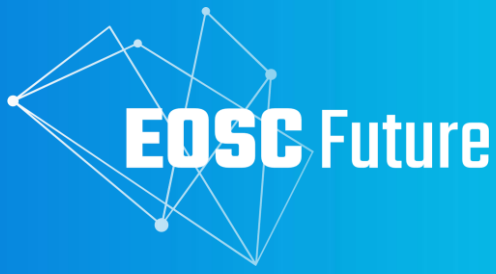

D7.4a
EOSC Usage Overview

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D7.4a / EOSC Usage Overview

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Abstract

This deliverable outlines the approach of how the EOSC Service Management System which is being developed within EOSC Future quantifies current and predicted usage of components of the EOSC Portal within Capacity Management. It also outlines how benefits of EOSC Portal components are evaluated and recorded as part of EOSC-Core Service Portfolio and their correspondent Service Design and Transition Packages. This approach is now being rolled out across all components within the EOSC-Core and is planned to be completed before the end of the project, when an update of this deliverable, D7.4b will be written. A revised version of this deliverable includes an appendix presenting how up-to-date statistics information may be obtained on demand.

Version History

Version	Date	Authors/Contributors	Description
V0.1	07/06/2022	Matthew Viljoen (EGI.eu)	Initiation – Proposed ToC – First draft
V0.2	28/06/2022	Matthew Viljoen (EGI.eu), Montserrat González (EGI.eu), Alessandro Paolini (EGI.eu), Cyril L'orphelin (CC-IN2P3)	Version ready for review
V0.3	04/07/2022	Matthew Viljoen (EGI.eu)	Revised version to incorporate review comments
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V1.0	06/07/2022	Matthew Viljoen (EGI.eu), Montserrat González (EGI.eu), Alessandro Paolini (EGI.eu), Cyril L'orphelin (CC-IN2P3), Athanasia Spiliotopoulou (JNP), Ron Dekker (TGB), Mike Chatzopoulos (ATHENA)	Submission to EC by PC (ATHENA)
V1.1	12/04/2023	Matthew Viljoen (EGI.eu)	Addressing rejection comments
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Abbreviations

Acronym	Definition
CAB	Change Advisory Board
CAPM	Capacity Management
CHM	Change Management
CI	Configuration Item
CONFM	Configuration Management
CPA	Core Participation Agreement
CSI	Continual Service Improvement
EOSC	European Open Science Cloud
EPOT	EOSC Portal Onboarding Team
ISM	Information Security Management
ISRM	Incident and Service Request Management
KEDB	Known Error Database
MVE	Minimum Viable EOSC
PM	Problem Management
PMB	Project Management Board
RDM	Release and Deployment Management
RfC	Request for Change
SACM	Service Availability and Continuity Management
SDTP	Service Design and Transition Package
SFI	Suggestions for Improvement
SLI	Service Level Indicators
SLM	Service Level Management
SMS	Service Management System
SFRM	Supplier Federation member Relationship Management
SOCRM	Service Ordering and Customer Relationship Management
SP	Service Portfolio
SPM	Service Portfolio Management
SQA	Software Quality Assurance
SRM	Service Reporting Management
TCB	Technical Coordination Board

1 Executive Summary

This deliverable outlines the approach of how the EOSC Service Management System quantifies current and predicted usage of components of the EOSC Portal within Capacity Management, along with all the completed capacity plans to date. It also provides the structure and content of the EOSC Service Portfolio entry that will record EOSC Portal components. The Service Portfolio entry gathers information to assess the value and potential impact of a component. It also presents the EOSC Service Design and Transition Package (SDTP) structure to help in planning new components or modifications to current components. The SDTP contains a business case to evaluate the benefits, costs, and risks and mandates how components or services can progress through their lifecycle. A sample of the EOSC Service Ordering service, which is currently in production, illustrates the value of the Service Portfolio entry. It is now being implemented and is planned to be completed before the end of the project, when an update of this deliverable, D7.4b will be written.

This deliverable includes usage statistics that was correct at M15 of the project, conforming to the description of this deliverable in the Description of Activities. An updated version of this deliverable contains a new appendix outlining how up-to-date usage statistics may be obtained on demand.

2 Introduction

For the purpose of ensuring the continued and sustained service delivery of the EOSC Core, both the usage and benefits of each component need to be quantified. This needs to be done not only initially when services are set up, but over time to ensure that the different components of the EOSC-Core continue to meet the needs of the users and that service delivery of these components is maintained at acceptable levels.

As part of the Grant Agreement, the EOSC Future project has been given *a priori* a list of services comprising the Core that it delivers. The composition of the Core is aligned with work done by the EOSC Governance working groups to define the Minimum Viable EOSC [1] published in February 2021. In September 2021, EOSC Future Deliverable D2.5a "Inventory of Core Functions and Inclusion Criteria" [2] defined the capabilities of Core and articulates the value that the components of the Core deliver. However, the needs of users and other stakeholders can change, and functionality needs to adapt to ensure that such needs continue to be met. This is especially the case in these early years of the EOSC where needs of the stakeholders are still being understood. It is for this reason that the EOSC Service Management System needs a robust method of putting into place a means to ensure that value and benefits are defined and continue to be defined into the future, both for existing services and new services.

The way that we are proposing to evaluate the *justification* and *value* of services within the EOSC-Core is by completing the Service Portfolio Entry for existing services and to use the Service Design and Transition Packages (SDTPs) for newly developed services being added to the EOSC-Core as part of the project. We plan to complete Service Portfolio entries for all existing EOSC-Core services. The Service Portfolio and SDTP represent updated information designed to track a service through its lifecycle, from proposal, development through to production delivery and final decommissioning. In this way, they represent a live service far better than a static document such as a project deliverable. In this document we suggest a Service Portfolio entry that is also included as part of a SDTP template to avoid repetition of work providing the same information in different documents. We will accompany the template for a Service Portfolio entry with an example that is completed for an EOSC-Core service (the EOSC Service Ordering service). We then plan to complete Service Portfolio entries for all EOSC-Core services and apply the SDTP to all new EOSC-Core services that are being developed, before the end of the project, and propose ways of maintaining the SDTPs after EOSC Future ends.

Within the EOSC SMS, quantifying the *usage* of each Core service/service component forms part of Capacity Management. This is because in order to understand whether there is adequate capacity to service current and future users for a service, there needs to be a defined way of measuring the usage of such service. Usage may vary depending on the service in question, so this approach needs to be flexible enough to allow usage to be determined for the service in question.

It is not possible at this stage of the project to include within this deliverable a comprehensive analysis of the usage and value of all EOSC-Core components. As has been already mentioned, D2.5a partially addresses the value via the capabilities of the EOSC Core, but here we define an approach for quantifying usage and value which we believe will be suitable for the EOSC-Core into the future, as part of the EOSC SMS. This approach will be supported by example entries for a subset of EOSC Core. We assert that this approach is flexible enough to account for new and changed Core services. For the remainder of the project, this approach will be applied to all EOSC-Core services as part of their SDTPs and Capacity Management plans, and an update of this deliverable will aim to include usage and value of all production EOSC-Core components.

Section 3 provides updated information about how Service Portfolio Management for the EOSC-Core components is approached within the EOSC SMS, and the information for each service that is being collected, along with the value and benefits that each service brings. A description of an EOSC-Core Service Portfolio entry is provided in Section 3.1 and a description of the SDTP is provided in Section 3.2. Section 3.3 provides an example Service Portfolio entry, defining the value of the EOSC Service Ordering service. Section 4 introduces how usage is being measured for EOSC-Core services as part of Capacity Management

3 Service Portfolio Management for EOSC-Core Components

Service Portfolio Management aims at defining a Service Portfolio (SP) that will include all past, present and future services part of the EOSC-Core and keeping it up to date. Services are added to the SP after being designed and evaluated and the SDTP is a key element for this. As mentioned before, a SDTP is a document that gathers information to facilitate the design, development, and assessment of the services to be added to the SP as well as their transition to different stages of the service lifecycle from proposal to retirement.

Our proposal in practical terms is that on one hand, providers currently offering EOSC-Core services should fill out the SP entry. This is because it gathers the most relevant information about the service. When they want to modify the service, such as add features, they should use the SDTP. On the other hand, new service providers should use the SDTP for planning, development, and roll-out of their services.

3.1 Service Portfolio

The service portfolio will record all past, present and future services that are part of the EOSC-Core in order to facilitate decision making on the alignment of EOSC strategic objectives and services to support and achieve them. This section explains what the expected content of an entry is describing a service in the Service Portfolio.

3.1.1 Service overview

The service overview offers the following basic information about the service, who is the provider as well as the access policies and terms of use in place.

Table 3-1: EOSC-Core Service Portfolio - Service overview section

Field	Description
Service name	Name of the service as known by the end user.
Service category	Category of the service from the list of Service and Resource Categories [3]
Lifecycle status	Lifecycle status according to the EOSC Service and Resource Lifecycle [4]
Service description	A short description of the service. The description will be written in a way that is oriented toward customers and users.
Service Portfolio entry	Link to the service portfolio entry once it has been created.
Leading service provider(s)	The name(s) of (all) the leading or coordinating provider(s) that manage or deliver the service in federated scenarios, which at the time being are beneficiaries of EOSC Future.
Contributing service provider(s)	The name(s) of (all) the contributing provider(s) that manage or deliver the service in federated scenarios, which at the time being are beneficiaries of EOSC Future.
Access policies	Policies stating how the service can be accessed, examples are: • Policy-based: users are granted access to the service based on policies defined by the EOSC Future; • Wide access: users can freely access the service provided; or • Market-driven: users can negotiate a fee to access the service either directly with the EOSC Future service provider or indirectly with EOSC Future.
Terms of use	URL to a document containing the rules which one must agree to abide by in order to use the service.

3.1.2 Service value

Service value identifies customer and user groups, and the value proposition is outlined considering the objective of the EOSC-Core services, as well as a short tagline that will be used for marketing purposes. There is also additional information on the service, like features, and the integrations with other services (EOSC-Core services, EOSC-Exchange resources, or others) and the benefits of these integrations.

Table 3-2: EOSC-Core Service Portfolio - Service value section

Field	Description
Customer group	Type of customers who are allowed to commission the service. Restrictions may apply according to various criteria like the location (e.g. country) or type of activity (e.g. research, commercial). By customer, we mean an organisation that commissions a service provider to deliver one or more services, doing so on behalf of a number of users; customers commission a service and usually discuss the terms of the contract and of the SLA but do not necessarily use it; users use the service but do not necessarily commission it. For EOSC-Core services this attribute typically equals to 1. For the EOSC legal entity (hub operators) to 2. Other operators of regional or thematic nodes of EOSC, to 3. External service providers who may integrate them with their services somehow.
User group	Type of individuals that primarily benefits from and uses a service. E.g. large research groups, individual researchers, site admins.
Value proposition	The benefit to a customer and their users delivered by a service; benefits are usually related to alleviating pains (e.g., eliminate undesired outcomes, obstacles or risks) or producing gains (e.g. increased performance, social gains, positive emotions or cost saving). Also it should be considered that a service part of the EOSC-Core must contribute to the digital platform providing the functionality required for cross-domain and cross-country sharing of open science practices according to the EOSC interoperability framework.
Tagline	Short catchphrase for marketing and advertising purposes. It will be usually displayed close to the Service name and should refer to the main value or purpose of the Service.
Features	List of distinct characteristics for this service and what makes it different to other similar solutions.
URL	Link to a webpage providing information about the service. This webpage is usually hosted and maintained by the service provider. It contains fresh and additional information, such as what APIs are supported or links to the documentation.
List of integrations with other services or resources	Name of the service that has been integrated (and link to the EOSC-Core SP entry or to EOSC Marketplace if it is an EOSC-Exchange resource), contact person and organisation, description of the integration and what are the benefits from it.

3.1.3 Service support

Service support provides the main contacts for processing service requests and incidents as well as ensuring that the service provider provides operational support through the EOSC Helpdesk.

Table 3-3: EOSC-Core Service Portfolio - Service support section

Field	Description
Service owner	The person(s) with overall responsibility for the delivery of the service component.

Operational contact	The person(s) responsible for operations of the service/service component. Ideally this should be a mailing list.
Security contact	The person(s) responsible for dealing with security aspects of the service/service component. Ideally this should be a mailing list
Supporters	Other people (apart from the operational contact) who are involved in providing operational support for the service/service component through the EOSC Helpdesk.
Public contact	External contact (e.g., e-mail, phone) for end users to ask information about the service.
User manual	Link to the user manual for this service.
Service request list	List of requests that a user can submit to the service desk during the provision of the service.

3.1.4 Service architecture

The service architecture shows the minimum service components to make the service available (enabling components) as well as components that add additional functionality (enhancing components), their description and the Technology and Readiness Level (TRL) according to Horizon 2020 for each of them as well as contact information for the component provider.

Table 3-4: EOSC-Core Service Portfolio - Service components section

Field	Description
Type	Enabling or enhancing.
Name	Component name.
Description	Short description of each component and the function(s) it enables.
Technology and Readiness Level	Value from 1 to 9.
Public contact	External contact (e.g., e-mail, phone) for end users to ask information about the service.
User manual	Link to the user manual for this service.
Service request list	List of requests that a user can submit to the helpdesk during the provision of the service.

3.1.5 Finances and resources

Finances and resources show an overview on the payment model, cost and revenues related to the service.

Table 3-5: EOSC-Core Service Portfolio - Finance and resources section

Field	Description
Type	Supported payment models and restrictions that apply to each of them; examples of types of payment models are: sponsored use, pay-as-you-go, subscription, membership to corporate customers, higher education, etc.
Cost	The costs required to develop and maintain/operate the service in the best case, e.g. human effort; financial investment.
Revenue	E.g. public funding, membership fees, in-kind, paid (specify price).

3.2 Service Design and Transition Package

A SDTP is a document that gathers information to facilitate the design, development, and assessment of the services to be added to the SP as well as their transition to different stages of the service lifecycle from proposal to retirement.

3.2.1 Service Portfolio entry

A SP entry contains information that is also normally included in the SDTP. Therefore, to avoid duplication of effort and ensure consistency, the first section of the SDTP is identical to the SP entry. When a service provider fills-in the SDTP, they can copy and paste the information in the SP and when they need to create an SDTP for developing a new feature, they can copy the SP entry to the SDTP.

3.2.2 Business case

The business case supports informed decision-making with respect to the extension or change of the Service Portfolio from a strategic perspective.

Table 3-6: EOSC-Core Service Portfolio - Service support section

Field	Description
Demand assessment	Describe what is the market potential (all user types / categories and size) considering the best case, average case and worst case scenarios.
Assumptions (about market uptake)	What assumptions need to be made to expect the best, average and worst case scenario e.g. EC policy supports it; no commercial alternative; high user friendliness will equal mass uptake.
Expected organisational impact on the service provider	Provide an estimate of the resources required to develop (CAPEX) and maintain / operate (OPEX) the service in the best, average and worst case scenarios, e.g. human effort; financial investment. Consider current or potential future project funding.
Expected revenue	What revenue types will the provider obtain in return for the investment described above and possible estimates e.g. direct payment(s); funding; in-kind contribution.
Risks	If any supplier(s), whether of potential service components and/or technology, will be needed or have been identified, describe the rationale and technical evaluation to ensure the service can/will be supported
Supplier evaluation	If any supplier(s), whether of potential service components and/or technology, will be needed or have been identified, describe the rationale and technical evaluation to ensure the service can/will be supported.
Constraints / limiting factors	Describe the factors that may limit or hold back the success of the service e.g. size of the market; demand in the market; availability of supply; competition; availability of finances; quality and skills of employees

3.2.3 Service conceptual design and deployment

The conceptual design includes the success criteria that identifies objectives, indicators and targets to assess the success level of the service, as well as the requirements for the service design. Identifying the requirements for the service design that are part of the deployment acceptance criteria will allow us to reduce effort and plan development when these requirements are met.

Table 3-7: EOSC-Core Service Portfolio - Success criteria subsection

Field	Description
Objective	Define one or more strategic objectives for this service.
Indicator	Name of the performance indicator(s) used to measure the progress towards the objective.

Description	Short description of the indicator(s) and of how it will be measured.
Target	Target value for the chosen indicator(s).

The list of requirements per category to be filled-in by the service provider has been pre-filled with mandatory requirements that derive from the EOSC Rules of Participation, the EOSC Interoperability Framework and the EOSC PID policy to increase awareness and facilitate this task to the providers. Table 3-8 explains the requirement categories, and in the SDTP, there will be two options to indicate if the requirement is part of the deployment acceptance criteria and if the requirement has been met.

Table 3-8: EOSC-Core Service Portfolio - Service requirements subsection

Category	Description
Organisational	Organisational requirements are aspects to be considered in order to comply with aspects such as the organisation's vision, objectives, strategy, health and safety, internal policies, effective communication and effective user or support training. E.g. Mandatory: The service must comply with the EOSC-Core Participation Agreement.
Functional	Functional requirements define something the service should do. It might be helpful to consider that a functionality test will assess whether or not the service works. E.g. Mandatory: The resource help desk or support function must at least be able to answer questions in at least one European language, and always include English as an option.
Usability	Usability requirements define how the service should do something. It might be helpful to consider that a usability test will assess whether or not the end user can access the functionalities and successfully use the product. E.g. Mandatory: The service must enable easy access to data sources in different formats.
Technical design	Technical requirements are technical design aspects that the service must fulfil. E.g. Mandatory: The resource help desk or support function must be integrated with the EOSC Helpdesk.
Availability	Availability requirements are normally related to the amount of time that a service should be available over a reporting period. Availability is related to how to minimise downtime related to incidents that can happen day to day. E.g. Mandatory: Comply with the EOSC-Core Participation Agreement availability requirements.
Continuity	Continuity requirements are the ones that ensure that the service can be recovered within required, and agreed business timescales. Continuity is related to extended downtime related to disasters (fire or flood type of scenario). E.g. An unplanned outage must last no longer than 24h
Performance	Performance requirements are the ones that define the expected operational performance of the service. The service performance is measured by Key Performance Indicators, a measurable value that demonstrates how effectively a service is run. E.g. Mandatory: Comply with the EOSC-Core Participation Agreement performance requirements.

Security	Security requirements make reference to the safeguards the service needs to consider. It involves aspects such as authentication, authorisation, non-repudiation, security on the protocols that might be used and how secure are the underlying applications. E.g. Mandatory: The resource must use the EOSC security and privacy framework (including the EOSC AAI).
Legal	The legal requirements make reference to legal regulations and standards to be compliant with. E.g. Mandatory: The resource must use permissive licences for metadata (and preferably for data, whenever possible). A CCo licence is preferred over CC BY 4.0

3.2.4 Service transition plan

The service transition plan provides a list of activities to be carried out for the service to evolve through the service lifecycle and to make changes on its operation.

Table 3-9: EOSC-Core Service Portfolio - Service transition plan

Field	Description
Transition phase	It can be: specification, negotiation and agreement; development and procurement; initial testing; operation with early support; and regular operation.
Activities and timing	Main activities including communication activities
Responsibilities	The RACI (Responsible, Accountable, Consulted and Informed) responsibility assignment.
Progress report	Report updating the status of the transition phase.
References and other documents	References and documents that would be useful to reflect the evolution of the transition phase.

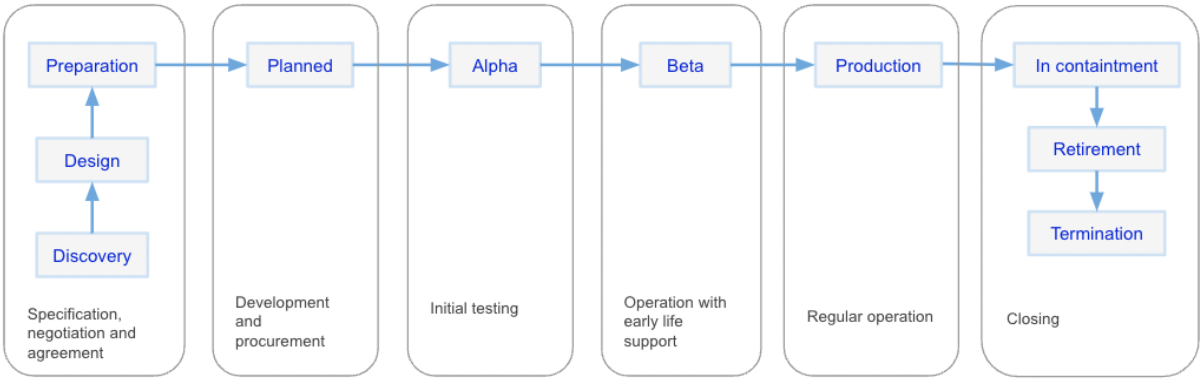

Figure 3.1 Service lifecycle phases and status of a service transition

The following table is a basis of a check-list to evaluate that prerequisites for a specific status are met. The requirements are incremental, that means that if a service is in phase 'beta', all requirements from the beta and from the previous phases need to be verified.

Table 3-10: EOSC-Core Service Portfolio - Service transition plan

Field	Description

Service lifecycle status	It can be: • Discovery: researching users' needs, exploring technological or policy constraints. • Design: service or resource in design. • Preparation: service or resource in preparatory phase • Planned: a plan to develop the service or resource is defined. • Alpha: service or resource prototype is available for closed set of users • Beta: service or resource being developed while available for testing publicly. • Production: service available in the live environment meeting security/performance requirements. • In containment: service or resource active, but generally not available to new users. • Retirement: service or resource is not anymore offered. • Termination: service or resource dissolution or dismantling.
Condition description	Description of the condition to be met for the service to be in the lifecycle status. E.g. A service owner has been assigned
Responsible	Responsible for the condition to be met.
Notes and evidences	Additional information to provide proof of the condition being met.
Verification and guidance	Guidance to validate the condition has been met.

3.3 Example Service Portfolio entry – EOSC Service Order Management

This section contains an example Service Portfolio entry, completed for the EOSC-Core service: EOSC Service Order Management service, to provide an overview of how the EOSC SMS plans to collect service value and benefits information from all EOSC-Core services before the end of the project.

3.3.1 Service order management

Table 3-11: EOSC-Core Service Portfolio - Service overview section

Field	Description
Service name	EOSC Order Handling System
Service category	16.9
Lifecycle status	7
Service description	The Order handling system is a web tool design to operate all the service orders registered in the EOSC Marketplace. It is accessible through the EOSC Federated AAI.
Service Portfolio entry	The EOSC-Core
Leading service provider(s)	CCIN2P3/CNRS
Contributing service provider(s)	CC-IN2P3 / CNRS
Access policies	Policy-based: users are granted access to the service based on policies defined by the EOSC Future

Terms of use	https://opsportal.eosc-portal.eu/home/termsofuse

3.3.2 Service value

Table 3-12: EOSC-Core Service Portfolio - Service value section

Field	Description
Customer group	The EOSC Future project
User group	Any user of the EOSC Portal (individual researcher, project, citizen scientist)
Value proposition	A central and easy to use means of ordering all orderable services available within the EOSC Marketplace. This service avoids the need for the user to go to separate services' ordering pages and the need to get familiar with different ordering workflows, by providing a uniform ordering interface for multiple services.
Tagline	Ordering system for EOSC
Features	• Create an order • Analyse orders • Approve/reject orders • Request more information from the customer • Exchange information between third parties • Start a negotiation process with service providers • Exchange information with service providers • Automatically generate an SLA/OLA from given templates
URL	https://gitlab.in2p3.fr/opsportal/sf3/-/wikis/sombo
List of integrations with other services or resources	EOSC Marketplace with the use of JIRA API EOSC Provider portal with the use of the portal API

4 Usage and Capacity Management

Capacity planning is an important aspect that extends across the service lifecycle: a key success factor in managing capacity is ensuring it is considered during the design stage, with periodic reiterations during delivery of the service, in order to guarantee that the capacity of the services meets the agreed capacity- and performance-related requirements in a cost-effective and timely manner. Capacity management is concerned with meeting both the current and future capacity and performance needs of the business.

In carrying out this activity we apply the FitSM Capacity Management requirements in order to cover the capacity aspects of the EOSC-Core and monitor its usage. The goal of this process is to ensure that sufficient capacities are provided to meet agreed service levels and performance requirements for services that are part of the catalogue. Capacity Management (CAPM) is usually triggered before the release of a service into the production environment (during the creation of the SDTP), with a periodic reiteration during the entire lifetime of the services in the catalogue: the process considers all resources required to deliver the IT service, and plans for short-, medium-, and long-term business, capacity, and performance requirements.

The result of this analysis is the creation of a plan that documents the current level of resource utilisation and service performance and, after consideration of the service strategy and plans to forecast the future requirements for new IT resources, that supports the IT services that underpin the business activities. The plan clearly specifies any assumptions made as well as any recommendations quantified in terms of resources required, cost, benefits, impact, etc. It is reviewed on a regular basis, typically every 6 months, collecting new data about the usage of the resources, and if the capacity is not thought to be enough then it is adjusted in order to respond to the current and future demand of the service.

4.1 Capacity plan structure and criteria adopted

A capacity plan is used to manage the resources (human, technical, and financial) required to deliver IT services: it contains details of current and historic usage of IT services and components, and any issues that need to be addressed (including related improvement activities). The plan also contains scenarios for different predictions of business demand and cost options to deliver the agreed service level targets.

The capacity plan structure we designed is divided into several sections (Table 4-1), each one corresponding to some of the steps bringing to the creation of a capacity plan.

Table 4-1: Capacity plan structure.

Section	Content
Service description	Reference to SDTP, OLA/UA, list of known issues related to service capacity
Service Level Indicators	List of defined SLIs along with a description
Capacity strategy	Strategies to adjust the service capacity to respond to changes in utilisation
Risks	A list of risks related to the capacity aspects of the service
Capacity monitoring	Data about service utilisation and performance covering up to the moment when the plan is created/reviewed
Forecast	Recommendations on capacity requirements for the next reporting period

First of all, the creation of a capacity plan is usually triggered by the addition of a new service in the portfolio or because there is a new or modified SLA for a service. The service business case design is reviewed, with a particular focus on the service demand, on the expected cost and expected revenue, and lastly on the Service Requirements and Service Acceptance Criteria. All this information is reported in the SDTP which can be updated if necessary. So, the first section of our capacity plans, named Service Description, contains a reference to the SDTP, to any existing Operational Level Agreement, and also a list of known issues related to service capacity, e.g. reported incidents/problems, SLA violations attributed to capacity, customer complaints, etc.

Once completed, it is time to define quantitative parameters, the so-called Service Level Indicators (SLIs) relevant for understanding the capacity of the service. Depending on the service, we define a series of parameters easy to measure which can provide a direct indication on the load of the service under its normal operation, corresponding to the several capacity aspects of the given service.

A group of SLIs usually included in a capacity plan is the one reflecting the hardware aspect, related to technical resources (either virtual or bare-metal) where the service is hosted: CPU, disk, memory, and network. Measuring these will give direct information about the load of the hosting machines.

Another SLIs category usually part of a capacity plan is related to the human and financial resources. Concerning our services, where the providers receive yearly contributions (PM, persons month effort) for specific activities to be accomplished in a given international project, we decided to consider as SLIs the "monthly effort" and the "number of staff members" that deliver the service; moreover, the providers are also required to provide support to the users (as stated in the services OLAs), in terms of addressing any incidents and service requests that are filed through the EOSC Helpdesk service, so that we added to the list indicators such as the "number of tickets" and the "ticket average response time" (without making distinction between "incidents" and "service requests" and regardless the tickets priority). In this way we can have an idea of the human load of the service, for instance if a particularly high number of tickets produces an increase in the average response time, then it could be the case of increasing the number of staff members.

Besides that, we needed some indicators providing a direct information of the usage of the service itself intended as a software, what is consumed by the users, so we defined a series of parameters to measure the "software capacity performance" of the given service; as shown in the next section, this kind of SLIs are service specific.

The next part of the plan is the "Capacity Strategy" section which describes the strategies to adopt to modify the capacity of a service as a consequence of a change in demand. For each SLI it is reported:

- how it is monitored
- any identified capacity issue
- users' experience in case of saturation (i.e. service completely interrupted, degraded, etc.)
- the designed capacity, if applicable
- capacity adjustment model (the best model to adopt to adjust the capacity).

Specifically, we defined four strategies to modify the capacity to respond to an increase of demand:

- Lead: adding capacity in anticipation of an increase in demand. The total capacity for the given service will be estimated and will be chosen to be always higher than the anticipated demand.
- Lag: waiting until the current capacity is stretched to its limits before adding more capacity.
- Incremental: adding capacity in small increments when you approach full capacity.
- Dynamic (Predictive): adding capacity, large or small, before it's required based on forecasts.

Given the context in which all these services (part of the Hub Portfolio) are currently being funded (through the EOSC Future project), we considered a "Lead" capacity strategy type for the "Effort" SLI in the "Human" component of the Service Model, as this is something allocated at the start of the project to cover operations of the service for the entire duration and it is less likely to be adjusted later.

On the other hand, the "Number of staff" indicator was considered across all services as a "Lag" capacity strategy type, since additional individuals can be assigned temporary tasks to provide support to a service experiencing degraded performance at a specific moment.

The same considerations have been taken into account for a "Lag" strategy on "Software/Service performance" capacity area: from an operational perspective, effort to fix the service is allocated when the existing capacity is stretched i.e. service performance becomes poor and the service needs some adjustments at software level.

For each service a number of risks affecting the capacity aspects is defined and rated in terms of likelihood and impact: the risks are then reviewed on a regular basis in order to track the actions to reduce either the likelihood or the impact of the risk if its rating is considered too high to be accepted. A common risk defined for all of our

services is the one related to the number of staff operating the service (Human category): in case of staff shortages, there could be either degradation of a service or delay in recovering the full functionalities after an incident, so that we aim to ensure that enough people can operate the service.

In the "Capacity Monitoring" section of the capacity plan we report the data collected for the several SLIs: looking at the data, we can analyse the utilisation trends of the several parameters to see how far we are from the capacity limit (if known). The trends analysis will then be used as input for the last part of the capacity plan, the one regarding the forecast service utilisation: based on historical data (and in case of new or changed service requirements) we make assumptions on the future demand of the service and on the needs of adjusting the capacity.

Regarding the "Capacity Monitoring" section, we have taken an approach valid for all our capacity plans: in general, the data related to the hardware SLIs are collectible through fabric monitoring, which is internal information directly available to the providers; we agreed that it is not necessary to provide these data to us, with the condition that we ensure that the providers are proactively monitoring them. So we asked the providers to notify us any time they detect an unusual hardware consumption and supply the related data of the affected SLI(s) in that particular period of time, in order to record this in the capacity plan, and document any decision taken to cope with the situation. In a similar way, any incident due to capacity issues will also be tracked. In some cases, moreover, there is not much sense in reporting data about the hardware capacity aspects, since the High Availability deployment of the given service can automatically detect any capacity overload and adjust the available resources accordingly.

Because of the specifics of each service in the EOSC Core, the corresponding Capacity plans have various complexities (i.e. more than one Service Provider in some cases, separate hardware configurations for multiple deployed sub-services), therefore the timeline of creation varied significantly. Hence at the moment of writing this deliverable, we do not yet have a capacity plan for each of the services/service components of the EOSC Core: we aim to cover all of the services by the next deliverable.

4.2 General remarks

Based on explanations provided in the previous section and without going into too much detail, when presenting the capacity plans and the usage of the EOSC-Core services we will focus on the Software and Human SLIs identified for each service, reporting the capacity strategy chosen for each SLI, and providing also some usage data if already available.

Each created capacity plan details information on Human SLIs as "Effort" (yearly PM allocated by the project - currently EOSC Future) and "Number of staff" (staff members operating the service). However, we are not reporting the respective figures in these cases due to project confidentiality aspects. Still, we would like to make the reader aware of the fact that the number of staff put in the Capacity Plans is not a full number of FTEs (Full-Time Equivalent), but a number of individuals operating the service (so it could be 0.4 FTE for a person and 0.8 FTE for another one). Also, a service needs to be controlled by more than one person (be it 1.0 FTE or 0.2 FTE) otherwise degraded performance could happen if the operator is unavailable and no replacement is provided. Lastly, the personnel mentioned in the capacity plans are deployed not only for processing tickets and service requests, but also for service/software performance i.e. maintaining or developing the service.

Other general remarks:

- the capacity monitoring data where possible start from the beginning of the project or since when they were available to the provider;
- we haven't identified any capacity issue concerning the several SLIs;
- when the service capacity is saturated, the users' experience will be degraded, but the service will be still available;
- for each service the capacity strategy model is a mix of "Lead" and "Lag", in some cases also "Incremental" (limited to the hardware SLIs);
- by analysing the usage trends and by estimating the future service demand in the next 6/12 months, we do not foresee that an increase of capacity is required to our services: their consumption seems still quite far from the capacity limit.

4.3 Usage information for EOSC-Core Services

In this section we include usage information extracted from the capacity plans for all services that have completed their capacity plans at this stage of the project.

4.3.1 EOSC Wiki and Issue Tracker

The EOSC Future Confluence (Wiki) and Jira (Issue tracker) support the EOSC Future project's coordination and activities. They are meant to be mainly accessed and used by the EOSC Future project partners and are supporting the SMS and other project-specific activities such as WP-specific activities.

Please note that a systematic collection of the statistics is being put in place, so in the coming months additional metrics will be available.

4.3.1.1 Software/Service Performance SLIs

- Number of concurrent Jira user sessions
  - Total number of concurrent Jira user sessions
  - Capacity strategy: lag
- Number of concurrent Confluence user sessions
  - Total number of concurrent Confluence user sessions
  - Capacity strategy: lag

4.3.1.2 Human (Operation and Tickets handling) SLIs

- Number of tickets
  - Number of Jira and EOSC Helpdesk tickets handled by the provider (regardless category and priority).
    - Between 2021-01 and 2022-06, 277 tickets were created in the HELP Jira project (the first real ticket got created in June 2021).
  - Capacity strategy: lag.

4.3.2 EOSC Helpdesk

The EOSC Helpdesk is the entry point and ticketing system/request tracker for issues concerning the available EOSC services. It implements incident and service request management and provides efficient communication channels between customers, users and providers of the IT resources and services. The implementation of Helpdesk-as-a-Service allows EOSC communities and EOSC providers to use all functions of the EOSC Helpdesk without need to maintain their own on-premise installations of helpdesk service.

4.3.2.1 Software/Service Performance SLIs

- Number of submitted tickets per month
  - Total number of tickets submitted through the EOSC Helpdesk on a monthly basis.
  - Capacity strategy: lag.

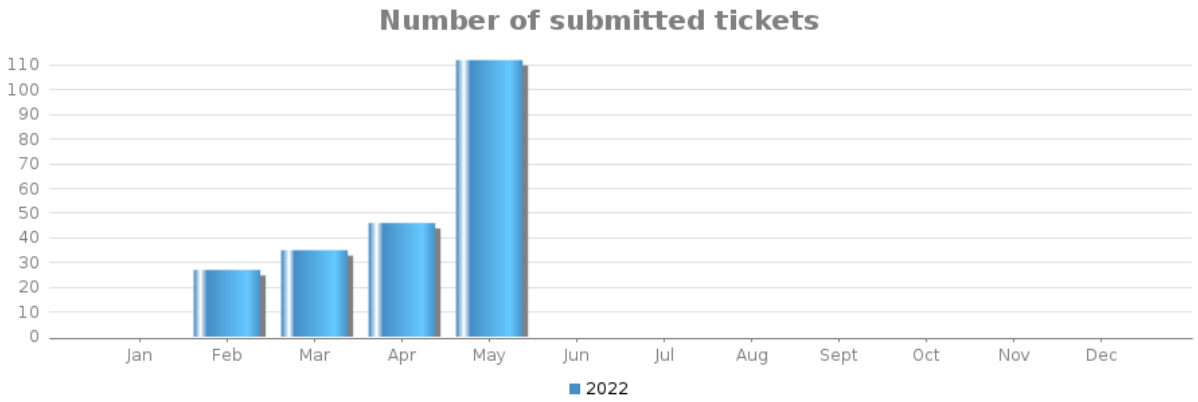

Figure 4.1:Number of submitted tickets on a monthly basis.

4.3.2.2 Human (Operation and Tickets handling) SLIs

- Number of tickets
  - Number of tickets handled by the provider (regardless category and priority). The statistic is collected by the EOSC Helpdesk system.
  - Capacity strategy: lag.
  - 15 tickets have been assigned to the group so far

4.3.3 EOSC Messaging Service

The EOSC Messaging Service is a Publish/Subscribe Service, which implements the Google PubSub protocol [5] . It provides an HTTP API that enables Users/Systems to implement message-oriented service using the Publish/Subscribe Model over plain HTTP. The EOSC Messaging Service is a real-time messaging service that allows the user to send and receive messages between independent applications.

4.3.3.1 Software/Service Performance SLIs

- Number of messages per day
  - Number of messages sent via the EOSC Messaging Service (per day).
  - Capacity strategy: lead.
  - The average number of messages per day for the defined period is 105.668.
  - The EOSC Messaging Service can support up to 2.000.000 messages per day.
- Number of users
  - The number of Services Authorised to use the Service.
  - Capacity strategy: lead.
  - No limit defined.
- Number of subscriptions
  - The number of subscriptions that can be created.
  - Capacity strategy: lead.
  - Max number of subscriptions is 1.000 (with typical rate of messages).
- Number of topics
  - The number of topics that can be created.
  - Capacity strategy: lead.
  - Max number of topics is 1.000 (with typical rate of messages).

Table 4-2: Capacity monitoring data (Software SLIs) for the EOSC Messaging Service

	Feb 2022	Mar 2022	Apr 2022
Number of users using the AMS	818	825	825
Number of topics	87	87	87
Number of subscriptions	76	76	76

4.3.3.2 Human (Operation and Tickets handling) SLIs

- Number of tickets
  - Number of tickets handled by the provider (regardless category and priority). The statistic is collected by the EOSC Helpdesk system.
  - Capacity strategy: lag.
  - 7 tickets have been assigned to the service group so far

4.3.4 EOSC Monitoring Service

EOSC Monitoring Service is a flexible and scalable framework for monitoring status, availability and reliability provided by infrastructures with medium to high complexity. It can generate multiple reports using customer

defined profiles (e.g. for SLA management, operations etc) and has built-in multi-tenant support in the core framework.

4.3.4.1 Software/Service Performance SLIs

- Number of connections
  - Total number of page views per month.
  - Capacity strategy: lead.
  - Limit not defined.
- Number of monitored service endpoints
  - Total number of Service endpoints as provided from the service registries or CMDB(s).
  - Capacity strategy: lead.
  - The EOSC Monitoring Service can support and monitor up to 5000 Service Endpoints.
- Number of metrics results (per day, daily average per month)
  - The average of metrics results collected per day.
  - Capacity strategy: lead.
  - The EOSC Monitoring Service can support up to 1 million metrics.

Table 4-3: Capacity monitoring data (Software SLIs) for the EOSC Monitoring Service

	Feb 2022	Mar 2022	Apr 2022
Number of connections	113	402	140
Number of monitored service endpoints	335	401	373
Number of metric results	98223	90641	83516

The reduction in numbers from March to April coincided with a switch from the Marketplace to the Provider's Portal component and indicates a possible previous over-counting of records.

4.3.4.2 Human (Operation and Tickets handling) SLIs

- Number of tickets
  - Number of tickets handled by the provider (regardless category and priority). The statistic is collected by the EOSC Helpdesk system.
  - Capacity strategy: lag.
  - 8 tickets have been assigned to the service group so far

4.3.5 EOSC SOMBO

The Service Order Management Back Office (SOMBO) is a tool design to track trace of all the orders received by the marketplace and to propose different actions on these orders.

For a new order, the tool allows shifters to:

- Analyse the orders.
- Approve/reject the orders.
- Request more information to the customer.
- Exchange information between third parties.
- Start a negotiation process.
- Automatically generate an SLA/OLA from given templates.
- Coordinate (semi-) automatic procedures to enable a customer to access a service.

4.3.5.1 Software/Service Performance SLIs

- Number of Service Orders
  - Number of service orders registered in Marketplace and consequently manageable into SOMBO application.
  - Capacity strategy: lag.
- Number of communications

  - Number of communications (comments , notes) made through the portal between SOMBO shifters and users / service providers
  - Capacity strategy: lag.
- Number of shifters
  - Number of persons using SOMBO with privileges.
    - 12
  - Capacity strategy: lag.
- Number of SO associated to a service provider
  - Number of service orders connected to a service provider.
  - Capacity strategy: lag.

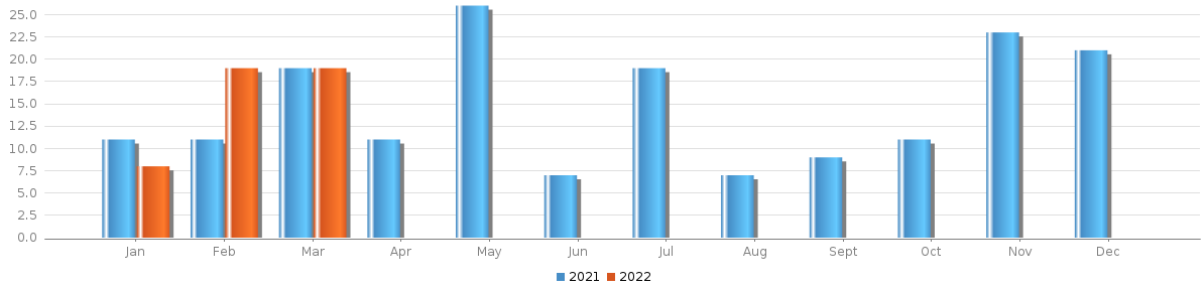

Figure 4.2: Number of Service Orders

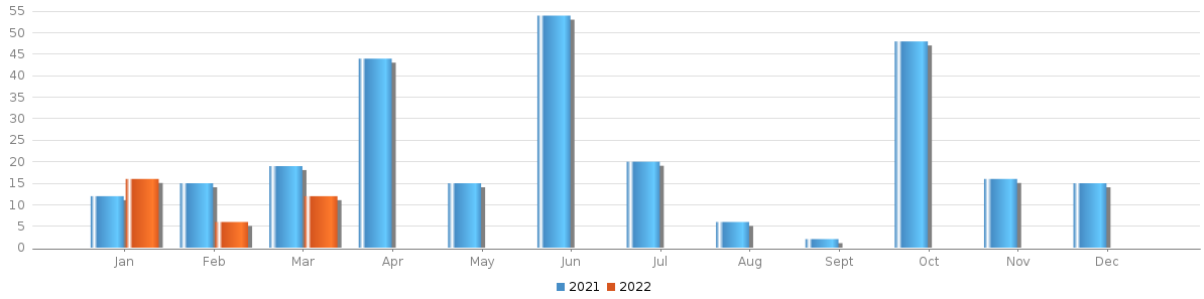

Figure 4.3: Number of requests

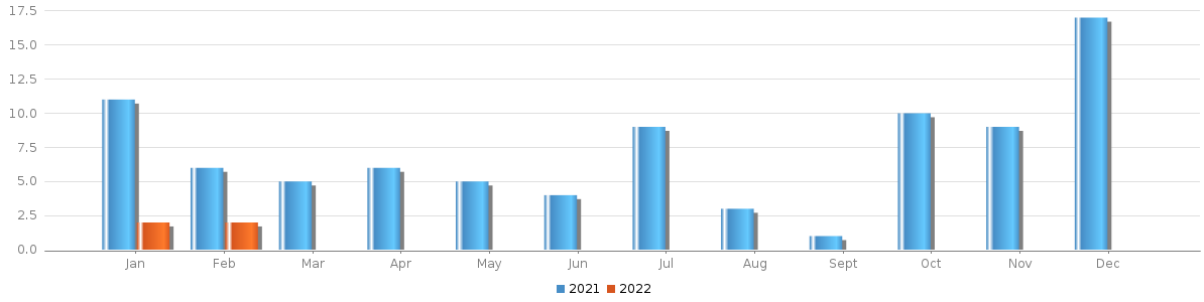

Figure 4.4: Number of SO associated to a service provider

4.3.5.2 Human (Operation and Tickets handling) SLIs

- Number of tickets
  - Number of tickets handled by the provider (regardless category and priority). The statistic is collected by the EOSC Helpdesk system.
  - Capacity strategy: lag.
  - 4 tickets have been assigned to the service group so far

4.3.6 EOSC Topology

This service is a central registry to record information about the topology of an e-Infrastructure and it contains general information about all of the EOSC-Core services.

4.3.6.1 Software/Service Performance SLIs

- Average and max concurrent webserver sessions
  - Average and max number of concurrent TCP sessions to production webservers per calendar month
    - Apache enforces a limit of 255 sessions per server at any one time by default.
    - Concurrent TCP sessions is an approximation of concurrent connections to Apache.
  - Capacity strategy: lag.

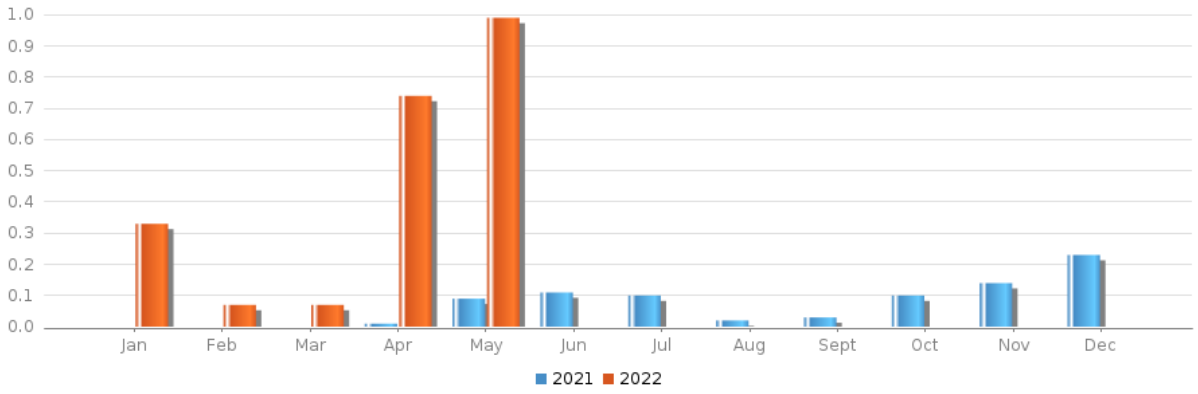

Figure 4.5: Average number of concurrent webserver sessions

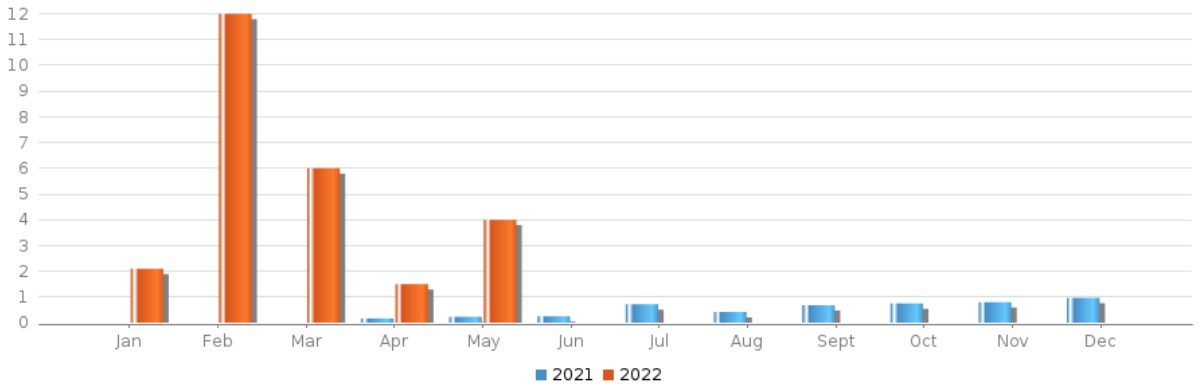

Figure 4.6: Max number of concurrent webserver sessions

4.3.6.2 Human (Operation and Tickets handling) SLIs

- Number of tickets
  - Number of tickets handled by the provider (regardless category and priority). The statistic is collected by the EOSC Helpdesk system.
  - Capacity strategy: lag.
  - No tickets have been assigned to the service group so far

5 Conclusion

This deliverable has aimed to provide an overview of how value and usage of the EOSC-Core services are being quantified within the EOSC SMS, within its Service Portfolio Management and Capacity Management processes. These processes are designed to continuously review and update this information over the lifetime of existing services. Moreover, through the Service Portfolio entry and the SDTPs, the value of new EOSC-Core services may be evaluated prior to their transition into production. In this way, the EOSC SMS is providing a framework necessary to ensure the continuity and sustainability of the EOSC-Core into the future, by understanding the need of the services and the resources and funding required for their continued delivery.

During the first year of the EOSC Future project, the EOSC SMS has been set up within the context of the new project and since at the time of writing this deliverable, it is being applied to all services within the EOSC-Core. For this reason, it is not possible to provide a complete overview of the value and usage of all services and components within the EOSC-Core. However, this deliverable has provided examples of how value and usage is quantified for a subset of the services and this approach will be applied to all production EOSC-Core services before the end of the project, in the following version of this deliverable.

Information and links have been provided showing how on-demand usage statistics may be obtained which are valid at the time of query.

6 Appendix A: On-Demand Usage Statistics

6.1 Operations Portal Statistics

The Operations Portal EOSC Instance [6] has developed a comprehensive set of openly accessible pages containing statistics pertinent to the EOSC Portal. There are three sets of statistics:

- **EC Report** containing the number of services on the marketplace, the number of visitors and views and statistics relating to service orders. In addition to this, there are comprehensive Google Analytics statistics of the portal and marketplace:

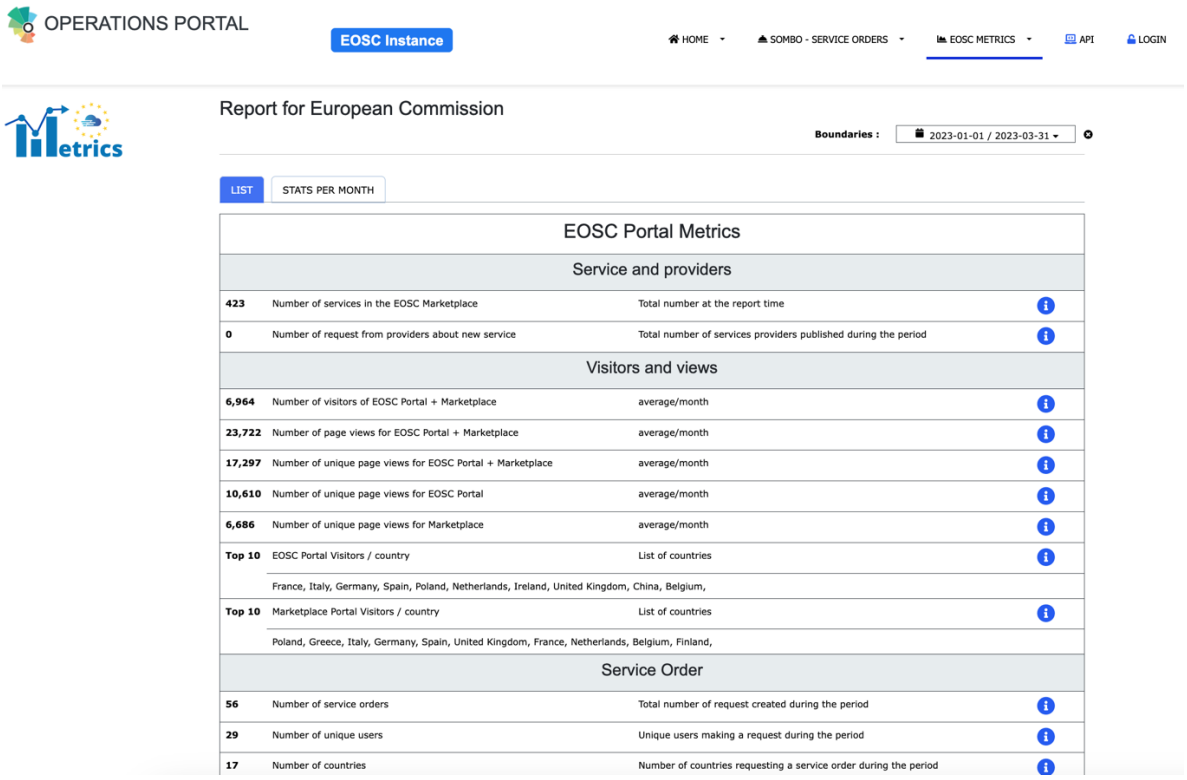

Figure 6.1: EC Report in the Operations Portal EOSC Instance

- **Service Order metrics** containing a list of service orders and their statuses. The list is open but links to Jira tickets corresponding to the service orders, which require a login to view due to data protection requirements, since they contain personal information. This page also contains statistics on a monthly basis and a visual graph. All views may be arbitrarily created based on the time period of interest.

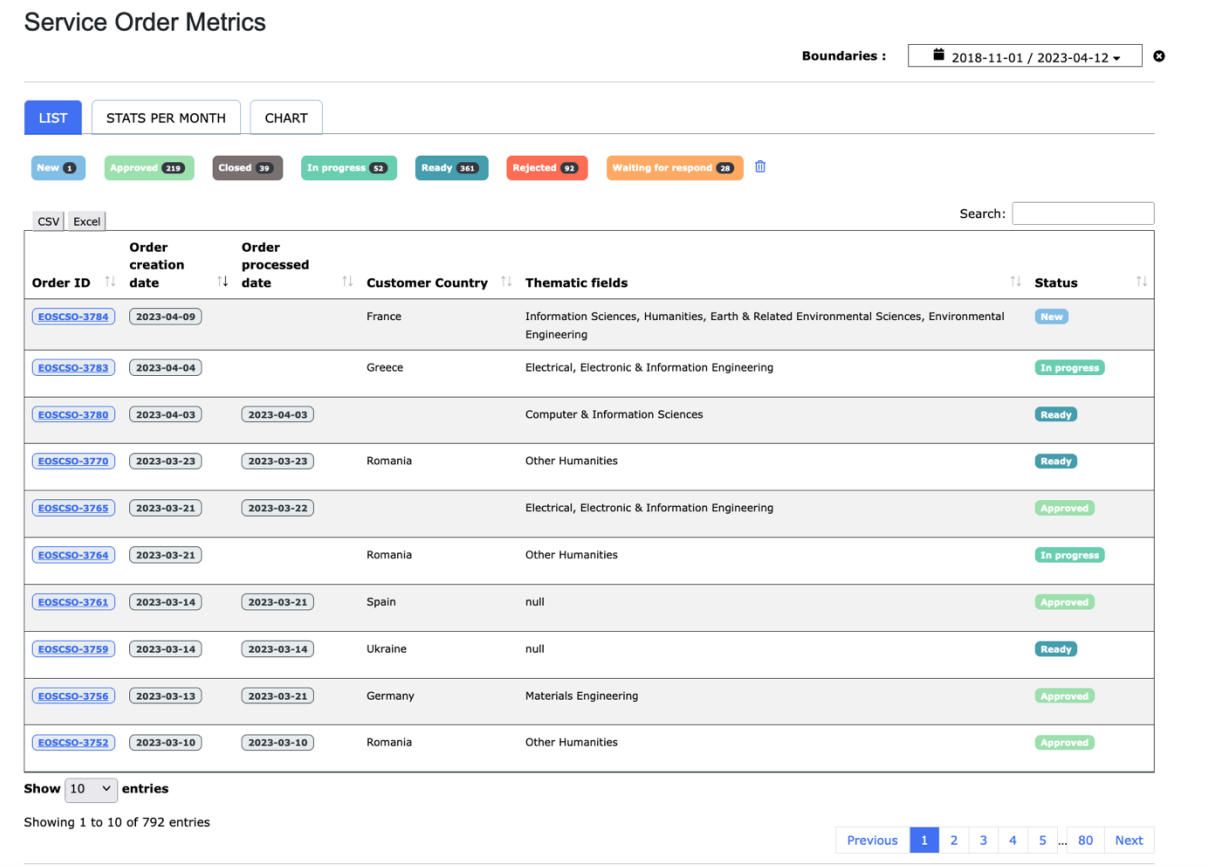

Figure 6.2: Service Orders in the Operations Portal EOSC Instance

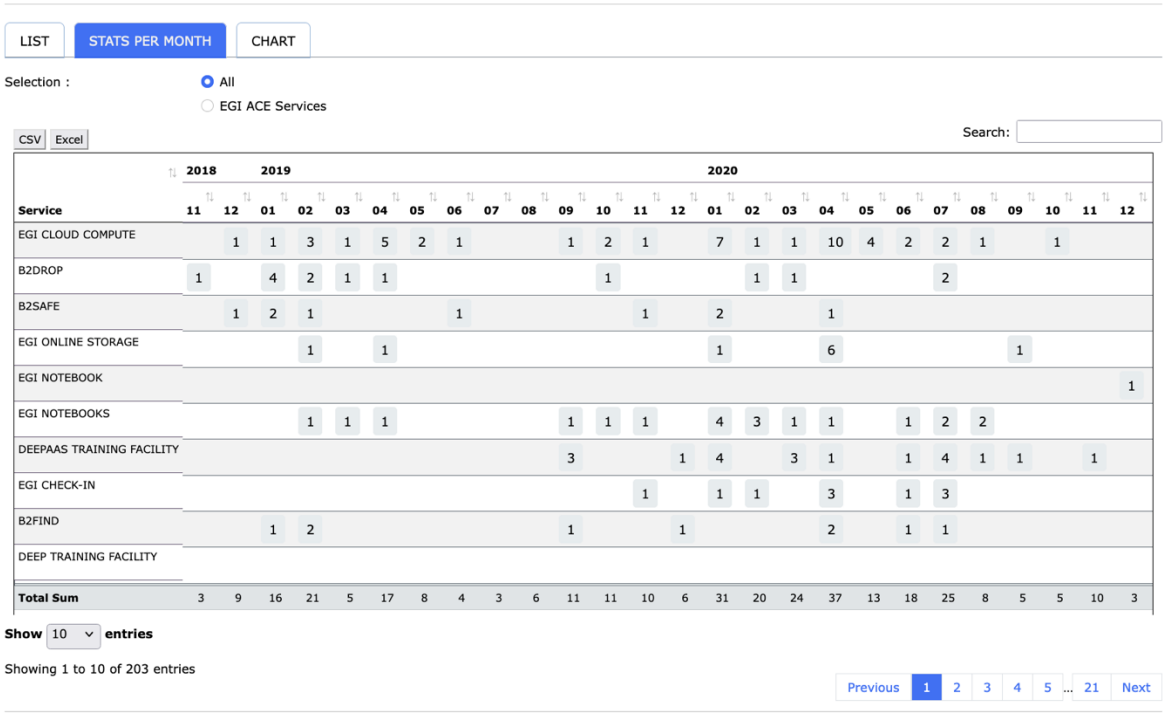

Figure 6.3: Service Order Monthly Statistics in the Operations Portal EOSC Instance

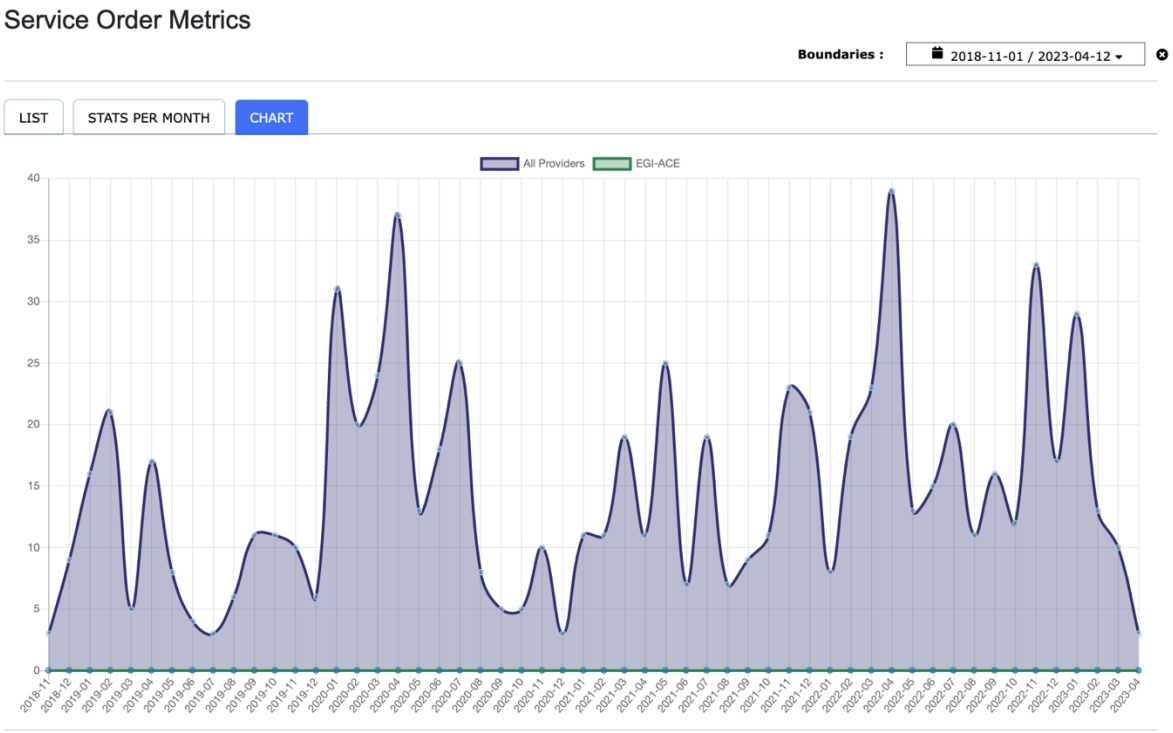

Figure 6.4: Service Orders graph in the Operations Portal EOSC Instance

6.2 KPI Framework

The project maintains a publicly accessible KPI Framework spreadsheet [7] which is maintained by WP6.2 to be the definitive and up-to-date source of the five project KPIs at different stages of the project (M6, M18, M24, M30). These KPIs are augmented by other useful integration metrics at the level of the Resource Catalogue and at the level of the individual EOSC-Core services. At the time of writing this deliverable update, the statistics for M24 are being added to this document.

	A	B	C	D	E	F	G	H	I	J
1	**EOSC Future KPIs**									
2										
3	**Metrics**	**Baseline M0**	**Value at M6**	**Target at M6**	**Value at M18**	**Target at M18**	**Value at M24**	**Target at M24**	**Value at M30**	**Target at M30**
4	**KPI-1 Integration with EOSC Core services by ESFRIs**	0	6	5	14	10		20		30
5	**KPI-1a Percentage of EOSC Exchange services registered in the catalogue integrated with at least 1 EOSC-Core service**	N/A	N/A	N/A	32.00%		53%		75%	
6	**KPI-2 Resource providers/resources in the Exchange**	140/274		180/300	200/350	200/350		225/425		250/500
7	**KPI-3 Connecting major Thematic and Regional Catalogues to the EOSC Exchange**	0		1		4		5		7
8	**KPI-4 Engagement with the EOSC Exchange: Unique monthly visitors**	1000		1500		2000		2500		3000
9	**KPI-5 EOSC uptake: a measurement of the number of accesses to EOSC services and resource over six months**	N/A	N/A	N/A	114	-		800		1000

Figure 6.5: Extract from the KPI Framework spreadsheet - EOSC Future KPIs

7 References

[1] EOSC architecture working group view on the Minimum Viable EOSC
https://op.europa.eu/en/publication-detail/-/publication/91fc0324-6b50-11eb-aeb5-01aa75ed71a1

[2] EOSC Future Deliverable D2.5a "Inventory of Core Functions and Inclusion Criteria"

[3] EOSC Service and Resource Categories
https://wiki.eoscfuture.eu/display/EOSCSMS/Service+and+Resource+Categories
NOT AVAILABLE TO THE PUBLIC

[4] EOSC Service and Resource Lifecycle
https://wiki.eoscfuture.eu/display/EOSCSMS/Service+and+Resource+Lifecycle
NOT AVAILABLE TO THE PUBLIC

[5] Google PubSub protocol https://cloud.google.com/pubsub/

[6] EOSC Instance Operations Portal https://opsportal.eosc-portal.eu

[7] KPI Framework Spreadsheet
https://docs.google.com/spreadsheets/d/19pa2tse4rgwWc9DbWIjjaFq3cmNcVP20SAZU5tAgUTY/edit?pli=1#gid=1361694582