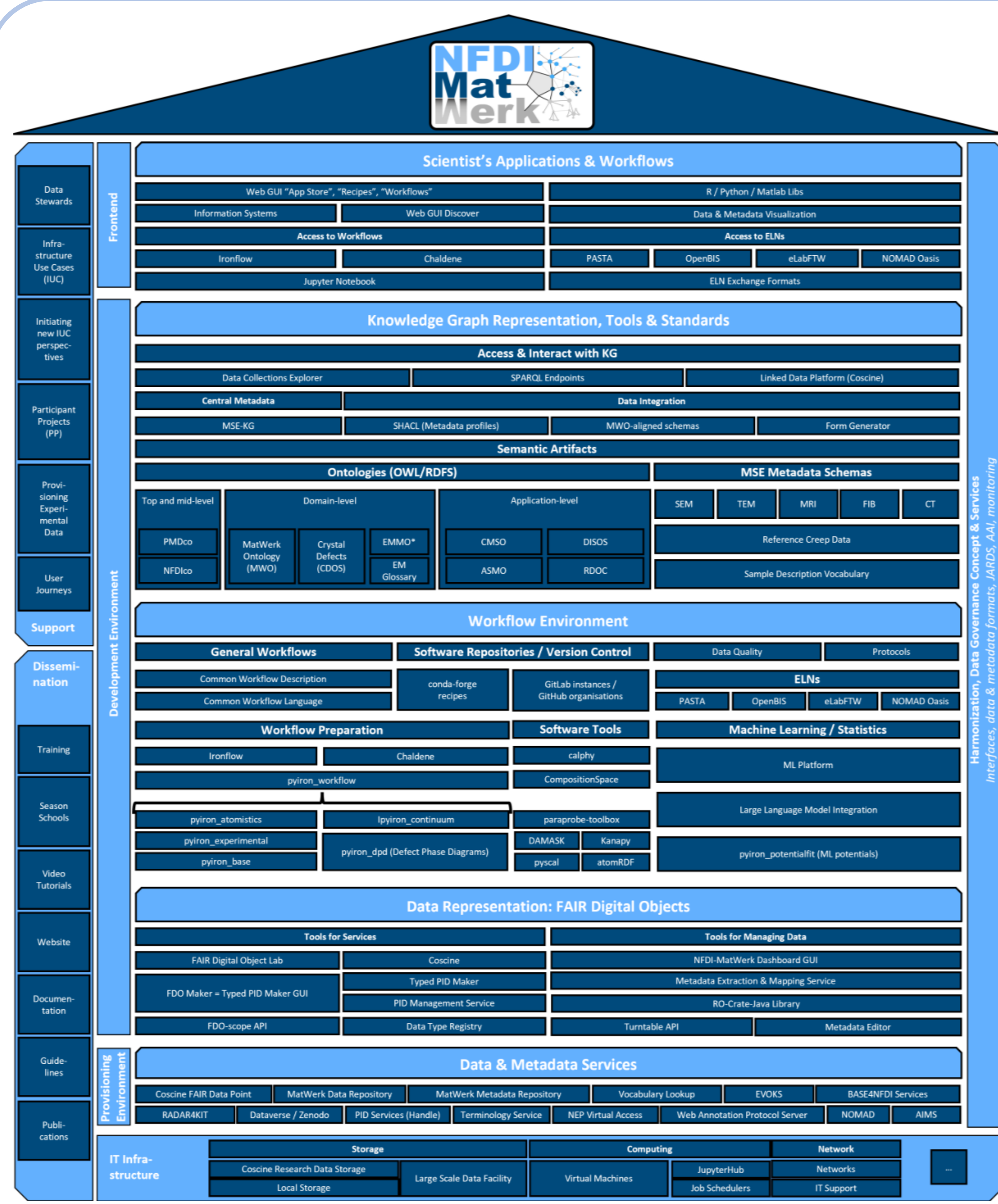




NFDI-MatWerk Service Architecture Overview



Functional Breakdown of the Architecture:

Our layered NFDI-MatWerk Service Architecture ranges from:

- top: the most Material Science Engineering (MSE)-specific components, tools, and services as frontend
- to bottom: the more generic components forming the fundamental basis.

MSE scientists work with the frontend consisting of “Applications & Workflows,” without needing to worry about technical details in the backend processes!

Application programmers will use the “Knowledge Graph Representation” with its tools, standards, and semantic artifacts. The “Workflow Environment” and common “Data Representation: FAIR Digital Objects” layers are more specific for the software developers.

The “Data and Metadata Services” layer builds on the generic data services that rely on established “IT Infrastructure” components of the involved research institutions.

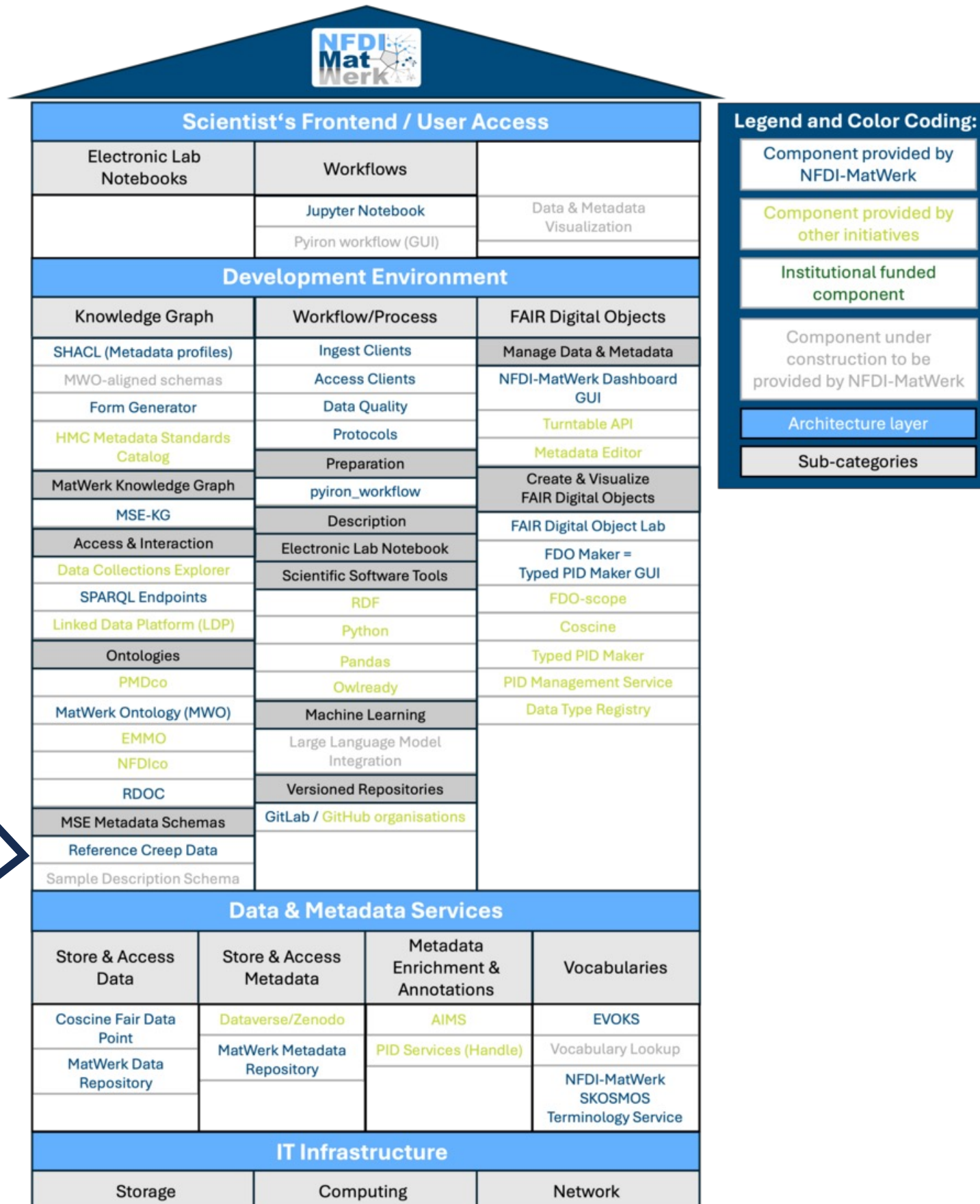
These technical layers are accompanied by the pillars “Support” and “Dissemination” to empower the MSE community in usage (e.g., Data Stewardship), along with “Harmonization & Data Governance”. Harmonization ensures sustainable interoperability with other technologies!

Unpacking Architecture by Mapping to an Example Use Case - Case in Point: Reference Dataset

What is the Use Case?

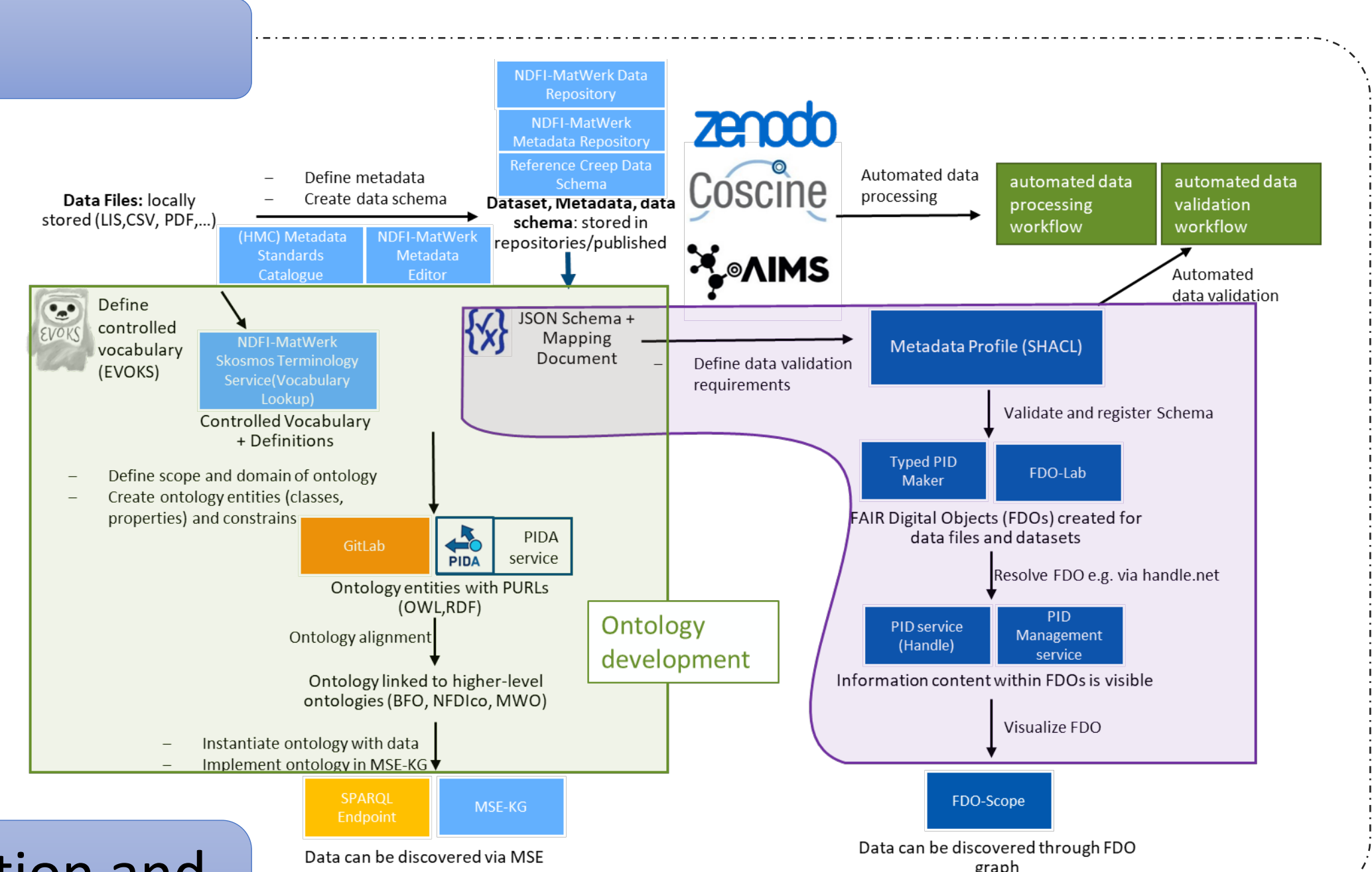
We created a best-practice framework for generating and sharing MSE reference datasets, demonstrated with creep data of Ni-based superalloys. It covers data/metadata generation and integration into a digital infrastructure that enables annotation, discovery, and distribution via a metadata schema aligned with a domain ontology.

This is the customized version of the overall architecture developed for this use case. This way, any material scientist can take the first step of mapping and adapting a use case to its specific requirements.

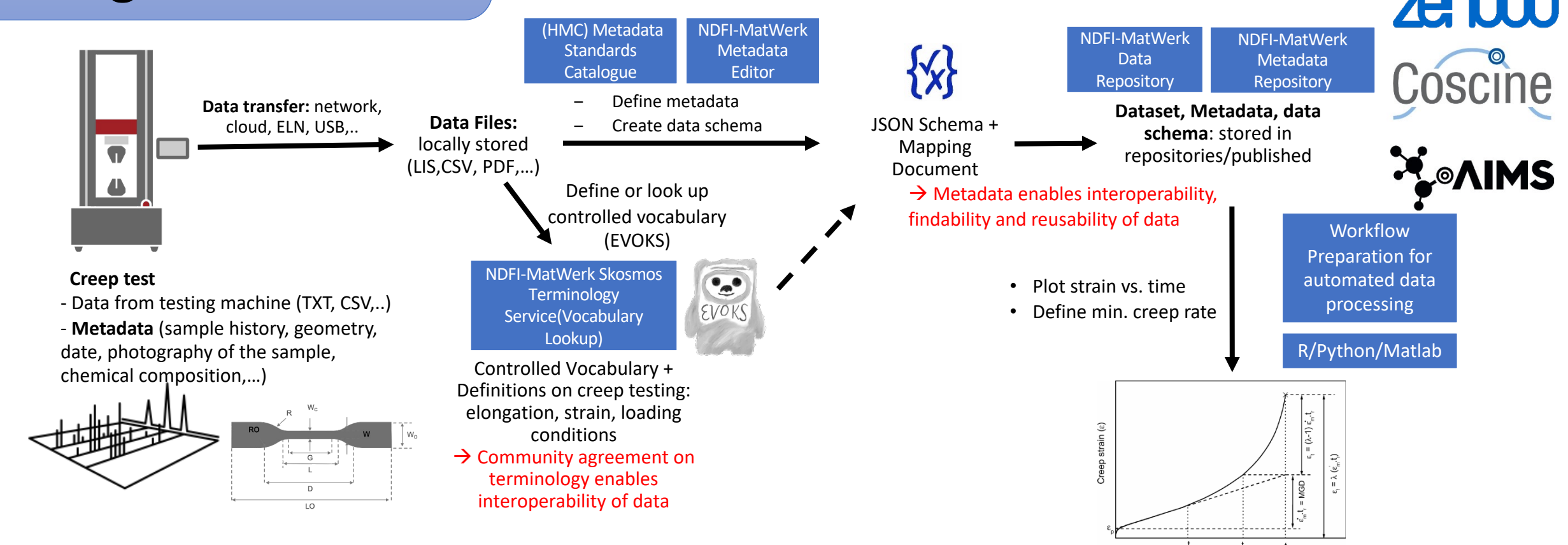


Based on this customized architecture, material scientists can establish various workflows, processes, and pipelines.

Overall Workflow



Sub-workflow: Data Acquisition and Processing



Sub-workflow: FAIR Digital Object Creation

