



ENVRI EOSC NODE

Building the environmental layer of the EOSC Federation



eosc
Federation



ATMOSPHERE

Air, climate, and weather observations



BIOSPHERE

Life on Earth and ecosystems



HYDROSPHERE

Water in all its forms, oceans to freshwater

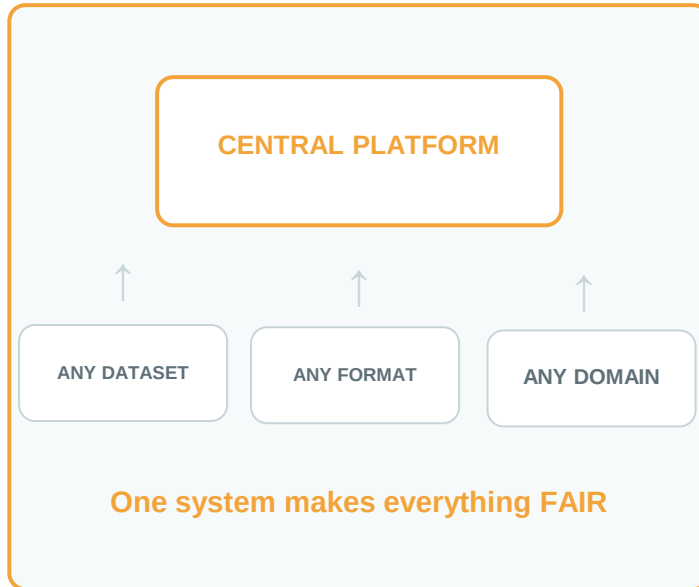


GEOSPHERE

Land, rocks, soils and Earth's solid materials

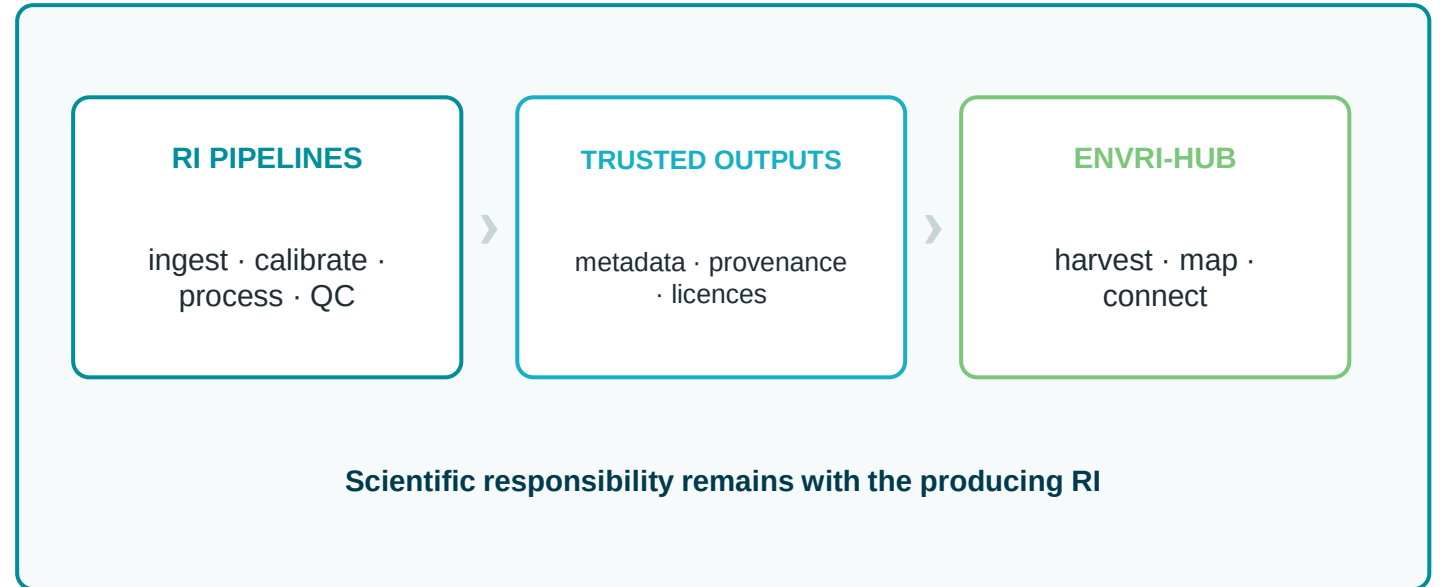
FAIRification at scale starts at the source

THE TEMPTING IDEA



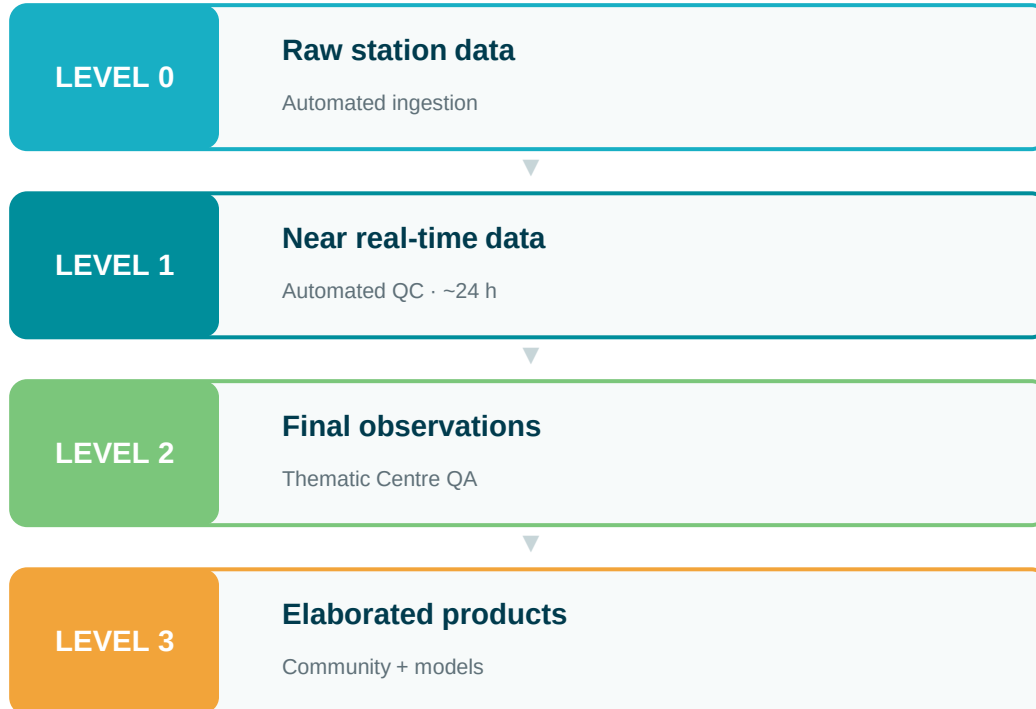
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THE ENVRI MODEL



Scale comes from stronger automation at the source and interoperability across the federation.

ICOS: FAIRification embedded in the data pipeline



COMMON THEMATIC CENTRES → ICOS CARBON PORTAL

FAIR SERVICES GENERATED WITH THE PRODUCT

F**FINDABLE**

PIDs and DOIs · dynamically linked metadata

A**ACCESSIBLE**

Repository · web services · SPARQL · Python/Jupyter

I**INTEROPERABLE**

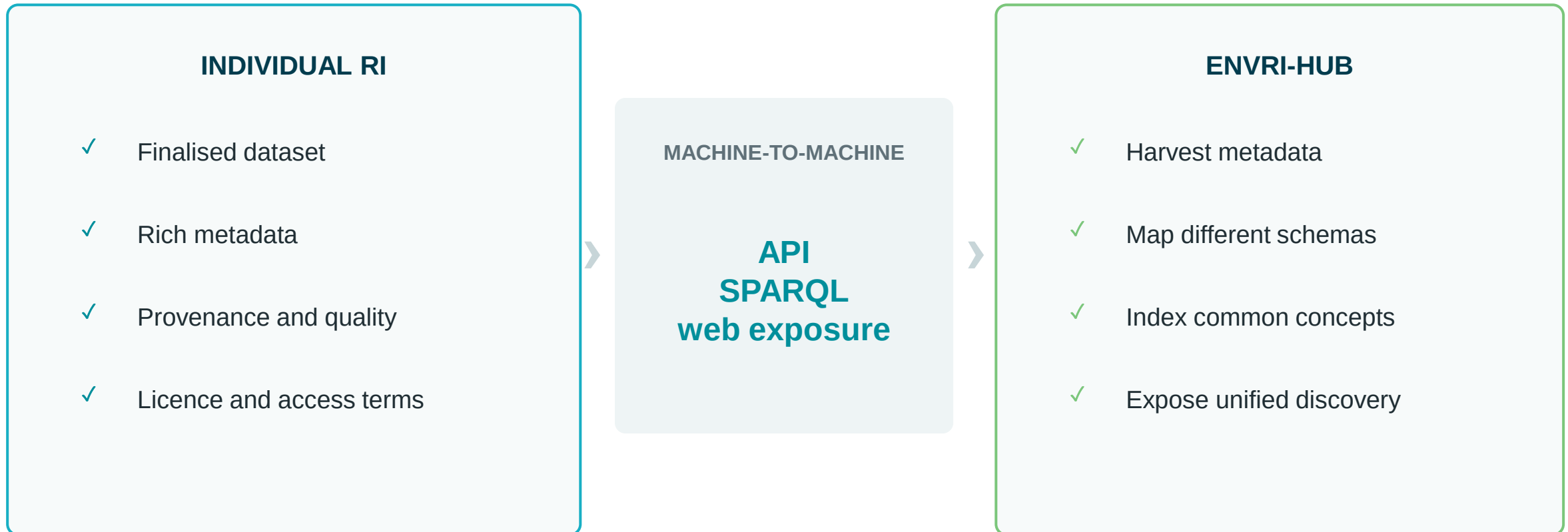
RDF/OWL ontologies · versioned triple store

R**REUSABLE**

Processing provenance · CC BY 4.0 · citation

The metadata burden is handled by infrastructure—not transferred to each researcher.

The engineering boundary is metadata harvesting



Raw data and production pipelines stay with the RI

Rules run the pipeline. AI handles selected complexity.

RULES-BASED BACKBONE

file movement · schema mapping · identifiers / DOIs · repository workflows

1

CONTEXT-AWARE QC

ML detects unusual patterns and flags likely sensor drift or environmental events for review.

2

GAP-FILLING

ANN and other statistical models estimate missing values for derived Level 3 products—with uncertainty.

3

AI-READY ACCESS

Zarr + Croissant make selected datasets directly discoverable and loadable by ML workflows.

HUMAN-IN-THE-LOOP

Disclose AI use · document models · verify outputs · retain scientific accountability

ICOS policy: scope and risk thresholds are defined in advance; outputs are reviewed for reliability and validity.

AI will not rescue undocumented data

AI CAN ASSIST

Extract candidate metadata
Suggest vocabulary mappings
Flag anomalies and missing fields

AI CANNOT RECOVER

Missing provenance
Undocumented processing choices
The scientific meaning of an unknown variable

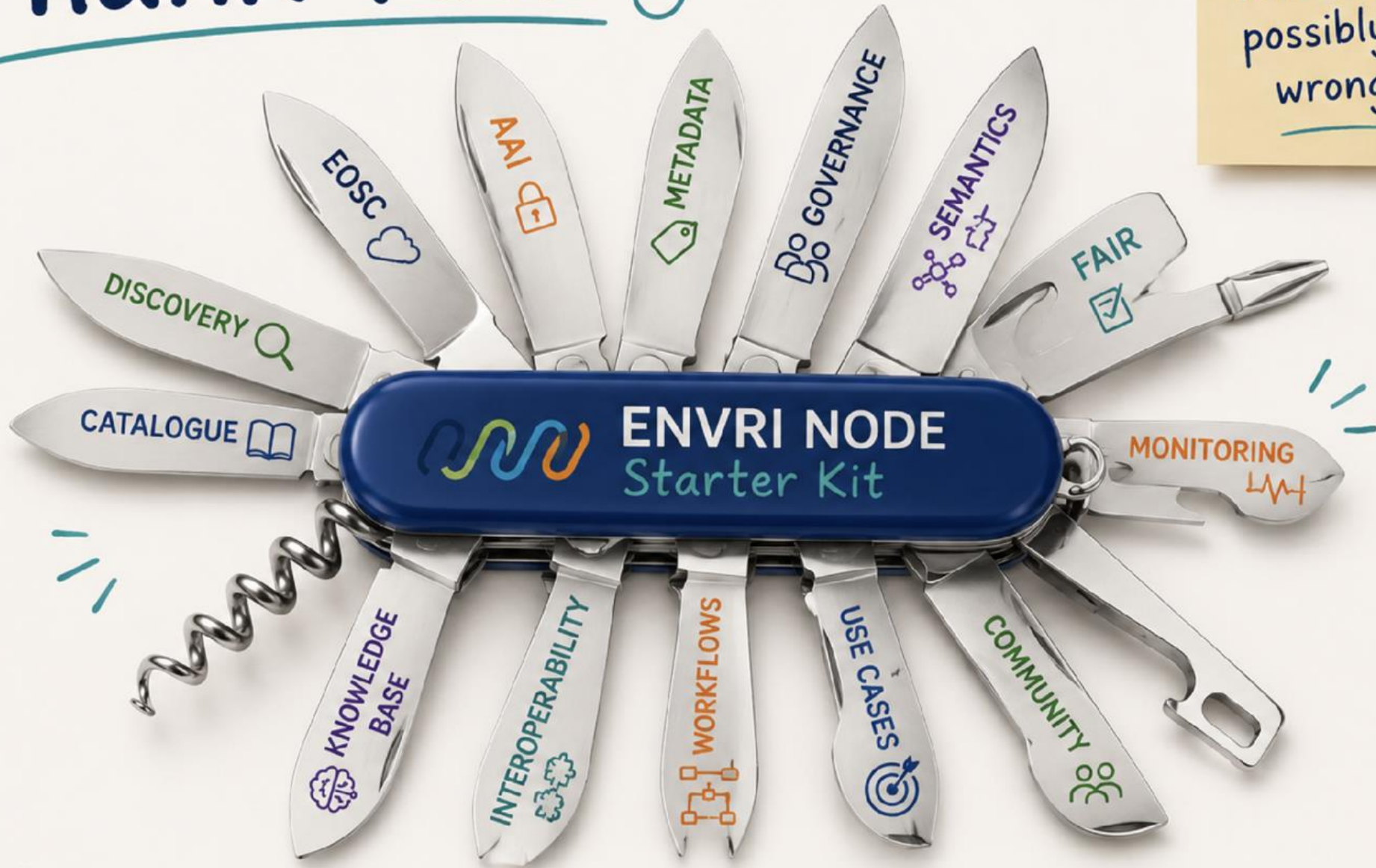
THE CONDITION

Traceable machine actions
Expert review where meaning matters
An RI accountable for the result

Without provenance, AI produces confident metadata, not FAIR data.

Thank You! 😊

What could
possibly go
wrong? 😊



Bringing environmental research infrastructures together in the EOSC Federation.

