

# EOSC PILOT D2.2:

DRAFT GOVERNANCE FRAMEWORK FOR  
THE EUROPEAN OPEN SCIENCE CLOUD



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## Abstract

This document outlines an initial draft framework for a stakeholder driven governance and decision-making structure. This will form the basis, of a governance piloting exercise whereby the framework will be co-designed and developed with the community using the draft framework outlined here as a foundation and strawman.

The draft framework outlines: a three-layer governance model consisting of Strategic, Executive and Steering layers, and the interactions and decision flow between these layers; a resource model for the EOSC, and a skeleton outline of the Executive layers role in commissioning and supporting the EOSC resource; an outline of the role and skeleton outline of the structure of the Steering layer in the form of Stakeholder Forums.

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## EXECUTIVE SUMMARY

The objective of Work-package 2 is to design and trial a stakeholder driven governance framework with the involvement of research communities, research institutions, research infrastructures including e-infrastructures, and research funding bodies, to shape and oversee future development of the European Open Science Cloud, and to identify appropriate federated governance model(s) and decision-making structure for it.

As part of that objective, this document outlines an initial draft framework for a stakeholder driven governance and decision-making structure. This will form the basis, of a governance piloting exercise whereby the framework will be co-designed and developed with the community using the draft framework outlined here as a foundation and strawman.

The draft framework outlines:

- A three-layer governance model consisting of Strategic, Executive and Steering<sup>1</sup> layers, and the interactions and decision flow between these layers
- A resource model for the EOSC, and a skeleton outline of the Executive layer's role in commissioning and supporting the EOSC resources
- An outline of the role and structure of the Steering layer in the form of Stakeholder Forums.



Figure 1 - EOSC Community Governance Model

<sup>1</sup> Whilst the EOSC Communication refers to an Advisory layer, it is important that stakeholders are, and feel that they are, peers in the decision-making process. They should perform a role that is both advisory *and steering*. For this reason, we have used the word “steering” in this document (see section 4.2 for the rationale). It should be noted that the Institutional\Strategic layer might need to play a strong steering role in the initial implementation of the EOSC, however, the stakeholder should have an increasing steering role as the EOSC matures.

## 1. INTRODUCTION

The EOSCPilot project objectives are to:

- design and propose a possible governance framework for the EOSC and contribute to the development of European open science policy and best practice;
- develop a number of pilots that integrate services and infrastructures to demonstrate interoperability in a number of scientific domains; and
- engage with a broad range of stakeholders, crossing borders and communities, to build the trust and skills required for adoption of an open approach to scientific research

The objective of Work-package 2 is to design and trial a stakeholder driven governance framework with the involvement of research communities, research institutions, research infrastructures including e-infrastructures, and research funding bodies, to shape and oversee future development of the European Open Science Cloud (EOSC), and to identify appropriate federated governance model(s) and decision-making structure for it (see Figure 2).

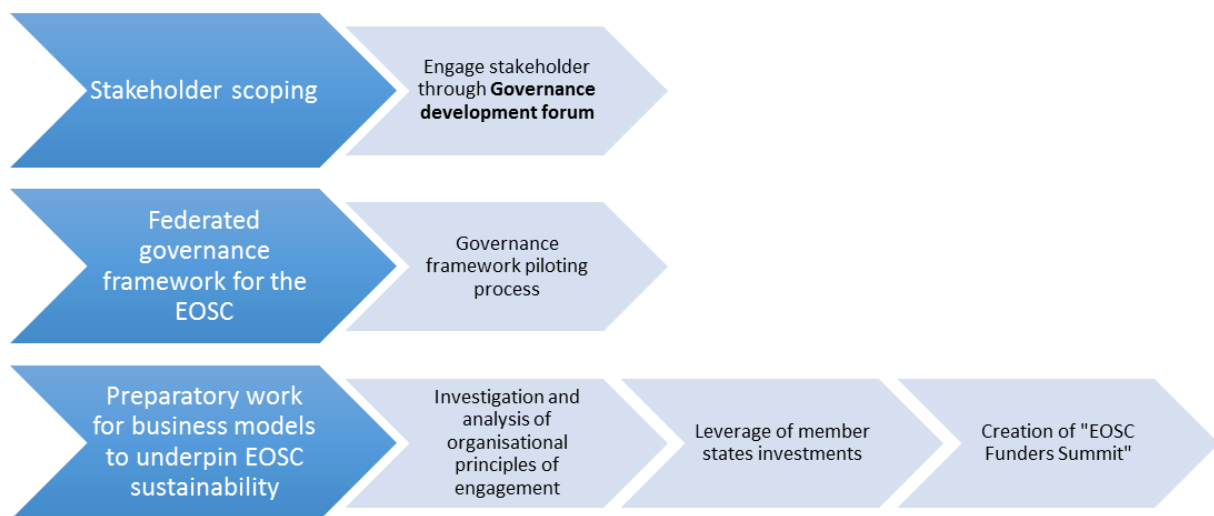


Figure 2 - EOSCPilot WP2 Governance Outline

As part of that objective, this document outlines an initial draft framework for a stakeholder driven governance and decision-making structure. This will form the basis of a governance piloting exercise whereby the framework will be co-designed and developed.

The EOSCPilot project is undertaking other work on Business and Funding Models; and Rules and Principles of Engagement which will also provide additional material to further develop the draft framework described here.

The framework is in three parts:

- **Strategic Requirements** – Outlines the current policy documents on the EOSC and the implications for Governance
- **Stakeholder Requirements** – Outlines the Stakeholders, Stakeholder Roles and Requirements

- **EOSC Governance Framework** – Outlines an overall decision flow model for a three layers EOSC Governance (Strategic, Executive, and Steering<sup>2</sup>), as well as initial options for the Executive and Steering layers.

In addition, the Annexes cover the following:

- Executive Layer Delivery Models
- Responsibility Matrices
- Consultation and Engagement

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<sup>2</sup> Whilst the EOSC Communication refers to an Advisory layer, it is important that stakeholders are, and feel that they are, peers in the decision-making process. They should perform a role that is both advisory *and steering*. For this reason, we have used the word “steering” in this document (see section 4.1)



## 2. STRATEGIC REQUIREMENTS

### 2.1. European Cloud Initiative Communication

On the 19<sup>th</sup> April 2016, the European Commission published a communication on the “European Cloud Initiative - Building a competitive data and knowledge economy in Europe”<sup>3</sup>. This document outlined the vision of the European Open Science Cloud as:

The European Open Science Cloud aims to give Europe a global lead in scientific data infrastructures, to ensure that European scientists reap the full benefits of data-driven science. Practically, it will offer 1.7 million European researchers and 70 million professionals in science and technology a virtual environment with free at the point of use, open and seamless services for storage, management, analysis and re-use of research data, across borders and scientific disciplines. Its development will be driven by the scientific community, who are the most advanced users and the largest producers of science in the world. The European Open Science Cloud will be also open for education and training purposes in higher education and, over time, to government and business users as the technologies developed will be promoted for wider application.

The Communication gives the following requirement for the EOSC Governance structure:

“Create a **fit-for-purpose pan-European governance structure** to federate scientific data infrastructures and overcome fragmentation. The institutional set-up will oversee long-term funding, sustainability, data preservation and stewardship. It will build on existing structures to involve scientific users, research funders and implementers”.

### 2.2. First HLEG Report

The second key policy document for the European Open Science Cloud is the first High Level Expert Group report published on the 11<sup>th</sup> October 2016<sup>4</sup>. This makes various recommendations on policy, governance, and implementation to take immediate action on the EOSC in close concert with Member States, building on existing capacity and expertise. Its recommendations on governance are as follows:

1. **Aim at the lightest possible, internationally effective governance.** Given the urgency and the number and variety of stakeholders and participants required to realise the EOSC, a tightly governed, new infrastructure built 'somewhere' is not the right model for the EOSC to be a success. Instead a more inclusive, flexible, transparent and less centralised approach is required, one that also enables effective global collaboration. The Commission needs to establish a lightweight, sustainable and collaborative governance model for the EOSC for all players to contribute.
2. **Guidance only where guidance is due.** While we advocate lightweight governance, we need a degree of regulation. For instance, the harmonisation of the current 'standards jungle' needs to be actively coordinated. With no regulation, some major players, public and private, may claim an unjust and counterproductive share in the EOSC. The EOSC will have a myriad of small and very large players, as is the case in the current internet, but it should be perceived by regulators and stockholders alike as a “commons” where citizens, researchers and innovators need to use each other's data and tools in a trusted affordable and sustainable environment. Europe should take a lead in this due guidance element of the Internet of FAIR Data and Services.
3. **Define Principles of Engagement<sup>5</sup> for service provision in the EOSC.** To support wide participation, innovation and sustainability the EOSC needs to be open to all players, public and private, European

<sup>3</sup> <https://ec.europa.eu/digital-single-market/en/news/communication-european-cloud-initiative-building-competitive-data-and-knowledge-economy-europe>

<sup>4</sup> [https://ec.europa.eu/research/openscience/pdf/realising\\_the\\_european\\_open\\_science\\_cloud\\_2016.pdf](https://ec.europa.eu/research/openscience/pdf/realising_the_european_open_science_cloud_2016.pdf)

<sup>5</sup> HLEG uses the expression “Rules of Engagement” but the EOSCpilot has adopted the term “Principles of Engagement” (PoE) to avoid the military connotation of the former expression.



and non-European and the development of the desired expert infrastructure will be guided and governed by a minimal set of rigorously applied and enforced protocols and developed by parties that endorse so called Principles of Engagement (PoE) that specify the conditions under which stakeholders participate. These PoE can be used to brand providers in the EOsc as trustworthy and compliant with the PoE, comparable to Conformant Cloud Providers in the USA. It should be clear that non-EOsc approved players are free to explore any role in the Open Science ecosystem they wish, even if they do not adhere to the PoE. They will just not be able to brand their services as EOsc approved/certified.

4. **Federate the gems (and amplify good practice).** Based on the consensus that most foundational building blocks of the Internet of FAIR data and Services are operational somewhere, but that they operate in silos per domain, geographical region and funding scheme, we recommend that early and strong action is taken to federate these gems. Optimal engagement is required of the e-infrastructure communities, the ESFRI communities and other disciplinary groups and institutes. Several of these cross-ESFRI building blocks begin to operate in individual Member States. Simultaneously, the wealth of small and large industrial players in Europe should be engaged. All partners and stakeholders that adhere to standards and sign off on the Principles of Engagement (PoE) should be eligible.

### 2.3. Open Science Policy Platform

In May 2017, the Open Science Policy Platform<sup>6</sup> adopted a “Report on the governance and financial schemes for the European Open Science Cloud” from its working group on the EOsc<sup>7</sup>. This report was submitted to the EU Competitiveness Council. It recommends that:

1. The EOsc should rely on a multi-level and multi-stakeholder governance that ensures a representation for the main stakeholder categories and disciplines, integrating both the national and European levels of authority.
2. Facilitate access to the EOsc across borders and disciplines by carefully analysing all aspects of interoperability (technical, semantic, organisational, legal and policy) and translate them into a common model and rules of participation.
3. European countries and EC should ensure long-term funding of the services that are needed to enable the integration of and access to the resources that can be federated in the EOsc.
4. Different and innovative funding schemes should be investigated to support users to consume services from EOsc-certified providers that are approved based on a commonly-agreed European certification scheme.
5. Kick-off the EOsc ecosystem with enough coordinated financial support from a sufficiently large set of European countries and the EC.
6. Raise awareness and communicate benefits of the EOsc among decision makers, research and education bodies, private sector, industrial and citizen organisations; share best practices and use-cases to highlight the potential and results of the EOsc.
7. Develop Open Science and data skills among all the key stakeholder categories.
8. Ensure to align and develop ethical rules in data management, storage and analytics that are recognized by all stakeholders in the EOsc.

### 2.4. EOsc Declaration

The EOsc Declaration, published by the EC on 24/10/17 is an outcome of the EOsc Summit of 12th June 2017 that was attended by eighty key stakeholders. The EOsc Declaration sets out key principles on Data

<sup>6</sup> <https://ec.europa.eu/research/openscience/index.cfm?pg=open-science-policy-platform>

<sup>7</sup> [https://ec.europa.eu/research/openscience/pdf/ospp\\_euro\\_open\\_science\\_cloud\\_report-.pdf](https://ec.europa.eu/research/openscience/pdf/ospp_euro_open_science_cloud_report-.pdf)

Culture and FAIR Data; Research Data Architectures and Services; and Governance and Funding<sup>8</sup>. The key principles for governance are:

1. **Governance model** - A long-term, sustainable research infrastructure in Europe requires a strong and flexible governance model based on trust and increasing mutuality. As interdisciplinarity is one of the main objectives of the EOSC, the governance model should be based on representability, proportionality, accountability, inclusiveness and transparency.
2. **Governance framework** - The EOSC governance framework will be co-designed, stakeholder driven and composed of three main layers: 1) institutional, including EU Member States and European Commission 2) operational, including a governance board and relevant working committees (e.g. thematic and functional) and 3) advisory, including a stakeholder forum.
3. **Governance board** - A governance board will coordinate the efforts of stakeholders endorsing the EOSC Declaration, with the broad mandate to reach practical agreements for the implementation of an EOSC Roadmap by 2020. The board will have an advisory role and an implementing role of the decisions by Member States and European Commission concerning the programming, financing and towards the setting up of a long-term governance and business model for the EOSC. It will make best use of the outcomes of past and current projects (e.g. EOSCpilot, eInfraCentral and EOSC-hub) and independent expert advice and studies.
4. **Coordination structure** - A coordination structure, funded by Horizon 2020, will help the governance board to manage the implementation, according to agreed rules and methods of stakeholder participation. The structure and its participating entities should be accountable for the responsibilities assumed, based on an objective assessment of their level of readiness in delivering the EOSC main functionalities.
5. **Global aspects** - The EOSC will be European and open to the world, reaching out over time to relevant global research partners. It will increase the global value of open research data and support stakeholder engagement, including researchers and citizens. It will gradually widen the initiative to federated network of infrastructures and nodes from global research partners. The EOSC Stakeholder Forum will have an important role in this sense.






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<sup>8</sup> [https://ec.europa.eu/research/openscience/pdf/eosc\\_declaration.pdf](https://ec.europa.eu/research/openscience/pdf/eosc_declaration.pdf)

### 3. STAKEHOLDER REQUIREMENTS

#### 3.1. Stakeholders

Through the EOSCPilot Engagement activities, we have established a range of different stakeholder who would participate in and would both benefit from and provide benefits to the EOSC. Any effective governance structure would need to involve and take input from all these stakeholders. The key classes of stakeholder identified with the community is outlined in Table 1.

 <b>Researchers</b>	<p>The European Open Science Cloud (EOSC) will offer Europe's researchers and science and technology professionals a virtual environment to store, share and reuse the large volumes of information generated by the big data revolution. EOSC, as a functional embodiment of the European Cloud Initiative, will support data-driven innovation and contribute to the creation of a Digital Single Market in Europe. Science and industry will obviously benefit from these developments.</p>
 <b>Service Providers</b>	<p>Service Providers are the heart of EOSC's value proposition</p> <p>Service Providers functioning nationally or at a larger scale, with commercial, non-profit or public status, can have 2 roles in the EOSC: builders or providers.</p>
 <b>Research Producing Organisations, Academic Institutions and Research Libraries</b>	<p>Research producing organisations, Academic Institutions and Research Libraries will be the core users of the European Open Science Cloud.</p> <p>Research libraries, archives, academic institutions, university departments and, generally, organisations that are significantly involved in promoting, supporting and enabling research-production activities, play an essential role in the research and scholarship ecosystem</p>
 <b>Learned Societies, Research Communities, Scientific and Professional Associations</b>	<p>Learned societies, research communities, scientific and professional associations are key allies to build, use and promote the EOSC</p>
 <b>Enterprise</b>	<p>Enterprises relate to the EOSC in multiple ways. EOSC's target group is categorized into a wide range of categories such as Small and Medium sized (SMEs), large enterprises, dynamic European start-ups and entrepreneurs-to-be, researchers, developers, deployers, providers, distributors, etc. Additionally, many sectors can benefit or contribute to the EOSC, for example healthcare, transportation, energy, manufacturing, education, analytics, etc.</p>

 <p><b>Research Infrastructures</b></p>	<p>The notion of Research Infrastructures refers both to traditional large physical installations, as well as to distributed facilities which “include networked resources and skill / capacity building initiatives. These resources use advances in information and communications technology and the big data revolution to underpin new collaborative methods of research”.</p> <p>Research infrastructures may be based at a single location, distributed across several sites and organisations, or provided via online platforms. Europe hosts several large-scale research infrastructures operating across national boundaries.</p> <p>Research Infrastructures are the base on which the future federated EOSC will be built. They provide several types of services to the EOSC, including data services and expertise. Research infrastructures are often very experienced in providing cloud services to researchers, and as such, are key players in the specification and the set-up of the EOSC. Close cooperation with other research infrastructures and e-Infrastructures within the EOSC will increase the capability of research infrastructures to combine and integrate data and resources in a common environment.</p>
 <p><b>E-infrastructures, VREs and other pertinent H2020 projects</b></p>	<p>E-Infrastructures, VREs and other H2020 projects are key building blocks of the European Open Science Cloud</p> <p>The EC Digital Single Market refers to E-Infrastructures as ways of addressing needs of European researchers for digital services in terms of networking, computing and data management. They foster the emergence of Open Science and support the circulation of knowledge in Europe online and therefore constitute an essential building block for the European Research Area.</p> <p>A Virtual Research Environment (VRE) is a community of practice, an organisation and a bundle of services which supports researchers by providing access to shared documents tools and resources they need during a research project. Some examples of VREs are EVER-EST, a VRE for research on Earth-science, and VRE4EIC, supporting a multi-disciplinary approach to research on climate change and energy sustainability.</p>




 <p><b>General Public</b></p>	<p>EOSc project will create a cross-border and multi-disciplinary open innovation environment with the aim of delivering its benefits to the final citizen as well. Democratization of science and open access to scientific data are indirectly providing their beneficial results to civil society. The activities and achievements of the EOsc and open science initiatives need to be linked with the everyday challenges, that citizens are sensitive to, such as public investments, new services and new job opportunities.</p>
 <p><b>National, Regional or Local Government Agencies</b></p>	<p>Public authorities and government agencies, specifically in their capacity as organisations performing monitoring activities and using research, shall be able to fully exploit the possibilities around Big Data as EOsc will allow them to move, share and reuse data seamlessly across European borders, among institutions and analytical facilities and between different research and data disciplines</p>
 <p><b>Research Funding Bodies</b></p>	<p>Research funding bodies are key stakeholders for the development of the EOsc. In recognition of this, they were among the first to be involved in extensive discussions with the European Commission’s High-Level Expert Group in 2016 with a view to contribute to the initial recommendations on the realization of the EOsc.</p> <p>Several bodies at the European level make research grants available to researchers regardless of their nationality or field of research. This includes programmes supported by the EU under the Research and Innovation Framework programmes – including for example the direct actions of the Joint Research Centre, or the Marie Skłodowska-Curie Actions or the actions managed by the European Research Council. Other European funding programmes are managed by the European Science Foundation, the European University Institute, the European Association of National Metrology Institutes (EURAMET), etc.</p> <p>Many European countries have one or more national agencies responsible for research, science and/or technology development. The policies and mandates of these agencies will inevitably be different from country to country, but they are essential drivers of Open Science and it is vital for the EOsc to engage in a common platform with these stakeholders.</p>

Table 1 - EOsc Stakeholders

### 3.2. Stakeholder Roles

Inspired by the analogy in the HLEG Report to the development of the Internet (see Section 2.2), as part of

the analysis of the stakeholders’ involvement and input into any governance framework, the project considered the ICANN infographic to outline the Digital Governance of the Internet as shown in Figure 3. Whilst this infographic was extremely useful in understanding the democratic and peer nature of internet governance, in our engagement with stakeholders (see Annex C), many of them could not identify with a single layer, and instead indicated that they would participate on multiple layers.

### THE THREE LAYERS OF DIGITAL GOVERNANCE

No one person, government, organization, or company governs the digital space. Digital Governance may be stratified into the three layers depicted here: Infrastructure, Logical, Economic and Societal. Solutions to issues in each layer include policies, best practices, standards, specifications, and tools developed by the collaborations of stakeholders and experts from actors in business, government, academia, technical, and civil society. For a map of Digital Governance Issues and Solutions across all three layers, visit <https://map.networkofall.org>.

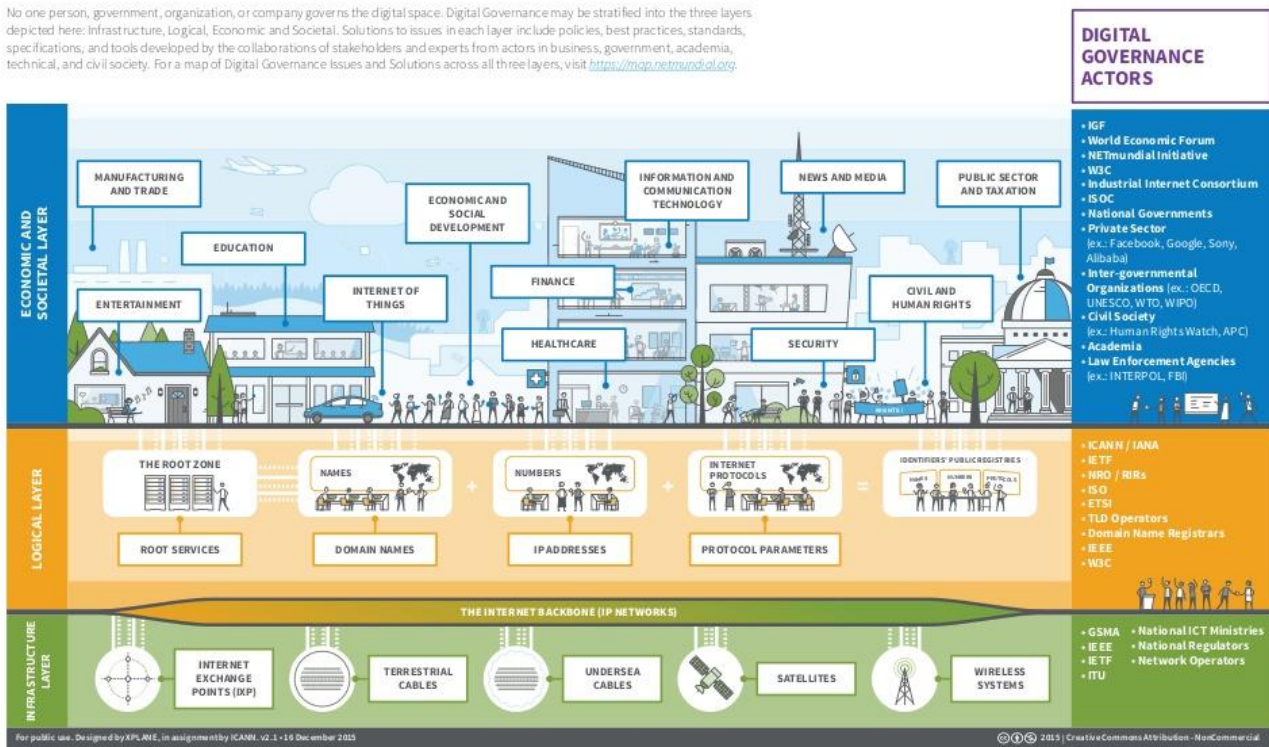


Figure 3 - The Three Layers of Digital Governance<sup>9</sup>

We also tried to develop a EOSC infographic based on the Digital Governance involving four layers:

1. Research Communities
2. Thematic Services (i.e. services designed for particular research areas)
3. Compute and Content Services (i.e. generic computational, analysis tools, and data repositories)
4. E-Infrastructure Services (i.e. underpinning middleware such as access and identity management and connectivity)

However, again, many stakeholders identified with multiple layers.

Based on this feedback from stakeholders, we decided to concentrate on three stakeholder *roles*, understanding that different stakeholders can play multiple roles, or different roles are different points in the research lifecycle or within their organisation. These are outlined in Table 2 (the stakeholders listed are indicative and not meant to be exhaustive or exclusive).

<sup>9</sup> <https://www.icann.org/news/multimedia/1563>



Primary Role	Description	Typical Stakeholders
<b>Provider</b>	Provides services, data or other resources (e.g. scientific instruments, training) into EOSC	e-Infrastructures Service Providers Enterprise Academic Institutions and Research Libraries Research Infrastructures Outputs from VRE, and Other H2020 Projects
<b>Consumer</b>	Will make use of services, data, or other resources from EOSC	Learned Societies, Research Communities, Scientific and Professional Associations Research Infrastructures Research Producing Organisation e-Infrastructures, VRE, and Other H2020 Projects Academic Institutions and Research Libraries Enterprise General Public
<b>Decision-makers</b>	Will be involved in the strategic direction, compliance and funding of EOSC	National, Regional or Local Government Agencies Research Funding Bodies

Table 2 - EOSC Primary Stakeholder Roles

In addition, there are some additional roles which are covered by the above stakeholders, but worth explicitly articulating – these are in Table 3.

Supplementary Role	Description	Relationship to Primary Roles
<b>Intermediary</b>	Many stakeholders (including e-infrastructures, research infrastructures, VREs etc.) will consume services from some providers to provide value added services to other consumers.	Member of both Provider and Consumer roles
<b>Funder</b>	Provides funding for research on a local, national or international level	Sub-role within Decision-makers



Supplementary Role	Description	Relationship to Primary Roles
Policy-makers	Regulates policy at a local, national or regional level.	Sub-role within Decision-makers

Table 3 - EOSC Supplementary Stakeholder Roles

### 3.3. Stakeholder Requirements

From our engagement activities (see Annex C) we explored the requirements for the governance structure from stakeholders in the context of the various stakeholder roles.

From the consumers perspective, EOSC needs governance mainly to ensure an environment where users – not only the most influential ones - can articulate their unmet needs. Governance mechanisms need to capture these needs. Large and influential consumers (the most advanced and organized research communities, RIs, etc.) will be the heaviest consumers which means that they should have a key role in developing EOSC, but EOSC must be flexible enough to let the less influential consumers coexist with the more influential ones.

EOSC should be a “market place”, in its almost traditional meaning, a place open to everybody where demand can meet supply, and in that sense, it should be a living creature, which gradually adapts to the consumers’ needs. There must be a built-in feed-back loop which should be in place already when initializing EOSC (and when further developing EOSC).

Once EOSC is put in place, both potential consumers and existing consumers should be accommodated, so that the EOSC captures the needs of research communities that are not yet “mature”. At the same time, one should realize that not everything can be covered at the same time, and the governance needs to focus on making things actually work, meaning to prioritize the most fundamental consumer needs first.

EOSC consumers is a huge and heterogeneous category. Two important questions are therefore:

1. How to make sure that consumers feel properly represented in EOSC governance
2. How to handle all various (maybe even partially clashing) needs from the whole range of consumers?

Transparency is a key feature when negotiating these questions.

## 4. EOsc GOVERNANCE FRAMEWORK

### 4.1. Stakeholder Engagement

*“Those groups who can affect or are affected by the achievements of an organization's purpose should be given the opportunity to comment and input into the development of decisions that affect them”<sup>10</sup>*

*Stakeholder Engagement: A Road Map to Meaningful Engagement – Cranfield School of Management*

A key requirement in the strategic requirements listed in Section 2 is the need for the EOsc to be stakeholder driven. It should be “a multi-level and multi-stakeholder governance that ensures a representation for the main stakeholder categories and disciplines, integrating both the national and European levels of authority.” (OSPP Recommendations – Section 2.3). It is therefore important for all stakeholders and all stakeholder roles to be able to participate in the governance.

Moreover, to be “open to all players, public and private, European and non-European” (HLEG Recommendations – Section 2.2), it can borrow from Internet and Digital Governance (see Figure 3 **Errore. L'origine riferimento non è stata trovata.**), following the analogies between the development of EOsc and the development of the Internet suggested in the HLEG report, that

*No one person, organisation, or company governs the digital space ... Solutions to issues in each layer include policies, best practices, standards, specifications, and tools developed by the collaboration of stakeholders and experts from actors in business, governments, academia, technical, and civil society.<sup>11</sup>*

This is encapsulated in discussing the EOsc as a “Commons” – a management theory for natural resources that groups of people (communities, user groups) manage for individual and collective benefit, which through the work of Fuster Morell amongst others have been extended to Digital and Knowledge Commons<sup>12</sup>:

*The **digital commons** are defined as “an information and knowledge resources that are collectively created and owned or shared between or among a community and that tend to be non-exclusive, that is, be (generally freely) available to third parties. Thus, they are oriented to favor use and reuse, rather than to exchange as a commodity. Additionally, the community of people building them can intervene in the governing of their interaction processes and of their shared resources.”<sup>13</sup>*

This has led to various proposals to apply the commons principles<sup>14</sup> to research e-infrastructures and open science. The e-Infrastructure Reflection Group proposed an e-Infrastructure Commons in a 2013 white paper<sup>15</sup>, which proposes the need for:

**Community building, high-level strategy and coordination in Europe:** for each type of e-Infrastructure service, a single coordinating organisation with a central role for user communities. These bodies, in turn, will need a forum for coordination between them across the different e-Infrastructure types.

This would require strong stakeholder engagement to strengthen governance on the following levels:

- On the **strategic** level user communities should organise themselves to drive the long-term strategy.

<sup>10</sup> <http://www.som.cranfield.ac.uk/som/p15175/Knowledge-Interchange/Guides/Corporate-Responsibility-and-Sustainability/Stakeholder-Engagement-A-Road-Map-to-Meaningful-Engagement>

<sup>11</sup> <https://www.icann.org/news/multimedia/1563>

<sup>12</sup> <http://www.onlinecreation.info/digital-commons/>

<sup>13</sup> Fuster Morell, M. (2010, p. 5). Dissertation: Governance of online creation communities: Provision of infrastructure for the building of digital commons.

<sup>14</sup> <http://www.bollier.org/blog/eight-points-reference-commoning>

<sup>15</sup> <http://e-irg.eu/commons>

- On the **service provision** level user communities will have to learn to use their joint purchasing power, in a competitive market, which includes both public and commercial offerings.
- On the **innovation** level, advanced users of international e-Infrastructures should participate in the specification and real-life testing of new e-Infrastructure developments.
- On the **standardisation** level user communities should contribute to the process of setting and implementing the international standards necessary to achieve the international, service-oriented, interoperable e-Infrastructure portfolio envisioned for the e-Infrastructure Commons 2020.

EGI and other e-infrastructures built upon the e-IRG e-Infrastructure Commons recommendations, extending them to Open Science in general, in a set of white papers and proposals on an Open Science Commons<sup>16</sup>. These map key principles of Commons management to Open Science<sup>17</sup>:

Principle of Commons	What it means to the Open Science Commons
<b>Shared resources</b>	Research data, scientific instruments, digital services (including those for data-intensive science), software, written knowledge (e.g., scientific publications, educational and training resources), expertise from people.
<b>Access rights</b> Collective rights, access with no central authority	Access modes are well defined and non-discriminatory for all members of the European Research Area.
<b>Policies</b> Community-based rules and procedures in place with built-in incentives for responsible use, right of access to all according to established community policies	Harmonized access policies, based on one market, clear points of access and support, integrated body of policies for access and use.
<b>Management</b> Community management of communal services and resources	Formally managed services using transparent methods to maintain service access and quality. Management spans organisations to support collaboratively-provided services and is intended to support provision of long-term, high-quality services.
<b>Governance</b> The community of individuals building the commons can intervene in the governing of their interaction processes and of their shared resources.	Governance model with multiple stakeholders, including research communities as producers of knowledge and data, scientific infrastructures, resource providers, national and European scientific infrastructures and e-infrastructures, and providers of the platforms that enable national and Europe-wide sharing (e.g. open source software repositories, training marketplace, service marketplace, identity providers).

<sup>16</sup> <https://www.opensciencecommons.org>

<sup>17</sup> <http://go.egi.eu/oscpw>

Principle of Commons	What it means to the Open Science Commons
<p><b>Stewardship</b></p> <p>Long-term, persistent care for a given resource for the benefit of oneself and others (including the resource itself) and collective trusteeship. Caring for the commons means more than just regulating. Caretakers are needed, that is, a system nurturing societal cooperation, sharing of goods and thoughtfulness of generations to come. It entails establishing norms that reduce free riding and hold communities together (community building).</p>	<p>Long-term support of funding agencies to allow for infrastructures to take a long-term view and build for a common European future.</p> <p>A framework of policies and support allows for the growth and development of e-Infrastructure capacity and capabilities.</p> <p>Active maintenance of open science resources, such as technical development, certification of data repositories, and maintenance of training and education programmes.</p> <p>Active effort to increase the amount and quality of knowledge held by the community on required topics such as data preservation, curation and sharing.</p> <p>Regional and national scientific instrumentations are accessible to all, for creation of knowledge, reuse of research outputs and new ways to create scientific data.</p>

Table 4 - Principles of Open Science Commons<sup>18</sup>

Both these initiatives can be considered prototypes of the EOsc vision and ambition. The key governance principles, particularly those concerning the involvement of all stakeholders as peers in the decision-making process, are still extremely pertinent. Key principles of Commons which underpin these white papers and which should be observed by any EOsc Governance model can be summarised from Eleanor Ostrom's book "Governing the Commons"<sup>19</sup>:

1. Group boundaries are clearly defined.
2. Rules governing the use of collective goods are well matched to local needs and conditions.
3. Most individuals affected by these rules can participate in modifying the rules.
4. The rights of community members to devise their own rules is respected by external authorities.
5. A system for monitoring member's behaviour exists; the community members themselves undertake this monitoring.
6. A graduated system of sanctions is used.
7. Community members have access to low-cost conflict resolution mechanisms.
8. Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

## 4.2. EOsc Governance Model

Ultimately the governance model should allow the engagement of all stakeholders, in all stakeholder roles, such that they are peers in the decision making for EOsc. For this, EOsc can borrow from Community Governance in the public sector as typically used for local government or social community initiatives. In this context, Community governance refers to the processes for making all the decisions and plans that affect life in the community, whether made by public or private organisations or by citizens. To be effective, it considers three core community skills of *engaging citizens*, *measuring results*, and *getting things done* in order to help people and organisations make decisions about what actions to take in a community and to measure their impact and effectiveness.<sup>20</sup> The interaction between these "skills" is shown in Figure 4.

<sup>18</sup> <http://go.egi.eu/oscpw>

<sup>19</sup> <http://www.cooperationcommons.com/Documents/EntryView?id=30>

<sup>20</sup> [http://www.rtmteam.net/page.php?pageID=25&section=overview\\_of\\_ecg](http://www.rtmteam.net/page.php?pageID=25&section=overview_of_ecg)

**Effective Community Governance Model**



- 1 Community Problems Solving:**  
Aligns “Engaging Citizens” and “Getting Things Done.”
- 2 Organizations Managing for Results:**  
Aligns “Measuring Results” and “Getting Things Done.”
- 3 Citizens Reaching for Results:**  
Aligns “Engaging Citizens” and “Measuring Results.”
- 4 Communities Governing for Results:**  
Aligns all three core skills.

**Figure 4 - Effective Community Governance<sup>21</sup>**

These map very closely to the layers defined in the EOsc Declaration (see Section 2.4), of Institutional, Executive, and Advisory). In this model, the Advisory Layer from the declaration would involve the *engaging citizens* skills to determine the scientific and technical needs of the users. The term “Advisory” is meant, in this context, to concern engaging with all stakeholders. It is important that stakeholders are, and feel that they are, peers in the decision-making process. They should perform a role that is both advisory *and steering*. For this reason, we have used the word “steering” in this document rather than just “advisory”.<sup>22</sup> It should be noted that there are a wide variety of definitions of “Steering Board” and “Steering Committee” from being the final decision maker or arbitrator to providing strong guidance and direction. As regards the governance framework, the definition of the Steering layer is closer to the latter – it provides strong guidance and direction (not just advisory) to the Strategic layer, but the Strategic layer is the final decision-making body.

The declaration’s Institutional layer would define the strategic objectives and measure the impact and effectiveness of EOsc against these objectives and so would principally map to the *Measuring Results* skill.

Finally, the Executive\Operational layer would map to the *Getting Things Done* skill by ensuring that the EOsc delivers to meet the needs of the stakeholders through the strategic objectives set by the Institutional layer. These layers are illustrated in Figure 5.



**Figure 5 - EOsc Governance Layers**

<sup>21</sup> [http://www.rtmteam.net/page.php?pageID=25&section=overview\\_of\\_ecg](http://www.rtmteam.net/page.php?pageID=25&section=overview_of_ecg)

<sup>22</sup> It should be noted that the Institutional\Strategic layer might need to play a strong steering role in the initial implementation of the EOsc, however, the stakeholder should have an increasing steering role as the EOsc matures.

The intersections of these skills and layers are important in delivering an effective governance structure for EOSC. The **Steering** layer determines within its communities best practice, standards, principles of engagement, in effect addressing the recommendations of “Guidance only where guidance is due” and “Define Principles of Engagement<sup>5</sup> for service provision in the EOSC” from the HLEG group report (Section 2.2), as well as the scientific and technical requirements of the EOSC. This forms a discussion and interaction with the **Strategic** layer, articulates the strategic objectives for the EOSC, and the metrics to measure how well the EOSC delivers against these objectives. This leads to an interaction between the **Strategic** and **Executive** layers to determine how the EOSC is provisioned and commissioned to meet these objectives. Finally, there is a feedback loop between the **Steering** and **Executive** on how well the EOSC is meeting the communities’ needs, standards and practices, and a report back from the **Executive** to the **Strategic** layer on how effective the EOSC is meeting the strategy, and how effective the strategic goals are at capturing the real needs of the communities. This is outlined in Figure 6.

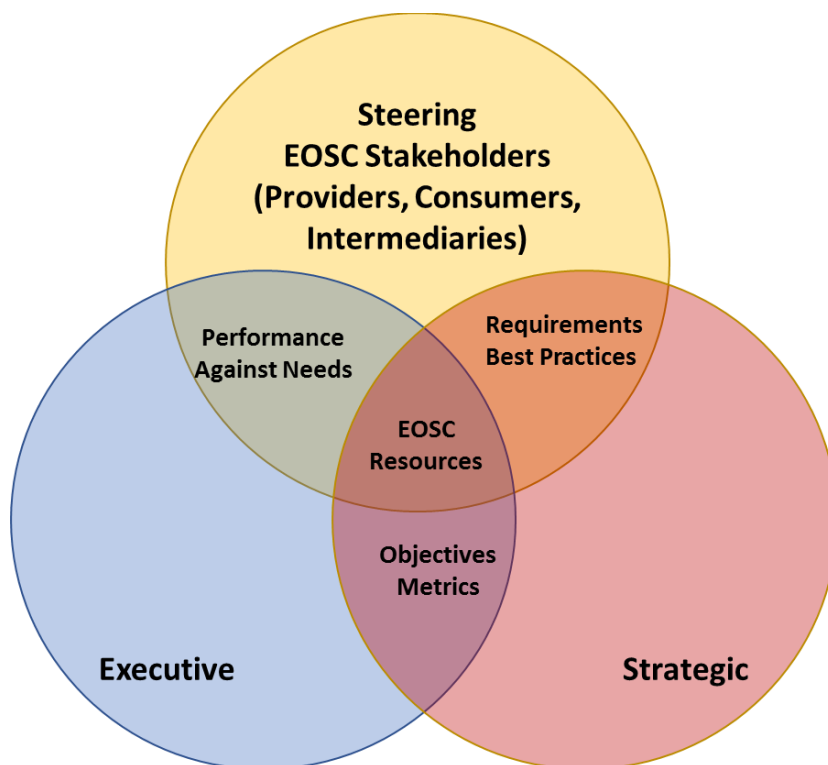


Figure 6 - Community Governance Model for EOSC

4.2.1. Resources

<b>EOSC Resource = Services + Data + People</b>
---

At the centre of this model are the EOSC Resources themselves – the EOSC Resources cover the range of services and facilities needed to support Open Science and Research. These include technical services such as analytics and computational services, cloud services, thematic services tuned to particular research disciplines, e-infrastructure and middleware services such as access identity management; but also knowledge resources such as datasets, storage, digital library and archives; access services such as a service catalogue and portals; scientific instruments and facilities; and facilitation activities such as training, software development support and consultancy.

4.2.2. Compliance and Compatibility

It is envisaged that most of the EOSC resources will be fully *compliant* with the Principles of Engagement and compatible with the technical architecture. However, it is likely that, at least initially, there will be resources which are not fully *compliant* but are merely technically *compatible* with the EOSC but are still of value to the EOSC Consumers. Such resources might meet the needs of specific disciplines only, or may be

currently in the process of becoming compliant.

There may also be some resources which may not be fully technically *compatible* with EOSC resources nor fully *compliant* with the Principles of Engagement, but which nevertheless outside are of value to EOSC consumers. These would still be usable by EOSC consumers as recommended by the HLEG that “It should be clear that non-EOSC approved players are free to explore any role in the Open Science ecosystem they wish, even if they do not adhere to the Principles of Engagement. They will just not be able to brand their services as EOSC approved/certified” (Section 2.2).

This is illustrated in Figure 7. The EOSCPilot is currently co-developing Principles of Engagement with the community, as well as developing the technical architecture which will further inform this model in terms of precise definitions of *compliant* and *compatible*. It is likely that *compliant* and *compatible* will be parts of a broader spectrum of different degrees of technical interoperability and compliance with the Principles of Engagement rather than the binary relationship implied here.



Figure 7 - EOSC Resource Model: Principles of Engagement

#### 4.2.3. Core Resources

To function, there will need to be some **Core Resources** underpinning the EOSC analogous to the Logical Layer in the Digital Governance for the Internet (Figure 3). Such resources might include the EOSC service catalogue, access and identity management, etc. The need for **Core Resources** was also identified by the OSPP EOSC Working Group (see Section 2.3) whose definition is “set of services and processes that are needed to integrate and enable access to the various resources federated in the EOSC”. The **Core Resources** will need to be directly commissioned and financially compensated. The **Executive** should have the primary responsibility, in discussion with the **Strategic** and **Steering** layers, to determine the requirements of these core resources, and decide how they will be delivered.

#### 4.2.4. Compensation

In order to meet the objective of “free at the point of use”, resource provision will need to be compensated by other means. The EOSCPilot is currently working on Business and Funding Models on how this compensation would work, but various models could include contribution of resources by member states and institutions, direct commission by the **Executive** or compensation based on usage using mechanism in the Framework Programmes (such as Transnational or Virtual Access instruments<sup>23</sup>) or new mechanisms such as “Cloud Coins” or other credit mechanisms. Facilities and services to enable such credit mechanisms will need to be provided by the EOSC **Core Resources**.

<sup>23</sup> [http://www.rich2020.eu/tas\\_calls/about](http://www.rich2020.eu/tas_calls/about)



#### 4.2.5. Service Gaps

To ensure that the EOsc remains relevant and to encourage innovation, it will be necessary to identify any gaps there may be in provision. Gaps may be identified by **Steering** or **Executive** layer and notified to the Executive and Strategic layers. The **Executive** will need to develop mechanisms to fill any such gaps in provision, either by directly incentivising the development of new services or through advocacy to the Strategic layer and the Framework Programmes.

#### 4.2.6. Open Market

To ensure that EOsc remains “open to all players, public and private, European and non-European” (Section 2.2), there may also be resources within EOsc which will not be directly compensated through EOsc, but through other means (including commercial resources paid directly by researchers or their institutions), but which nevertheless meet the requirements to be EOsc *compliant* or *compatible* and are of value to the community.

In summary (see also Figure 8):

- An EOsc Resource is *Compliant* if it meets the Principles of Engagement and the technical requirements as defined by the EOsc technical architecture
- An EOsc Resource is *Compatible* if it meets the technical requirements as defined by the EOsc technical architecture
- Some resources which are needed to integrate and enable access to the various resources federated in the EOsc will be *Core Resources* (which by definition will need to be *Compliant*)
- *Compliant* resources will be eligible to be part of EOsc; resources neither *Compliant* nor *Compatible* will be external to EOsc; *Compatible* only resources might be borderline (if, for instance, they are transitioning into EOsc)
- EOsc resources (both commercial and non-commercial) might be compensated for their usage via mechanisms within EOsc; some EOsc resources might be funded via other means, including commercial models

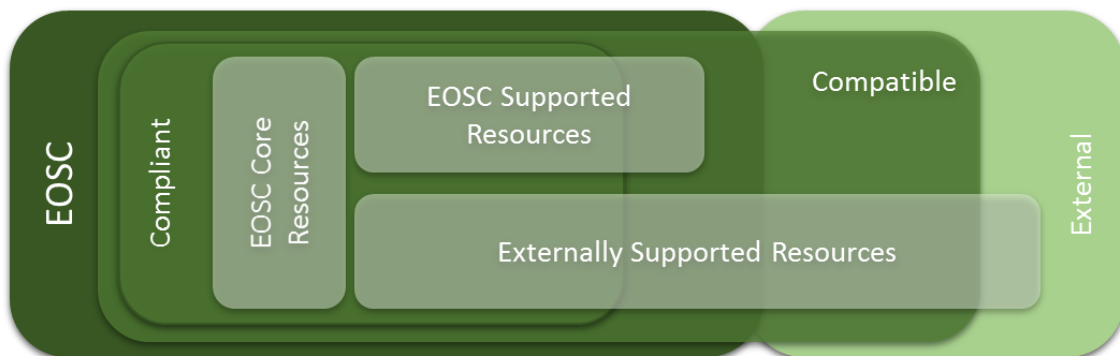


Figure 8 - EOsc Resource Model: Economics

Combining this Resource Model with the Community Engagement Model described earlier gives the Decision Flow Model as depicted in Figure 9. The **Steering** layer would allow the stakeholders to determine the requirements, policies and principles of engagement, and make proposals on how these could be met to the **Strategic** Layer. The **Strategic** layer would review, agree and prioritise these proposals and requirements to form the strategic vision and objectives of the EOsc. The **Executive** layer would be responsible for ensuring that the EOsc meets this vision and these objectives by: commissioning Core resource as required; commissioning new Supported resources as required; ensuring that Supported services are properly compensated; and ensuring that the resources within EOsc are both compliant and meet the strategic objectives. Annex A outlines some delivery models for how the **Executive** layer might

commission and support the Core and Supported resources. The **Steering** layer would also communicate to the **Executive** at how well the EOsc is meeting their requirements at an operational level, and the Executive would report this against the strategic objective to the **Strategic** layer.

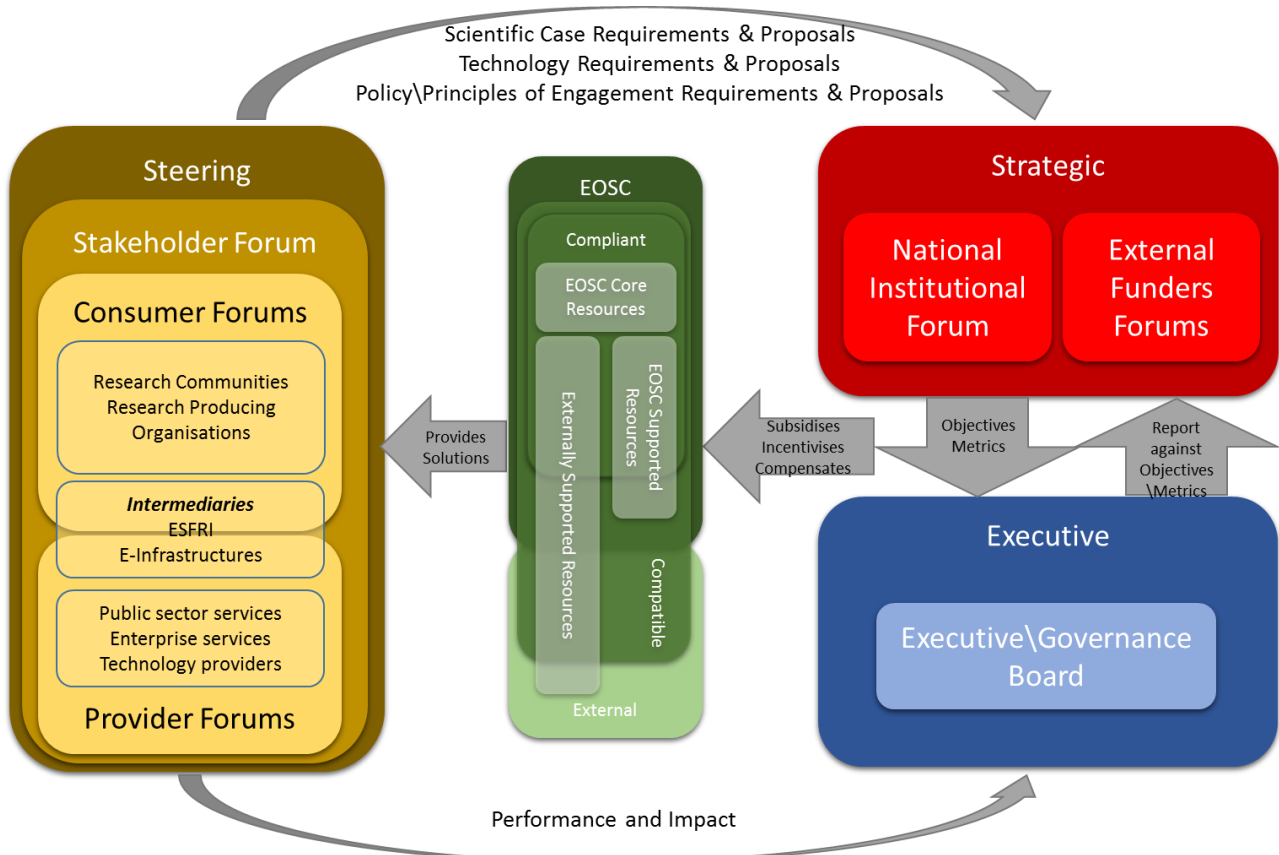


Figure 9 - EOsc Governance Decision Flow Model<sup>24</sup>

For example, a scientific discipline (or disciplines) within the **Steering** layer might define data interoperability and re-use principles for data within their domains. The **Strategic** layer would translate this into strategic objectives and requirements for resource within EOsc which handle such data. The **Executive** would have responsibility for ensuring such resources existed within EOsc, and would receive input from the **Steering** layer on how well these resources are in enabling data interoperability and re-use. Alternatively, communities within the **Steering** layer might identify key areas where training and support are required, the **Strategic** layer would again translate these to objectives, the **Executive** would ensure that there were resources within EOsc to meet these training and support requirements, and the **Steering** would report how effective they are.

### 4.3. Steering Model

The Stakeholder Forum is a key component of the **Steering** layer. The Stakeholder Forum should consist of multiple sub-forums representing the interests of Stakeholder Roles of *Consumers* and *Providers*, including those in the supplementary role of *Intermediaries*. Whilst these might have their own working groups, it is important that there is also cross working between these stakeholder roles.

The structure of the Stakeholder Forum in the **Steering** layer is key for the Governance Decision Flow Model to be effective, to allow participation from all stakeholders both large and small, and to be open and

<sup>24</sup> Whilst the EOsc Declaration mentions a “Governance Board”, the Work-Programme 2018-2020 for European research infrastructures (including e-Infrastructures) refers to an “Executive Board”

transparent. To achieve this, any structure for the Stakeholder Forum use the key principles of ISO 38500 (Governance of IT)<sup>25</sup> as guiding principles, namely:

- **Responsibility** – Stakeholders know their responsibilities, both in terms of demand and supply of EOSC resources and have the authority to meet them.
- **Strategy** – Business and funding strategies should be aligned with technological possibilities, and all the technologies and resources within EOSC within an organisation should support the EOSC objectives and strategies.
- **Acquisition** – all investments must be made based on a research case with regular monitoring in place to assess whether the assumptions still hold.
- **Performance** – the performance of EOSC resources should lead to research benefits and therefore it is necessary that the resources support research properly.
- **Conformance** – EOSC resources should help to ensure that research processes comply with legislation and regulations; EOSC resource themselves must also comply with legal requirements and agreed internal rules.
- **Human behaviour** – policies, practices and decisions respects human behaviour and acknowledges the needs of all the people in the process.

To achieve this, the European Interoperability Framework<sup>26</sup> (EIF) from the European Commission can be used as a “lens” to understand how different communities should interact and the areas of discourse within these interactions. The EIF derives the need for interoperability between public sector and e-government services and outlines specific guidance on how to set up interoperable digital public services.

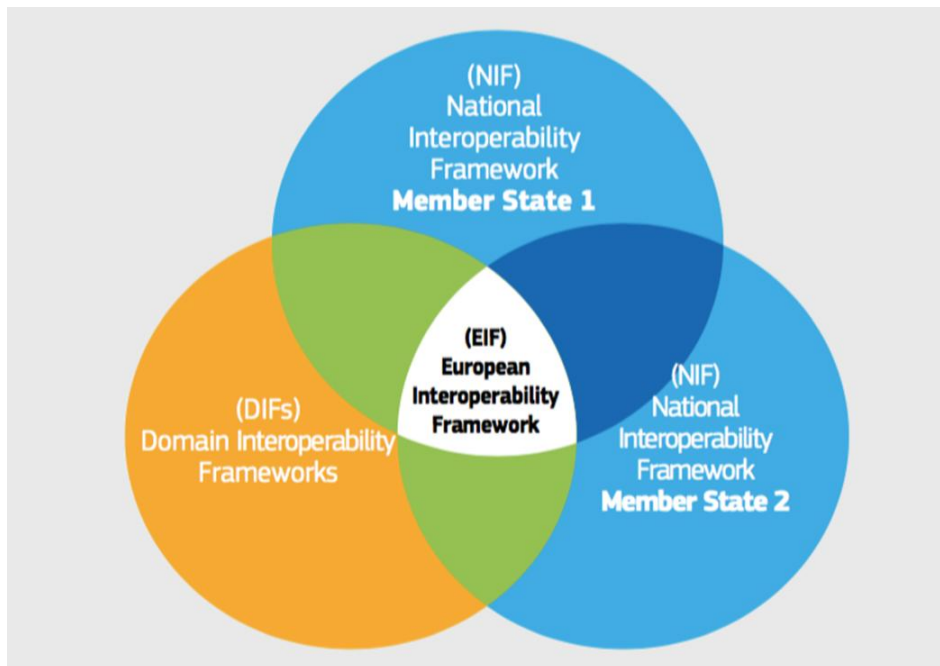


Figure 10 - European Interoperability Framework

The first part of the lens is the concept of overlapping domains as shown in Figure 10 and this can be used to understand how different communities would need to interact. This can be applied to scientific and research domains, comparable to the Domain Interoperability Frameworks in the diagram. Each scientific domain has its own best practices and standards, and the role of EOSC is to determine and coordinate the

<sup>25</sup> <https://www.iso.org/standard/62816.html>

<sup>26</sup> [https://ec.europa.eu/isa2/eif\\_en](https://ec.europa.eu/isa2/eif_en)

overlap between these different domains. In this way, it provides “guidance only where guidance is due” (Section 2.2). It also applies to how different providers and intermediaries should engage with the EOsc Governance, in that it is the intersection of practices and standards between International, National and Local provision of resources which is important for EOsc. Finally, the agreements on engagement principles, standards and requirements should be the intersection of those of the different stakeholder roles: *Consumer*, *Provider* and *Intermediary*. This lens is illustrated in Figure 11.

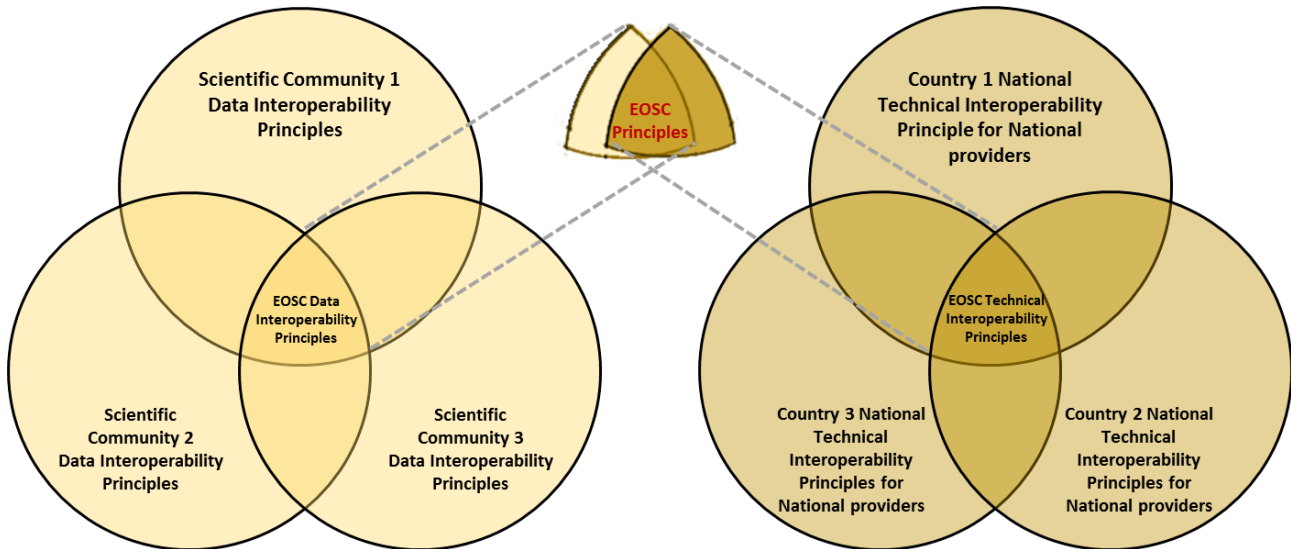


Figure 11 - Domains of Domains Applied to EOsc Governance

A second concept of the lens is the application of Interoperability Contexts which can help frame the topics of discussion and agreement between the different stakeholders on how different infrastructures, scientific domains, providers etc. need to interoperate to develop and deliver the EOsc. The European Interoperability Framework defines four such contexts:

- **Legal interoperability** is about ensuring that organisations operating under different legal frameworks, policies and strategies are able to work together.
- **Organisational interoperability** refers to the way in which public administrations align their business processes, responsibilities and expectations to achieve commonly agreed and mutually beneficial goals.
- **Semantic interoperability** ensures that the precise format and meaning of exchanged data and information is preserved and understood throughout exchanges between parties.
- **Technical interoperability** covers the applications and infrastructures linking systems and services. Aspects of technical interoperability include interface specifications, interconnection services, data integration services, data presentation and exchange, and secure communication protocols.

Within the context of EOsc, Legal Interoperability also includes Policy interoperability, and Principles of Engagement for EOsc; and Organisational Interoperability includes both Strategy and Funding. Annex B outlines some initial discussions on the responsibilities of different stakeholders, mapped against these contexts as a foundation for further discussions and development.

The Stakeholder Forum would be the organisational structure where the discussions as seen through the EIF lens should take place. There are a number of models used in other organisations which can be considered in structuring the Stakeholder Forum. Examples include the IETF<sup>27</sup> (for internet standards), RDA<sup>28</sup> (for Research Data Management), WISE Community<sup>29</sup> (for e-infrastructure security), OASIS<sup>30</sup> (for Web

<sup>27</sup> <https://www.ietf.org/>

<sup>28</sup> <https://www.rd-alliance.org>

Service and metadata standards) and W3C<sup>31</sup> (for Web standards). The main differences between these concern their legal and financial structures, but in terms of governance, they can broadly be modelled to two or more of the levels outlined in Figure 12.



Figure 12 - Stakeholder Forum Governance Outline

The model includes:

- An **Oversight Board** that agrees the rules of membership, engagement and processes and acts as the key contact point with the Strategic and Executive layers.
- A number of **Thematic Area Committees**, either based on the Interoperability Contexts, the Stakeholder Roles or broad scientific or infrastructure domains, dealing with specific thematic domains.
- **Working Groups**, that are time based, work on specific areas with the priorities determined by the Stakeholder forum governance in conjunction with the Strategic and Executive layers of the EOSC Governance.
- **Bird of a Feather Groups** discuss new activities which may lead to working groups.

Table 5 illustrates how various community organisations map to this model.

	IETF	RDA	WISE	OASIS	W3C
<b>Oversight</b>	Internet Architecture Board	Council Technical Advisory Board Organisational Advisory Board	Steering Committee	Board Technical Advisory Board	Technical Architecture Group Advisory Board
<b>Thematic Areas</b>	Internet Engineering Steering Group and Area Directors	Interest Groups	N/A	Member Sections	Interest Groups Business and Community Groups
<b>Working Groups</b>	Working Groups	Working Groups	Working Groups	Technical Committees	Working Groups

<sup>29</sup> <https://wise-community.org/>

<sup>30</sup> <https://www.oasis-open.org>

<sup>31</sup> <https://www.w3.org/>

	IETF	RDA	WISE	OASIS	W3C
<b>Birds of a Feather Groups</b>	Birds of a Feather (BOF) session at an IETF meeting	Birds of a Feather (BOF) session at an RDA meeting	N/A	Proposed Technical Committee Discussion List	Discussion Lists

Table 5 - Stakeholder Forum Governance Models

As part of the Governance Piloting activities, EOSCPilot will seek to co-design the structure of the Stakeholder Forum with the community, in line with the principles outlined above.

## 5. NEXT STEPS AND CONSULTATION

Within the EOscPilot project there are additional activities developing Principles of Engagement (within Workpackages 2 - Governance and Workpackage 5 – Service Architecture); developing a Policy Framework (within Workpackage 3 - Policy); and Business Models and Funding (within Workpackage 2 - Governance). The outputs from these activities will inform and help further develop the relative components of the Governance Framework.

This document is intended to be an initial “strawman” for continued discussion with stakeholders through the community engagement activities within both the Governance Workpackage and the project as a whole. These engagement activities include the EOsc Governance Development Forum, the EOsc Funders Forum and the EOsc Governance Piloting activities. These activities will be used to:

- Validate and further develop the EOsc Governance Decision Flow model as outlined in Section 4.2.
- Co-design and develop with all stakeholders, the Stakeholder Forum structure, responsibilities and process as outlined in Section 4.3, as well as determine its relationship with existing relevant bodies.
- Review and further develop the delivery models for the Executive as outlined in Annex A.



## ANNEX A. EXECUTIVE LAYER DELIVERY MODELS

This annex sets out three different models for the Executive layer to commission and provide financial support to Core and Supported EOSC Resources. Earlier models can be regarded as intermediate steps towards later model as well as potential final models.

### A.1. Lightweight Delivery Model

Executive commissions and pays for (either directly or through some compensatory mechanism) Core and Supported services from international, national, institutional and commercial providers through existing mechanisms (e.g. Framework Programme instruments such as Virtual Access)

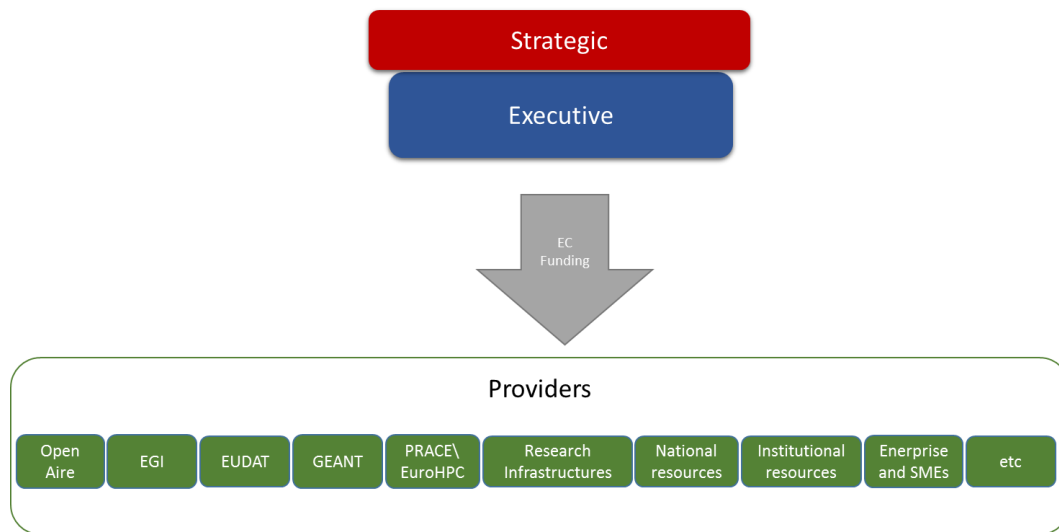


Figure 13 – Light Weight Executive Delivery Model

Pros	Cons
<ul style="list-style-type: none"> <li>Minimal Impact on present structures</li> <li>Maintains existing entry points</li> <li>Maintained Subsidiarity principle (that access should be through local or national institutions)</li> <li>Fast to implement</li> <li>Present funding mechanisms can be used</li> <li>Flexible and agile in terms of providers</li> </ul>	<ul style="list-style-type: none"> <li>Little impact of possibility to change services of present providers</li> <li>Slow change cycle</li> <li>Would need collaboration agreements</li> </ul>

Table 6 – Light Weight Executive Delivery Model: Pros and Cons

## A.2. Commissioning Authority

The establishment of a new entity (possibly a legal structure such as an ERIC) who would have responsibility for commissioning (e.g. contracting or framework agreements) Core and Supported Resources.

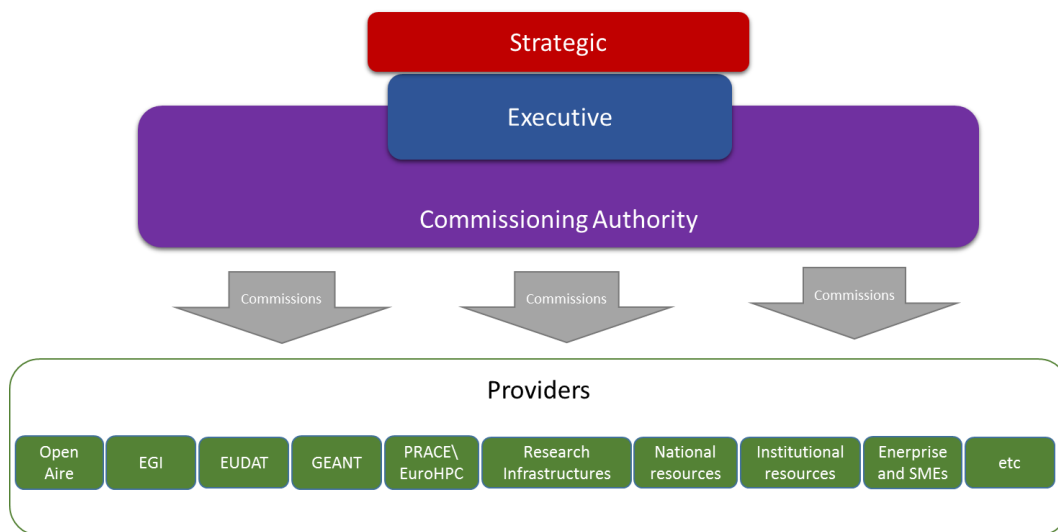


Figure 14 - Medium Weight Executive Delivery Model

Pros	Cons
Clean interface between funder and provider	Require major agreement between Member States and European Commission
From providers’ perspective, a new business opportunity	Slow to implement
An ERIC structure would allow additional mechanisms for Member State contributions/	Breaks Subsidiarity Principle by providing centralised provision of national or local resources

Table 7 – Medium Weight Executive Delivery Model: Pros and Cons

### A.3. Delivery Authority

The establishment of a new entity (possibly a legal structure such as an ERIC) who would have responsibility for delivering Core and Supported Resources, either directly or through contracting or framework agreements with third parties.

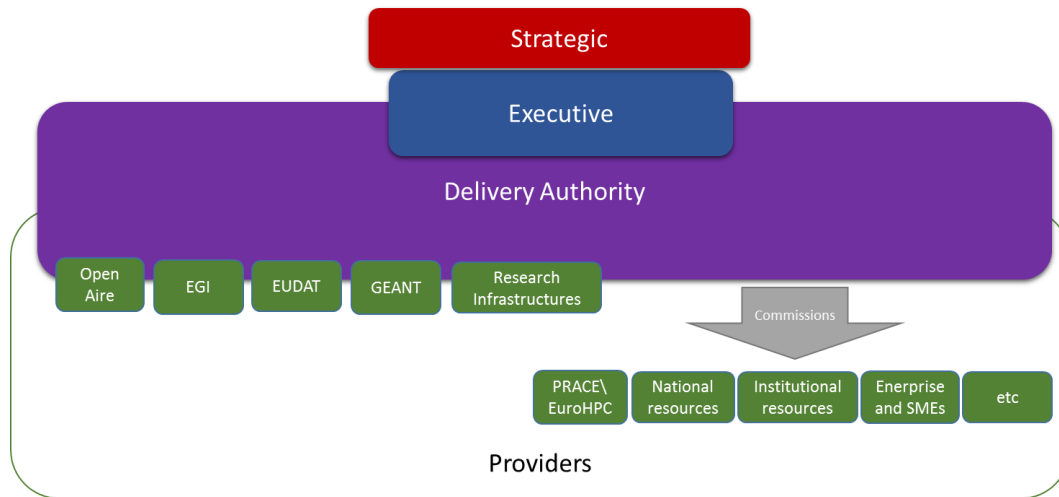


Figure 15 – Heavy Weight Executive Delivery Model

Pros	Cons
Organisational integration between public European e-infrastructures	Artificially tight integration of very different business models Very long time to implement Needs strong coordination of national resources

Table 8 – Heavy Weight Executive Delivery Model: Pros and Cons

## ANNEX B. RESPONSIBILITY MATRICES

Initial draft mapping some of the Interoperability Domains in the Stakeholder Forum (Steering Layer) to RACI (Responsible, Accountable, Consulted, Informed).

### B.1. Organisational: Strategy and Funding Responsibility Matrix

Functional Area	Task	Stakeholders					Governance Structure Layers		
		Research Communities	Research Institutions	Research Infrastructures & e-Infrastructures	Research Funding Bodies	Commercial Industrial Enterprise	Strategy Layer	Executive Layer	Steering Layer
<b>EOSC Strategy</b>									
	Long-term strategy	R	R	R	R	R	A	R	R?/C
	Short-term strategy	R	R	R	R	R	A	R	R?/C
	EU/member state high-level policy direction liaison & alignment	C	C	C	R	C	C	R	I
	International liaison	R	R	R	C	C	A	R	C
<b>Governance support</b>									
	membership of governance bodies	R	R	R	R	R	A	C	R?/C
	voting rights/weights	R	R	R	R	R	A	C	C
	secretarial support to governance bodies	C	C	C	C	C	C	A	-
<b>Budget &amp; finance</b>									
	EOSC funding	C	C	C	R	C	A	R	R?/C
	EOSC hub budget	C	C	C	R	C	A	R	C
	procurement	C	C	C	C	I	A	R	C/I

EOSC partners cost claims processing	-	-	-	-	-	A	A	-
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Table 9 - Strategy and Funding Responsibility Matrix

### B.2. Policy Responsibility Matrix

		Stakeholders					Governance Structure Layers		
Functional Area	Task	Research Communities	Research Institutions	Research Infrastructures e-Infrastructures	Research & Funding Bodies	Commercial Industrial Enterprise	Strategy Layer	Executive Layer	Steering Layer
EOSC policies									
	Principles of Engagement	R	R	R	C	C	A	R	C
	Open data/FAIR	R	R	R	C	C	A	R	C
	GDPR, IPR	R	R	R	C	C	A	R	C
	Ethics	R	R	R	C	C	A	R	C

Table 10 - Policy Responsibility Matrix

### B.3. Organisational: Operational Responsibility Matrix

		Stakeholders					Governance Structure Layers		
Functional Area	Task	Research Communities	Research Institutions	Research Infrastructures & e-Infrastructures	Research Funding Bodies	Enterprise Commercial Industrial	Institutional Layer	Executive Layer	Steering Layer
<b>Service support</b>									
	service support	C	C	R/C	C	C	A	R	C
	service development	C	C	R	C	C	A	R	C
	interoperability support	I	C	R/C	C	C	A	R	C
	architecture development	C	C	R	C	C	A	R	C
<b>User liaison</b>									
	user support (helpdesk? - e.g. data access & interoperability)	C	C	R	C	R	A	R	C/I
	user training and skills	C	R	R	R	R	A	R	C
	user satisfaction	C	R	R	R	R	A	R	C
<b>Outreach</b>		R	R	R	R	R	A	R	C

Table 11 - Operational Responsibility Matrix

## ANNEX C. CONSULTATION AND ENGAGEMENT

Time and Place	Event\Activity	Participants	Details
<b>13 – 31 March 2017</b>	Questionnaire: Ways to engage stakeholders in the development of the EOsc governance framework	21 responses / 68 targeted respondents	<ul style="list-style-type: none"> <li>- Questionnaire with 3 closed-ended and 5 open-ended questions</li> <li>- Views from people already involved in the planning and development of EOsc.</li> <li>- find out efficient ways to involve stakeholders in the EOsc governance framework development</li> <li>- Report at <a href="https://eoscpilot.eu/sites/default/files/eoscpilot_wp2_questionnaire_report.pdf#overlay-context=about/governance">https://eoscpilot.eu/sites/default/files/eoscpilot_wp2_questionnaire_report.pdf#overlay-context=about/governance</a></li> </ul>
<b>6 April, 2017</b>	1 <sup>st</sup> EOsc Governance Development Forum webinar	~20	<ul style="list-style-type: none"> <li>- WP2 activities presented, first results of the questionnaire</li> <li>- Webinar slides at <a href="https://eoscpilot.eu/sites/default/files/20170406_egdf_1st_webinar.pdf">https://eoscpilot.eu/sites/default/files/20170406_egdf_1st_webinar.pdf</a></li> </ul>
<b>20 – 21 April 2017, Amsterdam</b>	WP2 and WP3 internal workshop	22	<ul style="list-style-type: none"> <li>- 3-hour-workshop on EOsc governance framework, perspectives of funders, providers and users discussed</li> <li>- Internal notes</li> </ul>
<b>4 May, 2017</b>	2 <sup>nd</sup> EOsc Governance Development Forum webinar	23	<ul style="list-style-type: none"> <li>- Questionnaire results and conclusions, European Interoperability Framework introduced and its suitability in the EOsc context discussed</li> <li>- Webinar slides at <a href="https://eoscpilot.eu/sites/default/files/20170504_egdf_2nd_webinar.pdf#overlay-context=about/governance">https://eoscpilot.eu/sites/default/files/20170504_egdf_2nd_webinar.pdf#overlay-context=about/governance</a></li> </ul>



Time and Place	Event\Activity	Participants	Details
<b>9 May 2017, Helsinki</b>	EGDF workshop "Research Infrastructures perspectives on the governance of European Open Science Cloud"	~45	<ul style="list-style-type: none"> <li>- ½-day-meeting, in conjunction with ERIC networking meeting</li> <li>- Targeted to ERICs and other research infrastructures</li> <li>- Some conclusions: RIs both users and providers in the EOSC context; EOSC could make expertise available; Reuse experience from the RI cluster projects; Organisational interoperability; GDPR is a concern; "EOSC should follow the principle of subsidiarity and not redo what ERICs are already successfully doing"</li> <li>- Report at <a href="https://eoscpilot.eu/sites/default/files/eoscpilot_governance_development_forum_helsinki_9.5.2017.pdf#overlay-context=about/governance">https://eoscpilot.eu/sites/default/files/eoscpilot_governance_development_forum_helsinki_9.5.2017.pdf#overlay-context=about/governance</a></li> </ul>
<b>5 July 2017</b>	3 <sup>rd</sup> EOSC Governance Development Forum webinar	20	<ul style="list-style-type: none"> <li>- Topics: Conclusions from EOSC Summit, focus on sustainable funding and governance, Sneak preview of Governance Framework strawman</li> <li>- Webinar slides at <a href="https://eoscpilot.eu/sites/default/files/egdf_3rd_webinar1.pdf#overlay-context=about/governance-framework">https://eoscpilot.eu/sites/default/files/egdf_3rd_webinar1.pdf#overlay-context=about/governance-framework</a></li> </ul>
<b>17 August 2017</b>	4th EOSC Governance Development Forum webinar	26	<ul style="list-style-type: none"> <li>- Topics: Governance framework strawman</li> <li>- Webinar slides at <a href="https://eoscpilot.eu/sites/default/files/20170817_egdf_4th_webinar.pdf">https://eoscpilot.eu/sites/default/files/20170817_egdf_4th_webinar.pdf</a></li> </ul>
<b>5 September 2017, Brussels</b>	EOSCPilot – ERAC OSI working group roundtable meeting	44	<ul style="list-style-type: none"> <li>- Unofficial, working meeting, confidential report provided to the participants</li> </ul>
<b>8 September 2017, Athens</b>	EGDF workshop "Open science policy aspects in the context of EOSC governance framework"	~30	<ul style="list-style-type: none"> <li>- 1,5h workshop session at Open Science FAIR conference</li> <li>- Target: university administration, researchers, projects in the area of open science and FAIR data</li> <li>- Topic: how Open Science should manifest in the EOSC governance framework</li> <li>- Report available at <a href="https://eoscpilot.eu/about/governance-framework">https://eoscpilot.eu/about/governance-framework</a></li> </ul>

Time and Place	Event\Activity	Participants	Details
<b>14 September 2017</b>	5th EOSC Governance Development Forum webinar	25	<ul style="list-style-type: none"> <li>- Topics: EOSC declaration, funding</li> <li>- Webinar slides at <a href="https://eoscpilot.eu/sites/default/files/20170914_egdf_5th_webinar.pdf#overlay-context=about/governance-framework">https://eoscpilot.eu/sites/default/files/20170914_egdf_5th_webinar.pdf#overlay-context=about/governance-framework</a></li> </ul>
<b>2 – 3 October 2017, Tallinn</b>	EGDF workshop “Drafting Governance Framework and Principles of Engagement for European Open Science Cloud”	~53	<ul style="list-style-type: none"> <li>- 2-day-workshop, in conjunction with e-IRG workshop</li> <li>- Target: Member states’ representatives, funding agencies, service providers</li> <li>- Some conclusions: Member States and Associated Countries central role in the governance and decision making of EOSC; EOSC as inclusive as possible from service provider point of view</li> <li>- Workshop report at <a href="https://eoscpilot.eu/about/governance-framework">https://eoscpilot.eu/about/governance-framework</a></li> </ul>
<b>12 October 2017</b>	6th EOSC Governance Development Forum webinar	16	<ul style="list-style-type: none"> <li>- Topics: Discussions in the EGDF workshop in Tallinn; Status update of the EOSC principles of engagement work</li> <li>- Webinar slides at <a href="https://eoscpilot.eu/sites/default/files/20171012_egdf_6th_webinar.pdf#overlay-context=about/governance-framework">https://eoscpilot.eu/sites/default/files/20171012_egdf_6th_webinar.pdf#overlay-context=about/governance-framework</a></li> </ul>
<b>18 – 19 October 2017, Brussels</b>	WP2 internal face-to-face meeting	22	<ul style="list-style-type: none"> <li>- EOSC governance framework draft presented to EC EOSC team and WP2, feedback and discussion to complete the deliverable. Plans of EOSC governance framework piloting.</li> <li>- Internal notes</li> </ul>

Table 12 - Events and activities for EOSC governance framework consultation

## ANNEX D. GLOSSARY

Term	Explanation
<b>EOSC</b>	European Open Science Cloud
<b>EC</b>	European Commission
<b>EIF</b>	European Interoperability Framework
<b>EOSC Core Resource</b>	EOSC Resources, services and processes that are needed to integrate and enable access to the various resources federated in the EOSC
<b>EOSC Resource</b>	the range of services and facilities needed to support Open Science and Research. These include technical services such as analytics and computational services, cloud services, thematic services tuned to particular research disciplines, e-infrastructure and middleware services such as access identity management; but also knowledge resources such as datasets, storage, digital library and archives; access services such as a service catalogue and portals; scientific instruments and facilities; and facilitation activities such as training, software development support and consultancy
<b>European Interoperability Framework</b>	EC framework giving specific guidance on how to set up interoperable digital public services.
<b>H2020</b>	Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.
<b>HLEG</b>	High Level Expert Group
<b>IETF</b>	Internet Engineering Task Force
<b>OASIS</b>	OASIS is a non-profit consortium that drives the development, convergence and adoption of open standards for the global information society.
<b>Open Innovation</b>	According to EC, the basic premise of Open Innovation is to introduce more actors in the innovation process so that knowledge can circulate more freely and be transformed into products and services that create new markets, fostering a stronger culture of entrepreneurship.
<b>Open Science</b>	The movement to make scientific research, data and dissemination accessible to all levels of an inquiring society, amateur or professional.

Term	Explanation
<b>OSPP</b>	Open Science Policy Platform
<b>Project partners</b>	The EOSCpilot project partners
<b>RACI</b>	RACI is an acronym that stands for responsible, accountable, consulted and informed. A RACI chart is a matrix of all the activities or decision-making authorities undertaken in an organisation set against all the people or roles
<b>RDA</b>	Research Data Alliance
<b>Research Infrastructures</b>	Research infrastructures (RIs) are facilities, resources and services used by the science community to conduct research and foster innovation.
<b>SMEs</b>	Small and medium-sized enterprises
<b>Subsidiarity Principle</b>	The principle that the idea that political action should be taken as close to the citizen as possible. This means that in an instance where the EU and a member state are both able to take action, action should ordinarily be taken by the member state. Within the research context, this means that access to resources (scientific, IT, etc.) should be through local or national institutions.
<b>VREs</b>	Virtual Research Environments
<b>W3C</b>	World Wide Web Consortium

## EOSCpilot Project

The European Open Science Cloud will offer 1.7 million European researchers and 70 million professionals in science and technology a virtual environment with open and seamless services for storage, management, analysis and re-use of research data, across borders and scientific disciplines by federating existing scientific data infrastructures, currently dispersed across disciplines and Member States.

The **EOSCpilot project** has been funded to support the first phase in the development of the European Open Science Cloud (EOSC). It will:

- » Propose and trial governance frameworks for the EOSC and contribute to the development of European open science policy and best practice;
- » Develop a number of demonstrators functioning as high-profile pilots that integrate services and infrastructures to show interoperability and its benefits in a number of scientific domains; and
- » Engage with a broad range of stakeholders, crossing borders and communities, to build the trust and skills required for adoption of an open approach to scientific research.

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