



# Business Models Activity Report

Lead Partner:	<b>CERN</b>
Version:	<b>1.0</b>
Status:	<b>Final</b>
Dissemination Level:	<b>Public</b>
Document Link:	

## Deliverable Abstract

This document describes the business model related activities performed under work package 5 of the EOSCsecretariat project during the first reporting period (months 1 to 12). It includes material prepared and gathered by the partners, details of interactions with the EOSC Sustainability Working Group, other projects as well as the private sector to advance the understanding and identification of business models in the context of EOSC.

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## DELIVERY SLIP

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Approved by:	Andrea Grisilla	TGB	25/02/2020

## DOCUMENT LOG

Issue	Date	Comment	Author
v.1	29/01/2020	First version in non-deliverable format	Bob Jones
v1.1	14/02/2020	Updated following review	Bob Jones

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## 1 Introduction

This section explains the objectives of the work package and summarizes the activities performed during the first period. The subsequent sections of the document contain material produced and gathered by WP5 that has not been published elsewhere.

**Work package 5: Analysis and studies to support EOSC in practice**, has the following objectives:

- Commission relevant analyses & studies to support EOSC in practice
- Support development of innovative business models for the delivery of EOSC core functions.
- Support the set-up of the rules of participation for service providers and users
- Support the legal and organizational framework for next phase of EOSC

The partners will commission and coordinate studies and reports to help progress and transform the EOSC into its next operational phase. Initially it will focus on the three following areas identified by the call text and other strategic documents as critical:

- Innovative business models for EOSC
- Rules of participation for service providers and users
- Legal and organisational framework for sustainable governance

Task 5.1: Innovative business models, is led by CERN with the participation of CSC and GEANT.

The goal of task 5.1 is to contribute to the work of long-term sustainability planning for EOSC by studying the relevant business models for EOSC. The planned activities include a study of business models commissioned using the co-creation approach and budget of the EOSCsecretariat project. The study will assess the demographics to determine the different categories of researchers that could benefit from the EOSC, what are their needs and what must EOSC offer to encourage them to engage. The study will identify business models that will encourage the engagement of the different stakeholders, with a focus on data providers, service providers and end-users. The study will elaborate business models for service provisioning by both public and private sector providers to be consumed by end-user researchers. An objective will be to expand beyond the traditional grant based funding model to include pay-for-usage approaches to service consumption. The outputs of this task will be a report summarising the activities performed to support the investigation of business models as well as the published report resulting from the study of business models.

### 1.1 Revisions to the programme of work

The environment in which EOSCsecretariat.eu project operates is different from the time that the project proposal was written and approved: The EOSC governance is now launched with new decision making and expert bodies, therefore EOSCsecretariat.eu does not have the same mandate in designing and deciding studies to be commissioned. The role of WP5 is to provide support and information to the EOSC EB WGs as well as assistance with studies they request. As a result, WP5 after a decision by EOSC Secretariat Steering

Group restructured its work plan to align with the current situation and mandate of the secretariat. The new work plan has been approved by the EC project officer with an amendment to the Description of Action.

## 2 Activities performed during the first period

### 2.1 Scoping of activities

Task 5.1 started with a desk-top assessment of relevance of activities being performed in projects contributing to EOSC. The outcome of this work was the production of a scoping paper for Task 5.1 (see section 'Innovative business models for the EOSC - background material') as a contribution to the preparation of the inception document for WP5. This material from WP5 was also provided as background information to the Sustainability Working Group that was formed in the summer of 2019 with a mandate to examine suitable business models of EOSC (see section 'EOSC Sustainability Working Group mandate').

### 2.2 Sustainability Working Group

T5.1 has acted as a liaison between WP5 and the Sustainability WG to ensure the exchange of information and alignment of plans for the commissioning of studies in 3 domains: business models, legal entities and integration of national infrastructures.

The Sustainability WG has finalised their requirements for these initial studies with the assistance of WP5. WP5 has submitted the studies for review by the EOSCsecretariat steering group as part of the project's co-creation activities and channelled the feedback received to the Sustainability WG. A draft of the study proposal is included (see section 'Business Models Study Proposal').

### 2.3 Interaction with the EOSC-hub project

Based on the scoping activities, WP5 has actively engaged with the EOSC-Hub project which has performed a demand-side market analysis to understand the need for and level of demand for digital services for research in the context of the EOSC (see section 'EOSC-Hub WP12 Business models and Procurement'). The regular exchange between WP5 and EOSC-Hub WP12 has increased the relevance to the Sustainability WG of the demand-side market survey and resulting report. The scoping of the future work of EOSC-Hub WP12 and the contents of its next report, 'Deliverable D12.2: report on business model analysis for procuring services in the EOSC' takes into account feedback from the Sustainability WG.

### 2.4 Engagement with the private sector

The current EOSC governance structure has no private sector representation for the demand or supply side. Given that a stated objective of EOSC is to engage commercial service providers and offer EOSC services to private sector users, WP5 has participated in several events during the year to engage with the private

sector (see section 'Engagement with the private sector'). This work has been performed in collaboration with WP3: Engaging with the Stakeholder community & coordination with related initiatives and WP7: Communication, Dissemination, Stakeholder forum and events of EOSCsecretariat.

*Milestone 5.1: Market analysis results are available online*

The demand-side market analysis publications produced by the EOSC-Hub and OCRE projects focussing on the needs of publicly funded researchers have been published online and have been shared with the Sustainability Working Group.

*Key Performance Indicator 5.1: Level of endorsement of the business models for the next phase of ESOC by the stakeholder groups.*

The business models identified to-date are outlined in the series of draft documents produced by the Sustainability Working Group, namely the Strawman and Tinman documents. With the assistance of EOSCsecretariat, feedback from the EOSC stakeholders to the Strawman version has been gathered and analysed to determine the level of acceptance of their contents. More than 30 projects, organisations and board members provided written feedback to the Strawman document. A similar process is underway for the recently released Tinman document with the intention of arriving at wide endorsement for the subsequent final version to be published in the third quarter of 2020.

### 3 Planned activities for the next period

The primary focus for task 5.1 in the next period will be to support with EOSC Sustainability WG as it commissions its first studies on business models. This will involve co-developing the study proposals to satisfy both the desires of the EOSC Sustainability WG and the requirements of the EOSCsecretariat.eu co-creation process. In addition, and as requested by the EOSC Sustainability WG, WP5 will oversee the successful execution of the contracts resulting from the co-creation tender process for these studies. It is likely that additional studies will be commissioned during 2020 based on the outcome of the initial business model studies, such as addressing business models for the EOSC-Exchange and preparing the foreseen expansion of the EOSC to serve the wider public sector as well as private sector users.

Task 5.1 will continue to interact with WP12 of the EOSC-hub to ensure that the final version of 'Deliverable D12.2: report on business model analysis for procuring services in the EOSC' is relevant for the work of the EOSC Sustainability WG. Interaction with other projects will also expand as they start to produce results. In particular, the tenders to be published by the OCRE and ARCHIVER projects will provide valuable insights about the types of services in which public research organisations are willing to invest. The contracts that result from such tenders will create a set of engaged private sector service providers whom EOSCsecretariat can consult for input and feedback on the planned business models.

As a result of the EOSC coordination events organised by EOSCsecretariat, where all EOSC related projects participate (approximately 30 Horizon 2020 projects in total), closer interaction with EOSC projects will become possible. EOSCsecretariat has brokered an agreement with these projects to share the list of their foreseen deliverables and milestones. Task 5.1 will study this information to identify activities that could provide input for the EOSC business models.



## Appendix I. EOSC-Hub WP12 Business models and Procurement

A demand-side market analysis was performed to understand the need for and level of demand for digital services for research in the context of the EOSC, to understand the manner in which such needs and demand are currently satisfied, to identify the challenges presently being faced in respect of analysis workflows, data management and related infrastructure and services, to identify current and preferred delivery models for such services, to identify funding streams and procurement constraints, and finally to identify areas of improvements for business models. Business models have been analysed in the context of EOSC, with a specific focus on proposing mechanisms for acquiring digital services, based on the use cases where a researcher is acquiring services ‘on demand’, a departmental manager is acquiring services for its constituent researchers, and where resources can be procured in ‘bulk’ mode. The assumption of the analysis was that the customer/user always operates in a business-to-business (B2B) type of relationship and not as a consumer (as defined by the EU Consumer Rights Directive) for personal purposes. This assumption is important, as it rules out the need to comply with consumer rights regulations.

Based on the results of this analysis and recommendations from the deliverable D12.1, two business models are under development:

- “Cloud Coin” or “Voucher Market-Driven” Access Model: in particular, develop the concept of ‘cloud coins’ that are proposed by projects as an incentive to adopt cloud services, or as introductory schemes into a potentially more long-term solution to enable free use of paid commercial services. The work will align with the activities being performed by the OCRE and ARCHIVER projects. This business model will set out practical and concrete guidance to EOSC that defines 1) the end-to-end process that ensures that vouchers are meaningful for the access and resource management, 2) the specific financial regulatory parameters and rules that must be adhered to when offering services via vouchers, 3) determining which parties have ‘contract privacy’ (the contractual relationships between the parties that mean that the parties subject to a contract do not have contractual obligations to 3rd parties) in such a model, and considering other types of service provision (e.g. software licensing) that may be incompatible with this model.
- “Sponsored Use Market-Driven” Access Model: research organisations often rely on services provided by publicly funded infrastructures. It is likely that as well as services being consumed directly by the researcher, there will be requirements for institutions at a departmental level and projects to procure services from service providers to the EOSC. Typically, supply-side organisations from the public sector provide services free-at-point-of-use or with indirect cost recovery. Sometimes the demand-side organisations pay for the services. In this scenario, there is a need to identify what would be required to ensure that institutions can buy or consume services via the EOSC. There would be a need to investigate and analyse the end-to-end process and the agreements, etc, that would need to be provided in order to facilitate the process. It may also be necessary to investigate potential Teckal implications, the various roles in EU Procurement and their characteristics and whether procurements via the EOSC would be compliant with EC directives. Both models consider public-to-public, private-to-public and public-to-private scenarios and the wider funding environment in order to identify opportunities for new ways of working.



## Appendix II. EOSC Sustainability Working Group mandate

The EOSC Sustainability activity will provide a set of recommendations concerning the implementation of an operational, scalable and sustainable EOSC federation after 2020, that will gradually open up its user base to the public sector and industry.

The activity examines suitable business models of EOSC, governance structures and legal entity. The analysis will result in a set of strategic and financing orientations for EOSC in its second phase of implementation (post 2020). The activity also examines the impact of each legal and financial option to different stakeholders at national and European level.

The Sustainability activity foresees discussing the alternative scenarios and options with the Governing Board and Executive Board at an early stage of work. Regular updates of the Governance Board on work progress are seen as a way to favour real-time harmonisation of the national positions and enable a timely set up of the EOSC future model.

The Sustainability activity builds on the legacy of the EOSC Roadmap, Council Conclusions 2018, Horizon 2020-funded projects, stakeholder reports and experience of similar initiatives. Taking on board input of ongoing international and national initiatives will support analysing the gaps towards identifying a future sustainable model for EOSC.

The Sustainability activity takes stock, assesses and recommends strategic, legal and financing orientations that EOSC could follow during its second phase of implementation (post 2020).

More specifically, the activity aims to:

1. Conduct an in-depth analysis of business models and their different implications in the choice of legal entity, cost analysis, regulations, financial strategy and sustainability. The analysis would include an estimation of initial and longer-term cost projections. The proposed options accompanied with a sound risk analysis should be able to sustain, upgrade and scale the EOSC federation, as a whole and in its components. It should allow for alignment and convergence with national data infrastructures.

The final model will emerge as a transparent, concerted result of discussions with the Executive Board and the Governance Board and will be based on reliable mechanisms to ensure appropriate ongoing financial commitment by stakeholders and identify where funding responsibility lies for different components and services. It will identify income streams as well as opportunities for consolidation and economies of scale.

At the same time, the WG conducts either in subgroups or as an outsourced activity:

2. A mapping of potential legal entities taking into account the existing national and European legislation.
3. At the same time, and in line with the selected suitable legal entities, it analyses options for a governance framework to steer and oversee initial EOSC operations and further development beyond the initial phase. It is foreseen that the design of a suitable governance will follow the choice of the legal entity. The proposed framework will aim at balancing the requests of stakeholders, Member States and European Commission.

4. An analysis of the current regulatory/policy environments at the MS/AC levels for data and services with options and recommendations on how to regulate the EOSC ecosystem. The analysis should include an assessment of the impact that the proposed structures and funding streams will have on different stakeholders at national and European level.

It is important for the Sustainability activity to work in collaboration with Rules of Participation activity in order to ensure that the EOSC Governance and legal entity post-2020 will be compatible with the EOSC Rules of Participation.



## Appendix III. Business Models Study Proposal

- Brief abstract

The goal of EOSC is to give the European Union a global lead in research data management and ensure that European scientists reap the full benefits of data-driven science. EOSC could potentially serve 1.7 million researchers in Europe and progressively expand its user base to include the wider public sector and the private sector (business organisations). A key objective of the Sustainability Working Group is to identify the most feasible alternatives for the Financing Models and Legal Vehicle of the EOSC beyond 2020. This study addresses the Financing Models issue.

The main focus and value of EOSC is to connect disciplinary infrastructures and research data to enable cross-disciplinary research, leading to new scientific discoveries and new insights for society. The Minimum Viable EOSC (MVE) will enable the federation of existing and planned research data infrastructures for the benefit of publicly funded researchers accessing openly available data. The MVE includes EOSC-Core and EOSC-Exchange that work with the FAIR datasets to be federated via EOSC.

The *EOSC-Core* provides the means to discover, share, access and re-use data and services. These elements address key technical, cultural and policy decisions of EOSC and they must be maintained over the long term. The *EOSC-Core* does not, itself, provide the means to transfer, store, process or preserve research data. *EOSC-Exchange* builds on the *EOSC-Core* to ensure a rich set of services exploiting FAIR data and encouraging its reuse are available to publicly funded researchers. It is expected that rivalrous services, such as those that store, preserve or transport research data as well as those that compute against it, will be made available via *EOSC-Exchange*. Participation in *EOSC-Exchange* as a service provider is voluntary and without registration fee. Service providers that participate in *EOSC-Exchange* will be required to conform to predefined Rules of Participation. While the technical requirements for participation in *EOSC-Exchange* will be the same for all services, there may be differences in the legal and policy requirements for freely available and payment-based services.

The funding model for the *MVE* takes into account the differences in access policies for the *EOSC-Core* compared to *EOSC-Exchange*. The cost of operating *EOSC-Exchange* (but not the cost of operating the services it contains) will be included in the *EOSC-Core* funding model. Funding for *EOSC-Core* should be addressed by the participants engaging in EOSC as a means of supporting open research for their communities.

The **purpose of this study** is to address the following issues:

- **S1** - Identify the different Minimum Viable EOSC (MVE) cost and revenue models
- **S2** - Identify the different types of public funding for EOSC-relevant service providers and identify how EOSC infrastructures, services and end users can take benefit of them

**Who is concerned** by the study:

- Service providers: projects, organizations in charge of providing (some) EOSC services such as the ESFRI cluster projects, research organizations (CERN, EMBL, ...), research infrastructures, funding organisations

- End users: scientific communities, scientific organizations, funding organizations, participating countries

### S1 - (MVE) cost and revenue models

The *EOSC-Core* will provide

- A standard mechanism for naming and locating data and services
- A mechanism for discovery of and access to data and services across the federated EOSC ecosystem.
- A common framework for managing user identity and access

The *EOSC-Core services* will be assembled from amongst the widely used production quality services already deployed by the EOSC-related projects and communities to provide the following functionality:

- **A shared open science policy framework**, which effectively embeds a data compliance framework for open / FAIR data. It dictates and applies the rules of how the data elements are published, shared and re-used.
- **Authentication and Authorization Interoperability (AAI) framework**, a trust and identity service for researchers to seamlessly access all EOSC resources.
- **Data access framework**, whose primary role is to offer data as a service. It enables open interfaces where data consumers are able to discover and use data.
- **Service management and access framework**, whose role it to provide a consistent and agreed upon understanding of e-science services: what they offer, which science problem they address, what is their operational capacity, how they are accessed, who pays for them.
- **A minimum legal metadata framework**, for ensuring openness and interoperability, privacy and security (copyright status, disclosure limitations, patents pending, other IPR on the datasets or workflows, the existence of personal data, designation of data as PSI, etc.)
- **An open metrics framework**, which sets the rules (usage, performance, value for money) for the assessment of EOSC elements, i.e., policies, access framework, services, data, business, funding and usage models. This should include elements to facilitate the incentives and awards mechanism for researchers, as recommended by the EC HLEG on Next Generation Metrics and the EOSC Pilot policy group.
- **PID**: Services to generate, resolve and validate persistent identifiers (PID)
- **Help-desk**: framework for linking national/thematic/institutional service desks that can provide training/consultancy on EOSC-Core services
- **Portal**: an EOSC Service implementing a web portal providing one form of accessing and using the EOSC Resources.

**End user side.** The study will first identify some use cases that illustrate the need/use of MVE services and how much they are ready to pay for these services:

- What for: description of the use case
- How big: size of the community concerned
- When: Frequency of services and components used
- How much the community concerned is ready to pay for these services

**Provider side.** Then, projects, organizations in charge of providing (some) MVE services and components will be asked to detail:

- what is the associated cost model,
- what is the user base for what usage,
- what is the revenue model.

The cost of a (set of) services will be decomposed into development cost and maintenance cost.

## **S2 - Public funding models**

In the EOSC context, a significant portion of services will be delivered by publicly funded data/service providers. In Europe, such entities are very often subsidized with public funds for their capacity building (infrastructure, resources, facilities) and/or operational activities (infrastructure operations, service operations, support, trainings etc.).

For several EOSC service providers, public subsidies include Member State funding as well as European Structural and Investment Funding. Depending on the funding framework applied, a set of commitments and limitations to the use and utilization of the resulting infrastructures and services apply. For example, a cloud infrastructure (data center and services) funded via structural funds in a Member State, with a percentage of funding emerging from MS contribution, might not be allowed to produce revenues by applying infrastructure usage fees to its users for a pre-defined period of operation, enabling any type of service provisioning against payment or additional demand for services.

National policies, state-aid regulations, priorities and strategies as well as different programs of European funding at pan-European or regional levels impose a complex mix of public funding schemes and associated commitments to publicly funded service providers, for example limitations to the quantity of publicly funded resources/infrastructure within a Member State that can be allocated to pan-European initiatives such as the EOSC.

The study should explicitly address limitations in recovering capital expenditure (as applicable in compensation schemes such as the Virtual Access) or operational expenditure (as applicable in structural funding). Furthermore, there is a strong requirement for EOSC marketplace-announced fees to reflect the subsidies and state-aid, where applicable, so that Member State funding is visible/traceable across the different service layers of the EOSC.

The study will:

- A. Investigate and document all different types of public funding for EOSC-relevant service providers as currently applicable or foreseen in the 2021-27 period, as well as limitations in access, use, resource allocation imposed by such funding
- B. Propose ways to model the different types of public funding in cost models, cost attribution and remuneration schemes for publicly funded service providers in the context of EOSC
- C. Outline best practices and propose methodologies to apply cost modelling and attribution, pricing and remuneration models in digital marketplace environments and in particular, the foreseen EOSC digital

marketplaces, so that publicly funded service providers are remunerated as needed while the different funding elements are properly reflected and traceable in EOSC service fees.

The study should take into consideration the overall financial transaction needs in the EOSC ecosystem, including transactions involving public and private service providers, operators and users' home organizations, while maintaining the principle of 'free at the point of use' for EOSC end-users. The approach should balance between controlling the complexity (accounting, billing) in a diverse service provider landscape and effectively reflecting costs and subsidies in the compensation schemas addressed.

Encouraging sharing and maximum utilization of existing public sector capacity across countries and/or publicly funded providers should also be addressed by the study, thus allowing for cross-country, cross-discipline, cross-sector cost attribution and remuneration approaches.

EOSC transparency requires that actual costs are clear to end users/organizations so that they can make appropriate decisions on the use of the various EOSC capabilities. By modelling costs properly so as to reflect all different types of public funding and limitations, remuneration for publicly funded service providers will be possible on a cost basis while EOSC stakeholders and policy makers will be provided with useful insights on the funding mix of EOSC services as well as returns on investments.

Coupling remuneration of service providers in general and publicly funded ones in particular, with different financing models for data services in the EOSC digital marketplaces should also be addressed by the study.

- To which of the six action lines described in EOSC implementation roadmap will the study contribute to: Governance, data, services
- How does the study contribute to the implementation of EOSC?

This study:

- contributes to the definition of the EOSC MVP and its associated cost and revenue model
- addresses the limitations and solutions that need to be put in place for publicly funded service providers to be able to participate in digital marketplaces, while maintaining visibility of public funding and modelling constraints that public funding may impose to infrastructure and service offerings.



## Appendix IV. Innovative business models for the EOSC - background material

Last updated 2nd August 2019

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### Introduction

WP5 envisages to perform a market analysis on the EOSC market size and characteristics, which is going to be followed by an elaboration of suitable business models. This market analysis is especially meant to collaborate with and offer support to the work of the WG Sustainability. In principle, the output should consist in a report (open for publication) describing a set of business canvasses that can be adopted by EOSC. The study should also include descriptions for the different typologies of services that EOSC may provide.

This report (D5.1 EOSC market analysis report, scheduled for December 2019) should make the Sustainability WG able to propose a business model for EOSC to the EOSC Governance by March 2020. This document provides background material for the activity that can be used as input for the activities of the WG on Sustainability.

### Preparation for a business model study

The methodology to study the business models starts with an analysis of the current status, constraints and mid-term (2 to 5 years) needs for stakeholder categories separately and then collectively to understand the implications for EOSC as a whole. Building on this analysis, a set of business models will be identified that can be considered by the EOSC governance bodies. The business models describe the rationale of how EOSC creates, delivers, and captures value. The study will propose sustainable business models for a virtual environment with free at the point of use, open and seamless services across borders and scientific disciplines. The business model study will consider EOSC as a multi-actor value ecosystem where the primary actors are data providers, service providers and users:

- **Data and Service providers** from the public and private sectors that comply with the EOSC rules of participation and are registered in the EOSC service catalogue
- **Users** from the public and private sectors that agree to the EOSC Acceptance Use Policy and Conditions of Use

The study will consider how to incentivise these primary actors so that they actively participate in EOSC.

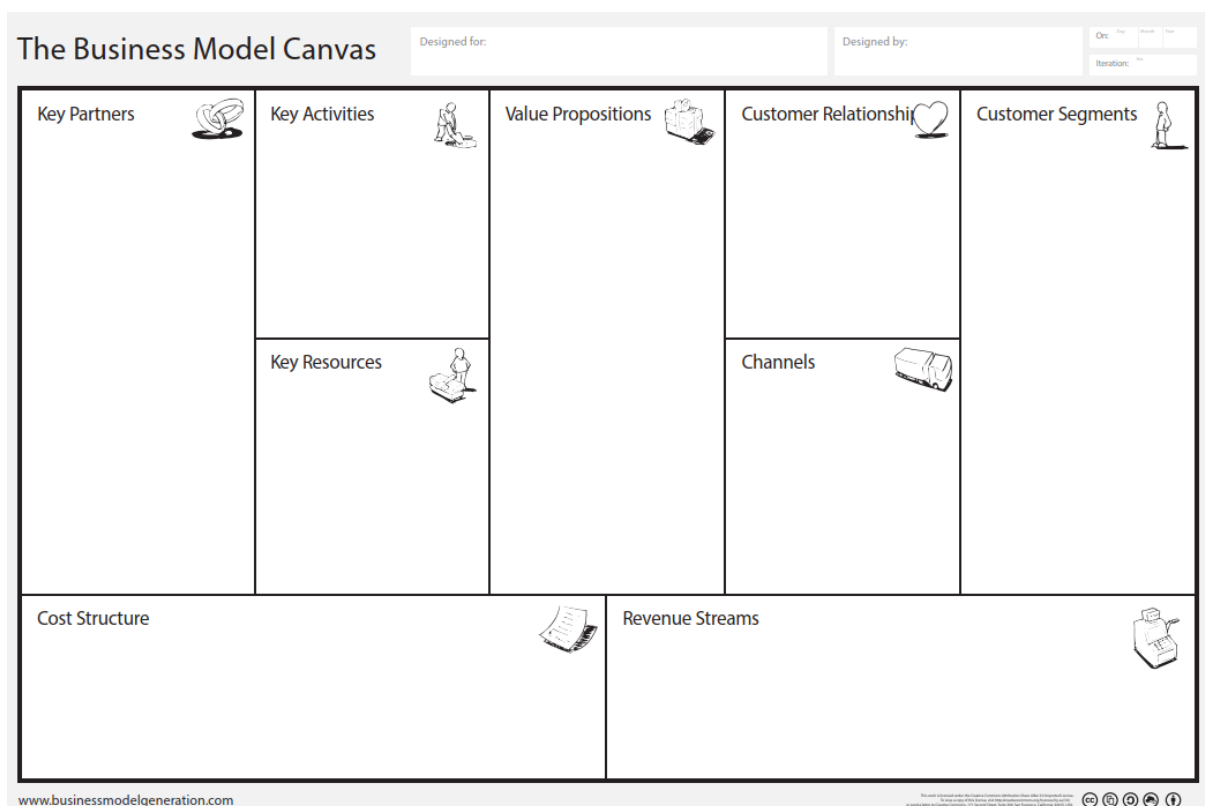
The business models cannot be considered in isolation and will need to take into account the regulations and legislation influencing the EOSC service delivery, including rules of participation (Task 5.2) and are closely linked to the choice of legal and organisation framework (Task 5.3). Interaction with the EOSC



Boards (Work Package 6) and relevant Working Groups (Work package 4) will be necessary at key steps during the study. The study will also solicit input from stakeholder groups and related EC projects via WP3 (Engagement with stakeholder community & coordination with related initiatives).

The output of the study will include a set of business models that can be summarised using the Business Model Canvas as shown in the figure below. The market analysis and business models development activities of the study will be commissioned from an entity that has proven professional experience in this domain.

**Figure 1: The Business Model Canvas**



### Scoping of the business model study

To help scope the study on the most appropriate business models, the following elements are extracted from the Implementation Roadmap document (notably section 2.5 *Preliminary reflections on the costs and financing of the EOSC implementation* of) and should be considered by the Sustainability WG at the start of the process:

- The Implementation Roadmap document states “Funding for data mandates and incentives to make data open are being addressed at Member State level via the revision of the Recommendation on

*access to and preservation of scientific information*<sup>1</sup>, consequently should the study assume data providers will be funded via member states to curate the data they will make available via EOOSC?

- There are no direct monetary benefits (other than cost optimisation) from establishing and operating EOOSC; instead, broader benefits include greater reusability, transparency, enhanced reputation and societal benefits?
- Trust and openness are key factors in the successful adoption of EOOSC by the primary actors. Consequently, business models that involve the transfer of intellectual property rights are considered out of the scope of this study?
- The Implementation Roadmap document (notably section 2.1 *A possible EOOSC Model*) identifies the classes of services that could be provided by EOOSC and how they are to be financed: Will the business model study limit itself to these classes of services and financing model?

1. *“A unique identification and authentication service and an access point and routing system towards the resources of the EOOSC.*
2. *A protected and personalised work environment/space (e.g. logbook, settings, compliance record and pending issues).*
3. *Access to relevant service information (status of the EOOSC, list of federated data infrastructures, policy-related information, description of the compliance framework) and to specific guidelines (how to make data FAIR, to certify a repository or service, to procure joint services).*
4. *Services to find, access, re-use and analyse research data generated by others, accessible through appropriate catalogues of datasets and data services (e.g. analytics, fusion, mining, processing).*
5. *Services to make their own data FAIR, to store them and ensure long-term preservation.*

*The consultation process recommended providing free of charge the services under 1, 2 and 3, as well as under 4 except when the re-use and analysis of data involves big data or large computation power, in particular via a commercial service provider. This would entail cofinancing from other sources (e.g. a national or EU grant). The cost model of the services described under 5 would be determined when deciding on the long-term business model for EOOSC.”*

The outcome will define the nature of the market analysis to be commissioned in order to perform a quantitative and qualitative assessment of the market the EOOSC intends to address.

### **Factors influencing the design of the EOOSC business model**

In determining the business model, it will be necessary to look beyond the existing models that deliver data and services to users. The proposed federated, distributed model will be influenced by various dimensions

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<sup>1</sup> <https://ec.europa.eu/digital-single-market/en/news/commission-recommendation-access-and-preservation-scientific-information>

of the macro environment, but particularly from a statutory legal, financial and regulatory perspective, and will be sensitive to a number of ‘tests’ against the relevant frameworks, for example:

It is assumed that the majority of users will be obliged to procure services according to EU Procurement Directives; in which case it would be valuable to assess:

- whether it is assumed that institutional end users’ interaction with the EOOSC would automatically comply with the EU Procurement Directives (for example, where total spend is assumed to be lower than the procurement thresholds)?
- whether the existing Directives would be required to ‘flex’ in order to allow a more transactional way of working, allowing procurement and consumption of public and private sector services (via the EOOSC) to be compliant with procurement regulations, and what strategies could be employed to identify and close any gaps?
- Whether the mechanisms for incentivising the provision of public and private sector services can be harmonised or will remain separate and whether such separation will lead to different business models being applied for the two types of service providers
- Whether the users consumption is formally arranged via an institutional or individual agreement with the service provider or operator
- whether the EOOSC’s goal to ‘chain together’ stacks of services and infrastructure procured by more than one organisation, thus being offered for purposes not explicitly set out during the procurement of those services, would risk non-compliance.
- whether the legal form that EOOSC might take would influence its position within the Directives, and the relevant implications downstream to the end user’s institution.
- how the model might manage/mitigate the impact of varying and misaligning (existing) contractual terms used by the various public and private organisations that would offer services via the EOOSC.
- Where the original sources of funding will be obtained from to pay for the services and whether the funding is directed to and through the user to enable their procurement or directed straight to the provider on the basis of a service being consumed.
- Whether the variants in services types have different types applicable funding models. Eg if a service requires funding to ensure it is available as an infrastructure and where services are directly related to the volume of the service consumed

It will be necessary to assess potential impact of international taxation (including VAT) on the implementation of proposed business models across a distributed customer and supply base, such as:

- Whether and where there could be a taxable point of supply and what the legal and financial implications for operators, service providers and consumers would be in terms of VAT being charged or payable and of VAT registrations being required in each country where such taxable supplies are being made or consumed (particularly where cross-border trading concerns states outside the EU).
- Opportunities and threats or constraints presented to the operator/s of the EOOSC
- Opportunities and threats or constraints presented to service providers to the EOOSC

- It may also be necessary to offer guidance to service providers in the formal advice they would need to take when selling/offering services to researchers based in countries via the EOSC that they are not specifically set up to serve.

The business model will be influenced by European and national copyright and licensing laws, particularly in terms of:

- where transactions relating to service use requires the end user to agree to a licence grant, and how this would be managed downstream in 'chained-together' services.
- where services that could be technically bundled or chained together are subject to varying commercial (or open source) license grants.
- where data or service providers would prefer to protect their contributions for future commercial benefit, and how/whether this would be recognised by the EOSC.
- where commercial organisations restrict re-selling of their services unless specific conditions are met.

## Relevant business model material from past and ongoing projects

### On-going H2020 projects

This section lists the relevant activities of the on-going projects funded via H2020-INFRAEOSC-2018-2020 - Implementing the European Open Science Cloud and related funding calls.

#### ARCHIVER

<https://cordis.europa.eu/project/rcn/219937/factsheet/en> Website: <https://www.archiver-project.eu/>

#### Archiving and Preservation for Research Environments

Using a Pre Commercial Procurement instrument, the ARCHIVER project will introduce radical improvements in the area of archiving and digital preservation services, thus closing critical gaps between what is increasingly required by funding agencies, requested by data creators and eventual (re-)users and what is currently commercially available. ARCHIVER will combine multiple ICT technologies, including extreme data-scaling, network connectivity, service inter-operability and business models, in a hybrid cloud environment to deliver end-to-end archival and preservation services that cover the full research lifecycle. By acting as a collective of procurers, the consortium will create an eco-system for specialist ICT companies active in archiving, who would like to introduce new services capable of supporting the expanding needs of research communities but are currently prevented from doing so because there is no common procurement activity for the advanced stewardship of publicly funded data in Europe. ARCHIVER's final goal is to allow research group to retain ownership of their data whilst leveraging best practices, standards and economies of scale.

## OCRE

The Open Clouds for Research Environments project (OCRE<sup>2</sup>), aims to accelerate cloud adoption in the European research community, by bringing together cloud providers, Earth Observation (EO) organisations and the research and education community, through ready-to-use service agreements and €9.5 million in adoption funding.

During 2019, OCRE plans to launch a call, under the existing GEANT IaaS tender, for vouchers to provide limited scale access to commercial cloud services for end-users. The results of this work will indicate the level of demand for the use of commercial cloud services and the applicability of the voucher scheme in the context of the EOSC.

## EOSC-Hub

The goal of EOSC-hub Work Package 12 is to contribute to the design of future business models and procurement frameworks for acquiring digital services from both publicly-funded and commercial providers.

WP12 has finalised a report, [D12.1 Procurement requirements and demand assessment](#), which presents the results of a demand-side market research to understand the need for and level of demand of digital services for research in the context of the EOSC. It explores the manner in which such needs and demand are currently satisfied and the challenges presently being faced in respect of analysis workflows, data management and related infrastructure and services. It identifies current and preferred delivery models for such services as well as funding streams and procurement strategies and proposes areas of improvements for business models for acquiring digital services for research in the EOSC:

- **‘Cloud Coin’ or Voucher Access Model:** applies when an individual researcher or a small research group needs limited-scale access to commercial services on an ad hoc basis; this model foresees that users will receive services free at the point of use while service providers are financially rewarded indirectly by funders.
- **‘Sponsored use’:** applies where institutional usage would be fulfilled via specific purchase-supply contracts between the service provider and institution
- **‘Aggregated procurement’:** aims to model the role of demand aggregation and joint purchasing to collectively exploit existing pan-European mechanisms and remove the need for repeated and costly procurement processes

## OpenAIRE

OpenAIRE provides digital repository related services<sup>3</sup> building on national nodes. A study to assess the economic sustainability of OpenAIRE<sup>4</sup> was undertaken in 2014. The study used the framework of Cost-

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<sup>2</sup> <https://cordis.europa.eu/project/rcn/219198/factsheet/en>, website <https://www.ocre-project.eu/>

<sup>3</sup> <https://www.esfri.eu/sites/default/files/Natalia%20Manola.pdf>

<sup>4</sup> <https://cordis.europa.eu/docs/projects/cnect/5/283595/080/deliverables/001-D357BusinessModelv8.pdf>

Benefit Analysis (CBA: a method that assesses the monetary social costs and benefits of an investment project over a time period in comparison to a well-defined baseline alternative).

In 2018, OpenAIRE A.M.K.E.<sup>5</sup>, with the legal form of a Non-Profit Partnership (NPP) incorporated under the provisions of Greek Law (articles 741 onwards of the Greek Civil Code) and Law No 4072/2012, was created with the mission to ensure a permanent presence and structure for a European-wide national policy and open scholarly communication infrastructure.

Clusters of national initiatives EOSC-Nordic, NI4OS-Europe, EOSC-Pillar, EOSC-synergy, ExPaNDS  
Material about the “5b” projects was gathered at the EOSC-hub week (Prague, 9-11 April) and is available on the web:

EOSC-Nordic <https://www.slideshare.net/TheEOSChubproject/eosc-nordic-project-overview>

NI4OS-Europe <https://www.slideshare.net/TheEOSChubproject/ni4oseurope>

EOSC-Pillar <https://www.slideshare.net/TheEOSChubproject/eoscpillar>

ExPaNDS <https://www.slideshare.net/TheEOSChubproject/expands>

EOSC-synergy <https://www.slideshare.net/TheEOSChubproject/eoscsynergy>

All of these cluster projects will start between July and September 2019 and include an activity to explore “Business model, innovation, exploitation and sustainability”<sup>6</sup>.

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<sup>5</sup> <https://www.openaire.eu/organization>

<sup>6</sup> <http://e-irg.eu/documents/10920/470912/presentation+Fulvio+Galeazzi.pdf>



## Completed projects

### HNSciCloud

The **Helix Nebula Science Cloud (HNSciCloud<sup>7</sup>)** hybrid cloud platform links together commercial cloud service providers and publicly funded research organisations' in-house IT resources to provide innovative solutions supporting data intensive science.

Current and planned large scale scientific projects have demands for huge data storage and analysis resources. Upcoming projects like the High Luminosity LHC and in the domains of Genome Analysis, Astrophysics, Life Science and Photon Science have requirements for their resources to scale massively, being able to share the data and to some extent being available on demand.

All of this being deployable in potential world-wide scientific collaborations including the 'long tail of science'. All represented scientific communities (the buyers group) expect benefits from hybrid cloud solutions especially for:

- economy of scale - the costs for commercial cloud resources have demonstrated significant reduction within the recent years. It is expected that this trend continues.
- more elasticity – adaptable to changing demands for faster and more efficient scaling.
- more concentration on science-specific services/demands not covered by commercial cloud providers
- standardization - make computational and storage infrastructure changeable and
- replaceable - benefit from real market for standardized resource providers

The specific challenges included:

- Compute and Storage - support a range of virtual machine and container configurations including HPC working with datasets in the petabyte range accessible transparently
- Network Connectivity and Federated Identity Management - provide high-end network capacity via the publicly funded GEANT network for the whole platform with common identity and access management
- Service Payment Models - explore a range of purchasing options to determine those most appropriate for the scientific application workloads to be deployed

The project published a report<sup>8</sup> on the initial use of **vouchers to access commercial cloud services**.

A **Total Cost of Ownership (TCO) study** for selected use cases was introduced in the pilot phase to help the buyers' group understand the impact of the contractors commercialisation plans for their organisations. The buyers' group have selected relevant use cases and provided the high-level input requirements and workflow information to perform the TCO study.

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<sup>7</sup> <https://www.hnscicloud.eu/>

<sup>8</sup> <https://doi.org/10.5281/zenodo.2615456>



Based on this, HNSciCloud contractors of the pilot phase, T-Systems and RHEA Group, have evaluated alternative approaches to support the use cases most effectively using commercial cloud services and derived the TCO per use case:

- T-Systems <https://doi.org/10.5281/zenodo.2605176>
- RHEA Group <https://doi.org/10.5281/zenodo.2605187>

### eInfraCentral

The eInfraCentral project<sup>9</sup>, which has produced a service catalog<sup>10</sup>, ends on 30 June 2019.

A final event was held on 20<sup>th</sup> June in Tallinn - [Building Open Science in Europe: The road ahead for the EOSC community and Member States](#). Its exploitation plan suggests a number of models for future sustainability that would require further assessment for unintended negative consequences, such as creation of a two-tier model, where services that have paid to advertise become promoted over and above those of higher academic value that have not paid (which is the modus operandi in commercial marketplaces).

### EOSCpilot

The EOSCpilot ended on 31 May 2019; its policy recommendations created within WP3 refer to challenges that must be overcome in the context of legislative constraints that will need to be satisfied when acquiring services in the EOSC.

### Other relevant initiatives

#### European Data Portal

The purpose of the tender (SMART 2017/1123) is to fund the maintenance and further development of the infrastructure whose deployment started in 2015: maintenance and development of the European Data Portal and related services, specifically:

- to operate, maintain and further develop a large-scale pan-European web-based data portal infrastructure (the "European Data Portal", EDP) to act as a single point of access to (open) datasets made available in the Member States, by EU institutions and bodies and certain third countries;
- to assist administrations in EU Member States and certain third countries with the definition and implementation of policies with respect to open data and to the establishment or the improvement of relevant organisational processes, as well as with the preparation of high quality datasets to be published on their respective data portals, aiming at their eventual inclusion in the European Data Portal so as to ensure a significant uptake on publication of public data resources in all EU Member States and certain third countries;

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<sup>9</sup> <https://einfracentral.eu/>

<sup>10</sup> <https://www.esfri.eu/sites/default/files/Alasdair%20Reid%20.pdf>

- to ensure that there is also a significant uptake on use made of such public data resources by further developing relations between data publishers and potential reusers, by supporting the development of applications based on public data and, where applicable, on other sources of data, by providing fora for discussion on subjects of common concern and by producing policy recommendations for the European Commission;
- to provide evidence on the socio-economic impact of publishing data assets by public bodies at various levels of administration, including the European one; to examine the sustainability of (open) data portal infrastructures.

European Data Portal is also catalysing alignment in terms of standards with respect to data formats, metadata information, including the availability of metadata information in more than just the original language. This has already helped in creating an environment supporting an organic, cost effective data integration in the publishing practices of European countries (based on the adoption of data standards, shared data models and entity identifiers, and data linkage best practices) as well as in providing incentives for organic, long term growth based on reuse of high quality (open) data assets in Europe.

The infrastructure is also providing the European Commission with a better overview on the state of publishing of datasets as (open) data in EU Member States, including the quality of such datasets, their linking to other datasets, as well as overall indicators on Member States' open data readiness and maturity.

The initial contract (2015-2017) had a final value of 6.647.322 EUR, which included building the portal and hosting it. The 2018-2020 contract had a final value of 3.749.909 EUR for the maintenance and expansions of the pre-existing portal, suggesting an annual maintenance cost of less than 1.8 million EUR.

#### Google Dataset Search

In 2018 Google launched<sup>11</sup> a dataset search engine called Dataset Search<sup>12</sup> to enable users to find datasets stored across the Web through a simple keyword search. The tool searches for information about datasets hosted in thousands of repositories across the Web, making these datasets universally accessible and useful.

#### DELLINGR cross-border resource sharing framework

Dellingr (<https://dellingr.neic.no/>) project is investigating how a lightweight framework for sharing High Performance Computing (HPC) resources can be implemented between participating Nordic countries. The resources will be open to eligible researchers from the participating countries who wish to access resources in other participating countries. A feature of this resource sharing includes the case where the computing project is performed in an HPC centre outside the home country of the researcher. The experience and funding model supporting Dellingr are of potential interest in the context of EOSC.

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<sup>11</sup> <https://www.blog.google/products/search/making-it-easier-discover-datasets/>

<sup>12</sup> <https://toolbox.google.com/datasetsearch>

The [Resource Exchange Models document](#) describes proposed resource exchange models and provides a brief summary of their analysis, followed by suggestions about resource fungibility, their exchange rates and possible metrics for the cross-border resource accounting. The [Nordic HPC/Cloud Inventory](#) document itemises the publicly operated HPC and cloud services in the participating countries being considered for this sharing framework.

It makes use of the Waldur open source product (<https://waldur.com/>) to provide a portal.

The [Resource exchange implementation and agreement](#) describes the preconditions and limitations for sharing resources from a policy, legal, and practical standpoint.

The project is planned to complete and produce its final deliverable, an overall final report, by December 2019.

Science Business publication, [The European science cloud: Who will pay?](#)



## Appendix V. Engagement with the private sector

The current EOSC governance structure has no private sector representation for the demand or supply side. Given that a stated objective of EOSC is to engage commercial service providers and extend its services to private sector users, WP5 has participated in several events during the year to participate with the private sector. These events are listed below.

- CloudBank

At the request of the co-chair of the Sustainability WG, CERN participated in a meeting entitled 'EU and US Strategies in the context of Open Science' held in Frankfurt on 11th May 2019 with Vince Kellen, CIO UC San Diego and Brett Pollak, Director Workspace Technology Services at UC San Diego. At this meeting we learned about the CloudBank<sup>13</sup> project funded by NSF which is investigating innovative financial engineering options that will provide research with more flexible cloud terms tailored for their needs and provide some sustainability for Cloud Bank operations. CloudBank is a 5-year project that kicked off on August 1, 2019. The first year is all about development of the portal and the workflows associated with processing proposals, allocating awards, working with the cloud providers, streamlining the accounting, and developing the tools and outreach materials to help PIs.

- Cloud Infrastructure Service Providers in Europe

CERN participated in the Cloud Infrastructure Service Providers in Europe (CISPE) event entitled 'How to transform governments through a smart cloud policy'<sup>14</sup> held in Brussels 3rd July 2019. There 34 registered participants primarily from commercial cloud service providers, national governments, consultancy groups and the European Commission (DG DIGIT, DG CONNECT). The goal of the event was to discuss how governments can accelerate cloud adoption through a smart cloud policy, enhance understanding of the cloud model, and ensure proper integration of key activities when moving to the cloud. It also coincided with the publication of the CISPE handbook 'Buying Cloud Services in the Public Sector' designed to provide helpful guidance and support to public authorities when procuring cloud services.

- Big Data Value Forum

CSC represent WP5 at the Big Data Value Forum event held in Helsinki on 14-16 October 2019<sup>15</sup>. The event was an opportunity to raise awareness of EOSC and encourage a discussion with the private sector on re-use of data and potential business models that support data marketplaces. BDVA published a paper entitled 'Towards a European Data Sharing Space Enabling data Exchange to unleash full AI Potential'<sup>16</sup> to which the EOSC community has been encouraged to provide feedback.

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<sup>13</sup> <https://www.cloudbank.org/>

<sup>14</sup> <https://cispe.cloud/2000-2/>

<sup>15</sup> <https://www.european-big-data-value-forum.eu/>

<sup>16</sup> [http://www.bdva.eu/sites/default/files/BdVA%20DataSharingSpace%20PositionPaper\\_April2019\\_V1.pdf](http://www.bdva.eu/sites/default/files/BdVA%20DataSharingSpace%20PositionPaper_April2019_V1.pdf)

- Red Hat

At the request of the leader of WP7: Communication, Dissemination, Stakeholder forum and events, CERN participated in a video meeting with representatives from Red Hat on 17th January 2020. The participants were:

- Rupert Lueck EMBL, Head of IT Services & Chair of EOSC Sustainability WG,
- Bob Jones, CERN & Rapporteur to EOSC Sustainability WG & EOSCsecretariat.eu partner
- James Lovegrove, Red Hat Director EMEA Public Policy
- Fred Hornain, Red Hat Solution Architect, technical point of contact with good overview of all the open source elements
- Silvana Muscella, CEO Trust-IT & EOSCsecretariat.eu partner, Nick Ferguson Project Manager & WP7 lead for EOSCsecretariat.eu, Trust-IT.

The purpose of the conference call was to understand how Red Hat's open source solutions, ecosystem and open innovation model could contribute to EOSC and how can EOSC engage with industry players – especially those with a strong Open Source (OS) component for the future?

## Appendix VI. How to transform governments through a smart cloud policy

Bob Jones, CERN  
4th July 2019

I attended the Cloud Infrastructure Service Providers in Europe (CISPE) event entitled ‘How to transform governments through a smart cloud policy’ (<https://cispe.cloud/2000-2/>) held in Brussels 3rd July 2019. There 34 registered participants primarily from commercial cloud service providers, national governments, consultancy groups and the European Commission (DG DIGIT, DG CONNECT).

The goal of the ‘How to transform governments through a smart cloud policy’ event was to discuss how governments can accelerate cloud adoption through a smart cloud policy, enhance understanding of the cloud model, and ensure proper integration of key activities when moving to the cloud.

It also coincided with the publication of the CISPE handbook ‘Buying Cloud Services in the Public Sector’ ([https://cispe.cloud/website\\_cispe/wp-content/uploads/2019/05/Public-Policy-strategy-on-Procurement-Handbook-Final-190528.pdf](https://cispe.cloud/website_cispe/wp-content/uploads/2019/05/Public-Policy-strategy-on-Procurement-Handbook-Final-190528.pdf)).

This handbook is designed to provide helpful guidance and support to public authorities when procuring cloud services. It is a useful handbook that includes text extracts and checklists that can be used for preparing cloud service procurements. The book highlights that acquiring cloud services differs from the more traditional on-premise h/w and s/w acquisitions known to the public sector.

CISPE is positioning the handbook in response to the cloud strategy published recently by the EC: [https://ec.europa.eu/info/news/european-commission-adopts-new-cloud-strategy-2019-may-28\\_en](https://ec.europa.eu/info/news/european-commission-adopts-new-cloud-strategy-2019-may-28_en)

The event was organised as a panel on the premise that procurement approaches need to be rethought: CISPE is encouraging EU policymakers to develop a more ambitious and forward-looking approach at EU scale based on “cloud first” policy initiatives, helping to drive the growth of the single cloud infrastructure market in Europe and underpinning Digital Single Market (DSM) growth goals.

Accenture published in 2013 a report summarizing cloud adopt for European national governments ‘A new era for European public services - Cloud computing changes the game’:

[https://www.accenture.com/t20150527T211057\\_w\\_/fr-fr/acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Local/fr-fr/PDF\\_4/Accenture-New-Era-European-Public-Services-Cloud-Computing-Changes-Game.pdf](https://www.accenture.com/t20150527T211057_w_/fr-fr/acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Local/fr-fr/PDF_4/Accenture-New-Era-European-Public-Services-Cloud-Computing-Changes-Game.pdf)

Later in the same year, the EC published a report ‘Analysis of cloud best practices and pilots for the public sector’ (<https://ec.europa.eu/digital-single-market/en/news/analysis-cloud-best-practices-and-pilots-public-sector>). The results show that in the ten Member States covered by the study (Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Portugal, Spain, the United Kingdom), the deployment of cloud in the public sector is at a very early stage.





In the same year, the EC commissioned report 'Clouds for science and public authorities' (<https://www.trust-it-services.com/sites/default/files/KK0213232ENN.en.pdf>) was published.

Strategic texts, reports, surveys, papers, etc. are collected and are available in the STORM CLOUDS' Smart City Platform as a cloud computing and public sector services body of Knowledge (<http://www.storm-clouds.eu/services/resources/body-of-knowledge/>)

National cloud first policies:

- United States (2011): The United States government launched a Cloud First policy.
- United Kingdom (2013): The British government introduced a Cloud First policy and set up the buyers and suppliers network required by this strategy
- Norway (2013): <https://www.regjeringen.no/en/dokumenter/Cloud-computing-strategy-for-norway/id2484403/sec3>.
- Australia (2014): The Australian Cloud Computing Policy (2014) "aims to drive a greater take up of cloud services by federal government agencies by adopting a 'cloud first' approach".
- Singapore (2015): The government of Singapore became a leader in cloud policies. Its 2015 brochure on cloud computing provides an overview of strategies for using the cloud.
- Philippines (2016): The government of the Philippines published the fourth draft of its Cloud First policy.
- Bahrain (2017): <https://tinyurl.com/ybf4gp4k>.
- India (2017): GI Cloud initiative: <http://meity.gov.in/content/gi-cloud-initiative-meghraj>
- The panellist discussed the state of public sector cloud service procurement in member states (France, Germany, Netherlands, UK).

Richard Sykes (Cloud Industry Forum) explained how the UK G-Cloud initiative (<https://www.digitalmarketplace.service.gov.uk/>) was introduced to take-back control from the small number of dominant government IT contractors (there were some notable failures, delays and cost overruns). It has successfully broadened the number of suppliers providing IT services to government authorities (with a significant number of SMEs) and though it handled more than £2 billion of procured services in 2018/2019 (<https://app.powerbi.com/view?r=eyJrIjoiNTEyMTZhZDAZGNiNi00OWQxLWI5ODYtMjg1ZWNIMmNkODVhIiwidCI6IjlmOGMwZDc5LTNlODctNGNkMy05Nzk5LWZmNDQzMTQzZWE1ZSIsImMiOiJh9>) it is estimated that it still has only a 20% penetration of the total government IT market. G-Cloud was established as an iterative model where the framework is regularly refreshed (currently at version 11) to take account of new suppliers, classes of services and terms and conditions. The whole platform was put in place and managed by a team of 15 people.

UK government published a Cloud First policy (<https://www.gov.uk/guidance/government-cloud-first-policy>) and after 6 years this currently being reviewed (<https://www.computerweekly.com/news/252463001/Government-cloud-first-policy-under-review-by-CCS-and-GDS>) (see also <https://www.computerweekly.com/blog/Ahead-in-the-Clouds/Has-the-UK-governments-cloud-first-policy-served-its-purpose>)



According to Andreas Weiss ( EuroCloud Deutschland / eco), in Germany the situation is more complex because of the federated nature of the country's administration. There is no published cloud first policy and the term Bundescloud (<https://www.spiegel.de/netzwelt/web/open-source-software-nextcloud-baut-die-bundescloud-a-1203261.html>) favours on-premise installations and is frequently applied to existing legacy systems.

According to, Alban Schmutz (CISPE, OVH), a national strategy has been and promoted by the ministry of digitalisation in France (<https://www.dotmagazine.online/issues/digitalization-creating-the-new-world/government-blockchain/moving-the-french-administration-into-the-cloud>). The strategy is based on 3 elements:

- Internal/private cloud (in-house government operated services for internal usage)
- Externally hosted services for internal usage
- Public cloud hosted services intended for use by government and its citizen

This strategy has raised political awareness of cloud services but the implementation of Public cloud hosted services has been slow to take-off. One of the issues is that the tax rules applied to on-premise procurements are 15% lower than those applied to external cloud services.

Ruud Alaerds (Dutch Hosting Provider Association) said there is no cloud first policy for the Dutch government, even if an ICT policy exists (<https://www.government.nl/documents/policy-notes/2012/03/30/the-netherlands-istrategy>) and the government continues to operate its own infrastructure (<https://www.odc-noord.nl/>, <https://joinup.ec.europa.eu/collection/open-source-observatory-osor/document/open-source-makes-dutch-government-cloud-reality>).

For all countries discussed:

- The level of uptake in the public sector lags behind that of the private, primarily because there is significant on-premise capacity supporting legacy systems that are not cloud-native.
- The procurement officers of local government are not very knowledgeable of IT and cloud services procurement represents a significant challenge to their existing procedures.

Neville Cannon, senior director analyst at Gartner, shared some of the findings of a public sector survey performed by Gartner. The survey highlighted that defining/publishing a cloud policy was insufficient on its own to have any significant impact on how IT was procured. Such a policy needs backing at the CIO level and should include an organisational change element to bring on-board procurement, legal and in-house service provisioning departments. Added value for users must be created in the transition and the same rules, such as a quality data privacy and security.

Pierre Chastanet (Head of Unit - Cloud & Software at European Commission – DG Connect) explained the EC's activities in the domain of digital transformation for the EC itself ([https://ec.europa.eu/info/sites/info/files/strategy/decision-making\\_process/documents/ec\\_digitalstrategy\\_en.pdf](https://ec.europa.eu/info/sites/info/files/strategy/decision-making_process/documents/ec_digitalstrategy_en.pdf)) and Europe as a whole ([https://ec.europa.eu/growth/industry/policy/digital-transformation\\_en](https://ec.europa.eu/growth/industry/policy/digital-transformation_en))

In terms of cloud services, the EC's approach has been to avoid heavy legislation in what is a rapidly changing market which is currently dominated by Amazon, Microsoft, Google and IBM. Instead they have promoted self-regulation via Codes of Conduct for data protection, cloud security (<https://ec.europa.eu/digital-single-market/en/news/cloud-stakeholder-working-groups-start-their-work-cloud-switching-and-cloud-security>) as well as templates for SLAs. CISPE has produced a code of conduct for data protection (<https://cispe.cloud/code-of-conduct/>). Pierre recognised there is a large divergence of implementation across the member states and expects that the new Commission will consider closer alignment as a subject to be addressed.

Dalibor Baskovc (European Commission – DG IT) explained the approach the EC is taking to make the cloud safe ([https://ec.europa.eu/isa2/actions/making-usage-cloud-safer\\_en](https://ec.europa.eu/isa2/actions/making-usage-cloud-safer_en)). The GovSec project, i.e. Governance and Security Plan, is in active development. Dalibor expects the system to be used in 2019 first at the EC and some of the EC agencies. In 2020, the solution will be made ready to be used as an open-source platform, reusable by public sector organisation in the Member States or the European institutions (<https://publications.europa.eu/en/publication-detail/-/publication/7785a99c-f6b2-11e8-9982-01aa75ed71a1/language-en>).

The European Data Protection Supervisor published “Guidelines on the use of cloud computing services by the European institutions and bodies” in March 2018 ([https://edps.europa.eu/sites/edp/files/publication/18-03-16\\_cloud\\_computing\\_guidelines\\_en.pdf](https://edps.europa.eu/sites/edp/files/publication/18-03-16_cloud_computing_guidelines_en.pdf))

