D11.1 First Release of EOSC Integration Suite

31/08/2025

Abstract

This is the release report for the EOSC Beyond Integration Suite Core Service. It contains information about its components, capabilities and associated software repositories. It also describes the changes made to the components and capabilities during the period M1 to M18 of the EOSC Beyond project.

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Lead Partner	EGI Foundation		
Authors	Carlos Brandt (EGI), Michal Kolomanski (CYFRONET), Agnieszka Pułapa (CYFRONET), Athanasios Mantes (ARC), Nikolaos Triantafyllis (GRNET), John Shepherdson (CESSDA), Levente Farkas (EGI)		
Reviewers	Lucia Vaira (LifeWatch), Marcus Povey (Instruct)		
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V 1.0	**25/08/2025**	**Final**	**Lucia Vaira, Marcus Povey, Carlos Brandt**

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Executive summary

This report presents the first release of the EOSC Integration Suite (IS), developed within the EOSC Beyond project (M1–M18). The Integration Suite is a new EOSC Core Service designed to streamline technical integration with EOSC resources through reusable software libraries called Adapters. By formalising Adapters as a distinct EOSC resource, the IS reduces the complexity of connecting services and promotes interoperability across the EOSC ecosystem.

The Integration Suite builds upon three existing EOSC components — the Interoperability Framework (IF) Registry, the Providers Portal, and the Discovery Hub — all of which have been enhanced to support Adapters:

- IF Registry: extended with an Adapter data model (Profile) and new API/UI features to link Adapters with Interoperability Guidelines and Services.
- Providers Portal: updated to support Adapter onboarding workflows, enabling Providers to register Adapters and associate them with existing EOSC resources.
- Discovery Hub: improved to promote Adapter discoverability through dedicated list and detail views, advanced filtering, and visualised relationships to Guidelines and Services.

A new adapter Profile defines the metadata model that ensures consistency across components. This schema underpins onboarding, storage, and presentation of Adapters throughout the Suite.

The release also documents the software repositories hosting the updated components, all openly available on GitHub and quality-assessed using EOSC's SQAaaS framework.

Collectively, these developments establish the foundations for the Integration Suite as an open digital repository of EOSC integration software, enabling providers and users to contribute, manage, and reuse Adapters.

The Integration Suite represents a significant step toward practical interoperability in EOSC, enhancing resource discovery, provider onboarding, and user access. This release sets the technical basis for the final implementation in WP12.

1. Introduction

The Integration Suite (IS) is a new EOSC service designed to facilitate integration with EOSC services and research outputs through reusable software libraries called Adapters. These Adapters simplify the technical effort required to interact with EOSC resources, enabling faster and more consistent integration across the ecosystem.

Built on top of three existing EOSC components – the Interoperability Framework (IF) Registry, the Providers Portal and the Discovery Hub – the IS acts as an open repository of integration software. It allows EOSC users to contribute, maintain, and reuse Adapters that support specific EOSC resources.

The IS also leverages the Discovery Hub, which enhances resource discoverability. For reporting purposes, the term “Marketplace” is used sporadically for it used to be the name of Discovery Hub.

Each underlying EOSC service has been extended to support Adapters as follows:

- **IF Registry:** Hosts Adapter definitions and links them to relevant guidelines and services.
- **Providers Portal:** Enables providers to register and manage Adapters as service extensions.
- **Discovery Hub:** Promotes Adapters, making them discoverable and accessible to end users.

The initial population of the Integration Suite is being led by EOSC service owners, who are contributing the first Adapters. The release of those Adapters is documented in this deliverable's companion D11.2 (in preparation).

1.1. Scope and purpose of the document

This report presents the capabilities of the Integration Suite service implemented during the period M1 to M18 of the project and provides information of the code repositories hosting the software components composing IS.

This document does not detail the software components nor the underlying architecture, for that we refer the reader to deliverables D10.1 and D10.2.

1.2. Structure of the document

- **Section 2**: Description of software components and their capabilities, and the corresponding listing of source-code repositories and technical documentation.
- **Section 3**: Conclusions.

2. Components, Capabilities and Software Repositories

This section details the components and capabilities of the EOSC Integration Suite service that have been added and/or updated during the period M1 to M18 of the EOSC Beyond project. It also provides details of the software repositories that underpin them.

2.1. Components

The Integration Suite service consists of the following components:

- IF Registry - acts as a repository of metadata describing available resources.
- Providers Portal - allows resource providers to manage the content that describes the resources that they make available via EOSC Beyond
- Discovery Hub - allows users to search for, browse and EOSC resources.

The metadata describing Adapters as an EOSC resource is formalized in the corresponding Profile. Figure 1 presents a condensed version of the Integration Suite components architecture diagram.

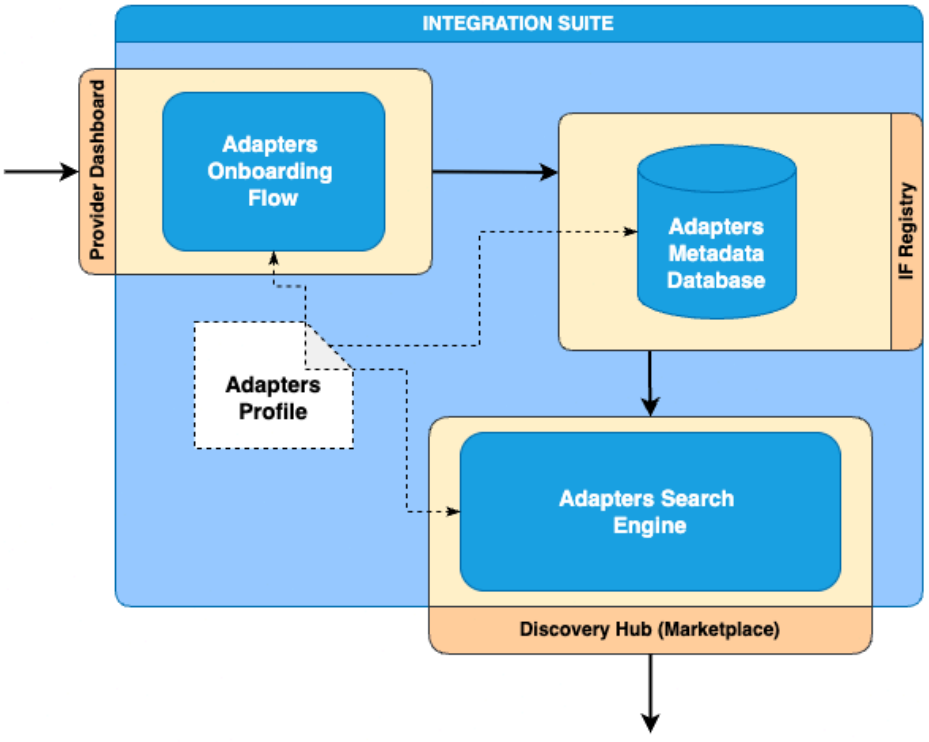

Figure 1: Integration Suite components diagram architecture Arrows indicate the direction of data flow. Solid lines correspond to Adapters metadata while dashed lines indicate the use of Adapters Profile, uniquely defined for all components for reliable exchange.

Adapters Profile

The Profile formalises the metadata schema defining the Adapter resource in the EOSC ecosystem. The software components use the Profile to define the data model used within the systems. Provider Dashboard uses it to define the web-form providers will fill-up, IF Registry structures its internal database to store the corresponding metadata, and Discovery Hub/Marketplace uses it to design the (graphical) interface rendering Adapters data when users search for them.

Adapters Profile is formalised in JSON format, following the JSON-Schema standard draft 2020-12[1], versioned and shared with the interested parts through a GitHub repository

2.2. Capabilities

The Integration Suite is an integrated software solution allowing consumers (such as service providers) to find the Adapters – in technical terms, IS provides an index of EOSC software libraries. Its main consumer-facing capabilities encompass resource discovery through Discovery Hub. The main provider-facing capability is the Providers Dashboard for onboarding Adapters metadata in the Interoperability Framework Registry (IF Registry) – the software component responsible for persistent storage of resources metadata.

All components were created before the onset of the EOSC Beyond project, and are being extended to provide Adapters as a new EOSC resource to the community.

2.2.1. Service & IF Registry Enhancements

Interoperability Framework Registry has evolved from containing a collection of guidelines that serve as human-readable instructions for EOSC Nodes and Providers to support the following (indicated in the new green connections in the diagram of Figure 2):

- Introduction of the Adapters data model (also known as Profile), for Adapters onboarding support through UI and API.
- Implementation of linkage procedure between Adapters and Guidelines: by associating each guideline with one or more adapters, EOSC Providers can easily implement technical requirements without having to develop custom solutions from scratch. This improvement involves changes in the IF Registry API and the Providers Portal UI responsible for IF Guideline onboarding and editing. For Interoperability Guideline API, new REST calls for fetching Adapters related to a specific Guideline are provided (similar to the ones provided for Services related to Guidelines). Changes for Providers Portal will be mentioned in the following section.
- Each Adapter is now associated with exactly one Guideline, ensuring each adapter is a compliant extension of EOSC Interoperability Framework. However, as already mentioned, Guidelines can be associated with more than one Adapter.

[1] https://json-schema.org/draft/2020-12/json-schema-core

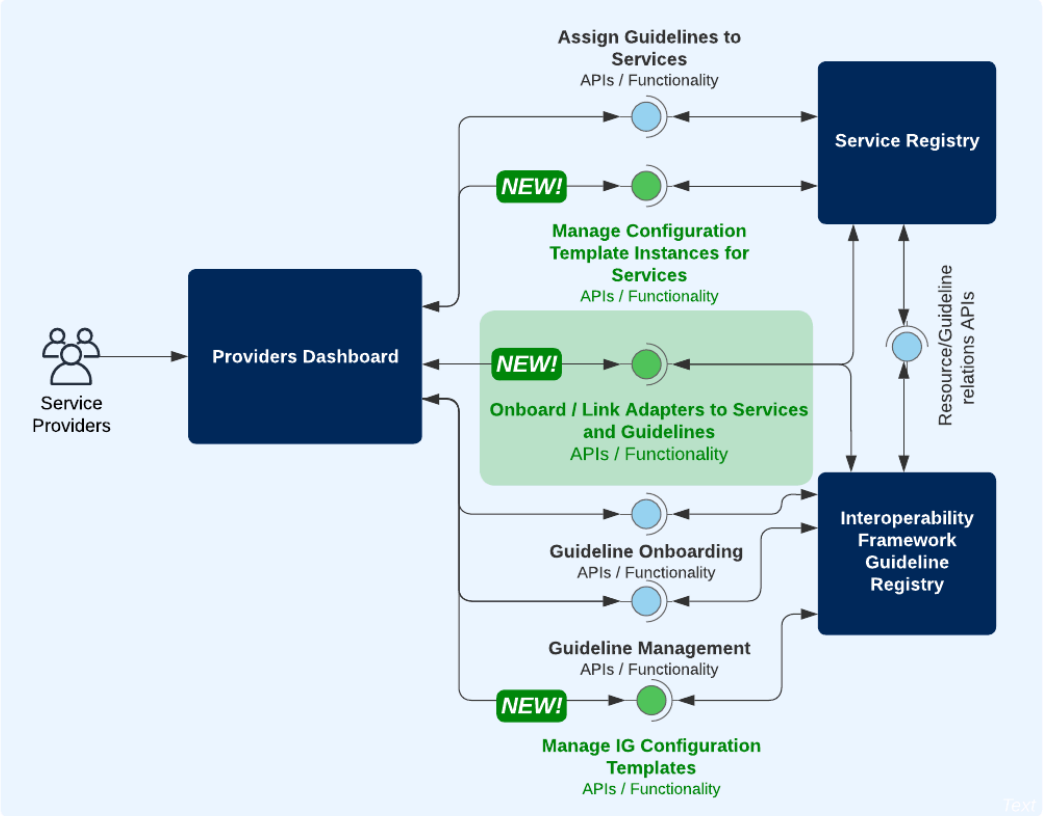

Figure 2: Interoperability Framework Registry and new capabilities

2.2.2. Providers Portal Enhancements

Improvements and new functionality added to Service Registry / Providers Portal to enable introduction of Adapters include:

- Providers Portal: Implementation of onboarding flow of Adapters. From specifications stemming from WP10, it was decided that Adapters onboarding includes two distinct flows:
    - Adapters onboarded from already registered Providers
    - Third-party Adapters onboarded by non-Providers.

  Currently, Providers Portal supports onboarding of Adapters from registered Providers, with the other flow to follow after M18.
- Ability to link Adapters to Services and Interoperability Guidelines already onboarded to Service Registry and Interoperability Registry through the UI (see Figure 3).

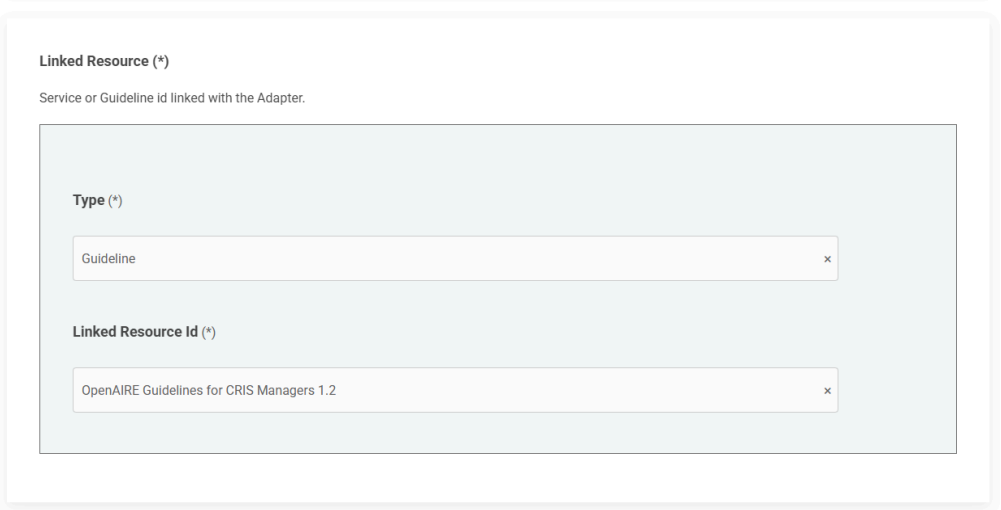

Figure 3: Linking an Adapter to a Guideline during Adapter onboarding

2.2.3. Discovery Hub Enhancements

As part of the recent development cycles, several key improvements have been introduced to the Discovery Hub, with a particular focus on the integration and presentation of Adapters:

- Indexing of Adapters: All Adapters have been indexed to enable efficient full-text searching, complex filtering and retrieval.
- Implementation of the Adapter List View: A dedicated list view for Adapters has been developed in alignment with the previously discussed design specifications. The implementation places particular emphasis on enabling advanced filtering capabilities and full-text search across selected Adapter parameters to facilitate precise and user-friendly discovery.
- Implementation of the Adapter Detail View: A comprehensive detail view for individual Adapters has been introduced, also in accordance with the pre-approved design guidelines. The focus has been on ensuring consistency with the overall system design and user experience standards.
- Display of Adapter Relationships: The detail view now includes a clear visualisation of the relationships between Adapters and related resources, namely Guidelines and Services. Each relationship is interactive, allowing users to seamlessly navigate to the corresponding resource.

The adapters have been integrated; however, please note that production-grade adapters have not yet been onboarded. We are currently working with test examples. Below, you can find the views that have been developed so far in the EOSC Discovery Hub.

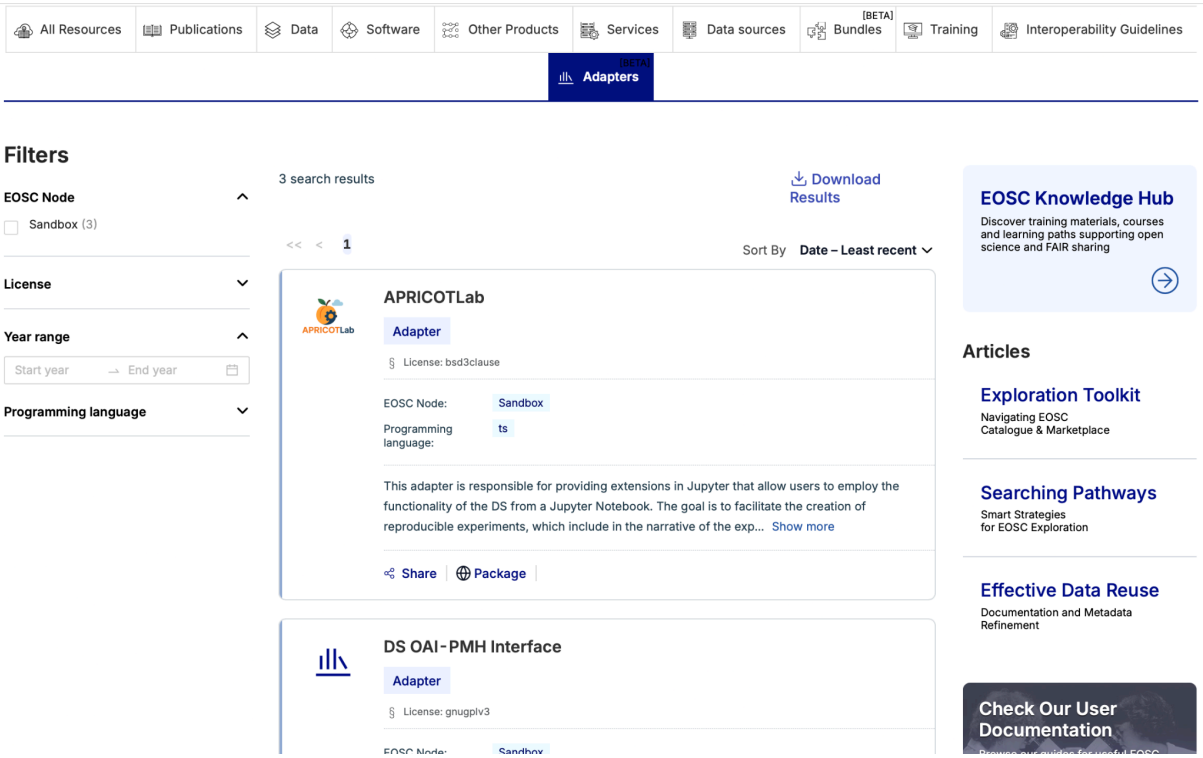

Figure 4: Adapters list page view in the EOSC Discovery Hub

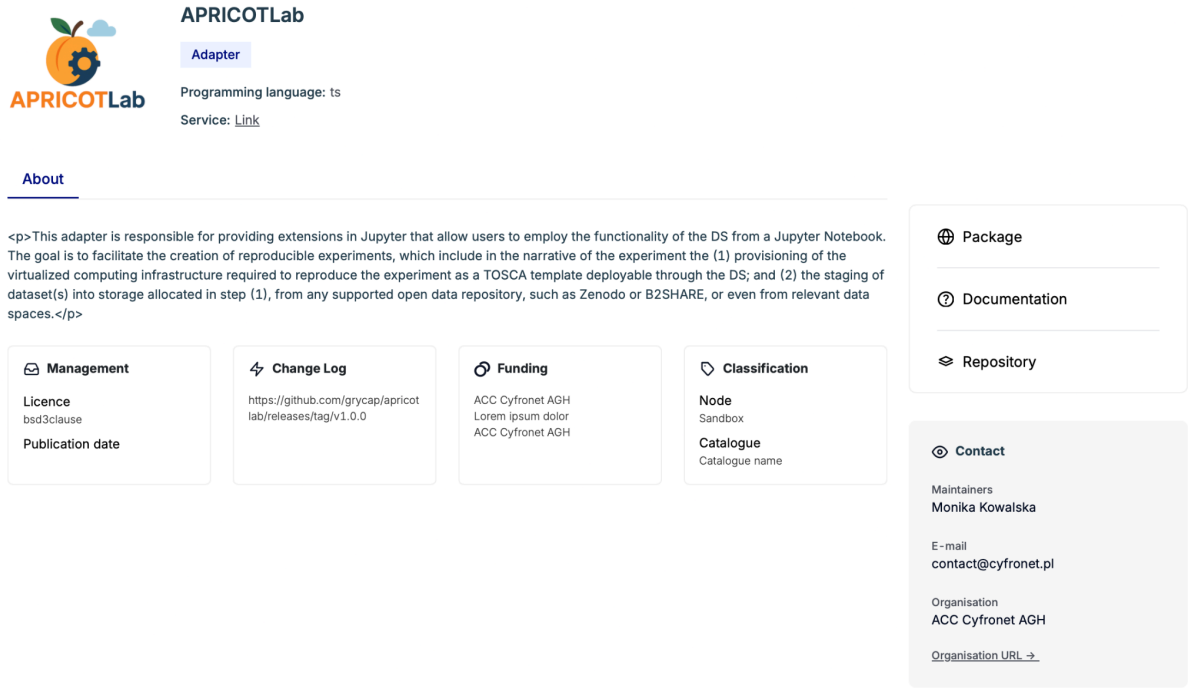

Figure 5: Adapter's detail page view in the EOSC Discovery Hub

2.3. Software repositories

In this section we present major information regarding the source code of the software we have been discussing so far: IF Registry, Providers Portal, Discovery Hub, as well as the

adapters Profile model. Software as well as data models are version controlled using Git and the GitHub platform.

Software code is tested for quality using EOSC SQAaaS[2], a service that scores software project metrics according to repository organization, documentation code structure, tests coverage and other attributes. SQAaaS provides a summary of its evaluation for a given software repository and a badge[3] – bronze, silver, gold – as a general score. It is important to note that SQAaaS only source codes in GoLang and Python can reach Gold level because of limitations in the service.

2.3.1. IF Registry

Attribute	Details
Name	EOSC IF Registry
Location (URL)	https://github.com/madgeek-arc/resource-catalogue
Licence	Apache 2.0
Release number	5.0.1
Documentation (URLs)	Onboarding and related API: https://providers.sandbox.eosc-beyond.eu/docs/
SQAaaS rating	Silver
TRL	8

Table 1: IF Registry software repository details

2.3.2. Providers Portal

Attribute	Details
Name	EOSC Service Registry / EOSC Providers Portal
Location (URL)	https://github.com/madgeek-arc/resource-catalogue https://github.com/madgeek-arc/resource-catalogue-ui
Licence	Apache 2.0
Release number	5.0.1 (service Registry) / 5.0.0 (Providers Portal)
Documentation (URLs)	Onboarding and related API: https://providers.sandbox.eosc-beyond.eu/docs/

[2] Software Quality Assurance as a Service, https://sqaaas.eosc-synergy.eu/
[3] SQAaaS badging: https://docs.sqaaas.eosc-synergy.eu/quality_assessment_and_awarding/synergy_badging_approach

Attribute	Details
SQAaaS rating	Bronze
TRL	8

Table 2: Providers Portal software repository details

2.3.3. Discovery Hub

Attribute	Details
Name	EOSC Discovery Hub (former Marketplace)
Location (URL)	https://github.com/cyfronet-fid/marketplace
Licence	GPL-3.0
Release number	3.58.0
Documentation (URLs)	ReadMe: https://github.com/cyfronet-fid/marketplace/blob/master/README.md
SQAaaS rating	Silver
TRL	8

Table 3: Discovery Hub (Marketplace) software repository details

2.3.4. Adapter Profile

Attribute	**Details**
Name	Adapter Profile
Location (URL)	https://github.com/EOSC-PLATFORM/adapter-profile
Licence	CC0-1.0
Release number	2.0
Documentation (URLs)	https://github.com/EOSC-PLATFORM/adapter-profile/blob/main/README.md
SQAaaS rating	N/A
TRL	N/A

Table 4: Profile schema repository details

3. Conclusion

The components of the EOSC Integration Suite Service have been extended during months 1 to 18 of the EOSC Beyond project to define and support the publication of Adapters, a new EOSC resource to facilitate the exploitation of EOSC Services.

The deployment of service components integrated into the Integration Suite has been carried out with success and has set the basis for the final implementation during WP12.

Acronyms

Acronym	Meaning
DS	Deployment Service
EBTR	EOSC Beyond Technical Roadmap
EF	Execution Framework
IF	Interoperability Framework
IG	Interoperability Guideline
IS	Integration Suite

Table 5: Acronyms