a need to find a partner to run and operate the service in a production mode. GWDC volunteered for this and currently EUDAT is migrating the service from the proof-of-concept from the cloud to the production environment at the GWDC. The service is called B2INST and is part of EUDAT's service portfolio, but it can be labelled as a joint effort between EUDAT, DataCite and ePIC.

4. <https://github.com/rdawg-pidinst/schema>

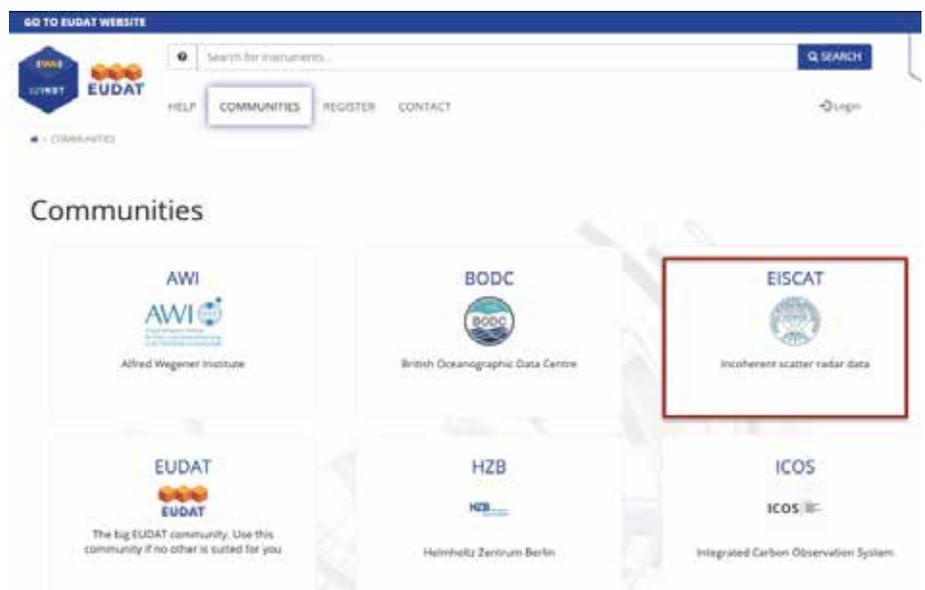
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Community involvement

Based on the root schema, communities can add metadata extensions to better support their community needs. While looking into the different community use cases for instruments, Mark noticed that all communities have different requirements of the metadata. The metadata schema coming out of the PIDINST working group only covers a minimum set of metadata requirements for describing instruments. With the B2SHARE technology, via community extensions, it is possible to support broader descriptions of instruments and to support the requirements of different communities.

The B2INST development team is currently seeking participation from additional communities in piloting the B2INST service and works together with DataCite and ePIC to get in touch with these communities.



The Community Extensions in B2INST enabled by the B2SHARE technology⁵.

Approach taken

One of the challenges has been to map the metadata schema defined by the PIDINST working group into a root schema, containing the correct structural definition of B2INST. The final touches to the PIDINST metadata schema will be made by the PIDINST working group, which requires some refinements to the B2INST metadata schema accordingly. Current work includes updating B2SHARE to a new version, which will also require work on the B2INST at a later stage, as these go hand in hand. Terms of use and privacy policy are next in line to be drafted, but first there is a need to make decisions on the service offering and long-term sustainability. Having a clear plan for long-term sustainability is especially important when providing a service for PIDs, as PIDs are to be sustainably maintained.

'This service FAIRifies information on instruments. Instruments are non-digital objects, so a challenge was how to FAIRify non-digital objects on the internet and make these discoverable. This service offers this information as digital representations making the information discoverable when PIDs are assigned.'

5. <https://b2share.eudat.eu/communities>

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■ Impacts

B2INST can FAIRify the registration of instruments. The B2INST service especially fills the gap for smaller or less mature communities or those who might not have the capability to implement a similar tool within their own services or to set up a service for doing this. Communities and organisations can make use of the service to FAIRify their instrument by registering their metadata and assigning the instrument a PID. This instrument-PID can then be added to research outputs, such as journal articles and datasets.

Only digital objects can be registered, described, sustainably maintained and persistently identified in a way that they are discoverable on the internet. What makes this a unique setting is the fact that an instrument is not a digital object, rather a physical object. The B2INST service makes the necessary transition happen and turns the instruments into a digital representation of a physical object. This reflects on the importance of a service like this, as it allows us to think beyond research data and publications to be able to FAIRify all kinds of research outputs. This not only enables referencing an instrument, which created the data, but it can also be used in automated workflows.

■ *About FAIRsFAIR Implementation Stories*

FAIRsFAIR Implementation stories illustrate good practices in research communities and organisations to support the implementation of the FAIR principles. These practices encompass 'FAIR-enabling' actions as recommended in the EC Expert Group on FAIR report [Turning FAIR into Reality](#) and the [FAIRsFAIR Recommendations on practice to support FAIR principles](#). FAIRsFAIR "Fostering FAIR Data Practices In Europe" has received funding from the European Union's Horizon 2020 project call H2020-INFRAEOSC-2018-2020 Grant agreement 831558. The content of this document does not represent the opinion of the European Union, and the European Union is not responsible for any use that might be made of such content.

■ *FAIRsFAIR - Fostering FAIR Data Practices in Europe*

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