Successful stories in NFFA-Europe Pilot and beyond

29.11.2023 – FAIR Data Day, Bologna (Italy)

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It’s all about Data Management

Common aim:
- Data management practices following the FAIR principles
- Tools and infrastructure solutions

Outline:
- Ongoing activities and achievements
- Reached in collaboration
- Development guided by requirements
Are we talking about the same thing?

• MDMC-NEP Glossary of Terms

Research User
Person, usually member of a Project, who conducts any part of the Study, in order to collect and/or analyse Research Data, or is interested in reusing Research Data by a third party (e.g. Reference Data) with the final aim to extract insights that support the answer to some specific research question (i.e., Conclusions). Research Users may be assigned with a role (data curator, instrument scientist, team leader, team member).

https://jl-mdmc-helmholtz.de/mdmc-activities/metadata-working-group/metadata-wg-topics/semantics/glossary/
Are we talking about the same thing?

- MDMC-NEP Glossary of Terms
- EVOKS Vocabulary service
  - Persistent identifier to each term
  - Websites, ELNs, automatic processes...
  - Centrally maintained

![Research User](image)

**User Name**
- Rossella Aversa

**User Role**
- Data Curator
- Instrument Scientist
- Team Leader
- Team Member

**User Role**

**User Role**

**Prefered Term**

**Narrower Concepts**
- Instrument Scientist
- Team Leader
- Team Member

**URI**

**Download this Concept**
- RDF/XML
- TURTLE
- JSON-LD

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This initiative has received funding from the EU’s H2020 framework program for research and innovation under grant agreement n. 101007417, NFFA-Europe Pilot Project.
What can I describe?

Publication Data

Dataset

Metadata

Research Data

Raw Data

Analysed Data

Processed Data

Reference Data

Sample, courtesy of M. Mail

Sample holder, courtesy of R. Thelen

Vertical Light Interferometer, courtesy of R. Thelen

Atomic Force Microscope, courtesy of R. Thelen

Cofocal Scanning Microscope, courtesy of R. Thelen

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How do I describe my data?

**Metadata**: descriptive information about data

**Metadata Document**: structured information about a data resource

**Metadata Schema**: outline of the overall structure of the metadata (elements, value types, rules, ...)

Example: JSON metadata schema for Sample

```json

"properties": {
  "sampleName": {
    "type": "string"
  },
  "sampleComponents": {
    "type": "array",
    "items": {
      "type": "object",
      "properties": {
        "sampleComponentName": {
          "type": "string"
        },
        "sampleComponentChemicalFormula": {
          "type": "string"
        }
      }
    }
  },
  "required": ["sampleComponentName"]
},
"samplePreparation": {...
```
Where do I find the metadata schemas?

MetaRepo:
- Metadata schema registry
- Metadata repository
- API and GUI (customizable)
- Automatic validation
- Versioning
- Access control management
- Arbitrary number of XML, JSON schemas

https://metarepo.nffa.eu
Which metadata schemas are available?

- proposal
- (minimal) input
- (minimal) precursor
- (minimal) sample
- (minimal) raw data
- (minimal) analysed data

- SEM
- SEM/FIB tomography
- Nano CT/micro CT
- TEM
- MRI
- STM → see talk by M. Panighel

Ongoing collaboration on Materials Deposition (L. Ferrario, D. De Angelis, M. Panighel)
How do I write my metadata?

**MetaRepo:**
- Register metadata documents according to existing schemas
- Validate them
What if I’m not familiar with JSON?

**Metadata editor:**
- Edit metadata documents according to schemas
- Register documents via the GUI
- Local application (exposes an API for instruments/ELNs)

https://metadata-editor.gitlab.io/documentation/
Should I fill all metadata by hand?

**Metadata editor (local)**

**Automatic Metadata Extraction and Mapping tool**

- **Input:** image, file, ...
- **Output:** metadata document
- **New plugins continuously under development**

https://matwerk.datamanager.kit.edu/mapping-service-ui.html
How do I find data from metadata?

MetaRepo:
- Use content of metadata documents to search for relevant data
- What is the data about? Is it useful for my needs?
- Full-text search
- (basic, customizable) faceted search
- Private vs Public resources
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MetaRepo:

• Use content of metadata documents to search for relevant data
• What is the data about? Is it useful for my needs?

• Full-text search
• (basic, customizable) faceted search
• Private vs Public resources
Let’s put it all together

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Closing Remarks

• Tools and services to facilitate (meta)data management
• Framed in a (meta)data management workflow
• Targeted to be useful to researchers
• Applied in daily research life
Contacts

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