EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR COMMUNICATIONS NETWORKS, CONTENT AND TECHNOLOGY

CNECT/C – Digital Excellence and Science Infrastructure
CNECT/C/01 – eInfrastructure and Science Cloud

GENERAL PROJECT REVIEW CONSOLIDATED REPORT

Grant agreement (GA) number:	777536
Project[1] Acronym:	EOSC-hub
Project title:	Integrating and managing services for the European Open Science Cloud
Type of action:	RIA
Start date of the project:	01/01/2018
Duration of the project:	36
Name of primary coordinator contact and organisation:	Yannick LEGRE (EGI Foundation)
Period covered by the report:	from 01/01/2018 to 11/11/2019
Periodic report/Reporting period number:	Assessment not linked to the end of a reporting period
Date of first submission of the periodic report (if applicable):	Not applicable
Amendments (latest AMD concerning description of the action)[2]	13/02/2019 (AMD-777536-42)
Date of meeting with consortium (if applicable):	08/10/2019 - 09/10/2019
Name of project officer:	Christos CHATZIMICHAIL
Name(s) of monitors:	– Totka CHERNAEVA • Ministry of Transport, Information Technologies and Communications – Emanuela SIRTORI • CSIL Centre for Industrial Studies • Innovation and Networks Executive Agency (INEA) • CSIL and University of Milan – Oscar CORCHO GARCIA • LocaliData • Universidad Politécnica de Madrid • Intelligent Software Components – WILLIAM JOHN WOMERSLEY • Science and Technology Facilities Council

[1] 'Project' means the same thing as 'action'.
[2] Only amendments to the description of the action (DoA; AT21) are relevant for general project reviews since they always have to be carried out against the latest version of the DoA

1. Overall assessment

1. Overall assessment
Project has achieved most of its objectives and milestones for the period with relatively minor deviations.
2. Significant results linked to dissemination, exploitation and impact potential
Project will likely provide results with significant immediate or potential impact in the next reporting period (even if not all objectives mentioned in the Annex 1 to the GA were achieved). The project has identified 9 key exploitable results (KERs), i.e. outputs which can be taken up, exploited and reused to support the future mature EOSC. During the progress review, an account was given as to the contribution of individual WPs to these KER. They are: 1. The EOSC Portal and Marketplace: it is the most tangible and visible result of the project. A prototype has been developed and is currently being improved. 2. Service Management System: comprehensive, coherent and standards-based set of procedures and processes to manage the complete life cycle of services in a complex environment. 3. Internal services in the Hub Portfolio: set of service interfaces providing basic enabling services for EOSC access. 4. Business and sustainability models to achieve compatibility of business and sustainability models of traditional and emerging EOSC stakeholder groups. 5. Services in the EOSC service portfolio: an open and integrated service catalogue covering different scientific fields were developed in WP6 and WP7, according to a model that combines a federated core and a service portfolio with common rules of participation. Currently, the service portfolio incorporates 86 services (76 researcher facing services and 10 internal services in the Hub Portfolio) plus many more in the process of onboarding. These services come from both project partners and research communities and external actors that registered their services through the Service Providers onboarding process (via the EOSC Portal). 6. Rules of participation the services to provide to onboard services into and make them discoverable and accessible through the EOSC Service Catalogue and Marketplace (including rules for policy integration, security policies, data sharing policies) (WP2). 7. Interoperability and integration guidelines aimed to remove fragmentation of RI service provisioning and allow technical integration of solutions to EOSC system (WP10). 8. Digital Innovation Hub, with 6 initial business pilots already supported. 9. Training courses and materials: Tools, consulting models and material that make it possible to provide training services tailored to optimally fit the needs of the diverse audience EOSC needs to reach. The progress review has shown that the project is on track to deliver these results. The key elements of the Hub, such as the EOSC service portfolio and service catalogue, the EOSC-Hub Marketplace, the EOSC Digital Innovation Hub and the Competence Centres are in a state assuring that in the next project period they will be directly exploitable. The service portfolio management process, in particular, the extended service description template, the services categorisation which is agreed with eInfraCentral, the already operational initial onboarding procedure, and practical rules of participation are well designed. The distinction between common and thematic services and the different levels of integration and engagement is logical, simple, and well described, and gives order and structure to a very complex landscape of services and needs/interests for federation. The project activities have already contributed to its expected impact, in terms of: • increased ability of national, regional and pan-European researchers to discover and access services and resources in different scientific disciplines; • increased interoperability and interconnection between the existing and new research digital infrastructures across Europe, by providing a thematic service catalogue for data exploitation, and a single sign-on, integrated access and order management system; • support to open science, by providing services to share and discover all types of research artefacts (publications, datasets, software, metadata, workflows, etc.) and their data sources (repositories, archives).
3. General comments
Good progress has been achieved in the development of the service architecture, operability and interoperability. There is a positive trend in the number of services onboarded and orders placed. Most of the technical work has been done in professional manner, with a service-oriented view. These activities are extremely important and challenging. Even if more work is needed to further develop the EOSC Portal and make it more user-friendly, the technical background architecture is there and this is already an important achievement of this project in the first implementation period. The EOSC portal is currently in a prototype stage and is undergoing further development to make it more attractive. The

dissemination efforts to promote the launch of the EOSC portal have been very significant and very successful. A wide set of materials (documents, presentation, videos) has been made available by the projects beyond the web site itself.

The project is contributing to the state of the art especially in terms of the integration of different services, and from a technical perspective by proposing interoperability specifications so that different services can be integrated easily into the architecture and framework. It is also contributing to ensuring better science in the supported research communities. The project has not yet had a strong impact on society, partially because of the complexity of the problems that are being tackled, which requires a lot of prior work. However, such impact is expected during the second period.

IPR management is adequately handled, with a detailed analysis of all the items subject to protection and the usage of adequate means to ensure IP protection in all cases, while ensuring open access and usage to as many results as possible with appropriate licenses.
The initial DoA was amended twice so far, and a third amendment is forthcoming in order to allocate some of the reserve budget to the Early Adopter Programme.

Some delays have occurred during the first project period. They were due to different reasons, from the late onboarding of all project participants, to the EC request to develop a prototype of the Portal by November 2018, to the extensive consultation and interaction process with other projects and stakeholders from the scientific communities and the EOSC ecosystem. These delays have been sufficiently explained. The project is huge, with 100 partners (linked third parties included) and over 150 staff working on it, and it is heavy to "move". The need to collaborate with other projects makes it even heavier. The capacity of the project management to coordinate and steer the activities is remarkable. Management is proceeding smoothly and in accordance with the principles of sound financial management.
In the first project period, the project spent 63% of resources for service integration, management and delivery (WP4,5,6,7,10,13), 22% for service adoption (WP8,9,11,13), 8% in service planning (WP2, 3, 12) and 7& for project administration, coordination and quality management (WP1). Service planning and adoption are behind schedule due to the late start of the project. Overall, the use of resources is coherent with the efforts made and results already achieved.

The project is now quite on track and no major delays are expected in the second period. However, it is acknowledged that the project still faces significant risks (especially the successful and "complete" onboarding of community-oriented services and the definition of the EOSC federating model and value proposition), which cannot be fully mitigated by the project itself (see below more on this).
The recommendations for the first informal review have been taken into account, in general, by the consortium, with a special mention to the increase in the collaboration with other ongoing initiatives and projects.

Most of the deliverables are accepted, except for some reports for which minor revisions are suggested (see Annex 1).

4. Recommendations concerning the period covered by the report

No major recommendations or corrective actions are suggested for the first project period. All resources are proposed to be accepted.
All deliverables are accepted with the exception of the following ones, for which some revisions are asked:
• D1.5 Data Management Plan
• D1.6 Data Management Plan (v.2)
• D5.2 First release of federation and collaboration services and tools
• D5.3 First Report on maintenance and integration of federation and collaboration services
• D6.1 First release of common services software
• D8.1 Report on progress, achievements and plans of the Competence Centres
• D10.4 EOSC Hub Technical Architecture and standards roadmap v2

Annex 1 provides more details on the improvements suggested for each of those deliverables. The revised deliverable should be resubmitted maximum 3 months after the consortium has received this review report.
In some cases, even if the deliverable is accepted, suggestions are provided to improve the quality of the next versions to be submitted during the second project period (see again Annex 1 and Recommendation 6 below).

It was noted that some of the deliverables have been submitted with a few month delays. While the reviewers do not consider such delay very critical now, it is important that the delays do not accumulate. Some of the deliverables were submitted for review in the very last moment. More timely submission of deliverables is recommended (see also Recommendation 5 below).

5. Recommendations concerning future work, if applicable

Recommendation 1: Maintain strong focus on the development of an operational and user-friendly EOSC Portal
The project should keep a high focus on the Portal development, on service integration, backend and frontend services. An attractive and functioning Portal, that can be acknowledged as a best practice by more and more communities, would

help EOSC-hub to increase acceptance on the Portal itself and the EOSC. The following specific recommendations are put forward:
• Rec. 1.1: It is recommended to continue working to make sure that the Portal looks like a single Portal instead of two different frontends (Portal and Marketplace). For that purpose, the material from the Marketplace should be adequately integrated into the service catalogue.
• Rec. 1.2: It is recommended to run a good number of workshops and training activities, so as to get requirements for the Portal, co-design it with other interested parties, and improve the user experience with the Portal. More information on the feedbacks collected and if/how they were taken into account in the development of the Portal should be provided during the next review meeting.
• Rec. 1.3: It is advised to expose dashboards or statistics about the services involved in running the Portal, the computing resources, number of CPU hours involved in experiments, etc.; that is, all the relevant material that allows showing more clearly all the "work behind the scenes" to provide support to researchers and research communities.
• Rec. 1.4: The Portal should include a set of training material focused on EOSC use, distinguishing between different audiences, as a minimum, users vs. service providers (see also Recommendation 3).
• Rec. 1.5: The project should establish smooth collaboration with EOSC-enhanced project (INFRAEOSC-06-2019-2020) since its start.
• Rec. 1.6: The project should start making an effort towards rebranding most of the services (or at least the main building blocks identified in the architecture and implemented in the project) with the EOSC brand, so as to show an appropriate level of integration. If external complementary actions and decisions are needed, the project should bring the issue at the attention of the relevant stakeholders and decision-makers (see also Recommendation 4).

Recommendation 2: Increase service integration
The project needs to work to expand the service offerings beyond the HPC/cloud computing provision, which still seems the core product. More specifically:
• Rec. 2.1: Some work was done to engage with ESFRI clusters projects and connect with their communities, but this has not yet translated in the use of services through the Portal. While the Cluster projects have just started, EOSC-Hub should keep interacting with them in order to stimulate them to use the Portal in the next period, as the project implementation progresses.
• Rec. 2.2: Scientific Competence Centres are recommended to be brought into the Marketplace. Even if the DoA does not expect the Competence Centres to become EOSC service providers, in the effort of engaging more user communities and keep expanding the Marketplace, the project should actively promote their integration into the Portal.
• Rec. 2.3: There are still some data-intensive science user communities (e.g. medical research) that are not yet represented in EOSC. This may limit the usability of the services in the future for those communities. Continuous efforts should be done to engage other communities, at least by targeting them with communication and training activities or asking feedbacks on the Portal.

Recommendation 3: Adjust the training strategy to make it more focused
A clearer and more focused training strategy, target and goal of training are needed to prioritise actions. The training catalogue and materials should be enhanced with clear routes that should be used by interested scientists/communities when trying to understand how to use EOSC, as well as for service providers to be able to provide services in EOSC.

Recommendation 4: Ensure fluid and open communication with the European Commission
• Rec. 4.1: Considering the project is facing significant risks coming from a crowded external environment with still limited consensus on the EOSC federating model, branding and the Portal's value proposition, the project coordinator should promptly bring to the Commission's attention any significant communication problems with the EOSC Governance and working groups. At the same time, the project is advised to continue contributing to the EOSC Working Groups and try to create strong links with the EOSC Governance stakeholders. The project is invited to make specific proposals on how communication and exchange of information could possibly be improved, in the view of increasing the project impact.
• Rec. 4.2: The Portal metrics should be kept monitored on an ongoing basis and a periodic report should be sent to the EC. This report should contain info on services and providers (number of offered services and providers, how many the orderable services through the Marketplace are, requests for new services, service orders country distribution, service orders' fields, new communities involved) and views/visitors (number of visitors of Portal and Marketplace, visitors country distribution, page views plus unique page views of Marketplace/Catalogue, number of unique users making an order). The frequency of this reporting should be agreed with the EC. It would be advisable to create a dashboard to enable the automated extraction of this information.
• Rec. 4.3: It is recommended to send to the EC, once by December 2019 and once in December 2020, the average number of users per month for each provider (users of service in general, not through EOSC), in order to assess if EOSC has a positive effect on the usage of already on-boarded services through the traditional e-Infrastructure channels.

Recommendation 5: More timely deliveries

• Rec. 5.1: The project should make more efforts to ensure the timely submission of deliverables in the next project period. This includes the progress report, which should be made available, for further reviews, in advance to reviewers, to facilitate the understanding of the actions taken in each WP.
• Rec. 5.2: After the EOSC symposium, the project coordinator should submit to the European Commission a brief report to summarise the progress made on the Portal and the outcome of the discussion about the training materials and activities.
• Rec. 5.3: The third amendment should be submitted as soon as possible in order to have sufficient time to implement the new activities in the next project period.

Recommendation 6: Improve the quality of some deliverables
Even if most of the deliverables of the first project period are accepted, the project implementers are invited to take into account the comments by the reviewers in the deliverables for which a next version is foreseen. More detailed comments and suggestions are provided in Annex 1.