

# A view on the Implementation of the European Open Science Cloud

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A successful implementation of EOSC at the local level

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01.09.2017



### About this document and the authors

This article was created collaboratively by members of the Austrian Open Science Support Group (AOSSG) and the Italian Open Science Support Group (IOSSG). It was one of the results of an Open Science Workshop held in Padua and Venice in August/September 2017. The outcomes were also presented at the University Ca' Foscari of Venice in September 2017 and at the national GARR Conference "The Data Way to Science" in Venice in November 2017.

### AOSSG – Austrian Open Science Support Group

The mission of the Austrian Open Science Support Group (AOSSG) is to assist Austrian ministries and funding bodies in supporting the information needs of the European Commission, ERA-ERAC, and ERC with respect national developments in research infrastructures, open science and open innovation strategies and in the implementation of the European Open Science Cloud (EOSC). AOSSG assists in producing regular status reports and country reports that provide updates on the development of institutional research data management policies, research and archiving infrastructures, and data management services. AOSSG maintains ongoing contact and communication with Austrian stakeholders through various channels, including meetings organized with international experts and international conferences (such as the conference "The European Open Science Cloud: Austria takes initiative" within the framework of the Austrian EU Council Presidency in autumn 2018). AOSSG also supports continuous technical exchange with peer organizations, such as the Italian Open Science Support Group (IOSSG), and international initiatives, notably the Research Data Alliance and e-Infrastructures Reflection Group. AOSSG was formed as an informal group in 2017 at the University Library Vienna in cooperation with representatives from the ministries BMBWF and BMVIT and the funding organizations FFG and FWF.

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### IOSSG – Italian Open Science Support Group

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The Italian Open Science Support Group (IOSSG) is an informal not-for-profit Italian working group that involves experts with different skills from different university research services (research support, ICT, digital libraries, Open Science, legal, communication) in order to promote the culture of Open Science in Italy, with a special focus on the implementation of the EOSC at local level. More information at:

<https://sites.google.com/view/iossg/>

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## A successful implementation of EOSC at the local level

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### Introduction

The European Commission is promoting the European Open Science Cloud (EOSC), a supporting environment for Open Science whose ultimate goal is the building of a federated, globally accessible environment where researchers, innovators, companies and citizens can publish, find and re-use each other's data and tools for research, innovation and educational purposes under well-defined and trusted conditions<sup>1</sup>.

According to the resolutions adopted so far, the EOSC is not an actual cloud service, but is based on the reengineering of existing e-infrastructures based on scientific data. As such, it is a bottom-up process based on existing and emerging elements in the Member States, with lightweight international guidance and governance and a large degree of freedom regarding practical implementation<sup>2</sup>. As research is not an individual task, but the result of a joint effort between research and research support, the EOSC implementation impacts the whole organization of any research institutions; in particular it requires a shift from vertical to horizontal thinking by integrating several skills and knowledges into a coordinate set of services.

The goal of this paper is to outline the discussion and to present the main outcomes of the workshop “*The European Open Science Cloud (EOSC) versus the single Research Institution. Drawing the scenario at local level*” held in Padova and the “*Workshop on Open Science*” held in Venice (August-September 2017) organized by the University of Padova, the Ca' Foscari University of Venice and the University of Vienna<sup>3</sup>. The results of the workshops are discussed here together with the final recommendations about the implementation of an EOSC strategy at local level.

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<sup>1</sup> [http://ec.europa.eu/research/openscience/pdf/realising\\_the\\_european\\_open\\_science\\_cloud\\_2016.pdf](http://ec.europa.eu/research/openscience/pdf/realising_the_european_open_science_cloud_2016.pdf)

<sup>2</sup> <http://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud>

<sup>3</sup> All documents are freely available at <https://hdl.handle.net/11168/11.334202>



## European Open Science Cloud - Three Layers

The implementation foresees the development of three layers: a governance layer, a service layer and a data layer.

The governance layer addresses the issues of policies, good governance, trust, legacy and sustainability; as noted above, it suggests a bottom-up strategy based on federation of existing infrastructures.

The service layer supports the governance strategy in several directions: (1) research support, legal and ethical issues, exploitation rights, statistics and analytics; (2) IPR protection, privacy and personal data protection; (3) big data processing and high-performance computing; (4) data storage, access and re-use; (5) Data Management Plans; (6) terminology; (7) data exchange, integration and fusion across different disciplines.

The data layer provides technical support in terms of data storage, manipulation, conversion, export and re-use, discovery strategies and cataloguing functions.

Different research areas have different demands about the amount of data; physics, life sciences and Earth sciences are the leading users with the most data intensive environments, while humanities and citizen science, at the other side of the range, are less demanding; such distribution justifies a high degree of flexibility in the organization of the research support systems, coherent with the bottom-up approach suggested by the European Commission.

## New Roles for Researchers and Research Support

To pave the way to the realization of EOSC at local level the Research Institution must provide a Digital Workflow to manage the research process and assure the convergence of knowledge into shared transversal services to support research. This organization is motivated by the idea that excellent research is possible only if accompanied by optimal research support.

A goal of this process is the offering of advice and the concrete monitoring on cost generation and development along the entire chain concerning data production, storage and reuse, e-infrastructures, human resources development, funding, services, timing. The key elements are:

- The Digital Workflow of research processes, to assure the compliance with the FAIR principles<sup>4</sup> required by the EOSC;
- Research Data Management Policies, regarding roles and responsibilities of Researchers, Research Support Entities and the Institution as well as Good Governance models<sup>5</sup>;
- Data Management Plans defining data and all processes concerning their production, use and final reuse<sup>6</sup>;
- A single Reference Point gathering transversal knowledge for research support involving a set of competences and skills (internal or/and outsourced).

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<sup>4</sup> Findable, Accessible, Interoperable, Reusable/Reproducible <https://www.dtls.nl/fair-data/go-fair/>

<sup>5</sup> H2020 Project LEARN [www.learn-rdm.eu](http://www.learn-rdm.eu) and the results of the working group GDL-Dati della ricerca (policies sulla gestione dei dati della ricerca – [http://wikimedia.sp.unipi.it/index.php/OA\\_Italia/Risorse\\_sugli\\_open\\_research\\_data](http://wikimedia.sp.unipi.it/index.php/OA_Italia/Risorse_sugli_open_research_data))

<sup>6</sup> The Data Management Plan (DMP) is a structured guideline (document or online tool) which depicts the entire lifeline of data and can be updated if needed. Data management plans must assure that research data are traceable, available, authentic, citable, properly stored and that they adhere to clearly defined legal parameters and appropriate safety measures governing subsequent use. Ideally, DMPs should be delivered in a machine actionable format. See: Model Policy for Research Data Management (RDM) at Research Institutions/Institutes, <http://learn-rdm.eu/wp-content/uploads/RDMToolkit.pdf>



The Reference Point is intended to be a service (internal or external). In any case the Reference Point will be able to solve questions referring to shared services, central services, cross-disciplines services.

The implementation of the EOSC at a local level will improve the visibility and the attraction of the Research Institution, contributing to improve also its ranking. Research Support entities will be called to play a major and strategic role in this process. The improved quality of training will attract further resources and more qualified personnel and students.

## Conception and adoption of RDM Policies

RDM Policies are key issues for the implementation of the EOSC Governance Layer. In this context we refer to the outputs and findings of the project LEARN<sup>7</sup> and the results of the Italian working group *GDL-Dati della ricerca*<sup>8</sup>.

Policies concern: Jurisdiction, Intellectual Property Rights, Handling Research Data, Responsibilities, Rights, Duties (e.g. Researchers are responsible for..., the Research institution is responsible for...), Validity.

Data management plans (DMPs) are the key elements of policies. They refer to description and management of information, the content acquired and generated by the projects and the context in which they are used. DMPs must be generated at the start of the project and may evolve into versions during the project development.

They concern: administrative details of the project, Dataset description, Standards and metadata, Data Management, documentation and curation, Data security and confidentiality of potentially disclosed information, Data sharing and access, Legal and ethical issues, Responsibilities and resources, Relevant institutional policies on data sharing and data security.

The FAIR principles are the guiding elements in the conception of the DMPs<sup>9</sup>. Particular attention should be paid to the following issues: the management of resources (especially time), reproducibility and reusability of the produced data, the assignment of proper licenses, security (infrastructure and processes), compliance of legal and ethical issues.

At present, there are several models of DMPs available<sup>10</sup>. They are offered by the issuing institutions according to the domain research processes of the related disciplines. Therefore, the research workflow may have different expressions (e.g., depending on data formats, size, objectives...)<sup>11</sup>.

## A set of recommendations for the successful implementation of EOSC at a local level

A bottom process grows and extends according to the dynamics of the organization's components which are most often different in size, data usage, temporal scale, requirements and practices. Partial insuccess (or, worse, complete failure) cannot be avoided, in principle, if the dynamics are left free to evolve

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<sup>7</sup> Project LEARN [www.learn-rdm.eu](http://www.learn-rdm.eu)

<sup>8</sup> Policies sulla gestione dei dati della ricerca, [http://wikimedia.sp.unipi.it/index.php/OA\\_Italia/Risorse\\_sugli\\_open\\_research\\_data](http://wikimedia.sp.unipi.it/index.php/OA_Italia/Risorse_sugli_open_research_data)

<sup>9</sup> See also GO-FAIR <https://www.dtls.nl/fair-data/go-fair/>

<sup>10</sup> See DCC-DMP online, the template of the EC, national versions of DMP online, locally tailored versions, etc.

<sup>11</sup> Future developments foresee the creation of machine actionable plans, process management plans and data stewardship plans.



independently. Hence, the importance of the governance layer is evident, and the Policies and DMPs are instruments effective only if properly driven by a common superior view.

Precise recommendations, even if plausible in principle, should be considered more than practical guidelines, and a control must be exercised over them to ensure the successful implementation of a common EOSC strategy. From the workshops in Padova and Venice the following issues were emerging as primaries:

1. Enhance the shift of mentality from vertical based thinking to horizontal based thinking. Create and offer new horizontal cross disciplines services. Make convergence of knowledge possible and gather efforts into Reference Points for Research Support.
2. Start Policy development and alignment at all levels, and introduce especially RDM Policies. As a further step generate and adopt Data Management Plans, supporting Data Stewardship <sup>12</sup>.
3. Acknowledge the increasing relevance of the roles of research support units versus the researcher community.
4. Get involved into the bottom-up processes of EOSC and participate to the networks and initiatives concerning the EOSC. Activate all stakeholders in your Research Institution for the realization of the EOSC.

## Conclusion

The realization of the European Open Science Cloud will generate changes. The implementation of the EOSC at a local level will improve the visibility and the attraction of the Research Institution, contributing to improve also its ranking. Research Support entities will be called to play a major and strategic role in this process. It will be not easy but the sooner a Research Institution starts to adapt its organization, the sooner it will achieve the goal: EOSC is planned to be a tangible reality in 2018.

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<sup>12</sup> See: Realising the European Open Science Cloud,  
[https://ec.europa.eu/research/openscience/pdf/realising\\_the\\_european\\_open\\_science\\_cloud\\_2016.pdf](https://ec.europa.eu/research/openscience/pdf/realising_the_european_open_science_cloud_2016.pdf)