LOD-GEOSS

Moving the domain of energy systems analysis towards FAIR data

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Open Energy Family

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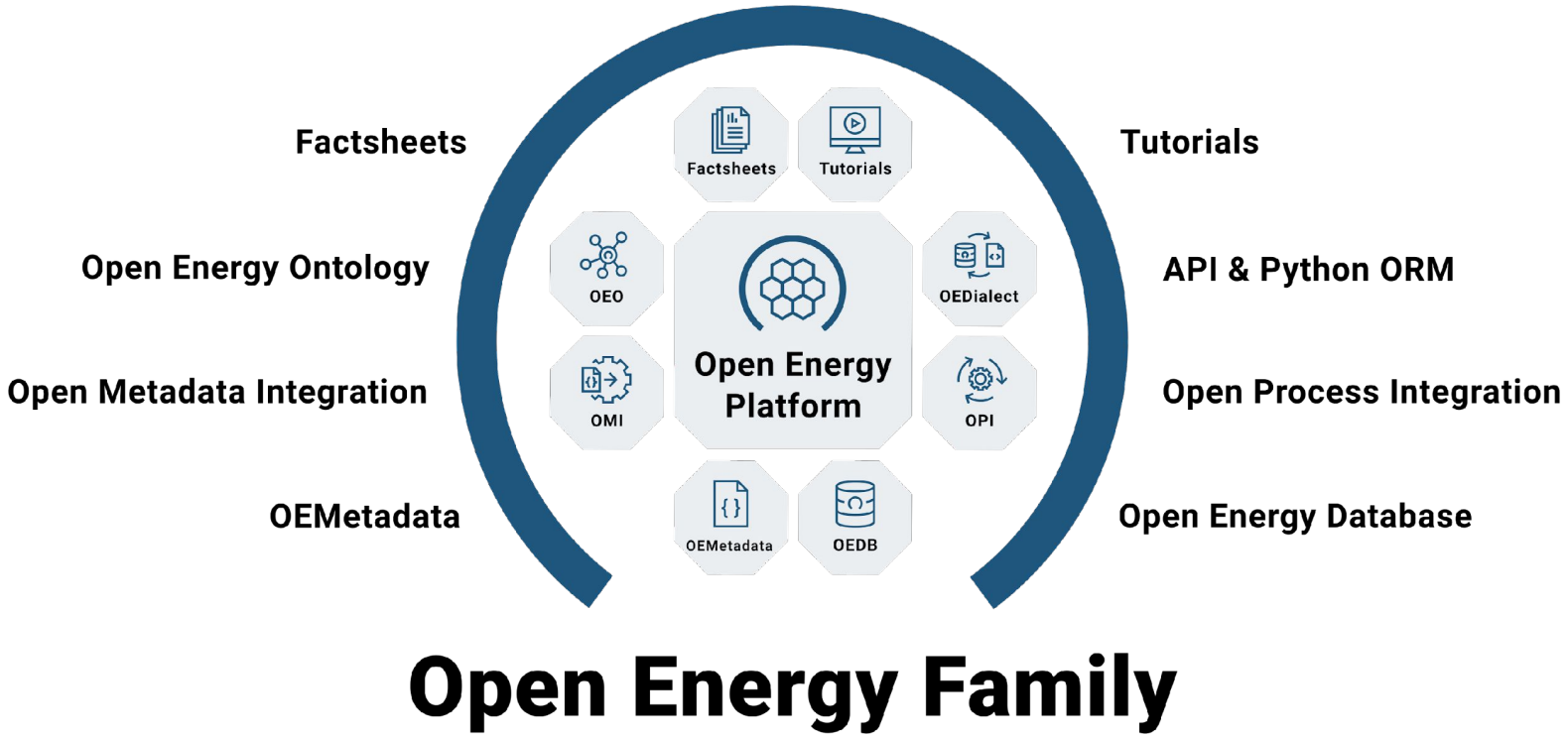
- The **Open Energy Family** is an initiative for open and FAIR data in the domain of energy systems research
- Development of a FAIR infrastructure within the Open Energy Family



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Findable: OEMetadata

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- A metadata standard for „energy related data“
- Based on existing technologies and standards as “Frictionless Data” and “DataCite”
- Implemented as JSON-LD to be human and machine readable
- Latest release (v1.5.1) is “ontology ready”
- Target: 5-star Linked Open Data

Categories

- **General** (name, title, description)
- **Context** (homepage, funding, contact)
- **Spatial** (location, extent, resolution)
- **Temporal** (referenceDate, timeseries)
- **Source** (origin, licenses)
- **Provenience** (contributors)
- **Resource** (schema, fields, type, description)
- **Review** (context and badge)

OEMetadata

FRICTIONLESS DATA

DataCite

Findable Accessible Interoperable Reusable

https://github.com/OpenEnergyPlatform/oemetadata

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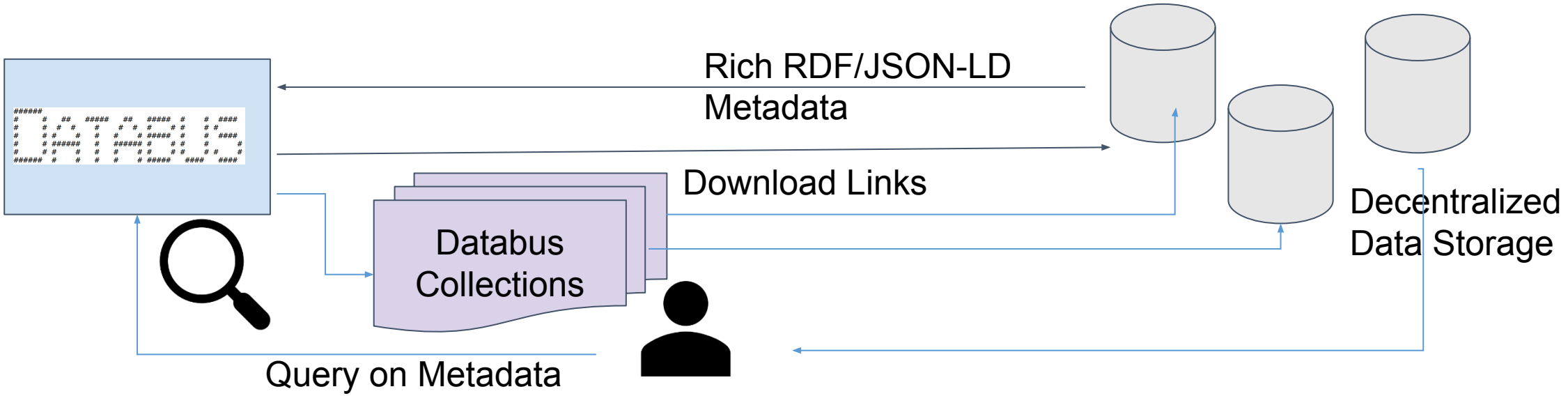
Findable & Accessible: The Open Energy Databus

Databus is a virtual bus. It can address files on the web and coordinate dataflows based on DataID metadata. No actual data is uploaded to the bus.



- Unique and persistent data identifiers (PID) are created by the Databus https://energy.databus.dbpedia.org/account_name/group/artifact/version/
- Data sets are linked to their source data through the data ids
- Incremental modifications to data (e.g. people can reuse cleanings or aggregations someone else has done before)

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Findable & Accessible: Architecture Concept

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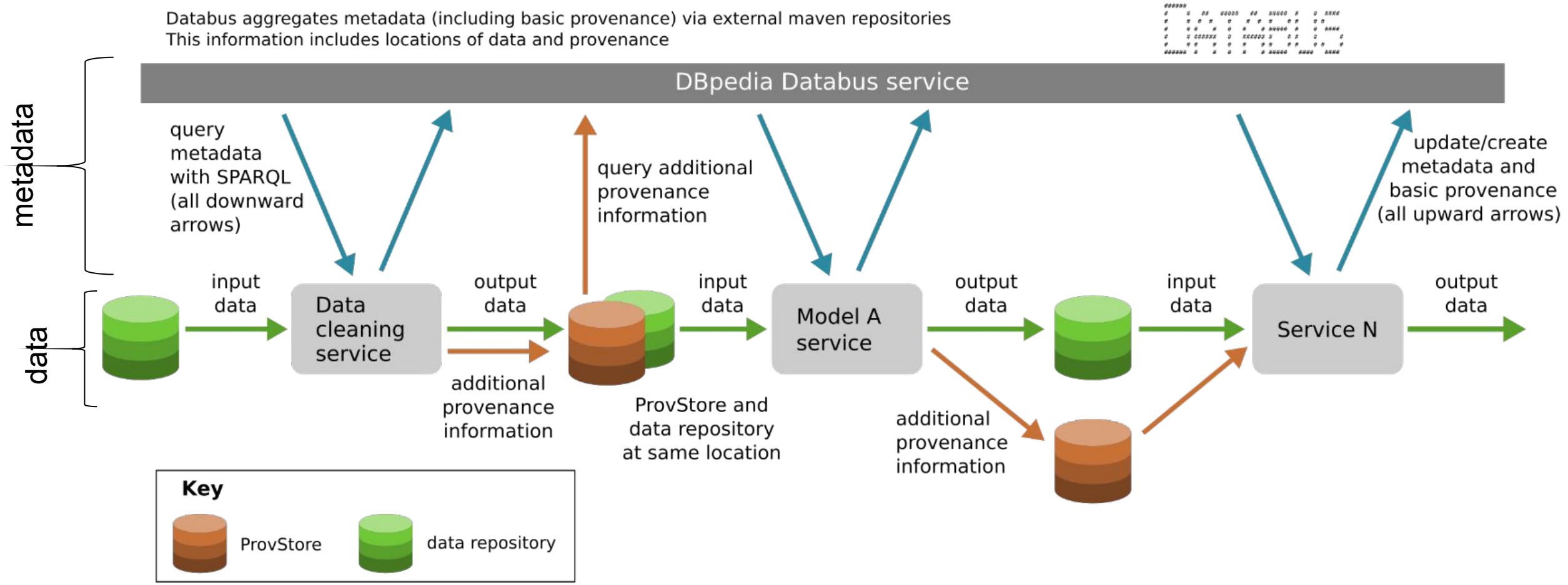

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Interoperable: The Open Energy Ontology

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- Each data source comes with its own annotation

- Example from solar meteorology:
  - **GHI:** Global Horizontal Irradiation (Energy) or Irradiance (Power)
  - **Global:** Could also be Global Horizontal Irradiation or Irradiance
  - **Surface downward irradiation:** The usual term in climate science for what we usually call GHI

- **Taxonomies** or **ontologies** create a **data language** to annotate data
- Ontologies can describe relations: *direct radiation* **is a part** of the *global irradiation reaching the surface*
- Ontologies make data interpretable, also by machines and algorithms

- **Good ontologies are created on a consensus building and open development process within the community.**
  - We use the 'Open Energy Ontology', https://openenergy-platform.org/ontology/, https://doi.org/10.1016/j.egyai.2021.100074

- Data sets can be annotated with the "**Subject"** tag, individual columns in the resource section with "**Is about"** within the JASON-LD metadata

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Conclusion

- The databus offers
  - a service to manage and search registered metadata
  - Persistent identifies for tracing data processing and citing data
  - Databus as pointers to digital objects
- **Reusable:** Data licenses are an obligatory part of the DataID and OEMetadata and are linked to dalicc.net to be machine actionable.
- The databus supports the implementation of FAIR principles in the Domain of Energy Systems Analysis
- The developed architecture in conjunction with the use of the Open Energy Ontology enables semantic searches for data in the domain of energy systems analysis
- **The developed architecture with distributed repositories, common metadata and schema descriptions, an ontology and a data catalog already forms some kind of open data cloud with the domain of energy systems analysis.**

- Further resources:
  - https://lod-geoss.github.io
  - https://energy.databus.dbpedia.org
  - hhttps://github.com/OpenEnergyPlatform/oemetadata
  - https://openenergy-platform.org/ontology/
  - https://doi.org/10.1016/j.egyai.2021.100074
  - https://moss.tools.dbpedia.org/search
  - https://github.com/LOD-GEOSS/databus-snippets

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Contact us

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