HORIZON 2020 CONTRIBUTIONS TO BUILDING THE EOSC

Joint CNECT-RTD project meeting & workshop

9-10 September 2019

FINAL WORKSHOP REPORT

EOSCsecretariat.eu has received funding from the European Union's Horizon Programme call H2020-INFRAEOSC-2018-4, grant Agreement number 831644

Background

The European Open Science Cloud (EOSC) was initiated in the European Cloud Initiative[1]. It aims to be a trusted and open distributed system first to the scientific community, providing seamless access to data and interoperable services that address the whole research data cycle, from discovery and mining to storage, management, analysis and reuse across borders and scientific disciplines. Widening to private and public sector is foreseen.

The joint meeting and workshop organised by DG CONNECT and DG RTD was intended as a Concertation Meeting for the ongoing H2020 projects funded by the DGs CNECT and RTD, and extended to include members of the EOSC Executive and Governance Boards. The two DGs are coordinating the activities of both the projects and the Boards, and there was a recognised need to bring everybody together and inform each other about the respective activities in order to find synergies and identify joint activities for the benefit of all participants and the EOSC community as a whole.

The workshop gathered around 100 invited stakeholders, including project representatives from 30+ EOSC-related H2020 projects, the EOSC Executive Board and members of the Governance Board. EOSCSecretariat provided support for the organisation.

For the European Commission (EC), the main objectives of this meeting were to (1) identify key assets for EOSC from the projects, (2) coordinate them with the Governance objectives, and (3) facilitate cooperation between the projects and the projects and the Governance structure.

[1] https://ec.europa.eu/digital-single-market/en/european-cloud-initiative

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Key Takeaways

General remarks

The EOSC is starting to emerge, as well as its identity, and there is a lot of interest in all the projects that participated in the meeting and the communities they represent. However, many issues remain and all parties consider open discussions on the future of EOSC extremely valuable.

Most important technical roadblocks for EOSC and its adoption include (a) the speed of data transfer from the source as the connection needs to be able to accommodate large data sets and increasing request for the data; (b) scalability to accommodate big data, as the ever-increasing size of data sets and amount of data being produced can limit the storage and ability to access and transfer data; (c) availability of open source software and (d) brokering of services that satisfy research communities, national infrastructures, and service providers.

User-driven development

Overall, it was considered that user requirements should guide the development of EOSC at all times. In order to achieve this, openness and transparency are needed in all steps of the process. This would ensure users are incentivized and convinced to use EOSC and clearly see the benefits and added value. It is expected that the appropriate means for a continuous dialogue with all relevant community stakeholders are provided in the process of building EOSC. The usefulness of collecting use cases was highlighted and several projects have evidence and results that can serve as best practice for EOSC (e.g. in the area of earth observation and life sciences). Showcasing them via demonstrator projects was suggested.

Key issues are deployment and interoperability whereby the architecture should allow services to be smoothly plugged-in and offered to users. PIDs and AAI are important, researchers do not necessarily need to be aware of fine-grained implementation aspects of EOSC but want an easy system that helps them do their research.

Key point is that the sum of EOSC should be more than its individual parts and that the benefits of collaboration and interoperable data should be demonstrated. It should be recognised that there are differences in the levels of technical readiness of countries and communities to take part in EOSC and support is needed, whilst conversely, initiatives that are fully deployed and operating effectively may not see a need to engage and invest in EOSC.

The priorities and added value of EOSC

The value of EOSC relies on the ability to address complex digital needs; integrate data and services from multiple suppliers; co-fund cross-infrastructure interoperability; the hosting and exploitation of research data of general interest; and provide technical support and advice. It was considered that in its first steps, **EOSC should prioritize availability and access to data, interoperability and federation.** The key elements of added value of EOSC include a serious and reliable AAI system, services to facilitate the discoverability and use of data and computing resources, availability of on-demand compute and storage capacity, but also a common data repository for long-term preservation of data, high speed connectivity for efficient data transfer and alignment with EuroHPC for processing big data sets.

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EOSC should provide generic core services that are needed across all research communities. The federating services are seen as a **minimum necessary requirement** for EOSC to function as a federation. Priority functions for the federated core should be determined, addressing also the interoperability needs. **Different federation levels and models** need to be considered depending on the use case (e.g. from discovery to matchmaking or full integration).

The Minimum Viable Product (MVP) needs to fund service and resources that are of general interest and applicability, for which sharing of provisioning introduces savings in cost. The goal is to cover the gap between the complexity of the services and making things seem simple for the user. A minimum set of Rules of Participation and on-boarding/federation criteria that reflect different levels of federation is needed. Privacy, security and integrity (quality control) aspects should fully be taken into account. Training and expert advice for integration and piloting across multiple providers are considered as important as technical services and data.

Long-term preservation of data is a difficult issue to deal with. Whether EOSC should act as a data platform, depends on the federation aspect (central entity in or federation of other repositories). EOSC funding for data analytics application layer and access costs to data that needs to be preserved for the long-term are seen as a useful contribution to compensate for costs of long-term preservation, and would incentivize opening the data.

Procurements should be aggregated - including solutions developed by the project, such as data preservation solutions - and made available via EOSC as this would be a factor on which to leverage for making big players adapt to the new environment.

Governance

Governance should be established in an incremental way and be end-user centric. EOSC should provide the **framework for guidance, standards, and policies (EU and national) as well as the definition and creation of legal entity/entities. Strong coordination between the European Commission and the Member States is needed for this**.

Currently **the private sector/industry** is not represented in the governance structure, which should be addressed, e.g. via an industry advisory board. Some communities, such as **researchers from universities and research centres**, are under-represented. Additionally, the introduction of **contact points in the Member States** was suggested in order to be able to follow the respective developments.

Regarding data and service certification, abstracting principles for a common approach in Europe is not straightforward, representing therefore a problematic issue for a common governance. A set of minimum criteria is needed in any case to be EOSC compliant.

Critical issues

Project participants identified several open issues that need to be dealt with to ensure successful development of EOSC. The most commonly identified critical open aspects relate to the sustainability and business model(s). S**table operation and continuous development (predictability), availability of FAIR services and EOSC data and service acknowledgments (branding)** are important in this respect**.**

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Economic incentives (cost recuperation) can be used to open data repositories for their exploitation by external communities. **Co-funding instrument** (capital investments and transnational access provisioning costs) is seen as a sustainable approach, which creates an incentive for national and international providers to pool funding, leverage existing investments, while creating economies of scale. **Different funding models** apply to different elements of the federating core and discoverable services, as data as non-depletable resource can be available for free, depletable resources (compute, storage, human support) need a sustainability path. **Funding challenges** include double dipping; redundancy; quality control; split between research and operational cost.

Furthermore, the rules of participation (RoP) and implications in terms of certification, organizational and technical aspects should be addressed. The rules/principles are different for users and providers as they define who is in or out but are also meant to incentivize. The release procedure for RoP needs to be governed and maintained by a legal entity/ies. The releasing entity should not to be the same as the monitoring entity and the metrics for RoP compliance should be defined. Commercial providers need the RoP to be clarified. Best practices and existing projects and programmes are crucial and should serve as input.

Communication and outreach

Continuous efforts should be made to build the ”EOSC brand” and, hence, communication and outreach activities should be increased to reach and positively engage all relevant community stakeholders and the wider public in these crucial times of development. Thus, strong coordination and alignment is needed and should be encouraged.

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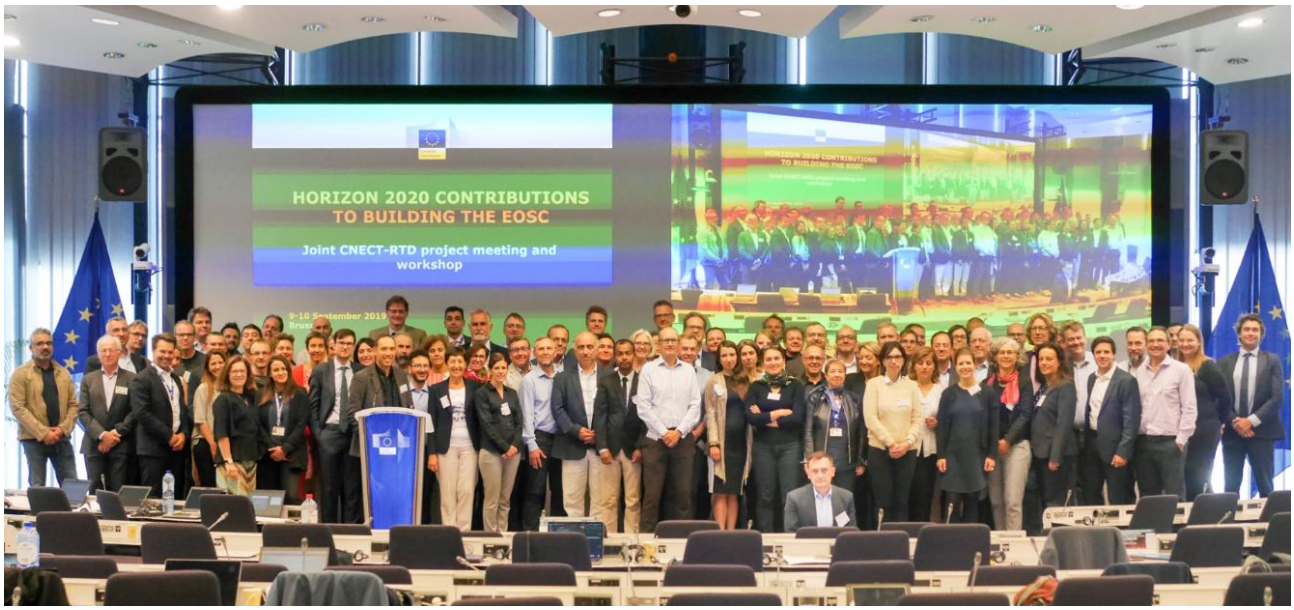
1 Setting the scene – EOSC through times

Europe is at the forefront of production of scientific information in the world and has made steady progress in building world-class digital infrastructure, tools and services for research to help the society in overcoming the challenges of the future. This meeting and workshop was intended to contribute to building and shaping EOSC through discovering and discussing synergies and joint activities for the benefit of all participants and the EOSC community as a whole.

In the opening session the Commission[2], together with the chairs of the Executive and Governance Boards[3], provided an overview of the current status and forthcoming plans, and set the context and purpose of the workshop.



2 Methodology and proceedings

The workshop gathered around 100 invited stakeholders including project representatives from 30+ EOSC-related H2020 projects (Annex 1) and respective members of the EOSC Executive and Governance Boards. The agenda was set out to cover key topics in regard to the current state of development of EOSC. The format was designed to be open and interactive and provided the opportunity to participate directly in breakout sessions or small group discussions. Templates were designed to collect feedback from all the sessions via rapporteurs and Board members facilitated the discussions. Furthermore, participants were also asked to "sponsor" discussions and propose questions.

It was highlighted that previous work in the respective areas was to be respected and exemplified to allow for open discussions. The breakout sessions served to jointly discuss the topics in smaller groupings to pool

[2] https://repository.eoscsecretariat.eu/index.php/s/pE6C9b9N6iNgafw#pdfviewer
[3] https://repository.eoscsecretariat.eu/index.php/s/eacyfT38HfBPk3c#pdfviewer

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the collective knowledge of the participants and constructive feedback. Following the meeting, the input entered in the templates was collected centrally and has served as the basis for the collation of this final report. The final report is distributed to all participants and made public in order to use it to promote the objectives of EOSC and raise awareness amongst stakeholders and the wider community. All the presentations are publicly available for consultation and download at the following link[4].

In the **first breakout session "Me, my project and EOSC"** the projects were clustered in four sectors covering the main sectors of activity, set in advance according to the preference indicated by the projects themselves (order of priority): Core technology, New services, Users and use cases, and Support for policies. Three rounds of discussions were organised in small groups of 4-5 participants and each round lasted 20 minutes. In the last round the participants were asked to change tables to allow more cross-fertilization across the participants (also across sectors).

In the **second breakout session "The Big Five – Architecture, FAIR, Rules of Participation, Landscape, Sustainability"** the coordinators of the five established Working Groups of the Executive Board briefly presented the five topics, the current state of work and three key questions they wanted to explore in the remit of the WG topic. After the presentations[5], the participants joined the WG of their choice and discussed the given topics in smaller groups. Again, a rapporteur for each table was chosen to summarise the results per table. Each question was discussed for about 15-20 minutes.

On the second day, the **third breakout session "Let's talk governance"** was organised. The key issues of the Governance (Chairs of the Board) were presented[6]. Prior to the session, participants had proposed questions for discussion[7], acting as "sponsors" of those discussions in the session. Due to high number of questions, the session was split into two rounds. The sponsors were then asked to join the table with the corresponding number (some questions were merged in order to be able to have more than one sponsor per table). Other participants chose the table of their choice and a rapporteur was chosen. The second round proceeded identically with new questions and sponsors.

[4] https://repository.eoscsecretariat.eu/index.php/s/eDsR2dxwH24fyxe
[5] https://repository.eoscsecretariat.eu/index.php/s/eDsR2dxwH24fyxe?path=%2FWG
[6] https://repository.eoscsecretariat.eu/index.php/s/cMZiFfrysXW5pEf#pdfviewer
[7] https://repository.eoscsecretariat.eu/index.php/s/FgjQD2J6YnBp4CQ#pdfviewer

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It was jointly decided to not have the **fourth breakout session "Let's talk users … and providers"** as most topics put forward for discussion had already largely been covered during the previous sessions. Instead, the results of the discussions of the previous session were presented by the respective rapporteurs and all participants were able to provide their feedback.

3 First breakout session: Me, my project and EOSC

The aim of the first breakout session was to present the current work of the projects contributing to EOSC[8], identify possible joint activities and areas of interest that have not been addressed yet. The key questions were:

1. What are the key areas of competence of our projects? How do they link with each other, what are possible joint activities? What are the best practices, tools and technologies that should be carried on to EOSC?
2. One key element of EOSC will be to connect data from different disciplines and existing data infrastructures. Connecting data and making it visible in EOSC will require quite a significant effort. Is your project dealing with this data from the different disciplines? How do you see your role and support in this regard? Do you see EOSC as a data platform, i.e. as a data repository for Horizon Europe and for long-term preservation of data?

[8] https://repository.eoscsecretariat.eu/index.php/s/mF8foX6xMAbcpmQ

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3.1 Core technology

The project representation at the workshop varied widely in terms of scientific disciplines and sectors. Present during the discussion were project representatives with an established linkage to EOSC on: data generation, data repository, e-infrastructures providers and operators, technology providers for data management systems, designers of a distributed, federated core and related services.

In terms of **best practices, tools and technologies**, the participants discussed the usefulness of collecting use cases and prioritising the identification of key functions of the federated core structure. It was mentioned that core services are needed across all research communities and, hence, generic services for example for data analysis, data transfer are required. Globus and Eduroam were mentioned as examples. Privacy, security and integrity (quality) are aspects that have to be taken fully into account.

A desire for a **core repository** as part of the EOSC federated core that will be maintained beyond the lifetime of the projects was expressed. Furthermore, the element of **discoverability** can be seen as an added value, not only in terms of data but also beyond (persons, projects, and possibly accompanying publications (context)). The Identifiers/PID's may be viewed as the basis, but it is important for EOSC to move beyond and **offer services based on these and closing on the full data path** (provenance for context and reproducibility).

Nevertheless, it was pointed out that the element of interdisciplinarity should not be at the centre of the work, but rather to focus on **data availability and accessibility**. EOSC should put the priority on **opening up data to make it ready as a layer that enables interoperability**. For the data to be useful it needs to be **accompanied by services** that process and analyse it.

The research communities are in need to develop, agree upon or adapt **standards** and apply them in a concrete way. **EOSC can be seen as the place to do this**. However, it needs to be determined whether this can happen in a bottom-up or top-down way.

In order to progress, a **clear set of priority functions** for the federated core should be determined, addressing the federated core as well as the interoperability needs.

Efforts to identify and develop **use cases** and prepare them for their respective inclusion in EOSC should continue. Continuous consultation, exchange and cross-fertilisation between communities and projects is likewise required as there is a **large degree of untapped potential for collaboration**. More opportunities for collaboration among projects should be encouraged and supported.

The role of EOSC is viewed as being the body to put the semantics and the "**optimization**" around data and data sources together and to reach the "**interconnectivity**" via AAI by design. A sound Authentication and Authorization infrastructure (AAI) is required to make it work.

3.2 New services

Present during the discussion were project representatives with the following EOSC-related core competences: service standards, persistent identifiers (PIDs), user engagement, data privacy obligations, open data service solutions, data discoverability, collaborative tools, data annotation and verification, computation, archiving, procurement, methodologies and integrated set of supporting technologies, and AAI.

Possible links and areas of collaboration were identified relating to the development of catalogues ("catalogue of catalogues"), PIDs for services, exchange and collaboration on data collection, storing and processing.

In terms of **best practices to be carried on to EOSC**, project representatives mentioned domain specific APIs and interfaces, workflow (model execution environment), storage services, metadata catalogue, legal and financial framework and consultation, business models, certification. It was suggested that **procurements should be aggregated**, as this would be a factor on which to leverage for making big players adapt to the new environment.

Due to the fact that all projects are dealing with data from different disciplines, a **common data repository** would be useful to sustain and maintain the results. However, there needs to be an effort **to bring together capital investment for sustainable storage nationally as well on pan-European level**. On the other hand, many data archives already exist and EOSC should collaborate with the existing data providers, whilst EOSC may be a solution for less mature communities as well as to set and enforce common standards. However, for this a **legal entity** would be required. Starting simple, one solution could be to provide EOSC-certified services at first and provide network and authorization solution. In the long-term EOSC should be the **legal and certification arm and could act as a regulatory agency**.

3.3 Users and use cases

In this sector, project representatives with the following EOSC linkages participated: cloud-based data platform providers, transnational scientific data analyzers, researchers in neutron science, catalogue infrastructures services providers, cluster projects, research infrastructure providers, EOSC-Hub (multiple service providers).

In terms of links and synergies, it was mentioned that projects could be **linked via demonstrator projects** and open calls were envisioned. Several **best practices** such as the RDA and EOSC Life were mentioned: Whereas RDA can add the international component to EOSC due to its link with the international community, EOSC Life is exposing its training already through EOSC (onboarding solutions envisioned). Furthermore, it was mentioned that **solutions developed by the project**, such as data preservation solutions, **can be procured and made available via EOSC**. Many of the project results may be useful for EOSC as they encompass software, scale-up services, analysis and postprocessing, testing services, data management from FAIR projects, the EUDAT services, digital infrastructure, catalogue services, use cases, and service integration. However, **several needs were identified**, such as computing capacity and AAI. Hence, a **stronger exchange** with the involved communities is required.

Again, it was stressed that EOSC may be successful if a **serious AAI is established**. A solution needs to be found to **facilitate the use of data and computing resources**. However, beyond data there are other issues linked to the **requirements of services and software**.

An important question is also the topic of **sustainability** and the need to determine the readiness of the various local and national EOSC initiatives. Otherwise, EOSC might run the risk of being build but not used. Therefore, **communities must get involved and work together** to find a common way forward.

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3.4 Support for policies

In this sector the following project competences were present: digital transformation services, FAIR repositories and certification, promotion of EOSC in the Nordic and Baltic countries via FAIR policies and practices, e-infrastructure providers, national initiatives services and data (EOSC pillar), EOSC synergy (synchronization of national policies) and requirements/RoP.

Several projects mentioned that they have **evidence and results that can serve as best practice for EOSC** (e.g. in the area of earth observation and life sciences). One project (NI4OS-EUROPE) is developing tools for certification, FAIRness (plus legal support to FAIR), RDM and GDPR-compliance, including wizards, license calculator, policy readers, and decision-trees. Automation will also be pursued. Collaboration should be established to analyze the guidelines created by FAIRsFAIR (or taken by CoreTrustSeal[9]) adapting them to the local/national contexts, respecting also language related issues (and possible translations). Some repositories need to be certified locally, some internationally. However, **abstracting some principles for a common approach in Europe is not straightforward**, representing therefore a problematic issue for a common governance. A **set of minimum criteria** is needed in any case to be EOSC-compliant.

Work is being done on harmonizing policies and federating relevant national research e-infrastructures, scientific data and thematic services, bridging the gap between national initiatives and EOSC. Furthermore, **new capabilities** are being introduced by opening national thematic services to European access, thus expanding the EOSC offer (areas mentioned: Environment, Climate Change, Earth Observation and Life Sciences). This may be supported by an **expansion of the capacity** through the federation of computing, storage and data resources aligned with the EOSC and FAIR policies and practices.

A discussion is now ongoing on the possibility of **extending the scope of CoreTrustSeal** as it does not fully correspond to FAIR (also there is the FAIR Maturity WG in RDA). There are bodies with such relevant adaptation experience (W3C, UNESCO, RDA) and their experience needs to be exploited. **EOSC is a process not a product** and all the tools existing or under development need to support the EOSC process (e.g. come up with **wizards** to select the right approaches). There needs to be some **mechanisms at the Governance level to support such an EOSC**

[9] https://www.coretrustseal.org/

process. The 5b projects[10] can check the realities in their countries, i.e. how the principles are applied in their countries with their services and data.

EOSC Secretariat[11], on its side, is focusing on fostering the coordination of the INFRAEOSC-05 projects and on the compilation of on a registry of a "**coalition of doers**", in which people declare what they want to contribute to EOSC.

Regarding federation, the **definition of boundaries for this "federation"** presents a supplementary challenge. There has to be some degree of flexibility, but a **catalogue of catalogues** should be pursued. A **minimum set of on-boarding/federation criteria** seems to be needed. A **possible vision** may foresee that a researcher logs in into the universal EOSC system and would be able to see all its national, European and thematic services relevant to her/him. This does not entail the establishment of a single portal, rather a **federation of the EOSC portal(s)** with the thematic and other (national) portals, possibly with a personalized view. EOSC can be seen as a **planet system**, with different orbits, some moving closer, some a bit further away, but all need to be gravitated to the federating core. I.e. different levels of gravity may exist, but in governance terms this may reflect in different levels of federation, leading to the discussion on the **minimum set of Rules of Participation**. Each thematic or other portals will have their own ideas, which may need to be discussed.

Long-term preservation of data is another difficult issue to deal with. **Governance and sustainability models** are required here. Whether EOSC should act as a data platform, **depends on the federation aspect**. The notion of data platform needs to be clarified: if this means a central entity in Europe, then at this point an answer cannot be given; otherwise, if EOSC is a **federation of other repositories**, then it is more in-line with the current discussions.

The participants input on the next steps to be taken as well as the identified needs will be presented in the last section of this report.

4 Second breakout session: The Big Five – Architecture, FAIR, Rules of Participation, Landscape, Sustainability

These five themes form the backbone of the current work on future governance of EOSC. After an introduction from the five coordinators of the Working Groups of the Executive Board[12], the participants chose the Working Group topic responding to their interests and discussed the questions related to these five topics in smaller groups.

4.1 Architecture

In this section, the three questions and response of the group discussion are presented.

[10] Projects selected in the call INFRAEOSC-05-b-2018-2019 (Coordination of national initiatives).
[11] https://www.eoscsecretariat.eu/
[12] https://repository.eoscsecretariat.eu/index.php/s/eDsR2dxwH24fyxe?path=%2FWG

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Question 1: The federated services approach assumes that open science initiatives are on the way at the national or community levels. What do you suggest to augment the deployment of open science initiatives at the national and community levels?

1. There is a feeling that there is a **rebranding of existing activities** of e-science centres and national computing initiatives into the term 'Open Science'. This term is **not so well defined or fully understood** by these stakeholders and covers minimally publications, data, and software.
2. EOSC aims to federate existing infrastructures and services. Those initiatives that are deployed and working well should be congratulated and used as **good practice examples**. Key point is to identify **gaps and problems** and support those initiatives experiencing issues.
3. Initiatives that are fully deployed and operating effectively may not see a need to engage and invest in EOSC. Key point is that **the sum of EOSC should be more than its individual parts** and that the benefits of collaboration and interoperating data should be demonstrated.
4. Different countries and communities may be at **different levels of technical readiness** to take part in EOSC. Key point is that the technical readiness of each country and community needs to be taken into account and they need to be supported for them to effectively engage EOSC.
5. To do Open Science we need to ensure that publications, data, and software are open. There are many mandates across institutions, funders, and countries for these research aspects. **The landscape of mandates for Open Science** needs to be mapped and then somewhat coordinated.

Question 2: Can you provide actual examples of operational open science services commonly used at the research scientist level?

1. Researchers themselves are generally not so aware of what exactly Open Science entails. Key point is that researchers **may not need to be aware of the process behind** making their publications, data, and software open as long as they are fully supported to do Open Science.
2. Examples of open data in the **biological community with protein databases** where protein structures are openly uploaded and available to researchers to access and use in their research.
3. Examples of open data in the **astronomical community with astrophysical data made open**. An interesting result is that even more science came from the data than traditional model where researchers collect data then hold on to that data to capitalise on publications before opening.
4. Examples of open data in the **linguistics community with language description** projects at Max Planck Institute for Psycholinguistics along with MPI Language Archive and CLARIN.
5. Examples of open data on a national level in Sierra Leone to coordinate fast and real-time sharing of data to map and combat the **outbreak of Ebola** across national medical responders.
6. Examples of open data for **transport research** in USA and Europe. Furthermore, the opening up of journal European Transport Research Review represents a step towards Open Access and self-sustainability. Key enabling factor was increasing **recognition of the quality and brand leading to investment**.

Question 3: What are the most important technical roadblocks for EOSC?

1. The **speed of data transfer from the source** can be a barrier to opening up the data. The connection needs to be able to accommodate large data sets and increasing request for the data.
2. The ever-increasing size of data sets and amount of data being produced can limit the storage and ability to access and transfer data. **Scalability to accommodate big data** is crucial.

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3. The **availability of open source software** is important to developing infrastructures and services for EOSC. There are examples of industry closing data, which hampers development.
4. The **brokering of services** that satisfy research communities, national infrastructures, and service providers is crucial to the successful adoption and further development of EOSC.

Recommended actions and next steps

EOSC should be developed as a **federation of existing and future infrastructures and services on community and national levels**. The aim is to have an EOSC whereby the sum is greater than the individual parts to the benefit of all stakeholders. The H2020 projects related to EOSC will play a crucial role in developing and giving feedback on EOSC. These projects began in 2015: some have finished, some are mid-way, and some are about to start. The past and current projects can share their experiences to support and improve the newer projects.

Key issues for WG Architecture are **deployment and interoperability** whereby the architecture should allow services to be smoothly plugged-in and offered to users. **Specific topics that are also of importance are PIDs and AAI**. Researchers do not need to be aware of fine-grained implementation aspects of EOSC but want an **easy system that helps them do their research**.

The H2020 projects should feed into WG Architecture. The WG members should check relevant reference documents and outputs from the WGs and discuss them both in the WG and with the projects and build consensus on the synthesis and further proposals. There will be disagreements on some ideas and proposals: this is normal but **key point is that any tensions are made transparent, discussed, and satisfactorily addressed**.

There should be a **short-term vision** with short-term goals and crucially an **overarching long-term vision** for EOSC. The WG will select the most important topics for the WG and create **task forces** to address these topics. The task forces will elect a chair and formulate a **charter to address key issues**. Use cases from existing projects, infrastructures, and services will play **a main role** in the activities of the WG.

The H2020 projects can contribute to the WG and help define the topics to be addressed, analyse relevant reference documents and outcomes from the projects, collect relevant use cases from the projects, identify and engage experts on selected topics, and build consensus forward.

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4.2 FAIR

Question 1: What activities and outputs do you have that are relevant to our remit? (i.e. FAIR practice standards for interoperability PIDs FAIR metrics and service certification)

1. **VirtualBrainCloud** project (4 years): deliverable on FAIRness challenges in accessing discipline data. The deliverable touches on privacy/sensitive data (consents), standards, annotation, ontologies, types of data, anonymization. The aim is the also the R (project is discussing internally how to share the process generating the data).
2. **ENVRI-FAIR** project (4 years): deliverable on FAIRness of data, focusing on the interoperability of data. The aim is mainly the interoperability, which is missing in the domain.
3. **CATRIS** (eInfraCentral): discussion on how to extend the concept of FAIR to other research entities, beyond datasets, such as services. How can FAIRness affect the description/development of services?
4. **FAIRsFAIR** project: WPs on FAIRness of repositories, computer centres, concept of FAIRness certification of services. Collaboration between EOSC-Secretariat to shape up synergies with INFRAEOSC Call 5 projects.
5. **FAIR4Health** project: FAIR access policies to health records (clinical information) taking into account standards (e.g. HL7)[13];

[13] Public deliverables available from https://www.fair4health.eu/en/resources/project-deliverable

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6. **OCRE**: aggregation of procurements (Amazon, Microsoft, etc.), interested to hear any recommendation/standards in the direction of FAIRness. Interesting to double-check influence and interest of adoption from large enterprises.
7. **PANOSC**: photon/neutron research infrastructure (RI) has a common data policy successfully adopted across the facilities involved. The project is willing to revise it in the light of the FAIR principles. Contacts with FAIRsFAIR from which the project expects recommendations. Deliverable expected June 2020. The project has also produced a "Lessons learned" document, which touches on issues encountered by users and the adoption of FAIRness.
8. **DIGITAL HEALTH EUROPE**: policy recommendations for DG Connect about the digital transformation of health care. Approach similar to VirtualBrainCloud, which acts at an application/applicative level.
9. **SSHOC**: deliverable on data interoperability issues on digital humanities.
10. **BE-OPEN**: transport data and FAIRness, code of conduct, forum/observatory for open science in transport.
11. **OpenAIRE:** training on FAIRness to increase awareness across scientists in Europe and worldwide (libraries, institutions, and communities), identify links between scientific results to achieve FAIRness, building bridges between RIs and scholarly communication (transparent publishing)
12. **OpenRiskNet**: measures of FAIRness (in collaboration with ELIXIR), reporting on how FAIRness level can be achieved

Question 3: How do you want us to engage with you and your stakeholder communities (research disciplines institutions funders etc.) to get feedback on proposals?

Participants recommended **direct communication via email and VREs**.

Recommended actions and next steps

Participants recommended **defining communication channels and creating a virtual repository** for deliverables on FAIRness guidelines (define collection in Zenodo.org; ask project representatives to upload their deliverable into the collection with title, authors, link to European project). Furthermore, other projects should be kept informed. **A roadmap** (also in synergy with other specific efforts, such as RDA WG, FAIRsFAIR, etc.) should be defined.

4.3 Rules of Participation

Question 1: Who will be responsible for releasing monitoring and revising the "rules of participation"?

The participants recommended that **the release procedure for RoP needs to be governed and maintained by a legal entity/ies**. Furthermore, it was stated that the releasing entity is not to be the same as the **monitoring entity**. The **metrics** for how RoP are fulfilled should be defined. Then on-boarding (adoption to RoP) and monitoring (continued fulfilment of RoP) should be organised **throughout lifetime of services in a way that scales for the whole of EOSC** (an opportunity to try this in the EOSC-hub and its on-boarding process was highlighted).

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Question 2: How will be the community be involved in “rules of participation”?

It was mentioned that 5b projects are to input on 5b calls regarding governance, therefore they need to **represent the community**. Governance should be established in an **incremental way and be end-user centric**.

Commercial providers need the RoP to be clarified. In relation to this, the question was raised as to **what is to be expected to be subject for procurement or be a provider in EOSC**? **General surveys** could be conducted in order to increase inclusiveness.

The **free-rider-problem** should be addressed, i.e. is there a needand is it possible to require that “if you use you have to contribute”?

Overall, **staged expansion of consultations** should be part of an incremental process. The development of the rules should be **user-centric**.

Question 3: How many different “rules of participation” do we need (e.g. for researchers, service providers, countries)?

The rules/principles define **who is in or out** (e.g. set of standards) and they are meant to **incentivize** (e.g. popular services or data sets). It was stated that these rules/principles are **different for users and providers**. Providers (incl. commercial ones) are bound to SLAs, EU characteristics, e.g. GDPR, and other legal provisions. They should be **balanced and driven by the mission**.

Remaining questions to be answered are as follows:

- How to cope with different levels of maturity? How to balance usage and contribution? e.g. entities only using data but not contributing their results?
- Requirement for reward on data citation?

Recommended actions and next steps

The number of projects involved in the WGs should be increased. **General tools**, like surveys, to gather the views of stakeholders should be utilised. **Use cases should feed into work directly** to understand better what is applicable in terms of RoP. Project participants stated that **input from funding bodies and governments** would be required. Furthermore, **legal expertise and early access to emerging policies** would be beneficial.

4.4 Landscape

Question 1: Recognizing the diversity, on one hand, and the need to provide a useful guidepost for future considerations, on the other, which criteria should be applied for the landscaping exercise to frame the pool of EOSC related infrastructures and services and what could be your contribution to this end?

The participants view **landscaping as an ongoing process to define criteria**. Different Member States have already contributed with lists of infrastructures. The **e-IRG National nodes document** was mentioned as it provides two categories: first horizontal e-infrastructures providing networking, connectivity, storage and, secondly, thematic ones.

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The Landscape WG has three categories: (1) cyber infrastructures for computing and network infrastructures, (2) thematic infrastructures and (3) other infrastructures for everything else, including services.

The Landscape WG has established as its priority to:

1) Make a comprehensive list of European infrastructures as a first step
2) Receive inputs from the surveys of EOSC 5b (national/regional) projects
3) In a third stage - in depth questions and collaborations with other WGs

The project representatives contributed in different ways to the discussion:

EOSC Nordic - eight countries contributing to the project to promote openness of research data in the Nordic and Baltic countries.

EOSC Synergy – highlighted their contribution in terms of e-infrastructures, understanding national plans/roadmaps, how these national plans feed the needs of EOSC, have specific use cases for example cryoEM. Filter out the best practices from national plans and understand the transnational barriers for collaboration e.g. regarding AAI.

The project **E-IRG** will discuss in its upcoming September meeting the possible publication of the national surveys (which include the horizontal and thematic e-Infrastructures per country).

It was highlighted that it is **challenging to assess all the infrastructure**, conducting surveys can address this. EOSC PILLAR drafted a survey that includes the following categories of stakeholders: e-infrastructure providers, RI, universities and funding bodies. Each category of stakeholders will be asked a set of questions for the mapping. National roadmaps are used as a starting point. Then again, FAIRsFAIR is not dealing with a country-specific approach, rather with a thematic approach.

The Landscape WG has decided to provide **aggregated summaries** of the landscape analysis, good practice examples and country sheets. An issue with the **data sharing policy** was identified.

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Question 2: In the first years of its operational phase EOSC will be critically dependent on existing e- and research infrastructures, which will be providing data and the various services, sharing resources, and interface EOSC to the users. Which principles shall be used for testing their "EOSC readiness" or "EOSC compliance", and how shall it be assessed?

The following points were mentioned during the discussion:

- The participants mentioned that **quality control** of infrastructures, services and data is required.
- **EXPANDS**: it was highlighted to check FAIR compliance of the data generated by the project and related services, and if it is the case then it will be identified to federate to EOSC. Furthermore, there is an RDA WG on FAIR Maturity that will come with a FAIR Maturity model.
- **FAIRsFAIR:** Fair certification and FAIR maturity model. Working also with RDA.
- **ESCAPE:** Virtual observatory standards to make data and services public.
- **Service providers should be incentivized to make the data FAIR, open and federated with EOSC** (EOSC Clusters doing so, getting funding and support)
- There is **no general principle to standardize data and services,** as it is quite vast an area to standardise. Hence, **data and services certification across all the domains is near to impossible.**
- **Incentives** for the users to use EOSC services can be provided. Incentives for the services providers can be explored. For users there is a clear incentive to have open access to wide range of data and services. On the other hand, users may not want to change their daily working environments, therefore incentives are vital.
- A low hanging fruit would be to let the cluster projects **set up the data and services standards** instead of uniforming it.
- EOSC is a framework and all services/data can be federated. **If the thematic users see their thematic tools federated in EOSC, then they will use EOSC**.

Question 3: Apart of sufficient financial coverage and political support, which factors do you, consider critical for the sustainability of EOSC?

Regarding sustainability, the project participants highlighted that the **FAIR services are important**. A **stable operation and continuous development** is required, even though it might be difficult to implement due to differences in views.

Other critical points are as follows:

- Predictability
- User friendliness
- Embargo periods (before making the data public as there might be IP issues)
- Introduction of EOSC data and service acknowledgments through publications
- EOSC portal should list infrastructures by Member States
- Action plans list for open science

The upcoming RDA meeting in Helsinki in October 2019 and the EOSC symposium in November 2019 in Budapest were highlighted in this regard.

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4.5 Sustainability

Question 1: How can your project contribute to motivating the national and international data infrastructures to make their data visible and accessible via EOSC?

Economic incentives can be used to open data repositories for their exploitation by external communities. These funds can give the possibility to **recuperate costs** incurred when supporting external users. This instrument was adopted in EOSC-Life to promote federation, and co-provisioning of data by public and commercial providers.

In the long term, after the project duration, a combination of funds should be ensured: from research infrastructures, EIROForum organizations, and national nodes. Curation and preservation of data is sustained by the respective research infrastructure whereas project funding is used to "link" RI repositories to EOSC. EOSC-hub is, for instance, using a **co-funding instrument**, where **capital investments** are supported by national infrastructures federated in EGI, EUDAT and Research Infrastructures, while **transnational access provisioning costs are funded through virtual access**. The co-funding model is a **sustainable approach**, which creates an incentive for national and international providers to pool funding, leverage existing investments, while creating economies of scale.

Mention was made of the fact that it seems important that **EC funds can be used to conduct national procurement**: any capital investment supported by national money is subject to national allocation procedures and accounting policies, which may be incompatible with transnational access.

The Astronomy Astrophysics and High Energy Physics community sees value in EOSC funding to support the **data analytics application layer** and access costs to data that needs to be preserved for the long-term are seen as a useful contribution to compensate for costs of long-term preservation. Scientists should see in this way **an incentive to open their own data**. The **participatory model in sharing** should be reflected in scientific impact.

Question 2: From your perspective what are the most essential elements an EOSC Minimal Viable Product (MVP) should contain at its initial stage?

The MVP of EOSC should focus on the **services that can be abstracted for general applicability**. Hosting of open data and data analytics tools of general interest across multiple research communities and user groups are such examples. EOSC funding would provide incentives to share costs and pool existing funding achieving economy of scale and increase utilization. It was highlighted that there should be a **distinction between MVP services for end-users and MVP services for the providers participating in the federation**.

In discussing the Minimum Viable Product for EOSC, it is noted that the cost of access to data depends on the data provider's business plans. There are **areas of overlap in sustainability and costing**, and a demarcation line separating the responsibility of EOSC from those of existing providers needs to be defined.

The **federating services are seen as a minimum necessary requirement** for EOSC to function as a federation. However, the EOSCpilot recommendations and EOSC Portal use cases indicate that the **value of EOSC relies on the ability to address complex digital needs, integrate data and services from multiple suppliers, co-fund cross-infrastructure interoperability, the hosting and exploitation of research data of general interest, and provide technical support and advice.**

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During the discussion, it was brought up that in the area of life sciences **trusted identity, on-demand compute and storage capacity** are necessary to support demand from external user groups. Compute and storage are not currently included in the MVP proposed by the sustainability WG Strawman document. It is noted that in the Life Science community **funding data by selling to industry may not be possible**. Open data policies come with a cost for open data infrastructure funding. Two elements are seen as necessary and complementary:

- **Open science**: good practices, certification and metrics
- **e-infrastructure federating core**: user access and transnational access and clear recovery mechanisms

Training and expert advice for integration and piloting across multiple providers are considered as important as technical services and data.

Question 3: What are the biggest hurdles/challenges to making your data infrastructure and associated services sustainable?

The following points were mentioned as the biggest challenges:

- **National policies** limiting the access to data and national infrastructures procured through public funds
- High costs of **data preservation**
- Costs of **scientific software development**
- Costs of **cross-infrastructure data integration**.

To sum up the discussion, the Minimum Viable Product needs to **fund service and resources that are of general interest and applicability, for which sharing of provisioning introduces savings in cost**. This includes **AAI, computing storage through e-Infrastructure consolidation**, and **costs of open science infrastructures** that in EOSC are made open to transnational access, like cross-infrastructure interoperability guidelines and their implementation, scientific software and long-term preservation of data of third-party interest. Besides services for the end-users, the MVP also needs to include **services for providers** to implement the federation. **The EC funding should be utilised to create an incentive to pool investments from national funding agencies, RIs and international research organizations**. Furthermore, a cost/benefit analysis should be conducted derived by **pooling funds and co-provisioning of data and services within EOSC**. Moreover, **use cases from the demand side** should be analysed to define the EOSC value provision and the related MVP.

5 Third breakout session: Let's talk governance

In the third breakout session, participants had been asked to provide their questions in advance. In total 14 questions[14] were received, allocated to tables and discussed in small groups. In total, 2 rounds were organised in order to cover all questions.

[14] https://repository.eoscsecretariat.eu/index.php/s/FgjQD2J6YnBp4CQ

Questions Table 1:

How can current projects interact with and provide input to the EOSC governance in the most efficient way?	Ana Helman	CATRIS
Do projects under development rely (or gamble) on the EOSC being able to provide substantial support for their future needs?	Michiel van Haarlem	AENEAS
How can smaller projects or even individual service provider be linked into the EOSC universe in a sustainable fashion and their services made easier to find in the catalogue by the relevant communities?	Thomas Exner	OpenRiskNet
Who is the recommended contact at EOSC for collaboration for VirtualBrainCloud (and in general)?	PETRA RITTER	VIRTUAL BRAIN CLOUD
How can we ensure the output of the cluster projects feeds into the EOSC ?	Giovanni Lamanna	ESCAPE
How to best align governance models across clusters and EOSC Hub	Ivana Ilijasic Versic	SSHOC

Short summary of key points and insights:
Current governance will end in 2020, and Governance Board has to develop the setting that could work in the future. It is also understood that EOSC is a federated infrastructure and already in place, but policies, services, interoperability and governance (amongst others) are assumed to be shared. However, **technical issues like AAI, or linkage and adoption of tools and services, and later governance and maintenance, still need to be resolved**.

Alignment of national initiatives is part of Governance Board efforts, but for EOSC projects it makes more sense to be **serviced/monitored through the Executive Board**.

Specific points addressed in discussion:

1. **Interaction of current projects and providing input to the EOSC governance in the most efficient way?** Clusters and ESFRI facilities are stakeholders in EOSC development. Projects should address the EOSC Working Groups' issues directly, and Governance Board subgroups have to communicate with WGs on common issues, but from different perspectives.
2. **Do projects under development rely (or gamble) on the EOSC being able to provide substantial support for their future needs?** There are already initiatives (i.e. EOSC Secretariat - FAIRsFAIR - other 5b EOSC projects) to set up a collaboration agreement thus ensuring the EOSC governance support. That still leaves out a number of projects. However, this should be a several steps' process, policies and standards to be developed in the later stages for all communities (projects) to get information and guidance. It also encompasses the possible extension of the EOSC Secretariat role. Tools and services produced by clusters would like to have a beyond-the-project maintenance guarantee.

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Executive Board should prepare the options for endorsement for the Member States on how to provide sustainability of updating and maintenance of databases, tools and services.

3. **How can smaller projects or even individual service provider be linked into the EOSC universe in a sustainable fashion and their services made easier to find in the catalogue by the relevant communities?** Smaller projects in many instances serve as the use cases and should be able to communicate with relevant cluster projects. In the long run, it would be important to be interoperable with larger databases. Additional point here was whether smaller projects are even capable to provide input to EOSC (see the next point).
4. **Who is the recommended contact at EOSC for collaboration (domain based and in general)?** Contact should be established through the relevant project from the five (5) EOSC cluster projects (ESCAPE, PANOSC, EOSC-Life, SSHOC and ENVRI-FAIR) or through the EOSC-Hub project. For alignment of current work, and improvement based on other services or tools, it is also advisable to get in touch with ongoing EOSC 5b projects (FAIRsFAIR). To be part of EOSC, as a first step, the service/tool/product needs to be registered in the EOSC Portal, and for the time being the implementation is done by the Hub project. In the future, EOSC WG Architecture will provide plans how to operationally join, and Executive Board should develop the legal and policy framework for joining.
5. **Alignment of governance efforts across cluster projects and EOSC Hub?** So far, only technical alignment has taken place and, considering the early stage of clusters' development and work, governance will probably become a topic a bit later. However, both Governance Board and EOSC WGs have upcoming deadlines, and it would be good to start a dialogue at least on pressing issues (i.e. partnerships under Horizon Europe to structure the governance dialogue? Needs to be discussed also with Member States). EOSC needs to be operated on a daily basis, and current issues would still require dialogue.

Questions Table 2:

How do we reach an understanding of the Minimum Viable Ecosystem necessary to initiate the EOSC, the transactions and parties concerned?	Matthew Scott	GN4-3
How to identify and prioritise the full set of requirements of the MVE?	Matthew Scott	GN4-3
Does access to data come before development of value added services?	Matthew Scott	GN4-3
What would be the specific roles, responsibilities, level of authority, the financial role of a central or distributed governance structure?	Matthew Scott	GN4-3
How can one describe a fit for purpose governance structure without understanding these?	Matthew Scott	GN4-3

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Short summary of key points and insights:

What is an Minimum Viable Ecosystem (MVE)? The minimum set of services, etc. needed to let the EOSC work/to deliver the EOSC. It consists of the basics to operate, integrate services, federate and provide service catalogues.

MVE can be seen as the same thing as the Federating Core – even though there is some interpretative differences between the Sustainability WG's draft Strawman document and the EOSC-hub briefing paper proposals. E.g. are DOI/PID included?

Question: How do we get consensus on the minimal?

Is the MVE/Core to support federation or integration of services? Integration creates dependencies, which can be expensive to maintain, which it is probably better to be avoided. Requirements of federation are lighter than integration. EOSC is between GÉANT and W3C in terms of degree of integration: whereas GEANT needs integration, EOSC needs federation and probably not full integration. Integration seems somewhat beyond MVE. W3C is at opposite end – just standards. EOSC then is in the middle: it needs technical rules, it needs to appear simple to the user whilst managing complexity at the service provider level. The goal of the MVE is to cover the gap between the complexity of the services and making things seem simple for the user. Furthermore, in the eyes of Member States interoperability is a factor that has to be preferred instead of integration.

Will the definition in practice be driven by those communities, which are able to articulate their requirements for federation/interoperation, and will the (initial) MVE be defined based on their requirements? Answer is "most probably yes as long as a user-driven approach is kept". RIs and clusters can act as the intermediaries since they are reaching out to libraries, for example. Consensus is built around developing user-based proposals (e.g. based on requirements of clusters and libraries) but then also consulting/reaching out to the rest of the community to gather input/feedback.

Governance cannot be defined at this stage since we need to define the MVE/Fed Core first, so we know what we have to govern and that has to be done by the end of 2019.

Does access to data come before development of value-added services? Without data the EOSC is nothing. Before value-added services you need publication, validation and software. The internet, built bit by bit, a function/component at a time, should be taken as example. Critical mass of data is needed to get started,

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then the core services will follow and the community will be able to develop its value-added services from there. So the question is what is the critical mass that is needed?

Caution must be taken about putting a heavy dividing line between data and services. Some communities are already federating, interoperating – we need to build from them to include others.

Some discussion took place on what message the EOSC can/should provide to the user: **is EOSC-branded material needed?** Does it get to the point of having "EOSC data" (e.g. from federating repositories which eventually become an EOSC repository)? The value-add of the EOSC has to be articulated, although that might probably not be done until after the federating core is defined.

What is anyone's motivation/incentive to participate in the EOSC? One motivation could be to get access to data from other disciplines – although not all communities' data is interesting to others – and perhaps access to big data processing resources (HPC, HTC?). Motivations could be quite different depending on the community. Across communities, an opportunity could be to bring data together from across the communities and innovating – e.g. earth observation/climate change data has applications in quite a variety of other disciplines. Some domains are good candidates – early adopters – and we should develop some marketing around them: again, there is the need to put some effort into defining and articulating the value-add of the EOSC.

For many communities, their **first priority** is to prepare their data to make it possible to share/use it better within their own community – per-domain. **Second priority** is to reach neighbouring disciplines. The community usually is already working to some extent with some other communities. **Third priority** is interdisciplinarity. Priorities two and three are actually longer-term. Funding is really directed at priority 1. Need to define the **interface**, which is opened to other communities.

Questions Table 3:

We would like to discuss a first proposal for the definition of the EOSC technical interoperability guidelines, their relationship with the Rules of Participation for service providers, and gather feedback about a first interoperability guidelines proposal, promoting projects to provide feedback through the EOSC Secretariat Liaison platform: https://www.eoscsecretariat.eu/eosc-liaison-platform/post/have-your-say-eosc-hub-proposal-eosc-technical- architecture	Tiziana Ferrari and Per Oster	EOSC-hub
The legal entity, in the form of EOSC PPP, can address a number of practical matters (handling finances, hiring dedicated staff). Can it, however, also successfully address procedural and technical barriers related to the service provisioning? Can the current round of the INFRAEOSC-5b projects cover this sufficiently, given the limited time of operation?	Eleni Toli	NI4OS-Europe

Is there an Access Committee to manage and control the access to the EOSC tools and data?	Gracia Martí	PRIMAGE

Short summary of key points and insights:

Present research needs have to be met at the same time as we develop EOSC. EOSC is nothing to wait for. Nevertheless, we must make as much as possible of present developments and solutions to feed into the development of EOSC so we get an **incremental improvement of access and use of data and related storage and computing capabilities all over Europe**. It would be recommended to **link research-oriented projects with e-infrastructure projects**. Furthermore, there is a clear need of **support to research to utilize e-infrastructures/EOSC**.

Questions Table 4 (Conclusions fromtables 4, 14, 13, 9)

What is the minimum set of national policies and the related organizational model that can support EOSC governance and ensure inclusivity?	Eleni Toli	NI4OS-Europe
How to get MS buy in if they already have the services at national level	Najla Rettberg	OpenAIRE Advance
What types of governance models are best for national EOSC structures?	Natalia Manola	OpenAIRE Advance

Short summary of key points and insights:

The question was raised **how to cater for the potential change in policies/regulation when services cross borders?** Is there a requirement for a coordination body to look after this and advise the Member States? Do we have a list of policies, so that each country can agree on the list at least? It was suggested to **start with data** (publication, access etc.), then look at what do the funders/ministries need and **then look at infrastructures and services and training**. EOSC Pillar is preparing a survey, which has a section to gather information relevant to this.

There is an assumption that the EOSC needs a set of policies because it will be a place you bring your data to. **This will not necessarily be the case**! EOSC aims to achieve Open Science and many of the EOSC implementation projects are addressing policy questions around OS. It would be useful to understand the national policies in the area of OS. It would be important to **keep consideration of OS policies very separate from service/infrastructure policies**. Treat these as two separate pillars. The federating core proposals assume the policies will apply across all the different layers of the "onion", but this will not necessarily be the case.

What kinds of policies are relevant? Interoperability - for services and for EOSC resources in general (different policy for different types of resource) - and access. Is there a country whose policies could be used

as a good practice example? National policies must be coordinated but in the context of those use cases that will likely become reality in the EOSC. The question remains: **how will this be governed**?

The discussion came back again to the need to define/articulate the **value-add of the EOSC and the incentives (including for ministries) to contribute to it**. Few public service providers are actually able to share services, so are we actually preparing a marketplace for commercial services? A marketplace for simply finding services is already organized at national level so there might not be value-add of doing the same at European level. Maybe there is an **alignment with EuroHPC** there: a look should be given at their model - services are being opened beyond national borders. **Can this be replicated for EOSC?** If you cannot open services beyond national borders, what can you achieve?

An example: a Polish researcher has access to a service in Poland and found a service (software) in EOSC. He wants the software installed in his server in Poland. So, the discovery was very valuable. But how to integrate it and maintain it?

Another example: a TDM project in Greece wanted to provide its services around Europe but in order to do so the only solution was to clone their service around different countries, because it was not possible to make the service available across borders. Can we use EOSC to find a better solution?

EOSC is currently trying to put many different things in the same pot, but they require **different business and governance models** for each. It would be better to **separate the strands and allow a different model to be developed for each of them**, but at the same time **bundle them together** (in marketing terms) in the EOSC to provide an overall solution/concept. It was suggested to look at each strand separately: what are its legal, training requirements etc.

From the end user point of view of the portal (services), **three access categories** were identified: access to services, access through EOSC (via interfaces, to be defined); and providers' access (external services - EOSC only gives visibility but access etc. is with the provider).

The question from the project FREYA about **governance of PID service** was raised: the EOSC could contract a PID service from an existing service provider or PID federation-enabling capability for inclusion can be developed in the federating core. The project OpenAIRE suggests to just apply the RoP, but this in turn raised the question of **how to address sustainability**. Perhaps the **EOSC should adapt to the already established e-infrastructures and services, rather than the other way round?** Different e-Infrastructure/services should be governed according to different models (but the **EOSC should not govern the e-Infrastructures**). And in the end, it should be **user-driven**: the user decides what continues to be needed to facilitate their research. Concerning policy, EOSC could provide a sort of **brokering service**. EOSC could help inform the user about a dataset's compliance/adherence to a particular Member State's rule.

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Questions Table 5:

Often research services exist on institutional infrastructures. How can they be transferred onto EOSC (or linked on EOSC)? Would there be central EOSC services to such providers in order to ensure the quality of the service?	Vangelis Karkaletsis	DARE

Short summary of key points and insights:

- **EOSC as a marketplace**. Institutional and domain-specific services to be advertised. Quality assurance?
- **DOIs for services** is essential for usage tracking, attribution and provenance. There is no authority in place at the moment.
- **PIDs for communities**.
- **Datasets and data access services**.
- **Monitoring and accounting models** will have to be agreed and implemented.

Questions Table 6:

Sustainability and business models depend on the composition of the EOSC Federating Core, and the functionalities to be delivered - with a special reference to the shared resources. We would like to propose to discuss a first approach that EOSC-hub presented with the Federating Core Briefing Document and use the discussion time to gather input and information about use cases: https://www.eoscsecretariat.eu/eosc-liaison-platform/post/have-your-say-eosc-hub- initial-proposals-eosc-federating-core-and-its	Tiziana Ferrari and Per Oster	EOSC-hub
Different federation models are possible for EOSC, from a lightweight approach realizing EOSC as a "yellow pages" services for faciliated discovery, to a federated facility with accounting, monitoring and on-demand capacity to be offered through the Portal. We would like to present various federating modes and discuss pros and cons of each model (https://wiki.eosc-hub.eu/display/EOSC/EOSC+Portal)	Tiziana Ferrari and Per Oster	EOSC-hub
How is managed the relationship between the use of EOSC tools and the IP generated using them?	Gracia Martí	PRIMAGE

Short summary of key points and insights:

The activity of decomposing the federating core into components is necessary to define what needs to be sustained and for which use cases. **The value proposition for EOSC consists of services that can be offered to all RIs/research communities, so that they can be centrally funded to reduce costs and ensure sharing**. It is noted that **user should be represented in the governance**. Different elements of the federating core have specific policy and regulatory aspects that altogether contribute to the definition of the EOSC rules of participation. The ESFRI clusters were mentioned, as they are producers of data and heavy user communities at the same time. They need a **sustainable technical infrastructure** to share their data products and make them exploitable.

In regard to the first question, **sustainability and business models depend on the composition of the EOSC federating core and the functionalities to be delivered** with a special reference to the shared resources. It was proposed to discuss a first approach that EOSC hub presented with the federating core Briefing document.

The decomposition of EOSC into: **regulatory tier, federating tier (Hub), resource tier (Shared Resources), and EOSC discoverable services** is perceived as a good starting point.

Other comments:

- EOSC-Life: **the layers of the EOSC require different policies and regulations** which are specific to their scope (open science policies, FAIR policies, technical interoperability policies etc.) - the model has to be adapted accordingly
- The EOSC needs to **commit to the support of the federated core**
- PRIMAGE: the user community needs **integration of the resource tier and applications for ready and easy to use services**
- FREYA: **different funding models** apply to different elements of the federating core and discoverable services. The group discussed how different models (free open access to data, sponsored/pay-for-use access for depletable resources) can co-exist. EOSC-Life**: data as non-depletable resource can be available for free, depletable resources (compute, storage, human support) need a sustainability path**
- ENVRI-FAIR**: first level of products** are also open in the cluster. ENVRI-FAIR is a provider of data and heavy users. ENVRI-FAIR needs **sustainability** from EOSC (policy, Hub, and shared resources). Examples of useful shared resources are **Copernicus data**, being used by multiple RIs, where data is available for free, but organized for exploitation by multiple research communities.
- ESCAPE: the AA community can benefit from EOSC **to support users that are not RI stakeholders**. Otherwise, AA RIs have a sheer need of compute and storage due to their scale, and these are **internally funded by the RIs**.
- EOSC Pillar: there is a value proposition for EOSC about services that can be offered to all RIs/research communities, so that they can be **centrally funded for economies of scale**. It is noted that user should be represented in the governance.

Concerning the second question, **different federation models are possible for EOSC**, from a lightweight approach realizing EOSC as a "yellow pages" services for facilitated discovery, to a federated facility with accounting, monitoring and on demand capacity to be offered through the Portal. In the present discussion, various federating modes were presented and the advantages and disadvantages of each discussed. In the end, there was a consensus in the group about the fact that **different federation models are useful depending on the use case**, from light federation with just discovery (yellow page service), to matchmaking with integration/co-design/support linking users and providers (for use cases with complex digital needs), to full integration (for turn-key easy to use solutions).

Q3: Management of IP generated from use of EOSC tools

There are no specific issues related to IP, normally the user remains owner of the input/output data generated from tools, however **tools/services need to offer an acceptable user policy (AUP)** that clearly states the applicable policies and provide the users the option to choose.

Questions Table 7:

What kind of governance structures and procedures need to be put in place to ensure harmonization of the European science landscape, considering current heterogeneous evolvement?	Eleni Toli	NI4OS-Europe
In the same time: is it important for EOSC to preserve research diversity, as it is reflected on national levels? If so, how will the EOSC governance support this? Do we need more granularity in the three-layer governance model or within each layer?	Eleni Toli	NI4OS-Europe

- The questions tables for his discussion were dealt with in other tables with similar questions.

Questions Table 8:

How to ensure a good representation of users (big users like the ESFRIs and also the long tail) in the governance? The participation of users representatives in the last stakeholder forum in Vienna under Austrian EU Presidency was very low, whereas the participation in the EOSC Summit and the Launch Event was very good.	Wiebelitz / Karayannis	e-IRGSP6
How do we convince those paying for EOSC resources to look beyond the needs and use of their own community, across disciplines and borders?	Michiel van Haarlem	AENEAS
How could EOSC assist in operationalising Open Science in transport research?	Maria Boile	BE OPEN
How to ensure the EOSC governance is, in its composition and in its processes, representative of the varied needs and priorities of the whole research community and of the MSs, so as to maximise the EOSC usefulness to researchers?	Fulvio Galeazzi	EOSC-Pillar
Can current governance model and structures ensure necessary agility for supporting the declared objective of enlargement of the user base?	Eleni Toli	NI4OS-Europe

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Short summary of key points and insights:

1. The group recognised the **variety in the EOSC user basis and profiles**. Individual researchers either do not know about EOSC or are not interested. **Some communities, such as researchers from universities and research centres, are under-represented in the EOSC governance. The same holds for industry and private sector.** Involving end users and individual researchers at least via related organizations (such as LERU, EARTO, EUA for academia) could improve this under-representation. **This issue needs to be taken up by the EOSC Governance** in their deliberation about the EOSC future governance (post 2020).
2. Furthermore, **agility in the governance is needed** to adapt to the evolving user needs and deal with new communities and developments. **Co-creation approach should be used** together with bringing incentives/expected benefits for the communities.
3. **For EOSC to be successful**, it should a) be made as disruptive as possible, b) prepare clear incentives to all stakeholder groups c) push stakeholders with regulations and policies to come to EOSC (carrot and stick approach) on European as well as national level (e.g. open data pilot in H2020). Force depositing all publications/data from H2020 /national /thematic funded projects in EOSC national/thematic/European repositories. Strong need for coordination between EC and MS and AC to harmonise regulations forcing the research communities to bring their project results into the EOSC.
4. **Several user communities are not well aware of Open Science and EOSC benefits**. They can follow some good practices from other sectors more progressed. There are also **national strategies** on Open Science (French example, document also in English) that form good practices. **FAIRness and openness of data and services** are good starting points. Governance needs to work and raise awareness to target multiple sectors. We need to understand more about **data sovereignty task force of the Governance Board** (presented this morning[15]) and **how it relates to the openness principle**. Clarifying the question of data sovereignty, could remove users concerns and help users to be more engaged.
5. Awareness-raising required from the EOSC Governance for **under-represented or non-represented communities.**

Questions Table 9:

Data governance policies are required that support the secondary use of health data for research purposes: What does the EOSC need to keep in mind?	Oliver Zobell	DigitalHealth Europe

Short summary of key points and insights:

- **Sharing of health data** has great potential to advance research and personalised medicine, but the challenges are equally great:
    - healthcare providers and pharma industry are generally **reluctant to share health data**

[15] https://repository.eoscsecretariat.eu/index.php/s/eacyfT38HfBPk3c#pdfviewer

    - **lots of distrust** in the population, reluctance/fear to share data (caused by news of hacker attacks, data breaches - mobile applications are not secure!) -> in some countries even governments are not seen as trusted parties
    - **consent**: how can data that are consented for use for a specific research question be made available to any other type of research question?
- Personal data are not only health data: **the ethical and legal issues** are also relevant for other thematic areas than healthcare
- There are **two different ways to establish data security**: **technical approach** such as encryption/anonymisation vs **legal approach**, e.g. putting legislation in place that punishes data misuse so heavily (e.g. doctor losing their license) that it effectively prevents misuses
- The way **biobank samples** are currently already being made available to research through biobanks could inspire solutions for the consented use of health data: in the case of biobank samples, the biobank acts as trust-establishing party
- EOSC could include **"gold-standard" services to preserve/safeguard privacy** such as data anonymisation/pseudonymisation, as well as services/tools to implement dynamic consent by citizens (e.g. eConsent-Tools developed by SAGE Bionetworks in the US)
- Provision of a **best practice approach** on how to make personal data available for research use in a way that respects data privacy (Austria mentioned anecdotally as an example of a worst practice approach: GDPR-standard data privacy eroded to make wide use of health data for research possible)
- EOSC could set the **standard for ethically and legally compliant use of health data** and as such function as trust-establishing party

Questions Table 10:

What are the mechanisms to ensure the local to national to European to global users and stakeholders connections are well established in EOSC? Who plays what role and how does that fit into the governance model plans?	Sara Garavelli & Hilary Hanahoe	RDA Europe
How can RDA community in Europe support EOSC in the international landscape (as RDA is focusing on the international dimension of EOSC) and how RDA can support EOSC in addressing the socio-technical dimension of EOSC (specifications, standards, guidelines, policies, expert platforms)?	Sara Garavelli & Hilary Hanahoe	RDA Europe

Short summary of key points and insights:

- EOSC - RDA **top down and bottom up - how can this work**?
- Incorporation of RDA approaches in cluster programmes and generation of an **on-going assessment** (which will be made public, if successful).
- Backbone of EOSC is connecting to the national level activities. **Big risk of misalignment**. A trusted place to ensure solutions.

- RDA can support the bottom layer of the EOSC in the resolution of a **mechanism to interact internationally** in this ramping up phase.
- EOSC can learn from RDA on **community building** and how they have successfully facilitated international experts.
- From a governance perspective, **EOSC should be as open as possible with a minimum set of rules**. Value of RDA is the consensus from the users. You can expose what you want in EOSC but **its true value and survival will emerge from what the EOSC users want**.
- Can also be seen as a **means to identify priorities**.
- From EOSC perspective, **RDA would need to be well nourished** to ensure that the community is funded to work and travel to interact with RDA.
- Regarding the international cooperation perspective, how we create the international connections for all aspects of EOSC, **RDA supports only the research data aspects**.
- **How much work / awareness raising is being done nationally** to engage with the users and the researchers on a national level? Unclear, but work of the EOSC secretariat is to interact and engage with users to get their feedback.
- Cluster projects should be the mechanism to **bridge to the users together with the Member States?**
- How can we create the snowball effect? When will that happen?

Questions Table 11:

How will the Commission coordinate with Member States and Associated Countries to ensure long-term, continuous funding to sustain EOSC operation and further development?	Wiebelitz / Karayannis	e-IRGSP6

Short summary of key points and insights:

- Coordination between EC and MS and AC is ongoing, since November the coordination is formalised through the EOSC governance structure.
- The actual discussion about partnership models in the Horizon Europe Multiannual Financial Framework (MFF) was discussed, **EOSC is recognized as one of the possible partnerships**.
- Selection of partnership model is important for EOSC in Horizon Europe, but there is a **lack of information about these discussions**. It was asked that the EC should shed some light on the .three types of partnership that are possible in Horizon Europe (co-funded, co-programmed, institutionalized[16]
- **No decisions have been made** for the type of possible partnership, but in particular, the co-programmed or co-funded partnerships have been at the focus of discussions for EOSC. All long-term funding would be covered (2021-2027) and can cover both operational and development dimensions and be both in cash and in-kind. The co-programmed partnership requires an Memorandum of Understanding (MoU), not a legal entity. The co-funded partnership requires a legal entity (the Sustainability WG is discussing business models). A combination of co-funded and co-programmed is not possible, but with the co-programmed model you can still have a legal entity. In general, **the**

[16] https://www.era-learn.eu/partnerships-in-a-nutshell/r-i-partnerships/transition-to-horizon-europe

difference between the two models is that with the co-programmed model you work with a MoU, with the co-funded model with a grant agreement and a common pot.

- WG Sustainability: it is too early to select a **legal entity** - but it will be needed. Relevant legislations have to be taken into account before selecting a legal entity.
- **Sustainability of tools, software and structures** (e.g. helpdesks) after the end of projects that do not continue is also needed.
- **Procurement approaches** in EOSC: (a) Possible exemption of procurement directive within Member States for EOSC if there will be a legal entity from which services and other resources can be procured. There can be exemptions between public organisations at national level or also beyond. (b) A central commissioning body could procure resources and give them free at the point of use. This may come close to the co-funding approach.
- **Who has responsibility for long-term preservation of data?** Is it EOSC or the research community? From other tables' discussions, **the EOSC solution was favoured**. Long-term preservation can be one of the key added values of EOSC, but a lot of work is needed to make this feasible. However, representatives from politics/funders usually assume that the responsibility remains at the research community.

Questions Table 12:

ARCHIVER is committed in developing a set of services for data archiving and preservation and make them available through the EOSC. A pressing question for commercial providers relates to the rules of engagement in the EOSC for the private sector. When can one expect them to be available and who in the Governance structure will be responsible for defining and reviewing them?	Joao Fernandes	ARCHIVER

Short summary of key points and insights:

1. **The role of the private sector relates very much to scalability and sustainability**. Sustainability of EOSC as such is different from the service sustainability, however if the services available through the EOSC are not sustainable, the added value of the initiative is hampered. The same happens if the EOSC cannot scale its offer in a sustainable manner.
2. **The EOSC could only benefit if more players, different mindsets and approaches (in service delivery and data access) are to be involved.** Report of the sustainability WG is exploiting already the next steps concerning the involvement of the private sector.
3. The "jargon" of the public sector needs to evolve: for example, "Business Model" is a term that needs to be assimilated. **Infrastructure that serves science would need to have a clear business model associated.**
4. **Digital Business2Business transactions** exist in the private sector for the last 15-20 years. There are many lessons to learn from this accumulated experience. The EOSC is currently not taking any benefit from it, as **there are no private sector representatives in the EOSC governance**.
5. ELIXIR has an **industry advisory board**. Should the EOSC exploit the same idea? **The objective should be two-fold:** make startups and SMEs access data to foster innovation and new services; have researchers access a set of sustainable EOSC "quality stamped" services, following standards, adequate to the current European legislation. Having services in the EOSC needs to be an added value

for companies, it needs to become a competitive advantage to access across the European research community through the EOSC.

6. What would be then the role of the EOSC as such in this context? Could it act as a **"user needs" based broker**? **A marketplace can be seen in two ways**: brokers can have a role of either simply facilitate access to services or provide the intelligence to find the best fit (in terms of cost-effectiveness, functionality and service level). These discussions should evolve by already involving the private sector to have their feedback.
7. Some current initiatives providing catalogues of services involving industry are not really fit for SMEs/startups **as they are not flexible enough**. Companies can be both service providers and data consumers.

Questions Table 13:

How can EOSC governance accommodate and adapt to e-infrastructures and services that are already well established, have their own functioning governance systems, and (possibly) have a global reach?	SimonLambert, Vasily Bunakov, Martin Fenner	FREYA
How can the overall governance of EOSC match up with community needs in specific areas of e-infrastructure (e.g. persistent identifiers, long-term data archives, CRISs)?	SimonLambert, Vasily Bunakov, Martin Fenner	FREYA

Short summary of key points and insights:

- Established services will have a certain governance model and can be added to EOSC as service provider. **EOSC will not own these services.**
- Question: More challenging **if the service provider is not mature**? Should it be offered and taken up by another organisation?
- **Different governance models may require different monitoring functionality.**
- Many research areas (and tools provided) have **global scope**, as EOSC is not limited to Europe. EOSC may have a big/worldwide impact. Recommendations on PID, services, etc. expected to be important and may have global uptake. Different metadata schemas and support/ publication are needed.
- **Root problem:** EC expects that after EOSC project ends, there is a sustainable environment.
- **A unified view of resources at EOSC level** (rather than delegated to national infrastructure) is needed and EOSC should provide services to support this.
- **Why would research centre use EOSC? Easy use of cloud services** without worrying about where these are executed is one of the main reasons. Nevertheless, simple access level opportunities for further integration are needed.
- 95% of funding comes from the Member States. This has **implications for openness**. Can the EC pay for higher level of 'openness'? Probably difficult at billion Euro level.
- It is important for funders to be aware of **scope and implications of funded resources**. It is important that all users joining EOSC comply to/agree with EOSC policies.
- How will **ESFRI projects integrate at technical level**?
- Initial point is about governance (**decision mechanisms**).

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Suggestions:

- **Existing infrastructures with own decision mechanisms**. Is it just necessary to absorb them in EOSC?
- **OpenAire as use case**: existing service providers were organized by themselves.
- Federation is at the core of EOSC and is happening. EOSC can **support research into further federation**, but existing services will not be funded through EOSC (if they would, the budget would be taken from other sources, e.g. RIs/Member States).

EOSC funding challenges:

- **Double dipping** (fund same infrastructure twice)
- **Redundancy** (multiple organisation providing same service)
- **Quality** (is it a useful service)
- Need to **split between research & operational cost**. This is not trivial, as the cost of evaluation may be significant.
- **A stable base** (sustainability) is needed for offered services.
- ENVRI-FAIR: Interoperability is taken up anyway but **EOSC has been used as a brand** to motivate extending it to other areas.
- In assessment phase of proposals, give feedback about **applicability of EOSC provided resources.** Expect users to acknowledge EOSC.

Questions Table 14:

OSC-Nordic will provide technical recommendations with regard to implementation of EOSC standards and policies in the Nordics, however - our joint issue is how do we facilitate/support our national policy makers and/or joint EU policy makers, in the LEGAL implementation of EOSC standards and policies, which will allow for smooth interoperability across Europe?	Damien Lecarpentier & Lene Krøl Andersen	EOSC-Nordic

- Please refer to the questions and responses of Table 4.

6 Conclusions and final takeaways

"The solution often turns out more beautiful than the puzzle" – Richard Dawkins

Lively discussions were held during these two days and it became clear that many projects are working on this topic. Thus, **strong coordination and alignment** are needed and should be encouraged. It was suggested that due to strict project deadlines, one possibility could be to include the element of collaboration more deliberately in H2020 work plans. It was also pointed out that **collaboration agreements** have been established between projects. Projects should also be encouraged to work with and contribute to the work of the established EOSC Working Groups.

Overall, the **requirements of the user** should guide the development of EOSC at all times. In order to achieve this, **openness and transparency** are needed in all steps of the process. This would ensure users are incentivized and convinced to use EOSC and clearly see the benefits and added value. It is expected that the

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right means for a **continuous dialogue with all relevant community stakeholders** are provided. In its first steps, EOSC should prioritize access to data, interoperability and federation. EOSC should provide network and authorization solutions, certified services and the required software.

In terms of **governance**, EOSC should provide the framework as project participants expressed the need for guidance, standards, and policies (EU and national) as well as the definition and creation of legal entity/entities. Therefore, a **starting point** should be to define the respective priorities, incentivise all relevant stakeholders and prepare regulations and policies. Nevertheless, it needs to be acknowledged that in order to achieve this, **strong coordination between the European Commission and the Member States** is needed. Furthermore, the introduction of **contact points in the Member States** was suggested in order to be able to follow up on the respective developments. **Lack of representation of the private sector/ industry** has been perceived in the governance structure and it should be addressed.

Project participants perceive several open issues that need to be dealt with in order to ensure the successful development of EOSC. The commonly identified critical open aspects relate to the **sustainability and business model(s)**. Moreover, the **rules of participation and implications in terms of certification, organizational and technical aspects** should be addressed. In this regard, **best practices and existing projects and programmes** are crucial and should serve as input.

Lastly, continuous efforts should be made to **build an" EOSC brand"** and, hence, communication and outreach activities should be increased in order to reach and positively engage all relevant community stakeholders and the wider public in these crucial times of development.

Appendix I. Project representation

AENEAS	https://www.aeneas2020.eu/
ARCHIVER	https://archiver-project.eu/
DARE	http://dare-project.eu/
DEEP	https://www.deep-projects.eu/
eInfraCentral	https://www.einfracentral.eu/home
e-IRGSP6	http://e-irgsp6.e-irg.eu/
ENVRI-FAIR	http://envri.eu/envri-fair/
EOSC-hub	https://www.eosc-hub.eu/
EOSC-Life	http://www.eosc-life.eu/
EOSC-Nordic	https://cordis.europa.eu/project/rcn/224181/en
EOSC-Pillar	https://www.eosc-pillar.eu/
EOSC-synergy	https://www.eosc-synergy.eu/
ESCAPE	https://projectescape.eu/
ExPaNDS	https://cordis.europa.eu/project/rcn/191815/factsheet/en
FAIRsFAIR	https://www.fairsfair.eu/
FREYA	https://www.project-freya.eu/en
GN4-3	https://cordis.europa.eu/project/rcn/224258/factsheet/en
NI4OS-Europe	https://cordis.europa.eu/project/rcn/224431/factsheet/en
OCRE	https://www.ocre-project.eu/
OpenAIRE-Advance	https://www.openaire.eu/advance/
OpenRIskNet	https://openrisknet.org/
PaNOSC	https://www.panosc.eu/
PROCESS	https://www.process-project.eu/
RDA Europe 4.0	https://www.rd-alliance.org/
SSHOC	https://sshopencloud.eu/
BE OPEN	https://beopen-project.eu/

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CatRIS	https://project.catris.eu/
CINECA	https://www.cineca-project.eu/
DigitalHealthEurope	https://digitalhealtheurope.eu/
FAIR4Health	https://www.fair4health.eu/
FAIRplus	https://fairplus-project.eu/
PRIMAGE	https://www.primageproject.eu/
VirtualBrainCloud	https://virtualbraincloud-2020.eu/vbc-main.html

Appendix II. Agenda

HORIZON 2020 CONTRIBUTIONS TO BUILDING THE EOSC

Joint CNECT-RTD project meeting and workshop

9-10 September 2019
Charlemagne building, Room Alcide de Gasperi
170, rue de la Loi-1049, Brussels

AGENDA

DAY 1: Monday 9 September 2019

9:00 **Registration and coffee** **60'**

10:00 **Welcome and setting the scene – EOSC through times** **30'**

The representatives of the DGs CNECT and RTD of the Commission and the EOSC Executive and Governance Boards set the context and purpose of the workshop, clarify the boundary conditions and what is open for discussion in this meeting.

- What is EOSC and its current state of play?
- Where are we heading?
- What are our means to realise EOSC?

10:30 **1st breakout session: Me, my project and EOSC** **75'**

The aim of this session is to identify the current work of the projects contributing to EOSC find synergies, identify possible overlaps and areas of interest not covered yet.

The projects are clustered in four sectors:

1) Core technology
2) New services
3) Users and use cases
4) Support for policies

11:45 **Reporting back from the 1st breakout session** **45'**

12:30 **Lunch and project poster session** **90'**

14:00 **2nd breakout session: The Big Five – Architecture, FAIR, Rules of Participation, Landscape, Sustainability** **90'**

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These five themes form the backbone of the current work on future governance of EOSC. After an introduction from the five coordinators of the Working Groups of the Executive Board, the participants discuss questions related to these five topics in smaller groups.

Possible topics:

- Financing model(s) to sustain EOSC infrastructure and services in the long run (SUST)
- Compatibility of EOSC-relevant national initiatives (LAND)
- FAIR digital objects: turning principles into practice (FAIR)
- Evolution of the EOSC Portal and its interfaces, expansion of the EOSC service offering to the researchers, service onboarding (ARCH)

15:30 Coffee and gallery walk of the results of the 2nd breakout session 30'

16:00 Reporting back from the 2nd breakout session and closing of Day 1 60'

17:00 End of Day 1

DAY 2: Tuesday 10 September 2019

9:00 Coffee

9:30 3rd breakout session: Let's talk governance 90'

In this session, issues related to EOSC governance are discussed at large. After an initial presentation on the current state of governance by the chairs of the Executive and Governance Boards, the questions put forward by all participants are discussed in small groups.

Possible topics:

- Governance model and best-fit legal vehicle for after 2020
- Rules of participation that govern the future EOSC transactions
- National policies and governance
- Role of regulation, standardisation, certification, oversight

11:00 Coffee and gallery walk of the results of the 3rd breakout session 30'

11:30 Reporting back from the 3rd breakout session 60'

12:30 Lunch 90'

14:00 4th breakout session: Let's talk users … and providers! 90'

After an initial setting of the context to this discussion by DG CNECT and RTD, these and other emerging questions are explored in small groups:

1) The role of EOSC in overall EU digital infrastructures

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2) Public sector use and demand of EOSC, EOSC for priority societal domains and challenges
3) Role of the private sector, EOSC and commercial clouds and services
4) User needs and analysis
5) Training and skills
6) EOSC in the international context

15:30 Final takeaways **30'**

16:00 End of the meeting

***

Appendix III. List of participants

Crouzet Laurent
Fox Gavin Connor
Herdegen Andrea
Linkens Hans Josef
Rossi Giorgio
Tonnello Nadia
van Londen Santje
Abramatic Jean-Francois
BICARREGUI Juan
Horstmann Wolfram
Hrusak Jan
Jones Sarah
Klemeir Jessica
LÜCK Rupert
MANOLA Natalia
O'Neill Gareth
Teperek Marta

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Timmermann Marie
WOMERSLEY John
Michiel van Haarlem
Hanno Holties
João Fernandes
Bob Jones
Maria BOILE
Caroline Alméras
Ana Helman
Jorge Sanchez
Thomas Keane
Vangelis Karkaletsis
Iraklis Klampanos
Oliver Zobel
Alasdair Reid
Fotis Karayannis
Jan Wiebelitz
Ari Asmi

Andreas Petzold
Per Öster
Tiziana Ferrari
Dale Robertson
Niklas Blomberg (FAIR+ as well)
Michael Raess
Lene Krøl Andersen
Damien LeCarpentier
Fulvio Galeazzi
Isabel Campos
Ludek Matyska
Norbert Meyer
Roksana Wilk
Giovanni Lamanna
Jayesh Wagh
Mark Heron
Knut Sander
Carlos Luis Parra Calderón

Niklas Blomberg
Ingrid Dillo
Eliane Fankhauser
Vasily Bunakov
Martin Fenner
Matthew Scott
Tryfon Chiotis
Eleni Toli
Anastas Misev
Paul Rouse
David Heyns
Natalia Manola
Paolo Manghi
Najla Rettberg
Thomas Exner
Stefan Kramer
Andy Gotz
Jean-François Perrin

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Gracia Marti Besa
Giuliana Restante
Jan Meizner
Maximilian Höb
Sara Garavelli
Hilary Hanahoe
Ivana Ilijasic Versic
Petra Ritter
André Gemünd
Jolanta Klimczak-Morabito
Kostas Glinos
Anette Bjornsson
Michel Schouppe
Corina Pascu
Thomas Neidenmark
Barbarossa Emanuelle
Kostas Repanas
Roy Keesenberg

Christian Cuciniello
Moschopoulos Panayotis
Nicolas Segebarth
Donatella Castelli
Agis Evrygenis
Sara Garavelli
Andrea Grisilla
Annika Kossack
Daniel Mallmann
Leonardo Marino
Liina Munari
Andreas Veispak
Enrique Gomez
Raluca Halas
Georgia Tzenou
Martine Noé
Christos Chatzimichail