

# Deliverable D4.3

## Roadmap for consolidating National Initiatives

Guidelines and actions to be performed  
to consolidate National Initiatives

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### Deliverable Abstract

The document sketches the status of the major National Initiatives and Mandated Organisations in the countries involved in EOSC-Pillar, i.e. Austria, Belgium, France, Germany and Italy, with the aim of identifying characteristics and peculiarities of each country, highlighting the points of strength and proposing a series of actions to consolidate them.



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## TERMINOLOGY

<https://eosc-portal.eu/glossary>

Terminology/Acronym	Definition
API	Application Programming Interface
BM	Business Model
CC BY	Creative Commons Attribution Licence
CNRS	Centre National de la Recherche Scientifique
DKRZ	Deutsches Klimarechenzentrum
EGI Federation	EGI Federation is an international e-Infrastructure providing computing and data analytics services for research and innovation
Elixir	European life sciences Infrastructure for biological Information
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
FDM	Full Data Model
GPL	General Public License
ICDI	Italian Computing and Data Infrastructure
ICT	Information and Communications Technology
INFRAEOSC	A project call in the EU Horizon 2020 program
IPR	Intellectual Property Rights
IT	Information Technology
ITSM	Information Technology Service Management
KIT	Karlsruhe Institute of Technology
NIS	National Initiatives survey
OA	Open Access
OD	Open Data
OS	Open Science
RDA	Research Data Alliance
RDM	Research Data Management
RI	Research Infrastructure
RoP	Rules of Participation
SRIA	Strategic Research and Innovation Agenda
TTF	Transversal Task Force
VLO	Virtual Language Observatory

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## Executive summary

This document outlines a set of actions to support the consolidation of National Initiatives in the countries involved in EOSC-Pillar, i.e. Austria, Belgium, France, Germany and Italy.

The proposed actions are the result of a thorough analysis of the current status of the National Initiatives, specifically the so-called Mandated Organisations in the realm of the EOSC Association, which has been based on information gathered through different sources, e.g. a general survey conducted within Work Package 3 and some interviews conducted by a specific Task Force.



# 1 Introduction

The main goal of this document is to outline “guidelines and actions to be performed to consolidate National Initiatives” to foster the uptake of EOSC. This will support countries in the process of participating in EOSC, learning from each other and leveraging a cross-country network to get a clearer understanding of the EOSC vision and challenges for the next few years. Given the federated nature of the EOSC, National Initiatives are one of the key elements for the creation of an inclusive and sustainable EOSC with the commitment of Member states.

The first step is therefore to understand what are the existing, or planned, National Initiatives in the five countries participating in EOSC-Pillar (Austria, Belgium, France, Germany and Italy). For this, a National Initiatives survey [1] has been performed at the start of the project. This initial survey considered any organisation or scientific infrastructure tied to Open Science and Open Data - with relevance to the EOSC - as a component of a National Initiative. Since then, the notion of a National Initiative has shifted over time from nationally oriented to EOSC oriented. The development of EOSC, now governed by the EOSC Association, was mutually motivated by activities of national research and government organisations. These organisations started coordination and alignment of policies and practices specifically with EOSC, and many applied for membership in the EOSC Association. A single member per country in the EOSC Association can be a mandated, i.e., government approved, coordinating organisation which is today referred to as the National Initiative. As an example, in Italy the Ministry of University and Research appointed the newly founded ICDI as Mandated Organisation in the EOSC Association and in Germany NFDI, a recently funded national research collaboration, was appointed as Mandated Organisation. Other countries have or are in the processes of appointing Mandated Organisations as well. This deliverable starts from the broader concept of National Initiatives used in the survey and then moves its focus to the interactions between these and the coordinating organisation that represents EOSC nationally.

The first source of information to have a general overview of the status of the National Initiatives is the survey conducted by WP3 during the first six months of the project. However, along with the evolution of the EOSC (whose current status is sketched in Chapter 3), i.e. the outcomes of its many implementation projects as well as the establishment of its governance structure, the National Initiatives are evolving too. In order to get additional and updated information, we set up a dedicated team, the Transversal Task Force (TTF), involving experts from different EOSC-Pillar areas (tasks T2.2, T4.1, T4.3, T4.5 and T7.1), which performed a series of interviews with the relevant stakeholders in the EOSC-Pillar countries.

A summary of the information collected is reported in chapter 4, while chapter 5 describes a set of possible actions to support the National Initiatives in their consolidation with the EOSC. With consolidation we mean to offer support and leverage possibilities to integrate with EOSC in the broadest sense. Thus this task enables the National Initiatives to prepare for participation in the EOSC ecosystem and for that it evidently relies on other activities in EOSC-Pillar (e.g. the services integration in WP7, the skills propagation in WP5, the surveys performed in WP3). Because the status of the National Initiatives is quite different from country to country, the best way we identified to support them is to create a communication channel to help them share information, experience and expertise, complemented by some additional specific actions.

## 1.1 A look back at the National Initiatives Survey

In the first months of the project, EOSC-Pillar designed and conducted a quantitative survey to gain insights into the research supporting infrastructures in the five EOSC-Pillar countries. The aim was to both shed light on the landscape and - in a second step - to provide information for further discussions and evidence-based decision making in the implementation process of EOSC. A wide range of survey results[1], detailed documentation material[2][3][4] and the data[5] have been published and are available for reuse. In this document, we will focus on a subset of the survey results and data relevant to the consolidation of National Initiatives and only briefly summarize the methodology. One has to account for the fact that at the time the survey was conducted, the actual realisation of EOSC was still being discussed and the EOSC Association, AISBL, was not established.

For more information, please see the cited documentation material[1].

### 1.1.1 Methodology

**Respondents and survey frame:** We invited four groups of EOSC-stakeholders to participate in the survey: funding bodies, universities, research infrastructures and e-infrastructures. To gain a representative picture of the landscape, we compiled comprehensive lists of all organisations that belonged to the definition of one of the target groups. Then, we sent invitations to all organisations of these lists, hence to the entire population of our survey frame.

For this document, we will focus on e-infrastructures as used in the definition of the survey frame: service providers “including data repositories, data archives, data/computing centres, grid infrastructures, HPCs, NRENs and national museums with digital archives”[1][2]. In autumn 2019, EOSC-Pillar invited 727 e-infrastructures to participate in the survey. Of all invited e-infrastructures, 318 (44%) responded at least partially [4]. However, we aimed for the highest level of comparability possible to the expert interviews conducted by the Transversal Task Force. To this end, we narrowed down the group of respondents to a subsample that is comparable to the selection criteria of the TTF interviews (see Section 4 for more details). As a consequence, the number of observations dropped substantially in several countries. For these cases, we abstained from interpreting the quantitative numbers and instead report tendencies that we observe in the data.

**Questionnaire:** The questionnaire was designed using best-practice examples of social survey research[6] and the input and feedback of various stakeholders to allow for a broad picture of the landscape. In this document, we will use a subset of questions with relevance to the consolidation of National Initiatives.

## 1.2 The Transversal Task Force interviews

As already anticipated, the EOSC-Pillar project has set up in December 2020 a TTF to coordinate a consultation process of National Initiatives, in particular those acting as national representatives in the context of EOSC, e.g. Mandated Organisations, but as well on national thematic infrastructures, such as domain-specific, vertical research infrastructures and generic, horizontal e-infrastructures at national level that are federating national services in the context of EOSC, e.g. national nodes of ESFRI infrastructures. The TTF brings together the survey efforts carried out by different EOSC-



Pillar's tasks: T4.1 on "Policy and legal framework", Task 4.3 on "Consolidation of National Initiatives", Task 4.5 on "Sustainable Business Models", Task 2.2 on "Concertation with the EOSC governance and related EOSC initiatives", and Task 7.1 on "Guidance on procedures for integrating services".

The TTF aimed at gathering information on:

- policy on open science and open data
- the expected role of the EOSC-Association and the EOSC related projects in the above processes
- the services relevant at national level with respect to onboarding into the EOSC
- the different ways for implementing a "federation" of services
- business models elements and issues for supporting sustainable national and trans-national data, compute and open science services

To achieve its goals, the TTF developed specific questions aimed at specific categories of respondents within the selected National Initiatives or thematic infrastructures, namely:

- reference contact person for the National Initiative or thematic infrastructure
- responsible person for policy on open science and open data
- technical expert of e-infrastructures for onboarding/federating services into EOSC
- financial officers related to service providers (e.g. data suppliers and aggregators, enablers) relevant from the perspective of the EOSC ecosystem

Two slightly different questionnaires were prepared to target National Initiatives or their constituents (e.g. e-infrastructures and thematic infrastructures) on one side and Mandated Organisations on the other side. Four sections in both questionnaires address the different roles described above. That way the questionnaire better reflects the needs the organisations might have with respect to the support EOSC-Pillar can offer them.

In particular, a set of questions relevant for this document were defined to gather information about the status, the type, the contacts, the current organisation and the needs of the National Initiatives with respect to their connection with the EOSC ecosystem. These questions are listed below:

1. What is the status of the National initiative (in operation, planned, to be defined, etc.)?
2. Is it (or does it aim at being) the Mandated Organisation at the national level?
3. Who are the contact points for the National Initiative itself as well as for other connected initiatives (or planned to be connected) to the National Initiative
4. What type of organisation is the initiative? Eg., infrastructure, e-infrastructure, research performing/funding organisation? Collaboration agreement between a set of the organisations mentioned above? community/domain/focus grouping etc.
5. Is this initiative managing/operating a national e-infrastructure? If yes, is it already connected to EOSC? How? And what are the future plans?
6. Could you please provide more information about the access mechanisms? e.g., excellence-driven (access exclusively based on peer review), market-driven (paid access), membership/policy based (access by affiliation), wide (open and free access to everyone), hybrid models, etc.

7. What are the major issues you foresee related to the National Initiative (e.g. funding, effectiveness to address the needs of the different actors, recognition by the ministries, etc.)?
8. What kind of support does your National Initiative expect from EOSC-Pillar?
  - a) to help consolidate your National initiative/infrastructure
  - b) in relation with the connection to the EOSC

For each country the TTF decided to consult the national/mandated organisation plus national thematic research infrastructures, trying to cover different disciplines. A total of 23 interviews were carried out between mid April and the end of June 2021: 5 in Austria, 2 in Belgium, 4 in France, 5 in Germany and 7 in Italy.

The results of the consultation were summarized in an internal document that forms the basis of the landscape and the guidelines illustrated in this deliverable and will help in steering the future activities and deliverables of work packages 4 and 7.

## 2 The EOSC landscape

The EOSC Association<sup>1</sup> was set up in 2020, in accordance with the recommendations of the first governance of the EOSC (Executive Board and Governance Board) delivered through the documents<sup>2</sup> of their Working Groups<sup>3</sup>, during 2020.

Four founding members (CESAER<sup>4</sup>, CSIC<sup>5</sup>, GEANT<sup>6</sup> and ICDI<sup>7</sup>) defined the statutes and launched a call for participation which was very successful with over 200 (acceptance at the next General Assembly in December 2021) applicants for full membership and 49 applicants as observers (see <https://www.eosc.eu/general-assembly>)

Most of these members applied on behalf of their institutions, therefore showing a wide interest in the EOSC by both research performing organisations and research funders, but some of them got the mandate of representing their national interests, on behalf of their ministries, in accordance with the EOSC Association Statutes<sup>8</sup>. This last category of applicants, called ‘Mandated Organisations’, included 19 organisations at the end of 2020, but it is expected their number will grow as soon as appropriate agreements among research institutions, thematic and National Initiatives and the ministries will be defined in all European countries. The list of provisional members, as of November 2020, is available here<sup>9</sup>.

At the time of writing, five countries participating in EOSC-Pillar have already defined their Mandated Organisation: Austria (ACOnet), Belgium (Belnet), France (INRIA), Germany (NFDI) and Italy (ICDI, represented by GARR).

In December 2020, the EOSC Association elected the eight members of the Board of Directors<sup>10</sup> (which is its Executive Body), the president and the vice president.

The management structure of the EOSC is tripartite, i.e. it consists of three components: the EU represented by the **Commission**, the European research community represented by the **EOSC Association** and the EU countries and countries associated with Horizon Europe represented through a **Steering Board**. These components are meant to ensure a strong connection with all the relevant stakeholders at both European and national level.

A Partnership Agreement Memorandum of Understanding<sup>11</sup> between the European Commission and the EOSC Association was signed on June 23 2021, to mark the start of the Co-programmed European Partnership on EOSC under the Horizon Europe Framework Programme. The Partnership

<sup>1</sup> <https://www.eoscsecretariat.eu/news-opinion/major-milestone-eosc-association-born>

<sup>2</sup> <https://www.eoscsecretariat.eu/eosc-governance/eosc-executive-board-outputs>

<sup>3</sup> <https://www.eoscsecretariat.eu/eosc-working-groups>

<sup>4</sup> <https://www.cesaer.org>

<sup>5</sup> <https://www.csic.es/en>

<sup>6</sup> <https://www.geant.org>

<sup>7</sup> <https://www.icdi.it/en>

<sup>8</sup> The EOSC Association statutes: [https://www.eosc.eu/sites/default/files/EOSC\\_Statutes.pdf](https://www.eosc.eu/sites/default/files/EOSC_Statutes.pdf)

<sup>9</sup> [https://eosc.eu/sites/default/files/list\\_of\\_provisional\\_members\\_and\\_observers.pdf](https://eosc.eu/sites/default/files/list_of_provisional_members_and_observers.pdf)

<sup>10</sup> <https://eosc.eu/board-directors>

<sup>11</sup> <https://www.eosc.eu/news/towards-european-open-science-cloud-revolutionising-research-digital-age>

will ensure until at least the end of 2030 a coordinated approach from the European Commission, the Member States and Associated Countries (MS/AC) and the stakeholders in investments and initiatives in the EOSC ecosystem. It will also help ensure directionality and complementary commitments and contributions at all levels.

The activities of the EOSC Association are not completely defined, although its role is quite clear and some activities have already started. Among these, the update of the Strategic Research and Innovation Agenda<sup>12</sup> (SRIA), inherited from the previous governance, and the establishment of a set of new Advisory Groups, including specific Task Forces<sup>13</sup> whose charters have recently been approved by the Board of Directors and they are in the process of kicking off.

<sup>12</sup> [https://www.eosc.eu/sites/default/files/EOSC-SRIA-V1.0\\_15Feb2021.pdf](https://www.eosc.eu/sites/default/files/EOSC-SRIA-V1.0_15Feb2021.pdf)

<sup>13</sup> <https://www.eosc.eu/form/open-call-membership-task-force>

## 3 The landscape in the different EOSC-Pillar countries

In this section, we first discuss some of the general results from the National Initiatives Survey (NIS) and in the individual subsections, we discuss the landscape for the individual countries.

### 3.1 General results from the National Initiatives survey

The following results of the NIS all concern “e-infrastructures” as used in the definition in the survey frame, hence, all organisations that provide research supporting services “including data repositories, data archives, data/computing centres, grid infrastructures, HPCs, NRENs and national museums with digital archives” [1, p. 27]. In the following sections, the terms “e-infrastructure” and “National Initiatives” are used interchangeably.

A first important aspect related to the process of consolidation of National Initiatives are **roadmaps**. If organisations are part of official roadmaps, this likely indicates that they are sustainable and important players in the national landscape. As the NIS shows, the percentage of e-infrastructures that are part of roadmaps varies across countries: 45% of the organisations indicated on average to be part of roadmaps (albeit only 21% in Austria, but 58% in France). Of these, roughly half of the e-infrastructures indicated to be part of a national roadmap and/or the ESFRI roadmap. Substantially fewer respondents indicated that their organisation is part of an “other” roadmap [3, p. 59-61][1, p. 51-52].

A second important indicator of the level of consolidation of National Initiatives is the **membership in European organisations**. Respondents were provided with the options “EGI”, “EUDAT”, “PRACE (Partnership for Advanced Computing in Europe)”, “other”, “none” and “don’t know” [4, p. 33]. Across countries, 37% of the respondents indicated on average that their organisation is part of one of the options or an “other” European organisation. Again, we observed large country differences since only about a fifth of the Belgian organisations gave an affirmative response whereas more than half of the French and Italian organisations did so. Of the organisations who gave an affirmative response, membership in “other” European organisations is most common, followed by EGI, PRACE and EUDAT [3, p. 61-63].

The quantitative NIS and the interviews conducted in the framework of the Transversal Task Force are complementary in the insights they gained from the landscape, but of course, they differ substantially in the selection criteria of respondents. The quantitative NIS aimed to gain a broad picture of the landscape by inviting the total population, hence, ALL e-infrastructures of a country [1]. As a result, the survey provides average figures for the landscape. In contrast, the Transversal Task Force pursued an approach of interviewing key players of the national landscape to gain in-depth knowledge of these selected organisations.

To make the results from these two complementary approaches as comparable as possible, we work in the quantitative analysis from hereon with a subsample. From the quantitative survey (NIS), we only include e-infrastructures that indicated to be part of an official roadmap and/or that indicated



to be part of a European organisation (see discussion above). These selection criteria reduce the sample for the qualitative TTF interviews to established and sustainable services. We label these organisations as “established e-infrastructure” for the purpose of this analysis.

Altogether, 181 organisations in the NIS indicated to be part of a roadmap and/or an European organisation: 12 in Belgium, 16 in Austria, 18 in France, 44 in Germany and 91 in Italy. Thus, the number of organisations in the subsample of the NIS used for this document is substantially larger than the 23 organisations interviewed by the Transversal Taskforce (as was to be expected due to the differences in qualitative and quantitative approaches). At the same time, there is no guarantee that the organisations interviewed by the Transversal Task Force are also part of these 181 organisations since the response rate of e-infrastructures was around 44% and the survey data were pseudonymized. In the case of Germany it is even 100% certain because the organisations that were interviewed did not exist at the time of the NIS.

Despite the comparatively large number of 181 established organisations in the analysis, the numbers for the individual countries are substantially lower (as discussed above) and in some cases decrease over the individual questions in this analysis because some respondents dropped out along the survey. As a consequence, percentages have to be interpreted cautiously since individual observations may have a large leverage on these figures. In several cases with low numbers of observations, we therefore refrain from discussing percentages and merely state tendencies that we observe in the data.

## 3.2 Analysis from the National Initiatives survey - overview over countries

In this section, we give a first impression of the characteristics of “established” e-infrastructures in the five EOSC-Pillar countries. To this end, we discuss several questions of the NIS with relevance to the consolidation of National Initiatives and - if possible - tendencies across all five EOSC-Pillar-countries in terms of the average across countries.

### **Services provided by established e-infrastructures**

A first important factor in describing established e-infrastructures is the type of services they provide. We differentiate between three services as defined by the European Commission (2016: 2): data repositories, HPCs and high-bandwidth networks.

In total, 153 established e-infrastructures “offer data infrastructures which store and manage research data (e.g. archive and disseminate data)” [4, p. 33] which is by far the largest group of organisations (among established e-infrastructures as well as e-infrastructures in general). Across countries, 78% of the established organisations provide on average data repository services.

53 established organisations “offer high-performance computing which can be used to process research data” [4, p. 33]. This group of service providers is substantially smaller as about a third of the established organisations on average provide HPCs services.



“High-bandwidth networks which transport research data” [4, p. 33] are least common among established organisations as 22 organisations provide this service in total (mean across countries = 16%).

### **Integration into EOSC**

In the NIS, we also asked representatives of e-infrastructures a question related to the integration into EOSC via other organisations: “Is your organisation part of or related to another organisation which facilitates integrating your data and services into EOSC?” [4, p. 32].

Of the 181 established e-infrastructures in the survey, 111 indicated that another organisation will take care of their integration into EOSC. Across countries, on average, about half of the organisations gave an affirmative response. However, the numbers vary substantially across countries as discussed in the country sections below.

In addition, a substantial number of organisations indicated that they do not know whether their organisation is “part of or related to another organisation which facilitates” the federation to EOSC: overall, 34 of the 181 organisations chose this response which corresponds to about a fifth across countries (mean across countries).

Compared to the entire sample of e-infrastructures, which also includes the less established e-infrastructures, established e-infrastructures can benefit from assistance in EOSC-integration to a substantially larger extent (+13 percentage points). Less-established e-infrastructures may be in more need of support than the well-established service providers.

### **User groups of services**

Which groups use a service are another important characteristic of e-infrastructures. This aspect is captured in question E78 of the NIS: “We would like to know which user groups use your organisation's services. How frequently do the following groups use your services?” [4, p. 42]. If e-infrastructures offer multiple services (e.g. they “store and manage research data” and provide HPC services or high-bandwidth networks at the same time), users may differ between these services. For this reason, we reshape the data from an organisation-level to a service-level. Hence, each established e-infrastructure can be part of the dataset multiple times depending on the number of services they provide.

Reshaping the dataset to a service-level results in an increase in observations: 200 established services are part of this subset. To facilitate the interpretation of the results, we summarize the categories “very frequently” and “frequently”. The resulting figure gives an estimate about the number of respondents (or percentage of respondents) who indicated that this specific user group (very) frequently uses their service [1, p. 57-59].

As the results show, researchers (of non-commercial institutions) and students are the most important user groups of services. In more detail, “(researchers based at) universities” are on average the largest group of frequent users of established e-infrastructures: Across countries, about 88% of the respondents indicated that this group (very) frequently uses their services. We observe very little variation across countries (standard deviation = 2.6). The other category where we saw large user groups being indicated was from research institutes which are not part of a university, government, hospital or corporation. These “researchers of non-university research institutions”

formed a second large user group: On average, 71% of all respondents indicated that this group (very) frequently uses their service (mean across countries). In this case, we observe more variation across countries (standard deviation = 9.4). Students use services on average to a similar extent: Across countries, 68% of the established e-infrastructures report that students (very) frequently use their services. The standard deviation is again small (2.8) indicating little differences between countries.

Respondents indicated that all other user groups use their services substantially less frequently: About 30% of the service providers count “(researchers of) private, commercial institutions” among (very) frequent users, albeit with a relatively large variation across countries (standard deviation = 9.5). “Governmental institutions (e.g. census bureaus)” are on average only in about 24% of the cases among the frequent users (standard deviation = 2.8), followed by professionals (mean = 20%, standard deviation = 5.1) and citizen scientists (mean = 17%, standard deviation = 4.4).

All these average frequencies for established e-infrastructures (those in roadmaps and/or members of European organisations) correspond quite closely to the results obtained for all e-infrastructures (Bodlos 2020a: 57-58). This suggests that there is little difference between user groups of more established services and user groups of less established services.

## 3.3 Austria

### 3.3.1 Results from the National Initiative survey in Austria

Of the 38 e-infrastructures in Austria, 16 indicated to be either part of a roadmap or to be part of a European organisation. The share of about 42% aligns with the finding of the NIS that the research supporting infrastructure in Austria is comparatively decentralized and consists of many e-infrastructures who appear less well-established compared to other countries (although we also noted many average findings) [1, p. 127-131].

Of these 16 “established” organisations (see discussion above), 13 organisations provide services related to storing and managing research data and five provide HPC services and/or high-bandwidth services. These frequencies align with the country averages with the exception that we observe a tendency of more high-bandwidth services.

Consistent with the decentralized landscape of research supporting infrastructure in Austria, a relatively small number of four (of the 16) established e-infrastructures indicated that another organisation will help them with federating their services to EOSC. Besides, seven established organisations indicate to be unaware of this information, a share larger than in any other country and substantially larger than the mean across countries (of 21%).

17 representatives of individual services answered the question on user groups of their services. The frequencies for universities and their researchers correspond almost perfectly to the mean across countries (88%). Researchers of non-university research performing organisations and students use established services less frequently than the average country but are still large user groups. Likewise, the other user groups follow more or less the pattern of the country mean as discussed above.

Overall, based on the NIS, we therefore observe that the landscape of National Initiatives in Austria is rather decentralized and to a large part unaware whether they will receive support for an integration into EOSC or lack this support. Given this finding, providing and disseminating information on EOSC integration seems an important first step towards the consolidation of the Austrian National Initiative.

### 3.3.2 Introduction to the interviews In Austria

In Austria, we have selected the Mandated Organisation “Aconet Verein” for the interviews, as well as several national, thematic infrastructures or service providers. The Mandated Organisation has been appointed recently and structures are only emerging, which is why some parts of the interview questionnaire were not applicable and have not been addressed in the interviews (i.e. the section on service federation, as the Austrian Mandated Organisation does not aim to federate services at this point). The national thematic service providers have been chosen according to the website “research data information site”<sup>14</sup>: these services and infrastructures are not representative of the country, as they rather depict the situation of the nation-wide, more established infrastructures

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<sup>14</sup> <https://www.forschungsdaten.info/fdm-im-deutschsprachigen-raum/oesterreich/technische-infrastrukturen/>

that are already aware and possibly engaged in EOSC. Results from this activity therefore do not provide a representative picture of the Austrian landscape (as did the NIS) but rather give more individual in-depth information for certain national services, to better understand their viewpoint on EOSC, as well as connection to and challenges with EOSC.

### **3.3.3 Overview of the major National initiatives in the country**

Following is an overview and a summary of the outcomes of the interviews with national, thematic infrastructures and services:

#### **AUSSDA - The Austrian Social Science Data Archive**

The Austrian Social Science Data Archive is a data infrastructure for the social science community in Austria and offers a variety of research support services. These include data archiving and management, data preparation, data access and data search as well as advice on licences and data protection for the purpose of data sharing. The archive has locations at several universities in different regions and is certified with the CoreTrustSeal (CTS) as a “trustworthy data repository”. Legally, the archive is organised as a consortium with several partners. Currently, they are all universities. Different committees take on the supervisory duties, managerial functions or supporting and advisory functions.

AUSSDAs policies cover GDPR, data use, IPR, data access and data licences. The rights to use data are regulated by contracts between AUSSDA and the data providers. Policies are reviewed after a certain time to see if there is a need for change. AUSSDA supports the reuse of data and the open access movement in its mission statement and through free licences (open access, creative commons, CC0). If open access is not possible, other legally compliant types of data access are provided, e.g. those that restrict use for scientific purposes.

AUSSDA is connected to the CESSDA ERIC data catalogue. AUSSDA also plans to connect Research Data Management Services to partner organisations. This will be implemented partly technically and partly by data stewards or consultants.

AUSSDA is financed by in-kind services provided by participating partners and direct financial contributions from participating partners. There is no sale of paid services. At the moment, there are no plans to change the financing model. However, the aim is to increase income by expanding the consortium.

#### **ARCHE - A Resource Centre for the Humanities**

ARCHE is a service for the long-term digital archiving of data and their metadata from the humanities. ARCHE makes data public and accessible. It is one of two repositories in Austria in the field of humanities that are CoreTrustSeal certified. ARCHE is in a working group within the Austrian Centre for Digital Humanities and Cultural Heritage (ACDH-CH) institute, which is located at the Austrian Academy of Sciences (OeAW). The OeAW is a non-university research and science institution.

Policies by ARCHE are reviewed and revised regularly and are published on the website. So far, there were no difficulties in the introduction of policies. ARCHE does not see policies as rigid specifications, but rather they are developed and adapted in interaction with actual processes and

changes. In the deposition agreement between ARCHE and the data provider, the tasks of both sides are specified, including access rights and licenses for the transferred data. Policies at ARCHE cover the areas of general data protection regulation and copyright law. ARCHE supports Open Access in its policies. When data cannot be made Open Access, it is stored with restricted access. Interested parties must then contact the data providers. ARCHE ensures that the data is made available in formats that are as open and widely used as possible to facilitate reuse. On the technical side, ARCHE ensures a variety of automatic interfaces and a web interface that is as user-friendly as possible.

ARCHE data are found at the European level: They can be harvested via OAI-PMH. This is already done by the CLARIN Virtual Language Observatory and Europeana Collections. Within CLARIN, the data are also searchable in full text. In the future, ARCHE intends to make metadata available via OAI-PMH also for ARIADNEplus and for the Digital Transformation of the Austrian Humanities. Many tasks are planned directly in connection with EOSC. This should also be done partly via CLARIN services. In addition to ARCHE, ACDH-CH offers a number of services for researchers, which will also be offered via the EOSC Catalogue and Marketplace. ARCHE would appreciate clear technical documentation from EOSC. ACDH-CH is involved in the EOSC projects SSHOC and EOSC Future. Thus, ARCHE is well informed about the developments.

ARCHE is not planning to establish any paid services. Currently, the archive sees no need to change its business model.

#### **GAMS - Humanities Asset Management System**

The repository GAMS is operated by the Institute Centre for Information Modelling. The centre is part of the University of Graz (Faculty of Humanities). GAMS is compliant with OAIS (Open Archival Information System) and offers long-term archiving as well as the assignment of persistent identifiers. It also makes data available for aggregation. Researchers can also receive advice on research data management in the humanities and get support, for example with the conversion of data into suitable formats.

The repository does not adopt any policies, only the host institution, the University of Graz, does. The recommendation by the subunit that runs the repository is “to publish data as open as possible, as closed as necessary” and to make it reusable. There are few data sets in the repository that are not published in Open Access. If necessary, data is anonymised or protected by a password, on the basis of data protection considerations. The rights to use the data are set in advance in deposit agreements or cooperation agreements with the data owners/producers. In the point of view of GAMS, the repository's host institution should adopt a data stewardship policy.

Services can be found via the CLARIN-B Centre and via DARIAH-EU. The contained data are delivered to numerous aggregations (e.g. culture pool, CLARIN VLO). GAMS is preparing the connection to OpenAIRE for this summer/autumn. It is also planned to link GAMS to EOSC. GAMS is striving for a joint strategic approach with other Austrian institutions in the field of FDM in the humanities. Within the project “Digital Transformation of the Austrian Humanities (DiTAH)”, the tools and services offered via EOSC will be evaluated and tested. Subsequently, GAMS should be federated to the EOSC.



Funding is largely provided by externally funded research, while limited permanent staff is funded by the repository's sponsoring institution. Paid services are not planned for GAMS.

### **VSC - Vienna Scientific Cluster**

Several Austrian universities jointly operate the Vienna Scientific Cluster (VSC). The VSC is a supercomputer that researchers can use when they need extremely high computing power for their projects. The VSC is affiliated with the Vienna University of Technology. The most common uses of the VSC are high-performance computing in batch processing, support for users and the continuing training program. Work is currently underway on a cross-university scientific cloud solution that will also be EOSC-compatible, particularly in the technical area.

Policies are decreed by the rectorate of the host institution, in some cases there is prior consultation within the institution. The topic of the right to use data mainly arises in projects in cooperation with companies. There are specific rules for publications. Work with personal data must be approved by the data protection officers of the institutions involved and entered in a registry. There are no formal measures to promote the reuse of data. This takes place subject-related and on a collegial basis. Regulations on copyright in policies of the host institution TU Wien are limited to standards of scientific practice and plagiarism. VSC considers researchers' interest in policies to be not very high. However, this could change as soon as appropriate support structures, such as data stewards, are created.

VSC is a member of networks in the area of High Performance Computing (HPC), for example in PRACE (Partnership for Advanced Computing in Europe). It is also one of the HPC Competence Centres that are part of the European network EuroCC. VSC would become involved with EOSC if necessary.

VSC is financed by contributions from the partner universities. To a lesser extent, VSC also generates income by selling computing time to other universities. Overall, paid services play only a minor role at VSC, although one or two services could become paid services in the future.

As mentioned above, the interviews do not paint a representative picture of the Austrian National Initiative landscape but rather give detailed information on some selected National Initiatives. This becomes apparent when the summaries of the interviews are compared to the results of the NIS: The four National Initiatives who participated in the interviews are very mature and well established. They are connected to several European organisations and therefore likely have access to information or support necessary for the federation of their services to EOSC. This is in disagreement with the results of the NIS which suggest that the majority of the National Initiative in Austria lack profound information with regard to EOSC integration. Given the goal that EOSC shall be an inclusive rather than an exclusive endeavour, we therefore keep our initial assessment that disseminating information broadly towards the Austrian National Initiative is a goal worth pursuing.



### 3.3.4 Details on the Mandated Organisation

Formally, the Mandated Organisation in Austria is the ACONET Association. For the implementation and coordination of the Austrian EOSC initiative, the Austrian members and observers of the EOSC Association AISBL have participated in the establishment of the “EOSC Support Office Austria”. The partners are united by their common interest in a coordinated development of requirements and implementations according to the Austrian EOSC goals. The aim of the EOSC Support Office Austria is to establish a real “Austrian EOSC Mandated Organisation”, whose function is currently legally performed by the association ACONET.

The mandate is given by the Austrian Federal Ministry of Education, Science and Research to the ACONET Association. The representation of the Austrian Mandated Organisation will be performed by the operative unit, the EOSC Support Office Austria. The involved partners are currently working on a Memorandum of Understanding that regulates the governance of the Austrian initiative and the cooperation of the EOSC stakeholders. The objectives of the EOSC Support Office Austria are to support and strengthen Austrian institutions in their work for EOSC and to support capacity building, both in terms of infrastructure and in terms of knowledge and skills. Furthermore, networking and exchange of experience with partners of the EOSC Support Office and beyond, e.g. stakeholders from the political, social and economic environment will be a key objective. Another task of the initiative is to connect the Austrian with the European level of EOSC and to coordinate the various inquiries and work assignments of the EOSC Association AISBL and its committees at the Austrian level. The initiative does not aim at providing a technical infrastructure to federate services to EOSC.

## 3.4 Belgium

### 3.4.1 Results from the National initiatives survey in Belgium

Of the 20 e-infrastructures which responded for Belgium, twelve of them are either part of a roadmap or a European organisation and hence comply with the definition of “established e-infrastructures” as discussed above. This indicates a maturing e-infrastructure landscape in Belgium. Of these twelve established e-infrastructures, six “store and manage research data”, four are HPCs and one organisation is indicated to offer high-bandwidth networks, one left the question blank. The frequencies per type of service correspond largely to the tendency observed on average.

Five of the 12 established e-infrastructures indicated that they are affiliated to an organisation which will assist in their EOSC integration, two “don’t know” the response to the respective survey question. As for user groups, it’s hard to come to a conclusion as only established service providers answered the question on user groups. However, we find no indication that users groups of Belgium services are fundamentally different from the average country.

In general there is a strong expectation that EOSC will affect the surveyed organisation or their strategic plans with 50% indicating they expect to benefit ‘very much’ from EOSC.

Belgian universities, for example, all indicate they are (very) familiar with EOSC, while the familiarity with EOSC is much lower among the universities of the other countries in the analysis. A reason for this high familiarity may be that EOSC is already quite some time part of the conversation in Belgium.

### 3.4.2 Introduction to the interviews in Belgium

In Belgium, the Mandated Organisation, Belnet, and the Flanders Research Information Space (FRIS) were interviewed as they played an active role in building capacity towards EOSC.

In Belgium there is an example of a federated model where policy making bodies are acting at different levels. The governance of the Belgian research systems reflects the federal structure of the country. Strategic science policy-making bodies at the federal, regional and community levels (with shared competence) are involved in the inter-federal (Belgian) coordination in the field of research infrastructures and Open Science. This makes for a bottom-up approach where funding bodies, service providers, universities and research performing organisations are involved in the Open Science and EOSC eco-system. Although no overarching research council exists in Belgium, the federated entities are in constant dialogue. On a political level, there is the “Inter-ministerial Conference for Science Policy”, consisting of the ministers responsible for science policy. This inter-ministerial conference had mandated, on the administrative level, a coordination/consultation commission involving all these actors, with the mandate to decide on the Belgian position in international matters. The Committee for International Cooperation – Committee for Federal Cooperation (CIS-Cfs), has a subcommittee specialised in research infrastructures called CIS/INFRA, the subcommittee for Open Science is called CIS/Open Science. CIS/Open Science has an EOSC group which has been established to give a platform for discussion and coordinate between Belgian EOSC members, the Mandated Organisation and the governments to put forward advice on a Belgian level.

### 3.4.3 Details on the Mandated Organisation

Belnet<sup>15</sup> was selected by the CIS-CfS as the Mandated Organisation for Belgium within the EOSC association. Since Belgium is a federated country where research is a regional capacity, coordination is established through a bottom-up process through the Open Science working group of CIS-CFS (Commission International Cooperation-Commission Federal Cooperation). As such, the Mandated Organisation represents the federated research landscape where Belnet functions as a representative of the different stakeholders. Within the EOSC association, they represent Belgian interests and positions.

Belnet is a federal government organisation and belongs to the Federal Science Policy (BELSPO). As a National Research and Education Network (NREN), Belnet is one of the few research-oriented infrastructures in Belgium that is national in scope. Belnet is a data network provider that has an important role to play as a Service Provider with services focused on connectivity and security. They stimulate the deployment of the knowledge and information society by providing and maintaining high quality innovative network infrastructures with associated services. Belnet will represent the interests of all players that form a part of the Belgian research landscape. Furthermore Belnet will take care to provide a variety of value-added services to the EOSC and is already connected through the GÉANT network.

### 3.4.4 Details on the Flemish Open Science Board

In Flanders, the Flemish Open Science Board unites all Flemish stakeholders in a shared vision for the future with regard to Open Science and EOSC, and, supported by technical working groups, advises the policy on steps to be taken to fully integrate Flanders into the international Open Science landscape. The aim is to roll out and support open science policy in Flemish knowledge institutions. Its operation is part of a broader European policy - such as the European Open Science Cloud (EOSC) - and mainly focuses on open data and research data management (RDM). This requires infrastructure (data archiving), metadata and standardization (data discovery) and training and expertise.

The main objectives of the Flemish Open Science board are:

- To unite all Flemish stakeholders in a shared vision of the future with regard to Open Science and the EOSC.
- Consolidate existing expertise in the field in the Flemish Open Science Board to advise policy on steps to fully integrate Flanders into international Open Science initiatives such as EOSC.
- Ensure interoperability between data providers and promote FAIR data with e.g. investing in data stewards
- Investment in infrastructure and human resources to transition to FAIR and Open Science practices.

In the Flemish region, this transition is supported by the Flanders Research Information Space<sup>16</sup> (FRIS) the regional digital platform containing information on researchers and their research, funded

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<sup>15</sup> <https://www.belnet.be/en>

<sup>16</sup> <https://www.researchportal.be/en>

via public Flemish funds since 2008. The Flemish Government wants to offer a unique window on research in Flanders and increase its visibility. FRIS aggregates all the publicly funded research in Flanders. Five Flemish universities and 9 research institutions have already linked their systems directly to FRIS, automatically ensuring their data feeds directly into its information space. All information from the FRIS platform is displayed on a portal website. FRIS has been established as close cooperation between the Department of Economics, Science and Innovation of the Flemish Government and the knowledge institutions in Flanders, i.e. Flemish universities, higher education colleges, strategic research centres, and other scientific institutions. FRIS is in the process of providing metadata to OpenAIRE, prioritizing datasets, to connect to the EOOSC.

## 3.5 France

The French ecosystem relies on Research Infrastructures (“Infrastructures de Recherche”) which associate the main research organisations. They operate the observation, measurement, experimentation, and supercomputing instruments required to generate, store and share scientific data at the national, European or international levels. In order to provide the Ministry of Higher Education, Research and Innovation (MESRI) with the tools required for an efficient management of these high-tech facilities, the roadmap and strategy for National research infrastructures was published in 2016, and updated in 2018<sup>17</sup>. It includes the ninety-nine (99) initiatives which have been rolled out to transform the practices of the scientific communities, with a distinction between (generic) e-Infrastructures and large (thematic) research Infrastructures. The former (GENCI, Renater, CC-IN2P3 and France Grilles) provide digital services such as HPC, telecommunication network or storage typically open to all French research communities, and the latter (e.g. DataTerra, IFB - both described below, HUMA-NUM and ESRF) are more dedicated to specific communities. The roadmap is currently being revised as new projects have flourished, and the next update is going to be published in early 2022.

### 3.5.1 Results from the National initiatives survey in France

Twenty-four e-infrastructures responded to the NIS that was conducted by EOSC-Pillar [1]. Eighteen of them are either part of an official roadmap or an European organisation and hence match the definition of “established e-infrastructure” as used in this analysis. The relatively large share of 75% aligns with the finding of the NIS that e-infrastructures in France are comparatively well established and mature - which can be explained by the fact that they were set up well in advance of the 2016 roadmap.

In terms of services provided, these 18 established e-infrastructures follow the pattern observed for all countries: 14 organisations indicated to provide services as data repositories, eight provide HPCs services and 4 provide high-bandwidth networks. Overall, 24 French services are classified as “established” since their organisation corresponds to the described definition (hence, it is part of a roadmap or an European organisation). The user groups of these services correspond more or less to the averages observed across countries. Some noteworthy exceptions are that non-university research institutions and their researchers use services more frequently than the country average suggests (+12 percentage points) and professionals are less frequent users (-8 percentage points).

Two thirds of the 18 established e-infrastructures are affiliated to organisations which will pave the way to their integration into EOSC. This share is comparatively large compared to other countries. In addition only two of the 18 e-infrastructures ticked the “don’t know” option, a smaller share than in any other country. Hence, we again observe that the research supporting infrastructure is rather well-established and centralized in France.

<sup>17</sup> [https://cache.media.enseignementsup-recherche.gouv.fr/file/Infrastructures\\_de\\_recherche/04/6/Brochure\\_Infrastructures\\_2018\\_UK\\_1023046.pdf](https://cache.media.enseignementsup-recherche.gouv.fr/file/Infrastructures_de_recherche/04/6/Brochure_Infrastructures_2018_UK_1023046.pdf)



### 3.5.2 Results from the interviews in France

A National open science plan for France was published<sup>18</sup> in 2018. It set up a committee for open science (“Comité pour la Science Ouverte”) which supports the major structuring initiatives for the landscape regarding the publications and data, and makes mandatory the open access for publications and data produced as part of publicly funded research projects. It also establishes an international pillar to liaise between the scientific communities and the emerging EOSC landscape.

Its second version, published in July 2021<sup>19</sup> saw the apparition of another axis dedicated to research source code and increased the means previously allowed, with the stated objective of making science open by default, leveraging the research infrastructure.

These two milestones (strategy for National research infrastructures and National open science plan) can be seen as the starting point of the National strategy towards the EOSC.

In 2020, an EOSC-France work group has been put in place by the MESRI to propose an entity, which will federate the French stakeholders from the higher education and research communities towards the engagement in the EOSC Association. This structure will have the following duties:

1. Propose a mandated institution as a representative for the EOSC Association and follow-up the proper execution of this mandate;
2. Coordinate the exchanges between the EOSC stakeholders in France, the EOSC Association and MESRI;
3. Stimulate the discussion of French EOSC stakeholders and provide feedback on EOSC topics such as the SRIA, MVE, EOSC portal, etc.;
4. Ensure the French participation in the Horizon Europe Work Program (information, creation/participation into proposal consortia, preparation of HE WP next steps, etc.);
5. Coordinate and inform the French communities on EOSC relevant topics.
6. Propose the form of a persistent entity or committee in charge of these tasks and to act as French EOSC initiative

In response to the last task, the working group proposed to create a permanent committee, the Collège EOSC-France, under the supervision of the national committee for digital services and infrastructures (Comité Services et Infrastructures Numériques - CoSIN). The CoSIN was founded in October 2021, with creation of the Collège EOSC-France foreseen in the upcoming months. The main purpose of the Collège EOSC-France is to coordinate the French position within the EOSC, propose the French mandated membership of the EOSC Association which will be approved by MESRI, and to further establish the French EOSC community.

This National Initiative will not be a legal entity, but is coordinated as a consortium and its precise composition is yet to be decided. The French delegate at the EOSC Steering Board is expected to be a member of this coordinating body. Thus, the French interests with respect to the EOSC Association

<sup>18</sup> <https://www.enseignementsup-recherche.gouv.fr/cid132529/le-plan-national-pour-la-science-ouverte-les-resultats-de-la-recherche-scientifique-ouverts-a-tous-sans-entrave-sans-delai-sans-paiement.html/>

<sup>19</sup> <https://www.ouvrirlascience.fr/second-national-plan-for-open-science/>



and Steering Board will be directly represented and coordinated here. Observers will be invited to participate in the work of the Collège, e.g. within working groups on certain aspects, when relevant.

The representative from the EOSC-France working group has been interviewed as part of the TTF activities, as he was undoubtedly the centrepiece of the French EOSC sphere, and the outcome of the discussion on the objectives and governance is detailed above. The other National Initiatives which were interviewed included GENCI (generic e-Infrastructure), DataTerra and IFB (thematic research infrastructure) as they were typical of the National landscape.

### 3.5.3 Overview of the major National initiatives in the country

**GENCI** is a numerical infrastructure that was established in 2007 with the objectives to increase the use of high performance computing (HPC) and numerical simulation and bolster competitiveness within the French economy, across all scientific and industrial fields. To achieve these goals, GENCI implements the national strategy by deploying HPC resources in the three national computing centres and making the systems available for French researchers, supports the creation of an integrated European high performance computing ecosystem and works to promote numerical simulation and HPC within the academic and industrial communities. As a national agency, the funding comes primarily from governmental budgets, along with some grants from national and European projects. Access to HPC resources is excellence-driven (i.e. exclusively based on peer review), but with different scales, that include fast access with quick and short review for small amounts of resources and specific thematic access, such as AI. Along with preparatory access, it allows access for testing, benchmark and porting, outside the scope of scientific excellence.

**Data Terra** is a multi-site, distributed, virtual and human-network based infrastructure. It deploys a distributed platform for accessing and processing Earth System FAIR data, products and services in order to facilitate their use, develop services over the entire data cycle and implement interdisciplinary approaches. These services are operated by DataTerra clusters (one for each component of the Earth system: Ocean, Solid Earth, Atmosphere, Continental surfaces) and supported by the Data and Services centres (“Centre de Données et de Services” - CDS). The CDS are attached to the Data Terra clusters and are managed by institutional partners (CNES, IFREMER, IRD, INRAE, etc.), thematic or regional mesocentres and national centres (CNES, IDRIS, etc.). Services are intended for the scientific community (Geosciences, and, in the framework of the GAIA Data project, climate and biodiversity communities), as well as to public actors and private actors in the context of partnerships. Funding streams for DataTerra come from organisations and Research institutes that are part of the DataTerra consortium and the French Ministry. There are no permanent revenues for the moment from the services provided. In the context of GAIA Data, different kinds of business models will be built depending on the type of users and applications: a public/public business model for the major part, along with a public/private BM for services to private sector, added value data products for private companies, partnerships and scientific collaboration (e.g. SAPTIA), on-demand services to private companies (e.g. Thales) for better operational aspects.

**IFB** is both an e-infrastructure and a research infrastructure. It is a national infrastructure, and also the French node for ELIXIR, an intergovernmental organisation whose mission is to develop a distributed European infrastructure, providing scientists in life sciences with access to resources like databases, software tools, training material, cloud storage, and computing clusters. IFB platforms

provide a direct service to biologists for their research. IFB also provides training (e.g. use of high volume data). France's financial contribution to ELIXIR is 1M€ per annum, funded by the French Ministry of Research, which is the highest contribution for France's participation in an ESFRI. ELIXIR is organised in platforms (data, software, tools, etc.) and in communities (different areas of application of bioinformatics), the latter building the use cases for the former. The IFB Cluster federation has recently put together a business model. The basic package is free, and for more extensive use, a pricing has been established, based on both data volume and computing time. This should be deployed in 2021.

## 3.6 Germany

### 3.6.1 Results from the National Initiatives survey in Germany

The numbers returned by the infrastructure respondents of the 2019 NIS [1] clearly attest the familiarity of the German infrastructures with EOSC and, even more clearly, show that the infrastructures expect EOSC will have a large effect on their organisation and strategic plans as well as their intention to contribute to EOSC [1, p. 36-38].

The e-infrastructure respondents in Germany were also adamant in their response to the need for universal and open access to research data and that this should come from collaborations and federations that can benefit from EOSC. Therefore this response can be interpreted as an implicit backing of the development of EOSC. Of the 89 German e-infrastructures who responded to the relevant questions in the NIS, 44 (i.e. 49%) are either listed in an official roadmap or have a membership in a European organisation, hence are considered “established” in this analysis. This makes Germany the second largest player in the NIS regarding the number of established e-infrastructures (after Italy). Of these 44 established e-infrastructures, almost all (42) provide services dedicated to archiving research data. This share is larger than in any other country. A quarter offers services as HPCs (which is only a slightly smaller share than the mean across countries of 32%). As in all other countries, organisations providing high-bandwidth networks are least common: 14% of the established e-infrastructures offer such services.

It is observed that 55% of the established e-infrastructures receive support from affiliated organisations regarding the federation of their services. About a fifth indicated a lack of information in this regard. These figures almost perfectly correspond to the mean across countries. Finally, 51 providers of individual services fulfil the definition in the survey of “established” and hence are part of the analysis of user groups. The percentages for the user groups of German service providers all correspond very closely to the mean across countries which indicates the German situation corresponds to that in the other surveyed countries.

### 3.6.2 Overview of the major National initiatives in the country

In Germany, several initiatives took on the development of data federations and are in that respect related to EOSC. Most recently the National Research Data Infrastructure (in German: ‘Nationale Forschungsdateninfrastruktur’ (NFDI)) is tasked to coordinate a network of organisations that are grouped in consortia. It is envisioned that NFDI will lead the organisation and implementation of a common data infrastructure in Germany. Before describing details on NFDI, some already existing initiatives with a national impact must be mentioned. What follows is an overview of the most prominent initiatives and is by no means exhaustive. The list of initiatives that will potentially interact with EOSC is much longer and will grow not only at federal but also at state level. German data infrastructures are funded federally via the ministry for education and research or federal research bodies like the Helmholtz association<sup>20</sup> by one state, by several states, and by a combination of federal and state funding. Some state-funded projects have a national exposure,

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<sup>20</sup> <https://www.helmholtz.de/en>

e.g. the Federating Identity Services of Baden-Wuerttemberg that have been enabled by the bwIDM project<sup>21</sup>.

Apart from the national infrastructure projects initiated by the German Research Network that were geared towards exploiting the network infrastructure (e.g. the DFN AAI<sup>22</sup>) one of the first initiatives with the objective of bundling efforts in data management and long term data preservation was the Helmholtz Data Federation (HDF). The HDF, which is a project that is supported by an internal funding scheme of the Helmholtz Association is principally only for users from the Helmholtz Association and technically not a National Initiative. However, given the fact that the Helmholtz Association is a country wide research organisation funded at the national level and with a compound history of open science practice<sup>23</sup> and because they operate the largest instruments in Germany it is a relevant activity in the scope of this report. The HDF is the first step towards a generic data infrastructure as envisioned in EOSC. Many of the plans in HDF, e.g providing a common AAI, storage and compute platform form the basis of standardised data management practice. Activities in the HDF are taken up in HIFIS, see below, or are repositioned and made part of the EOSC effort to which many members of the Helmholtz Association (e.g KIT, GFZ, DESY and FZJ) are already long-time contributors.

Just like the HDF but from a later date, the HIFIS project<sup>24</sup> is funded by the Helmholtz Association. The goal of HIFIS is to create a seamless, high-performance, community-wide IT infrastructure in the Helmholtz association. HIFIS takes the next step with its goal to provide reliable networked services that are findable through a portal which lists services that have gone through a well-defined onboarding process. A federated service and cloud-oriented platform is being built on a high-performance network infrastructure, complemented with a federated AAI that will encompass all Helmholtz centers. Next to storage and cloud computing, HIFIS offers services for training and for sustainable software development. EOSC-Pillar partner KIT and ten other Helmholtz centres are working in HIFIS.

Started as a German National Initiative, the GAIA-X project<sup>25</sup>, today also includes French participants and discusses a roadmap with the EOSC Association and NFDI. The GAIA-X project, launched in autumn 2019, was initiated by the German Federal Ministries for Economic Affairs and Energy (BMW) and for Education and Research (BMBWF) with the aim of establishing a networked, high-performance, secure and trustworthy data infrastructure for Europe. The project is closely aligned with the European Data Strategy, which strives towards a genuine single market for data, as well as the EU Recovery Plan. GAIA-X is a fairly new initiative and a demonstrator-like Minimal Viable GAIA-X is expected in 2021. The project aims to build a European data ecosystem, especially for business. Soon after its inception 11 French partners joined the founding 11 German companies and the project became a legal entity after it was transferred into an association under Belgian Law (AISBL) in 2020.

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<sup>21</sup> In German: <https://www.bwidm.de>

<sup>22</sup> <https://www.aai.dfn.de>

<sup>23</sup> <https://os.helmholtz.de/en>

<sup>24</sup> <https://www.hifis.net/roadmap>

<sup>25</sup> <https://www.data-infrastructure.eu/GAIAX/Navigation/EN/Home/home.html>

EOSC-Pillar interviewed a representative from the German Fraunhofer ISST institute who co-leads the development efforts in the International Data Spaces (IDS) initiative. The IDS initiative and the IDS Reference Architecture Model<sup>26</sup> (IDS-RAM) offer various concepts and solutions that contribute to the overall vision of GAIA-X and to the concrete GAIA-X architecture demands.

The GAIA-X AISBL currently has over 300 members. The project envisions the networking of decentralized infrastructure services, primarily cloud and edge instances, into a homogeneous, user-friendly system and is organised around the concept of national hubs.

Collaboration with GAIA-X is of particular interest for NFDI, which together with GAIA-X issued two small projects with the goal to investigate communalities and a joint roadmap. Together with GAIA-X, NFDI will help shape the discussion on collaboration between research and industry.

A second large initiative in Germany is the 2016 founded Medical Informatics Initiative<sup>27</sup> (MDI). The MDI was created to close the gap between research and healthcare and received 180 million euros from the Federal Ministry of Education and Research (BMBF) for the development and networking phase from 2018 till 2022. Grouped in 7 consortia, all Germany's university hospitals together with research institutions, businesses, health insurers, and patient advocacy groups have created a framework that brings research findings to the direct benefit of patients. The initiative strives to establish and interconnect integration centers which will focus on technical and organisational solutions for data exchange in healthcare. The concept of integration centers demands that data is only stored at the site where it was captured and comes with high measures for data protection and security. Furthermore, the consortia are involved in development of IT solutions, in order to improve sharing clinical data across organisations, and they work on the improvement of medical informatics, e.g., by the development of curricula, and the establishment of professorships and research groups.

Finally, we cite the GO FAIR Initiative<sup>28</sup> and RDA Deutschland<sup>29</sup>, the German hub of the international Research Data Alliance (RDA). In doing so, RDA Deutschland, like the international organisation, is committed to improving the exchange of scientific data and underpinning standardization. GO FAIR's goal is the dissemination of the FAIR principles and related concepts in which several organisations, including RDA, work together. Besides Germany, GO-FAIR has offices in France and the Netherlands. Both GO-FAIR and RDA provide targeted cooperation in the area of scientific data management but do not offer direct IT services.

<sup>26</sup> <https://internationaldataspaces.org/publications/ids-ram>

<sup>27</sup> <https://www.medizininformatik-initiative.de/en/start>

<sup>28</sup> <https://www.go-fair.org>

<sup>29</sup> <https://www.rda-deutschland.de>



### 3.6.3 Details on the Mandated Organisation

In November 2018, the German federal government and the governments of the German states, acting in unity with the Joint Science Conference<sup>30</sup> (GWK), has decided to fund one of the largest scientific national data oriented initiatives named National Research Data Infrastructure (NFDI). The initiative has a current budget of €900 Million, which is secured for ten years.

With the goal to bring scientific communities together to eventually provide science-driven data services, the infrastructure also aims to contribute to the development of EOSC and to connect German data infrastructures with European and international platforms. NFDI is the mandated member in the EOSC Association for Germany<sup>31</sup>.

The NFDI is a close interaction of two entities. On one side there is the NFDI association, which is the registered legal entity that receives funding for staff and offices. It's headed by a directorate that has the main goal to coordinate a network of organisations and these organisations organize themselves into consortia.

On the other hand are the Consortia. Over three funding rounds, starting with calls for proposals in 2019 and 2020 and accompanied by the DFG<sup>32</sup>, consortia were invited to develop a portfolio of FAIR data services oriented along scientific disciplines or communities. A third call is being prepared for 2021.

The NFDI consists of a number of consortia which are associations of universities, non-university research institutions, departmental research institutions, academies, and other publicly funded information infrastructure institutions or other corresponding actors. As of this writing 9 consortia are in operation with 18 more awaiting formal approval. Each consortium will develop and offer a service portfolio for research data management for its subarea. Proposals and the consortia of NFDI must comply to the requirement of describing how they will connect with international developments, such as EOSC, and how they plan to ensure compliance with the FAIR principles<sup>33</sup>.

In addition to the scientific consortia that work on a thematic basis, project structures will be established that are primarily concerned with the construction of a horizontal technical infrastructure. The organisation of these basic services has not yet been finalised, but they will in any case link up with existing European organisations such as EOSC.

#### Consortia as members of the NFDI association

There will be two kinds of consortia. One, which is usually called "NFDI consortium", is funded by the DFG. In a scientific selection process that is principally and legally separate from NFDI, funding consortia are formed. Candidate consortia write a proposal to be submitted to the DFG, which is then carefully reviewed by a number of international evaluators. Based on this evaluation, a list of consortia is proposed by the DFG to the GWK. It's the GWK that makes the actual approval. This

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<sup>30</sup> <https://www.gwk-bonn.de/en>

<sup>31</sup> Because of procedural steps the German DFG is currently a placeholder for this role until the earliest General Assembly of the EOSC Association.

<sup>32</sup> <https://www.dfg.de/foerderung/programme/nfdi>

<sup>33</sup> <https://www.eosc-pillar.eu/establishing-fair-data-services>

procedure guarantees a research driven process, where researchers select which consortia are eligible for funding. The GWK, the political representation, can only approve or disapprove but they cannot add or change proposals.

This first type of DFG funded consortia will be transformed into the second type, which is a consortium that exists within the NFDI association. This step is necessary because German law requires that membership in an association is voluntary, so the NFDI directorate cannot force anyone to become a member of an association. NFDI cannot expect that the DFG funded consortia become members of the NFDI association. Therefore, the directorate must show the benefits of participating in the coordinating activities that it conducts within the association. The members will become subsidiaries in the NFDI association.

Currently, NFDI is building a network of researchers and is building cooperations with existing organisations and initiatives such as MDI, DFN, GAIA-X and National Initiatives as well as with EOSC. Only in the near future, NFDI is foreseen to play a central and active role in building up a federated data infrastructure in Germany. This means that today, NFDI consortia, although representing the building blocks of a new national data infrastructure, cannot be compared with the regular and established infrastructures. On the other hand, because NFDI today fulfils a central role and at the same time encompasses all existing scientific communities it is interesting to learn how the existing scattered landscape will be transformed in a collaborative interoperable data environment.

## 3.7 Italy

### 3.7.1 Results from the National initiatives survey in Italy

In the NIS conducted by WP3, of the 134 Italian e-infrastructures, 91 (68%) are considered “established” since they either are part of an official roadmap and/or a European organisation. In absolute numbers, no other country has such a large group of established e-infrastructures in the survey (in the second-ranked Germany “only” 44 e-infrastructures are “established”).

Of these 91 organisations, 78 (86%) indicated to provide services as data repositories, 25 (27%) as HPCs and 6 (7%) as high-bandwidth networks. These figures correspond to the pattern observed also in all other countries.

73% of the 91 established e-infrastructures in Italy don’t need to take care of their integration into EOSC on their own, but will receive support from affiliated organisations. This figure is the largest of all countries and substantially larger than the mean across countries (which lies at 52%). Hence, we observe that established e-infrastructures in Italy are benefitting from support from affiliated organisations regarding the integration into EOSC more than e-infrastructures in any other country.

On a service level, 99 providers are part of the dataset for Italy. For most user groups, the percentages of frequent users are similar to the average values. Students and commercial institutions are an exception since they use services slightly less frequently compared to the average figures (respectively -9 percentage points and -10 percentage points).

### 3.7.2 Results from the interviews in Italy

In Italy we’ve selected the Mandated Organisation, ICDI (Italian Computing and Data Infrastructure), and five well-established stakeholders operating National thematic research infrastructures, which, as members of the ICDI network, are very much interested in playing an active role in EOSC and federating their services in the context of EOSC, e.g. national nodes of ESFRI infrastructures:

1. the Italian node of BBMRI-ERIC (Biobanking and Biomolecular Resources Research Infrastructure – European Research Infrastructure Consortium);
2. Elettra - Sincrotrone Trieste, an open RI, that is the Italian node in CERIC-ERIC (Central European Research Infrastructure Consortium)
3. INAF, the Italian National Institute of Astrophysics, a RI connected with many global RIs
4. INFN, the RI for High Energy Physics in Italy, playing a fundamental role in many EOSC-related projects
5. CNR, the National Research Council of Italy, playing a key role in many RIs and EOSC-related projects and initiatives;

They have been selected to span different research disciplines and because they represent organisations already familiar with the challenges of the EOSC. ICDI will be able to continue the consultation in order to collect further requests and fill the gaps for the consolidation of EOSC at national level. EOSC-Pillar could support in organising together with ICDI a series of meetings and information days on EOSC, including through the EOSC-Pillar Ambassadors campaign.

### 3.7.3 Overview of the major National initiatives in the country

#### **BBMRI.it - Biobanking and BioMolecular resources Research Infrastructure**

BBMRI.it is the Italian node of BBMRI-ERIC<sup>34</sup>, a European research infrastructure for biobanking. It has been established with a joint effort by the Ministry of Health and the Ministry of University & Research and it involves ISS (National Institute of Health), CNR, Universities, Hospitals, IRCCS - institutes of health care and research - and Patient organisations - POs. It brings together all the main players from the biobanking field – researchers, biobankers, industry, and patients – to boost biomedical research and to make new treatments possible.

BBMRI.it is a highly data centric infrastructure, based on biobanking that stores biological tissues that are linked to patient data. Each tissue sample is the material element that represents the health status of a patient throughout his/her life and illness. These samples can be also linked to research data. It is a distributed research infrastructure including biobanks, biological resource centers (BRCs) and sample collections, located in different Italian regions.

Regarding the access mechanisms, BBMRI has an harmonised access procedure to samples and data at the Pan-European and national levels. But not all the 97 biobanks connected to the Italian node are compliant with the European policy and governance, which provides guidelines for shared access profiles. Meanwhile data are all compliant with the FAIR principles.

#### **ELETTRA - Sincrotrone Trieste**

Elettra - Sincrotrone Trieste S.C.p.A. is a non-profit Share Company (Società Consortile per Azioni) of national interest pursuant to Law 370/99 of the Italian Republic. The company, which was established in 1987, manages the synchrotron light source Elettra and the free electron laser FERMI. It is supported by state funding as agreed between the Autonomous Region Friuli Venezia Giulia and the Ministry of Education, Universities and Research. Shareholders of the company are the Consortium of the Trieste Science and Technology Research Area (53,70%), the Autonomous Region of Friuli Venezia Giulia (37,63%), CNR (the Italian National Research Council, 4,85%) and Invitalia Partecipazioni S.p.A. (3,82%).

Elettra is an open research infrastructure, with half users from Italy and half users worldwide. More than 300 researchers work at Elettra. It is the representative entity of Italy in CERIC-ERIC<sup>35</sup> (Central European Research Infrastructure Consortium) and it hosts data services for all partners of CERIC-ERIC. As an example, the Austrian Academy of Sciences at the University of Graz loads its data in the Elettra storage servers (a 60 PB library is available for long term data preservation). It has 2 accelerators and 35 light lines. Only part of these 35 lines are offered to CERIC-ERIC. The ICT services are data catalogues, computing and storage services. Elettra provides a DOI service, based on Data Cite, for itself and for CERIC-ERIC. Each dataset is associated with a PID. After 3 years of embargo the datasets become open. Elettra is also part of ICDI and of the EOSC Association. Elettra has two kinds of users: private (<5% of beam time) and public. Public users are selected through a competition based on a peer review.

<sup>34</sup> <https://www.bbmri-eric.eu>

<sup>35</sup> <https://www.ceric-eric.eu>

### **INAF - The Italian National Institute of Astrophysics**

INAF is a national research infrastructure collaborating with the International Virtual Observatory Alliance (IVOA, <https://www.ivoa.net/>) and several other intergovernmental organisations and projects such as for example the European Southern Observatory (ESO), the Square Kilometre Array Observatory (SKAO) and the Cherenkov Telescope Array (CTA). INAF manages two ICT infrastructures: CHIPP (Calcolo HTC in INAF – Progetto Pilota) and IA2 (Italian center for Astronomical Archive). They are not yet connected with EOSC, but there are mid-term plans to do it, when it will be more clear which services are relevant for EOSC. INAF was approved as a provider in the EOSC Portal on May 11, 2021.

The access mechanism depends on the infrastructure: it is based on peer review for CHIPP, while there is free access for IA2.

The infrastructure is distributed across different INAF units, based on a human network and not outsourced.

### **INFN - The Italian research infrastructure for High Energy Physics**

INFN is part of the international infrastructure supporting High Energy Physics (HEP) experiments. INFN manages and operates an ICT infrastructure supporting not only HEP experiments but other INFN research activities; there is interest in connecting this infrastructure to EOSC as part of a federated environment supporting with similar ICT tools a variety of multi-disciplinary activities. Some services have already been onboarded into the EOSC catalogue. So far, the access is based on membership's policy, with a small fraction of the resources in wide non-priority access.

INFN has both hardware distributed computing and storage infrastructure, but also a widely distributed human network of know-how on implementing highly distributed and scalable computing and storage infrastructures. Its infrastructure and services are open to other communities based on policy. The INFN-Cloud infrastructure<sup>36</sup> federates resources belonging to different administrative domains, and there are plans to federate additional external resources.

### **CNR - The National Research Council of Italy**

CNR is the largest public research institution in Italy, consisting of 88 research institutes called to perform research, promote innovation and competitiveness of the national industrial system, promote the internationalization of the national research system, provide technologies and solutions to emerging public and private needs, advise Government and other public bodies, and contribute to the qualification of human resources. It plays a key role in many thematic Research Infrastructures as well as in horizontal data infrastructures. Regarding Thematic Research Infrastructures: CNR is coordinating the development of Research Infrastructures (e.g. SoBigData<sup>37</sup>); CNR is hosting the national node(s) of several Research Infrastructures (e.g. ACTRIS, CLARIN, DARIAH, ELIXIR, Lifewatch). Regarding horizontal data Infrastructures: CNR is leading the development of the D4Science Infrastructure<sup>38</sup> (an eInfrastructure serving diverse Research

<sup>36</sup> <https://www.cloud.infn.it>

<sup>37</sup> [www.sobigdata.eu](http://www.sobigdata.eu)

<sup>38</sup> [www.d4science.org](http://www.d4science.org)



Infrastructures, communities of practice and initiatives by providing a rich array of services facilitating the implementation of open science practices<sup>39)</sup> and hosting the primary site and headquarter; CNR is also driving the development of the OpenAIRE Infrastructure<sup>40)</sup> (a pan-European infrastructure offering services promoting the implementation of open science and monitoring) and operating the Italian node. Many of the services offered by these infrastructures are contributing to the implementation of the European Open Science Cloud (and many more they will contribute to it in future).

<sup>39)</sup> D4Science is enacting the development of Thematic Research Infrastructures: e.g. ARIADNE (ariadne-infrastructure.eu), Blue-Cloud (www.blue-cloud.org)

<sup>40)</sup> www.openaire.eu

### 3.7.4 Details on the Mandated Organisation

ICDI (Italian Computing and Data Infrastructure) is the Italian Mandated Organisation in the EOSC Association, appointed by the Italian Ministry of Research, encouraging and extending Italian participation in EOSC and the development of National Initiatives consistent with EOSC. ICDI started as a collaboration agreement between the most important research organisations such as the CNR, INFN, ENEA, CINECA, INGV, Elettra, INAF, OGS with the aim to collaborate in new projects and to coordinate their participation in EOSC. Thanks to ICDI, Italy plays a leading role in the development of the EOSC, since ICDI was one of the four founding members of the EOSC Association AISBL.

ICDI currently has the form of a MoU<sup>41</sup> signed by 17 organisations, but more are joining and the plan is to set up a legal entity by the end of 2021. Albeit in a preliminary form, they have set up basic governance and representation and kickstarted several activities. In the meantime, GARR, the Italian NREN, is representing ICDI in EOSC as the Mandated Organisation for Italy. Actually ICDI is managed by a General Assembly formed by two representatives from each partner of the MoU.

Besides the MoU participants, ICDI mobilizes a wide community which includes most of the representatives of Research Infrastructures and e-Infrastructures of national interest<sup>42</sup> as well as the Italian delegates in ESFRI and the representatives in the EOSC Steering Committee. The activities towards this wide community include convening periodical meetings, offering training and information related to OS and EOSC topics, and carrying out consultations.

ICDI is planning to manage a national e-infrastructure serving all the Italian research and academic institutions. Its access method as well as its service portfolio has still to be defined: an internal task force is analysing methods and opportunities. The infrastructure aims at federating resources and services belonging to different administrative and scientific domains and plans to federate its services with other organisations, mostly using common APIs, AAI solutions, and a common service catalogue.

In the long term, ICDI aims to create a national coordination body that is representative of Italian infrastructures and interacts with national and European institutions on their behalf.

To promote community engagement, ICDI set up some task forces dedicated to topics of interest to the Italian community<sup>43</sup>:

- the Italian Federated Cloud Platform Task Force to develop a strategy and identify adequate technical solutions to create a federated cloud dedicated to research on a national scale;
- the Italian Competence Center for EOSC Task Force<sup>44</sup> to set up a national Competence Center and a platform to federate, coordinate and further disseminate the existing competences within Research organisations, Infrastructures and Universities that are part of the Italian Open Science community.

<sup>41</sup> The MoU was started in January 2020 and has a duration of five years

<sup>42</sup> see the members' list at <https://www.icdi.it/en/about/members>

<sup>43</sup> <https://www.icdi.it/en/activities>

<sup>44</sup> <https://www.icdi.it/en/activities/tf-cc>

- the Clinical Data Management Task Force<sup>45</sup> to build a support platform among the infrastructures for the management of clinical data, with a special focus on data related to COVID-19, contributing to the European COVID-19 platform, and creating a Proof of Concept that can be used for sharing biomedical data relating to other pathologies.

ICDI is responsible for collecting information on specific topics related to Open Science and EOSC activities, both on its own initiative and in response to requests from the MUR and the Italian delegations in ESFRI and EOSC, with the aim of improving the knowledge of the scenario of Italian research and digital infrastructures. A recent example of this documentation action is the survey on free access to infrastructural resources for research on SARS-CoV-2 and COVID-19 in Italy.

Moreover, ICDI sets up Shadow Working Groups, composed of experts, who are discussing and providing feedback to the Italian delegates participating in the EOSC Advisory Groups. This activity allows the ICDI community to share the strategies and directions of the EOSC and to create a virtuous mechanism of bottom up participation.

The National Plan for Research Infrastructures and the National Plan for Open Science (NOSP), integrated in the new National Research Programme 2021-27 [7] of the Ministry of Universities and Research, recognizes the role of ICDI to create the conditions for Italy's full participation in European and international open science processes.

The NOSP involves the whole research network, the Research Infrastructures, the public research and universities at large to:

- adopt advanced management of research data and services needed to extract knowledge from the data and to support computing and networking needs;
- support the training and recruitment of qualified data scientists for the development of architectures and services, and of data stewards for the curation, description, identification and archiving of datasets;
- encourage the adoption of Data Management Plans (DMPs) for the management of legal aspects, contributing to the implementation of the EOSC<sup>46</sup>;
- disseminate methods and protocols for data, archives and services quality and for the regulation of ethical and legal aspects.

The NOSP supports the ICDI Competence Center, as a driving and coordinating hub for training initiatives in all aspects of open science, as an essential activity for the full involvement of the national scientific community into EOSC.

So far all the ICDI activities are done as in-kind contributions, and each organisation is supporting their persons on a voluntary basis. The plan is to set up a staff that could be dedicated to carry on the different activities, also in relation to the implementation of the NOSP.

<sup>45</sup> <https://www.icdi.it/en/covid-19>

<sup>46</sup> Implementing the EU Directive 2019/1024 of 20 June 2019 on the openness of data and re-use of public sector information and, in particular, Article 10 specific to research data

## 4 Actions to support the consolidation of National initiatives

After a thorough analysis of the possible options to support the consolidation of the National Initiatives, the following main actions were identified as more promising and with the possibility of being effective along two different lines: direct and indirect support to the National Initiatives.

The action for direct support concerns the interaction, and possible mutual support, among the National Initiatives in the EOSC-Pillar countries. From the information gathered through the various actions described in the previous chapters, it emerged that their status is quite different, ranging from more advanced initiatives, such as ICDI in Italy, to less advanced ones in other countries. What could then be beneficial to all of them is the possibility to exchange information, experience and expertise concerning a lot of items related to the set up and management of a National Initiative as well as to discuss the main issues and difficulties which may be encountered along that journey.

This exchange of information could happen if the reference people of the National Initiatives can interact among themselves through a communication channel, becoming part of a network.

EOSC-Pillar can facilitate the creation of such a network, by both providing some communication tools and taking the lead to start the process. This could be achieved by first creating a small team within EOSC-Pillar with expertise and experience on the most relevant subjects, such as policy, formal agreements, technical solutions, etc. This team can start the process by identifying the National Initiatives reference people interested and by setting up a first plenary meeting. The process can then continue with further plenary meetings, as well as with bilateral, multilateral or thematic meetings according to the needs and requests of the participants. If successful, this activity can be very fruitful to help National Initiatives to progress on their consolidation.

The indirect support is strongly related to two already ongoing activities defined within EOSC-Pillar Work Package 2, i.e. the Ambassadors programme and the interaction with the Italian Ministry of research.

The EOSC-Pillar Ambassadors Programme aims at fostering exchanges and discovery through the creation of a community in the context of EOSC-Pillar. This programme was initiated following the survey analysis showing medium to low familiarity with EOSC on an institutional level with the idea to produce a communications kit designed to be reproduced even with a desktop printer allowing interested supporters to promote EOSC at a grassroots level. Although EOSC-Pillar focus is on the Austrian, Belgian, French, German and Italian communities, the programme aims at sharing the materials with the entire research ecosystem. The EOSC-Pillar Ambassadors Programme is open to all the professionals dealing with Open Science at research institutions, universities, ministries and local governments, and the private sector. The main goal is to support researchers to get a deeper insight into EOSC.

The team already considered the possibility that the materials of the programme could be adapted to different situations and needs for use and for dissemination and this is exactly the point where task T4.3 (“Consolidation of National Initiatives”) action can connect.

Since the current Ambassadors programme materials on EOSC are quite general, they could be complemented with additional materials showing what are the benefits, services and tools available to researchers in EOSC. Raising the end users (researchers) awareness of the EOSC may be an indirect contribution to strengthen the National Initiatives, specifically for their connection to the EOSC.

The second indirect action is based on an ongoing activity in Italy.

EOSC-Pillar T4.3 is committed to providing a more precise and detailed picture of the evolving status of the National Initiatives and the Mandated Organisation in Austria, Belgium, France, Italy and Germany, making the relationship with the EOSC-A and the Steering Group more fruitful. Along this line, upon the invitation of the Italian Ministry of Research, the T4.3 team started a collaboration with the ERA-Learn project<sup>47</sup>, which has been actively supporting the partnerships in exchanging views and experiences about creating synergies between different funding sources, namely Horizon 2020 and the European Structural and Investments Funds<sup>48</sup> (ESIF). T4.3 conducted a study on synergies between ESIF and the EOSC Partnership. This synergy was also stressed in the SRIA and it is a topic of interest for National Initiatives, as it potentially unlocks more resources for them to contribute to EOSC.

In July 2020 EOSC-Pillar organised, in collaboration with the NI4OS Project, a Webinar on synergies and complementarities between Horizon 2020 and ESIF<sup>49</sup> and launched an on-line open consultation addressing participants in the EOSC Regional Projects with the aim to identify experiences of synergies that could inspire the design of the new EOSC partnership under Horizon Europe.

As a result of this activity [8], several experiences that have set the pre-conditions, especially in terms of research capacity and availability of infrastructures, for the establishment of EOSC including examples of synergies at both national and regional levels have been identified. The nature and the scope of all the EOSC-focused initiatives was mainly to either set new or empower existing e-infrastructures and computing infrastructures. Complementary regional and national projects aimed basically to increase computing capacity, expand the interconnection of national networks and improve the e-services of the public administration. The analysed initiatives led to strengthening of the national/regional infrastructures and capability. This activity could be continued and expanded to encourage efforts on synergies and the experience and expertise gained so far is considered very important to ensure effectiveness for the consolidation of the National Initiatives.

The actions described in this chapter will be the focus of task T4.3 activities in the last part of the EOSC-Pillar project and the concrete ways to implement them will be discussed by the T4.3 team jointly with the other project teams interested in this.

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<sup>47</sup> <https://www.era-learn.eu>

<sup>48</sup> [https://ec.europa.eu/regional\\_policy/en/policy/what/glossary/e/esif](https://ec.europa.eu/regional_policy/en/policy/what/glossary/e/esif)

<sup>49</sup> Webinar “Synergies between Horizon and European structural and investment funds in EOSC Partnership 20 July 2020” <https://www.eosc-pillar.eu/events/webinar-synergies-between-horizon-european-structural-investment-funds-eosc>



## 5 Conclusions

The activities defined in chapter 5 to support the consolidation of National Initiatives seem promising but of course they cannot be exhaustive because this process in the different EOSC-Pillar countries depends on various factors, most of them beyond the boundaries and area of action of this project.

In addition, the activity of identifying National Initiatives to foster their formation, development and participation in EOSC is carried out by several projects, such as the other regional projects of the INFRAEOSC-05 call.

The TTF consultation conducted by the EOSC-Pillar project was also analysed by the EOSC Secretariat, which conducted a 'Study on EOSC engagement mechanisms at national level' last June, which will be soon published.

T4.3 will also continue to support the consolidation of National Initiatives by promoting discussions with other regional projects within the Landscaping Task Force<sup>50</sup>, as well as with new projects and initiatives, such as EOSC Future and the EOSC Association, linking to the monitoring activities of National Initiatives, carried out by the Steering Board.

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<sup>50</sup> The projects supported by the INFRAEOSC-05-2018-2019 call (Call5), i.e., EOSC-Synergy, EOSC-Pillar, EOSC Nordic, NI4OS-Europe, ExPaNDS, FAIRsFAIR, and EOSCSecretariat.eu signed a Collaboration Agreement in 2020. Since then, these projects have been actively involved in joint activities.

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