RISIS

RESEARCH INFRASTRUCTURE FOR SCIENCE AND INNOVATION POLICY STUDIES

RISIS Tool Demonstration Event: The OpenAIRE Research Graph: an Open Access resource for research on research

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Getting started

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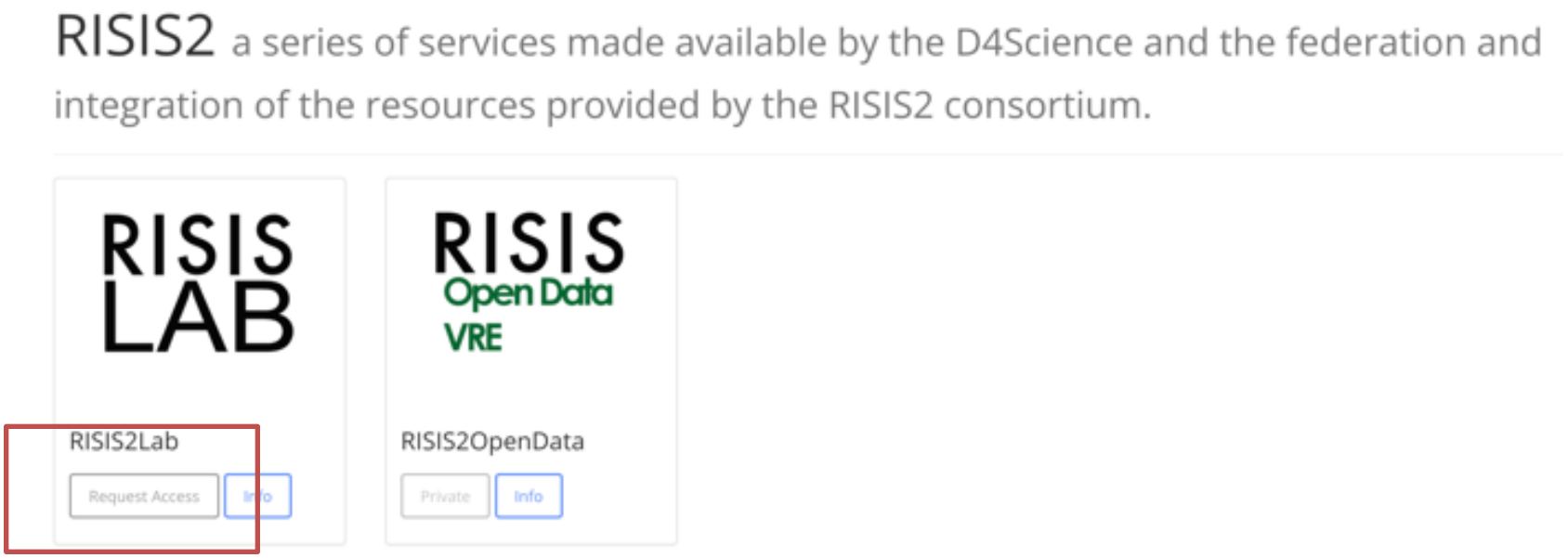
- Ensure you can enter the RISIS Lab Virtual Research Environment of the D4Science infrastructure

Request access (if needed)

https://risis2.d4science.org/explore



Request access, wait for the acceptance email. 10 minutes later you should be able to enter the VRE.

Get into the VRE

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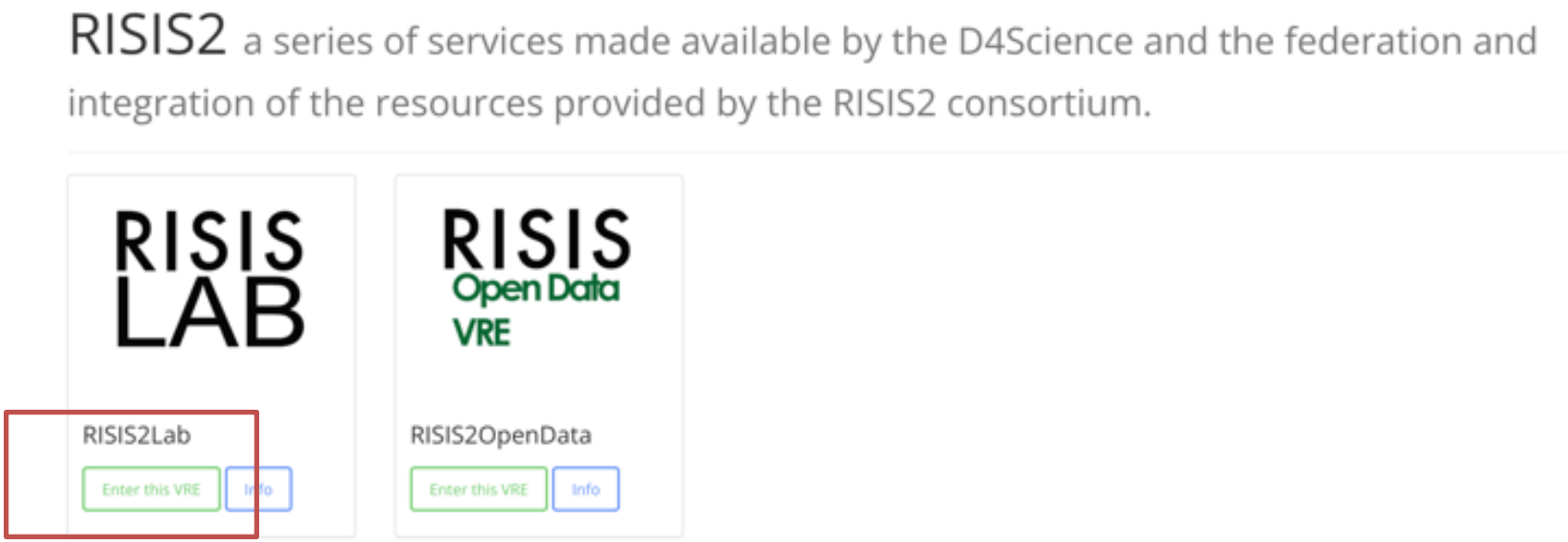
- Click on « Enter this VRE »
- You can also access directly to https://risis2.d4science.org/group/risis2lab



Agenda

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12:35 – 13:00 OpenAIRE Research Graph

- Concept and data model
- The json dumps

13:00 – 14:15 Practical session

- Dataset description (selection of the subset, format)
- Dataset queries with JupyterHub

14:15 – 14:30 Final discussion

Supporting Material

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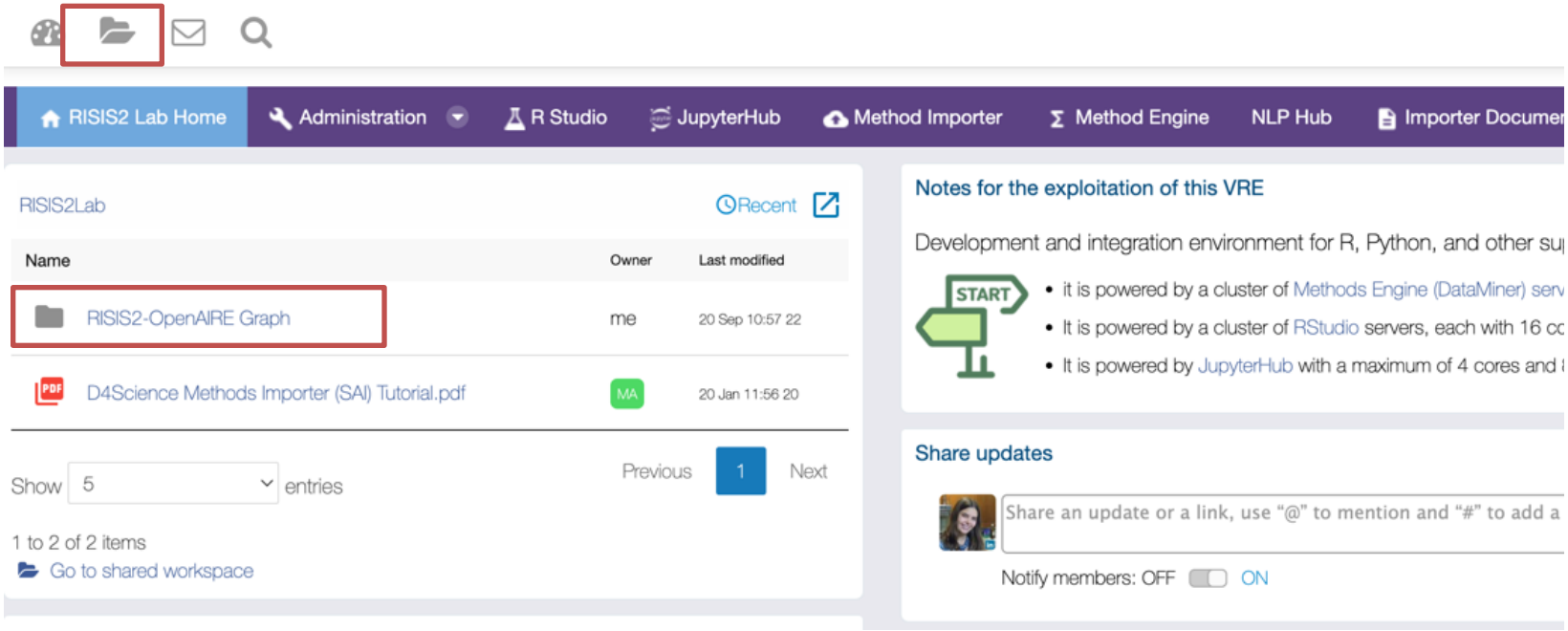
- You can find everything in the VRE workspace, under the folder RISIS2-OpenAIRE Graph:
  - Slides
  - Examples



Subset of the dump

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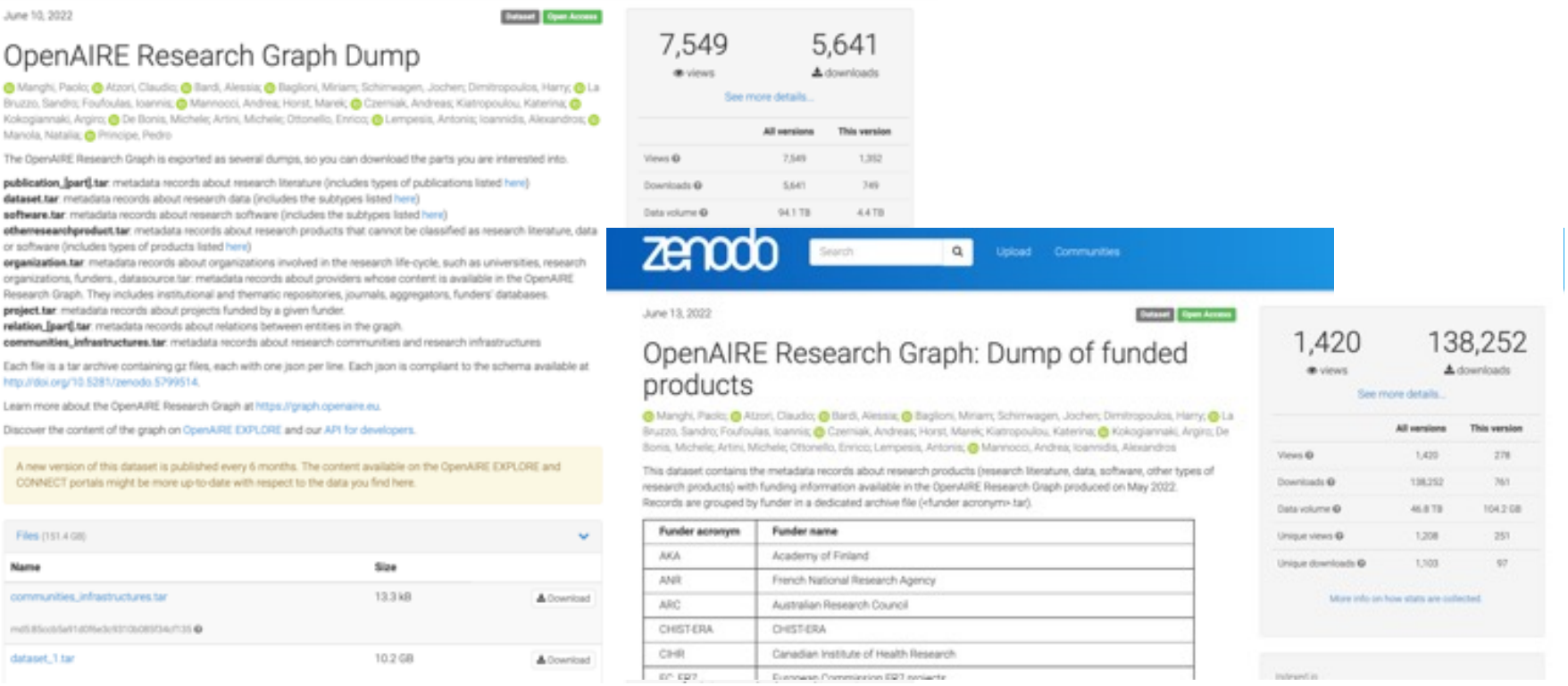
Because the whole [OpenAIRE Research graph Dump](#) is 4.4TB and the [dump of funded products](#) is 104GB and we do not want to lose time in copying data or waiting too much to get results of our queries



Selection of the subset

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- H2020 funded products
- Subset of products funded by a selection of 848 projects: 17369 research results
- Relationships from the whole dump:
  - Organization <isAuthorInstitutionOf> Result (where Result in the subset above)
  - Organisation <isParticipant> Project
  - Result <isSupplementedBy> Result (where both in the subset above)

Data model

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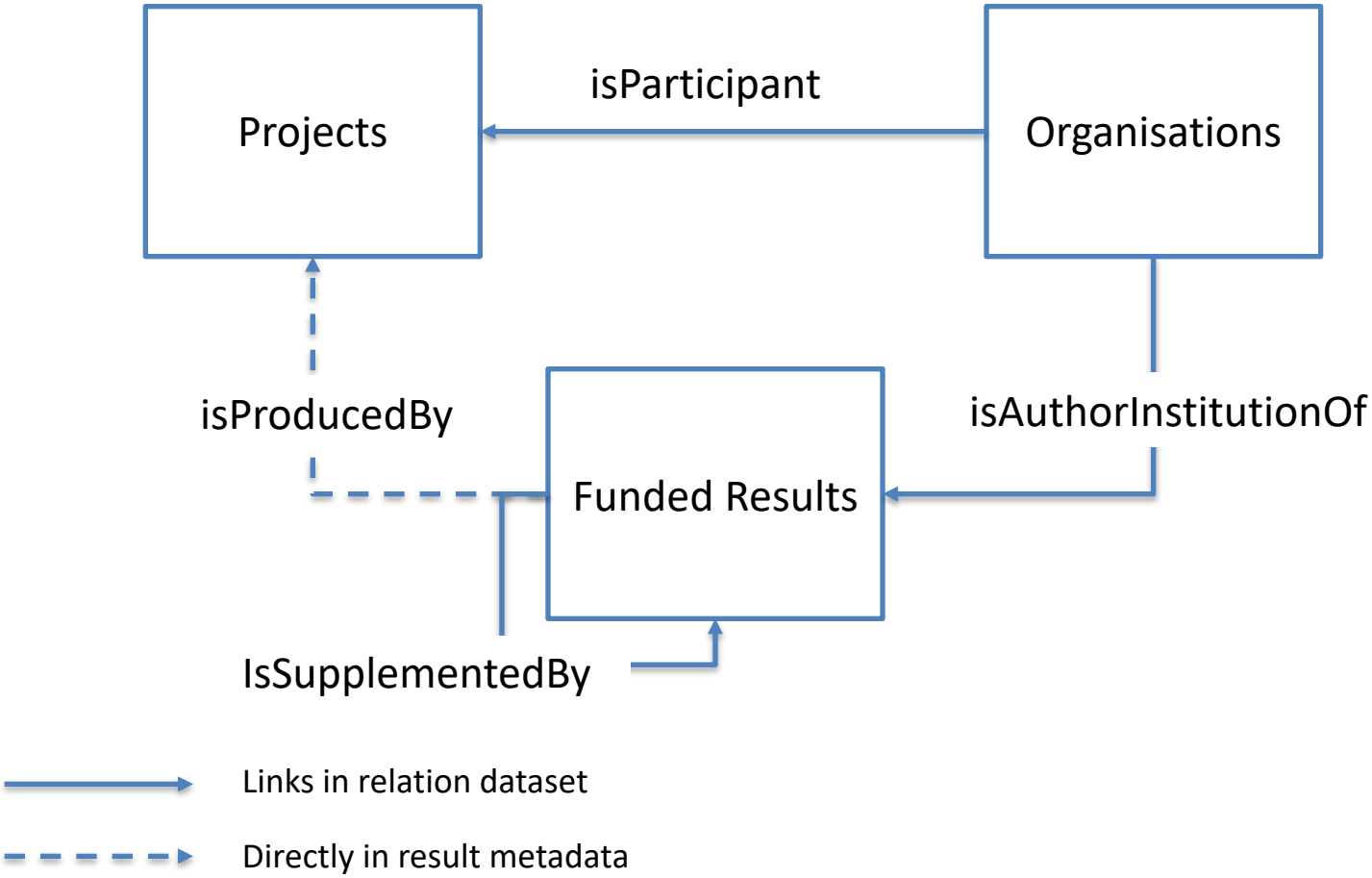
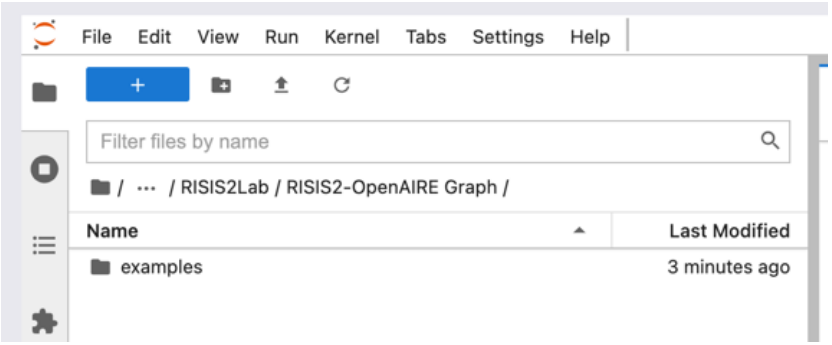
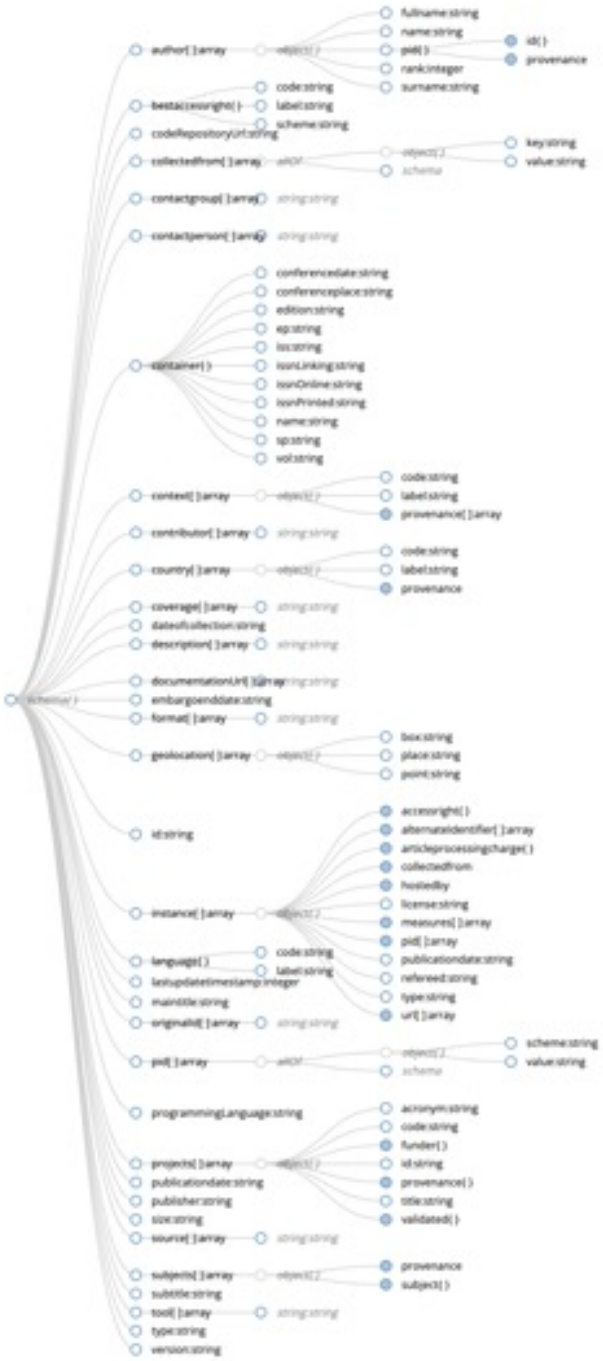


Json schema for funded results

- Funded result schema: 10.5281/zenodo.6372977
- For a “nice” visualization you can download it and use jsonschemaviewer
- See fundedresult-example.json in /workspace/VREFolders/RISIS2Lab/RISIS2-OpenAIRE Graph





Metadata fields we will use: type

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- The type of the research product: publication, dataset, software, other types of research products
- Do not confuse with instance.type, which is the specific type of a version of the product (e.g. Article, Pre-print, Poster)

Metadata fields we will use: subjects

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- Keywords associated to the result. May be free text or terms from controlled vocabularies. May be harvested from the sources, added by MAG, or inferred by OpenAIRE


```
"subjects": [
    {
    "provenance": { "trust": "0.9", "provenance": "Harvested"},
      "subject": {"scheme": "keyword", "value": "Nature-Based Solutions"}
    },
    {
    "provenance": {"trust": "0.39543077", "provenance": "Harvested"},
    "subject": {"scheme": "MAG", "value": "business"}
    },
    {
    "provenance": {"provenance": "Inferred by OpenAIRE", "trust": "0.891"},
    "subject": {"scheme": "mesh", "value": "bacterial infections and mycoses"}
    }
]
```

Metadata fields we will use: container

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- Conference or journal where the result has been presented or published


```
"container": {
    "issnPrinted": "2071-1050",
    "name": "Sustainability",
    "vol": "",
    "sp": "",
    "iss": "",
    "edition": "",
    "issnOnline": "",
    "ep": "",
    "issnLinking": ""
  },
```

Metadata fields we will use: authors

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- Authors of research products. They are ordered and may come with an orcid (persistent identifier) or not.


```
"author": [
    {
        "fullname": "Gerd Lupp","rank": 1
    },
    {
        "fullname": "Aude Zingraff-Hamed",
        "pid": {
            "provenance": {
                "trust": "0.91",
                "provenance": "Harvested"
            },
            "id": {
                "scheme": "orcid",
                "value": "0000-0001-7602-7830"
            }
        },
        "rank": 2
    }
],
```

Metadata fields we will use: bestaccessright and publicationdate

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- Bestaccessright: The most open access right among those of the different versions of this result. Codes and semantics from https://vocabularies.coar-repositories.org/access_rights/


```
"bestaccessright": {
    "scheme": "http://vocabularies.coar-repositories.org/documentation/access_rights/",
    "code": "c_abf2",
    "label": "OPEN"
  },
```


- Publicationdate: main date of the research product. Typically the date of publishing, but it could also be the “issued date” or the deposition date of the pre-print (I know…metadata is not as clean as we would like…)

Metadata fields we will use: projects

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- Project grant in the context of which the result was produced. The association to a project may come from a source (Harvested), from a user (Linked by user), or inferred by OpenAIRE. If validated, it means that it was confirmed by the funder (SyGMA portal for EC projects)


```
"projects": [
    {
        "code": "776681",
        "title": "PHUSICOS: 'According to nature' - solutions to reduce risk in mountain landscapes",
        "acronym": "Phusicos",
        "provenance": {"trust": "0.900","provenance": "Harvested"},
        "funder": {
            "shortName": "EC",
            "jurisdiction": "EU",
            "name": "European Commission",
            "fundingStream": "H2020"
        },
        "validated": {"validationDate": "2021-10-20","validatedByFunder": true},
        "id": "40lcorda__h2020::16a8d0f2527d083af2c361529f982e96"
    }
],
```

Json schema for organisations

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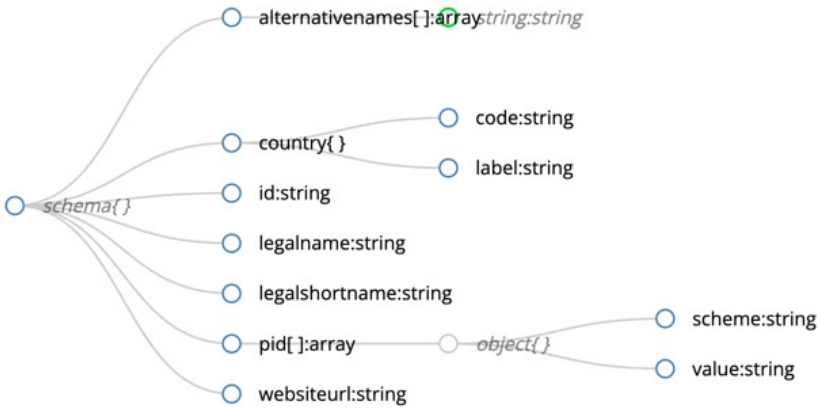
- Organisation schema: 10.5281/zenodo.5799514
- See organisation-example.json


```
{
  "legalshortname": "IFW",
  "country": {"code": "DE","label": "Germany"},
  "pid": [
    {"scheme": "ISNI","value": "0000 0000 9972 3583"},
    { "scheme": "OrgRef","value": "25588007"},
    {"scheme": "GRID","value": "grid.14841.38"},
    {"scheme": "ROR","value": "https://ror.org/04zb59n70"},
    {"scheme": "Wikidata","value": "Q835883"},
    {"scheme": "PIC","value": "999544746"},
    {"scheme": "OrgReg","value": "DE1163"}
  ],
  "websiteurl": "http://www.ifw-dresden.de/",
  "legalname": "Leibniz Institute for Solid State and Materials Research",
  "alternativenames": [
    "IFW Dresden",
    "Leibniz Institute for Solid State and Materials Research",
    "Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden",
    "IFW"
  ],
  "id": "20|openorgs____::b26c5d36199137435bc577f28a3fef5e"
}
```

Json schema for relations

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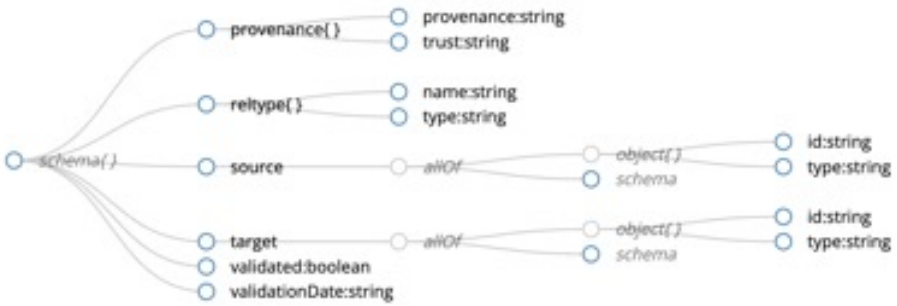
- Relation schema: 10.5281/zenodo.6372977
- Examples: Supplement-example.json, Participation-example.json, Affiliation-example.json




```
{
    "source": {
        "type": "result",
        "id": "50ldoi_________::39af87f0d1d69f135e7e5f3a41a77220"
    },
    "reltype": {"type": "supplement","name": "IsSupplementedBy"},
    "provenance": {"provenance": "Harvested","trust": "0.9"
    },
    "validated": false,
    "target": {
        "type": "result",
        "id": "50ldoi_dedup___::17d8bd9c2095e56b9a0017b71cb0505f"
    }
}
```

Json schema for relations

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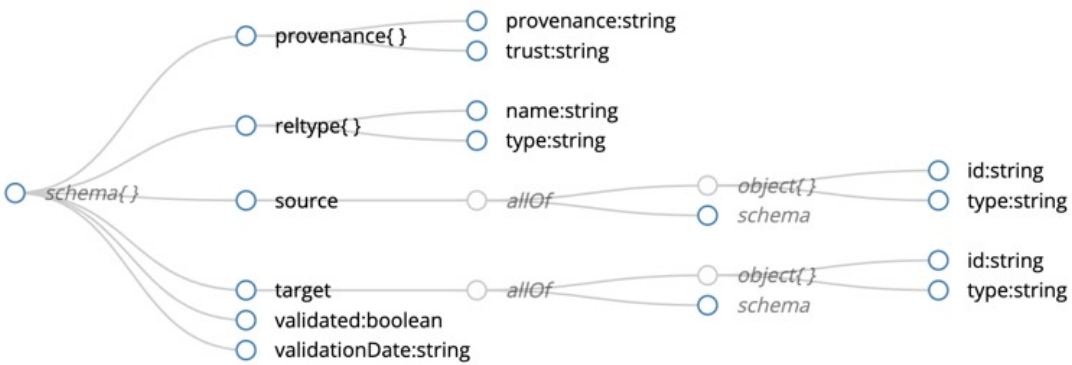
- Relation schema: 10.5281/zenodo.6372977
- A relation may come from a source (Harvested), from a user (Linked by user), or inferred by OpenAIRE.
- Source and target tells you the type of object (result, organization, project) and its OpenAIRE id
- reltype.type tells you the “type” of relation (e.g. supplement). Specific semantics is in reltype.name (e.g. IsSupplementTo)



References to controlled vocabulary

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- https://api.openaire.eu/vocabularies/
- In the dump you'll find the terms, not the codes (that are useful mostly for internal use)
- Of particular interest:
  - dnet:provenanceActions: details about provenance of the records, properties and relationships
  - dnet:result_typologies: types of research results
  - dnet:subject_classification_typologies: subject classification schemes
  - dnet:review_levels: peer reviewed or not?
  - dnet:pid_types: types of PIDs you may find
  - dnet:access_modes: access rights

Ready for coding?

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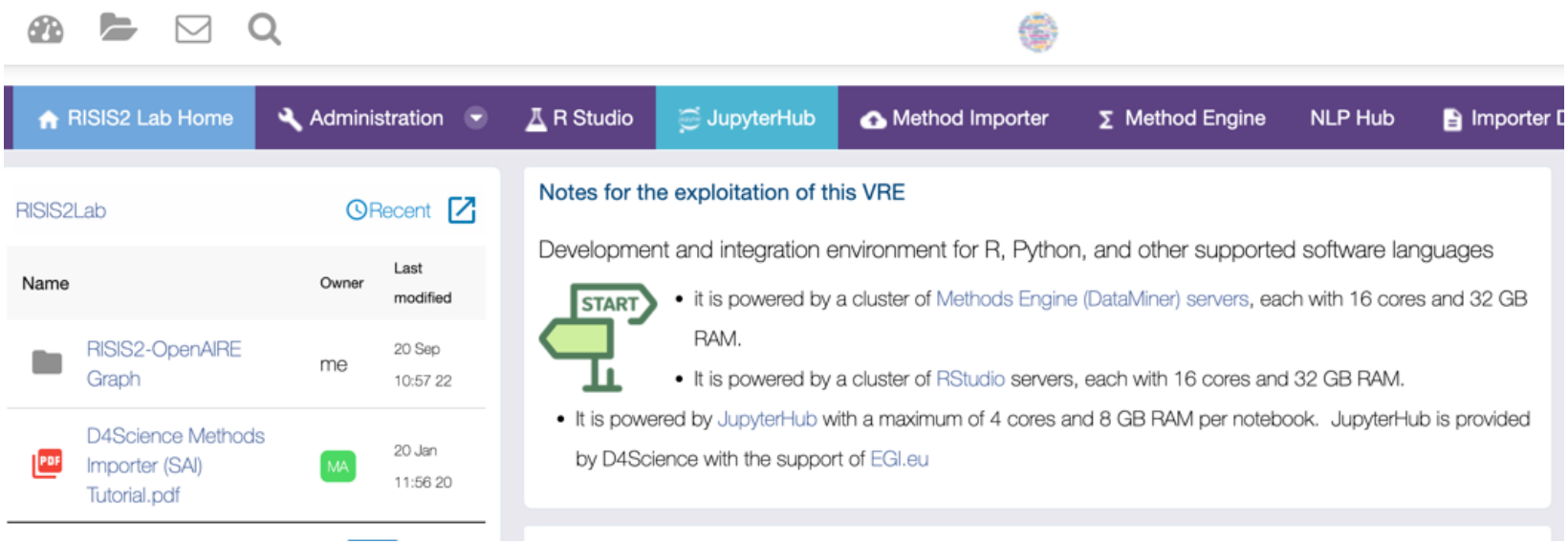
https://risis2.d4science.org/group/risis2lab and go to the JupyterHub



D4SCIENCE INFRASTRUCTURE

Get your server

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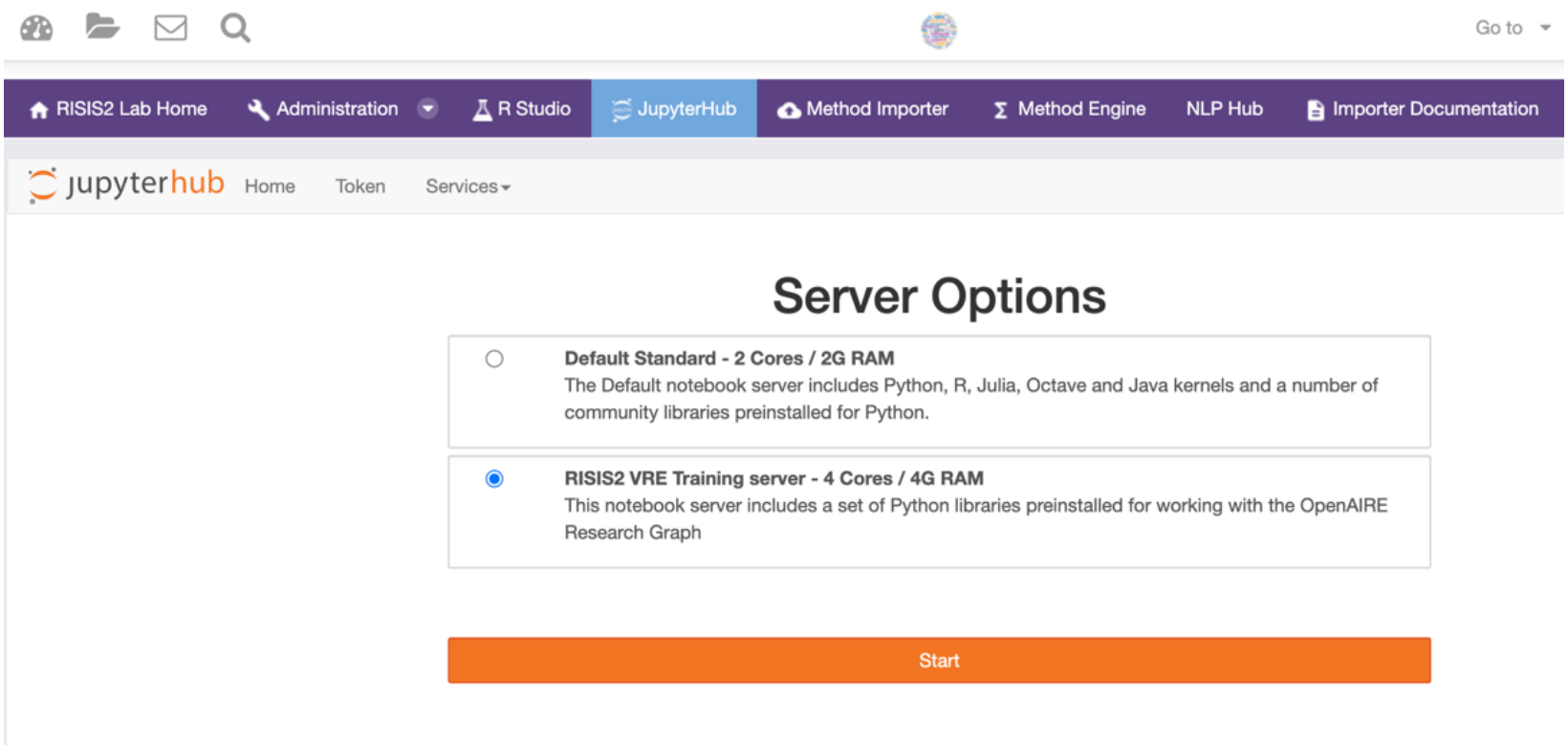
Start the configuration for the RISIS2 VRE Training Server



Server ready?

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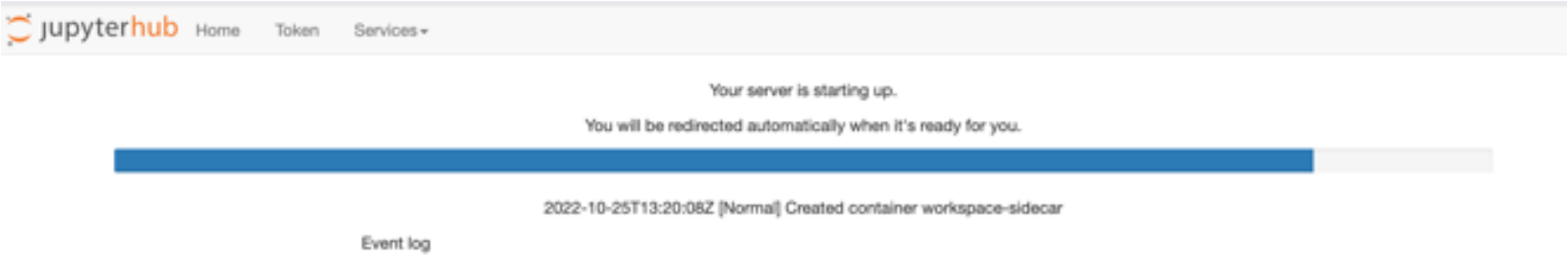
Give it few seconds to set everything up



What do you see?

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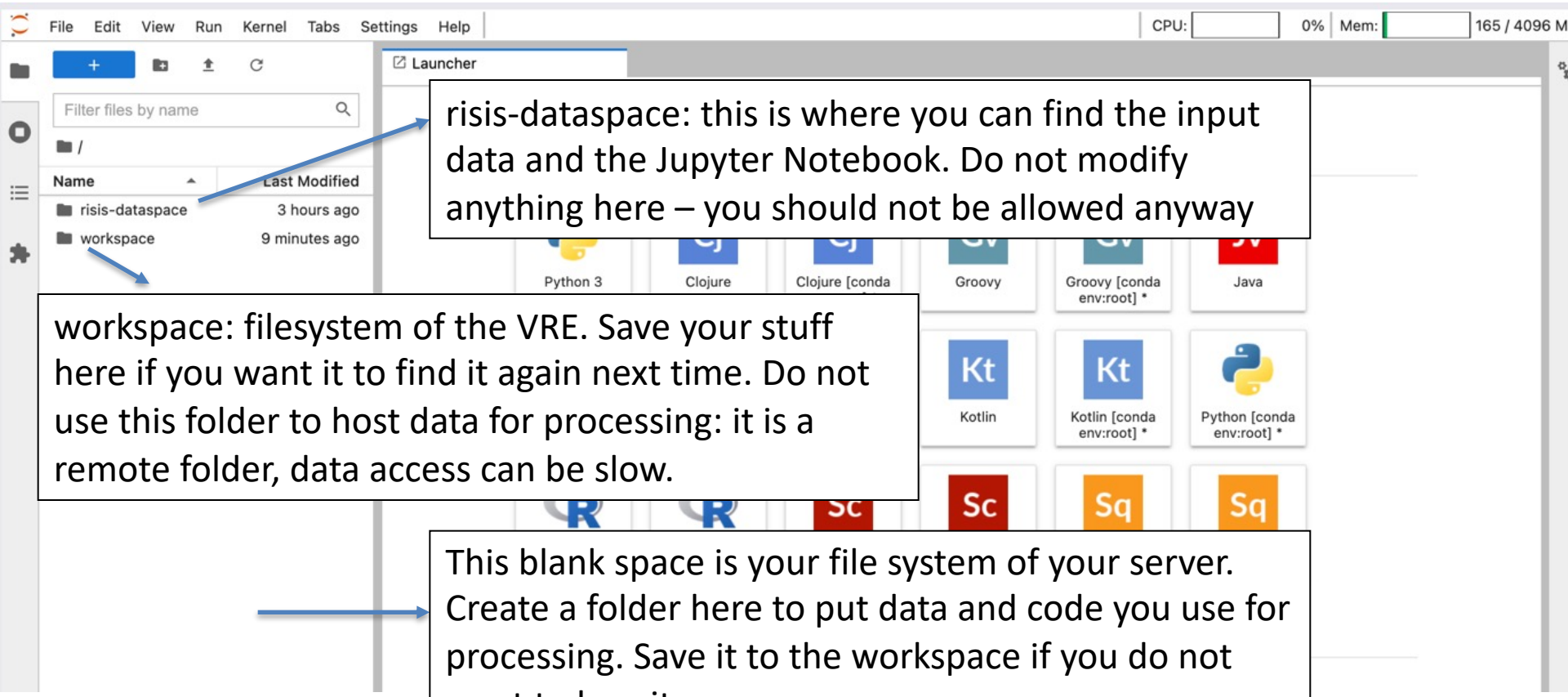
JupyterLab GUI. General documentation in “Help”



risis-dataspace: this is where you can find the input data and the Jupyter Notebook. Do not modify anything here – you should not be allowed anyway

workspace: filesystem of the VRE. Save your stuff here if you want it to find it again next time. Do not use this folder to host data for processing: it is a remote folder, data access can be slow.

This blank space is your file system of your server. Create a folder here to put data and code you use for processing. Save it to the workspace if you do not want to lose it.

Get the data and the notebook

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- Open risis-dataspace
- Copy to your local file system (i.e. at the same level of workspace and risis-dataspace:
  - risis-dataset.zip
  - risis.ipynb
- Before leaving the JupyterLab remember to save everything into the workspace

risis_dataset.zip

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```
jovyan@jupyter-alessia-2ebardi:~/risis_dataset$ ls -l
total 260
drwxr-xr-x 2 jovyan users 77824 Oct 25 13:30 organizations
```
→ metadata about orgs

```
drwxr-xr-x 2 jovyan users 40960 Oct 25 13:31 rel_affiliation
```
→ affiliation rels between results and orgs

```
drwxr-xr-x 2 jovyan users 40960 Oct 25 13:31 rel_participant
```
→ rels between orgs and projects

```
drwxr-xr-x 2 jovyan users    55 Oct 25 13:30 rel_supplement
```
→ rels between research results

```
drwxr-xr-x 2 jovyan users 12288 Oct 25 13:31 results
```
→ metadata about results

Useful documentation

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- PySpark: https://spark.apache.org/docs/latest/api/python/index.html
- D4Science infrastructure: https://www.d4science.org/
- JupyterLab: https://docs.jupyter.org/en/latest/ (also integrated into the JupyterHub)

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THANK YOU !

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RISIS2 EU PROJECT

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