



VO interoperability framework integration in the European Open Science Cloud First steps and challenges

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> Astronomical Data Archives Meeting 5-8 August 2019 – Sydney (NSW, AU)



- Astrophysics & Interoperability
- Integration in the EOSC scenario
- Computing infrastructure @ OATs





Interoperability

- Interoperability is a characteristic of a product or system, whose interfaces are completely understood, to work with other products or systems, at present or in the future, in either implementation or access, without any restrictions.
 - It requires open standards by default







Interoperability in Astrophysics

The Virtual Observatory (VO) is the vision that astronomical datasets and other resources should work as a seamless whole. The International Virtual **Observatory Alliance (IVOA) is** an organisation that debates and agrees the technical standards that are needed to make the VO possible.









European Level Interoperations

Genova & al. 2015

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European Open Science Cloud

Over the past years, numerous policy makers from around the world have articulated a clear and consistent vision of global <u>Open Science as a</u> <u>driver for enabling a new paradigm of transparent, data-driven science</u> as well as accelerating innovation.

In Europe, this vision is being realised through an ambitious programme under the heading of the <u>European Open Science Cloud (EOSC)</u>.

The EOSC will offer 1.7 million European researchers and 70 million professionals in science, technology, the humanities and social sciences a virtual environment with open and seamless services for storage, management, analysis and re-use of research data, across borders and scientific disciplines by federating existing scientific data infrastructures, currently dispersed across disciplines and the EU Member States.







European Open Science Cloud



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European Science Cluster of Astronomy & Particle physics ESFRI research infrastructures

Aims to address the Open Science challenges shared by ESFRI facilities (CTA, ELT, EST, FAIR, HL-LHC, KM3NeT, SKA) as well as other pan-European research infrastructures (CERN, ESO, JIV-ERIC, EGO-Virgo) in astronomy and particle physics research domains.



https://projectescape.eu/







ESCAPE @ CEVO

- WP4 "Connecting ESFRI projects to EOSC through VO framework"
 - Lead: Mark Allen
- Objectives

INAF

- assess and implement the connection of the ESFRI and other astronomy Research Infrastructures to the EOSC through the Virtual Observatory framework
- refine and further pursue implementation of FAIR principles for astronomy data via the use and development of common standards for interoperability including the extension of the VO to new communities
- establish data stewardship practices for adding value to the scientific content of ESFRI data archives







Molinaro, Bertocco, Taffoni – VO integration within EOSC 5 August 2019 –Astronomical Data Archives Meeting – Sydney (NSW, AU)

• "Integration of astronomy VO data and services into the EOSC"

- Bulk goals

Task-4.1

- Indentify contacts & relevant EOSC services
- Assess information to help data providers (ESFRI & RIs) to work within EOSC
- Contribute to the EOSC Hybrid Cloud
- Containerise domain-specific services
- Starting phase
 - Inclusion of (VO) Registry in the EOSC catalogue
 - VOSpace integration as a distributed data solution within EOSC Hybrid Cloud





INAF – OATs Computing & Data Infrastructure







EOSC Hybrid Cloud & INAF – OATs

- The INAF-OATS computing facility will be used as an integration test-bed for ESCAPE
 - WP4 (Connecting ESFRI projects to EOSC through VO framework)
 - WP5 (ESFRI Science Analysis Platform)
- to integrate IVOA compliant Virtual Observatory (VO) services within the EOSC hybrid cloud scenario
- to test containerization of VO aware applications.
- Data archive infrastructure managed by IA2 (see R. Smareglia talk)





There's a poster describing the computing infrastructure in place at INAF – OATs



INAF Trieste Astronomical Observatory Information Technology Framework

S. Bertocco, D. Goz, L. Tornatore, A. Ragagnin, G. Maggio, F. Gasparo, C. Vuerli, G. Taffoni, M. Molinaro

ABSTRACT

INAF Trieste Astronomical Observatory (OATs) has a long tradition in information technology applied to Astronomical and Astrophysical use cases, particularly for what regards computing for data reduction, analysis and simulations; data and archives management; space missions data processing; design and software development for ground-based instruments.

INAF - OATs participated, since the beginning, in Italian Grid and Cloud initiatives gaining a major role in Italy and in Europe in large projects for the development of a multidisciplinary platform for distributed computing and data resources sharing.

Recently it participated in EU <u>EGLeu</u> projects, coordinating the Astronomy and Astrophysics community, for the development of a cloud based infrastructure in Europe with the aim to spread the <u>IVOA</u> standards based interoperability with <u>CANFAR</u> in Canada.

INAF - OATs deployed a computing centre that offers HPC and cloud resources for internal users, INAF and large international projects. Now INAF - OATs is active in the design of the SKA regional centres

In this poster we describe our technological stuff and main computing activities.

[Bertocco & al.]

For further info refer to the computing centre pages...



http://tiny.cc/193eaz

Further reading...







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ESCAPE

European Science Cluster of Astronomy Particle physics ESERI research Infrastructure ESCAPE "European Science Cluster of Astronomy & Particle physics ESFRI research infrastructures" is a project, funded by the European Commission under the Horizon2020 programme with grant number 824064.

Thank you!





BACKUP SLIDES





Open: Data, Access, Science

INAF

Open Science involves transitioning from a system in which it is difficult to access and locate the results of scientific research to one that openly distributes results to all kinds of end users [...]







IVOA FAIR mapping





