Report on "iCUPE tests plan and interoperability interfaces with GCI, TEPs, DIAS and with other strands (ver 1)"

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Florence, Italy, 19 September 2018

WP5: Data provision, interoperability and facilitation of data and services

Task 5.3: Compliance of iCUPE to GEOSS and Copernicus data sharing principles and GCI interoperability testbeds (horizontal) / Deliverable 5.3.1: iCUPE data management principles (ver 1)

Version 1

Note

The deliverable D5.4.1 on *iCUPE tests plan and interoperability interfaces with GCI, TEPs, DIAS and with other strands (ver 1)* is a deliverable of type O (Other), consisting in the configuration of the interoperability test engines and procedures. The present document is the report on D5.4.1 summarizing the main results.

Introduction

The iCUPE WP5 ("*Data provision, interoperability and facilitation of data and services*") facilitates the data provision and services from the iCUPE project (www.atm.helsinki.fi/icupe) to the end-users, decision-makers, and stakeholders. Data obtained, integrated and accessed in WPs 1-4 are distributed in WP5 as data products and assessments. Data (ground-based, time-series, column, etc. observations) will be harmonized and assessed through developed novel methods, proxies and observables. These will be delivered through interoperability tools and services and will be available to iCUPE partners and any other end-users, decision-makers, and stakeholders (in agreement with existing data policies and open source principles).
In particular, interoperability tests are necessary to assure the integration of relevant data systems like GEOSS through the GEOSS Common Infrastructure (GCI), the ESA Thematic Exploitation Platforms (TEPs), the multiple implementations of the Copernicus Data and Information Access Services (DIAS), and the infrastructures developed in the other ERA-PLANET Strands (SMURBS, GEOESSENTIAL, IGOSP).

To this aim, the iCUPE WP5 carries out interoperability tests on the exposed interfaces of those systems using proper tools and procedures: D5.4.x "iCUPE tests plan and interoperability interfaces with GCI, TEPs, DIAS and with other strands (ver x)" under responsibility of CNR.

Report on interoperability tests

GEOSS Common Infrastructure

A central part of GEO's Mission is to build the Global Earth Observation System of Systems (GEOSS). GEOSS is a set of coordinated, independent Earth observation, information and processing systems that interact and provide access to diverse information for a broad range of users in both public and private sectors. GEOSS links these systems to strengthen the monitoring of the state of the Earth. It facilitates the sharing of environmental data and information collected from the large array of observing systems contributed by countries and organizations within GEO. Further, GEOSS ensures that these data are accessible, of identified quality and provenance, and interoperable to support the development of tools and the delivery of information services. Thus, GEOSS increases our understanding of Earth processes and enhances predictive capabilities that underpin sound decision-making: it provides access to data, information and knowledge to a wide variety of users. This 'system of systems', through its GEOSS Platform (former GCI), proactively links together existing and planned observing systems around the world and support the need for the development of new systems where gaps currently exist. It will promote common technical standards so that data from the thousands of different instruments can be combined into coherent data sets. The GEO Discovery and Access Broker (GEO DAB) is the primary mechanism by which all data and information is discovered and accessed. The GEO DAB implements the necessary mediation and harmonization services through Application Program Interfaces (APIs). These APIs allow data providers to share resources without having to make major changes to their technology or standards [1].

CNR-IIA designs, develops, maintains and operates the GEO DAB and the GEOSS API. The GEO DAB is also one of the Key Enabling Technology (KET) in ERA-PLANET for the development of the ERA-PLANET Knowledge Platform therefore no issue was encountered during the interoperability tests.

ESA TEP

ESA has started in 2014 the EO Exploitation Platforms (EPs) initiative, a set of R&D activities that in the first phase (up to 2017) aims to create an ecosystem of interconnected Thematic Exploitation Platforms (TEPs) on European footing, addressing:

- Coastal,
- Forestry,
- Hydrology,
- Geohazards,
- Polar,

- Urban themes; and
- Food Security (under definition),

In short, an EO exploitation platform is a collaborative, virtual work environment providing access to EO data and the tools, processors, and Information and Communication Technology resources required to work with them, through one coherent interface. The fundamental principle of the EP operations concept is to move the user to the data and tools. Users access a platform work environment providing the data, tools, and resources required, as opposed to downloading, replicating, and exploiting data 'at home' [2].

The H2020 EDGE (European Direction in GEOSS Common Infrastructure Enhancements; 2017-2020) project led by ESA, with CNR-IIA as subcontractor, is analyzing the interoperability with ESA TEPs in the GEOSS Platform context. CNR-IIA plans to leverage the outcomes of this EDGE activity for interoperability test in ERA-PLANET. Interoperability tests have been postponed.

Copernicus DIAS

The European Commission (EC) has launched an initiative to develop Copernicus Data and Information Access Services (DIAS) that facilitate access to Copernicus data and information from the Copernicus services. By providing data and information access alongside processing resources, tools and other relevant data, this initiative is expected to boost user uptake, stimulate innovation and the creation of new business models based on Earth Observation data and information. In response to the requirements laid down by the EC and approved by Participating Countries, ESA has launched a call for services to establish the DIAS with the aim to deploy operational access platforms in early 2018. In parallel, EUMETSAT are building up a DIAS in a stepwise approach and aim at first functionalities to be available in the same timeframe [3].

The European Commission launched the 4+1 Copernicus DIAS (Consortium led by SERCO with OVH as cloud provider; Consortium led by CREOTECH INSTRUMENTS with CLOUDFERRO as cloud provider; Consortium led by ATOS INTEGRATION with T-SYSTEM INTERNATIONAL as cloud provider; Consortium led by AIRBUS DEFENCE AND SPACE with ORANGE as cloud provider; EUMETSAT) on 20th June 2018. They offer the DIAS initial services addressing the provision of access to Copernicus data and information (so called back-office services) [4].

Due to the short time since the release of the 4+1 DIAS instances, it still was not possible to conduct full interoperability tests. However, a preliminary analysis of the DIAS support to data sharing specifications suggests that no major issue will be encountered (as for Requirement DIAS-1-15: *The DIAS catalogue(s) and its (their) contents shall be interoperable with the catalogues offered by the*

Copernicus distribution services and adhere to common standards that ensure interoperability with other communities and infrastructures (e.g. the European Data Portal, INSPIRE infrastructures, and GEOSS) [4])

Other ERA-PLANET Strands

ICUPE is one of the four strands for ERA-PLANET Transnational Projects. The other three strands have similar activities to design and develop platform for data, information and knowledge generation and sharing. Although the requirements differ, synergy between the efforts in Transnational Projects is useful and even necessary, for avoiding duplication of efforts, optimizing mobilization of resources and last but not least, a better and harmonized contribution of ERA-PLANET to international inititatives – GEO/GEOSS in primis.

Taking into account the preliminary design of platforms in the Transnational Projects, a common design principle is the adoption of a loosely-coupled architecture allowing interoperability with the external environment - see GEOEssential DP6 "ERA-PLANET Knowledge Platform exposes a set of (high-level) APIs for interaction with the external environment". Therefore, in general it is possible to conceive an interaction between the different Transnational Project platforms. Moreover, the different platforms share a second design principle concerning the extension of the platform itself through internal APIs – see GEOEssential DP4 "ERA-PLANET Knowledge Platform is made of software components interacting through (low-level) APIs". Therefore, it is possible to conceive the four platforms as specialization through extension of a single ERA-PLANET Platform.

Since there will be a single ERA-PLANET Knowledge Platform with dedicated views to the four Strands, no interoperability issue between the four strand platforms exists.

Summary

Platform	Status
GEOSS	No issue
TEPs	Postponed
DIAS	Postponed. No issue foreseen.
Other Strands	No issue

References

[1] GEO, «GEOSS,» [Online]. Available: http://earthobservations.org/geoss.php.

[2] ESA, «About TEP,» 2017. [Online]. Available: https://tep.eo.esa.int/about-tep.

[3] Copernicus, «The upcoming Copernicus Data and Information Access Services (DIAS),» 2017. [Online]. Available: http://copernicus.eu/news/upcoming-copernicus-data-and-information-access-services-dias.

[4] European Commission, «Annex to the Commission Implementing Decision on the Adoption of the Work Programme 2018 and on the Financing of the Copernicus Programme,» 2018.

[5] European Commission, «Functional Requirements for the Copernicus Distribution Services and the Data and Information Access Services (DIAS),» 2016.