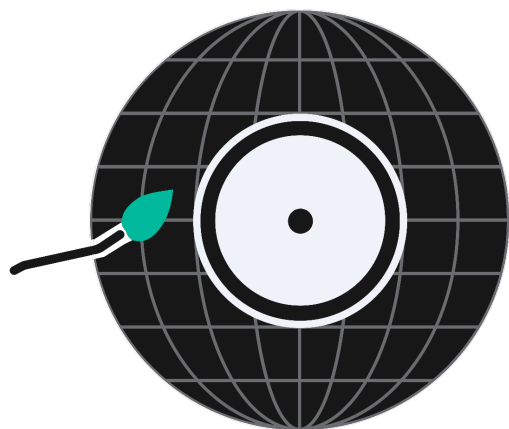




CONCERTO

Deliverable D1.5 – Release of CONCERTO Data Sharing Platform 1

Lead Beneficiary: MEE0

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Project full title

CONCERTO

**Improved CarbOn cycle represeNtation through
multi-sCale models and Earth obseRvation for
Terrestrial ecOsystems**

Start of the project

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48 months

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Manuela Balzarolo

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Subject to change

Preface

In the framework of the *CONCERTO* project, the *Data Sharing Platform (DSP)* is the primary gateway to access the diverse environmental data collected, generated and made available by project partners.

This deliverable acts as software release note and summarises the main features and capabilities introduced in the first release of the Data Sharing Platform, broken down per component. The document is structured as follows:

- Chapter 1 - Cloud resources
- Chapter 2 - Service release
- Chapter 3 – Conclusions

Summary

This document provides release notes for the Data Sharing Platform (DSP) developed within the CONCERTO project at month 12.

The **Data Sharing Platform** is a key element of the Data Sharing Framework (DSF), which establishes a **structured, secure, and scalable approach** for enabling efficient data exchange both among partners within the project Consortium and with external organisations, stakeholders, and the general public. It is designed to **promote interoperability, transparency, and responsible data use** while supporting organisational goals such as informed decision-making, innovation, and compliance with legal and ethical standards.

The functionalities of the DPS are based on open standards (such as Open Geospatial Consortium - OGC and International Organization for Standardization - ISO) to ensure the adequate level of interoperability in compliance with FAIR principles.

The functionalities will be released incrementally during the project lifecycle.

List of Abbreviations

DAP	Data access and processing
DSF	Data Sharing Framework
DSP	Data Sharing Platform
FAIR	Findability, accessibility, interoperability, and reusability
IAM	Identity access management
OGC	Open Geospatial Consortium
S3	Simple Storage Service
STAC	SpatioTemporal Asset Catalog
UI	User interface
WCS	Web coverage service
WMS	Web map service

Subject to change

1. Cloud resources

The DPS is a centralised cloud-based system that enables organizations to store, manage, govern, and securely share data across teams, partners, and applications. In a containerised model, the data sharing platform is composed of loosely coupled microservices, each running in containers and orchestrated by a managed Kubernetes service (see Kubernetes (2025), source: [Wikipedia](https://kubernetes.io/)). Persistent data, such as geospatial data and databases, remains in cloud-native storage services, while containers, namely the applications and services, remain stateless wherever possible.

In a managed Kubernetes deployment, cloud resources are allocated as a combination of virtual compute (vCPUs and memory), scalable object storage, persistent volumes, and managed networking services. Kubernetes orchestrates these resources efficiently, while the cloud provider ensures elasticity, availability, and operational reliability, making this model well-suited for data sharing platforms operating at scale.

To deploy the DPS, cloud resources are required: development and production environments are actually planned, but at the time of writing this deliverable, we are in the development phase and only cloud resources for the development environment are allocated.

The concrete cloud resources in terms of computational resources (i.e. core, CPU, RAM) and storage resources (e.g. volumes, object storage) are reported in Table 1.

Table 1. CONCERTO components.

Component	Namespace	Amount	core [max value]	RAM [max value]	Volume	Autoscaling
OpenSearch / STAC	concerto-catalog	1	1	1		FALSE
WMS / WCS	concerto-wxs	4	1	2		TRUE
mongo	concerto-mongo	2	4	8		FALSE
dap	concerto-dap	1	4	8		FALSE
Explorer	concerto-explorer	1	1	1		FALSE
Explorer backend	concerto-explorer	1	1	1		FALSE
Dashboard	concerto-dashboard	1	1	1		FALSE
Public data storage					1 TB	
User private storage					1 TB	

The setup of the production instance will be planned at a later stage.

2. Service release

The high-level architecture (Figure 1) of the DPS shows the major components grouped by functional capabilities, their relationships and interfaces, and how users with different roles can interact with the DSF.

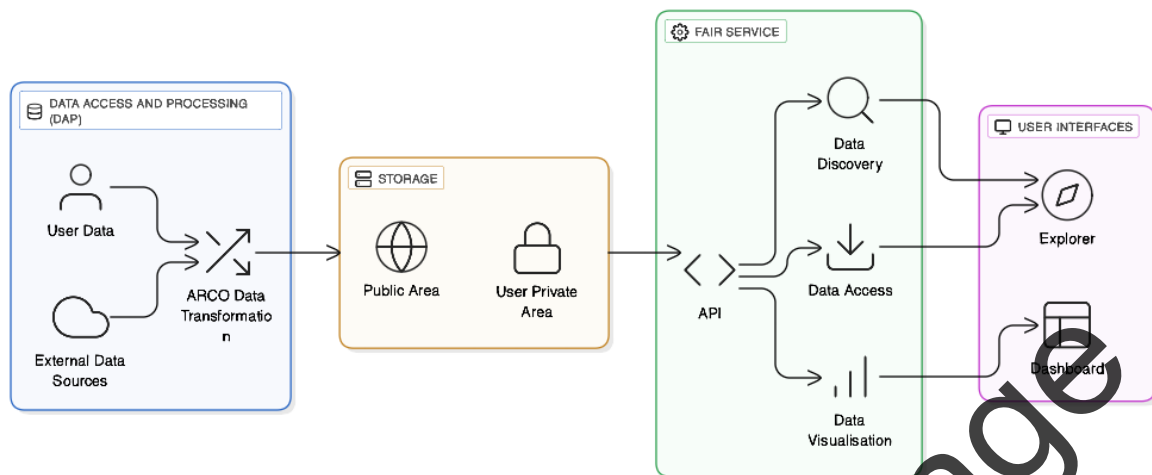


Figure 1. DSF: main components of its architecture.

Leveraging on state-of-the-art cloud technologies and services to properly manage heterogeneous datasets distributed in and/or coming from different data sources and providers, the following modules are described below.

- **Identity access management** (IAM) serves to manage, control and monitor the accesses to the underlying platform, software stack layers and submodules.
- **User interfaces** (UI), including human-friendly (Explorer GUI, Dashboard, ...) and machine-to-machine (API, S3, ...) are devoted to the provision of an integrated environment to allow users developing their workflows along with a web portal for accessing the produced indicators.
- **Data access and processing** (DAP) for the end-to-end data management workflow, including:
 - user data provisioning – to provide users with functionality to upload and manage their own data in the data storage layer;
 - programmatic data retrieval – to provide the system operators with fully automated functionality to access data from remote sources, eventually apply data transformation from native to cloud-native data format, store in the data storage layer, index in the FAIR backend services in order to enable discovery, access and visualisation;

- analysis-ready cloud-optimised (ARCO) data transformation – to prepare and convert native data into a format that is optimised for analysis in cloud environments. This transformation is crucial for enhancing the accessibility, efficiency, and usability of data for scientific research and analysis;
- data storage – to provide real-time, secure, and scalable access to data across various applications, users, and analytics tools. The data storage is based on object storage as the state-of-the-art technology adopted for storing large volumes of geospatial data across multiple locations for redundancy and availability.
- Interoperability and adherence to FAIR principles for discovery, access and visualisation (opensearch, WCS, WMS, etc.).

Additional details can be found in *Deliverable D1.2 – Report on CONCERTO Data Sharing Framework*.

In the following sections, the features in the first release of the DSP (month 12 of the project) are presented.

2.1. Initial release

Release date: 30/11/2025

The Data Sharing Platform components, including a short description and version, are listed in the following table.

Table 2. DPS components, including main functionalities and reused software.

Platform component	Functionality	Reused software (version)
Identity Access Management	• Sign-in / Sign-out • Admin and operator interface to manage users and groups • Procedure for credential request	Keycloak (26.0.8)
User Interface: Explorer	N/A	
User Interface: Dashboard	• Access to Private area • Access to Public area • Integration with IAM	• NextCloud (31.0.11)
User Interface: FAIR services	• S3 API	• Minio (RELEASE.2025-04-22T22-12-26Z)
Data storage	• Storage (Private area, 10 GB per user) • Object storage (Public area)	• NextCloud (31.0.11) • Minio (RELEASE.2025-04-22T22-12-26Z)
Data access and processing	N/A	

2.2. Development and production environments

To ensure stability and agility, the web application is deployed in separate development (dev) and production (prod) environments:

- Development
 - Used for feature development, testing, and integration
 - Connects to test datasets and non-production services
 - Lower resource allocation, relaxed scaling
 - Frequent deployments and experimentation enabled
- Production
 - Serves end users and external data consumers
 - Connects to authoritative, governed datasets
 - High availability, autoscaling, and stricter security controls
 - Controlled release process and monitoring enabled

The access to the web user interface is available at:

- Development
 - <https://dashboard.cloud.dev.projectconcerto.eu>
- Production
 - User Interface: Dashboard: <https://dashboard.cloud.projectconcerto.eu>

3. Conclusion

This release represents the initial version of the data sharing platform, establishing the foundational cloud architecture, containerised deployment model, and core data access capabilities.

As a first release, the focus has been on delivering a stable and scalable baseline rather than feature completeness. Future iterations will build on this foundation, with planned enhancements including expanded data governance capabilities, improved user experience, additional automation, and performance optimisations.

Progress on these improvements is expected in upcoming releases, with incremental updates delivered as the platform matures and adoption increases.