

DOCUMENT

FedEO FEDEO DATA PARTNER GUIDE

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Table of contents:

1	INTRODUCTION	7
1.1	Purpose.....	7
1.2	Scope.....	7
1.3	Glossary	8
1.3.1	Acronyms	8
1.3.2	Definition of Terms.....	9
1.4	References	10
1.4.1	Applicable Documents.....	10
1.4.2	Reference Documents.....	11
1.5	Document Overview.....	12
2	GENERAL DESCRIPTION	13
2.1	Function and Purpose.....	13
2.2	Relation to Other Systems	13
2.3	FedEO Systems.....	16
2.4	Contact Information	16
3	FEDEO PARTNER GUIDELINES	18
3.1	Metadata Models.....	18
3.1.1	Dataset Series Metadata	18
3.1.2	Dataset Metadata.....	19
3.1.2.1	OGC 10-157 r3 - EOP O&M Version 1.0	19
3.1.2.2	OGC 10-157 r4 - EOP O&M Version 1.1.....	19
3.1.2.3	OGC 06-080 - EO GML.....	20
3.1.2.4	ISO 19139	20
3.1.2.5	Dublin Core	20
3.1.2.6	Custom format	21
3.2	Interaction Model	21
3.2.1	Dataset Series Discovery (Optional)	21
3.2.1.1	Data series metadata hosted by FedEO	21
3.2.1.2	Data series metadata hosted by Data Partner	21
3.2.2	Dataset Discovery	23
3.2.3	Online Data Access (Optional).....	24
3.2.3.1	Product Viewing link provided in metadata (Optional).....	24
3.2.3.2	Product Download link provided in metadata (Optional)	25
3.2.3.3	Redirection to dedicated Web Page (Optional)	25
3.2.3.4	Product Ordering service (Optional)	26
3.3	Supported Protocol Connectors.....	26
3.3.1	OGC 06-131 – EOP EP of CSW.....	26
3.3.2	OGC 07-045 - ISO AP of CSW	28
3.3.3	OpenSearch.....	29
3.3.4	OGC 13-084r2 – I15 EP of CSW	32
3.3.5	OGC CSW (CWIC-style)	33
3.3.6	Custom HTTP-based API	35
4	DATA PARTNER INTEGRATION PROCEDURE	36
4.1	Step-1: Data Partner provides access to Dataset catalog.....	36
4.2	Step-2: Send endpoint to ESA FedEO team for integration.....	36
4.3	Step-3: Data Partner provides dataset series metadata	36
4.4	Step-4: FedEO team provides test endpoint	37
	APPENDIX A DATASET SERIES FORM	38
A.1	Organisation Form.....	38



A.2 Dataset Series Form..... 38
APPENDIX B DATASET SERIES METADATA EXAMPLE40



Table of figures:

Figure 1: Top-level view of FedEO Environment14
 Figure 2: CCMs Accessible through ESA EO-DAIL15
 Figure 3: EOP O&M Metadata Model (source: [RD.1]). 20

Table of tables:

Table 1: Applicable Documents..... 10
 Table 2: Reference Documents12

Table of examples:

Example 1: Inclusion of time:start and time:end constraints in generated OSDD 22
 Example 2: Inclusion of atom:category in search response 22
 Example 3: Inclusion of Quicklook information 24
 Example 4: Inclusion of Cloud mask information 24
 Example 5: Extract of OGC 06-131 Capabilities Document..... 26
 Example 6: Configuration file extract for OGC 06-131 27
 Example 7: Extract of OGC 07-045 Capabilities Document28
 Example 8: Extract of configuration file for OGC 07-045 endpoint 29
 Example 9: Extract of configuration file for an OpenSearch endpoint30
 Example 10: Extract of OSDD Document for OpenSearch Dataset catalog.....31
 Example 11: Extract of OGC 13-084r2 Capabilities Document 32
 Example 12: Extract of configuration file for OGC 13-084r2 endpoint..... 32
 Example 13: Extract of CWIC-Style CSW Capabilities Document 33
 Example 14: Dataset Series Metadata file 40



1 INTRODUCTION

1.1 Purpose

This document provides technical information about the interfaces required by FedEO to connect to external data provider systems and is intended to help data providers to make available their metadata and data through the FedEO Gateway.

Note: The current version of the document covers mainly the OpenSearch discovery interfaces of FedEO.

1.2 Scope

The Federated Earth Observation Missions (FedEO) initiative was initially an OGC pilot activity aimed to refine OGC specifications relevant to Earth Observation.

The same OGC specifications have subsequently been implemented in support of the Copernicus programme, in particular to provide interoperable access to catalogues from European Earth Observation Missions and support the subsequent ordering of data in support of the European Commissions' Copernicus Service Projects.

The resulting interoperable catalogue is presented here as the FedEO Clearinghouse, providing discovery, ordering¹ and on-line data access services for space based Earth Observation missions from over 25 years, as a potential contribution to GEO GEOSS. The FedEO Clearinghouse brings together the catalogues from ESA, e-GEOSS, EUMETSAT, DLR, DMC, DMI, MDA, SPOT and VITO, as well as access to Alaska Satellite Facility and the CEOS WGISS Integrated Catalog.

The development of the OGC specifications used are developed and maintained in a series of initiatives under an umbrella known as Heterogeneous Missions Accessibility. The HMA Projects are overviewed by the HMA Architecture Working Group and the Ground Segment Coordination Body (GSCB). The relevant links for the HMA community are available in [RD.1] for further reference.

¹ The ordering interfaces available through the FedEO Clearinghouse are the subject of a separate document (to be published).

1.3 Glossary

1.3.1 Acronyms

ANSI	American National Standards Institute
AOI	Area of Interest
API	Application Programming Interface
CCM	Copernicus (formerly GMES) Contributing Missions
CEOS	Committee on Earth Observation Satellites
COTS	Commercial Off The Shelf
CSCDA	Copernicus Space Component Data Access
CSV	Comma Separate Values
CSW	Catalogue Services for the Web
CWIC	CEOS WGISS Integrated Catalog
DC	Dublin Core
DLR	Deutschen Zentrums für Luft- und Raumfahrt
EO	Earth Observation
EOP	Earth Observation Product
ESA	European Space Agency
ESRIN	European Space Research Institute
FTP	File Transfer Protocol
GCMD	Global Change Master Catalog
GIS	Geographic Information System
G-POD	Grid Processing on Demand
GMES	Global Monitoring for Environment and Security
GML	Geography Mark-up Language
GSCB	Ground Segment Coordination Body
GUI	Graphical User Interface
HMA	Heterogeneous Missions Accessibility
HTML	Hyper Text Mark-up Language
HTTP	Hyper Text Transfer Protocol
I/F	Interface
ICD	Interface Control Document
IDN	International Directory Network
IETF	Internet Engineering Task Force
INSPIRE	Infrastructure for Spatial Information in Europe
ISO	International Standards Organization
JPEG	Joint Photographic Experts Group
JSP	Java Server Pages
KML	Keyhole Markup Language
N/A	Not Applicable

OASIS	Organisation for the Advancement of Structured Information Standards
OGC	Open GeoSpatial Consortium
O&M	Observations & Measurements
OSDD	OpenSearch Description Document
QoS	Quality of Service
RDF	Resource Description Framework
RDFS	Resource Description Framework Schema
RSS	RDF Site Summary
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
SRU	Search/Retrieval via URL
SSO	Single Signon
URL	Uniform Resource Locator
W3C	World Wide Web Consortium
WGISS	Working Group on Information Systems and Services
WSDL	Web Services Definition Language
XML	eXtensible Markup Language
XSL	Extensible Style Language

1.3.2 Definition of Terms

For an extensive list of terms, we refer to [RD.1].

Collection	Datasets sharing the same product specification. A collection typically corresponds to the series of products derived from data acquired by a sensor on board a satellite and having the same mode of operation. Source: [RD.1].
Dataset	Observations obtained by satellite instruments. Source: [RD.1].
Dataset series	Collection of datasets sharing the same product specification. In HMA, the term is used as a synonym for a collection of (Earth observation) data. Source: ISO 19113, ISO 19114, ISO19115 and [RD.1].
Granule	The smallest aggregation of data that can be independently managed (described, inventoried, and retrieved). Granules have their own metadata model and support values associated with the additional attributes defined by the owning collection. Source: [RD.17]. Same meaning as dataset.
IDN	The CEOS International Directory Network, a Gateway to the world of Earth Science data and services accessible at http://idn.ceos.org/portals/Home.do?Portal=idn_ceos Source: [RD.17].
Product	Same meaning as dataset.

1.4 References

1.4.1 Applicable Documents

Ref.	Title	Code	Version	Date
[AD.1]	FedEO Client Partner Guide, HMASE-SPB-D3200.4, https://wiki.services.eoportal.org/wiki-download_wiki_attachment.php?attId=3444		1.0	05/02/2014
[AD.2]	http://www.opensearch.org/Specifications/OpenSearch/1.1		1.1	
[AD.3]	OGC 10-032r8, OGC OpenSearch GeoSpatial and Temporal Extensions, https://portal.opengeospatial.org/files/?artifact_id=56866 .		r8	14/04/2014
[AD.4]	OGC 13-026r5, OGC OpenSearch Extension for Earth Observation Products, "https://portal.opengeospatial.org/files/?artifact_id=61006.		r5	29/10/2014
[AD.5]	RFC 6573, The Item and Collection Link Relations, http://www.ietf.org/rfc/rfc6573.txt .			April 2012
[AD.6]	RFC 4287, The Atom Syndication Format, http://www.ietf.org/rfc/rfc4287.txt .			
[AD.7]	OGC 10-157r3, Earth Observation Metadata profile of Observations & Measurements, https://portal.opengeospatial.org/files/?artifact_id=47040 .		1.0.0	
[AD.8]	OGC 10-157r4, Earth Observation Metadata profile of Observations & Measurements, https://portal.opengeospatial.org/files/61098 .		1.1	10/06/2014
[AD.9]	ISO 19139, Geographic Information – Metadata XML (ISO 19139:2007), http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=32557 .			2007
[AD.10]	ISO 19139-2:2012, Geographic information -- Metadata -- XML schema implementation -- Part 2: Extensions for imagery and gridded data, http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=57104			2012
[AD.11]	http://www.opensearch.org/Community/Proposal/Specifications/OpenSearch/Extensions/SRU/1.0/Draft_1		1.0 DRAFT 1	
[AD.12]	http://www.opensearch.org/Community/Proposal/Specifications/OpenSearch/Extensions/Semantic/1.0/Draft_1		1.0 DRAFT 1	
[AD.13]	searchRetrieve: Part 7. Explain Version 1.0, OASIS Standard, http://docs.oasis-open.org/search- ws/searchRetrieve/v1.0/searchRetrieve-v1.0-part7-explain.html			30 January 2013
[AD.14]	searchRetrieve: Part 4. APD Binding for OpenSearch Version 1.0, OASIS Standard, http://docs.oasis-open.org/search- ws/searchRetrieve/v1.0/os/part4-opensearch/searchRetrieve-v1.0-os- part4-opensearch.html			30 January 2013
[AD.15]	OGC 06-121r9, OGC Web Services Common Standard, http://portal.opengeospatial.org/files/?artifact_id=38867 .		2.0	
[AD.16]	http://www.opensearch.org/Specifications/OpenSearch/Extensions/Parameter/1.0/Draft_2		1.0 DRAFT 2	
[AD.17]	Media RSS Specification, http://www.rssboard.org/media-rss .			

Table 1: Applicable Documents

1.4.2 Reference Documents

Ref.	Title	Code	Version	Date
[RD.1]	“Heterogeneous Missions Accessibility (HMA), Design methodology, Architecture and Use of geospatial Standards for the Ground Segment Support of Earth Observation Missions”, European Space Agency, ESA TM-21, ISBN 978-92-9221-883-6, http://esamultimedia.esa.int/multimedia/publications/TM-21/TM-21.pdf			April 2012
[RD.2]	OGC 06-080r4, GML Application Schema for EO Products, Version 1.0.0, 25/02/2010, http://portal.opengeospatial.org/files/?artifact_id=31065			
[RD.3]	OGC 06-131r5, Catalogue Services Specification 2.0 Extension Package for ebRIM (ISO/TS 15000-3) Application Profile.		0.2.4	
[RD.4]	INSPIRE Technical Guidance for the Implementation of the INSPIRE Download Services, http://inspire.jrc.ec.europa.eu/documents/Network_Services/Technical_Guidance_Download_Services_v3.1.pdf .		3.1	09/08/2013
[RD.5]	OGC 06-141r2, Ordering Services for Earth Observation Products.		0.9.4	
[RD.6]	OGC 07-141r2, OGC KML			2008-04-14
[RD.7]	DCMI Metadata Terms, http://dublincore.org/documents/2012/06/14/dcmi-terms/?v=terms			
[RD.8]	OGC 07-118r8, User Management for Earth Observation Services.		Version 1.0	08/09/2010
[RD.9]	OGC 07-038r3, OGC Cataloguing of ISO Metadata (CIM) – Using the ebRIM profile of CS-W.		Version 0.1.12	14/12/2009
[RD.10]	OGC 13-084r2, OGC 115 (ISO19115 Metadata) Extension Package of CS-W ebRIM Profile, https://portal.opengeospatial.org/files/?artifact_id=56905		Version 1.0 r2	28/04/2014
[RD.11]	OGC 11-035r1, EO Collection and Service Discovery using the ebRIM Application Profile of CSW 2.0, https://portal.opengeospatial.org/files/?artifact_id=53276 .		Version 1.0	26/03/2013
[RD.12]	http://www.loc.gov/standards/sru/recordSchemas/			
[RD.13]	OGC 06-131r5, OGC Catalogue Services Specification 2.0, Extension Package for ebRIM Application Profile: Earth Observation Products.		Version 0.2.4	
[RD.14]	CWIC Client Partner Guide, CWIC-DOC-12-006r1, CWIC Technical Document, http://www.ceos.org/images/WGISS/CWIC/CWIC-DOC-12-006r1_CWIC_Client_Partner_Guide.doc		V1.0	03/12/2012
[RD.15]	searchRetrieve: Part 0. Overview Version 1.0, OASIS Standard, http://docs.oasis-open.org/search-ws/searchRetrieve/v1.0/os/part0-overview/searchRetrieve-v1.0-os-part0-overview.html			30 January 2013
[RD.16]	searchRetrieve: Part 3. searchRetrieve Operation: APD Binding for SRU 2.0, Version 1.0, OASIS Standard, http://docs.oasis-open.org/search-ws/searchRetrieve/v1.0/cs01/part3-sru2.0/searchRetrieve-v1.0-cs01-part3-sru2.0.html			30 January 2013
[RD.17]	CWIC Client Partner Guide	CWIC-DOC-12-006r1	V1.0	2012
[RD.18]	OGC 08-167r2, Semantic annotations in OGC standards, https://portal.opengeospatial.org/files/?artifact_id=47857 .		2.0	2012-10-10

Ref.	Title	Code	Version	Date
[RD.19]	INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119, http://inspire.jrc.ec.europa.eu/documents/Metadata/MD_IR_and_ISO_20131029.pdf		1.3	29/10/2013
[RD.20]	https://portal.asf.alaska.edu/api/			
[RD.21]	Google Data APIs, Protocol Reference, https://developers.google.com/gdata/docs/2.0/reference#query-requests			
[RD.22]	OGC 07-045, OpenGIS Catalogue Services Specification 2.0.2 – ISO Metadata Application Profile, Version 1.0, http://portal.opengeospatial.org/files/?artifact_id=21460		Version 1.0	19/07/2007
[RD.23]	Recordkeeping Metadata Schema Extension to ISO8601 (RKMS-ISO8601), http://www.ukoln.ac.uk/metadata/dcmi/collection-RKMS-ISO8601/			
[RD.24]	Metadata Vocabulary for Tabular Data, W3C Working Draft 08 January 2015, http://www.w3.org/TR/tabular-metadata/			
[RD.25]	Model for Tabular Data and Metadata on the Web, W3C Working Draft 08 January 2015, http://www.w3.org/TR/tabular-data-model/			

Table 2: Reference Documents

1.5 Document Overview

Chapter 1 of this document defines the information that can be found in the document and references the list of Applicable and Reference documents.

Chapter 2 provides a general description of the FedEO environment, its relation to other systems and provides contact information.

Chapter 3 contains guidelines for FedEO Data Partners. This chapter defines the interaction model including the main metadata models. It also lists the standard protocols which facilitate integration of data partner catalogs in the FedEO system.

Chapter 4 summarises the Data Partner Integration procedure.

Finally, the appendices provide the following reference information:

- Appendix A includes forms that Data Providers can use to provide information required to prepare organisation and dataset series related metadata.
- Appendix B includes a complete example of a dataset series metadata file.

2 GENERAL DESCRIPTION

2.1 Function and Purpose

The FedEO Clearinghouse provides a unique access point for discovering, ordering and accessing Earth Observation (EO) dataset series and datasets. The interfaces it provides to client applications are described in detail in the FedEO Client Partner Guide [AD.1].

2.2 Relation to Other Systems

The FedEO Clearinghouse (shown as FedEO in the diagram below) provides a unique access point to a growing number of scientific catalogues and services.

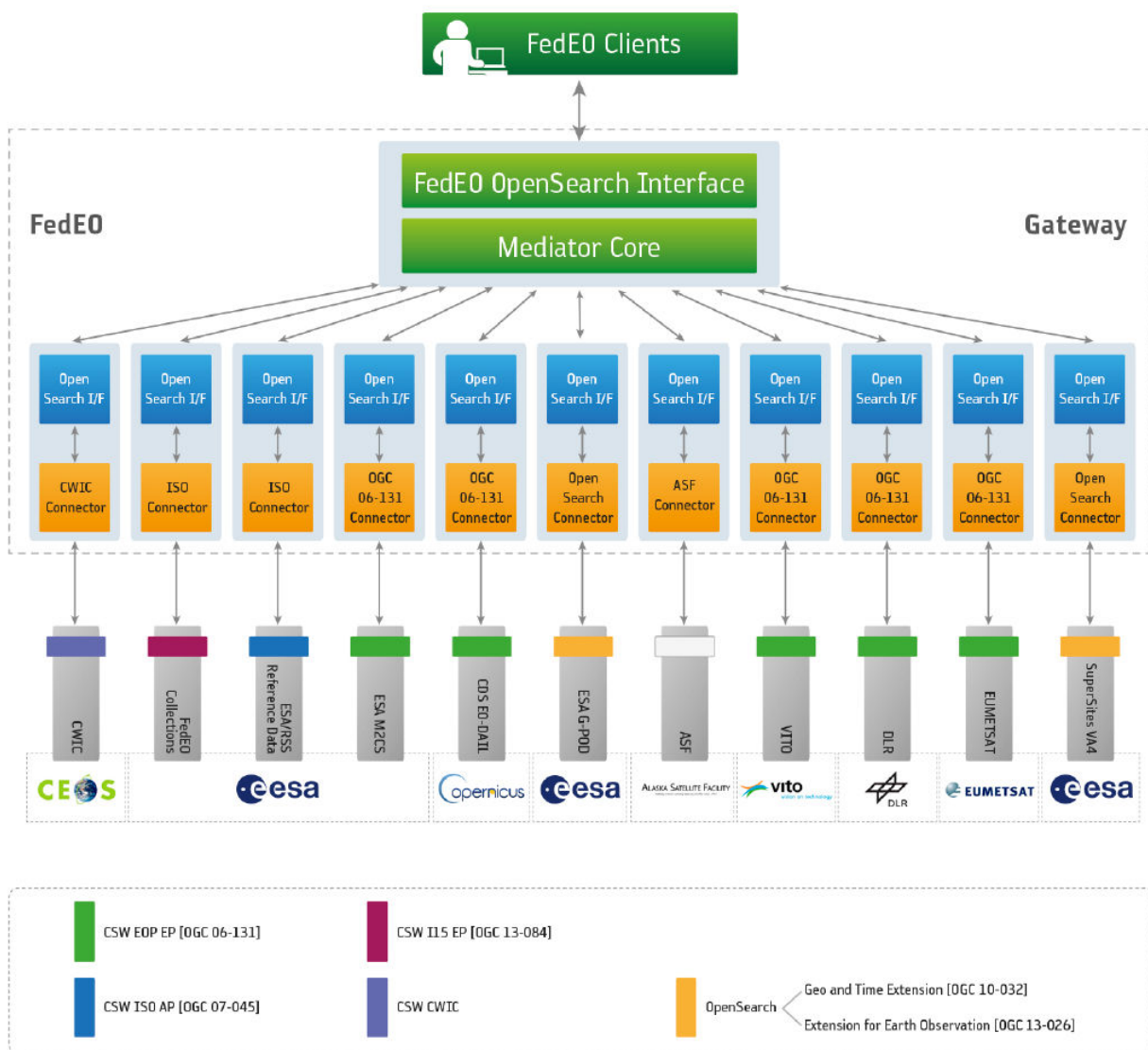




Figure 1: Top-level view of FedEO Environment

FedEO Gateway accesses the data providers through standard-based or custom Connectors shown in orange in the figure above. These Connectors accept OpenSearch requests from the Mediator Core and translate them into valid requests to be sent to the Data Partner. Results provided by the Data Partners are then converted into valid responses which are returned to the Mediator Core.

The data providers currently reachable through FedEO include:

- ESA EO-DAIL, part of the ESA CDS and the Copernicus Space Component Data Access (CSCDA), offering dataset series from Copernicus Contributing Missions (CCM),
- ESA G-POD,
- ESA M2CS+LDS offering dataset series from ESA missions including ERS, ENVISAT etc.
- ESA SuperSite Virtual Archive 4,
- ESA DISSHARM-LDS,
- DLR EO Web,
- EUMETSAT Catalogue,
- VITO Catalogue.

In addition, the following external systems are also made available through FedEO:

- CEOS WGISS Integrated Catalog,
- Alaska Satellite Facility²,
- NASA ECHO,
- ESA Sentinel-1 Scientific Data Hub³ (*),
- JAXA CATS-I⁴ (*),
- CNES THEIA (*).

(*) Expected soon.

The current list of Copernicus Contributing Missions (CCM) accessible through the ESA EO-DAIL is depicted below.

² <https://www.asf.alaska.edu/>

³ <https://scihub.esa.int/>

⁴ <http://catsi.jaxa.jp/about-cats-i/>

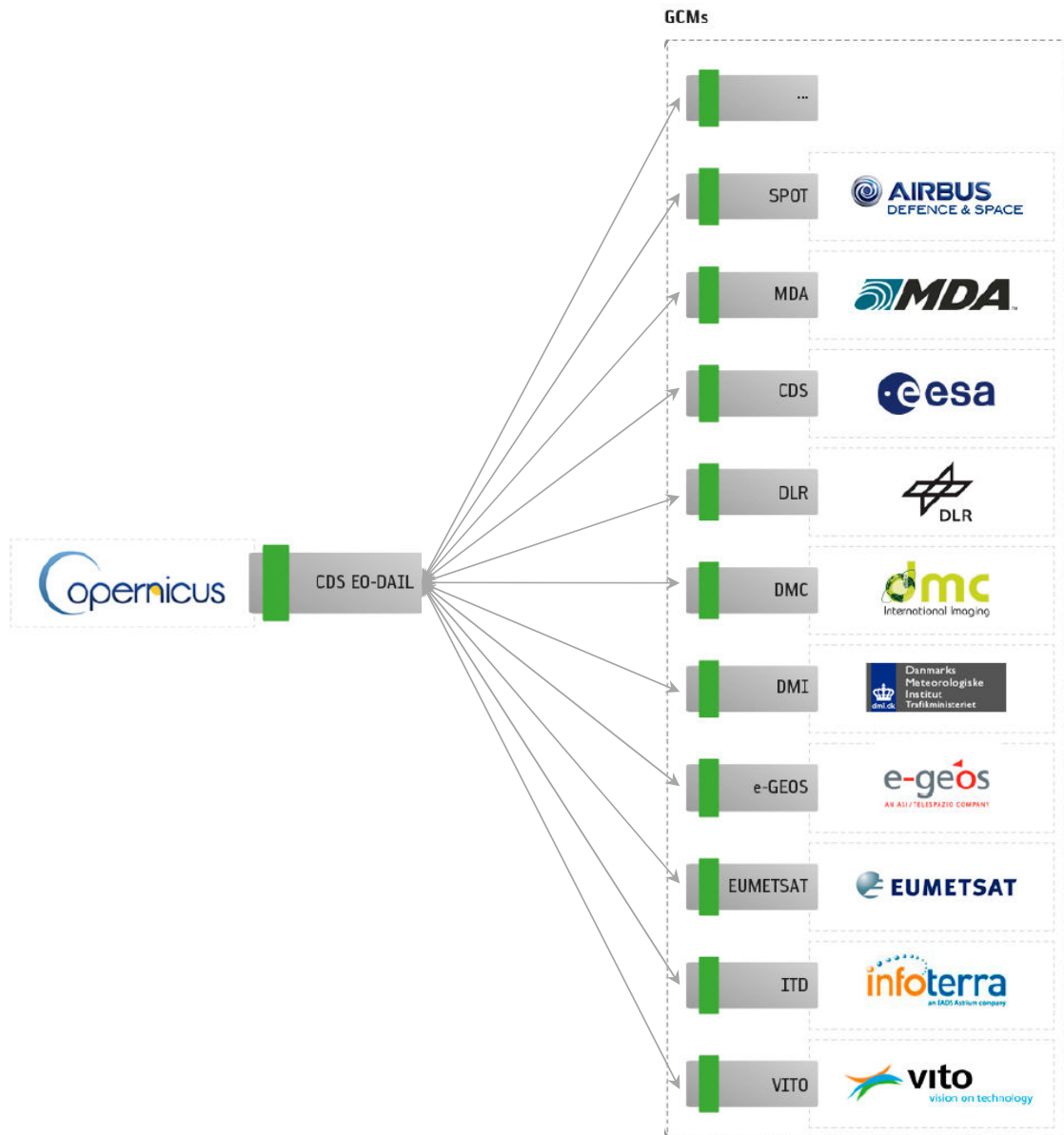


Figure 2: CCMs Accessible through ESA EO-DAIL

The table below gives an overview of the number of dataset series accessible as of April 2015.

Dataset Series	# Dataset Series
ESA EO-DAIL	61
ESA G-POD	390
ESA M2CS+LDS	32
ESA SuperSite Virtual Archive 4	20



DLR EO Web	14
EUMETSAT Catalogue	21
VITO Catalogue	1
Alaska Satellite Facility	19 ⁵
JAXA CATS-I (*)(**)	70
ESA Scientific Data Hub	4
NASA ECHO (**)	4500
CWIC (**)	1949

(*) Expected soon.

(**) Can be enabled/disabled.

2.3 FedEO Systems

There are two FedEO Clearinghouse instances you have as developer access to:

- FedEO Operational System: This is the currently operational system and is accessible to all users. It can be found at <http://fedeo.esa.int>.
- FedEO Test Environment: This is a test system area used by partners and FedEO developers to test before changes to the FedEO system go operational. It is currently located at <http://geo.spacebel.be> and will eventually become available at <http://fedeo-test.esa.int>.

2.4 Contact Information

The FedEO Clearinghouse is operated by the RSS team at ESRIN which can be contacted at RSS_TEAM@esa.int.

Feel free to contact the following persons for more information:

- FedEO Operations Team: giancarlo.rivolta@esa.int
- FedEO Catalogue Population and Test: andrea.della.vecchia@esa.int, yves.coene@spacebel.be
- FedEO Evolutions: philippe.mougnaud@esa.int
- HMA standardisation: pier.giorgio.marchetti@esa.int
- Coordination and international cooperation: mirko.albani@esa.int

⁵ Products from 19 different “platforms” according to the Web site <https://portal.asf.alaska.edu/api/>.



More information can be found as well on the HMA and FedEO Wiki pages at <http://wiki.services.eoportal.org/tiki-index.php?page=HMA%20Wiki> and <https://wiki.services.eoportal.org/tiki-index.php?page=FEDEO>.

3 FEDEO PARTNER GUIDELINES

FedEO aims to harmonise the interface with the data partner systems by proposing a harmonised interaction model for dataset series and datasets discovery. Data partners either support one of the already supported metadata models, or provide custom metadata in which case FedEO will allow its clients to either obtain this custom metadata or another metadata type FedEO was able to generate based on the custom metadata received from the data partner.

FedEO clients can use the {sru:recordSchema} parameter of its OpenSearch interface to obtain different supported metadata types embedded in the search response as explained in the FedEO Client Partner Guide section 3.3.3.

3.1 Metadata Models

3.1.1 Dataset Series Metadata

FedEO can cope with various types of dataset series metadata made available by Data Providers either online or offline. The preferred format for dataset series metadata is OGC 11-035r1 [RD.11]. It is a profile of ISO19139:2007 [AD.9] enriched with specific elements from the gmi namespace ISO19139-2:2012 [AD.10].

Examples are available online: e.g. all dataset series returned by <http://fedeo.esa.int/opensearch/request/?parentIdentifier=EOP:ESA:FEDEO:COLLECTIONS> are described using OGC 10-035r1. See also Appendix B for an example.

FedEO will convert the custom metadata to OGC 11-035r1 compliant metadata if sufficient metadata elements are available.

FedEO support staff can make available sample dataset series XML records for data partners to complete and return or prepare the metadata using information provided by Data Partners.

The following options are available for data partners:

- Provide dataset series metadata online using one of the supported Protocol Connectors (See section 3.3).
- Edit ISO19139 dataset series files offline based on metadata examples provided by FedEO. FedEO will then host the dataset series metadata on behalf of the data partner.
- Fill out a dataset series form (See Appendix A) and have FedEO support create the corresponding dataset series metadata records. FedEO will then host the dataset series metadata on behalf of the data partner.

The following metadata elements are of particular importance:

- The unique identifier of the dataset series. We recommend an identifier with the structure EOP:<organisation>:<series> or simply <series>. For instance EOP:MDA-GSI:RSAT2_SEGMENTS, EOP:SPOT:MULTISPECTRAL_10m, EOP:VITO:VGT_S10,



ER02_SAR_RAW_OP. The list of already reserved identifiers available in FedEO can be found in the <configInfo> section at <http://fedeo.esa.int/opensearch/request/>. This identifier is returned by FedEO in dataset series search responses as the <dc:identifier> element and is to be used in subsequent dataset searches as {eo:parentIdentifier} search parameter.

- The temporal extent of the dataset series. This information is used by FedEO to return the <dc:date> element in the Atom search response as per [RD.23]. It is typically used by clients to constrain the search period for which datasets may exist.
- The geographical extent of the dataset series.
- The satellite (platform) name. Ideally, provide the GCMD⁶ URI for the platform as well. For example “Sentinel-1” corresponds to <http://gcmdservices.gsfc.nasa.gov/kms/concept/c7279e54-f7c1-4ee7-a957-719d6021a3f6>.
- The instrument name. Ideally, provide the GCMD URI for the instrument as well. For example “ASAR” corresponds to <http://gcmdservices.gsfc.nasa.gov/kms/concept/912c3308-23bc-4e12-b7fb-9d82e9fc5fe9>.

3.1.2 Dataset Metadata

The use of the following dataset metadata formats by the data partners facilitates their integration in FedEO. In addition to these formats, data partners can also have their own custom format which can be considered for integration with some additional effort.

3.1.2.1 OGC 10-157 r3 - EOP O&M Version 1.0

This format is defined in [RD.8] and is slightly different from [RD.9] which is the recommended dataset metadata format.

3.1.2.2 OGC 10-157 r4 - EOP O&M Version 1.1

This format is defined in [RD.9] and is the recommended dataset metadata format. It allows for specific attributes for optical, radar, atmospheric, altimetry, limb looking, synthesis and systematic products.

⁶ http://gcmd.nasa.gov/learn/keyword_list.html

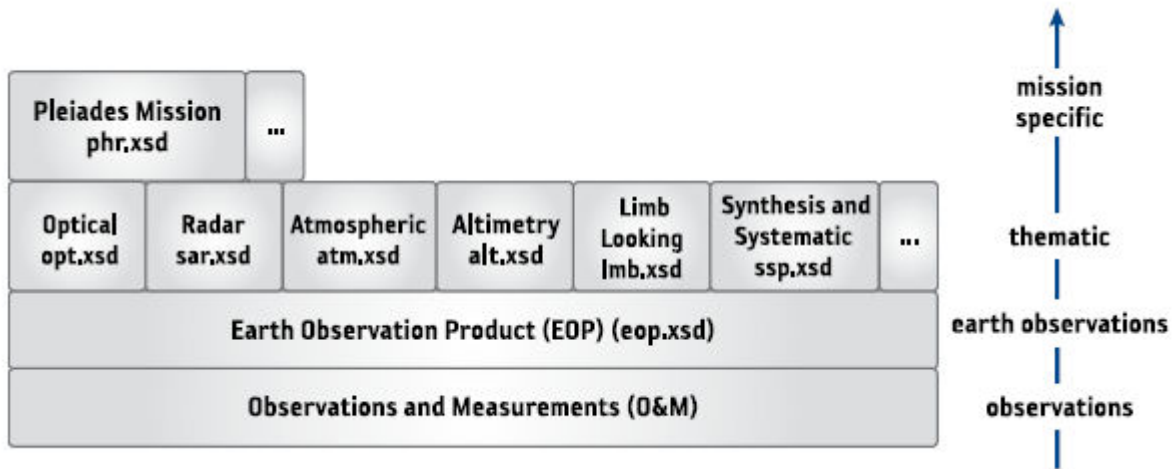


Figure 3: EOP O&M Metadata Model (source: [RD.1]).

3.1.2.3 OGC 06-080 - EO GML

This format is defined in [RD.2] and contains similar attributes as [RD.9] which is the recommended dataset metadata format.

3.1.2.4 ISO 19139

FedEO supports metadata as defined in [AD.9] [RD.11] and [RD.19]. OGC 11-035r1 [RD.11] is the recommended metadata model for dataset series metadata. It is a profile of ISO19139:2007 [AD.9] enriched with specific elements from the gmi namespace ISO19139-2:2012 [AD.10].

3.1.2.5 Dublin Core

A standard encoding schema for Dublin Core⁷ metadata is available at <http://www.loc.gov/standards/sru/recordSchemas/dc-schema.xsd>. It supports one or more of the following attributes:

- dc:title
- dc:creator
- dc:subject
- dc:description
- dc:publisher
- dc:contributor
- dc:date
- dc:type
- dc:format
- dc:identifier

⁷ <http://dublincore.org/documents/dces/>

- dc:source
- dc:language
- dc:relation
- dc:coverage
- dc:rights.

3.1.2.6 Custom format

FedEO does also support custom metadata formats. Data partners can provide their metadata using their own XML, JSON, JSON-LD, RDF XML, Turtle or CSV (Comma-Separated-Values) formats.

FedEO dataset search responses will make available these custom formats as atom:links.

3.2 Interaction Model

FedEO provides a growing set of Connectors which aim to implement a common interaction model with the Data Provider backend systems. It is assumed that interactions between FedEO and the data partner infrastructure use the HTTP protocol.

3.2.1 Dataset Series Discovery (Optional)

The first step consists in retrieving dataset series metadata matching specific search criteria.

The dataset series metadata can be hosted by the data partner or by FedEO.

3.2.1.1 Data series metadata hosted by FedEO

If FedEO hosts the dataset series metadata, then all search parameters defined in the FedEO Client Partner Guide for the ISO Connector will be available.

3.2.1.2 Data series metadata hosted by Data Partner

If the data partner hosts his dataset series metadata, then the data partner is free to propose the set of search parameters supported by his catalog. This set is known by FedEO if the data provider implements a standard catalog protocol such as OGC 07-045 [RD.22] or OGC 13-084r2 [RD.10]. As a minimum, parameters equivalent to the following OpenSearch parameters are expected to exist in the interface provided by the data partner:

- searchTerms: to perform a free text search matching any metadata field including title, abstract, keywords etc .
- geo:uid: retrieve all available metadata for a given dataset series using a locally unique identifier.
- startIndex: start index of first result to be returned (used for paging of results).
- count: number of results to be returned (used for paging of results).



To offer the end-user a better search experience, it is also recommended to support the equivalent of the following search parameters as well and have this information available in the dataset series metadata:

- eo:platform: satellite name.
- eo:instrument: instrument short name.
- eo:sensorType

The response format should at least contain the total number of results matching the query and the following information about the dataset series:

- Identifier
- Title
- Abstract
- Start Date (optional)
- End Date (optional)
- Keywords (optional)

If sufficient metadata elements are provided then FedEO will generate on-the-fly an ISO19139 metadata file for the dataset series to offer a harmonised metadata model to external clients.

If Start Date and End Date information for the dataset series is available, it will be used by FedEO to enrich the Dataset search OSDD for this dataset series with constraints for the time:start and time:end queryables using the Parameter extension [AD.16] as shown below.

Example 1: Inclusion of time:start and time:end constraints in generated OSDD

```
<param:Parameter name="startDate" value="{time:start}"
  minimum="0"
  minInclusive="2009-01-01T00:00:00Z"
/>

<param:Parameter name="endDate" value="{time:end}"
  minimum="0"
  maxInclusive="2011-01-01T00:00:00Z"
/>
```

Keywords (possibly with semantic annotations) which are provided will be automatically converted in the corresponding atom:category elements as defined in [RD.18].

Example 2: Inclusion of atom:category in search response

```
<entry>
```



```

<dc:date>1991-07-25T00:00:00Z</dc:date>

<georss:polygon>-90.0 -180.0 90.0 -180.0 90.0 180.0 -90.0 180.0 -90.0 -
180.0</georss:polygon>

<category label="Geology" scheme="http://www.eionet.europa.eu/gemet"
term="http://www.eionet.europa.eu/gemet/concept/3650"/>

<category label="Land cover" scheme="http://www.eionet.europa.eu/gemet"
term="http://www.eionet.europa.eu/gemet/concept/4612"/>

. . .

</entry>

```

3.2.2 Dataset Discovery

The second step consists in retrieving dataset metadata which belong to a dataset series found in the previous step matching specific search criteria.

The data partner is free to propose the set of search parameters supported by his catalog. This set is often known by FedEO if the data provider implements a standard catalog protocol. As a minimum, parameters equivalent to the following OpenSearch parameters are expected to exist:

- Spatial search: providing for instance an area of interest as a bounding box.
- Temporal search: providing a time range which is to intersect with the start time / end time of individual datasets (i.e. products).
- eo:parentIdentifier: identifier of the dataset series to be searched.
- geo:uid: a locally unique product identifier which can be used to retrieve all available metadata for a given dataset (product), possibly in combination with the dataset series identifier.
- startIndex: start index of the first result to be returned.
- count: number of results to be retrieved.

The response format should at least contain:

- Total number of results matching the query
- Dataset identifier
- Start time, End time
- Geographical extent (i.e. footprint information)
- Platform name (optional)
- Instrument name (optional)



- Orbit number (optional)

It is highly recommended to include HTTP URL to (JPEG) thumbnail images, browse images (also called quicklooks) and possibly cloud masks for each dataset (product) in the metadata.

If the data provider provides these URL in the dataset metadata then FedEO will include these URL in the Atom search responses as shown below. FedEO, uses Atom link (rel="icon") and the "Media RSS Specification" [AD.17] to return this information inside Atom feeds.

Example 3: Inclusion of Quicklook information

```
<link
href="http://geofuse.geoeye.com/static/browse/ikonos/2/kpms/2012/11/2012113010003790000011629261_0.jp
pg" rel="icon" type="image/jpeg"/>
<media:group>
  <media:content medium="image" type="image/jpeg"
url="http://geofuse.geoeye.com/static/browse/ikonos/2/kpms/2012/11/2012113010003790000011629261_0.jp
g">
    <media:category
scheme="http://www.opengis.net/spec/EOMPOM/1.0">QUICKLOOK</media:category>
  </media:content>
</media:group>
```

Example 4: Inclusion of Cloud mask information

```
<media:content url="http://daliis.spotimage.fr/wsTools/img/getImage.aspx?ST=S&SN=37998313&IT
=CLD&CP=N&SD=T&FT=BMP&CM=75" type="image/jpeg" medium="image">
  <media:category scheme="http://www.opengis.net/spec/EOMPOM/1.0">CLOUD</media:category>
  <media:title type="plain">Cloud mask</media:title>
</media:content>
```

The scheme parameter reflects the thesaurus/codelist covering the various possibilities, e.g. the values allowed in the EOP O&M codelist for browse/BrowseInformation/type (THUMBNAIL, QUICKLOOK, ALBUM) and mask/MaskInformation/type (SNOW, CLOUD, QUALITY).

3.2.3 Online Data Access (Optional)

Allowing a client application access to the actual data products is an optional capability for which FedEO offers a number of alternatives.

3.2.3.1 Product Viewing link provided in metadata (Optional)

If Data Partners can make available browse image URLs as WMS URLs, then FedEO will make these URL accessible in the Atom search responses and sophisticated catalog clients can exploit the WMS links to allow zooming in/out.

```
<media:group>
  <media:content url="http://eoos.pisa.intecs.it/DREAM/instance01/ows?
SERVICE=WMS&VERSION=1.3.0&REQUEST=GetMap&BBOX=$coordinates.
getContainingBBOXFromPolygon($coordinates.wkt2oem(
$metadata.RDF_DataSet_spatial))&CRS=EPSG:4326&WIDTH=600&
HEIGHT=600">
```




```
LAYERS=ASA_IMM_1PNPDE20051116_070843_000002382042_00321_19413_1351_WGS84_view
&STYLES=&FORMAT=image/png&DPI=96&TRANSPARENT=TRUE" type="image/jpeg"
medium="image">
  <media:category
scheme="http://www.opengis.net/spec/EOMPOM/1.0">QUICKLOOK</media:category>
  </media:content>
</media:group>
```

3.2.3.2 Product Download link provided in metadata (Optional)

Data Partners typically make available their data products for download on an online server at their Product Facilities through HTTP, FTP, SFTP or other protocols and possibly apply local authentication before end-users can download their product.

We recommend partners in such case to include the download URL in the dataset metadata record. FedEO will then extract this URL and include it in the corresponding Atom entry of the OpenSearch response as an atom:link “enclosure”.

```
<entry>
  <link href="http://archive.daac.asf.alaska.edu:80/L1.0/A3/ALPSRP206802580-L1.0.zip"
length="470034678" rel="enclosure" title="Download" type="application/x-binary"/>
  ...
</entry>
...
</feed>
```

3.2.3.3 Redirection to dedicated Web Page (Optional)

If Data Partners want users to be redirected to a custom Web page for dataset (product) download or ordering for a given dataset series, they can provide this fixed URL or the URI template⁸ taking two parameters corresponding to dataset series and product identifier respectively.

For instance: `http://example.org/order.html{?parentIdentifier,uid}` would be converted by FedEO to `http://example.com/order.html?parentIdentifier=EOP%3AVITO%3AVGT_S10&uid=AV2KRNS10__20130801F` according to the rules defined in RFC6570.

FedEO will then return the information to clients in the following ways:

- As atom:link with relation “order” and type “text/html” in the <entry> of the dataset search response.
- As Resource Locator in the dataset series ISO19139 metadata returned by FedEO for this dataset series with <gmd:function> “order”.

⁸ <https://tools.ietf.org/html/rfc6570>



```

<entry>

    <link href="http://example.org/order.html?parentIdentifier=EOP%3AVITO%3AVGT_S10&uid=
AV2KRNS10__20130801F " rel="order" title="Ordering" type="text/html"/>
    ...
</entry>
...

```

3.2.3.4 Product Ordering service (Optional)

If Data Partners want client applications to be informed about the existence of an OGC 06-141 [RD.5] compliant ordering services for dataset (product) ordering for a given dataset series, they can provide the URL of the corresponding Capabilities document.

FedEO will then return the information to clients in the following ways:

- As atom:link with relation “order” and type “application/vnd.ogc.oseo.capabilities.response_xml” in the <entry> of the dataset search response.
- As Resource Locator in the dataset series ISO19139 metadata returned by FedEO for this dataset series with <gmd:function> “order”.

3.3 Supported Protocol Connectors

The current section contains material about the Configuration of the OpenSearch Gateway which is also available in the FedEO OSGW SCF Document (PDGS-FEDEO-OSGW-SPB-SCF-14-0646). It allows Data Providers to understand which minimum information is required by FedEO and will be extracted from their OSDD or Capabilities documents. It also provides information about the supported backend protocols.

3.3.1 OGC 06-131 – EOP EP of CSW

FedEO can connect directly to your OGC 06-131 catalog if a correct Capabilities document is available via HTTP GET. FedEO will extract the following information from this file:

- Location of the GetRecords and GetRecordById endpoints.
- Protocol binding for access: only <ows:HTTP><ows:Post> is allowed which is interpreted as a SOAP binding.
- List of supported dataset series from the <ows:OperationsMetadata> element in the Capabilities file as shown below.

Example 5: Extract of OGC 06-131 Capabilities Document



```

<?xml version="1.0" encoding="UTF-8"?>
<csw:Capabilities version="2.0.2" xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:dct="http://purl.org/dc/terms/"
xmlns:sch="http://www.ascc.net/xml/schematron" xmlns:gml="http://www.opengis.net/gml"
xmlns:ogc="http://www.opengis.net/ogc" xmlns:ows="http://www.opengis.net/ows"
xmlns:xlink="http://www.w3.org/1999/xlink">
  . . .
  <ows:OperationsMetadata>
    . . .
    <ows:Operation name="GetRecords">
      <ows:DCP>
        <ows:HTTP>
          <ows:Post
xlink:href="http://example1.com/gateway/services/Catalogue" xlink:type="simple"/>
          </ows:HTTP>
        </ows:DCP>
        . . .
      </ows:Operation>
      <ows:Operation name="GetRecordById">
        <ows:DCP>
          <ows:HTTP>
            <ows:Post
xlink:href="http://example1.com/gateway/services/Catalogue" xlink:type="simple"/>
            </ows:HTTP>
          </ows:DCP>
          . . .
        </ows:Operation>
        . . .
      <ows:ExtendedCapabilities xmlns:rim="urn:oasis:names:tc:ebxml-
regrep:xsd:rim:3.0">
        <rim:Slot name="urn:ogc:def:ebRIM-Slot:OGC-06-131:parentIdentifier"
slotType="urn:oasis:names:tc:ebxml-regrep:DataType:String">
          <rim:ValueList>
            <!-- VITO -->
            <rim:Value>urn:ogc:def:EOP:VITO:VGT_P</rim:Value>
            <rim:Value>urn:ogc:def:EOP:VITO:VGT_S10</rim:Value>
            <rim:Value>urn:ogc:def:EOP:VITO:VGT_D10</rim:Value>
          </rim:ValueList>
        </rim:Slot>
      </ows:ExtendedCapabilities>
    </ows:OperationsMetadata>
    . . .
  </csw:Capabilities>

```

The above Capabilities file defines the dataset series EOP:VITO:VGT_P, EOP:VITO:VGT_S10, EOP:VITO:VGT_D10 as valid FedEO {eo:parentIdentifier} values. The prefix “urn:ogc:def” is ignored by FedEO.

The endpoint can be added to the FedEO Gateway by the Administrator by adding the following section to the \$OPENSEARCH_HOME/resource/conf.xml Configuration File:

Example 6: Configuration file extract for OGC 06-131

```

<dcat:Dataset>

    <!-- Label shown in Explain document.      -->
    <rdfs:label>Example1.com Collections</rdfs:label>

    <dcat:distribution>
        <dcat:Distribution>
            <dcat:accessURL type="OGC 06-131">./resource/example1-
capabilities.xml</dcat:accessURL>
        </dcat:Distribution>
    </dcat:distribution>

</dcat:Dataset>

```

3.3.2 OGC 07-045 - ISO AP of CSW

FedEO can connect directly to your OGC 07-045 [RD.22] catalog if a correct Capabilities document is provided or accessible via HTTP GET. FedEO will extract the following information from this file:

- Location of the GetRecords and GetRecordById endpoints.
- Protocol binding: only <ows:HTTP><ows:Post> is allowed which is interpreted as a HTTP/Post binding

Example 7: Extract of OGC 07-045 Capabilities Document

```

<?xml version="1.0" encoding="UTF-8"?>
<csw:Capabilities version="2.0.2" xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:dct="http://purl.org/dc/terms/"
xmlns:sch="http://www.ascc.net/xml/schematron" xmlns:gml="http://www.opengis.net/gml"
xmlns:ogc="http://www.opengis.net/ogc" xmlns:ows="http://www.opengis.net/ows"
xmlns:xlink="http://www.w3.org/1999/xlink">
    . . .
    <ows:OperationsMetadata>
        . . .
        <ows:Operation name="GetRecords">
            <ows:DCP>
                <ows:HTTP>
                    <ows:Post
xlink:href="http://example2.com/gateway/services/Catalogue" xlink:type="simple"/>
                </ows:HTTP>
            </ows:DCP>
            . . .
        </ows:Operation>
        <ows:Operation name="GetRecordById">
            <ows:DCP>

```

```

                <ows:HTTP>
                    <ows:Post
xlink:href="http://example2.com/gateway/services/Catalogue" xlink:type="simple"/>
                    </ows:HTTP>
                </ows:DCP>
                . . .
            </ows:Operation>
        . . .
    </ows:OperationsMetadata>
    . . .
</csw:Capabilities>

```

The endpoint can be added to the FedEO Gateway by the Administrator by adding the following section to the \$OPENSEARCH_HOME/resource/conf.xml Configuration File:

Example 8: Extract of configuration file for OGC 07-045 endpoint

```

<dcat:Dataset rdf:about="#EOP:ESA:REFERENCEDATA">
    <rdfs:label>ESA RSS Catalogue</rdfs:label>
    <dcat:distribution>
        <dcat:Distribution>
            <dcat:accessURL type="OGC 07-045" supportCollection="true"
supportService="false" searchPriority="4">./resource/iso-
capabilities.xml</dcat:accessURL>
        </dcat:Distribution>
    </dcat:distribution>
</dcat:Dataset>

```

The above configuration file defines the dataset series EOP:ESA:REFERENCEDATA, as valid FedEO {eo:parentIdentifier} value.

Several open-source implementations of OGC 07-045 exist, for instance:

- GeoNetwork⁹

3.3.3 OpenSearch

Endpoints of an OpenSearch catalog can be added to the FedEO Gateway. However, OpenSearch catalogs exist in various flavours and all implement different portions of the related specifications OpenSearch 1.1 [AD.2], OGC 10-032r8 [AD.3] and OGC 13-026 [AD.4].

⁹ <http://geonetwork-opensource.org/>



Several open-source implementations of OGC 13-026r5 exist which Data Partners can deploy, for instance:

- Earth Observation OpenSearch Catalog¹⁰.
- RESTo2¹¹

Data Partners implementing their own OpenSearch interfaces may use the following open-source conformance tests which run on the OGC TEAM Engine¹²:

- Executable Test Suite for OGC OpenSearch Geo and Time Extensions (OGC 10-032r8)¹³
- Executable Test Suite for OGC OpenSearch Earth Observation Extension (OGC 13-026r5)¹⁴

The endpoint of an OpenSearch catalog can be added to the FedEO Gateway by the Administrator by adding the following section to the Configuration File:

Example 9: Extract of configuration file for an OpenSearch endpoint

```
<dcat:Dataset rdf:about="#EOP:ESA:GPOD-EO">

    <!-- Label shown in Explain document. -->
    <rdfs:label>ESA G-POD</rdfs:label>

    <!-- Fixed dataset series metadata fields -->
    <!-- applicable to all records in the catalog -->
    <!-- represented by this dcat:Dataset. -->

    <dc:type>collection</dc:type>
    <dc:publisher>ESA</dc:publisher>
    <eo:organisationName>ESA</eo:organisationName>

    <dcat:distribution>
        <dcat:Distribution>
            <dcat:accessURL .. type="OGC 10-032">./resource/grid-eo-catalog-
esrin-esa-int.osdx</dcat:accessURL>
        </dcat:Distribution>
    </dcat:distribution>
</dcat:Dataset>
```

The above configuration file defines the dataset series EOP:ESA:GPOD-EO, as valid FedEO {eo:parentIdentifier} value.

¹⁰ <https://github.com/IntecsSPA/eoos>

¹¹ <https://github.com/jirom/resto2/>

¹² <https://github.com/opengeospatial/teamengine>

¹³ <https://github.com/opengeospatial/ets-osxgeotime10>

¹⁴ <https://github.com/opengeospatial/ets-osxeo10>



FedEO can connect directly to your OpenSearch catalog if a correct OSDD document is available via HTTP GET which complies with OGC 10-032r8 [AD.3] and OGC 13-026r5 [AD.4]. FedEO will extract the following information from this file:

- URL template of the OpenSearch endpoint (for dataset series) returning Atom responses: i.e. `<Url rel="collections" template="http://...." type="application/atom+xml"/>`. Is only required if the endpoint supports dataset series search.
- URL template of the OpenSearch endpoint (for datasets) returning Atom responses: i.e. `<Url rel="results" template="http://...." type="application/atom+xml"/>`. Is only required if the endpoint supports dataset search.
- Optionally: List of supported dataset series from the `<param:Parameter value="{eo:parentIdentifier}">` element in the OSDD file as shown below.

The dataset series which are searchable via this endpoint are extracted by FedEO from the OSDD description in which they can also be described using the Parameter extension [AD.16] as shown below.

Example 10: Extract of OSDD Document for OpenSearch Dataset catalog

```
<opensearchdescription>
<Url rel="collection" template="http://...." type="application/atom+xml"/>

<Url rel="results" template="http://...." type="application/atom+xml">

. . .

  <param:Parameter name="parentIdentifier" value="{eo:parentIdentifier}">
    <param:Option label="ASA_IM__0P" value="ASA_IM__0P"/>
    <param:Option label="TLM_MIRA0_" value="TLM_MIRA0_"/>
  </param:Parameter>
</Url>

. . .

</opensearchdescription>
```

The above OSDD file defines the dataset series ASA_IM__0P and TLM_MIRA0_ as valid FedEO {eo:parentIdentifier} values which can be used for dataset search without a previous series search. If only a two-step search is required, then these identifiers do not need to be defined separately.

For OpenSearch requests, the dataset series identifier of the dataset series catalog (in this case EOP:ESA:GPOD-EO) can be used as prefix to distinguish dataset series with identical names belonging to different dataset series catalogs, e.g. EOP:ESA:GPOD-EO:ASA_IM__0P.



3.3.4 OGC 13-084r2 – I15 EP of CSW

FedEO can connect to your OGC 13-084r2 [RD.10] catalog if a correct Capabilities document is provided or made accessible via HTTP GET. FedEO will extract the following information from this file:

- Location and binding for the GetRecords endpoint. Only <ows:HTTP><ows:Post> is allowed which is interpreted as a SOAP binding

Example 11: Extract of OGC 13-084r2 Capabilities Document

```
<?xml version="1.0" encoding="UTF-8"?>
<csw:Capabilities version="2.0.2" xmlns:ows="http://www.opengis.net/ows" . . . .>
  . . .
  <ows:OperationsMetadata>
    . . .
    <ows:Operation name="GetRecords">
      <ows:DCP>
        <ows:HTTP>
          <ows:Post
xlink:href="http://example2.com/gateway/services/Catalogue" xlink:type="simple"/>
        </ows:HTTP>
      </ows:DCP>
    </ows:Operation>
    . . .
  </ows:OperationsMetadata>
  . . .
</csw:Capabilities>
```

The endpoint of an OGC 13-084r2 compliant (dataset series) catalog can be added to the FedEO Gateway by the Administrator by adding the following section to the \$OPENSEARCH_HOME/resource/conf.xml Configuration File:

Example 12: Extract of configuration file for OGC 13-084r2 endpoint

```
<dcat:Dataset rdf:about="#EOP:ESA:FEDEO:COLLECTIONS">
  <!-- Label shown in Explain document. -->
  <rdfs:label>FEDEO I15 Collection Catalogue</rdfs:label>
  <!-- Fixed dataset series metadata fields -->
  <!-- applicable to all records in the catalog -->
  <!-- represented by this dcat:Dataset. -->
  <dc:type>collection</dc:type>
```



```

<dc:publisher>ESA</dc:publisher>
<eo:organisationName>ESA</eo:organisationName>

  <dc:at:distribution>
    <dc:at:Distribution>
      <dc:at:accessURL .. type="OGC 13-084">./resource/example5-
capabilities.xml</dc:at:accessURL>
    </dc:at:Distribution>
  </dc:at:distribution>
</dc:at:Dataset>

```

The above configuration file defines the dataset series EOP:ESA:FEDEO:COLLECTIONS, as valid FedEO {eo:parentIdentifier} value.

Open-source implementations of OGC 13-084r2 exist, for instance:

- Buddata¹⁵.

3.3.5 OGC CSW (CWIC-style)

FedEO can connect to a CWIC-style CSW catalog if a correct Capabilities document is available via HTTP GET. FedEO will extract the following information from this file:

- Location of the GetRecords and GetRecordById endpoints.
- Protocol binding: only <ows:HTTP><ows:Post> is allowed which is interpreted as a HTTP/Post binding
- List of supported dataset series from the <cwic:FederationMetadata> element in the Capabilities file as shown below.

Example 13: Extract of CWIC-Style CSW Capabilities Document

```

<?xml version="1.0" encoding="UTF-8"?>
<csw:Capabilities version="2.0.2" xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:dct="http://purl.org/dc/terms/"
xmlns:sch="http://www.ascc.net/xml/schematron" xmlns:gml="http://www.opengis.net/gml"
xmlns:ogc="http://www.opengis.net/ogc" xmlns:ows="http://www.opengis.net/ows"
xmlns:xlink="http://www.w3.org/1999/xlink">
  . . .
  <ows:OperationsMetadata>
    . . .
    <ows:Operation name="GetRecords">
      <ows:DCP>

```

¹⁵ <https://github.com/IntecsSPA/buddata-ebxml-registry>

```

                <ows:HTTP>
                    <ows:Post
xlink:href="http://example4.com/gateway/services/Catalogue" xlink:type="simple"/>
                    </ows:HTTP>
                </ows:DCP>
                . . .
            </ows:Operation>
            <ows:Operation name="GetRecordById">
                <ows:DCP>
                    <ows:HTTP>
                        <ows:Post
xlink:href="http://example4.com/gateway/services/Catalogue" xlink:type="simple"/>
                        </ows:HTTP>
                    </ows:DCP>
                . . .
            </ows:Operation>
        . . .
    </csw:Capabilities>
</csw:Capabilities>
<cwic:FederationMetadata>
    <cwic:catalog id="USGS">
        <cwic:dataSet entryId="LANDSAT_ETM_PLUS">Enhanced Thematic Mapper Plus (Landsat
7)</cwic:dataSet>
        <cwic:dataSet entryId="LANDSAT_MSS">Landsat Multispectral Scanner (MSS) Imagery
</cwic:dataSet>
        <cwic:dataSet entryId="LANDSAT_TM">Landsat Thematic Mapper Imagery</cwic:dataSet>
    </cwic:catalog>
    <cwic:catalog id="INPE">
        . . .
    </cwic:catalog>
    <cwic:catalog id="NOAA">
        . . .
    </cwic:catalog>
    <cwic:catalog id="NASA">
        . . .
    </cwic:catalog>
</cwic:FederationMetadata>
. . .
</ows:OperationsMetadata>
. . .
</csw:Capabilities>

```

The above Capabilities file defines the dataset series LANDSAT_ETM_PLUS, LANDSAT_MSS and LANDSAT_TM as valid FedEO {eo:parentIdentifier} values.

The endpoint can be added to the FedEO Gateway by the Administrator by adding the following snippet to the \$OPENSEARCH_HOME/resource/conf.xml Configuration File:

```
<dcat:Dataset>
```



```

    <rdfs:label>CEOS WGISS Integrated Catalogue</rdfs:label>

    <dcat:distribution>
      <dcat:Distribution>
        <dcat:accessURL type="CWIC"
separator=":">http://cwic.wgiss.ceos.org/cwicv1/discovery?request=GetCapabilities&service=CSW&version=2.0.2</dcat:accessURL>

          </dcat:Distribution>
        </dcat:distribution>
      </dcat:Dataset>
  
```

3.3.6 Custom HTTP-based API

Other API (over HTTP or HTTPS) can be considered on a case by case basis. The data partner is free to propose response formats (including Atom, RSS, RDF or custom XML) and can offer metadata in various formats (EOP O&M, EO GML, ISO19139, Dublin Core, .CSV, RDF or custom XML) as long as they can be mapped on the Interaction Model presented in section 3.2.



4 DATA PARTNER INTEGRATION PROCEDURE

The current section summarizes the steps to be undertaken to add a new Data Provider or Data Provider dataset series to the FedEO Clearinghouse.

4.1 Step-1: Data Partner provides access to Dataset catalog

The Data Partner provides on-line access to his dataset catalog which supports a standard protocol (See Section 3.3) or has a custom HTTP-based interface.

4.2 Step-2: Send endpoint to ESA FedEO team for integration

Please provide:

- Examples of successful search requests (including area of interest / time period).
- List of dataset series identifiers i.e. {eo:parentIdentifier}.
- List of supported search parameters if different from formal (OGC) specifications and actual values, including search parameter to be used to pass dataset series identifier (e.g. parentIdentifier) in request.
- Optional: mechanism to discover list of allowed dataset series identifiers automatically.

4.3 Step-3: Data Partner provides dataset series metadata

The Data Partner provides ISO19139 files as described in 3.1.2.4 (See example in Appendix B) or provides the necessary information to prepare such files using the forms included in Appendix A. .

The dataset series metadata files can be created with support of the FEDEO support team (e.g. through answers to a questionnaire). Sample metadata files can be provided as well.

The FedEO support team can also help adding semantic annotations in the dataset series metadata.

The way the administrator is to insert dataset series metadata in the FedEO Dataset Series catalog is explained in the FEDEO Software Configuration File (PDGS-FEDEO-SPB-SCF-14-0645) section 8.4.



4.4 Step-4: FedEO team provides test endpoint

After integrating the Data Partner catalog in the FedEO test environment, the FedEO support team will make available the OpenSearch endpoint to the Data Partner for verification and feedback. A list of findings, issues to be resolved to improve integration can be provided as well.



APPENDIX A DATASET SERIES FORM

A.1 Organisation Form

This form is to be filled once for each data partner. It collects the dataset series properties common to all dataset series of the data partner.

<i>Identification Information</i>			<i>Example</i>
	Point of Contact	Organisation Name (M)	ESA
		Phone	
		Fax	
		Street / Number	
		City	
		Postal Code	
		Country	
		Email	
		Web site	http://www.esa.int
		Role	originator (default)

A.2 Dataset Series Form

This form is to be filled for each dataset series for which dataset series metadata is to be prepared and hosted by FedEO on behalf of the data partner. It collects the main dataset series properties required to generate OGC 11-035r1 [RD.11] compliant dataset series metadata.

<i>Identification Information</i>			<i>Example</i>
	Identifier (M)		EOP:VITO:VGT_S10
	Title (M)		
	Abstract (M)		
	Temporal extent	Start date (M)	2014-04-03T00:00:00Z
		End date	unconstrained (default)
	Geographical constraints	West (longitude) (M)	-180
		East (longitude) (M)	180
		South (latitude) (M)	90



		North (latitude) (M)	90
	Keywords (1)		
	Satellite / Platform (1)		
	Instrument short name (1)		
	Sensor type (OPTICAL, RADAR, ...)		
Distribution Information			
	Format		GEOTIFF, ZIP
	Online Resource 1		e.g. URL of ordering Web page.
	Online Resource 2		
Data Quality Information			
	Lineage (free text)		



APPENDIX B DATASET SERIES METADATA EXAMPLE

Data Partners can download example ISO19139 metadata files from FedEO. All metadata returned by <http://fedeo.esa.int/opensearch/request/?parentIdentifier=EOP:ESA:FEDEO:COLLECTIONS> are described using OGC 10-035r1.

A complete example is included below.

Example 14: Dataset Series Metadata file

```
<?xml version="1.0" encoding="utf-8"?>
<gmi:MI Metadata xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:gco="http://www.isotc211.org/2005/gco"
xmlns:gmx="http://www.isotc211.org/2005/gmx" xmlns:gmi="http://www.isotc211.org/2005/gmi"
xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.isotc211.org/2005/gmi file:///D:/Projects/hma-
s/trunk/metadata/Isofull/gmi/gmi.xsd">
  <gmd:fileIdentifier>
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  </gmd:fileIdentifier>
  <gmd:language>
    <gmd:LanguageCode codeListValue="eng"
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schemas/resources/Codel
ist/ML_gmxCodelists.xml#LanguageCode">eng</gmd:LanguageCode>
  </gmd:language>
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode codeListValue="series"
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  </gmd:hierarchyLevel>
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      </gmd:organisationName>
      <gmd:positionName>
        <gco:CharacterString>Earth Observation helpdesk</gco:CharacterString>
      </gmd:positionName>
      <gmd:contactInfo>
        <gmd:CI_Contact>
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            <gmd:CI_Address>
              <gmd:electronicMailAddress>
                <gco:CharacterString>eohelp@eo.esa.int</gco:CharacterString>
              </gmd:electronicMailAddress>
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      </gmd:role>
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  </gmd:metadataStandardName>
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```




```

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      </gmd:CI_Citation>
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    <gmd:abstract>
      <gco:CharacterString> The Medium Resolution Imaging Spectrometer (MERIS) (more
info here ) is one of the instruments aboard the Environmental Satellite ENVISAT (more info
here ). The primary mission of MERIS is the measurement of sea colour in the oceans and in coastal
areas. Knowledge of the sea colour can be converted into a measurement of chlorophyll pigment
concentration, suspended sediment concentration and of aerosol loads over the marine domain. MERIS
is also capable of retrieving cloud top height, water vapour total column, and aerosol load over
land. Some examples of specific MERIS applications can be found here . From this collection you
may order products of the following types: - Level 1b Full Resolution (MER_FR_1P) - Level 2
Full Resolution (MER_FR_2P)</gco:CharacterString>
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        </gmd:organisationName>
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        </gmd:positionName>
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```



```

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- INSPIRE Themes, Version 1.0</gmx:Anchor>
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Visible Imagery</gmx:Anchor>
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Science Keywords. Version 6.0.0.0.0 </gmx:Anchor>
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the Category of use the data products
into:

            1 use: Comprises data which are
for research and applications,

```

research on long term issues of System science, research and in preparation for future use and ESA internal use. ESA Category 1 use data either at costs or free of charge.

2 use: Comprises all other data do not fall into Category 1 use, operational and commercial data. 2 use data are provided by Entities appointed by ESA.

```

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1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the
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    </gmd:report>
  </gmd:lineage>
  <gmd:LI_Lineage>
    <gmd:statement>
      <gco:CharacterString> The Medium Resolution Imaging Spectrometer (MERIS)
(more info here ) is one of the instruments aboard the Environmental Satellite ENVISAT (more
info here ). The primary mission of MERIS is the measurement of sea colour in the oceans and in
coastal areas. Knowledge of the sea colour can be converted into a measurement of chlorophyll
pigment concentration, suspended sediment concentration and of aerosol loads over the marine domain.

```



MERIS is also capable of retrieving cloud top height, water vapour total column, and aerosol load over land. Some examples of specific MERIS applications can be found here . From this collection you may order products of the following types: - Level 1b Full Resolution (MER_FR_1P) - Level 2 Full Resolution (MER_FR_2P) </gco:CharacterString>

```

    </gmd:statement>
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</gmd:lineage>
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                <gmd:CI Citation>
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