Slides: https://tinyurl.com/lswt-2024-databus

LOD-GEOSS

Databus: FAIR Data in Energy Systems Analysis

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DBpedia Databus - Data Catalog Platform

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- **Metadata Matters**:
  - Data Catalogs and Data Metadata are often neglected (takes some extra effort)
  - Why do you need them?
  - Raising awareness:
    - You might not wonder, why your data projects are slow and mediocre quality, because you probably never worked with good metadata and a good catalog

Data catalogs offer a high potential for innovation, i.e.

realize faster, cheaper & better data projects

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DBpedia Databus - Data Catalog Platform

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› DBpedia Databus
  - a lightweight, scalable, adaptable, powerful Data Catalog Platform
  - Open Source - https://github.com/dbpedia/databus
  - addresses the lack of Open Source data catalog software

› DBpedia Databus is deployed in these areas
  - **Supply Chain Management**
  - **Engineering & Industry 4.0**
  - **Knowledge Graphs & AI**
  - **Data Governance**
  - today: **Research Data Management**

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Open Energy Family

Findable Accessible Interoperable Reusable

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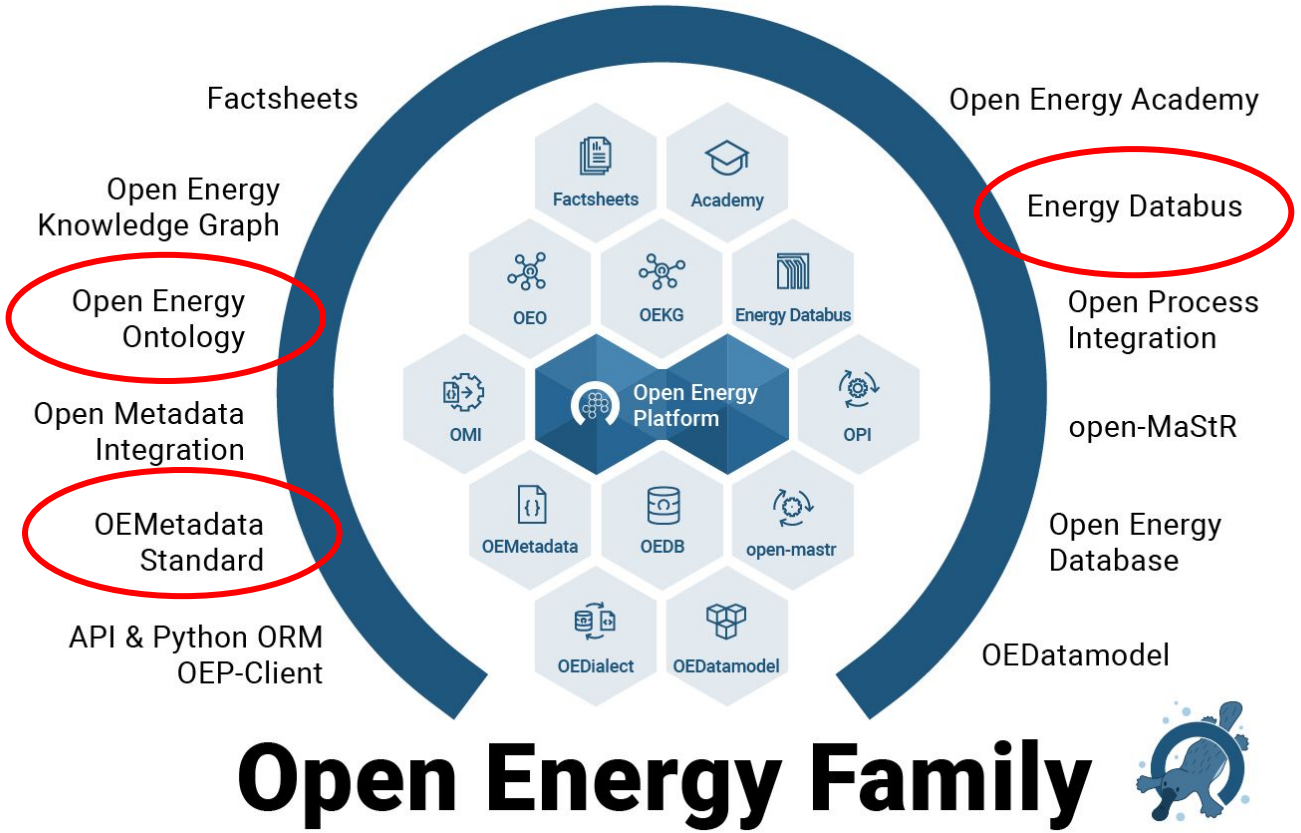
- The **Open Energy Family** is an initiative for open and FAIR data in the domain of energy systems research
- Energy systems research develops models to evaluate and compare future energy scenarios like electricity demand and offer at the Energy Exchange Agency (EEX, Leipziger Strombörse)
- Development of a FAIR infrastructure within the Open Energy Family



https://openenergyplatform.org/

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Challenges I: Finding and Accessing Data

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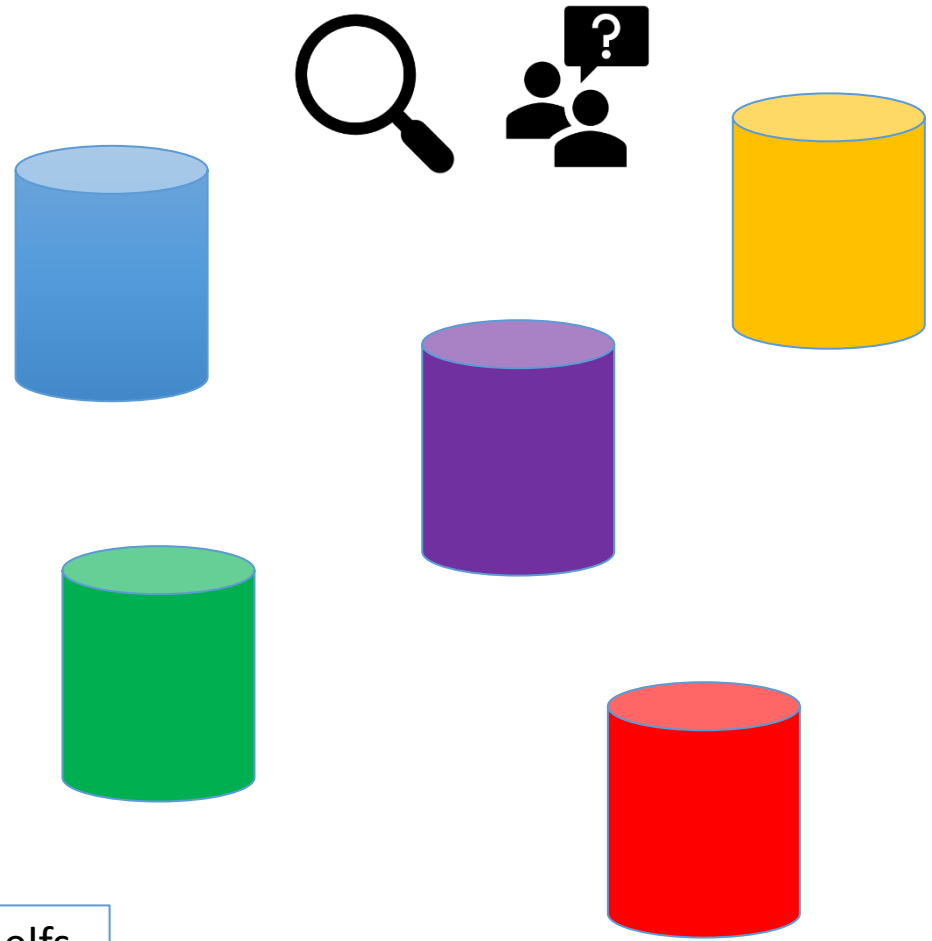
- Most of the research datasets are already online in energy systems research, but …
  - **Online availability (publication) ≠ Findability (Search)**



Pain points for energy systems researchers:

- Data collection is a labor intensive task
- Data cleaning, aggregation, etc.
  is repeated by many researchers with different results
- Data quality is often unknown

Imagine a library without a catalog and systematic numbers on the shelfs

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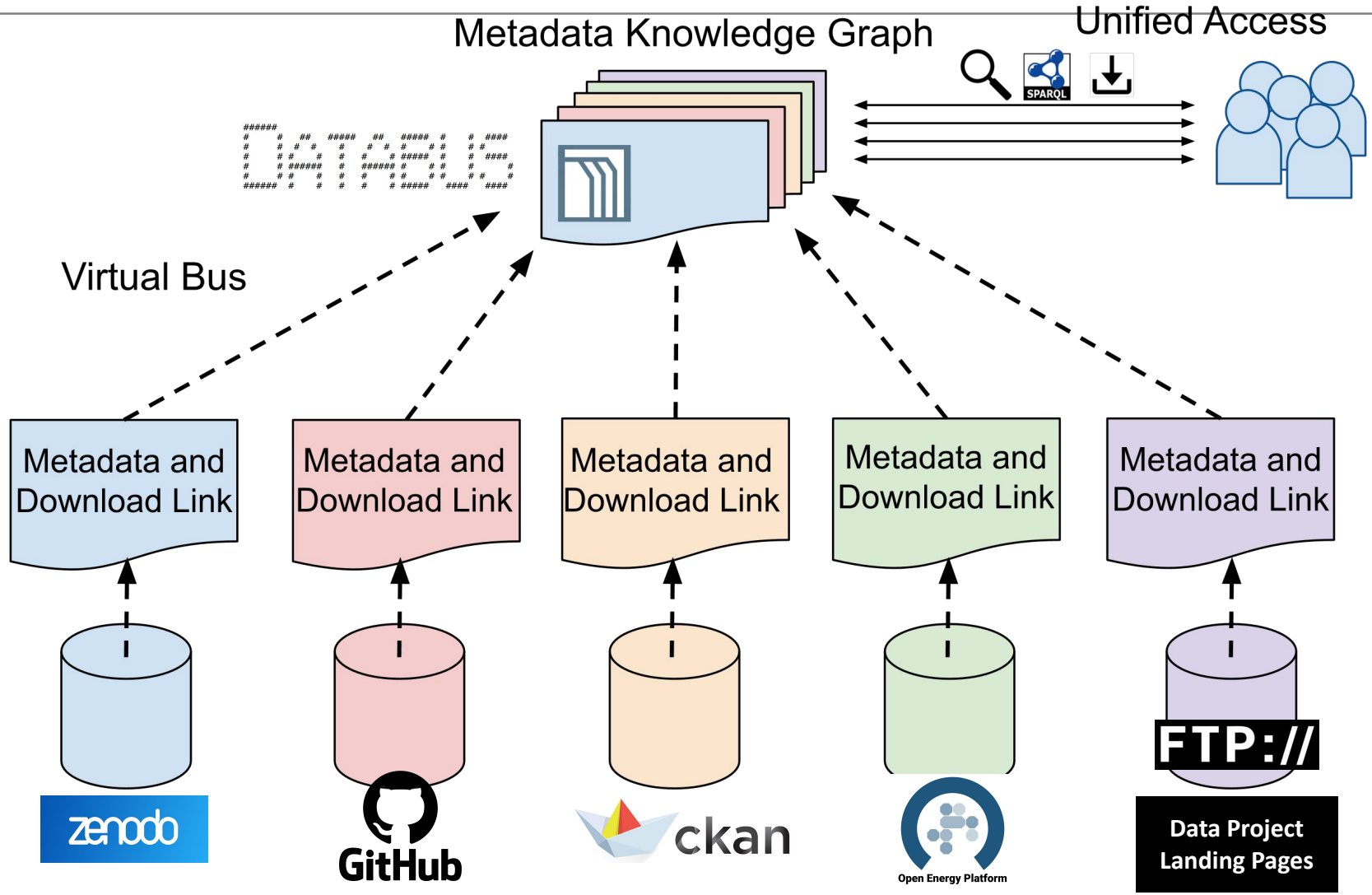
Solution I: Semantic Metadata Catalog

- A metadata catalog harvests the (rich) metadata from the available data sources
- The catalog can be used to discover data
- The metadata contains a URI to the actual data



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Solution II: Effective Search over Data (Findability ≠ Online Availability)

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- **Effective search needs domain customization**
  - cf. “No Free Lunch in Search and Optimization” (NFL Theorems) Wolpert and Macready (1997)

- Metadata Overlay Search System (MOSS)
  1. extends the Databus core graph with custom metadata subgraphs
  2. indexes these subgraphs for searching

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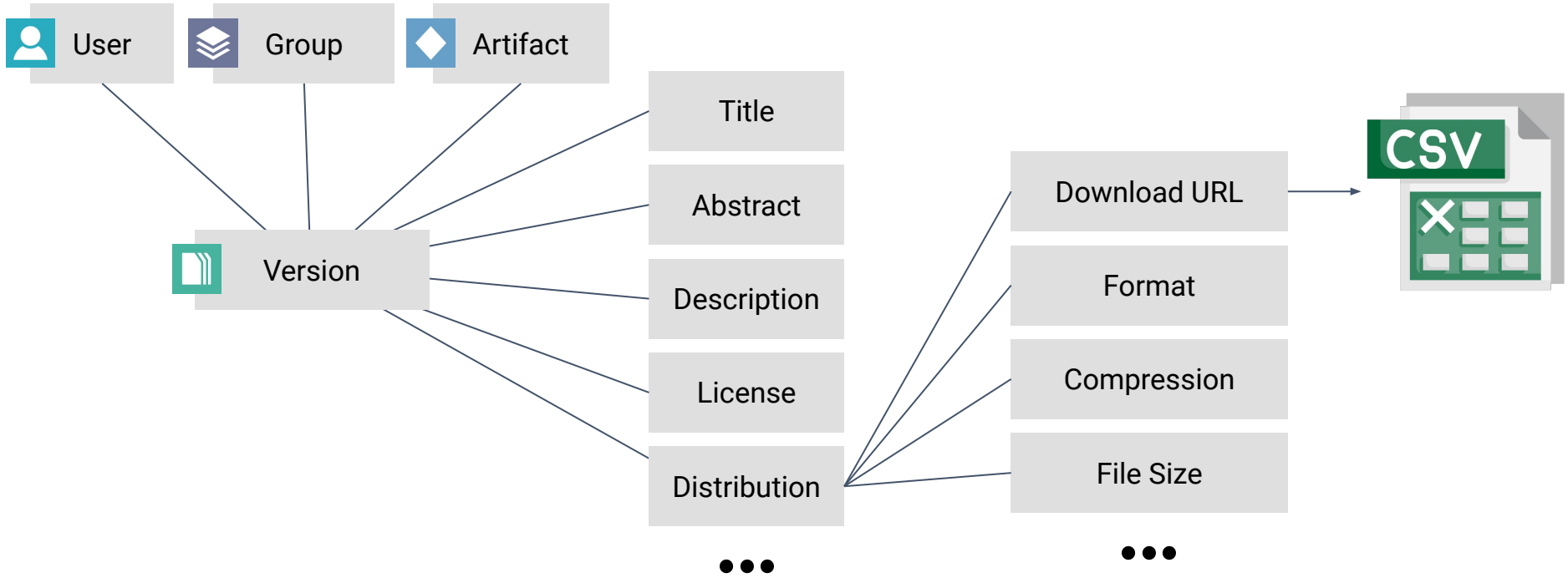
Core Metadata (improves DCAT significantly)



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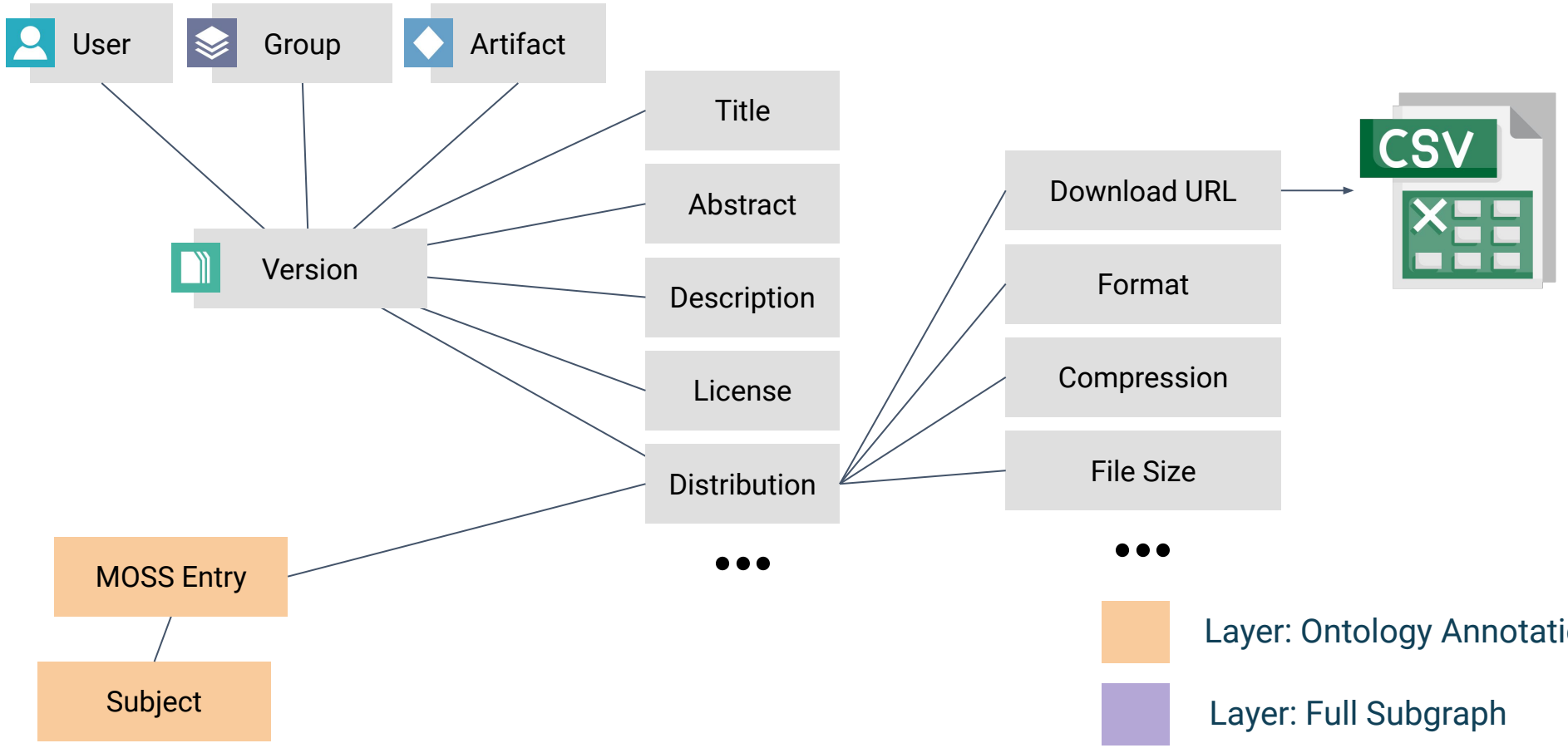
Metadata Subgraph Extensions (Example Layer 1)



OEO e.g.
https://openenergyplatform.org/ontology/oeo/OEO_00000446/

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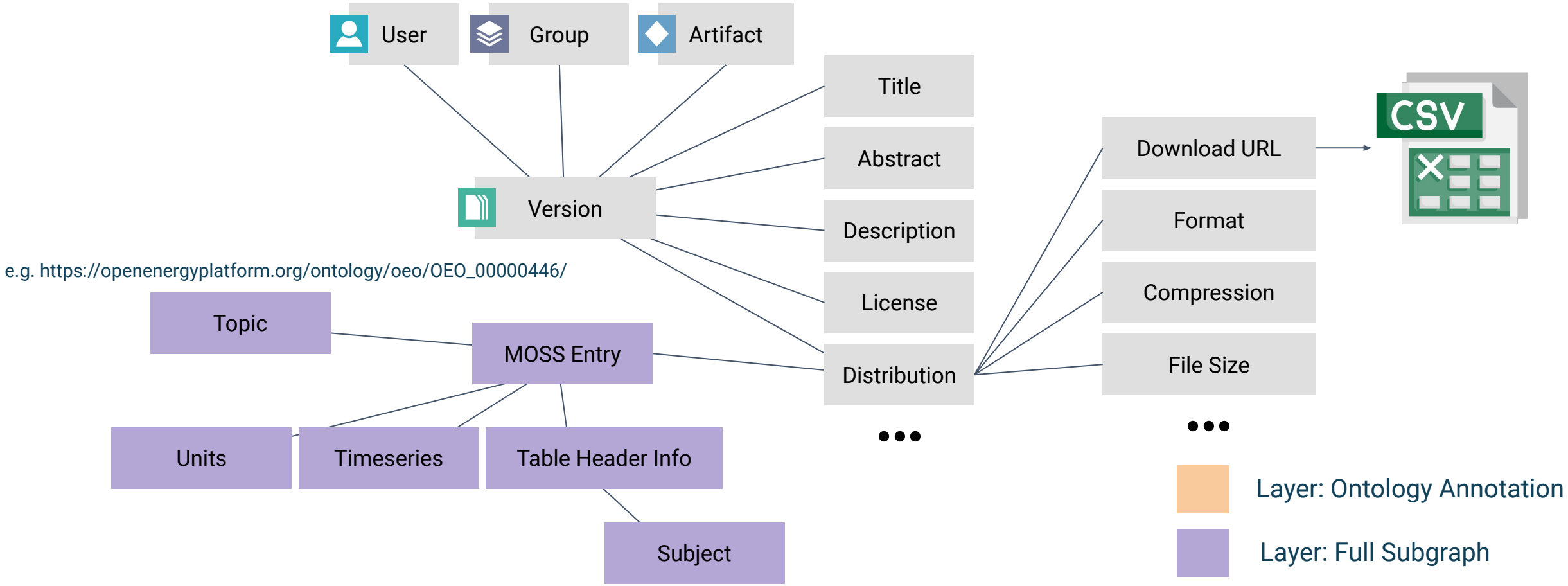
Metadata Subgraph Extensions (Example Layer 2)



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Searching data with the MOSS (Metadata Overlay Search System)

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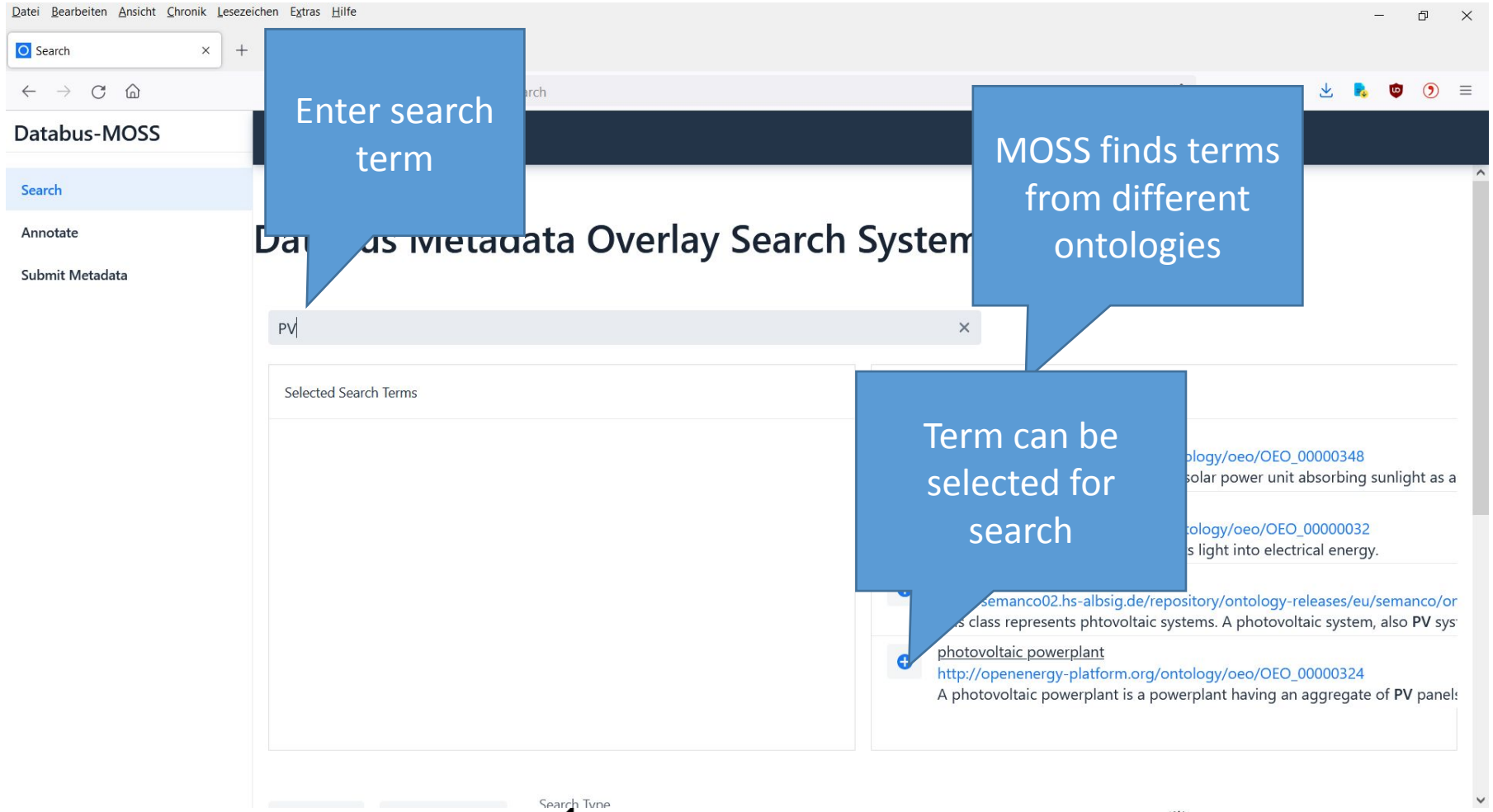

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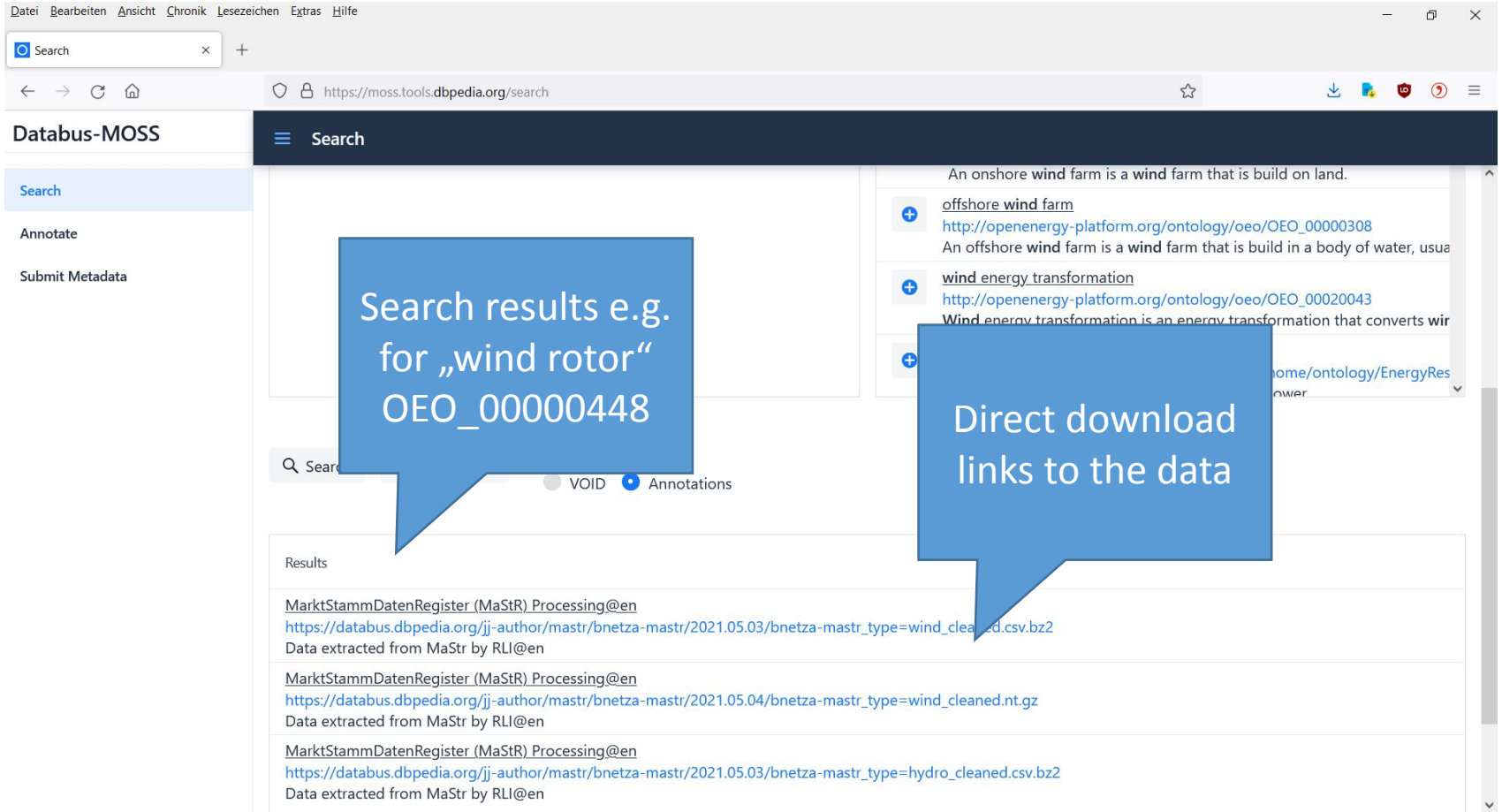
Searching with MOSS



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Features of MOSS

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Engine:

- Built on the Databus Ontology and Prov-O
- Multiple parallel layers of metadata possible
- Graph Wiki tracks revisions (GStore)
- Data quality validated with SHACL
- Terminology service
- Graph indexer (Lucene/Elastic Search)
- Search over one or multiple Databuses

User Interface:

- Customizable forms for data entry
- Ontology autocompletion
- Customizable Search and Facets

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Summary and Take Away

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Databus

- Databus is comparable to Open Source Huggingface, Google Dataset Search, Maven Central for Data
- Databus has a very different purpose and mission to online data publishing portals like Zenodo, Invenio, CKAN, Leibniz Data Manager, Open Data Portal Sachsen
- It's gaining adoption
- It's Open Source
  - we offer support and managed hosting

Transforming Energy Systems Research

- FAIR and Open Data is
  1. a necessity for research
  2. a productivity factor
- Open Energy Family succeeded in producing useful standards:
  - Open Energy Ontology
  - Open Energy Metadata (JSON-LD)
  - Databus as Data Catalog
- Supports researchers in finding relevant data, trace provenance and automate workflows for models and scenarios

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Watch the video and vote for us to win:

Open Energy Databus

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https://buergerbeteiligung.sachsen.de/portal/smwa/beteiligung/themen/1040556

or

https://tinyurl.com/vote-open-energy-databus

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