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Report on Base4NFDI service portfolio framework

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Overview

This paper documents the outline of the upcoming (Base4-)NFDI service portfolio as envisaged by Task Area 2. Its scope and purpose are being discussed in different contexts and in other fora as well, in particular with regard to the future strategy of NFDI within the national and European landscape as a whole. The results of these discussions are expected by mid of 2025 and will clarify (and possibly even supersede) what is presented here.

Nevertheless, we provide practical working definitions of

- what the portfolio will represent between the two poles of a) the totality of all services operated in the NFDI and b) a catalogue-based offering for the service users,
- the functionalities it can provide for different interest groups,
- the components it will be built on and what its architecture will look like.

Adjustments to these outlines will be incorporated in revised versions of this document as matters become clearer in the NFDI in general.

Definition and scope of the portfolio

The NFDI member institutions operate a wide range of different IT, data management and support/consulting services and further are being developed. It should therefore be clearly defined which of these will make up the future service portfolio of Base4NFDI. To

begin with, all services taken together should be summarised under the term [service landscape](#). This landscape will not be considered further here, especially as it also includes services that are only (or can only be) used within a particular institution.

However, the declared aim of Base4NFDI is to bring together existing services and make them usable for the scientific community in a federated context. In the first place, this includes the Basic Services established according to Base4NFDI's three steps initialisation, integration and ramp-up. At the end of its integration phase, a Basic Service is supposed to become part of the [service portfolio](#)¹ which in turn is defined as the totality of all services that went through the decision and development process of Base4NFDI. This definition allows for further extensions in the direction of including other, widely used services that are already in place and do not require much development effort. Based on the definitions below, a suitable portfolio management system will be implemented to allow the management of all the necessary service- and workflow-related information and that provides the required functions to the various user groups.

After the integration phase,² a service should be fully developed and ready for productive use, but it may not yet be available on a long-term and scalable basis. Achieving this is subject of the ramp-up phase, at the end of which the service should be mature enough to be generally available. Potential users should then be able to search a web-based [service catalogue](#) for services that are suitable for them. They should find all relevant information about the service, in particular about its possibilities and limitations as well as the requirements for use and ways of access. If applicable, a service may show up in the catalogue already after the integration phase. Ideally, the catalogue functions and its management system would be an integrated part of the portfolio system.

In short, there are three sets:

- The [service landscape](#) comprises all services of the NFDI.
- The [service portfolio](#) comprises the subset of all services which passed the Base4NFDI process and provides all required management functions.
- The [service catalogue](#) comprises the subset of all services which are provided on a long-term basis and all functionalities required by the service users.

Functionalities

Not only should the scope of the service portfolio be clear, but also its purpose, i. e., how the different user groups will use it. Ideally, the portfolio (management system) should support the needs of all groups collaborating in Base4NFDI: the service teams, Base4NFDI staff and management, the service providers and - most importantly - the users of the services. Here we outline what functionalities might be required in these contexts.

¹ [20231130_Base4NFDI_Proposal_Revised-Community-Release.pdf](#), deliverable D2.4.4

² Details on service integration are given in the [Report on Base4NFDI service integration procedures](#)

However, not all of these will be able to be realised in the current funding phase of Base4NFDI, some may even not turn out to be necessary, and others may be added. We therefore attempt a prioritisation at the end of this section. Similarly, the functions do not necessarily need to be provided by a single system, but by a number of sensibly linked systems that may already be in place, e. g., OpenProject, or will have to be developed, e. g., the catalogue web interface.

The user perspective

Users receive a [catalogue](#) with an overview of all available services, displayed as a sorted list or a collection of tiles. They can browse through the services or search using keywords to identify services that may be suitable for their respective use case. For each service, a detail page can be opened which offers further information in the form of a concise profile, in particular on usage requirements, options for assistance, and access guidance. Both the overview and the detail pages should be generated dynamically from centrally stored content that is essentially maintained by the service providers, see below.

The service provider perspective

The Base4NFDI colleagues will not know all the provider-related details of a service and may not be aware of any changes. This information should therefore be maintained by the service providers themselves. This is not only the prerequisite for an up-to-date presentation in the service catalogue, but in particular also the basis for controlling the service lifecycle³ and the regular collection of performance indicators. To maintain this data, the service operators should be provided with both a web interface for manual data maintenance or - especially during the operational phase - with appropriate interfaces for an automatic synchronisation.

The NFDI sections and working group perspective

Currently, the collaboration of the service teams, the involved consortia and working groups, and Base4NFDI is organised using OpenProject and shared documents in Google Drive. Occasionally, workflow information is inconsistently distributed across both systems and granting appropriate access privileges can be difficult. Part of the portfolio could be lean, web-based self-service components that complement (or even replace) the current application forms and their associated workflows, helping the service teams to initiate and keep track of the different Base4NFDI phases as well as trigger the inclusion of a finalised service in the catalogue.

The perspective of Base4NFDI and NFDI

Base4NFDI employees should be able to find all information about the current status of a service to support their workflows. They should also be able to maintain all the information for which they are responsible. The same applies to the portfolio and

³ Base4NFDI report on service life cycle management - *in preparation*

catalogue managers in their respective contexts. This would cover the entire service-related processes from initialisation and operation through to the decommissioning of the service and the eventual inclusion of the service (or its components) in the tool pool.

In addition to detailed views of individual services, it should also be possible to generate aggregated views of, for example, missing information, pending approvals or upcoming due dates in order to maintain an overall overview or set up automatic reminders of tasks to be completed. The management of (Base4)NFDI should have the ability to generate aggregated on-demand reports on service utilisation and performance, consortium or facility participation, etc. to support decisions and complement Base4 NFDI assessments and reports.

Prioritisation

We suggest two priority levels:

Priority 1

Base4NFDI strives to provide value-added services to the scientific community, and to benefit from this, the users need a centralised point of access. This will, of course, be the **service catalogue**. Task Area 2 will focus on its development to have a prototype up and running by the end of 2026 when the first services will enter the ramp-up phase. As explained above, the information and capabilities available there represent subsets of what will be required for the portfolio as a whole. Therefore, the development of the catalogue and its management system will be embedded in that of the portfolio.

Service teams are already identifying possible performance indicators for their services as a prerequisite of the ramp-up and operational phases. A **portfolio component for automatically collecting, aggregating and analysing the key figures** delivered by the service provider should be available towards the end of the currently running first integration phases. Work on this is underway and will be completed by the end of 2026.

Priority 2

Above we have outlined **organisational and reporting functionalities that could support both Base4NFDI staff and management**. This refers to the Base4NFDI workflows that are already up and running. A thorough evaluation of what their current drawbacks are and what components of the portfolio/catalogue management system could be used for improvement is required. Once these have been identified and agreed, the corresponding functionalities will be implemented in the portfolio. It is important to avoid building workflows or information systems in parallel to what is already in use. Where appropriate, improved components should seamlessly integrate with or replace the existing ones.

Architecture and components

Based on the above, the service portfolio and the catalogue as its integral part will require a three-component architecture consisting of a data store, a web portal, and a middleware stack.

Data store

This acts as the backend and holds all information about a service:

- descriptive attributes, e. g., service type, application purpose, providing institution, service levels and restrictions, access requirements, contact and help desk addresses, links to documentation regarding the handling of personal data, data protection, business models, chosen KPIs, and more,
- the specification of this information as requirements to be met for the inclusion of a service in the portfolio, the consistency of the latter, and the interoperability of the services, as detailed in our publication on the Base4NFDI integration process⁴ (cf. priority 1 above),
- the use of this information for the portfolio and catalogue management (priority 1),
- information on the organisation of the Base4NFDI process, e. g., status of initialisation, integration, etc., technical readiness, existing or pending votes from TEC or KV (priority 2).

Depending on the type of data, different storage platforms can be employed, such as a database system for tabular, descriptive information, or a Git repository for the accumulation of KPI figures.

Web portal

The portal offers access to the portfolio and provides functions and information that are tailored to the respective needs of the above-mentioned user groups and their use cases. In a first phase, it will focus on the catalogue, portfolio management, self-services for information maintenance and KPI management (priority 1). Further steps will address electronic workflows that could complement or replace the current Base4NFDI workflows and contribute to streamlining the established processes, as proposed in “Status quo and perspectives of the NFDI”⁵ (priority 2).

⁴ “Notes on portfolio requirements” - [Report on Base4NFDI service integration procedures](#)

⁵ <https://zenodo.org/records/14726487>, p. 12

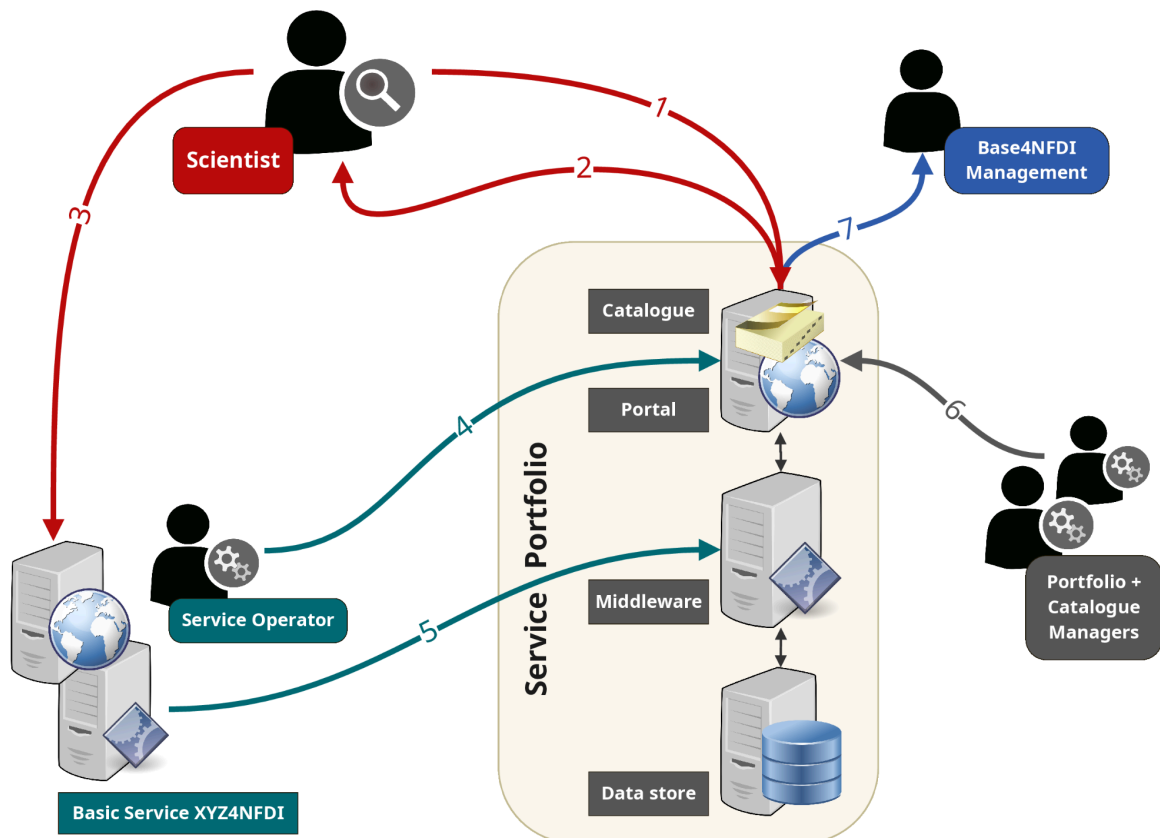
Middleware

The middleware stack

- organises the data flows between the database and the portal,
- enables automatic and manual data maintenance for service providers and Base4NFDI staff,
- prepares the data for display in the catalogue, for supporting workflows and for creating reports.

Typical workflows

The following diagram schematically illustrates the architecture, its components, and the typical workflows as planned until the end of 2026 (priority 1).



- The **users** search the catalogue for available services (1) and find all necessary information (2) which allows them to access the chosen service (3).
- The **service operators** manage the service information either manually (4, e. g., contact information) or automatically (5, e. g., KPI figures).
- **Portfolio/catalogue managers and Base4NFDI staff** maintain process-related information (6) and use this for organising their daily work and supporting the service teams.
- For **management**, KPI graphs and statistics are generated automatically and on demand (7).

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⁶ <https://hifs.net>