

# Elevating cloud storage systems into FAIR digital objects

FAIR Digital Objects (FDO) are a concept to transfer digital objects to the world of the FAIR principles that form a common baseline for the handling of research data. Combined with an enterprise-ready cloud storage system, FDOs can be used to elevate these systems in terms of FAIR principles and make them fit for purpose in the research data management (RDM) context. This allows profiting from scalability by connecting data spaces concepts defined in Gaia-x. The presented concepts are implemented based on a shared, geo-redundant storage system and within the research data management platform Coscine that is made available to researchers in the German federal state of North Rhine-Westphalia and the German NFDI.

The RDM platform Coscine can be regarded as highly advanced with regard to the implementation of FDOs, a so-called "Base FDO", is already available, so that an FDO is automatically generated when a project or resource is created and also adapted accordingly in the event of changes. The Coscine FDO consists of the PID Record, the Coscine Kernel Information Profile and the Data Type which results in user- and machine-readability. In addition, the assigned handle PIDs can be displayed using FDO visualization tools. In terms of interoperability, the focus in future will be on exchanging information with others and constantly comparing and adapting to standards in RDM. This makes it much easier to bypass the barriers of different infrastructures.



## PID

### Handle PIDs

- Prevent Loss of Access
- Bypassing the barriers of different infrastructures

## Protocols

### General Protocols

- Object Store (S3)
- Open HTTP based

### Specific Protocols

- Type & Semantic Metadata (RDF)
- SPARQL based Access

## Metadata

### Semantic Interoperability

- W3C Conforming Data Types
- Semantic Metadata (RDF, SHACL)

- Compatible with Gaia-x Federation Services

### Findability & Accessibility

- Search function & SPARQL-Queries
- Typed PID Record

## Cloud Storage System

### Object Storage

- Globally accessible
- Geo-redundant
- Single Name Space

### Archiving for 10 Years

- Ensuring Good Scientific Practice
- Read-Only Status

### Rights Management

- Read- and/or Write- Access-Keys to Buckets
- Scalable Access
- Federated IdM

FAIR Space

Enterprise-Ready