



Periodic progress report

September 2019 to February 2021

Document Control Information

Settings	Value
Document Identifier:	D1.8
Project Title:	ExPaNDS
Work Package:	WP1
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Responsible Partner:	DESY
Doc. Issue:	1.0
Dissemination level:	Public
Date:	30/04/2021

Abstract

This document presents the progress of the ExPaNDS project after its first 18 months of activities, spanning from September 2019 to February 2021. It reproduces the explanation of the work carried out by the ExPaNDS partners as provided to the European Commission in the first periodic report of the project.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857641.

Executive Summary

The ambition of ExPaNDS is to guide the national Photon and Neutron RIs, with their highly diverse scientific communities, towards the EOSC. In order to extend this work to the pan-national (ESFRI) facilities, ExPaNDS is closely collaborating with the H2020 PaNOSC cluster project on a variety of topics.

The leading objective of both projects is to enable “Open Science” for the PaN community by making the majority of their data “open”, following the FAIR principles.

To achieve this goal, ExPaNDS promotes the use of data policies at the national PaN facilities by drafting prototype frameworks and by providing consolidation in implementing data policies and in consequence Data Management Plans at the beamlines. Within the first 18 months, the partners established a draft framework for national RIs data policies mainly based on our previous PaN common policy framework on scientific data, the PaNOSC data policy framework for ESFRIs and FAIRsFAIR’s recommendations for policy enhancement. We are now engaging with the policy makers at each of our facilities to discuss the draft framework and its concrete implementation.

To ease the re-use of data within the PaN domain and ideally beyond, the project defined ontologies for the PaN science domain and supports the integration of those ontologies into existing frameworks. At the time being, PaN ontologies were successfully integrated into the BioPortal of the National Center for Biomedical Ontology. This portal will, in the end, be accessible through the EOSC marketplace.

In order to allow high level scientific search engines, like OpenAire or B2FIND, to harvest metadata of data-sets at the facilities, ExPaNDS partners are working on implementing open harvesting protocols into the facility specific catalogue systems. Metadata for an initial set of facility datasets is already being harvested by B2FIND, which is available through the EOSC marketplace.

Complementary to the work on enabling global harvesting of PaN metadata, the project is preparing for a European-wide federation of the above mentioned local catalogue services, allowing for interactive usage of complex search patterns. Partners of ExPaNDS and PaNOSC defined a specialised search API, customised to PaN needs. The first version of the search API was successfully released.

The activities described above guarantee that the entire data treasure of PaN science in Europea can be browsed and resulting datasets can either be reused for different purposes or previous results can be verified.

As one of the goals of the EOSC is to perform the analysis or the reuse of data at different facilities or even at a horizontal infrastructure, as provided by our partner EGI, automated data transfer tools must be provided. On that topic ExPaNDS is collaborating with the “Data Lake” work package of the ESCAPE cluster project with which ExPaNDS organised a workshop to present the PaN use cases.

After the data is detected, an appropriate analysis facility is found to which the data is finally transferred. The last step is to ensure that scientific algorithms can be executed unmodified



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at different facilities producing the same results. For that purpose, ExPaNDS investigates in harmonizing interfaces to the various compute methodologies, like Virtual Machines, Containers, Jupyter notebooks or HPC batch systems. A technical workshop was organized to collect the available compute components at the facilities and to define further steps along the ExPaNDS DoA to make those services ready to be integrated into a PaN portal, delivered by PaNOSC. This portal will finally be linked from the EOSC marketplace. In preparation of a demonstrator, ExPaNDS was able to show that the same notebook could analyse datasets at PSI, MAX IV and through the EGI horizontal compute infrastructure: the FedCloud.

Working at a PaN facility with the already discussed large variety of scientific disciplines and technologies requires a broad and deep knowledge of the domain, which needs to be updated frequently, as PaN facilities are working at the edge of modern science. This assumes high quality teaching material but at the same time an easy-to-navigate and centrally accessible teaching platform. Although the corresponding work package only started at month 12, ExPaNDS partners are already evaluating a very promising professional open source platform for this purpose.



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1. Objectives

The specific objectives for the project as described in section 1.1 of the DoA are listed in this section, with a description of the work carried out during the first period of ExPaNDS towards the achievement of each listed objective.

Objective 1.	To deliver the EOSC to the wide variety of Photon and Neutron users
Description (DoA)	The EOSC offers an opportunity to improve the availability and effectiveness of data services for users to deliver their science. ExPaNDS aims to develop and deliver capability within the EOSC, which can be utilised across the user base.
ExPaNDS action	The architecture of ExPaNDS technical services is designed to improve the experience of PaN users when using our EOSC services. The architecture was articulated in WP3 (data catalogues) and WP4 (data analysis) in a roadmap and common best practices. To raise awareness of EOSC in the PaN community, ExPaNDS was presented at Soleil's user meeting in January 2021. Our WP6 team represented the project at many other PaN facilities user meetings, discussing EOSC with PhD students and scientists coming to our booth, may it be virtual or not.
KPI	11 300 scientists reached by ExPaNDS dissemination in the first period
Objective 2	To enable FAIR scientific data at European national RIs
Description (DoA)	Data sharing within the EOSC by national RIs requires the enabling and adoption of FAIR data principles and practices within RIs, for managing and publishing data within the EOSC. A FAIR data framework of policies, practices and guidelines tailored to the Photon and Neutron domain will be developed in consultation with national RIs and their user communities which they in turn will adopt.
ExPaNDS action	Several steps were taken to update the data policies of our facilities towards FAIR practices: <ul style="list-style-type: none"> - ExPaNDS was highly involved in the update of the PaNdata policy framework led by our sister project PaNOSC, where the RDA maturity model was applied. - We extended this framework to our national facilities, notably providing 30 key elements for a data policy for national PaN RIs and applying the FAIRsFAIR Recommendations for Policy Enhancement. - We are now consulting policy makers at our facilities to discuss the refresh of their data policies. In addition to policy work, a draft metadata framework and accompanying recommendations for FAIR PaN data management were produced, providing a list of the potential metadata available at each step of an experiment. Metadata fields were prioritised using the RDA data maturity model priority flags.
KPI	The initial landscaping survey of ExPaNDS facilities showed that: <ul style="list-style-type: none"> - 3/10 facilities data policy explicitly mention FAIR and DMPs - 1/10 facilities offer training related to FAIR data



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Objective 3	To make national RI data accessible to user communities via the EOSC
Description (DoA)	National RI FAIR data will be made accessible and shareable across wide user communities to ensure RI's data catalogues conform to common standards and APIs and made available within the core EOSC Portal and data search services. This will make data more accessible to existing and potential new user communities, offering new opportunities for more effective data exploitation and reuse, and provide innovative data and catalogue services for the Photon and Neutron community and beyond.
ExPaNDs action	ExPaNDs has helped facilities using community data catalogues (SciCat and ICAT) to standardise the external interface to their open data and thus enable their harvesting by community tools (B2FIND, OpenAIRE or any other aggregator using the OAI-PMH standard interface). For the data to be efficiently searchable and interoperable, significant effort was put into defining PaN techniques ontologies. A script was also developed to make NeXus (a community standard for file formats) terms "FAIRer", e.g. providing them with unique identifiers.
KPI	The overall progress of our facilities towards a FAIR catalogue was evaluated in October 2020 as 45% (see details ¹).
Objective 4	To enrich the set of data services available in the EOSC with services from national RIs
Description (DoA)	National RI FAIR data processing and analysis services targeted at specific user communities will be made available and shared across wide user communities by ensuring RI's data services conform to common standards and APIs and will be made available within the EOSC Portal services. This will make services more accessible to existing and potential new user communities, allowing access to the tailored, scalable services to a wider community, offering new opportunities for more effective data analysis.
ExPaNDs action	The candidate PaN analysis services to be made available in EOSC were selected with their associated reference datasets, which are accessible ² . They were selected based on their added value and relevance to both EOSC and the PaN user community. ExPaNDs partners committed to populate the PaN software catalogue which has since been registered as an EOSC service ³ by our sister project PaNOSC.
KPI	11 open access "reference" datasets published

¹ <https://doi.org/10.5281/zenodo.4146819>

² <https://doi.org/10.5281/zenodo.4558708>

³ <https://marketplace.eosc-portal.eu/services/panosc-software-catalogue>



Objective 5	To raise the level of awareness and competence in FAIR data practices within user communities
Description (DoA)	FAIR data publication, data sharing and the potential value of sharing services and resources within the EOSC are not familiar to the wider user community served by national RIs. ExPaNDs seeks to raise the awareness of the potential benefits of FAIR data sharing within the EOSC by engaging with different stakeholder communities, particularly user groups. This will offer advocacy, guidance and training to raise the level of awareness and competency of FAIR data practices and use of shared services within the EOSC.
ExPaNDs action	Advocacy of FAIR practices for facilities and facility staff was the key aim of our October 2020 training workshop series focused on FAIR. FAIRsFAIR contributed to the first workshop and reported on it very positively ⁴ . A “best practices sharing” workshop was also organised on the topic of DOIs/PIDs for data. Several PaN facilities (STFC, HZDR, PSI, HZB, ILL, ESRF) shared examples of practice at the workshop. This led to a set of key points that we will build on in the next period as part of our task on PIDs.
KPI	115 participants for the first session of the workshop on FAIR (01/10/2020), 87 for the second session (02/10/2020).

4

<https://www.fairsfair.eu/articles-publications/fairsfair-fair-facilities-workshop-expands-blogpost-elizabeth-newbold>



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Objective 6	To engage with the EOSC programme to empower national RI user communities and to maintain sustainability
Description (DoA)	In order to fully realise the potential gains from FAIR data sharing within the EOSC, the national RI community needs to engage with the broader EOSC programme to understand the potential synergies with activities across the EOSC, deliver their benefits back to the national RI communities, and to feedback experiences and requirements to influence the further development of the EOSC. ExPaNDs will participate in the emerging governance structures of the EOSC (e.g. Executive, Stakeholder forums, technical Working groups) to ensure it is represented within the evolution of the EOSC. Further, ExPaNDs will participate in the work undertaken within a wide variety of EOSC activities.
ExPaNDs action	<p>To influence the development of the EOSC in the direction that will be most useful and sustainable to our PaN communities, we have participated in the organisation of two ESFRI-clusters workshops on EOSC where we presented the ExPaNDs position on EOSC (January 2020) and both ExPaNDs and PaNOSC (October 2020). We directly contributed and provided feedback to several EOSC working groups outputs, notably on Architecture, Sustainability and FAIR, as well as in the EOSC glossary.</p> <p>Following the SRIA consultation in summer 2020, and in addition to our initial position paper on EOSC⁵ written with the regional projects, we published an article with PaNOSC⁶ covering four user-oriented actions we thought the EOSC should consider.</p> <p>To detect synergies, our privileged channel has been the INFRA-EOSC-5 task forces. Thanks to these we are e.g. experimenting the use of the Tess training platform for our project and we have used FAIRsFAIR recommendations in our work on data policy.</p>
KPI	<p>9 direct feedback provided by ExPaNDs to EOSC-related consultations in the first period</p> <p>2 partners in the EOSC Association in Nov. 2020 (Elettra, DESY)</p>

⁵ <https://doi.org/10.5281/zenodo.3831561>

⁶ <https://expands.eu/2020/09/21/expands-and-panosc-position-paper-on-eosc/>



2. Work Package 1: Management and Sustainability

2.1. Objectives

The main objectives of this WP, as stated in the DoA, are:

WP1 is dedicated to the overall project administration and leads the project towards the successful achievement of its objectives on time. Furthermore it oversees the synchronisation of activities with the EOSC coordination structure. Another important task of WP1 is the overall architecture of the services and the compliance with the model of the EOSC-hub architecture. Special attention will be made to governing frameworks like the European Interoperability Framework (EIF) in order to ensure sustainability and future relevance.

2.2. Description of work done and role of partners

T1.1	Consortium coordination and project administration (DESY)
<p>The aim of this task is to coordinate the project team and administer the project in such a way as to ensure that the results are delivered with high quality within the time and budget constraints.</p> <ul style="list-style-type: none"> • Ensure establishing project structures and mechanisms at the project partners; • Ensure efficient communication between project partners (see task 1.4); • Conflict resolution; • Preparing the periodic activity reports requested by the EC; • Supporting the preparation of the EC reviews; • Meeting support and follow-up (e.g. recorder of minutes); • Guidance concerning IPR issues (Intellectual Property Right Management). 	

The Project Executive Board (PEB) gathering all WP leaders, technical and project coordinators is the main management structure of the project.

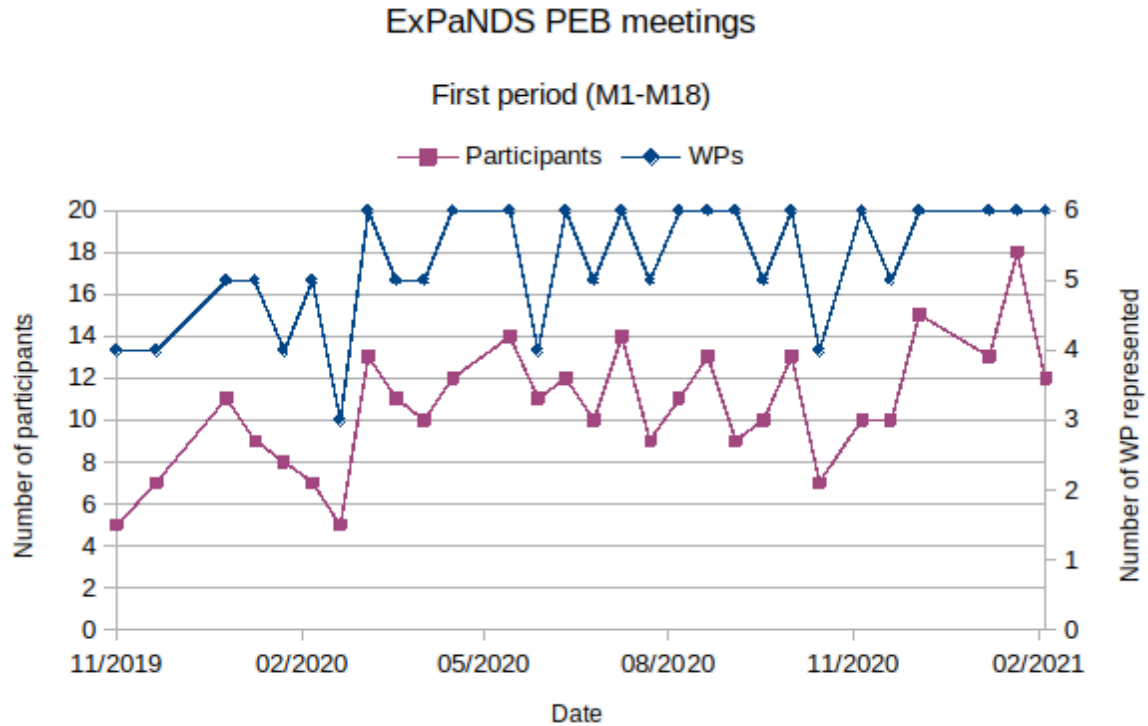
Meetings take place every second Tuesday since November 2019. WP1 (DESY) organises the agenda and records the minutes, which are all publicly available⁷. Following the risk analysis update, WP1 suggested occasionally extending the traditional PEB to all our partners. A first extended-PEB took place in early February 2021.

To keep track of the WPs' progress and alignment to their goals, progress reports are regularly issued. The progress reports are all publicly available⁸.

⁷ <https://expands-eu.github.io/WP1-reporting/pebs.html>

⁸ <https://expands-eu.github.io/WP1-reporting/reports.html>





Statistics on PEB meetings: dates, number of participants and number of work packages represented during the first period

To monitor technical progress and expenses for the first 9 months of the project, an interim report was conducted in June 2020. The significant impact of COVID-19 on ExPaNDS resources workload prompted the Consortium to request a 6-month extension of the project from the European Commission. WP1 (DESY) took care of the rescheduling of the project and of the amendment process itself. The extension and updated timeline of milestones and deliverables was approved by the EC in November 2020.

T1.2	Financial management (DESY)
<p>This task monitors resources and financial expenditure, including external financial transactions (e.g. buying-in 3rd party services or invoicing services delivered to 3rd party). It prepares the periodic financial reports to be delivered to the EC. They will include:</p> <ul style="list-style-type: none"> • Individual financial statements for each beneficiary and for the reporting period concerned; • Explanatory information on the use of project resources; • Periodic summary financial statement consolidating the claimed Community contribution of all the beneficiaries. 	

The first consolidated financial report was presented to the collaboration board in July 2020 and participated in the decision to request the extension. WP1 (DESY) is regularly monitoring recruitment updates from the partners since.

The first report on cumulative expenditure incurred by the partners was delivered in December 2020.



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For this first periodic report, DESY supported and consolidated the individual statements from our partners for the use of resources and worked with WP leaders to explain the deviations.

T1.3	Project Quality Assurance (PSI)
<p>The objective of this task is to establish and enforce effective management and quality procedures that will result in high quality project deliverables. The main activities are:</p> <ul style="list-style-type: none"> • Definition of a Quality Plan (tools, metrics), including specific measures to follow up the fulfilment of KPIs; • Encouraging and verifying that standards, procedures and metrics are defined, applied and evaluated; • Defining rules for professional software development applied by the work packages; • Definition of the process and procedures to: <ul style="list-style-type: none"> o Assess the work and achievements of the different WPs, o Review deliverables and reports, o Verify fulfilment of milestones, o Monitoring the risk and develop contingency plans, o Monitoring ethics and gender equality. 	

Since the proposal, the project's KPIs were refined with the WP leaders in June 2020 and in November 2020 by WP1 (PSI) and whenever possible, matched to PaNOSC's.

A first risk analysis was carried out by PSI and DESY in December 2019. The evaluation of likelihood and impact of identified risks was updated in June 2020 to integrate the effects of COVID and Brexit. A complete update was then carried out in November 2020 by WP1 (PSI) with PaNOSC's project manager. All risks and actions were reviewed and compared, triggering updates on both sides.

The quality assurance defined at the beginning of the project by PSI carries on being applied, notably with the internal review process of all deliverables orchestrated by WP1 (DESY).

T1.4	Internal communication (DESY)
<p>This task aims at ensuring and monitoring the communication between the WP and the project partners in order to achieve the project objectives on time and within the budget constraints.</p> <ul style="list-style-type: none"> • Setting up project boards and other project management elements and defining communication channels between those structures; • Providing and enforcing seamless communication between work packages; • Ensuring that there is clear and effective communication between partners; to detect management and technical issues as early as possible and bring them to resolution; • Providing the necessary communication tools for reporting, sharing of documentation, software and tools; • Providing the necessary (video, audio) conference tools; • Monitoring ongoing communication (e.g. meeting schedules, minutes) and performing corrective actions if necessary. 	



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The kick-off meeting of ExPaNDS was organised in September 2019 in Hamburg. Another important milestone for internal communication was the annual ExPaNDS/PaNOSC all-hands meeting from the 9th to the 11th of November 2020. WP1 (DESY) was part of the organisational committee along with WP6, ELI and both project coordinators. All minutes of this organisational committee are publicly available⁹.



Group photo at ExPaNDS kick-off meeting (11/09/2019)

All meetings ExPaNDS organised or was represented in are listed in appendix.

The following tools for internal communication were set up and are maintained by WP1 (DESY):

- mailing lists for each appropriate group (with details on how to subscribe¹⁰)
- shared calendar¹¹ for all ExPaNDS-related meetings and events
- a who's who file with contributors roles and contact details, kept in SharePoint for GDPR compliance

⁹ <https://github.com/panosc-eu/panosc/issues/53>

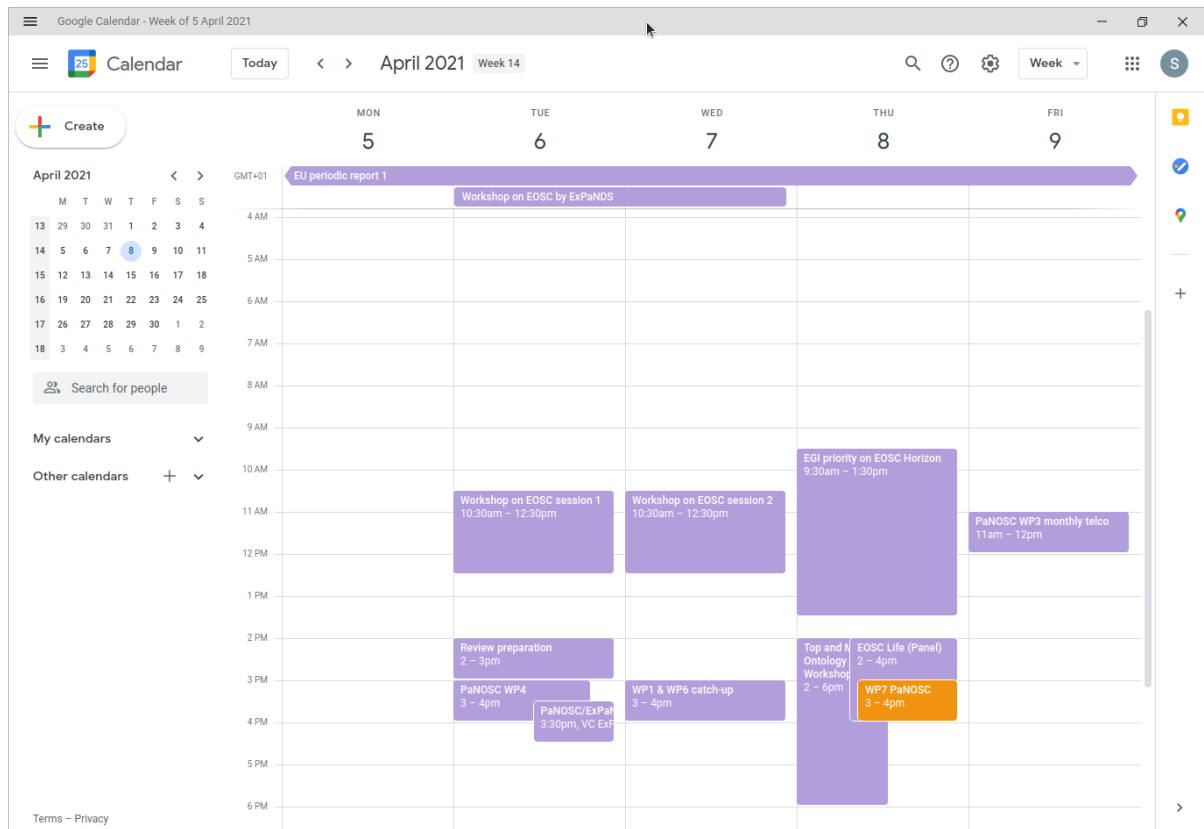
¹⁰ <https://github.com/ExPaNDS-eu/ExPaNDS/wiki/Mailing-lists>

¹¹

<https://calendar.google.com/calendar?cid=YWJnY3R2N3E5dnBvY2VhZzRnNnNndmrcjBAZ3JvdXAuY2FsZW5kYXluZ29vZ2xLmNvbQ>



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Screenshot of the ExPaNDS shared calendar

T1.5

Coordination with PaNOSC and EOOSC (EGI)

This task synchronizes activities of ExPaNDS with EOOSC structures in general and PaNOSC in particular. Activities include, but are not limited to:

- participating in the EOOSC Stakeholder Forum;
- working with EOOSC technical working groups in the areas of the ExPaNDS work packages;
- working with the EOOSC Executive Board to provide EOOSC Compliant services;
- liaising with other successful projects in INFRAEOOSC-05b to coordinate their work in developing the EOOSC;
- Alignment of the general architecture of the ExPaNDS services with the EOOSC architecture including EOOSC portals, EOOSC Marketplace etc.

Since the signature of the Collaboration Agreement with the other 5b projects in December 2019, WP1 (DESY) set up the involvement of ExPaNDS in the associated 'task forces' (TFs). We were also directly involved in the Sustainability Working Group of the EOOSC Executive Board (PSI) and are in the 'policies' (DESY) and 'onboarding' (EGI) TFs.



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EOSC symposium 2019 - all INFRA-EOSC 5 projects chairs (27/11/2019)

To influence the development of the EOSC in the direction that will be most useful and sustainable to our PaN communities, WP1 (DESY) wrote with the other 5b projects the position paper on EOSC for ExPaNDS¹², building on the paper published by PaNOSC in December 2019. It was presented along with the other ESFRI cluster projects at the ESFRI workshop on EOSC in January 2020 and published for the EOSC consultation day in May 2020.

In addition, WP1 (DESY) participates in the EOSC liaison platform and organises ExPaNDS feedback to relevant EOSC-related documents, like for example the EOSC assessment survey from the European Commission or the EOSC-hub core services specifications (EGI). In August 2020, WP1 (DESY) organised the project's answer to the SRIA consultation. To make our contribution to this important document more sustainable, we then published a subsequent article with PaNOSC¹³.

To make sure technical common work between ExPaNDS and PaNOSC is satisfactory and that communication is seamless, WP1 (DESY) participates biweekly in PaNOSC's PMC (which is the equivalent of ExPaNDS PEB) and has monthly meetings with its project manager. We also wrote and maintain a public wiki page mapping the activities in both projects¹⁴, following a suggestion made by our Project Officer.

Finally, the alignment of ExPaNDS' services with EOSC was at the centre of the technical architecture elaborated by WP1 (EGI) with WP3 and WP4. WP1 (EGI) delivered a presentation on the EOSC onboarding procedure to ExPaNDS technical WPs in July 2020. To align future services, WP1 (DESY) also made sure the EOSC interoperability framework was taken into account in the WP3 roadmap to federated data catalogues.

WP1 participated in several EOSC-related events, including the ESFRI-EOSC meeting in Oct. 2020 (acting as rapporteur), the EOSC governance symposium and organised a PaN session at the EGI conference 2020.

¹² <https://doi.org/10.5281/zenodo.3831561>

¹³ <https://expands.eu/2020/09/21/expands-and-panosc-position-paper-on-eosc/>

¹⁴ <https://github.com/ExPaNDS-eu/ExPaNDS/wiki/Mapping-ExPaNDS-and-PaNOSC-activities>



T1.6	Sustainability plans (PSI)
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This task will provide general best practice recommendations to enable the project's work packages to make their work sustainable beyond the end of the lifetime of the project. Furthermore, the task is monitoring sustainability activities of the different work packages and provides advice in cases needed.

WP1 (PSI) issued recommendations to each WP in the sustainability policy report¹⁵ to make their achievements persist after the end of the project.

The FAIR lady report issued by the EOSC Working Group on Sustainability was examined by PSI together with PaNOSC and discussed during the annual meeting. A common approach for the sustainability of technical WP outputs was also decided.

T1.7	Coordination of boards (DESY)
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This task will coordinate boards, like the Collaboration Board, the Technical Advisory Board and the EOSC Liaison Group. In particular it will oversee the selection of board members in accordance with the Grant Agreement and the Collaboration Agreement. The task will organise board meetings, it will provide input for board members from within the project and in return it will communicate board suggestions to the project members and it will follow up on the implementation of those suggestions.

The Collaboration Board is responsible for approving changes to the Consortium, effort allocation and any other deliberation affecting legally or financially the partners.



ExPaNDS first Collaboration Board meeting (12/09/2019)

WP1 (DESY) organised four Collaboration Board meetings in the first period and followed up on the decisions taken.

¹⁵ <https://doi.org/10.5281/zenodo.3715279>



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The Technical Coordination Board assists the Technical Coordinator in defining the technical strategy and in deciding on specific technical issues. The members of the Technical Coordination Board were nominated and endorsed by the CB, including a PaNOSC technical representative, all of which WP1 facilitated.

WP1 (DESY) helped the technical coordinator organise a workshop with the technical coordination board (TCB) on the portal deployment at our facilities in October 2020. The event gathered almost all technical contributors to ExPaNDS, PaNOSC and Calipsoplus. It enabled an important sharing of knowledge and progress of our different facilities, including live demos of the deployed portal. WP1 also contributed to the associated survey on infrastructure status and “cloud-readiness”.

T1.8	DMPs for the project and ethics of handling data (DESY)
<p>This task will develop a Data Management Plan for the project, including treatment after the end of the project’s lifetime. It comprises ORD pilot-related topics like description of data that will be collected, processed and/or generated, methodology and standards that will be applied, whether data will be shared/made open access and how data will be curated and preserved. The task also addresses:</p> <ul style="list-style-type: none"> • Security and authorised access; • Monitoring the treatment of any personal data; • Acknowledging provenance (when necessary); • Anonymising scientific data (related to humans). 	

An ExPaNDS community was set up in Zenodo in January 2020 and is used to make our public deliverables findable and accessible. The use of CC licences for ExPaNDS outputs is encouraged whenever relevant.

Partners are well aware of the precautions when handling personal data in surveys or registration forms. The handling of personal data for project management purposes is explained to each ExPaNDS contributor in the welcome message to all@expands.eu which was checked with DESY’s Data Protection Officer. A mailing list was set up (popd@expands.eu) to record consent from project participants to appear in photos on social media.

2.3. Outlook for WP1

Common standards for quality of software using e.g the SQAaaS services developed by EOSC-Synergy will be explored with the technical WPs in the next months. To align and discuss our integration into PaNOSC and EOSC, a workshop will be held the 6-7th of April 2021.

WP1 will work with WP6 to add the most prominent KPIs to the expands.eu website and to disseminate more on women in science, participating for example in the Women in Science initiative of neutronsources.org.

Most importantly and together with PaNOSC, WP1 will follow the technical developments in WP3 and 4 to help make their outputs sustainable. PSI’s position in LEAPS-IT will be leveraged to push for LEAPS and LENS to be key players in the sustainability of our products.



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2.4. Deliverables and milestones of the WP for the period

#	Deliverable	Partner	Due date	Actual date
1.1	Human resources allocation	DESY	30 Nov 2019	29 Nov 2019
1.2	Project Quality Assurance and Progress Monitoring Plan	PSI	31 Jan 2020	05 Feb 2020
1.3	Risk analysis and contingency plan	PSI	31 Dec 2019	17 Dec 2019
1.5	Communication Plan (internal + EC)	DESY	31 Dec 2019	23 Dec 2019
1.6	General Architecture in relation to the EOSC services	EGI	29 Feb 2020	05 Mar 2020
1.7	Sustainability policy report	PSI	29 Feb 2020	18 Mar 2020
1.10	Data Management Plan	DESY	29 Feb 2020	14 Feb 2020
1.11	Collaboration agreement(s)	DESY	31 Dec 2019	20 Dec 2019
7.1	POPD - Requirement No. 1	DESY	29 Feb 2020	29 Feb 2020
1.4	Risk analysis and contingency plan report	PSI	30 Nov 2020	27 Nov 2020
1.12	Financial report 1	DESY	31 Dec 2020	29 Dec 2020

#	Milestone	Partner	Due date	Actual date
1	Kick-off meeting	DESY	30 Sep 2019	11 Sep 2019
2	Management structure implemented	DESY	31 Oct 2019	31 Oct 2019
3	Report on quality assurance, risks and contingency plan	DESY	31 Dec 2019	05 Feb 2020
4	General architecture ready	DESY	29 Feb 2020	05 Mar 2020
5	First all-hands meeting organised	DESY	30 Nov 2020	11 Nov 2020
6	Successful completion of mid-term	DESY	28 Feb 2021	-



3. Work package 2: Enabling FAIR data for PaN national RIs

3.1. Objectives

The main objectives of this WP, as stated in the DoA, are:

The community of national Photon and Neutron RIs has its own barriers and opportunities for the uptake of FAIR data practices. By making data more Findable, Accessible, Interoperable and Reusable, facility users can manage their own data resources more easily, as well as share data with collaborators, increase the transparency and trust in their scientific processes. Practises vary within RIs. RIs issue data policies, typically with reference to the PaN-Data Data PolicyFramework (2011). However, these policies vary between RIs and their user communities. User communities typically have concerns over scientific confidentiality and priority and are not always aware of the best practise and benefits arising from good data management and from the provision of FAIR data. There is a need to harmonise and promote FAIR data practices within the national RI community. The goal of this work package is to extend and deepen the adoption and use of FAIR data principles within the Photon and Neutron science community to allow publication and access of national RIs data and services within the EOSC. The work package will work closely with FAIRsFAIR on the FAIR Competency Centre objective of INFRAEOSC-5c, working with the centre to form practical solutions and form a centre of knowledge and expertise in this domain. Further, the work package will adopt the FAIR data certification scheme, under development within FAIRsFAIR. The outcome will be a framework of policies, practises and guidelines to enable FAIR best practice for Photon and Neutron science.

3.2. Description of work done and role of partners

T2.1	Alignment of policies (PSI)
<p>Relevant Research Infrastructures have a variety of data policies and practices, typically building on the PaNdata Common Policy Framework (2011), and on later activities in CALIPSOplus. This task will review current data policies and revise this framework within the policy recommendation of the EOSC and FAIR data principles. Further factors on data policy, for example, IPR and data licensing, commercial data, and sensitive data (e.g. GDPR) will also be considered. The task will work closely with PaNOSC, participating in a policy workshop and other consultation exercises.</p>	

This task began at M1. Progress in the first 18 months has focussed on coordinating with PaNOSC on developing a revised model policy, and developing a draft revised framework deliverable (D2.1), surveying the wider Policy landscape for FAIR data, including the work of FAIRsFAIR. Ongoing work is consulting with the ExPaNDS partners individually on the guidance in preparation for a final revised version (D2.3, August 2021).

Activities to date with contributing partners:

- Undertook and published a landscaping survey on data policy, metadata use (see also T2.3) and current practices on DMPs (see also T2.2). jointly with WP3 – WP2 contributors: ALBA, UKRI



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- Coordinating with and contributing to the revision of the 2011 PaNdata Common Policy Framework model policy in conjunction with PaNOSC (in PaNOSC D2.1, May 2021), including use of the RDA maturity model : UKRI, PSI, ALBA, HZB, (Diamond)
- Surveying the EC and national data policy context for national PaN RIs: UKRI, PSI, HZB, ALBA, SOLEIL, ELETTRA, (MAXIV)
- Assessing the application of the FAIRsFAIR recommendation on FAIR data policy within a PaN RIs context: UKRI
- Preparing Deliverable D2.1: UKRI, Elettra, HZB, (Diamond), ALBA, Soleil, PSI
- Issued ExPaNDS Project Guidance Note: “30 keys elements for a data policy for national RIs”: UKRI
- Undertook Data policy framework consultation with ExPaNDS partners (work in progress): UKRI, Elettra, Soleil, PSI, ALBA, (DESY)

T2.2	Data management planning and DMP (HZB)
<p>As the science domains, instruments and techniques vary across national RI experiments, each experiment should describe its approach to providing FAIR data via a tailored Data Management Plan (DMP). This would give details on the metadata collected, the approach to data storage and release, and intended approach to data management for derived data. The DMP can then be used to guide the collection and validation of data and metadata and its subsequent publication and use. Much of the additional cost of developing DMPs for experiments can be mitigated by taking a common approach for a facility and its instruments, and by automatically populating metadata information based on the proposal and instrument information. We propose to develop a systematic approach to the development of DMPs within national RIs. This would include considering outcomes of various international working groups as the Commission’s Expert Group on FAIR data, the RDA Active Data Management Plans, IGs and related WGs, as well as the PaNOSC DMP templates for experiments. We would also consider tools for DMP, such as for example using Research Data Management Organiser (RDMO).</p> <p>Thus we make recommendation on a common DMP framework for national RIs, considering knowledge sources and related roles and activities for DMP relevant information, and then develop a common DMP template for use within RIs, aligned to that of PANOSC, which can be tailored to particular instruments and scientific methods. We then develop and trial an approach to active DMPs, integrating the DMP information into data lifecycle and metadata collections, and within the RDMO tool for policy enforcement and reporting.</p>	

This task began at M7, and is undertaken as a consultation in conjunction with PaNOSC, developing a set of criteria for the inclusion of topics and questions within a model DMP template for PaN RIs. This template will be tested and trialled on a set of use cases for their application. This is currently work in progress, with a set of questions under development and use cases being identified, in conjunction with use cases in PaNOSC and also reference data sets within WP4.

Activities to date with contributing partners:

- The development of an initial set of questions to include within a DMP template, in conjunction with PaNOSC. This includes the identification of relevant information sources that can be accessed to populate the plan (work in progress): HZB, with contributions from UKRI, HZDR, Elettra, ALBA, (Diamond, DESY)
- The selection of beamline/method use cases for active DMP trials (work in progress): HZB, UKRI, (HZDR), with contributions from Elettra and Soleil



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T2.3

Mainstreaming of standards for data management (ALBA)

To enable FAIR access to data for users and re-users of data, consistent open metadata standards should be used. However, Photon and Neutron RIs use a variety of metadata standards and formats. A survey of the current use and requirement of metadata within RIs will be undertaken and recommendations on best practice on metadata standards for Findability, Accessibility, Interoperability and Reusability will be developed for the benefit of Photon and Neutron service providers and the wider science user community. This will be undertaken by developing a common metadata framework on different aspects of metadata and other practices required for FAIR data, and in close interaction with the development of detailed metadata ontologies and implementations in data catalogue and API services in WP3, and for use in WP4, coordinating closely with PaNOSC. The framework include recommendations to profile RI metadata to publish RIs data into common EOSC data catalogues e.g. OpenAire-Zenodo, EUDat-B2Find, consider the use of common metadata formats and standards, such as schema.org, and promoting cross-search between RIs catalogues published in the EOSC Portal.

Further, common metadata will promote data reuse, with increased contextual and provenance metadata, supporting the whole data lifecycle, in preservation, and considering the use of relationships with ontologies for provenance and preservation, such as PROV-O and PREMIS. The metadata framework will take into account the software environment where data were produced and the environment required to reuse the data, also the events on data lifecycle such as data creation, validation or verification. This task will provide an draft framework early in the project, for use in WP3 and WP4, and a revised recommendation late in the project.

The task started in M1, and undertook an initial survey of policy and metadata usage and standards within RIs within RIs, in conjunction with WP3. This task then began to develop a draft framework early in the project. This gives recommendations on common metadata framework on different aspects of metadata and other practices required for FAIR data. This metadata framework takes into account the environment where data were produced and the environment required to reuse the data across the events on RIs Experimental data lifecycle such as data creation, validation or verification, building on work from the PaNData-ODI project. This framework is available for use in WP3 and WP4, and a revised recommendation will be produced later in the project, in the light of activities to develop ontologies and to federate data across RIs and with EOSC services (e.g. OpenAIRE, EUDat-B2FIND).

Activities to date with contributing partners:

- Began development of a common glossary of terms for PaN facilities (work in progress): UKRI, Elettra, PSI, Soleil, Diamond
- Contributions to EOSC glossary: UKRI
- Produced Deliverable D2.2: draft common metadata framework, which sets out what metadata is available at each stage of the experimental lifecycle and prioritises these metadata for FAIR based on the RDA maturity model:
ALBA, UKRI, HZB, Soleil, (Diamond), Elettra, with contributions from (DESY).
- Delivered M2.1: Production of draft FAIR Data Framework : UKRI
- Coordinated with the Ontology development within WP3 (work in progress): UKRI.



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T2.4	Persistent Identifier infrastructure (UKRI)
<p>Persistent Identifiers (PIDs) are used for data publishing within some existing RIs. We will promote PIDs within the community, sharing best practices in their use and citation by user communities, and on mapping from the metadata framework to PID provider metadata. We will work with projects such as OpenAire Advance (OpenAire Graph) and FREYA (PID Graph) to contribute to the cross referencing of PID information into a graph of connections. Further, we will explore how work on PIDs for additional resources (e.g. instruments, software, samples) could be used within the Photon and Neutron communities.</p>	

This task began at M12. It has begun a consultation with partner RIs on the state of PID usage and infrastructure. Work is in progress to develop best practice guidance for the use of PIDs for RIs, and to develop a more advanced use of PIDs within RIs, including integration with data analysis services (WP4) and with the cross-linking of information.

Activities to date with contributing partners:

- Held a workshop on sharing best practices for PIDs within ExPaNDs and PaNOSC RIs: UKRI, PSI, HZB, (HZDR)
- Issued meeting report on PIDs for data best practice: UKRI
- PID overview meeting presentations: UKRI, HZB
- Participation to the EOSC PID policy workshop: UKRI, Elettra

T2.5	Quality assurance and certification schemes for data repositories (UKRI)
<p>Certification schemes for quality data repositories (e.g. CoreTrustSeal) and assessment schemes for FAIR data are now emerging. This task will assess these schemes and profile their application to the Photon and Neutron community, and will lead an open self-assessment exercise of the national research infrastructures against these schemes. The task will work closely with the successful project within INFRAEOSC-05-c, which includes the objective of developing a certification scheme for evaluating FAIR data sharing and publication. We would evaluate how the collected metadata and associated data management procedures contribute to certification and what can be learned from related standards (e.g. CoreTrustSeal, ISO Standard 16363 Information package, PREMIS) and self-assessment against the appropriate parts of the certification standard to achieve FAIR data principles.</p>	

This task is scheduled to start at M22, no activities to report.



T2.6

Uptake of FAIR data practices (UKRI)

Advocacy of the use of FAIR data practice will need to be tailored to different stakeholder groups, in order to be most effective. In particular we will target the following groups:

- Senior management and steering bodies;
- instrument scientists and other facilities staff;
- user groups and specific science communities.

We will prepare promotional material and presentations, highlighting the benefits of FAIR data, including user case studies and stories, developing domain specific guidance and training on benefits and rewards of FAIR data within national RIs, working closely with WP5 and WP6 within workshops and outreach. We will also work closely with the competency centre in FAIRsFAIR to make recommendations for RIs to incentivise the use of FAIR data in policies, DMPs and citations, and also consider the skills and competency framework specifically for national RIs.

We have focussed advocacy activities to date largely at facilities staff, with a well-attended FAIR practices workshop. We have been working with FAIRsFAIR in the INFRA-EOSC-5 Synchronisation task force, and we have also prepared and promoted an implementation story on FAIR data policy for FAIRsFAIR. We are developing a programme of future events, targeting scientists, data users and other facilities staff.

Activities to date with contributing partners:

- Assisted WP6 develop promotional videos on use of PIDs: UKRI
- Worked in the FAIR Synchronisation task force with FAIRsFAIR and in the task force on FAIR with all the INFRA-EOSC-5 projects, including presentations of our work on data policy and metadata framework: UKRI
- Produced FAIR implementation story for FAIRsFAIR: UKRI
- Designed and delivered FAIR workshops (1/2 October 2020), in conjunction with WP5 and WP6: UKRI, (Diamond), ALBA, with contributions from Soleil and (DESY)
- Preparation of workshop on sharing of RIs data related to COVID research at Research Data Alliance, April 2021: UKRI
- Preparation of workshop on FAIR data for librarian staff at RIs, in conjunction with WP6: UKRI
- Presentations on use of FAIR data within local facilities: UKRI.



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3.3. Outlook for WP2

T2.1: We will carry on with the consultations with the facility staff in charge of the data policies, using the 30 key elements of a policy. Over the next 6 months the result will be assessed and consolidated into a final framework for FAIR data policy within RIs.

T2.2: WP2 will continue to work with PaNOSC on the development of a DMP template and framework. This will be via joint monthly meetings with PaNOSC to progress on this task. PaNOSC will focus on the DMP template aspects, while ExPaNDS will focus on use cases to demonstrate the implementation of the DMP template and how this adds value for both researchers and the facility.

T2.3: The metadata framework will be revised in response to feedback from facilities staff on the published metadata framework, with the objective to update the deliverable in November 2021. Further, this will take into account the experience of implementing a common metadata framework and ontology within WP2 and on sharing with EOSC discovery tools, such as B2Find and OpenAIRE.

T2.4: Guidance on the use of PIDs within Facilities will be developed for use across the RIs. More advanced PID features will be explored, with guidance on the emerging use of PIDs for new resource types such as Instruments, and on the use of PIDs in the research lifecycle, such as for data analysis. Methods for linking and bundling PIDs will be explored.

T2.5: This task will be starting at M22. It will start by considering the current best practices in FAIR data assessment, including the RDA FAIR Maturity Model, and the work of FAIRsFAIR (FAIR-Aware, F-UJI)¹⁶. A consultation across the project will lead to an approach to evaluating the state of FAIR data implementation within ExPaNDS.

T2.6: The outreach programme will continue with the planned events at RDA and with facilities librarians covering the FAIR data management aspects in their area of expertise. Further activities, targeting particularly user communities and senior managers will be planned.

3.4. Deliverables and milestones of the WP for the period

#	Deliverable	Partner	Due date	Actual date
2.1	Draft extended data policy framework for Photon and Neutron RIs	PSI	31 Aug 2020	18 Sep 2020
2.2	Draft recommendations for FAIR Photon and Neutron Data Management	ALBA	30 Nov 2020	14 Dec 2020

#	Milestone	Partner	Due date	Actual date
10	Production of draft FAIR data framework	UKRI	30 Nov 2020	14 Dec 2020

¹⁶ <https://doi.org/10.5281/zenodo.4486280>



4. Work package 3: EOSC data catalogue services for PaN national RIs

4.1. Objectives

The main objectives of this WP, as stated in the DoA, are:

The European Open Science Cloud (EOSC) data catalogue services for Photon and Neutron RIs will provide one-stop-shop services for users to find, access and use their research data. Releasing this at the national RI level will enable users to effectively exploit available EOSC-ready data analysis services (cf. WP4). Metadata catalogues are a pivotal tool for EU Photon and Neutron national RIs and its users to implement Open Research Data policies according to FAIR principles. WP3 will coordinate the adoption and enhancement of existing solutions. Furthermore it will link them to the PaNOSC federated metadata catalogue to make them available via the EOSC Portal as a service of the European Open Science Cloud for all users of the EU national Photon and Neutron RIs, in conformance with the Rules of Participation of the EOSC. WP3 will enable the implementation of harmonised policies, practices and guidelines coordinated in WP2 (enabling FAIR data) and provide services for WP4 (EOSC data analysis services). It facilitates federated access to metadata, experimental data, derived data and related information. Exploiting existing links with communities such as PaNOSC, services such as OpenAIRE and standards such as NeXus, WP3 will enable and coordinate the adoption of agreed standards at a national science community level. Many national RIs have already catalogued experiment data (e.g. DLS alone has over 15PB of user data catalogued from 10 years of operation). UKRI and PSI are leading partners in the development of metadata catalogues for Photon and Neutron RIs (i.e. ICAT, SciCat). WP3 will coordinate with these EOSC-ready initiatives and make services available for users in the EOSC.

We aim to:

- Evaluate the current status of metadata catalogues at national RIs and perform a gap analysis
- Develop baseline standards for Metadata Catalogues based on harmonised policies (cf. WP2) to make Photon and Neutron data FAIR
- Define baseline standards for APIs linking data catalogues to data analysis platforms (WP4)
- Coordinate the deployment at national RIs to capture metadata in a FAIR enabling way.
- Implement standards that enable the association of FAIR data to scientific discoveries through links to publications as defined in WP2
- Provide technical documentation to WP5 for training the wider community of developers and scientists to ensure sustainability



4.2. Description of work done and role of partners

T3.1	Coordinate metadata catalogue services (PSI)
<p>Perform landscape analysis on the current usage and approaches to metadata catalogues at ALBA, DESY, DLS, ELETTRA, HZB, MAX IV, PSI and SOLEIL. Based on the landscape analysis and requirements defined in WP2 a gap analysis will provide the necessary input to develop a roadmap towards harmonised and federated metadata catalogue services. A workshop will be performed at M6 with WP2 and WP4 to align requirements and specification of services. Coordinating this task and compatibility with PaNOSC and the EOSC-hub will be essential and a key success factor to the three projects (PaNOSC, EOSC-hub and ExPaNDS).</p>	

As an implementation work package that is highly dependent on the local landscape and current status of the participating RIs, recording the current status and offering a roadmap to help facilities develop their strategies based on the experience of other facilities was the initial goal. Once achieved another task undertaken for this work package was to take considerable care to correctly align with PaNOSC activities in this area. This alignment with PaNOSC is ongoing and reflected in the initial joint workshops and mailing lists. Since the outbreak of the COVID crisis has limited face to face activities, the work package has moved to online forums, frequently shared with the equivalent work package in PaNOSC.

Activities to date:

- Roadmap and gap analysis for implementing a FAIR data catalogue and ensuring that data is available for data reprocessing (part of WP4). One of the objectives is to have the open data of our facilities (dependent on the adoption of the open data policy) harvested into OpenAIRE and B2FIND (Diamond, PSI, UKRI, MAX IV, HZB, ALBA, ELETTRA).
- Landscaping survey on metadata catalogues, file formats, etc¹⁷ in conjunction with WP2 (UKRI, Diamond, PSI, ALBA, SOLEIL).
- Deliverable D3.1¹⁸: Diamond, PSI, with additional contributions from ALBA, DESY, Elettra, HZB, HZDR, MaxIV, SOLEIL, UKRI.

T3.2	Develop an EU PaN ontology (Diamond)
<p>Develop ontologies for main application domains of Photon and Neutron science to standardise the metadata used in metadata catalogues based on requirements defined in WP2. This will ensure that federated EOSC metadata catalogues are not only based on a common syntax, but also on a common semantics. The ontology itself will be provided as an EOSC service using existing tools to document and make ontologies accessible (e.g NeOn, Knoodle, Protégé, Swoop). Development of the ontology will be closely linked to the existing NeXus file format and its further developments (PSI, ISIS and DLS have leading roles in the specification and implementation of NeXus). Photon and Neutron-related ontologies provided by NeXus will be used and extended. In a similar way existing ontologies (such as those provided by NIST) should be taken into account.</p>	

¹⁷ <https://doi.org/10.5281/zenodo.3673811>

¹⁸ <https://doi.org/10.5281/zenodo.4146819>



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The activities of developing a PaN ontology started in M6 and a key goal is to have the ontology as well integrated to both ontologies in the wider science domain as well as ontologies already used as part of the recording of data. As the scope and task is significant, the delivery will be staged and challenged by implementations.

Regarding the implementation of the experimental technique and the NeXus ontologies, here are the activities performed:

- Develop and release in GitHub a first draft for the PaNKOS ontology update (HZB).
- Agree across the ExPaNDS and PaNOSC partners, the structure of the experimental technique ontology. This has resulted in an initial spreadsheet (All ExPaNDS partners).
- Use ROBOT tool to convert the experimental techniques in the spreadsheet into an OWL format (Diamond).
- Develop a script to convert the base and upper application definition classes defined in the NXDL (NeXus Definition Language) format to an OWL format. One of the benefits is the provision of PIDs and making the NeXus ontology FAIR - work in progress - (Diamond, HZB, UKRI).
- Followed the recommendations from the Ten Simple Rules for making a vocabulary FAIR paper¹⁹ (Diamond, HZB).
- Design a workflow for deploying the experimental technique ontology - work in progress - (Diamond).
- Deploy draft ontologies in BioPortal with restricted access (Diamond, HZB).
- Presented the NeXus ontology in the last NeXus code camp. It was well received and awaiting for a formal vote concerning the domain name to be used as IRI. It is expected that the script will be available in the NeXus GitHub repository (HZB, Diamond).
- Requested feedback for the Experimental techniques ontology to have a more complete list for the deliverable D3.2 - work in progress - (Diamond, PSI, HZB).

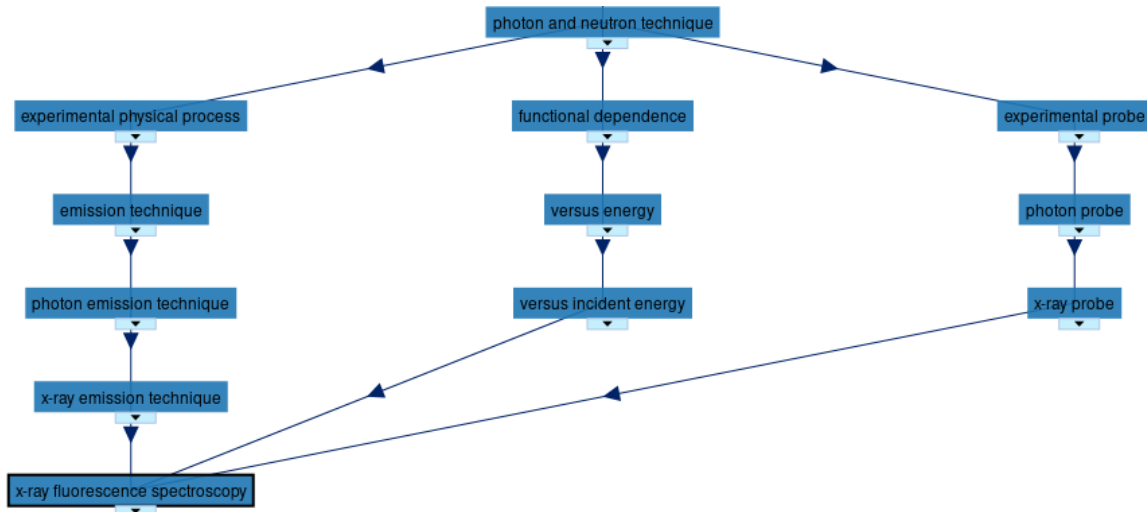
There has also been extensive community engagement which includes:

- Engage with CalipsoPlus project with presentation on the Way for light portal, which already has an extensive list of photon instruments (Diamond, ALBA).
- Engage with WP2 in particular task 2.3. Participation in the deliverable D2.2. (Diamond, ALBA, UKRI, HZB, ELETTRA).
- A significant stakeholder engagement was conducted through a survey on how to search for data in a data catalogue. It included the actor type (data owner, non-data owner, future facility user, external Data Consumer, Funder/Policy Maker), the type of data (raw, processed, sample information, beamline, experiment/visit information), the search terms used and the reason for searching. Analysis has been performed and the results were recently presented in a joint WP3 ExPaNDS and PaNOSC presentation. A full report will be published alongside Deliverable 3.2. (UKRI, Diamond, MAXIV, ALBA, ELETTRA, SOLEIL).
- Coordination of ontology work with other key collaborators including PaNOSC.
- Engage with BioPortal for the hosting of the service (Diamond). The main advantage is the sustainability/re-use of the ontology as the IT infrastructure is provided by BioPortal.

¹⁹ <https://arxiv.org/abs/2012.02325>



- Engage with EOSC. A presentation on EOSC onboarding was organised by WP1 in August 2020. The contact was initially about understanding which ontology repository to use and how the ontology would be integrated into EOSC as a service. Meanwhile we contacted BioPortal who has agreed to start the EOSC onboarding process (Diamond, DESY (WP1)).
- Engage with NIAC (NeXus International Advisory Committee) for the sustainability of the Nexus ontology.
- Presentation on the application of ontologies (Diamond, UKRI) to the ExPaNDs and PaNOSC WP3.



Graph representation of the x-ray fluorescence spectroscopy technique in the Experimental Technique Ontology (Figure from the Visualization option in BioPortal)

T3.3	Implement ontologies in metadata catalogues (PSI)
<p>The defined ontologies will be implemented in different data catalogues (e.g. ICAT at UKRI and SciCat at PSI). To foster the federation of local services a reference implementation will be provided on the basis of the NeXus format. These will result in a European standard with international impact, and as such provides the basis for APIs and interoperability. The latter activities will be aligned with the PaNOSC initiative.</p>	

The implementation of the ontologies into metadata catalogues used at the facilities followed naturally on from T3.2 and deliverables achieved by the PaNOSC WP3. There have been no deliverables associated with this task to date but there have been a number of developments and examples of collaborative working on the two main categories used (SciCat and ICAT) that will lead to improved FAIR data being recorded and made available.

Activities to date:

- Extensive collaboration with PaNOSC for the search API - work in progress - (Diamond, PSI, HZB, UKRI, MAXIV).



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- Ongoing discussion to accommodate ontologies in the data catalogue, covering discussion with beamline scientists, historical modification of data, ingestion method for new data - work in progress - (PSI, Diamond, UKRI).
- Ongoing discussion about parameters ontologies (Diamond especially), in collaboration with PaNOSC (ESS in particular) - work in progress - (PSI, Diamond, UKRI).

T3.4

Coordinate metadata catalogues and data life cycle (HZB)

Based on the roadmap defined in task 3.1 the national sites will deploy the developed standards and processes. The WP will help to coordinate these activities by providing best practices and cross-site support. Technical and user interface related information will be documented and provided as input for WP5 to facilitate training. The coordination process will be continued until the end of the project.

The main activities of this task are due to start on month 24. However, several steps have already been taken to start applying the roadmap defined in task 3.1:

- Internally, MAX IV is working to integrate two beamlines to the chosen data catalogue, SciCat. We have registered a repository with DataCite and have carried out tests on minting DOIs. Work is also ongoing to facilitate access to published datasets. - work in progress - (MAXIV).
- SciCat data catalogue in place, containing “real-life” data and daily used (PSI).
- Internally, SOLEIL is working to integrate the chosen data catalogue, SciCat. It has been installed, tested with mock data. Work is in progress to link it to the User Office tool. Concerning the DOI, at SOLEIL, we have registered a repository with DataCite and we are carrying out tests on minting DOIs (SOLEIL).

T3.5

Integrate metadata catalogue services into EOSC (MaxIV)

The different metadata catalogues will be integrated into the PaNOSC federated metadata catalogue and provided as a service on EOSC-hub. Access to metadata catalogues will be facilitated by Umbrella-ID (federated AAI services for Photon and Neutron RIs).

The main activities of this task are due to start on month 24. However, as for task 3.4, several steps were already taken to align our data catalogues with community standards like OAI-PMH and to align with the PaN search API:

- Contribution to ExPaNDS architecture and alignment with WP4 - work in progress - (UKRI, PSI, Diamond).
- Developed an ICAT plug-in to allow the harvesting of metadata into OpenAIRE using the OAI-PMH protocol (UKRI, HZB).
- Developed a SciCat plug-in to allow the harvesting of metadata into OpenAIRE using the OAI-PMH protocol (PSI).
- OAI-PMH deployed, allowing users to query data (potentially from doi.org, using the corresponding DOI) (PSI, HZB).
- Testing the ability of using the OAI-PMH to harvest metadata in OpenAIRE - work in progress - (Diamond).



- Open data in B2FIND (and OpenAIRE in progress) (PSI).
- Contribute towards the development of the PaN search aggregator service - work in progress - (Diamond, MAXIV, PSI, UKRI, HZB) and installation (PSI, MAXIV).
- Provided example data for the federated search demonstrator (HZB, PSI, Diamond).
- SciCat front end (catanie) reachable from the research institute's internal network (PSI).
- Landing page server deployed (PSI).
- Work in progress to make data FAIRer by reviewing the ICAT schema and preparing to add ontology terms to the metadata (UKRI, HZB, Diamond).
- Working on Reverse-Proxy solution together with Network/Security experts to open SciCat for the search API use - work in progress - (PSI).
- Enable publishing of datasets, and work on the publishing of associated raw data - work in progress - (PSI).

T3.6	Training material (SOLEIL)
<p>These will be used by WP5 to develop training material for facility staff responsible for data lifecycle management and provide training materials for scientific users. A training plan and material will be developed to ensure training and deployment of solutions, to ensure sustainability of support and operations in the context of EOSC.</p>	

This task is scheduled to start at M24, no activities to report.



4.3. Outlook for WP3

T3.1: The landscape analysis and associated deliverable have developed into a KPI for the project so will continue to be monitored as part of the ongoing progress monitoring of the project. It is also envisaged that additional workshops will be required to help disseminate activities between RI's especially where resources are only now starting.

T3.2: WP3 will continue to work with other domain leaders especially the NeXus and PaNOSC communities. Engagement into the wider EOSC community will also continue. One additional aspect that will continue is the engagement with end user communities (with WP6) to ensure the overall ontology adequately describes their work and provides a useful FAIR tool.

T3.3: Although the majority of the work for Task 3.3 has been undertaken by ExPaNDS and PaNOSC developers working in the existing collaboration frameworks of SciCat and ICAT, it is envisaged that the work package will need to ensure lessons learnt and successes will be shared between the implementers.

T3.4: Starting in M24 further coordination and lessons learnt activities for deployment at RIs will be vital to improve the findings from T3.1 activities.

T3.5: The main activities for this task are not due to start until M24, however as the report outlines, due to activities such as those in the other WP3 tasks and PaNOSC have already led to progress that will be further rolled out to the RI's during the main period of the task.

T3.6: Due to start in M24, a key goal for sustainability will be the wider uptake of the solutions and developments for the preceding tasks. Working closely with WP5 and other training service providers, training on the key aspects will be provided and will also be sustained by the appropriate communities e.g. SciCat and ICAT or NeXus.

4.4. Deliverables and milestones of the WP for the period

#	Deliverable	Partner	Due date	Actual date
3.1	Report on status, gap analysis and roadmap towards harmonised and federated metadata catalogues for EU national Photon and Neutron RIs	PSI	31 Oct 2020	03 Nov 2020

No milestone in this period for WP3.



5. Work package 4: EOSC data analysis services for PaN national RIs

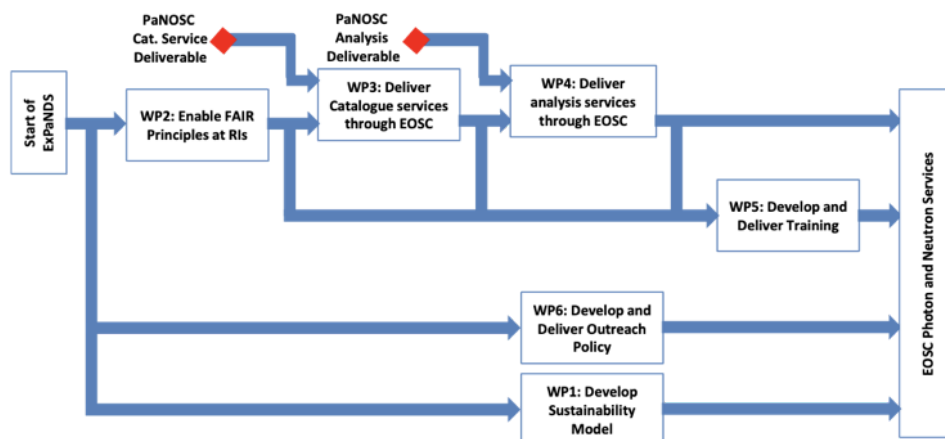
5.1. Objectives

The core objective of WP4 is to provide access to data analysis services at participating national research infrastructures through EOSC in a coordinated manner. An additional objective is to provide a harmonised interface and compute service access portal for both NRI and ESFRI facilities through a common PaN portal integrated into EOSC in cooperation with the partner PaNOSC project.

5.2. Description of work done and role of partners

Progress within WP4 is best described by first explaining the landscape in which the work package exists. This is because the operational environment provides practical constraints which in turn determine some of the technical choices made.

To achieve its objectives, WP4 exploits the deliverables provided by ExPaNDS WP2 and WP3 that provide indexes to FAIR-ready data through established metadata catalogues. Additionally, ExPaNDS WP4 works closely with PaNOSC to deliver a harmonised PaN interface to EOSC. Although the two projects ExPaNDS and PaNOSC run in parallel, they are in fact interlinked with the intention of presenting a common Photon and Neutron ('PaN') interface to EOSC. The intention expressed in the proposal is that ExPaNDS mirrors decisions in PaNOSC as far as practically possible, and that ExPaNDS ideally uses the same common PaN portal and APIs in order to present a unified 'Photon and Neutron' interface to EOSC. As a consequence, WP3 and WP4 of ExPaNDS have a dependency on the corresponding PaNOSC work packages. This was illustrated in the proposal (p. 44). Additionally, WP4 will utilise technological solutions provided by other Horizon 2020 funded initiatives, such as CALIPSOplus and previous projects such as PaNData.



ExPaNDS WP and dependencies to PaNOSC

Photon and Neutron reference data sets from the NRI institutions have been prepared and published, forming a concrete basis for further continuous development and integration of FAIR datasets from NRI facilities into the PaN portal services developed by PaNOSC. Placing the existing data analysis services within the EOSC through the PaN portal will make them



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readily Findable and Accessible to Photon and Neutron users. Finally, developing analysis workflows against standardised analysis services will greatly increase the reusability and reproducibility of the underlying algorithms used, improving interoperability and portability between facilities.

As was found in the process of tasks 4.2 and 4.3, greatest benefit to EOSC will be obtained when we integrate NRI core services into EOSC. This ensures access to useful infrastructure from EOSC for the photon and neutron science user community, and ensures sustainability after the project ends. We thereby avoid spending effort on test instances located on isolated islands which will disappear at the end of the project. While our initial plan and initial efforts were directed towards deploying PaNOSC services at each NRI, we came to the conclusion that it would be more desirable to focus on integrating core NRI facility infrastructure as data analysis services accessible through the PaNOSC portal. This is the direction in which efforts are now focussed.

Here, the diversity of existing services at the infrastructures requires careful consideration. In practice, replacing an existing, operational service with a harmonised one will first require parallel operation of both. Unlike the particle physics community, which has managed to standardise on the Worldwide LHC Computing Grid architecture at each facility, no such standardisation exists between photon science communities and it is unreasonable to expect to achieve complete harmonisation through a horizontal infrastructure such as the WLCG within the scope of ExPaNDS. Rather, the purpose of ExPaNDS is to expose the diverse existing data analysis services through the PaNOSC portal deployed by PaNOSC in the EOSC marketplace according to the guidelines described in this document. As part of our work we came to the realisation that in order to interface to core infrastructure it would not be possible to enforce uniformity. Instead, it will be necessary to deal with this heterogeneity of systems, maximising portability between infrastructures as far as practical while providing access to diverse infrastructure within the framework of EOSC. We have addressed this challenge and devised an architecture by which to make data analysis as portable as possible across diverse facility infrastructures, as described in T4.3. This outcome was one of the main results of months 12-18 of the project and forms the basis for further progress in WP4 during the remainder of the project.

The reader is referred to the documents for D4.1 (Framework), and D4.2 (Example datasets) for further discussion and details. We now turn our attention to describing task progress within the DoA.

T4.1	Kick-off meeting (DESY)
To be organised in conjunction with WP1 to define roles and processes to coordinate between RIs, keep NGIs informed and connected to EOSC coordination. Expected outcome: list of roles, identities and meeting structure to deliver an operational framework with associated documentation.	

A kick-off meeting took place on site at DESY as a satellite to the main ExPaNDS kick-off meeting on 11-12 Sept. 2019, followed by an additional meeting at the 6-month mark, on the 7th of February in Hamburg, to coordinate the work between the contributing RIs and with PaNOSC. Contributors agreed on a draft architecture that could integrate into the PaNOSC portal. COVID travel restrictions have precluded further face-to-face meetings and hence bi-weekly teleconferences have been the main method of communication between the partners.



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Discussions within T4.1 contributed towards the D4.1 organisational framework document defining the organisational framework for during and after the project and guidelines for integrating existing analysis services into EOSC through the PaN portal. WP4 (DESY) also contributed to the general architecture description in relation to the EOSC deliverable published in Mar. 2020 with WP3 and WP1. For EOSC coordination follow-up and NGIs reporting, EGI is directly involved in WP4.

T4.2	Select candidate EOSC data analysis services (DESY)
<p>Select candidate data analysis services by evaluating their impact on the broadest Photon and Neutron European community, as well as their readiness for integration into the EOSC-hub using PaNOSC services. Simultaneously evaluate the current readiness of EOSC and PaNOSC services. This will involve attending PaNOSC and other related activities to acquire the necessary knowledge to adapt the candidate services for integration into EOSC-hub.</p>	

A fundamental prerequisite for ongoing sustainability of ExPaNDS analysis services after the project concludes is to (a) select analysis services pertaining to use cases that are relevant to the analysis needs of the PaN community, ideally in cases where there is high demand for open results and where datasets are sufficiently large that access to cloud infrastructure could be beneficial to users, and (b) to integrate analysis services into the RI's core data analysis service portfolio without unnecessary delay.

The selection from day one of ExPaNDS data services that are aligned with the users workflow will create a desire by facility users to keep those services maintained after the ExPaNDS project funding period ends. Furthermore, the ability to improve software portability between facilities will directly benefit the PaN user community and facilitate migration towards horizontal infrastructures, as well as lowering the cost of integration by consistently applying industry standards and interfacing to common software stacks across facilities.

One outcome of this analysis was the observation that only 10% or so of workflows involved Jupyter notebooks, while the majority relied on community software accessed through remote desktops, and that in many cases analysis workflows (as we refer to data analysis services within the PaN science community) made use of HPC resources to fulfil compute and storage requirements. We therefore concluded that focussing on Jupyter-based analysis services would have limited application. Instead, ExPaNDS WP4 will focus on implementing existing community data analysis workflows in portable facility-independent containers against HPC back-end infrastructure.

The selected use cases and associated analysis services are described in D4.2, which also contains the selected reference datasets corresponding to task T.4.4. Main activities took the form of teleconferences and joint report writing. Selection of candidate data services was guided by the task of PaNOSC alignment in T4.3. Contributions towards selection of data analysis services and example data sets were provided by all partner institutions, with significant input from UKRI, DESY, PSI, MAX IV and HZDR.



T4.3

Alignment of PaNOSC services (Diamond)

Provide input to, and negotiate with, PaNOSC and other related activities to develop the alignment needed for the integration of data analysis services developed at the national RIs.

Alignment with PaNOSC is essential for ExPaNDS WP4 and for the wider integration into EOSC. The role of ExPaNDS WP4 is to interface the heterogeneous infrastructure and selected existing analysis services available at NRI facilities into the PaN portal. Although the two separate projects run in parallel, they are in fact interlinked with the intention of presenting a common Photon and Neutron ('PaN') interface to the user community accessible via the EOSC.

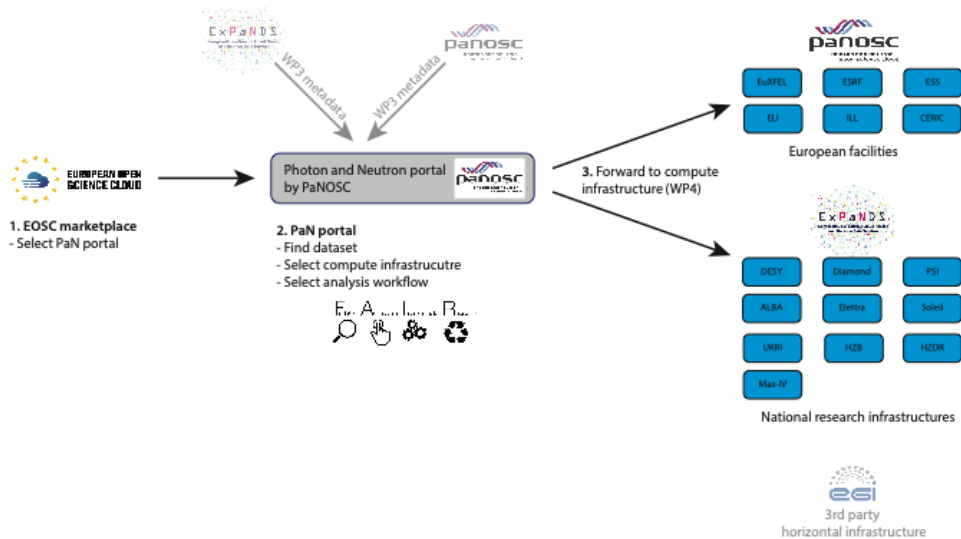
From the perspective of the PaN science user community the distinction between national and European infrastructures, and thus the distinction between PaNOSC and ExPaNDS facilities, is an entirely artificial one. By deploying ExPaNDS services from within the PaN portal we achieve the goal of presenting a unified 'Photon and Neutron' user community interface to EOSC users. This represents a step in the right direction for our users towards integrated remote analysis solutions. Since many of the use cases we selected do not run within Jupyter services, we have a focus on cross-facility software portability through the use of containers within which the necessary software is deployed.

Guidelines and a framework for integration into EOSC via PaNOSC services is detailed in deliverable D4.1. To summarise, our initial plan was to deploy PaNOSC services at each NRI, and we spend some effort in exploring the deployment of PaNOSC services. As a result of this process it became apparent that integration of core NRI facility infrastructure as data analysis services accessible through the PaNOSC portal was more both more desirable for project sustainability and better suited to the test cases needs. Thus at the time of writing we anticipate the following strategy for integration of NRI analysis services on existing core compute and storage infrastructure to proceed as follows:

From the EOSC user perspective:

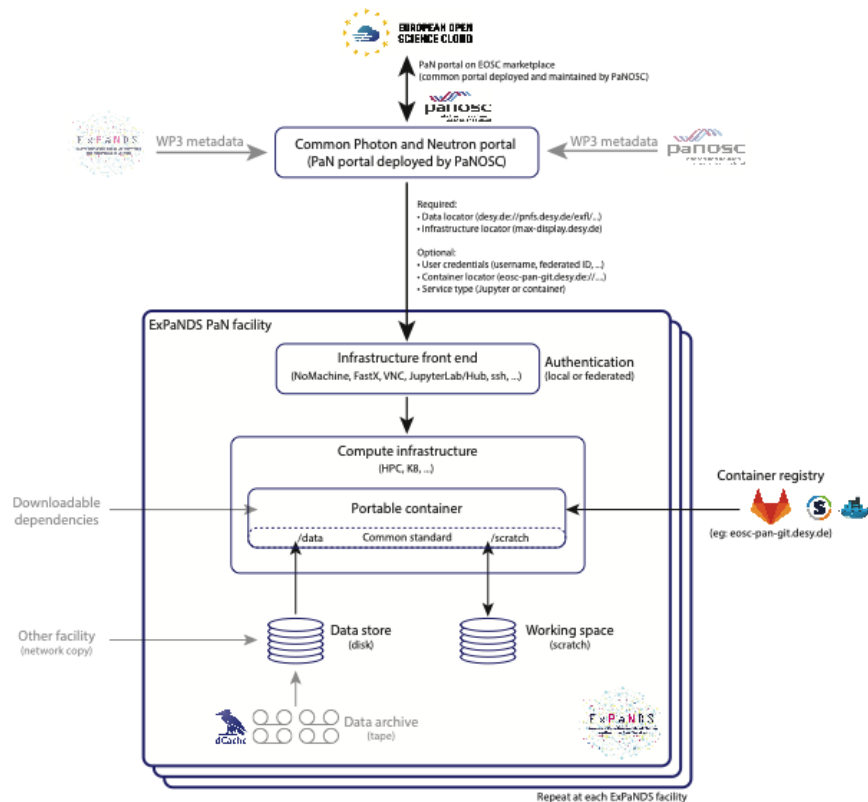
1. EOSC users will access the PaN portal from EOSC marketplace in order to locate datasets and infrastructures. The PaN portal is developed and maintained by PaNOSC and populated with metadata from NRI facilities through the efforts of WP3.
2. Once a dataset is selected in the PaN portal for analysis using an ExPaNDS service, the user is transferred by the PaN portal to the appropriate containerised software or Jupyter service at the selected NRI facility





User journey from the EOSC portal to the underlying infrastructures

Authenticating for access to data and compute resources, copying of data to or from other facilities, compliance with local user policies, and how to handle guest users are a few considerations of many which need to be taken care of and is beyond the scope of discussion here. Aspects of the technical details of implementing this structure are illustrated in the following figure:



Technical implementation at the national RIs



On the facility side:

1. Software necessary to execute work flows for each use case, including any necessary dependencies, will be containerised to enable portability between facilities.
2. Containers containing workflow software will be accessible from a common container registry. We put issues of software licencing and redistribution detailed in D4.1 to the side for the purposes of this technology demonstration, however note they would have to be addressed before services could be opened beyond a pilot phase.
3. Containers will mount a specified dataset and provide working space at common mount points, executing on local compute infrastructure so that each facility 'looks the same' from within the container.
4. From outside the facility, specification of the workflow (which container), the dataset (in practice often path to data on local infrastructure), and user credentials will start the container and land users in a containerised analysis environment that will have a similar 'look and feel' and execute across facilities (horizontal infrastructure).

This brief description obviously omits many important practical details such as obtaining access credentials for compute resources, restaging of data from tape, copying of data from other facilities, and so on.

As noted, working towards a common PaN portal interface for all facilities requires tight integration with PaNOSC. WP4 members regularly attend PaNOSC WP4 meetings. These meetings take place monthly and enable input into PaNOSC so as to maintain alignment of the two projects. Preparing demonstration cases identified key issues and proved highly useful. Additionally, a technical workshop organised by ALBA in late 2020 helped clarify the path for alignment with PaNOSC services and the technical issues involved in deployment.

T4.4	PaN reference data sets (UKRI)
Identify, prepare and publish Photon and Neutron reference data sets, which can be used to adapt, align and validate the Prototype Data Analysis Services.	

The task of selecting reference data sets was integrated into the discussion of selecting candidate data analysis services. Use cases of high relevance to the PaN community were selected, concentrating on use cases where there is high demand for open results and where datasets are sufficiently large that access to cloud infrastructure could be beneficial to facility users. As already noted with respect to T4.2, one outcome of this analysis was the observation that only 10% or so of existing workflows (i.e. analysis services) involved Jupyter-based analysis services. We therefore chose to select services and datasets of relevance to the user community, rather than restricting ourselves to candidate services that could be executed in a Jupyter environment.

The selected workflows and associated reference data sets were published in D4.2. A summary of the selected use cases and associated datasets is contained in the following table, and the reader is referred to D4.2 for further details.

Main activities took the form of teleconferences and joint report writing, with considerable engagement with the task of analysis service selection T4.2. Contributions towards selection of data analysis services and example data sets were provided by all partner institutions, with coordination provided by UKRI.



#	Technique	Lead	Published location
1	Serial crystallography	DESY	https://cxidb.org/id-98.html
2	Full field tomography	PSI	https://doi.psi.ch/detail/10.16907/7eb141d3-11f1-47a6-9d0e-76f8832ed1b2
3	4D Full field tomography	MAX IV	https://app.globus.org/file-manager?origin_id=e133a81a-6d04-11e5-ba46-22000b92c6ec&origin_path=%2Ftomobank%2Ftomo_00080%2F
4	Single-crystal X-ray diffraction	Diamond	https://zenodo.org/record/4445063#.YAVazNanxR4
5	Ptychography, Ptychographic X-ray computed tomography	MAX IV	https://doi.org/10.5281/zenodo.3702582
6	2D Scanning SAXS	Soleil	http://doi.org/10.5281/zenodo.4553498
7	Neutron Small Angle Scattering	UKRI / ISIS	https://github.com/DAAaS-reference-data/SANS
8	Neutron Imaging/Tomography	UKRI / ISIS	https://doi.org/10.5281/zenodo.3672798
9	Neutron reflectometry	UKRI / ISIS	https://data.isis.stfc.ac.uk/doi/INVESTIGATION/84794745/
10	Terahertz Spectroscopy	HZDR	https://rodare.hzdr.de/record/277
11	Electron scanning diffraction imaging (4DSTEM)	Diamond	https://dls.ltd.sharepoint.com/:u:/s/GRA0046/ER6eICBerHxDICfYCIBeUFsBakNbDsREMRobNW9VvrUXaQ?e=b7MLjY

ExPaNDS reference datasets



T4.5

Testing and validation framework (MaxIV)

Establish a continuous test and validation framework which assures that the data analysis services can be validated against the reference data sets. This will serve to make sure that the services are working correctly as the different prototypes are adapted by the various partners.

This task is in progress and a bit behind schedule. We are currently in the process of defining testing requirements based on the services outline described in T4.3, and are simultaneously determining the technical requirements for efficiently implementing those tests (the two go hand-in-hand). Key points are that:

1. CI/CD tests should be passed at the time of container creation before posting to the container registry
2. Validation of execution against a test data set should be performed to ensure science output is correct
3. Container execution should be automatically tested at each facility; facilities which can't run a workflow should be excluded from the list of options (eg: due to lack of specific resources such as certain types of CPU or GPU)
4. Compute infrastructure access from the PaN portal along with container execution, including access to data and scratch space

T4.6

Prototype data analysis services (SOLEIL)

Adapt the candidate data analysis services to comply with the EU Photon and Neutron Ontologies provided via metadata catalogue services implemented in WP3. Adapt the candidate data analysis services to the APIs, standards and data lifecycle management guidelines provide by WP3. Adapt the candidate data analysis services to use EOSC services such as browser driven remote desktops and Jupyter analysis services.

This task is in progress and a bit behind schedule. We are currently in the process of implementing the infrastructure required for integration of NRI analysis services into the PaN portal as outlined in T4.3.



T4.7	Deploy data analysis services into the EOSC-hub (DESY)
<p>Develop validation criteria for deployment of the data analysis services within EOSC. Test the services by inviting test candidates from the user community to use them and provide feedback to the developers. Feed necessary adjustments back to the developers, keeping in mind the application of the service is intended for a wider scope than the prototype case. Anchor the outcome of task T.4.6 within the national RIs organisation and report back the results to WP1. To ensure consistent development of data analysis services, provide well documented usage examples to WP5 which demonstrate the mainstreaming of standards for data management and certification schemes for data repositories, and all relevant supporting activities within the data analysis services.</p>	

This task is still pending. Rules and best practices for integration of services into EOSC have been outlined in D4.1, while the architecture for accessing NRI analysis services via the PaN portal has been described in relation to T4.3.

5.3. Outlook for WP4

Our immediate goals are tasks related to the creation of the common container repository, and enabling execution of common containerised workflows across facilities. This work forms the basis of T4.6. It also lays the groundwork for integration with the PaNOSC PaN portal envisaged in T4.7.

5.4. Deliverables and milestones of the WP for the period

#	Deliverable	Partner	Due date	Actual date
4.2	Photon and Neutron reference data sets prepared and published	UKRI	28 Feb 2021	28 Feb 2021
4.1	Guidelines for implementing the national RI's analysis services within the EOSC	DESY	28 Feb 2021	29 Mar 2021

No milestone in this period for WP4.



6. Work package 5: Training activities through EOSC platforms

6.1. Objectives

The main objectives of this WP, as stated in the DoA, are:

Organise a series of training events in data FAIR principles, data stewardship, data management and data analysis services integrated into the EOSC services. These actions dedicated to service providers and users will foster faster adoption of best practices by an enlarged number of the Photon and Neutron user community. Provide training materials accessible to different stakeholders (staff and users from national RIs) through EOSC and Photon and Neutron data websites and e-learning platforms. WP5 activities started at M12.

6.2. Description of work done and role of partners

T5.1	Organising at national RIs a series of staff and users training events (SOLEIL)
<p>The purpose of this task is to promote the outcomes of the catalogues and services provided by ExPaNDs for EOSC by organising a series of events.</p> <ul style="list-style-type: none"> • Task 5.1.1 Workshop(s) to promote FAIR principles. This would cover the benefits of Open Data, data lifecycle, collecting metadata for Photon and Neutron RIs, tools for storing and archiving data, data publishing, DOIs and Data Citation. (M12) • Task 5.1.2 Workshop(s) to develop common rules and best practices between national RI's which build on previous work (e.g. PaNdata) and harmonise the provision of the EOSC services. (M12) • Task 5.1.3 Workshop/meeting(s) to educate and train developers and facility staff on how to deploy and support their own workflows enabling a long term viability and sustainability of the data analysis services. This activity will be organized and performed in close collaboration with WP3 and WP4. (M25) • Task 5.1.4 Workshop to educate and train metadata catalogue services within data management and data life cycle management including Photon and Neutron Ontologies developed in WP3 (M34) • Task 5.1.5 Workshop/meeting(s) to educate and train Photon and Neutron users in the use of the data analysis services. This activity will be organized and performed in close collaboration with WP4 (M35) <p>A total of 6 workshops will be organised by ExPaNDs partners and associates, as event providers. The dedicated budget will include all usual cost related to the organisation (room rental, catering for meals, and travel expenses for the lecturers, ...). Depending on the location of the workshop at the different RIs, there will be a level of recharge between partners in the delivery of these activities.</p>	

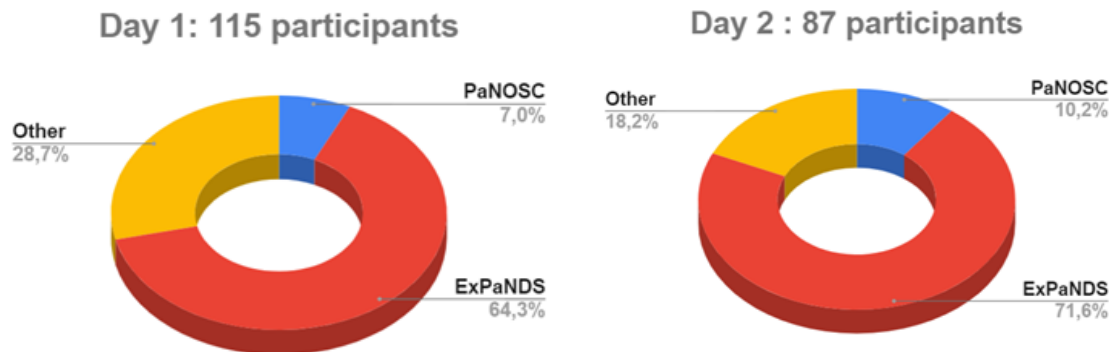
Activities to date:

- Task 5.1.1 : The FAIR workshop has been held the 1st and 2nd of October 2020. The main goal was to raise awareness of FAIR to instruments, scientists and other facility staff. Due to the Covid situation, this workshop was organized as a remote workshop. There were two sessions of 1h30 (one per day). The format of a remote workshop is



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flexible, allowing a wider audience to attend. The first session (Day 1) gathered 115 attendees whereas the second session (Day 2) had 87 attendees. An integrated Ad-hoc survey about FAIR status at the facilities was performed during the event.



Number of participants to the workshops on FAIR per facility of origin

- Task 5.1.2 : The second ExPaNDS workshop on EOSC is being organised online with WP1 for the 6th and 7th of April 2021.

T5.2	Evaluation of available e-platforms and provision of a training demonstrator (HZDR)
<p>The purpose of this task is to contact the e-platforms providers (ESRF for PaNOSC and EGI for EOSC-hub) to define together the prerequisites to maximise and expand the use of the platforms as appropriate. WP2, WP3 and WP4 will work closely with WP5 and WP6 to deliver tailored specification for each of the online trainings.</p> <p>The output will be a definition of the most suitable training materials in accordance with the requirements and recommendations made by the targeted e-platform providers.</p> <p>A demonstrator for using e-learning platforms will be developed and provided (D5.2).</p>	

Activities to date:

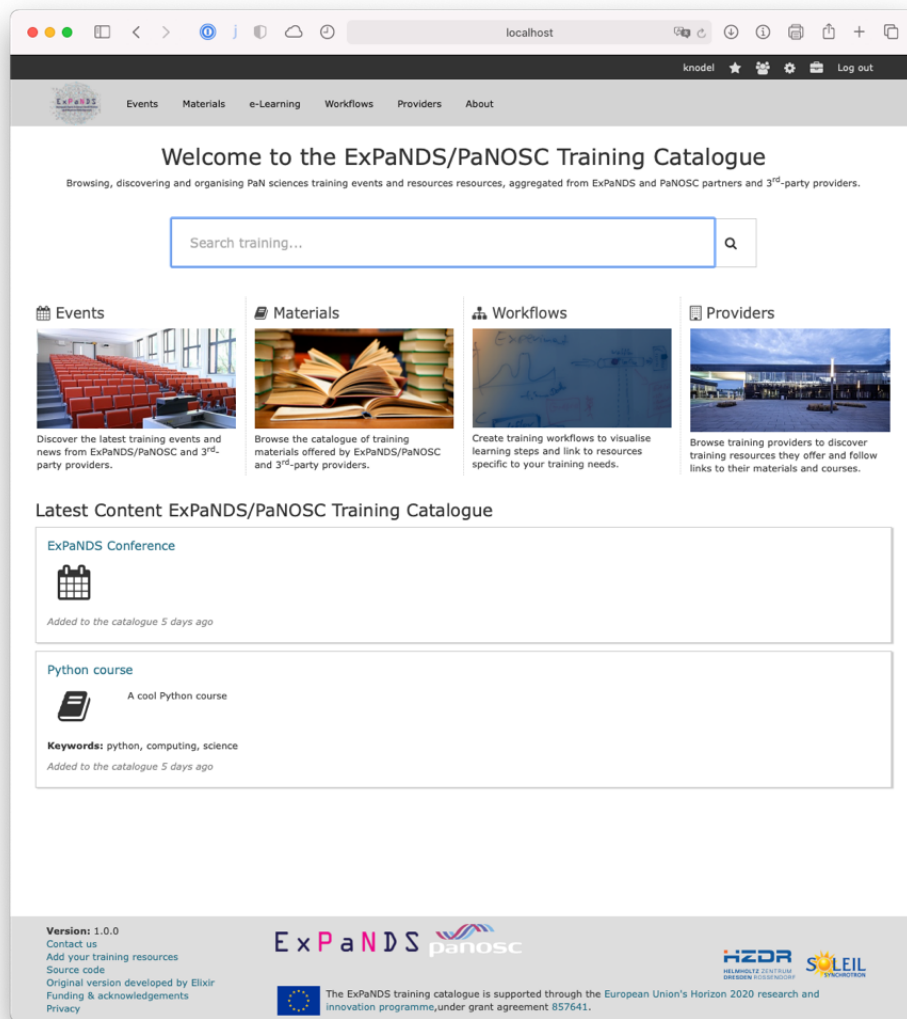
- A Training Task Force was established to discuss the training portal infrastructure and coordination with PaNOSC WP8. A joint Github organization²⁰ was established to develop the e-learning platform and the training catalogue (PaNOSC and ExPaNDS).
- The e-learning platform²¹ was refurbished as a result of our Task Force (Apr 2020 ff). HZDR participated in the Train the Trainer Workshop organized by PaNOSC (Feb/Mar 2021).
- First prototype of our ExPaNDS Training Catalog based on TeSS available as a development instance at the HZDR (Sep 2020 - Mar 2021). The catalog will be used to reference existing training material at the PaN facilities but also training developed by the ExPaNDS project. This training catalog is complementary with the E-learning platform, people who want to index specific documents (a specific link to a github/gitlab repository, link to different training datasets...) will be able to use the

²⁰ <https://github.com/pan-training>

²¹ <https://pan-learning.org/>



training catalog. Furthermore, the training catalogue will index courses developed on the E-learning platform.



ExPaNDS training catalogue prototype

Work performed during this first period laid the foundation of the evaluation of various e-Learning platforms to develop a concept for our portal architecture “Evaluation and Demonstrator of an e-Learning Platform, D5.4” started by the HZDR. The portal architecture concept is aligned with PaNOSC WP8.



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T5.3	Collection, Preparation and Publishing of Training Material (SOLEIL)
<p>The purpose of this task is to provide the training materials to foster the uptake of ExPaNDS services in the existing e-learning platforms. WP5 will support the collection of the material provided by the technical work packages WP2, WP3 and WP4 and prepare and publish the training material. This will ensure training material, such as Moodles, Wikimedias, modules and so on is disseminated in a consistent form:</p> <ul style="list-style-type: none"> • FAIR data guidelines, common rules and best practices for the Photon and Neutron community (Task 2.6, WP2); • Standard dataset definition (WP3) and Photon and Neutron reference data sets (WP4); • Long term viability and sustainability of the data analysis services developed by ExPaNDS (Task 4.5, WP4); • etc. <p>This task will be strongly correlated to the actions related to the development of WP2, WP3 and WP4.</p>	

Taks 5.3 is in close relation with the Task 5.2.

During this period, we performed a first survey to assess the needs of the PaN community in terms of training. A first conclusion of the ExPaNDS survey is that trainers have a wide range of training needs, varying from course creation to the development of specific documents accessible to the community (e.g. simple data sets created for training purposes, guidelines, source code, ...). To fulfill these needs, we decided to have a complementary approach for developing the training platform.

The already existing PaN E-learning platform developed and maintained by PaNOSC enables trainers to create courses for different purposes (training of students, specific workshops, summer schools...). As a complement and to accommodate all the needs expressed in the survey, ExPaNDS is developing a prototype training catalog based on the open source TeSS platform²² (the detailed description of work performed up to date is available in Task 5.2).

For all the training material developed during ExPaNDS to be easily indexed, we plan to use the resources developed by the RDA²³ on standard metadata for training material. This document will help us be interoperable with other training aggregators.

T5.4	Monitoring and Measuring of training effectiveness (HZDR)
<p>In connection with the various workshops and training activities WP5 will gather user feedback in the form of surveys and usage statistics. This task will be performed closely together with WP2, WP3, WP4 and WP6. The outcome will be collated, analysed and presented in the form of a final report.</p>	

This task is scheduled to start at M24.

The KPIs for WP5 are defined together with PaNOSC WP8. This includes the number of attendees per workshop, (ExPaNDS staff, PaNOSC staff, other people), the numbers of

²² <https://tess.elixir-europe.org/>

²³

<https://docs.google.com/spreadsheets/d/1rpuDwCrt-tC-kY5pNiJ2pOwFL-UQppy2Fra74Jja1JA/edit#gid=157509536>



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users registered on the e-learning platform (users from ExPaNDS, users from PaNOSC, users from others facilities). KPI regarding the training material added on the platform needs to be more accurately described and is still in progress.

WP5 collaborates jointly with WP6 on a survey to evaluate the requirements on e-learning resources of the ExPaNDS and PaNOSC partners. Evaluation surveys were also sent to the participants attending our first workshops and will be further developed and analysed.

6.3. Outlook for WP5

Next steps of WP5 activities will be dedicated to training material content in the PaN e-learning platform. The training material (remote webinars, MOOC, documents, etc...) will be developed by WP2, WP3 and WP4 and monthly progress meetings will be organized with the “technical” ExPaNDS WP leaders and PaNOSC WP8 leader and co-leader to follow up the actions from M13.

The training demonstrator prototype with a first synchronization between the PaNOSC e-learning platform and the ExPaNDS training catalogue will be completed in September 2021 by HZDR and SOLEIL. By that time an uniform appearance of the components of both projects (domains and design) should also be available.

The next workshop on EOSC is already scheduled to happen at the beginning of April 2021 and was organised with WP1. The next workshops will be in discussion starting M25. They will be organized during the final year of the project to ensure a maximum dissemination of the project results.

6.4. Deliverables and milestones of the WP for the period

#	Deliverable	Partner	Due date	Actual date
5.1	Annual report on training activities, workshops held, materials published and investigations performed	SOLEIL	31 Aug 2020	31 Aug 2020

No milestone in this period for WP5.



7. Work package 6: Dissemination and outreach

7.1. Objectives

The main objectives of this WP, as stated in the DoA, are:

The aim of this work package is to support and promote the ExPaNDS initiative in Europe and beyond. To this end, we will use a tactic of an ever-increasing circle ensuring first and foremost effective flows of information amongst project partners, then ensure that each Work Package is well supported in their respective dissemination needs and where appropriate help them engage with their various audiences, and finally, more widely, we will ensure effective cascade of information so that the outputs produced are widely disseminated.

Objectives include:

- To raise awareness of the EOSC services and to position the Photon and Neutron RIs and their user communities as core users of the EOSC services as well as to ensure strong engagement of all stakeholders in that process
- To promote Open Data and FAIR data principles to Photon and Neutron users and Photon and Neutron RIs
- To support the implementation of training materials, activities and events
- To facilitate the flow of information amongst project members and partners
- To facilitate the interactions and exchanges with other relevant EU initiatives, like PaNOSC, FREYA
- To disseminate widely to Photon and Neutron RI user communities as well as the general public where appropriate.

7.2. Description of work done and role of partners

T6.1	ExPaNDS internal and external communications strategy and delivery (Diamond)
<p>This work package will facilitate the flow of information amongst all project members and partners by using a cloud platform for communicating and sharing information. Within the first month of the project a detailed communication and dissemination plan (D6.1) will be developed. This will include tasks associated with the dissemination and exploitation of results.</p> <p>Whilst WP1 will take the lead on management and reporting, WP6 will put into place the necessary communication tools to support an efficient management and contribute high-quality graphics and infographics for adequately displaying project achievements, e.g. for reporting purposes.</p> <p>WP6 will coordinate all external communications and will provide support to all WPs for their various dissemination and communication activities.</p> <p>Internal communication tools using the most performant cloud-based technology (SLACK, Office 365 or other) will be put into place within the first months of the collaboration and will be curated throughout the project's duration.</p> <p>External communications will encompass a range of activities from the development of tools for external presentation, e.g. standard presentation to introduce the ExPaNDS project, template for Powerpoint presentations, poster, roll-up, to the conception and organisation of dissemination events.</p> <p>Within the first few months, a website will be set up to present the project and, as soon as data is available, results will be displayed in an accessible, searchable and visual way. Being</p>	



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aware of the persisting gender imbalance in the target community, which continues to be dominated by men, particular care will be taken to balance role models in any promotional literature that will be created.

In addition, a well-coordinated social media strategy will be developed in collaboration with all partners and observers to ensure swift and effective cascade of information.

A major activity of WP6 will be the design and organisation of a dedicated European user meeting promoting the achievements of ExPaNDS and offering focused tutorials to enable users to fully benefit of the work having been performed by the consortium. This event will be co-organised by other European initiatives such as LEAPS, PaNOSC, LENS and others.

To spread the project achievements beyond the borders of Europe, the WP6 partners will identify suitable large international conferences such as Synchrotron Radiation Instrumentation, Gordon X-ray Science or Neutron conferences where the EOSC services could be presented. On a case by case basis, attendance and/ or sponsorship will be decided upon. The goal is to be present at 15+ events in the form of trade stands, presentations or posters. As part of the communications strategy WP6 will regularly provide contributions to key websites like lightsources.org, wayforlight.eu, interactions.org and neutronsources.org.

WP6 has set up a website for ExPaNDS (expands.eu). The website continues to be updated throughout the development and progression of the project. In this current reporting period and since the project began the following elements have been created and added:

- a 'members' link to the internal collaboration tool;
- a page containing the open job applications at our partners;
- a page summarising the grant 'deliverables' and linking these to the Zenodo publications;
- a dedicated page to the grant related projects, giving a short overview and link to the projects website;
- a new tab entitled 'resources' has been added, sharing the grant outputs, such as the infographics, grant videos and recorded presentations;

ExPaNDS shares its news and events content via its own grant website, social media channels but also through its collaborations with other grants / websites such as PaNOSC, [Lightsources.org](http://lightsources.org), LEAPS, LENS, [Neutronsources.org](http://neutronsources.org).

ExPaNDS SharePoint was put in place in January 2020 and is now fully functional (110 members recorded on 23.03.2021). This collaboration space gives all members access to all documentation in relation to the project, ongoing progress reports, meeting minutes, individual work package folders to offer a common location for depositing all relevant documentation.

ExPaNDS' twitter account tweets regularly with news from the project, related projects and collaborations from the PaN or EOSC community informing about latest news, events or updates (total of 169 tweets and a total of 257 followers recorded on 23.03.2021).

ExPaNDS LinkedIn account is updated with news from the project (total of 27 followers recorded on 23.03.2021).



Related Projects

The Photon and Neutron Open Science Cloud (PaNOSC) is a European project for making FAIR data a reality in 6 European Research Infrastructures (RIs), developing and providing services for scientific data and connecting these to the European Open Science Cloud (EOSC).

ExPaNDS and PaNOSC are closely collaborating to achieve together a web of FAIR data and services for the European Photon and Neutron communities.



[OFFICIAL SITE](#)



LEAPS is the League of European Accelerator-based Photon Sources, actively and constructively promoting and ensuring the quality and impact of fundamental, applied and industrial research carried out at their facilities.

All ExPaNDS Photon Sources are part of the LEAPS.

[OFFICIAL SITE](#)

ExPaNDS website - page on related projects²⁴

WP6 participates in the 5b projects task force on communication, which meets frequently and allows for great understanding of what each project is working on.

WP6 assisted WP1 in the organisation of the joint all hands annual meeting which was held with PaNOSC. Due to the pandemic the decision was made to host the event fully 'virtually' as travel restrictions were imposed. Over 140 participants, including IT professionals, researchers and managers from photon and neutron facilities, and representatives of the EOSC landscape, attended the 1st online Photon and Neutron EOSC Symposium on the 9th November. The projects' annual meeting followed on 10th – 11th November, gathering PaNOSC and ExPaNDS managers and contributors to present the projects' status and roadmap for the future, and to interact with the community to further increase the impact of the actions implemented so far. WP6 ensured the website News & Events page was updated with an overview of what took place at the meeting and making the presentations from the first day available to all.

Since the inception of this project WP6 has represented ExPaNDS at a number of user meetings, be that in person at the DESY-XFEL user meeting in Hamburg in January 2020, or

²⁴ <https://expands.eu/related-projects/>



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virtually since at SOLARIS in September 2020, EMBL Hamburg November 2020, HZB User Meeting December 2020, ISSE December 2020, DESY-XFEL user meeting January 2021. ExPaNDS also hosted a booth at the annual EOSC Projects EXPO which ran from the 16th - 19th November 2020. Lastly, ExPaNDS was also presented in the plenary session of the SOLEIL user meeting in January 2021.



ExPaNDS Postcard

ExPaNDS has hosted a number of virtual events itself in collaboration with our internal work packages. In collaboration with WP2, ExPaNDS hosted two online workshops aimed at instrument scientists and other facility staff providing an overview of FAIR – data that are findable, accessible, interoperable, and reusable.

ExPaNDS jointly hosted a Technical Coordination workshop on the 8th & 9th October, aiming to gather professionals from the Photon and Neutron facilities who are participating in the development and integration of the technical tools on both projects. Its focus was also to get an overview from each facility to talk about the team and their role within the project and their relevant expertise to foster closer relationships between all work packages for both grants.

ExPaNDS and PaNOSC contributed to the 2020 virtual edition of the EGI conference, with the panel session “Achieving a Photon and Neutron community federated cloud in EOSC”, taking place on 2 November 2020. During the event, our representatives of the two projects presented PaNOSC and ExPaNDS’ contributions to:

- Enabling PaN facilities to produce FAIR data;
- Federated services accessible through the ‘PaN portal’;
- Sharing knowledge with the open PaN e-learning platform;
- Remote access to PaN facilities’ instruments and services, including data transfer.

The most recent event hosted by ExPaNDS WP6 was the PaN ESCAPE Data Management Workshop, which took place on January 12th 2021 and was jointly organised with WP1, PaNOSC and the H2020 ESCAPE project²⁵. The workshop aimed at presenting the ESCAPE Data Lake concept to the PaN community to discuss possible synergies. Speakers

²⁵ <https://projectescape.eu/>



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shared their use case on federated data infrastructures, enabling large national research data centres to work together and build a robust cloud-like service.

T6.2	ExPaNDS' marketing and communication toolbox (Diamond)
<p>An important activity right from project start will be the development of a full brand with associated style guide and relevant templates (logo, presentation, banners, conference folders, giveaways etc) for both internal and external communication use.</p> <p>The WP6 participants will assist the technical WP2-3-4 in the creation of a graphical presentation (infographic, maps and figures) of their metrics and Key Performance Indicators linked to ensure that their output is clearly communicated and widely disseminated using traditional channels as well as social media (see Task 6.1).</p> <p>The marketing tool box will also include a standard information sheet on ExPaNDS and on the benefits of Open Data for RI users. A document highlighting the vision of ExPaNDS for EOSC, discussing the roadmap to reach the goals and announcing training events will be designed, targeting software engineers, managers and librarians of national RIs.</p>	

The development of ExPaNDS full brand started early on in the project with logos and banners already available for the kick-off meeting in September 2019. The grant has created promotional material such as postcards which have been handed out at user meetings to attendees highlighting the project and driving traffic to the website and the project mailing list. Two posters were also designed to be used at our partner facilities but also during events, for general information on ExPaNDS and the benefits of open data.

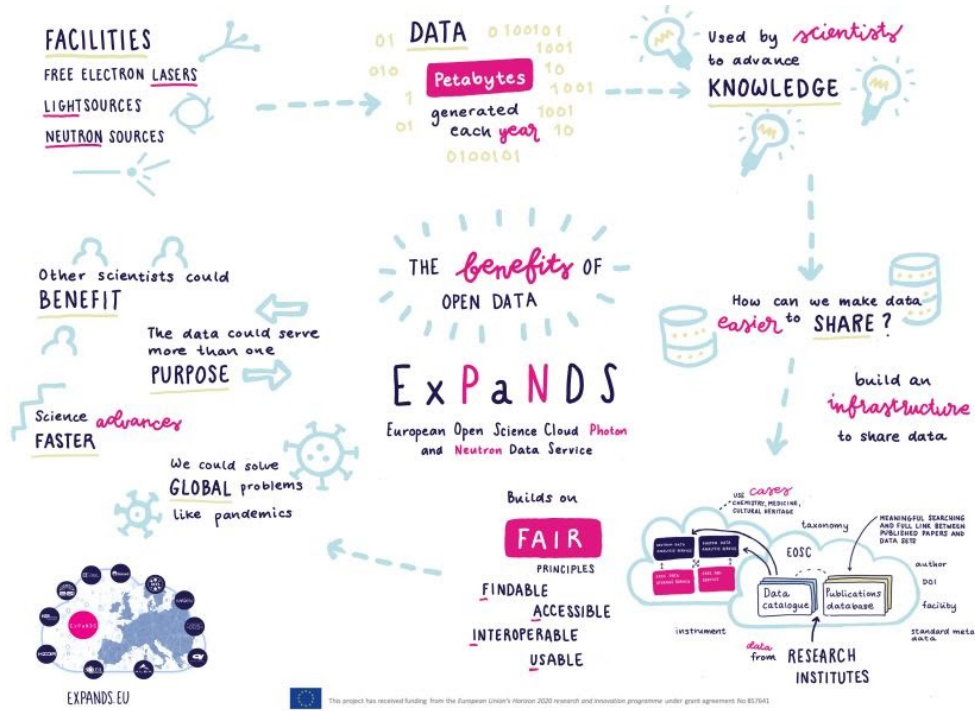


Poster "Understanding more about our ExPaNDS project"



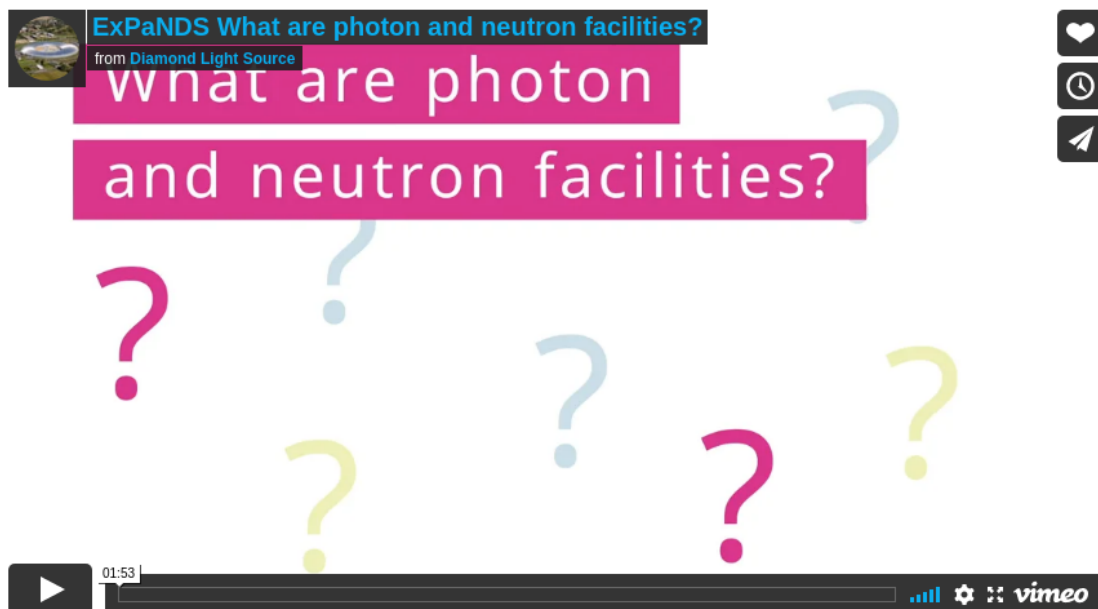
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ExPaNDS



Poster "The benefits of Open Data "

ExPaNDS has so far produced three infographic videos for dissemination over social media and the website. Dissemination covered but was not exclusive to PaNOSC, Lightsources.org, LEAPS, LENS and Neutronsources.org. The first infographic video was designed to explain what the project is looking to achieve, the second is focusing on the benefits of open data. The third video was produced in direct feedback received explaining what Photon and Neutron facilities are. All infographics and videos were also sent to all Head of Communications at all participating national facilities for dissemination.



ExPaNDS video "What are photon and neutron facilities"²⁶

²⁶ <https://vimeo.com/video/438859175>



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General presentation templates of ExPaNDS are available to all partners in SharePoint.

T6.3	Formulation and dissemination of metrics and refinement of KPIs (Diamond)
<p>We propose to develop a taxonomy strategy in collaboration with the relevant technical work packages and to support their ontology requirements.</p> <p>In addition, a metrics will be developed in order to enable an efficient monitoring of the project's KPIs. The WP leader will ensure that these metrics are meaningful, accessible and are widely reported on global platforms such as www.lightsources.org, www.interactions.org, www.wayforlight.eu and www.neutronsources.org to serve as best practice examples for the target groups of these platforms.</p> <p>The metrics will be developed in line with the taxonomy strategy and will also reflect milestones in data management.</p> <p>The achievements of ExPaNDS evaluated against these metrics and the KPIs will be unveiled every year on WorldScience Day. In addition, we propose to use the American Association for the Advancement of Science and the European Science forum (ESOF) to highlight the importance the European Open Science Cloud and the importance of PaNOSC as well as ExPaNDS and their transformative impact.</p> <p>A style will be designed for the collaboration to ensure information is well presented which then will be filtered in all communications and literature produced.</p>	

WP6 proposed in October 2019 an initial version of the ExPaNDS taxonomy (excluding neutron) to start the development process of a common vocabulary to classify and categorise all appropriate records and datasets.

7.3. Outlook for WP6

Carry on with the communication and dissemination of the project using the developed channels, i.e. website, social media, and fostered relationships with other grants, websites and facilities.

Next steps will be to concentrate on implementing our Vision and Roadmap activities²⁷ planned for the remainder of 2021 and beyond, with the creation of use cases relevant to ExPaNDS and in collaboration with other grants. Discussions are ongoing to organise and host a symposium targeted specifically at librarians with WP2 to cover all FAIR data management aspects in their area of expertise. We are also in talks with WP5 to organise the next joint PaNOSC / ExPaNDS learning portal workshop to map training available for facility users.

In addition, ExPaNDS is looking to engage with publishers to add data fields for publications, to encourage the change needed that data fields are linked to Publications more 'naturally'.

²⁷ <https://doi.org/10.5281/zenodo.4424770>



7.4. Deliverables and milestones of the WP for the period

#	Deliverable	Partner	Due date	Actual date
6.19	Assistance to the development of the taxonomy strategy for the relevant data catalogues	Diamond	31 Oct 2019	31 Oct 2019
6.1	Communication and Dissemination Plan	Diamond	30 Nov 2019	30 Nov 2019
6.2	Project website	Diamond	30 Nov 2019	30 Nov 2019
6.3	Social media strategy	Diamond	30 Nov 2019	30 Nov 2019
6.8	ExPaNDS presentation for conferences	Diamond	29 Feb 2020	29 Feb 2020
6.9	ExPaNDS presentation for conferences	Diamond	30 Jun 2020	30 Jun 2020
6.14	Engage science communicators based at PAN RIs	Diamond	29 Feb 2020	29 Feb 2020
6.17	Standard Information sheet on ExPaNDS and the benefits of Open Data for RI users	Diamond	30 Apr 2020	30 Apr 2020
6.18	Infographic of metrics and KPI linked to WP2, 3 and 4	Diamond	29 Feb 2020	29 Feb 2020
6.4	Vision and roadmap documents for key audiences	Diamond	31 Dec 2020	19 Dec 2020
6.10	ExPaNDS presentation for conferences	Diamond	28 Feb 2021	06 Apr 2021
6.15	Dedicated European user meeting focused on ExPaNDS	Diamond	31 Oct 2020	-

#	Milestone	Partner	Due date	Actual date
18	Website	Diamond	30 Nov 2019	16 Sep 2019
19	Social media strategy	Diamond	30 Nov 2019	29 Nov 2019
25	Collaboration network of communicators in place with regular updates	Diamond	29 Feb 2020	29 Feb 2020
28	Infographic and KPI presentation	Diamond	29 Feb 2020	29 Feb 2020
27	Standard ExPaNDS information sheet	Diamond	30 Apr 2020	30 Apr 2020
21	Reference from community websites	Diamond	30 Sep 2020	13 Oct 2020
20	Vision and roadmap documents	Diamond	31 Dec 2020	19 Dec 2020



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Appendix: List of all ExPaNDS-related meetings

WP #	Date	Host	Topic
All	11-12/09/2019	DESY, Hamburg	Kick-off meeting
WP1	<i>Quarterly</i>	DESY, Hamburg	Collaboration Board meetings
<i>12/09/2019, 06/02/2020, 16/07/2020, 13/11/2020</i>			
WP2	22/10/2019	RDA, Helsinki	RDA 14th plenary
WP2	1/11/2019	Diamond	FAIR data presentation to staff
All	4-7/11/2019	CERIC ERIC, Trieste	PaNOSC annual meeting
WP2	11/2019	FAIRsFAIR, Porto	Open Science Fair
WP1	<i>Bi-weekly</i>	DESY	Project Executive Board meetings
<i>13/11/2019, 03/12/2019, 17/12/2019, 07/01/2020, 21/01/2020, 04/02/2020, 18/02/2020, 03/03/2020, 17/03/2020, 31/03/2020, 14/04/2020, 28/04/2020, 26/05/2020, 09/06/2020, 23/06/2020, 07/07/2020, 21/07/2020, 04/08/2020, 18/08/2020, 01/09/2020, 15/09/2020, 29/09/2020, 13/10/2020, 27/10/2020, 17/11/2020, 01/12/2020, 15/12/2020, 19/01/2021, 02/01/2021, 16/01/2021</i>			
All	26-28/11/2019	EOSC secretariat	EOSC Symposium (Budapest)
WP2	28/11/2019	FAIRsFAIR	FAIRsFAIR synchronisation task force
WP6	05/12/2019	HZB, Berlin	User meeting
WP1	<i>Bi-weekly</i>	ESRF	PaNOSC Project Management Committee
<i>04/12/2019, 18/12/2019, 15/01/2020, 29/01/2020, 19/02/2020, 04/03/2020, 18/03/2020, 01/04/2020, 15/04/2020, 29/04/2020, 13/05/2020, 27/05/2020, 03/06/2020, 17/06/2020, 01/07/2020, 15/07/2020, 13/08/2020, 26/08/2020, 09/09/2020, 23/09/2020, 07/10/2020, 21/10/2020, 04/11/2020, 18/11/2020, 02/12/2020, 16/12/2020, 06/01/2021, 20/01/2021, 03/02/2021, 17/02/2021</i>			
WP2	16/12/2019	UKRI	ExPaNDS facilities landscaping results analysis
WP1	<i>Monthly</i>	DESY / ESRF	Joint ExPaNDS / PaNOSC WP1 meetings
<i>07/01/2020, 04/02/2020, 03/03/2020, 07/04/2020, 05/05/2020, 02/06/2020, 07/07/2020, 01/09/2020, 08/10/2020, 03/11/2020, 01/12/2020, 14/01/2021</i>			
WP1	13/01/2020	ESFRI, Brussels	ESFRI cluster projects meeting on EOSC
WP6	24/01/2020	Diamond	ExPaNDS presentation to staff
WP4	<i>Bi-weekly</i>	DESY	WP4 regular meetings
<i>22/01/2020, 27/03/2020, 03/04/2020, 17/04/2020, 05/06/2020, 19/06/2020, 03/07/2020,</i>			



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17/07/2020, 31/07/2020, 14/08/2020, 28/08/2020, 11/09/2020, 25/09/2020, 09/10/2020, 23/10/2020, 28/10/2020, 06/11/2020, 20/11/2020, 04/12/2020, 18/12/2020, 14/01/2021, 22/01/2021, 05/02/2021, 19/02/2021			
WP1	Multiple	EGI	ExPaNDS architecture
23/01/2020, 31/01/2020, 14/02/2020, 28/02/2020			
WP3	Monthly	ESS	Joint ExPaNDS / PaNOSC WP3 meetings
27/01/2020, 05/03/2020, 13/03/2020, 17/04/2020, 11/05/2020, 12/06/2020, 10/07/2020, 14/08/2020, 11/09/2020, 09/10/2020, 13/11/2020, 04/12/2020, 15/01/2021, 12/02/2021			
WP1	28-30/01/2020	Universidad Politécnica de Valencia	All-hands meeting EOSC-Synergy
WP6	28-31/01/2020	DESY, Hamburg	DESY and XFEL user meeting
WP1	Bi-monthly	INFN	INFRA-EOSC-5 Service onboarding TF
30/01/2020, 17/02/2020, 04/05/2020, 12/06/2020, 03/07/2020, 06/10/2020, 21/12/2020			
WP6	3-6/02/2020	ESRF, Grenoble	User meeting
WP2	Bi-monthly	DANS	INFRA-EOSC-5 FAIR TF
04/02/2020, 18/03/2020, 20/04/2020, 09/06/2020, 25/08/2020, 23/09/2020, 26/11/2020, 26/01/2021			
WP1	Quarterly	KIT	INFRA-EOSC-5 National policies TF
06/02/2020, 29/04/2020, 02/10/2020			
WP5	Multiple	SOLEIL	WP5 meetings
06/02/2020, 02/04/2020, 08/10/2020, 28/10/2020, 06/11/2020			
WP1	Bi-monthly	GARR	INFRA-EOSC-5 Landscaping TF
06/02/2020, 24/03/2020, 21/04/2020, 17/06/2020, 30/11/2020, 22/01/2021			
WP4	07/02/2020	DESY, Hamburg	WP F2F all day meeting
WP3	11-12/02/2020	ESS, Lund	PaN search API and data catalogues coordination
WP1	Multiple	ELI	Annual meeting organisational committee
14/02/2020, 04/03/2020, 23/03/2020, 06/04/2020, 23/04/2020, 25/05/2020, 08/06/2020, 15/06/2020, 26/06/2020, 13/07/2020, 13/08/2020, 21/08/2020, 31/08/2020, 21/09/2020, 05/10/2020, 12/10/2020, 26/10/2020, 02/11/2020, 05/11/2020, 09/11/2020, 16/11/2020			



WP #	Date	Host	Topic
WP2	17-20/02/2020	DCC, Dublin	15th International Digital Curation Conference
WP5	<i>Bi-monthly</i>	Technopolis	INFRA-EOSC-5 Training TF
<i>19/02/2020, 30/04/2020, 30/06/2020, 05/02/2021</i>			
WP2	<i>Multiple</i>	ESRF	Joint ExPaNDS / PaNOSC WP2 meeting on data policy
<i>19/02/2020, 24/03/2020, 26/03/2020, 27/03/2020, 02/04/2020, 09/04/2020, 07/05/2020, 14/05/2020</i>			
WP5	26-28/02/2020	DANS, The Hague	Workshop on training in EOSC
WP3	10-11/03/2020	ESRF, Grenoble	ICAT workshop
WP6	<i>Quarterly</i>	Trust-IT	INFRA-EOSC-5 Comms TF
<i>11/03/2020, 23/04/2020, 10/07/2020, 23/09/2020, 01/12/2020</i>			
WP3	<i>Multiple</i>	Diamond	Techniques ontology
<i>23/03/2020 (with WP2), 20/04/2020 (with WP2), 30/04/2020, 06/05/2020, 12/05/2020, 27/05/2020, 09/06/2020, 07/09/2020, 18/09/2020, 05/11/2020, 22/01/2021</i>			
WP2	<i>Multiple</i>	ALBA	Standards for data management meeting
<i>31/03/2020, 07/04/2020, 28/05/2020, 11/06/2020, 25/06/2020, 07/07/2020, 16/07/2020, 21/07/2020, 28/07/2020, 04/08/2020, 11/08/2020, 18/08/2020, 25/08/2020, 01/09/2020, 08/09/2020, 15/09/2020, 29/09/2020, 06/10/2020, 13/10/2020, 27/10/2020, 03/11/2020, 12/11/2020, 17/11/2020</i>			
WP1	02/04/2020	INFN	ESCAPE AAI webinar
WP1	03/04/2020	GARR	EOSC-Pillar webinar on national initiatives survey results
WP1	<i>Multiple</i>	ALBA	Technical coordination workshop preparation
<i>06/04/2020, 01/07/2020, 09/07/2020, 04/08/2020, 14/09/2020, 21/09/2020, 28/09/2020, 05/10/2020</i>			
WP1	<i>Multiple</i>	PSI	ESFRI-RIs-EOSC organisational committee
<i>06/04/2020, 16/07/2020, 10/09/2020, 23/09/2020, 25/09/2020, 29/09/2020, 05/10/2020</i>			
WP4	22/04/2020	DESY	Container orchestration workshop
WP2	24/04/2020	EOSCsecretariat	Working meeting on the EOSC glossary



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WP #	Date	Host	Topic
WP1	27-28/04/2020	EOSCsecretariat	EOSC Landscape Validation workshop
WP2	29/04/2020 and fol.	DANS, The Hague	FAIRsFAIR synchronisation workshop and following working sessions
WP1	<i>Quarterly</i>	EOSC secretariat	INFRA-EOSC-5 CPCB meeting
<i>17/01/2020, 30/04/2020, 11/09/2020, 19/01/2021</i>			
WP2	<i>Multiple</i>	UKRI	WP2 meeting on extended data policy for national RIS
<i>12/05/2020, 16/06/2020, 02/07/2020, 09/07/2020, 23/07/2020, 30/07/2020, 06/08/2020, 13/08/2020, 20/08/2020, 27/08/2020, 10/09/2020, 17/09/2020</i>			
WP6	12/05/2020	ALBA	ExPaNDS presentation to staff
WP3	<i>Multiple</i>	ESS	Federated search API implementation meeting
<i>13/05/2020, 18/05/2020, 23/10/2020, 24/11/2020, 14/12/2020, 29/01/2021, 26/02/2021</i>			
WP1	18/05/2020	EOSC secretariat	EOSC consultation day
WP1	18-20/05/2020	EOSC-hub	EOSC-hub week
WP2	<i>Multiple</i>	UKRI	WP2 meetings on glossary
<i>19/05/2020, 26/05/2020, 02/06/2020, 09/06/2020</i>			
WP2	<i>Monthly</i>	UKRI	WP2 monthly meetings
<i>21/05/2020, 18/06/2020, 14/07/2020, 11/08/2020, 24/09/2020, 15/10/2020, 19/11/2020, 17/12/2020, 18/02/2021</i>			
WP2	10/06/2020	EOSC FAIR WG	EOSC PID Policy consultation
WP3	01/07/2020	Diamond	Wayforlight.org presentation
WP3	08/07/2020	Diamond	Instrument scientists survey results presentation
WP3	<i>Multiple</i>	PSI	WP3 meetings on roadmap
<i>06/07/2020, 23/07/2020, 22/09/2020, 25/09/2020, 30/09/2020, 05/10/2020, 06/10/2020</i>			
WP1	15/07/2020	EGI	Onboarding procedure to EOSC for ExPaNDS
WP2	20/07/2020	UKRI	Discussion on national policies with KIT
WP2	21/07/2020	STFC	ExPaNDS presentation to STFC scientific computing department / data division



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WP #	Date	Host	Topic
WP1	<i>Multiple</i>	DESY	SRIA consultation meetings
<i>03/08/2020, 11/08/2020, 04/09/2020</i>			
WP6	09-11/09/2020	SOLARIS	User meeting
WP6	23-25/09/2020	ESS / ILL	User meeting
WP1	24/09/2020	Elettra	IPFS presentation
WP1	25/09/2020	DEIC	EOSC-Nordic Symposium
WP1	28-29/09/2020	EOSCsecretariat	EOSC Landscape Final Validation workshop
WP5	01-02/10/2020	UKRI / ALBA	FAIR for facilities and the FAIR experiment training workshops
WP1	05/10/2020	ESRF	PaN meets Globus
WP1	06-07/10/2020	PSI	ESFRI RIS-EOSC workshop
WP4	08-09/10/2020	ALBA	ExPaNDS / PaNOSC technical coordination workshop on PaN portal
WP2	13/10/2020	F1000	Open Research Europe presented to ExPaNDS
WP1	19-22/10/2020	EOSC secretariat	EOSC Symposium 2020
WP5	29/10/2020	FAIRsFAIR	Workshop on training resources catalogue interoperability
WP1	02-04/11/2020	EGI	EGI conference 2020 including Achieving a PaN community federated cloud in EOSC
WP1	09-11/11/2020	ELI	ExPaNDS / PaNOSC annual meeting and EOSC PaN symposium
WP2	10-12/11/2020	RDA	RDA 16th plenary
WP6	16-19.11/2020	EOSC-hub, FREYA, SSHOC	EOSC projects EXPO
WP3	18-19/11/2020	DESY	PETRA IV workshop on scientific computing
WP1	<i>Multiple</i>	PSI	Risk analysis update brainstorming
<i>03/11/2020, 20/11/2020, 27/11/2020</i>			
WP6	<i>Multiple</i>	DESY / Diamond	PaN ESCAPE mini-workshop preparation
<i>24/11/2020, 30/11/2020, 14/12/2020, 06/01/2021</i>			



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857641.

WP #	Date	Host	Topic
WP2	08/12/2020	ISIS	ExPaNDS data policy framework presented to data policy colleagues / managers
WP6	10/12/2020	HZB	MLZ user meeting
WP4	10-11/12/2020	PSI	PaNOSC portal deployment at ExPaNDS facilities
WP5	11/12/2020	DANS (EOSC-hub)	Joint workshop on DMP preparation
WP3	15/12/2020	ESS	NeXus constructor presentation / demo
WP2	<i>Multiple</i>	HZB	WP2 task on DMPs meetings
<i>07/01/2021, 04/02/2021</i>			
WP6	12/01/2021	Diamond	PaN ESCAPE data management mini-workshop
WP2	14/01/2021	UKRI	WP2 task on PIDs kick-off
WP6	21/01/2021	SOLEIL	User update 2021 including ExPaNDS presentation
WP6	25-29/01/2021	DESY	DESY and XFEL user meeting
WP2	28/01/2021	UKRI	Best practices DOIs/PIDs
WP6	01-02/02/2021	Diamond	Africa-Europe Symposium on Research Infrastructures
WP1	04/02/2021	ESRF	Training on AAI
WP6	08-10/02/2021	ESRF	User Meeting
WP5	09-11/02/2021	ESS	Train the trainers workshop on PaN learning platform

