Standards and Interoperability

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Why

Idea & Scope

The Open Science paradigm and FAIR principles are essential in disseminating scientific results and curating and distributing research data. Topics like preservation, curation, annotation, interoperability, usability of data and connected service are key in advancing those principles within a research domain, and can only be reflected through an open definition of community driven, shared standards.

This thematic group is meant to gather experts, and interested people, in topics related to standardization and interoperability of data and service resources and discuss details and facets specific to the astrophysics domain (to be considered at large: observational to numerical simulations, whatever the subdomain: cosmology, stellar or galactic physics, heliospheric physics, space weather, exoplanets research, ...).

Idea highlights

The **Open Science** paradigm and **FAIR principles** are essential in disseminating scientific results and curating and distributing research data. Topics like preservation, curation, annotation, **interoperability**, usability of data and connected service are key in advancing those principles within a research domain, and can only be reflected through an **open** definition of **community** driven, shared **standards**.

- Open Science <> opposite of bad science
- Digital resources -> leverage FAIR principles
- Principle ≠ Rule/Convention/Norm
- Research domain -> Intrinsic characteristics
- Characteristics -> turn principles into conventions
  - conventions -> standards
- **research domain** :: community
- community shared conventions :: **open standards**

Research domains

Select Concepts | Explore | Contribute | Updates | About | Contact

BROWSE & SEARCH UAT CONCEPTS

Index | Hierarchy | Search

expand all | collapse all

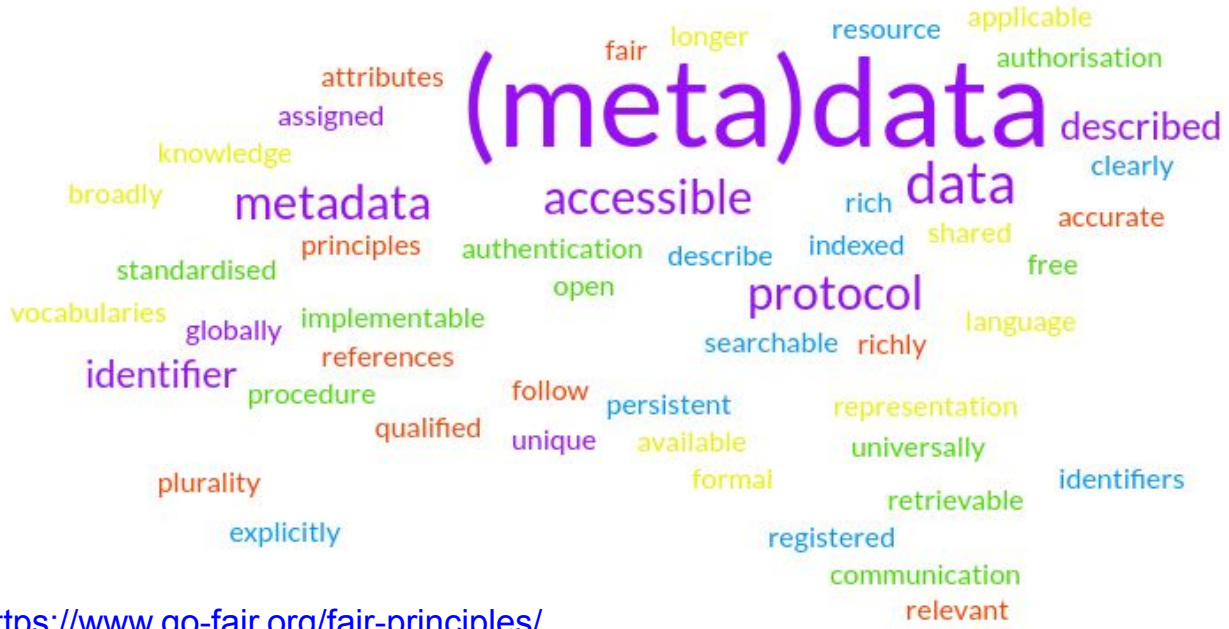
- Astrophysical processes
- Cosmology
- Exoplanet astronomy
- Galactic and extragalactic astronomy
- High energy astrophysics
- Interdisciplinary astronomy
- Interstellar medium
- Observational astronomy
- Solar physics
- Solar system astronomy
- Stellar astronomy

The full list of UAT Concepts can be viewed alphabetically via the Index view, or by its structured hierarchy. You can also search through all the UAT concepts.

In the Index view, the list of all available UAT concepts is visible, sorted alphabetically. Clicking on the name of a concept will take you to more details about that concept.

The UAT is designed to be a polyhierarchy, meaning that for some concepts there are multiple paths to get to it starting from top level concepts. You can see this structure in the Hierarchy view. Clicking on arrow icons will open or close a list of child concepts. Clicking on the name of a concept will take you to more details about that concept.

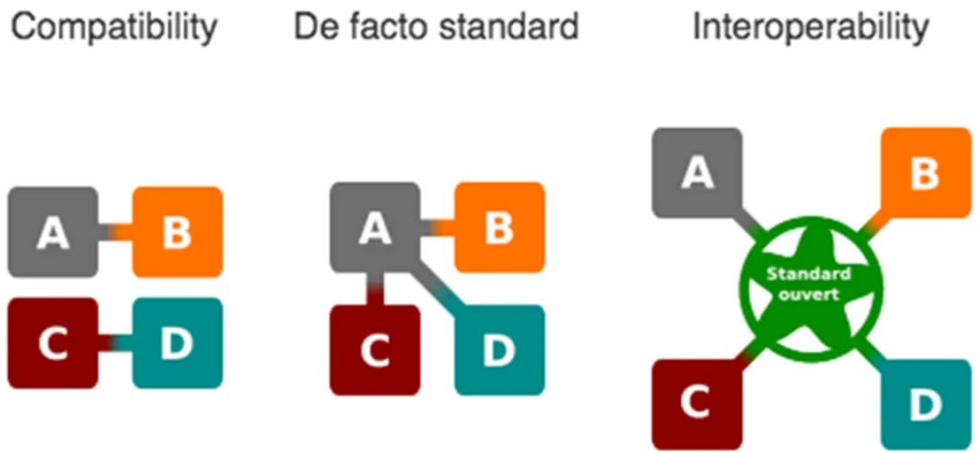
Standards



https://www.go-fair.org/fair-principles/

Why open

not open == not interoperable



What

Definitions

Data

In computing, a data is a collection of facts, figures, or details that can be processed or analyzed. It often consists of numbers, text, or other types of information that are recorded and stored electronically.

Data serves as the foundation for creating information and insights through analysis and interpretation. It can be raw, unprocessed input or structured and organized to facilitate meaningful conclusions. In various contexts, data is used to make decisions, generate reports, or drive machine learning algorithms. Proper management and understanding of data are crucial for effective decision-making and problem-solving.

Metadata

A metadata is data that provides information about other data. It describes various attributes of data, such as its origin, format, and relationships to other data, which helps in organizing, managing, and retrieving it efficiently.

Metadata can include details like the creator of a file, the date it was created, and how it should be used. It is essential for data cataloging and improving the accessibility and usability of information.

By offering context and structure, metadata enhances data searchability and interoperability across different systems and platforms.

FAIR

The FAIR principles (Findable, Accessible, Interoperable, Reusable) are guiding principles aimed at making scientific data and resources more easily findable, accessible, interoperable, and reusable. Applying them concretely means implementing a series of practices that improve data management.

Findable

- **Detailed metadata:** Provide clear and detailed descriptions of your data through accurate metadata. Use standardized metadata schemas (e.g., Dublin Core, DataCite).
- **PID (Persistent IDentifier):** Assign a unique and persistent identifier, such as a DOI, to your dataset to make it easily findable online.
- **Repository:** Deposit your data in public and well-indexed repositories that make the dataset visible to scientific data search engines.

Accessible

- **Open access protocols:** Use repositories that support open access or clearly define access levels (open, restricted, authenticated) through standard protocols.
- **Persistent metadata:** Even if the data cannot be fully open, the metadata should remain permanently accessible.
- **Clear licenses:** Apply standard licenses (e.g., Creative Commons) to clarify how the data can be used and under what conditions.

Interoperable

- **Standard formats:** Use open and community-recognized data formats.
- **Controlled vocabularies:** Use standardized ontologies and vocabularies to describe the data, ensuring they are understandable and usable by different systems and tools.
- **Links to other data:** Facilitate connections between your data and other relevant resources, such as ontologies or related datasets.

Reusable

- **Comprehensive documentation:** Provide detailed documentation on how the data were collected, processed, and how they should be used.
- **Clear reuse licenses:** Clearly define under what terms and conditions the data can be reused, ideally with a license that allows free reuse (e.g., CC-BY).
- **Quality and reliability:** Ensure the data are of high quality, up-to-date, and valid for further use, with any revisions or corrections well documented.

Conclusions

Group activities

Examples of goals and purposes of this group are:

- Sharing Knowhow, to factorise experiences, reducing redundancy in work and help overcome common issues;
- Tech Forum to discuss existing technologies, their usage and upgrade;
- INAF harmonization, to coordinate participation and connection to national, European and global organizations devoted to standards development (IVOA, IPDA, IHDEA, VObs.it, etc.) to bring requirements and provide feedback from INAF community experience;
- Funding Search Support, to Investigate funding opportunities to support standardisation efforts and improve INAF data and services resources in terms of FAIR principles adherence.

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JOIN US!

https://usc8.inaf.it/tematic-groups/standards-and-interoperability/