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OSCARS: Taking science research to the next level

To cite this article: Melanie Nentwich *et al* 2025 *J. Phys.: Conf. Ser.* **3010** 012128

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OSCARS: Taking science research to the next level

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Abstract. Open Science Clusters' Action for Research and Society (OSCARS) is a EU-funded project that will bring your research data to new audiences and target new use-cases. The FAIR (Findable, Accessible, Interoperable and Reusable) principles allow research data to be used in new and novel ways, with increased citations acknowledging the original researchers and facilities. OSCARS builds on the EOSC (European Open-Science Cloud) science cluster's outcomes to support open science, by enhancing communication between the science clusters, creating thematic competence centres, improving the outcomes of the science clusters software and services, connecting this activity with other EOSC funded activities, and providing direct funding for open science projects.

1 Introduction

Open Science Clusters' Action for Research and Society (OSCARS) is a EU-funded project that brings together European *Research Infrastructures* (RIs) organised into five *Science Clusters* (SCs) along the ESFRI (European Strategy Forum on Research Infrastructures) thematic research domains:

- ENVRI: European environmental research infrastructures,
- ESCAPE: European Science Cluster of Astronomy and Particle Physics ESFRI,
- LS-RI: European Life-Sciences research infrastructure,
- PaNOSC: Photon and Neutron Open Science Cloud,
- SSHOC: Social Sciences and Humanities Open Science Cluster.



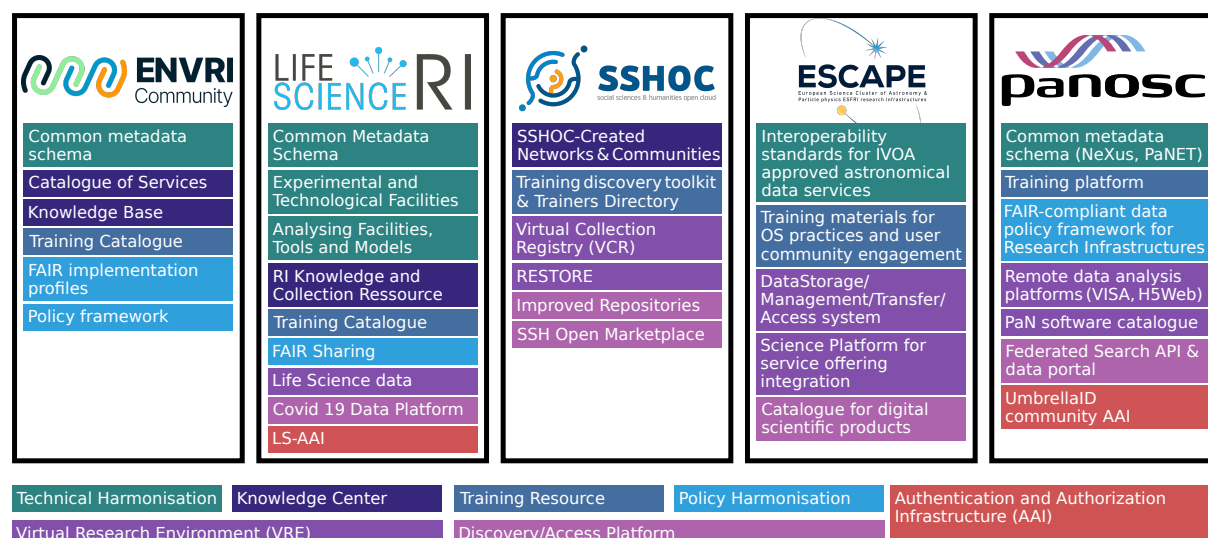


Figure 1: An initial schematic overview of the actively involved Science Clusters and their previous contributions to the creation of a pan-European data access mechanism and to the coordination activities for the EOSC on-boarding process. The Science Clusters are: Environmental Sciences (ENVRI Community), Life Sciences (Life-Science RI), Social Sciences and Humanities (SSHOC), Astronomy and Particle Physics (ESCAPE), and Neutron and Photon Science (PaNOSC). The figure based on [1] displays only the current status of the clusters; the graphic will be updated upon upcoming developments.

Each of these clusters established long-term structures by Memoranda of Understanding (MoU), Collaboration Agreements, or established consortia [1]. On this basis, two to three RIs have been appointed on their behalf in order to take part in the OSCARS consortium to drive the uptake of FAIR-data-intensive research throughout the European Research Area. All participating Science Clusters had already received funding as H2020 INFRA EOSC (European Open Science Cloud) projects and made significant contributions to their scientific communities (see Fig. 1).

The two main objectives of the project are: consolidation of preceding achievements and support of research communities via Open Science projects. Within the consolidation part, the OSCARS project now focuses on extending preceding achievements, deploying the concept of community-based *Competence Centres* (CC), and enhancing the previously created services into lasting interdisciplinary services, thus targeting new use-cases and applications.

The OSCARS Open Calls aim to select projects through a cascading grant mechanism to be funded for *Open Science Projects and Services*. The SCs will support these new projects through the construction of their own composable, inter-cluster services, the consolidation of their CCs, and mentoring programmes.

Here, we will present the strategy within OSCARS and provide the anticipated impact within the photon science community, as core members of the *Photon and Neutron Open Science Cluster* (PaNOSC).

2 Work Packages and their aims

2.1 Work Package WP1 – Cluster Open Science Competence Centres

WP1 will establish specific domain-orientated community-based Competence Centres for the science clusters' facilities. These competence centres will focus specifically on the achievements and skills of their scientific community and respond to their needs. Additionally, they will also encourage and strengthen intra-cluster collaboration, the sharing of best practices, software, services, and strategy development. Specifically, the following steps are pending: prototyping funding opportunities as well as events, improving the PaN Training catalogue and extending it by best practices, establishing and extending a catalogue of software, services, and data sources (with WP2), building/adopting a common vocabulary (with WP3).

So far, we defined the relevant RIs of PaNOSC as the members of LEAPS, LENS, as well as laser-based RIs and CERIC institutes, complemented by the European user organisations. In total, we identified 31 potential institutions (Fig. 2) that could both benefit from participating in the PaN Competence Centre (PaN CC) and also enrich the community's knowledge by contributing to the PaN CC. Furthermore, we identified possible representatives of the RIs that deal with the topic of Open Science and in particular

provide services. They are mostly situated in the IT and experimental control sector. After contacting the identified people, we found volunteers from the different RIs to resource on a best-effort capacity the PaN CC.



Figure 2: Overview of the potential PaN CC members, including LEAPS and LENS associated, as well as additional related RIs.

Currently, the PaN CC is already contributing in creating a catalogue of competences that will allow the RIs to support each other more easily by sharing and distributing existing competences [2]. Additionally, the members of the PaN CC supported the creation of portfolio of services and data sources that will be available to the broad public soon. The formation of the PaN CC is an ongoing process not only with respect to trainings, workshops, and joint projects, but also with respect to the members. All RIs in the broad range of PaN research are encouraged to join the network anytime by exploring panosc.eu/about-panosc/photon-and-neutron-competence-centre or contacting us directly via competence.centre@panosc.eu.

The OSCARS project foresees the PaN CC and the other four thematic CCs to start operation by the end of 2024, with a roadmap for training events and workshops available at that point.

2.2 Work Package WP2 – Composable Research Infrastructure Services in EOSC

WP2 takes a catalogue of existing services, data hubs, and analysis platforms of varying maturity and will identify how they might be composed, possibly when enhanced, to provide broader support for scientific investigation. This might involve services and software from different science clusters, breaking down barriers that prevent cross-domain research and allowing new research. OSCARS will enhance specific tools to show the benefits to researchers.

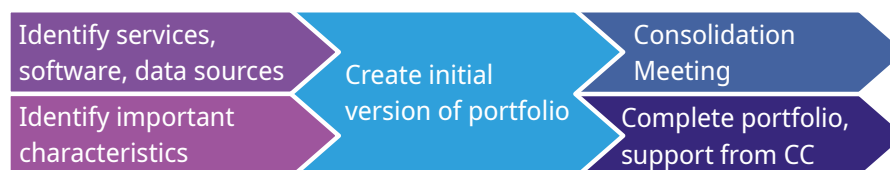


Figure 3: Current progress of WP2 towards the consolidation of research infrastructure services.

In contrast to some of the other Science Clusters, such a catalogue did not yet exist for the PaN cluster at the beginning of the OSCARS project. The creation of the catalogue includes the identification

of services, software, and data sources on the one hand and the definition of necessary characteristics on the other hand. Some of these characteristics were adapted from the EOSC marketplace, which was unfortunately shut down in April 2024. Other properties were added step-wise when they seemed to become important for upcoming steps, *e.g.* *Technical Readiness Level* (TRL) and licenses. The search for services and data sources proved to be tedious, time-consuming work, which started with collections at highly relevant webpages of the PaN community, *e.g.* IUCr and RI collections. This first version of the portfolio is currently being refined with the support of the CC members, which analyse the list of their RI for missing services and data sources, as well as for missing properties. Furthermore, the portfolio has been enhanced during the Consolidation Meeting in October 2024, which put emphasis on harmonising the results of all Science Clusters and on identifying services with a high potential of composability in order to discuss the best options for *Composable Open Data and Analysis Services* (CODAS).

Subsequently, a Composability Action Plan will be drawn up in order to organise the decisions made at the Consolidation Meeting and translate them into concrete work items. After presenting the Composability Progress, the Engagement Phase of the work package starts, which aims at reaching out to the research communities to demonstrate the CODAS.

2.3 Work Package WP3 – Testing and Widening Uptake

WP3 will establish connections between OSCARS and other EOSC projects, task forces, and related efforts at both European and international level. This collaboration allows OSCARS to leverage existing developments, align its activities with ongoing work, and enhance the adoption and interoperability of its outcomes. Additionally, WP3 will implement a testing methodology aimed at improving the quality of project results and introduce *Key Performance Indicators* to evaluate the efficiency of Competence Centres within specific Science Clusters. These efforts will culminate in a configurable dashboard, tailored to the specific components of each Competence Centre, and will undergo testing by the Cluster Competence Centres at the earliest opportunity.

Within the broader EOSC framework, WP3 also spearheads the creation of a *Data Steward* registry, based on the Skills4EOSC ontology [3], which reflects DS skill sets and their involvement in European and international projects, task forces, and global working groups such as EOSC [1], RDA [4], and CODATA [5].

The next steps for this work package include the development of a mentoring framework, see Fig. 4. This framework will establish a mentoring network that addresses the user requirements of different SCs. It will enable the transfer of knowledge, best practices, and technical expertise by connecting experienced domain experts with emerging practitioners. The framework will also include tailored training sessions and workshops designed to support the development of the SCs and enhance their capacity to contribute to a more cohesive and efficient research environment across Europe.



Figure 4: Upcoming milestones within WP3.

2.4 Work Package WP4 – Management, Communication and Open Calls

WP4 oversees a funding programme that accepts a wide range of proposals that target open science and the FAIR data environment. The involvement of a broad range of research communities will drive the uptake of FAIR-data-intensive research throughout the European Research Area. Successful proposals are funded for 1 – 2 years, with a budget of 100 – 250 k€. The Open Calls will focus on supporting projects that [6]

- leverage and/or exploit the SC's services aimed at demonstrating the use of EOSC resources,

- enlarge the inclusiveness of new RI communities
- use data and services that are well established and were in the past on-boarded to the EOSC platform,
- connect RIs and/or domains, covering topics with high societal relevance,
- deposit the generated digital research data in the SC's trusted catalogues.

The Open Calls are split into two rounds, with each call being open for two months. At the time of SRI 2024, the first call had already closed and the projects were under review. At the time of writing this proceeding, in total 58 projects have been selected (signature pending) from an overall of 264 proposals from 19 different countries, see Fig. 5. Preliminary statistics reveal that within PaNOSC, 14 proposals from six different countries have been selected (mainly from France and Germany). Almost half of all selected proposals welcomed the mentoring offer by WP3 in behalf of the OSCARS project; within PaNOSC even two third would like to use this offer, which is the highest quota amongst all SCs. Industry cooperations are involved in a total of 16 % of all selected proposals (21 % within PaNOSC), emphasising the relevance of Open Science even for corporations. PaNOSC has the second highest share of cross-cluster or cross-domain projects (71 %; total rate 57 %), which reflects the wide range of research topics investigated at synchrotron, neutron, and related RIs as well as the high relevance of PaN research for other SCs.



Figure 5: Announcement of the successful evaluation and selection of projects from the 1st OSCARS Open Call within WP4.

The second call will be open from 15th of January 2025 until 15th of March 2025, offering another opportunity to receiving financial support for Open Science projects. The funded projects will publish the impact of their work mid-term and at the end of OSCARS in order to showcase the results and engage with all organisers, participants, and stakeholders.

In addition to the Open Calls, WP4 is responsible for management and communication of the OSCARS project. In this function, a webpage has been created and both a data management [7] as well as an exploitation plan [6] have been established.

3 Conclusion and Outlook

The OSCARS project is a great initiative to consolidate preceding achievements with focus on Open Science within the five big Science Clusters in Europe. The project will drive the uptake of FAIR-data-intensive research throughout the European Research Area through its four closely-related work packages.

WP4 is responsible for overall project management, but also for the organisation and implementation of the Open Calls. The second round of the Open Call will be open from 15th January 2024 until 15th of March 2025 and will provide another opportunity to receive funding for numerous promising projects. These projects require a mentoring network, which is set up and extended by WP3 and will additionally support RIs within the different Science Clusters covering not only community specific, but also general Open Science topics. The community specific needs and skills will be identified by the Competence Centres organised by WP1. With the support of the CCs, WP2 will identify and enhance suitable services in order to compose them into highly useful workflows within their communities. These new developments will finally be shared with the communities again using the well established contacts to the RI representatives through the Competence Centres.

Acknowledgement The OSCARS project has received funding from the European Commission's Horizon Europe Research and Innovation programme under grant agreement No. 101129751.

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