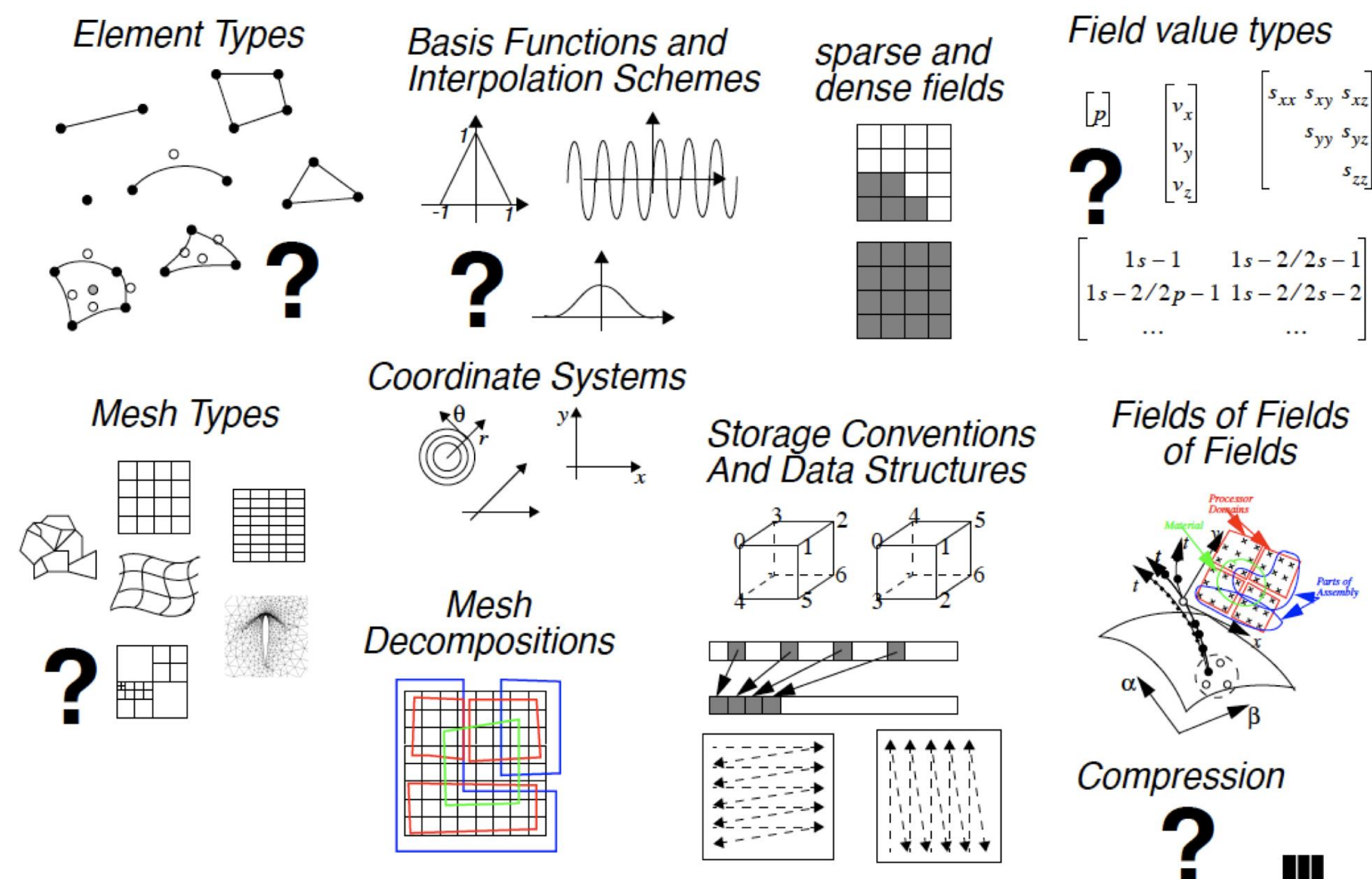


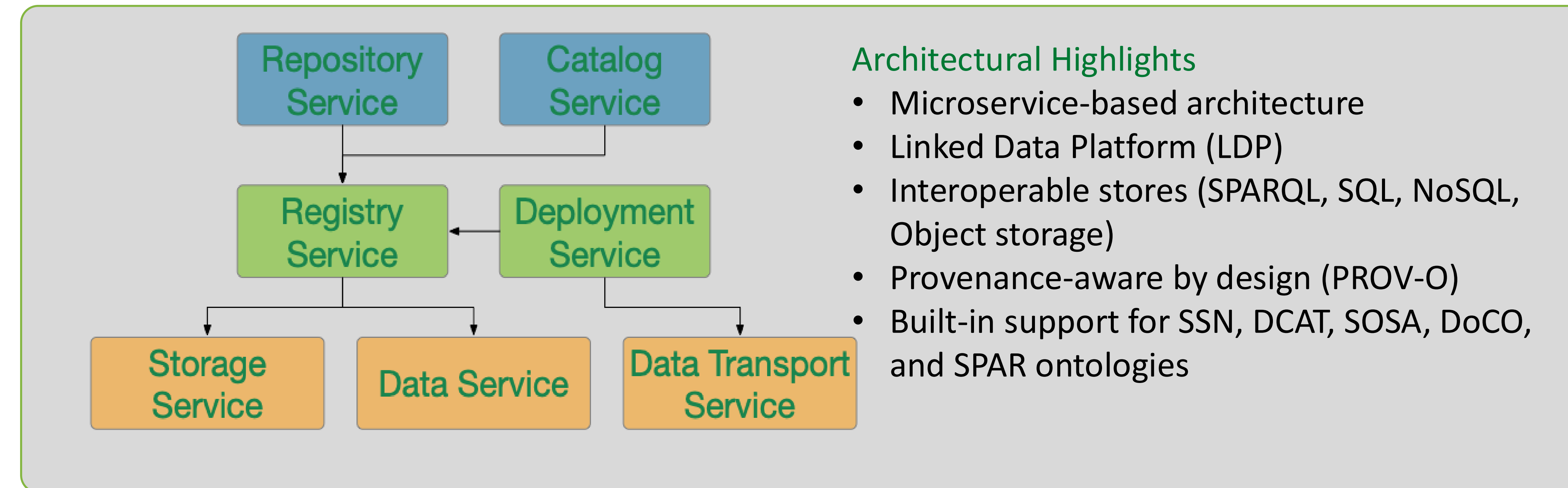
Swen Boehm, Terry Jones, Patrick Widener, Christian Engelman, Olga Kuchar

### Scientific Data is Diverse, Complex, and often Fragmented or hard to Reuse.



#### Key Problems

- **Siloed** datasets — no easy federation
- **Poor or no documentation**
- **Little to no metadata**
- **Incompatible formats & structures**
- Difficult to **integrate across disciplines**
- AI/ML applications **blocked by data quality issues**
- Scientific pipelines are evolving, often without consistent data governance.
- Metadata, if present, is rarely **machine-readable**.
- Loss of **provenance** limits reproducibility.



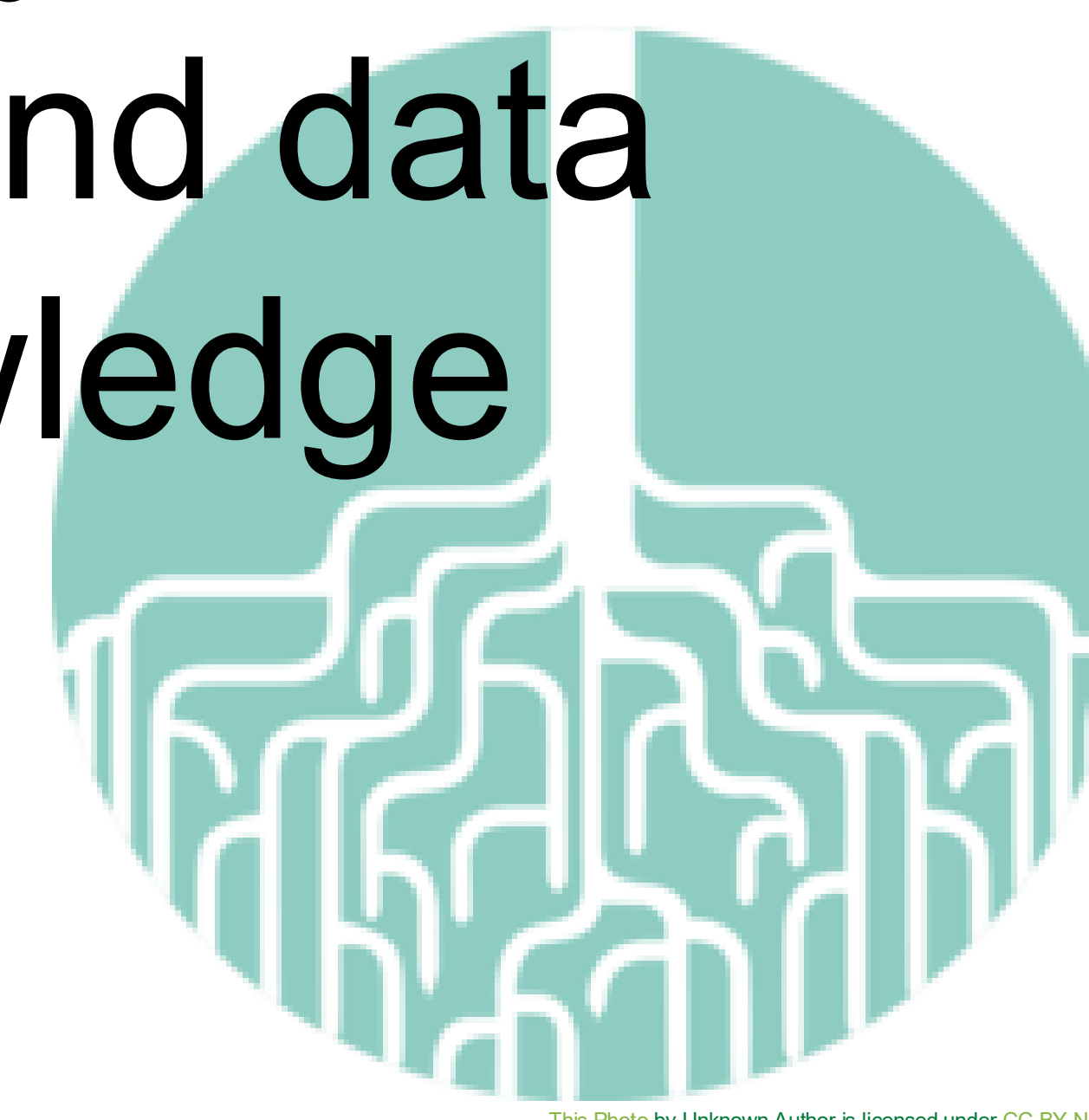
#### Architectural Highlights

- Microservice-based architecture
- Linked Data Platform (LDP)
- Interoperable stores (SPARQL, SQL, NoSQL, Object storage)
- Provenance-aware by design (PROV-O)
- Built-in support for SSN, DCAT, SOSA, DoCO, and SPAR ontologies

#### Key Capabilities

- **Modular deployment:** Customizable stacks per deployment
- **Scientific instrumentation modeling:** Full support for describing instruments, sensors, samples, actuators
- **Provenance tracking:** Tightly integrated PROV-O structures and sample tracking workflows
- **Cataloging and repository frameworks:** DCAT v3 + RDF-based repository infrastructure
- **Collaboration & Sharing:** Semantic tagging, access control, and multi-user workspace support

# Connect your context and data in a knowledge graph



### Standardized, Documented, Extendable, FAIR, AI/ML-ready

- Data:** Organized, ingested, and preserved in interoperable formats
- Information:** Rich metadata, linked entities, standardized vocabularies
- Knowledge:** Federated queries, reasoning, and domain context
- Wisdom:** Actionable insights, AI/ML-ready datasets, FAIR principles met

#### Semantic web standards

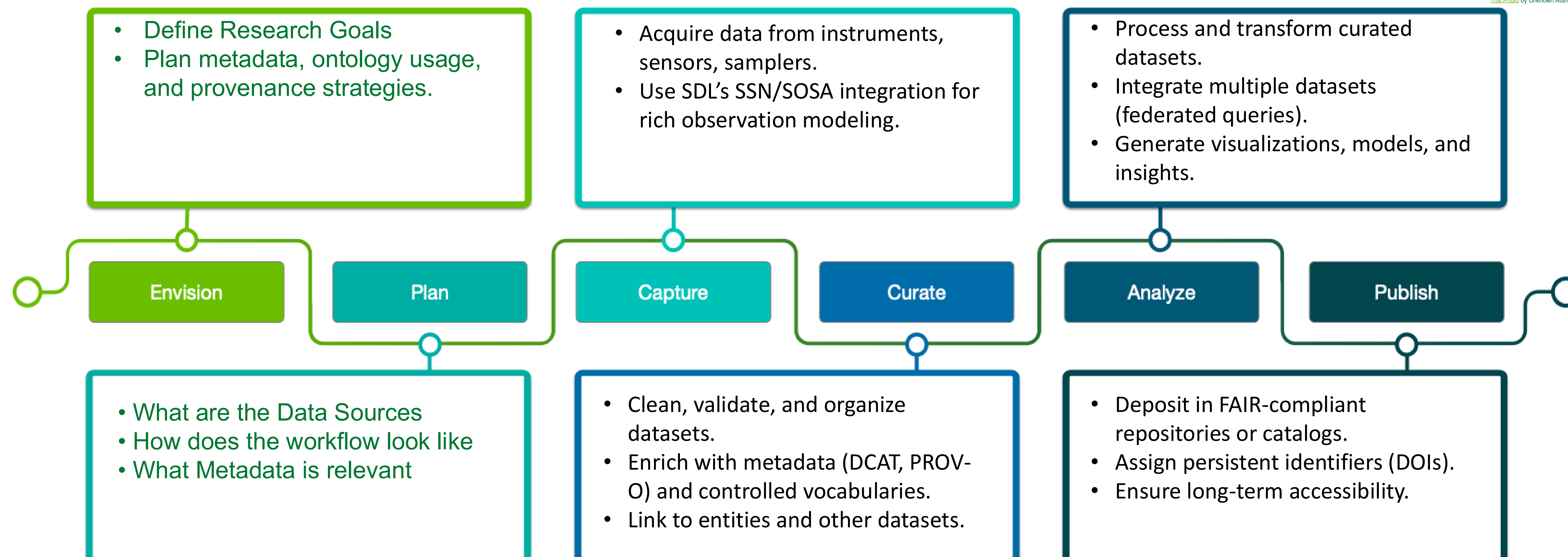
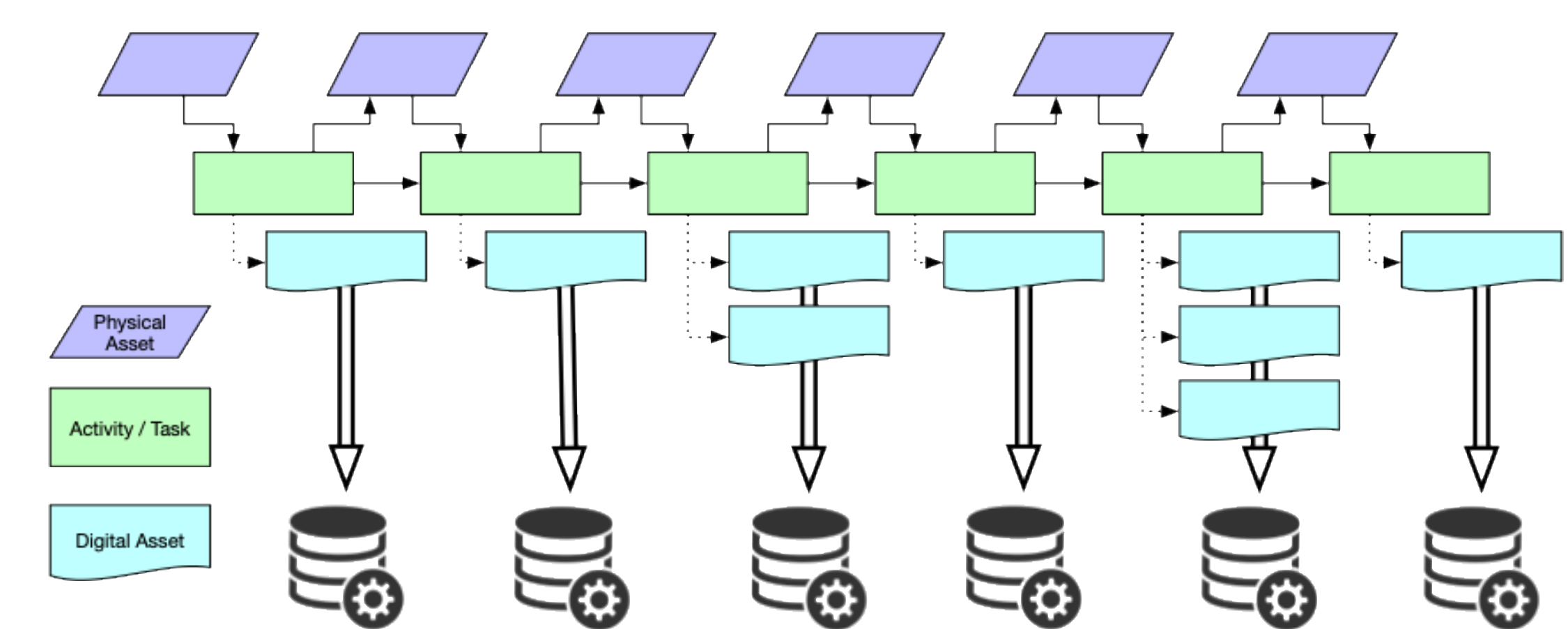
- Core support for RDF, OWL
- Build as Linked Data Platform
- LinkML
- Expandable with domain Ontologies

#### Ontologies

- Based on:
  - DCAT for Data Catalogs
  - SSN to describe instrumentation, inputs and outputs
  - PROV-O to track provenance of assets

#### Data Sharing & Teamwork

- Support for FAIR data
- Open APIs



#### How SDL works in your workflow:

- Connects instruments, repositories, and analysis tools
- Enriches datasets with machine-readable metadata
- Links entities across datasets and domains
- Makes data FAIR and AI/ML ready