

GEO Infrastructure

Implementation plan overview

Presentation by

Felipe Carlos on behalf of the GIDTT

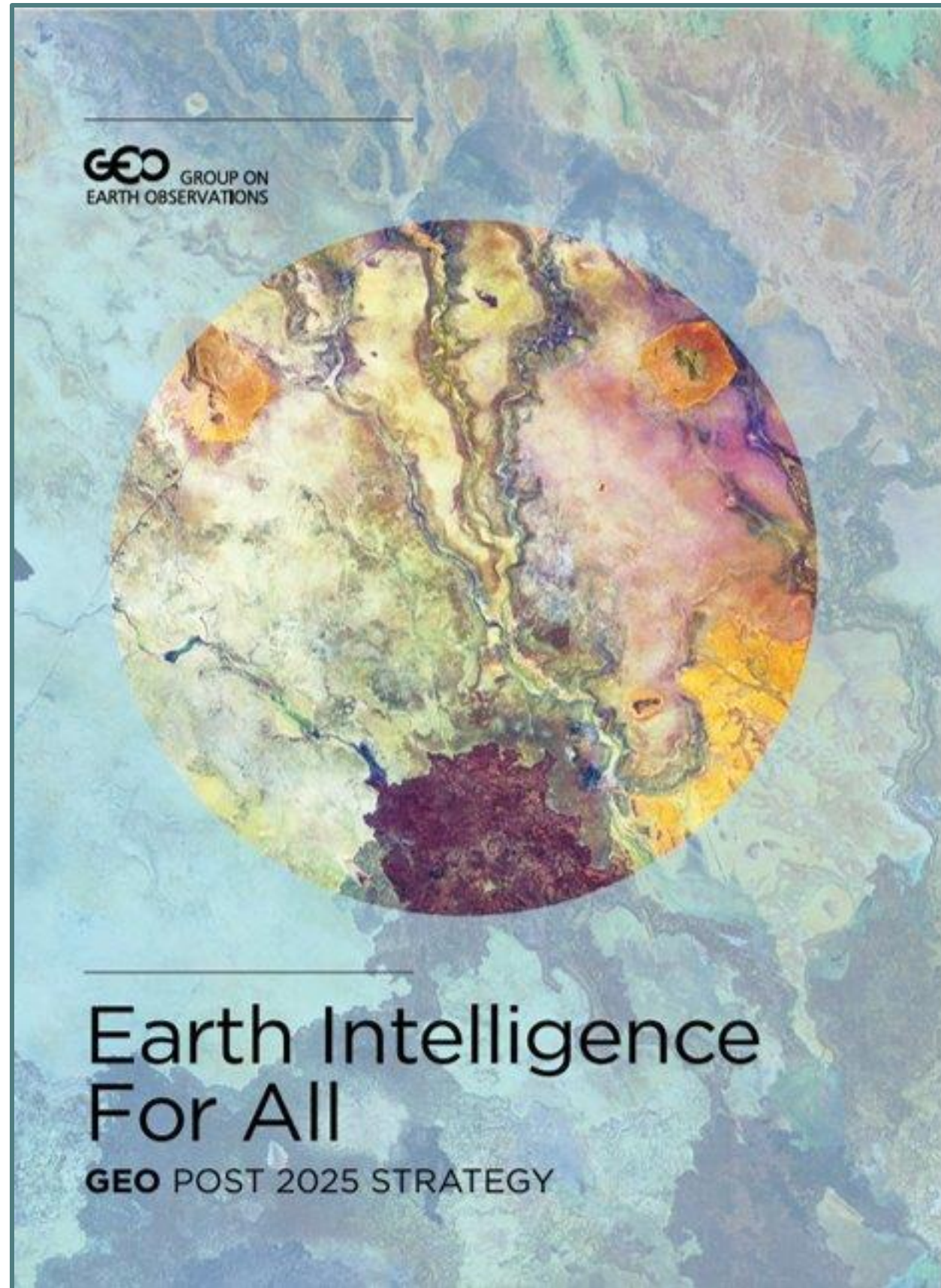
Supported by

GEO Infrastructure Development Task Team (GIDTT)

October 24, 2025

This presentation shares details of the GEO
Infrastructure Implementation Plan to **inform** SA-CoP
and **collect** feedback

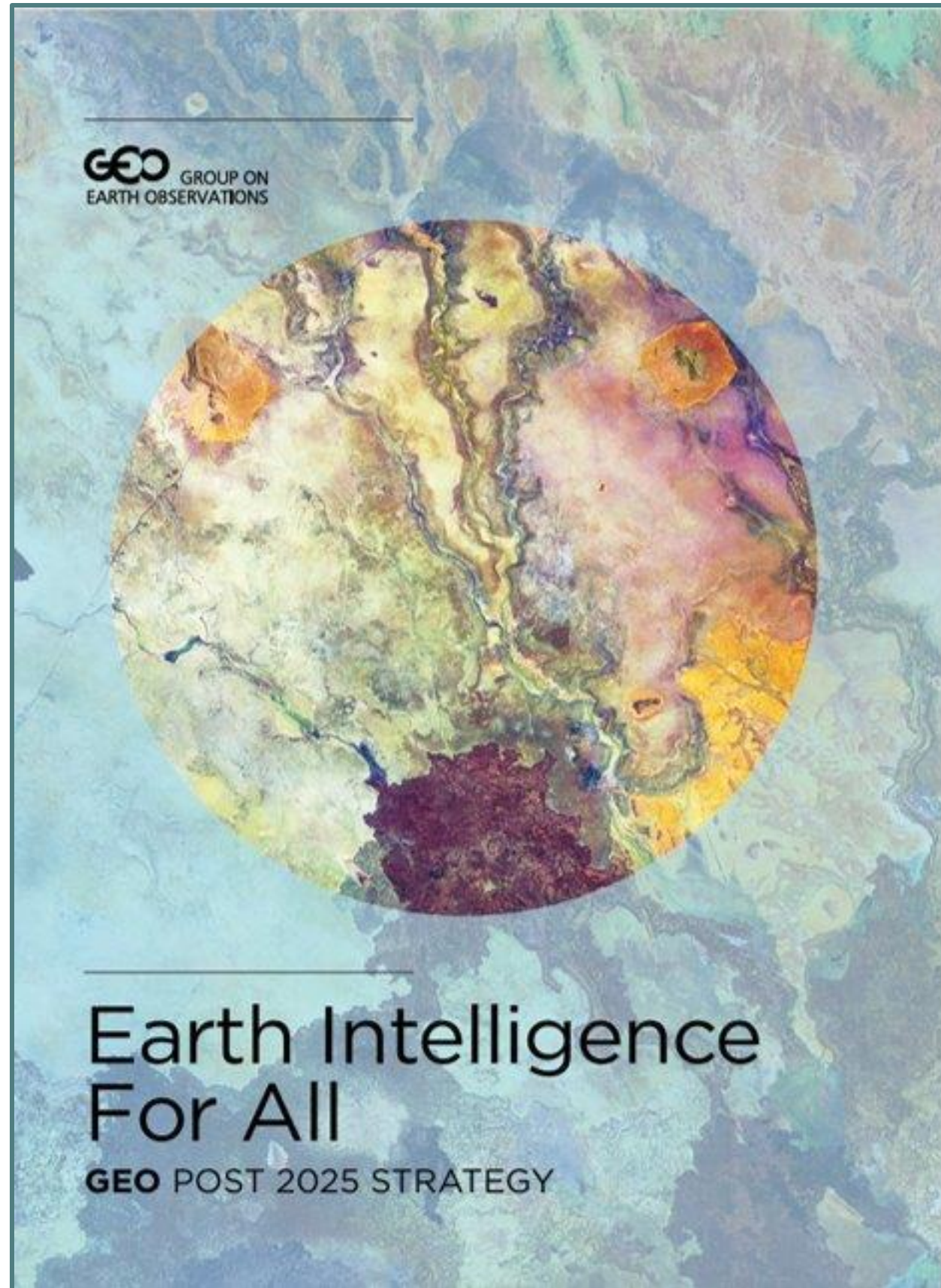
The GEO Post 2025 Strategy



"There is a clear **need for a global partnership** where data providers and users **from all communities work together**, leading to better coordination, greater inclusion, reduced duplication, and faster action"

"GEO reaffirms its **commitment to promote data and knowledge** sharing and co-development of services that empower users....."

The GEO Post 2025 Strategy



"There is a clear **need for a global partnership** where data providers and users **from all communities work together**, leading to better coordination, greater inclusion, reduced duplication, and faster action"

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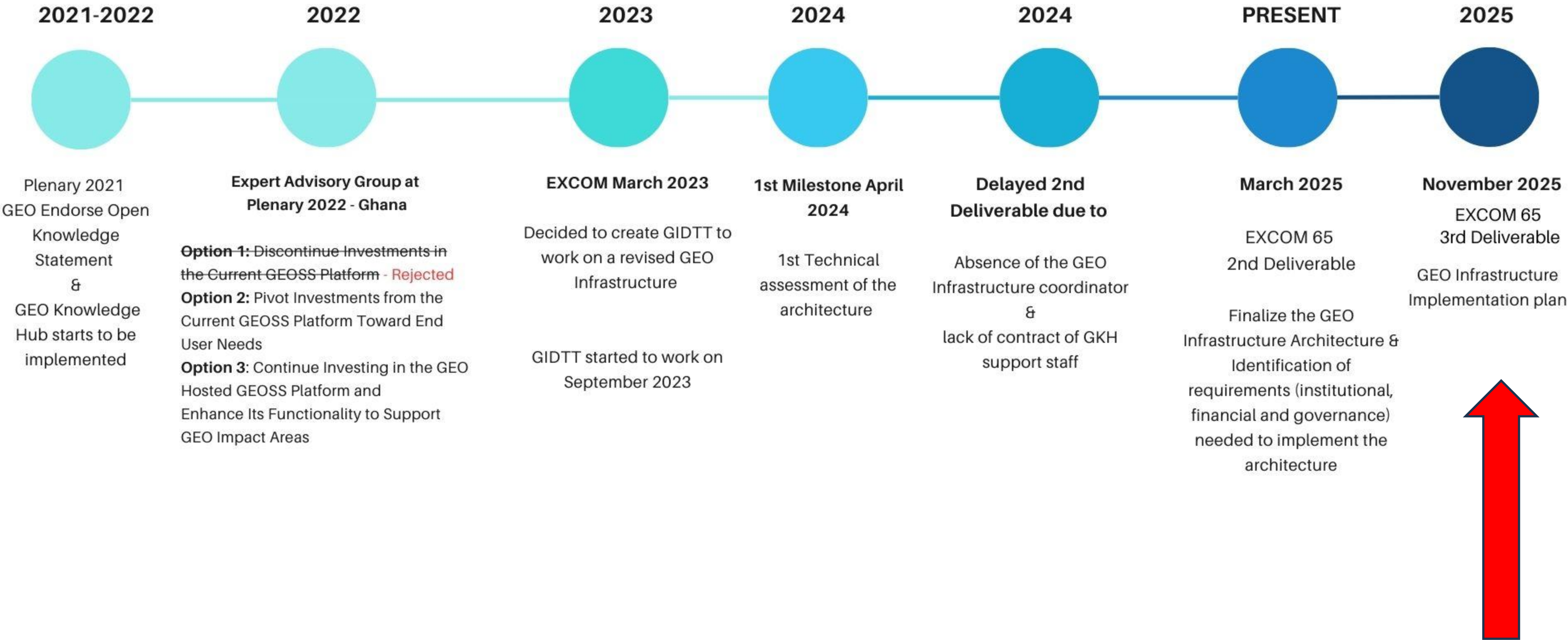
We need to provide the right tools to empower the community to build on top of all work developed so far!

The **GEO Infrastructure** plays a **pivotal role** in advancing the Post 2025 Strategy, GEO's role within the international community and demonstrates the importance and impact that Earth Observations have in the decision-making process.

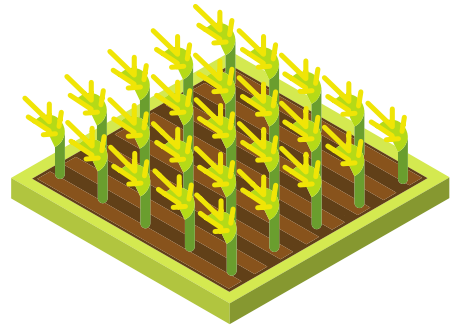
Evolve the GEO Infrastructure is about enhance the **user experience** to accelerate the impact of GEO Community work

GEO Infrastructure Development Task Team (GIDTT) is the group designated to work in the evolution of the GEO Infrastructure

BRIEF RECENT HISTORY OF THE GEO INFRASTRUCTURE



What is the current landscape ?



In situ



Services

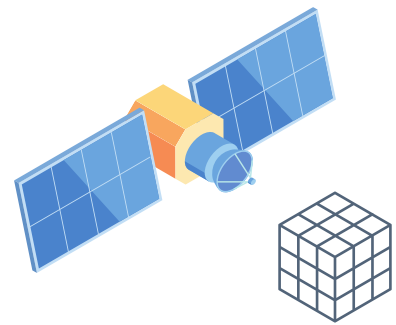


EO Derived

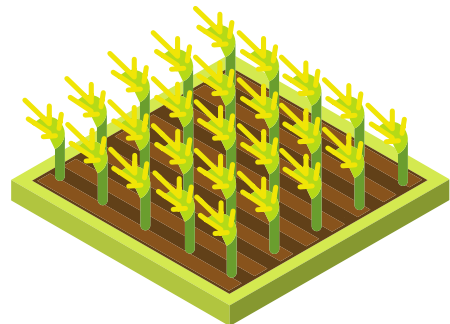


Platforms





Satellite data
and datacube



In situ



Tools



Services



EO Derived

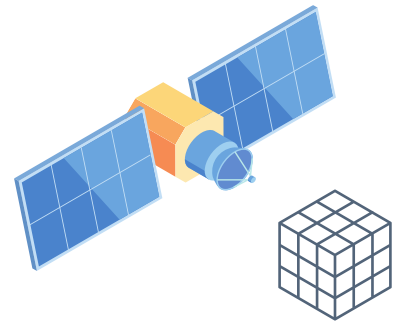


Methodology

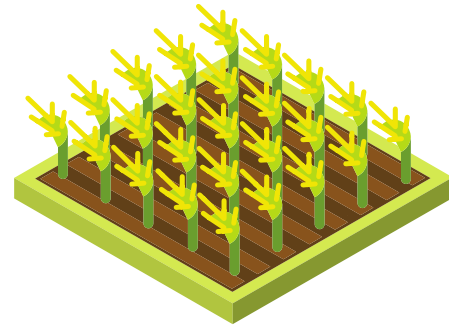


Platforms





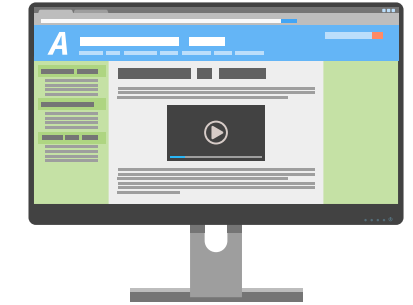
Satellite data
and datacube



In situ



Tools



Services



A lot of EO data and knowledge, **scattered!**



EO Derived

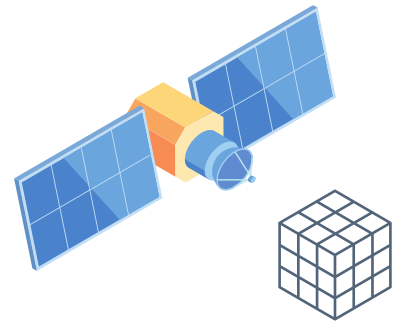


Methodology

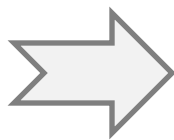


Platforms

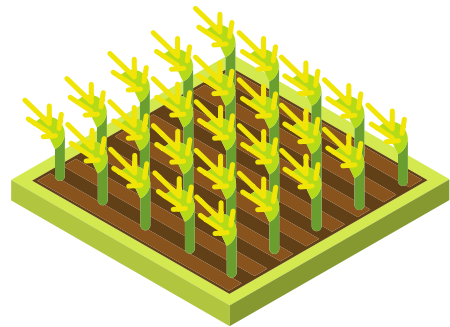




Satellite data
and datacube



EO Derived



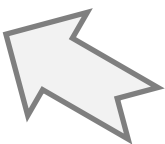
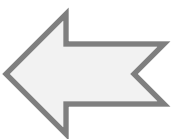
In situ



Tools



Services

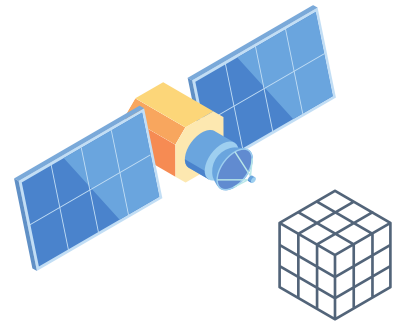


Platforms

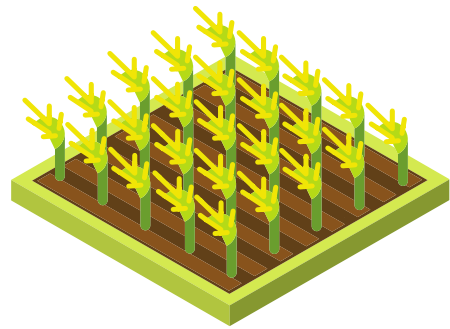


Methodology





Satellite data
and datacube



In situ



Tools



Services



Centralize and preserve all EO resources available



EO Derived



Methodology



Platforms



EO resources available in the GEO Infrastructure

Data and resources



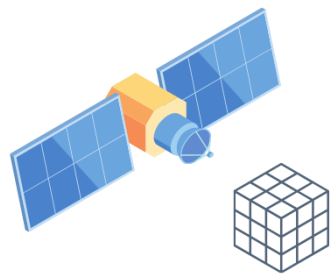
EO Derived



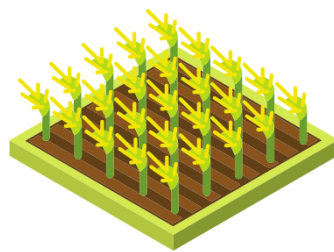
Tools



Services



Satellite data
and datacube

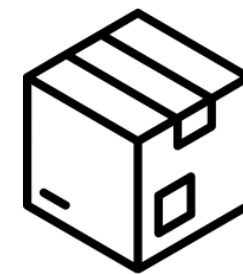


In situ



Platforms

Applications



Knowledge



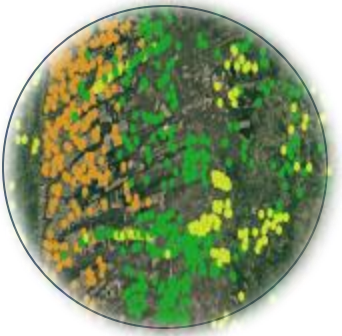
How are these resources going to be organized in the new GEO Infrastructure ?



Knowledge Package



Satellite imagery



In-situ data



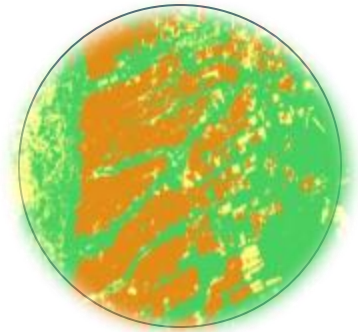
Processing scripts



Knowledge Package



Workflow



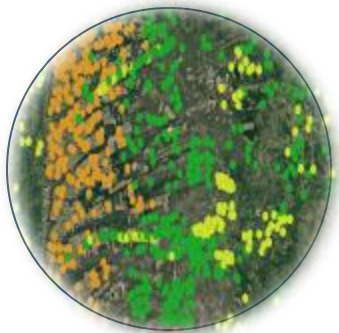
Data results



Articles & notes



Satellite imagery



In-situ data



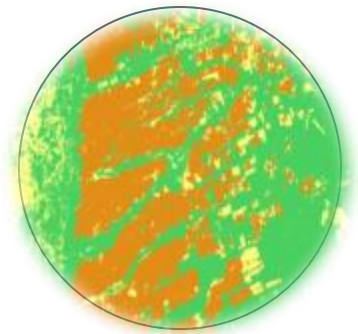
Processing scripts



Knowledge Package



Workflow

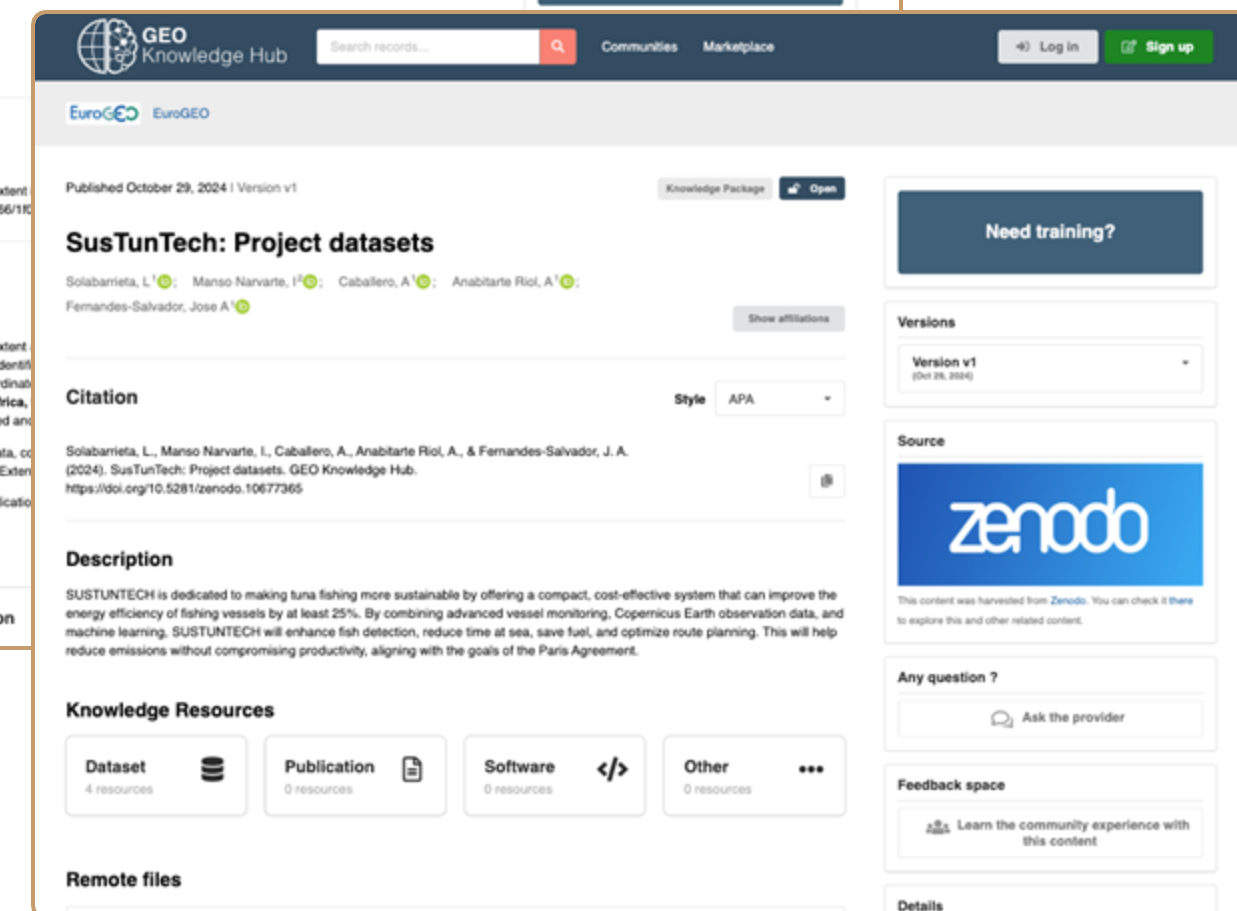
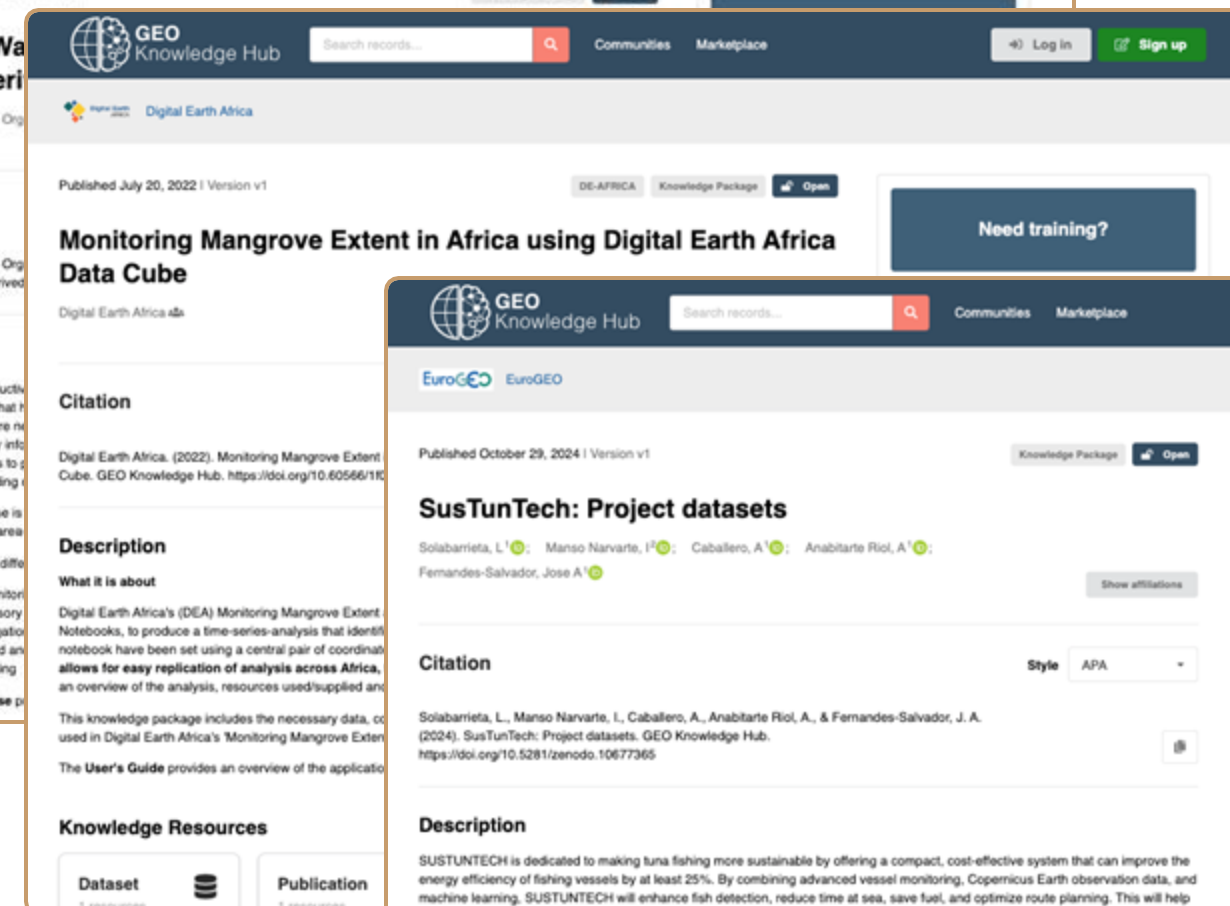
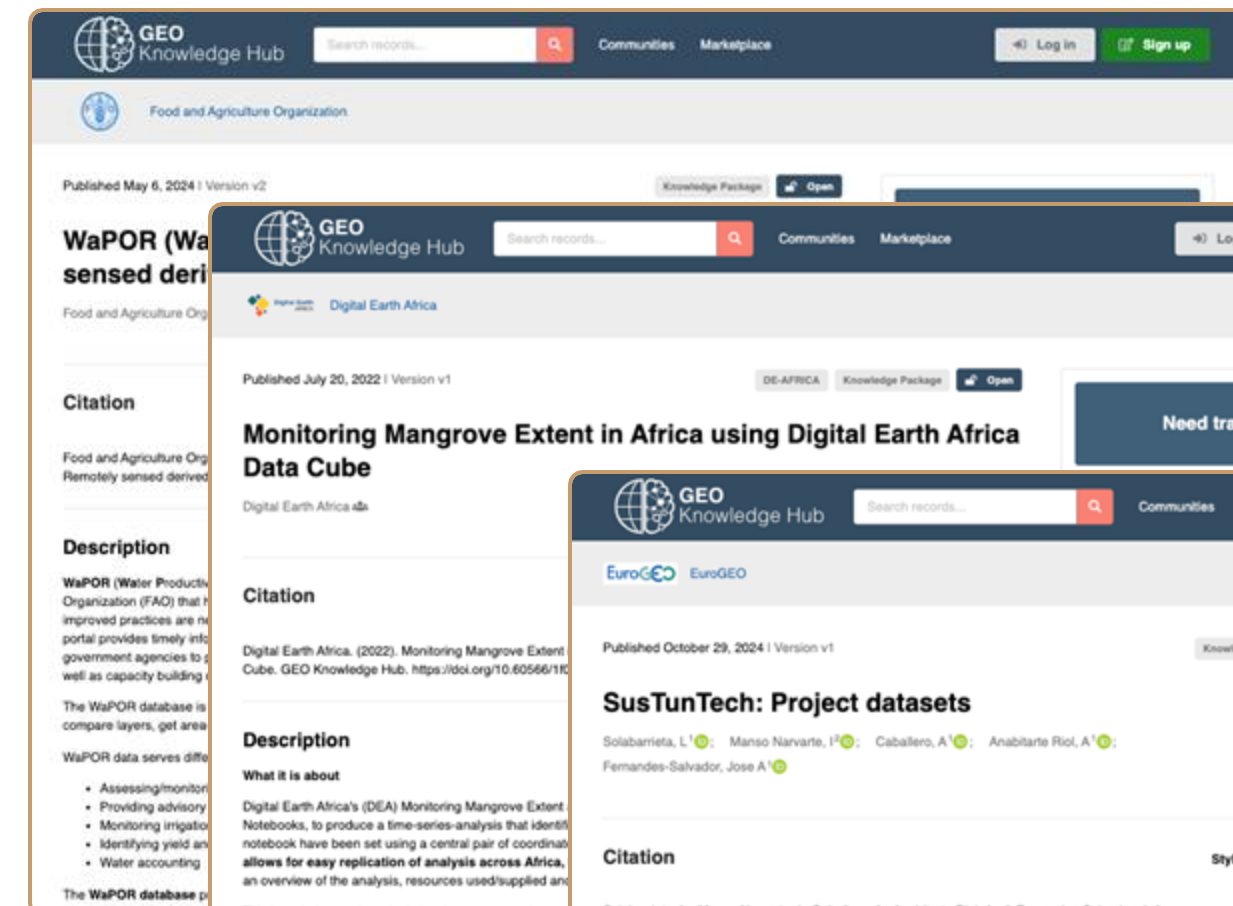
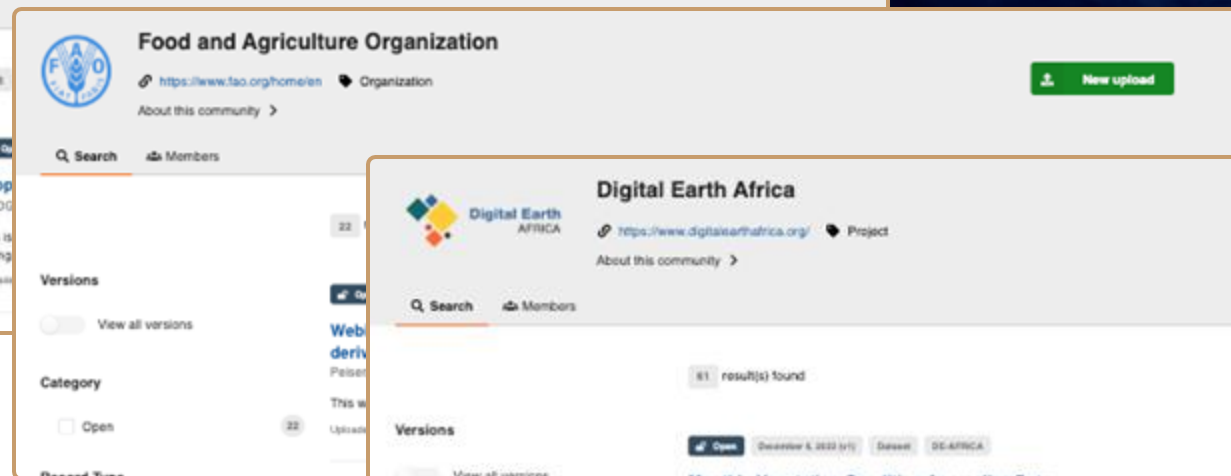
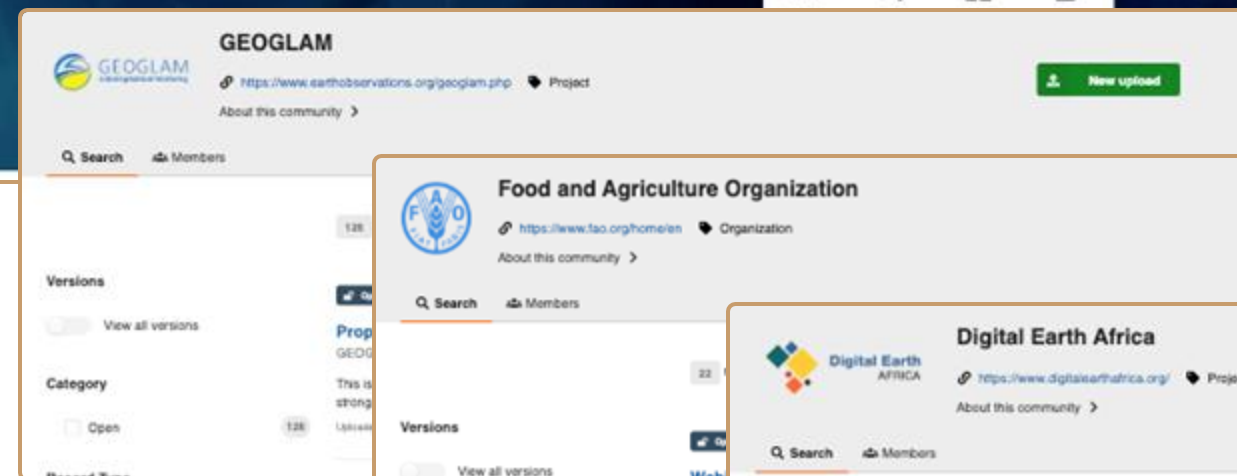
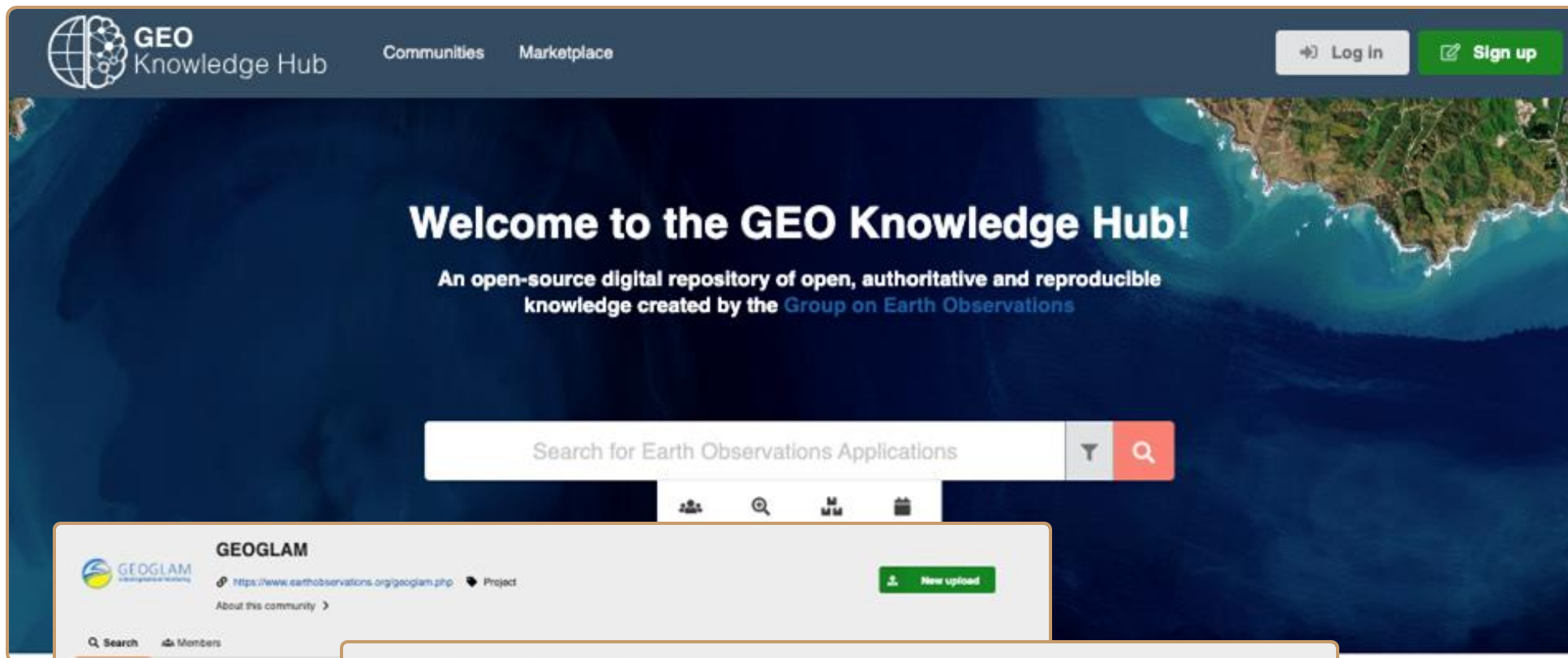


Data results



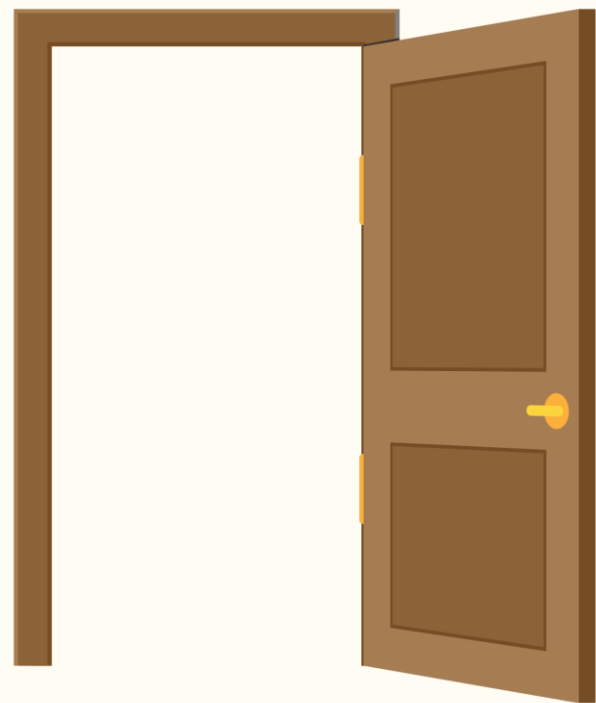
Articles & notes

The GEO Knowledge Hub

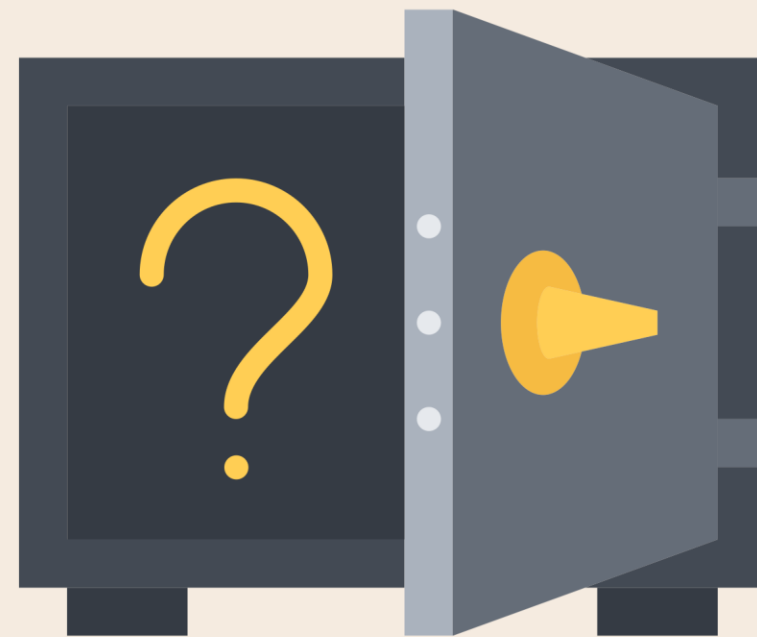


gkhub.earthobservations.org

Open



Preserve



Use



Package multiple scenarios

Land cover forecast

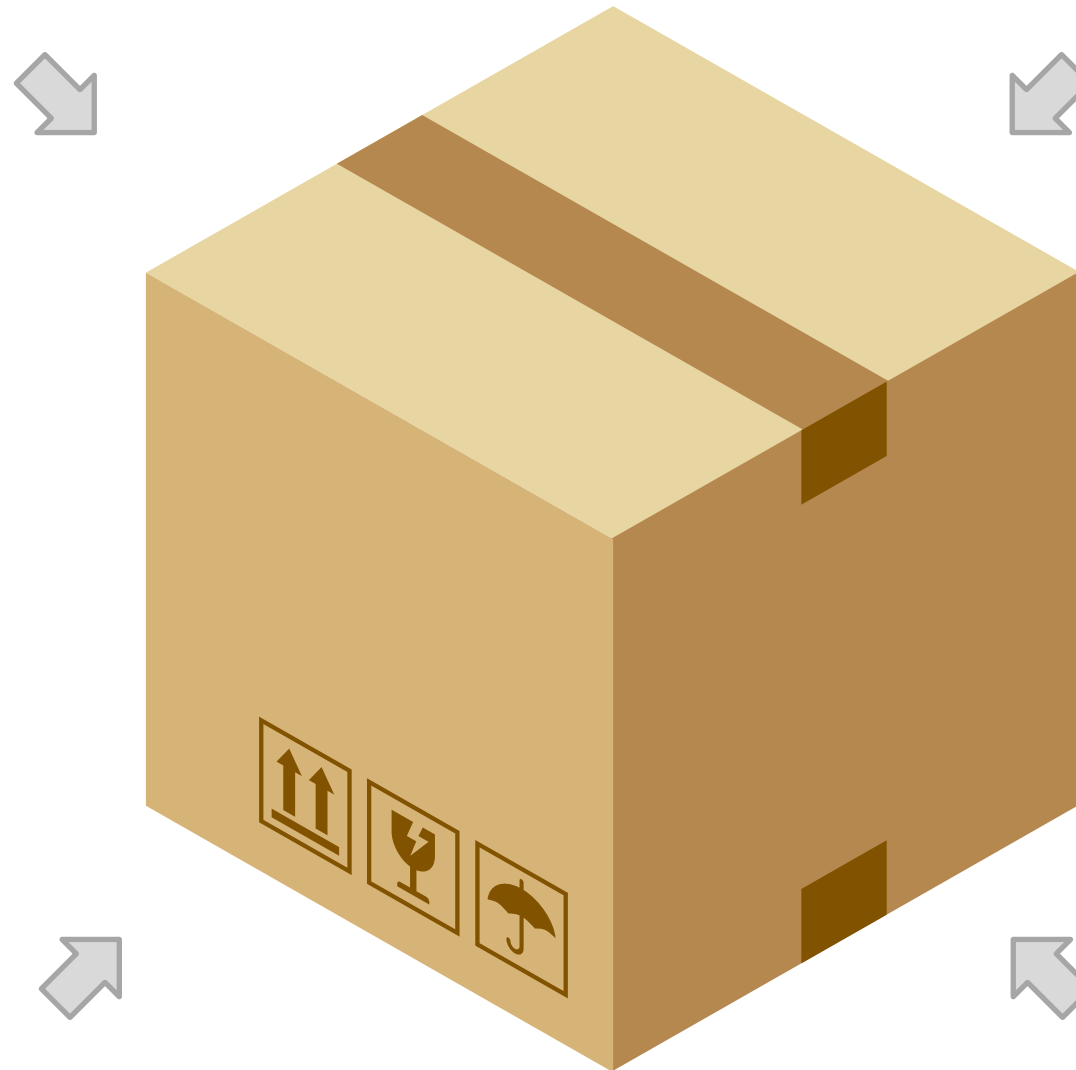
Water quality management

Crop type mapping

Deforestation detection

LULC mapping

Crop statistics



GEO Infrastructure general workflow

User



Search content



GEO Infrastructure



Return packages as results



Crop type mapping



Deforestation detection

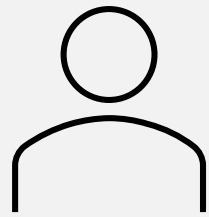


Crop type mapping

Technical architecture

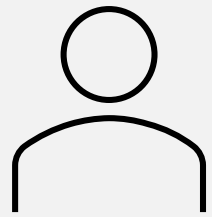
Implementation plan principles

Implementation plan principles



User first

Implementation plan principles

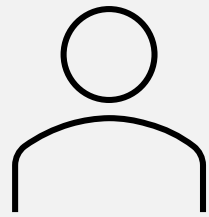


User first



Simple

Implementation plan principles



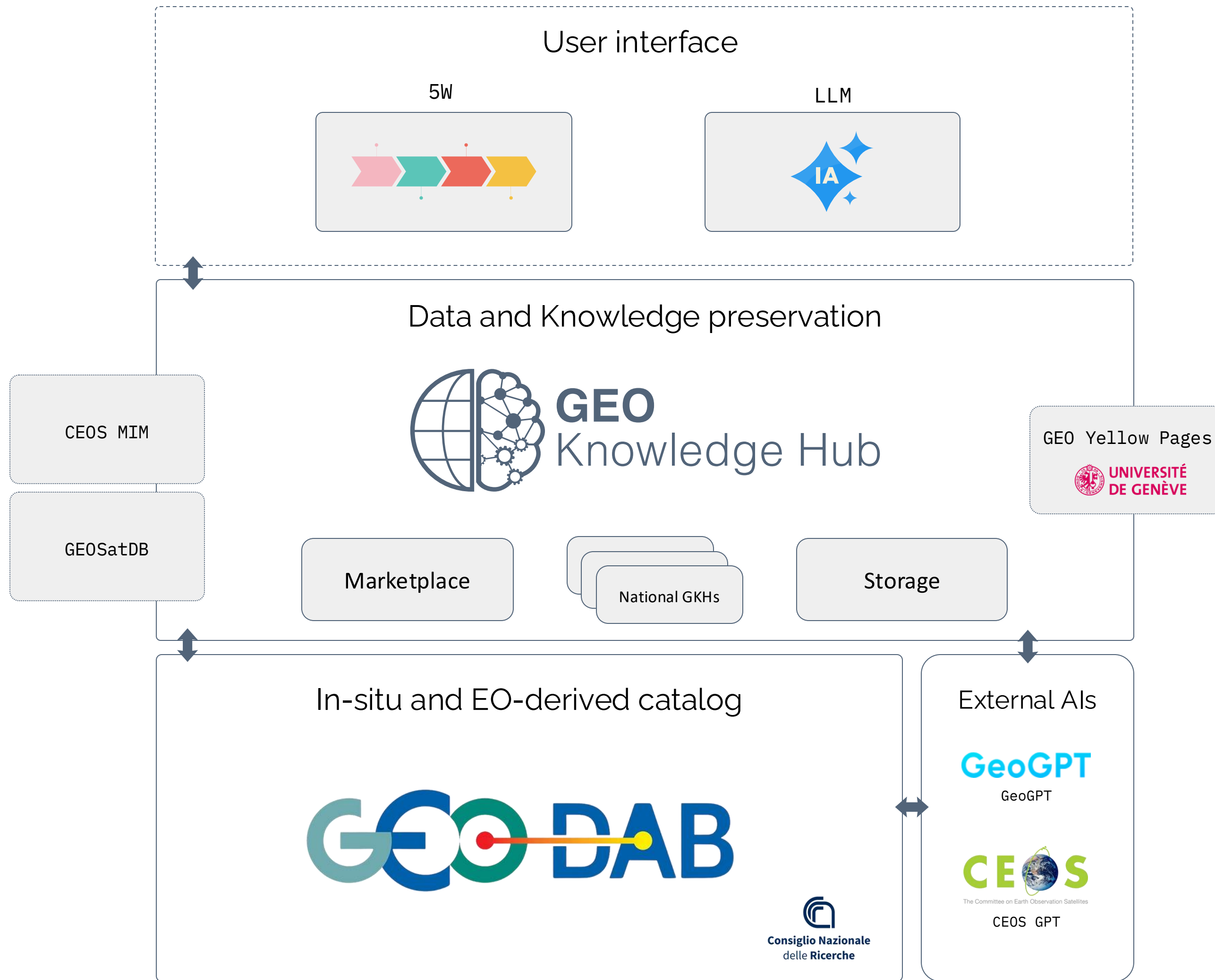
User first

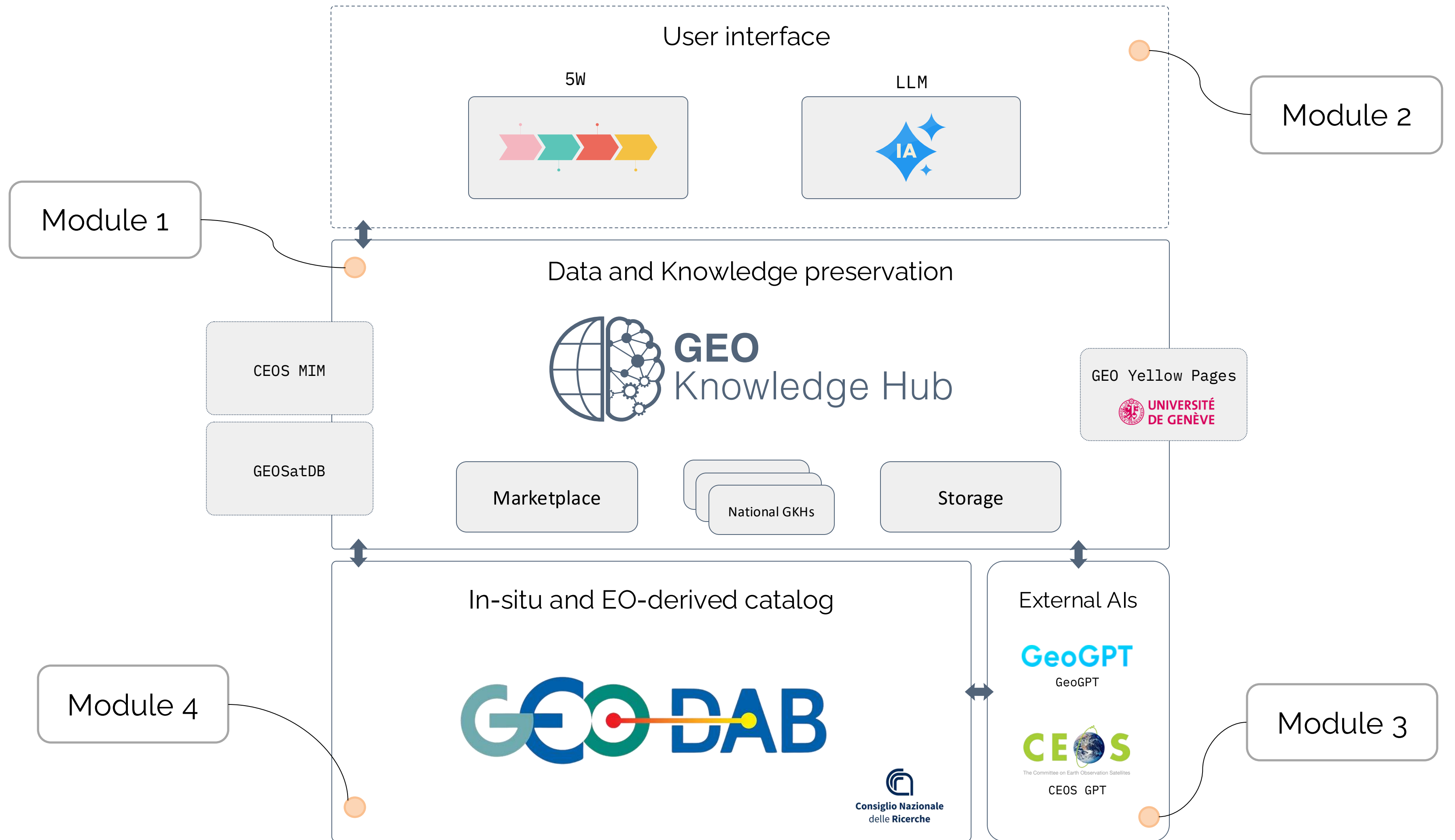


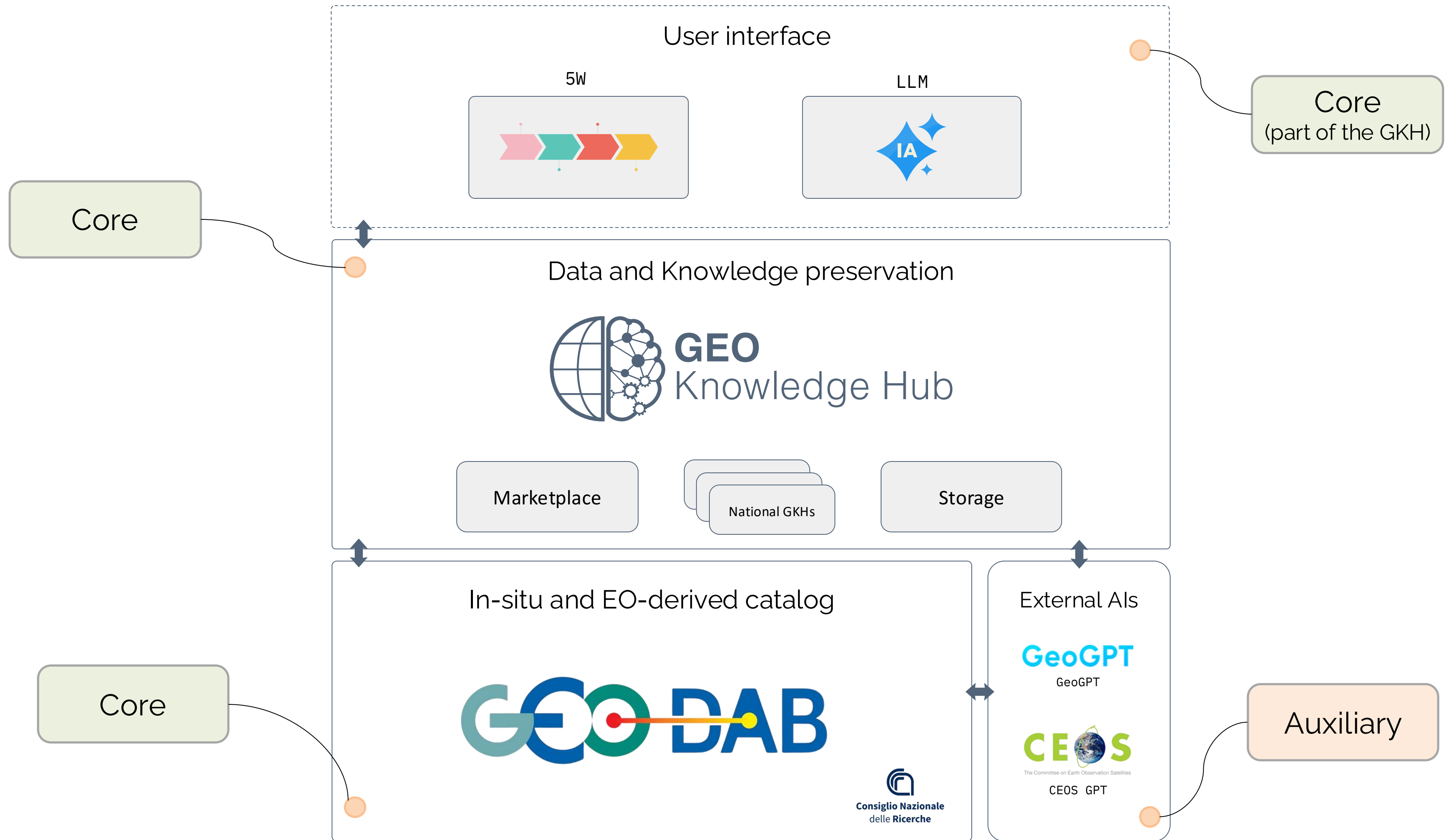
Simple



Pragmatic



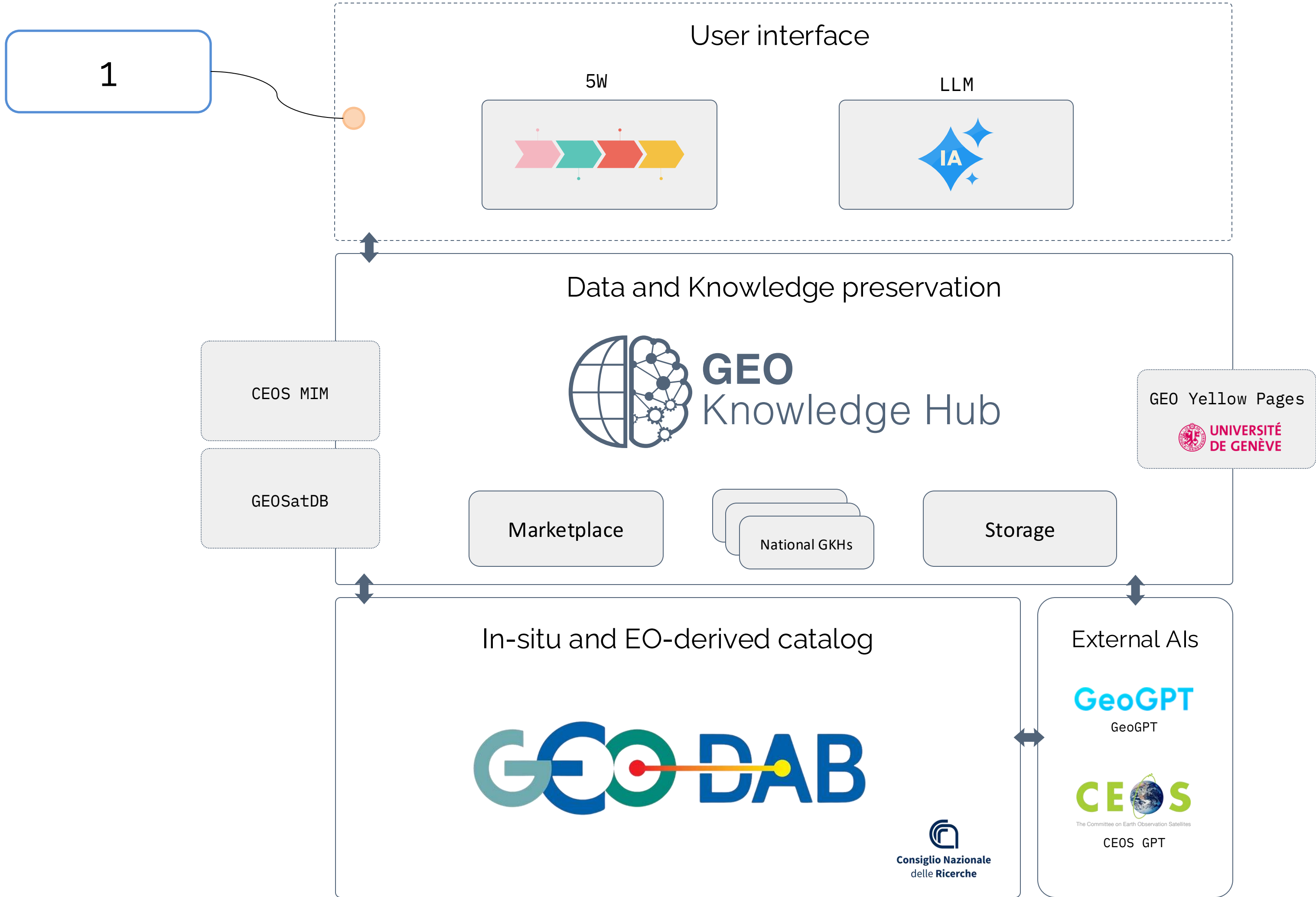


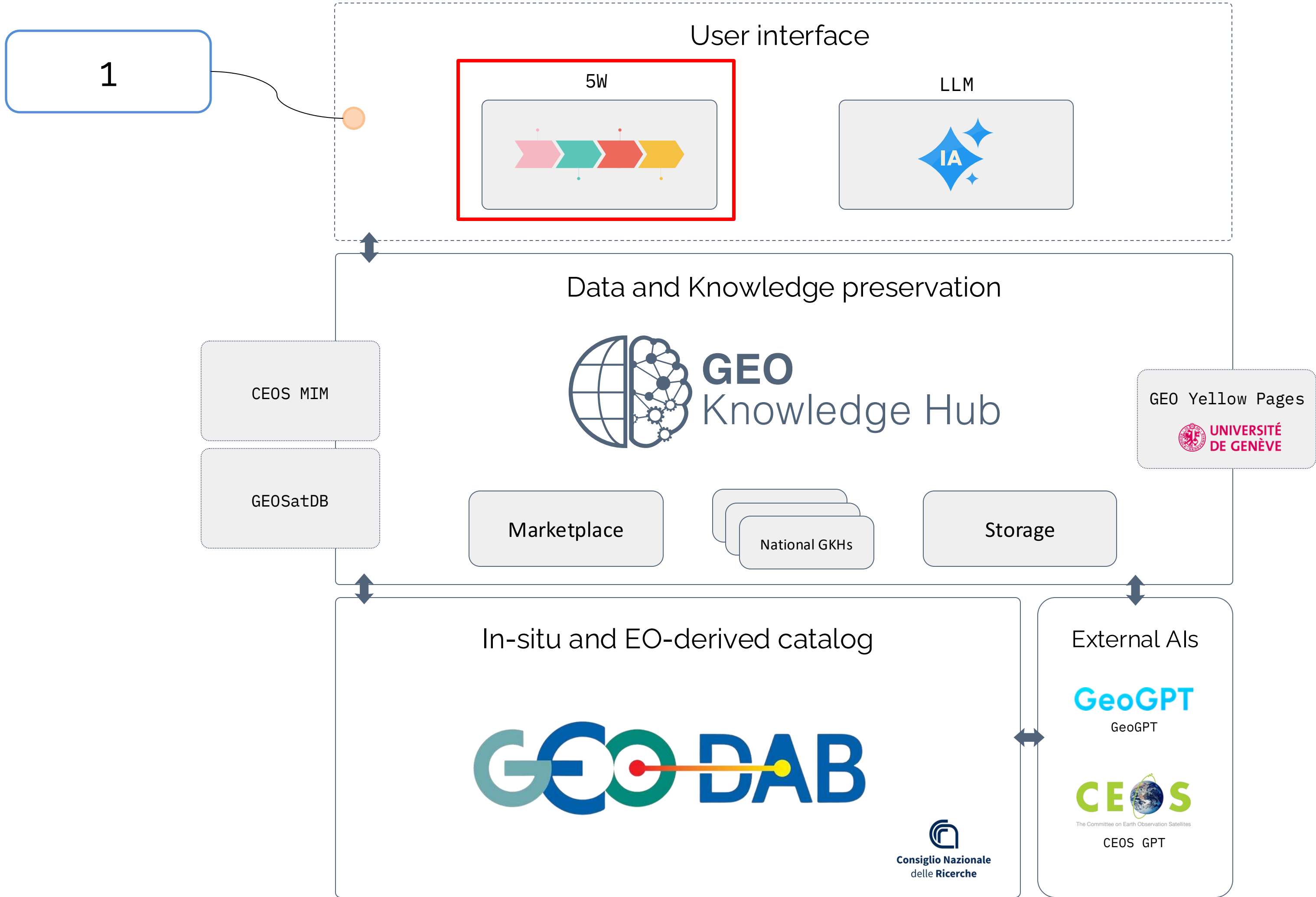


Modules to enhance sustainability

In the new GEO Infrastructure, we use modular design to improve sustainability

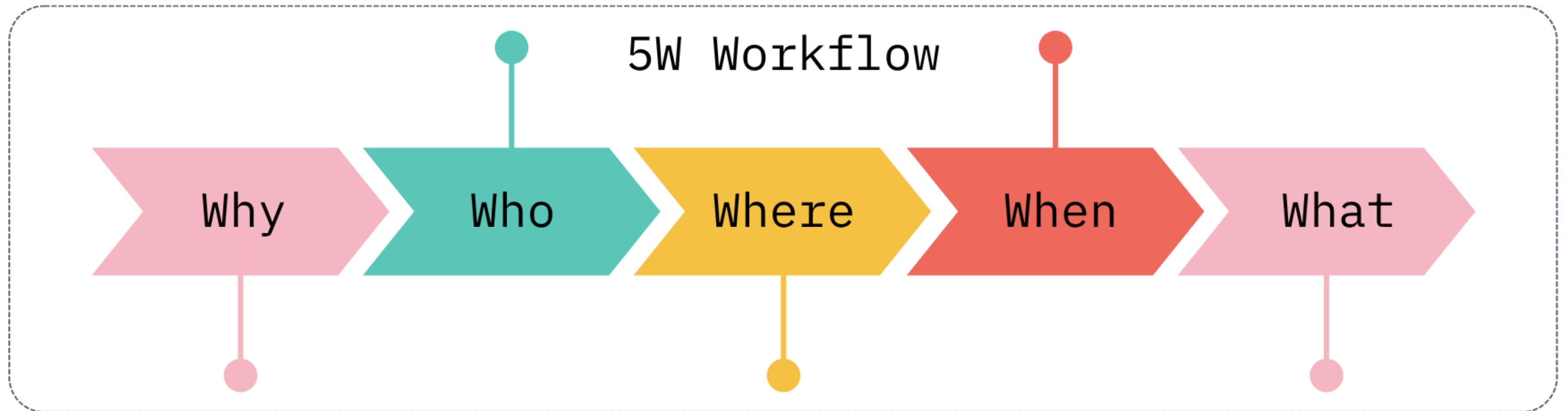
We treat all non-core modules as “services” that provide features or content to the platform. This design allows the system to continue operating even when some modules are unavailable.





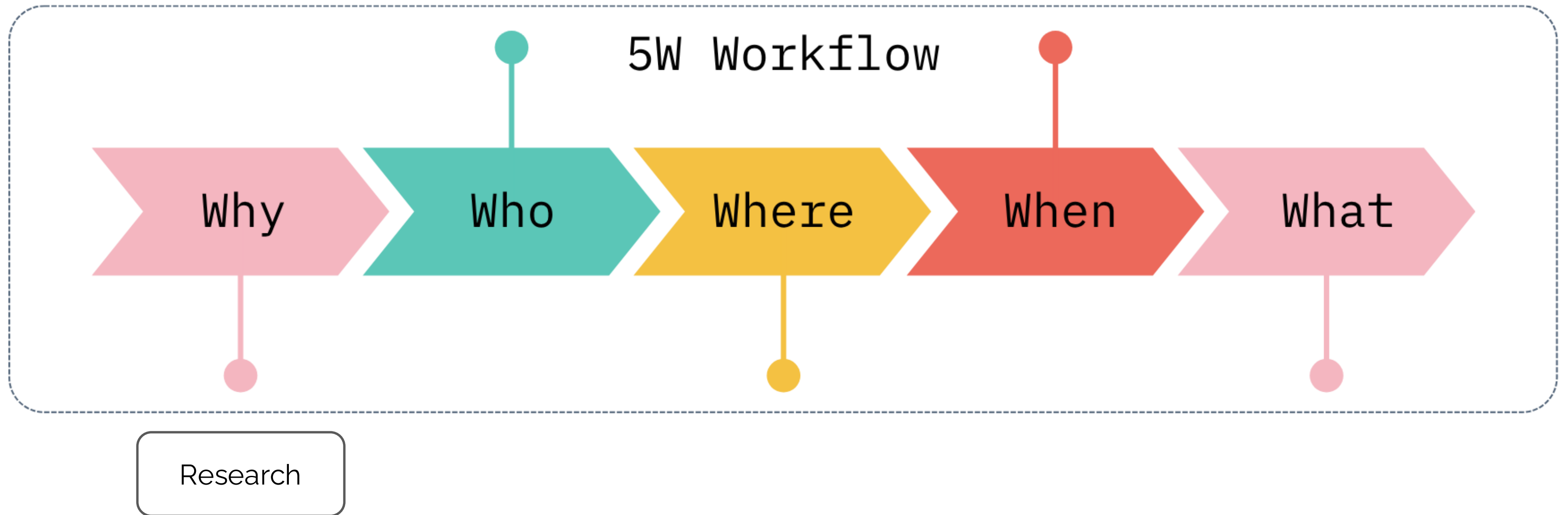
Search by properties

(guided search)



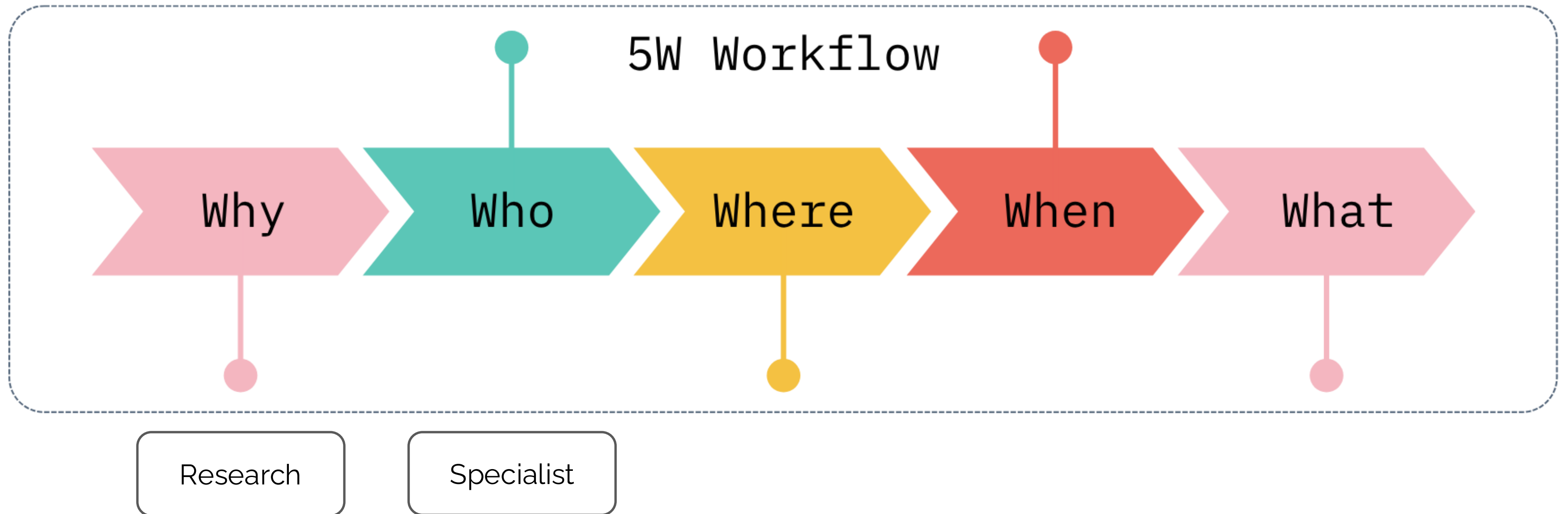
Search by properties

(guided search)



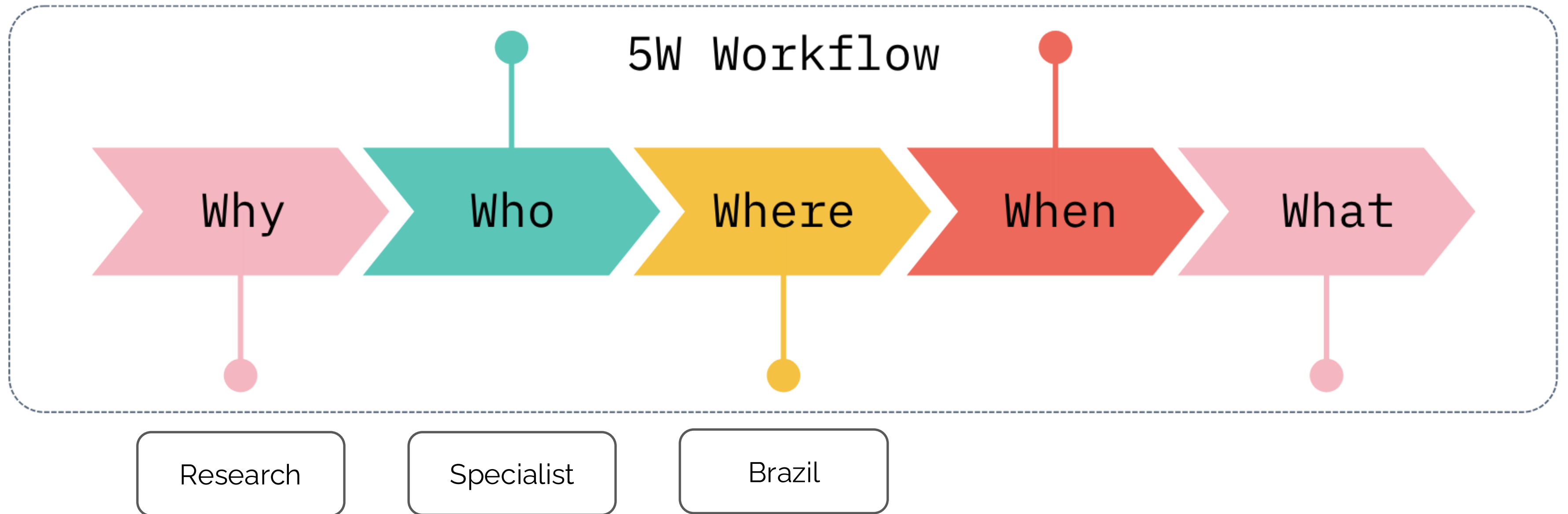
Search by properties

(guided search)



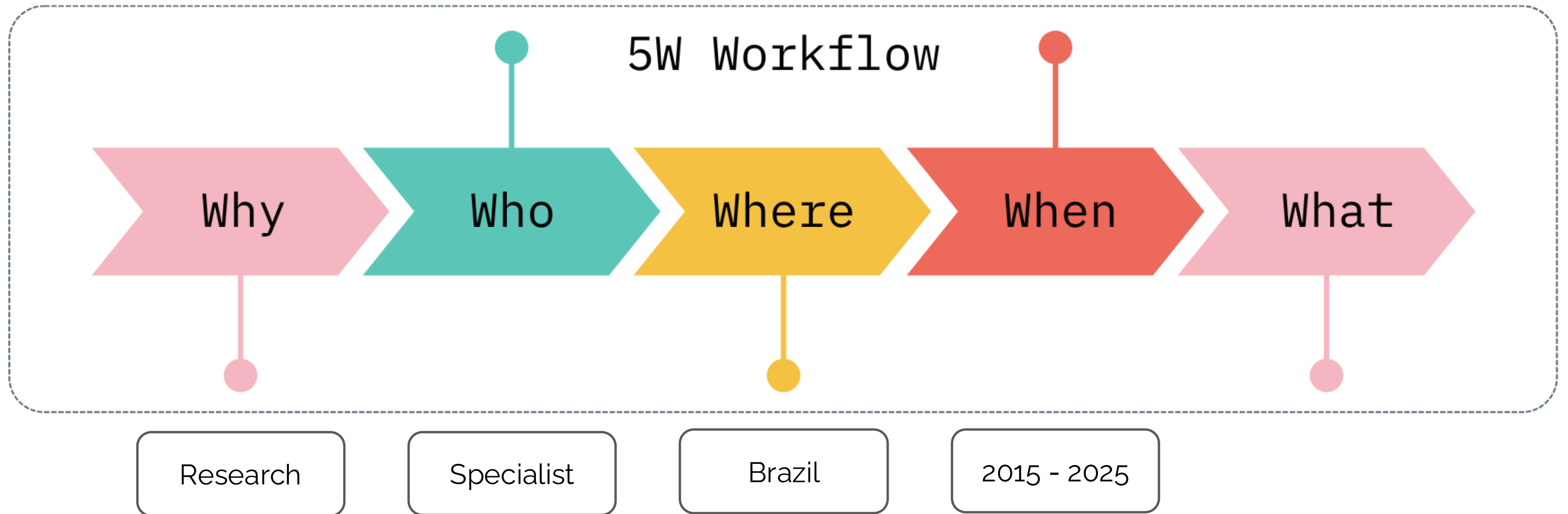
Search by properties

(guided search)



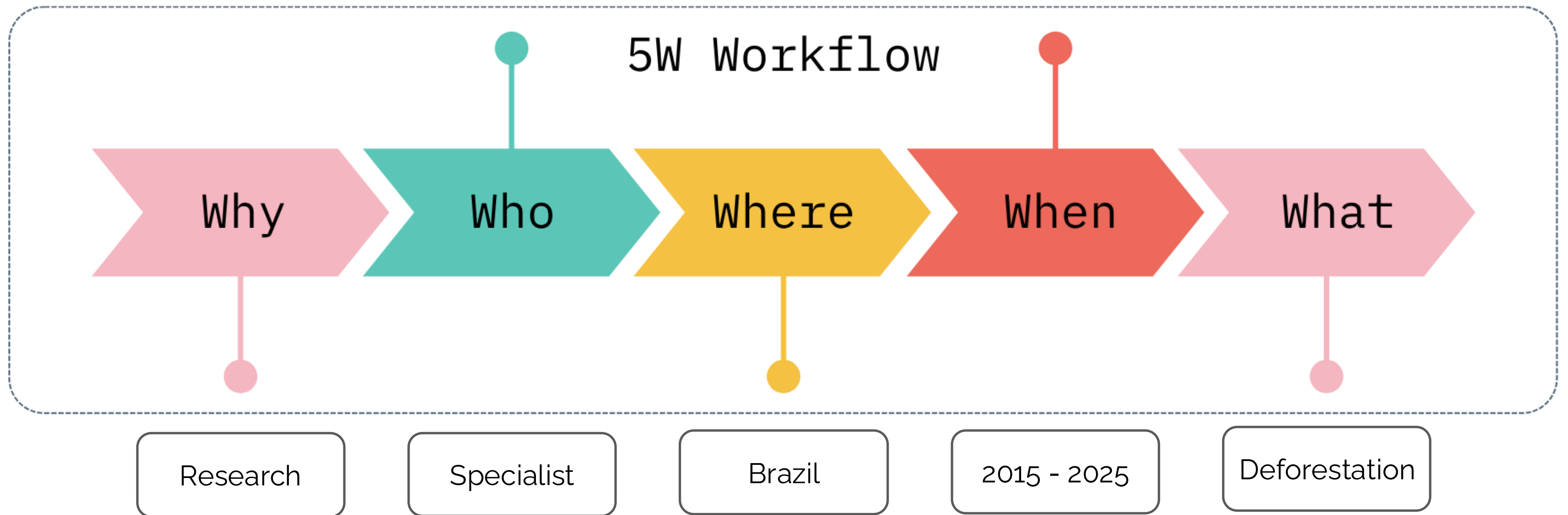
Search by properties

(guided search)



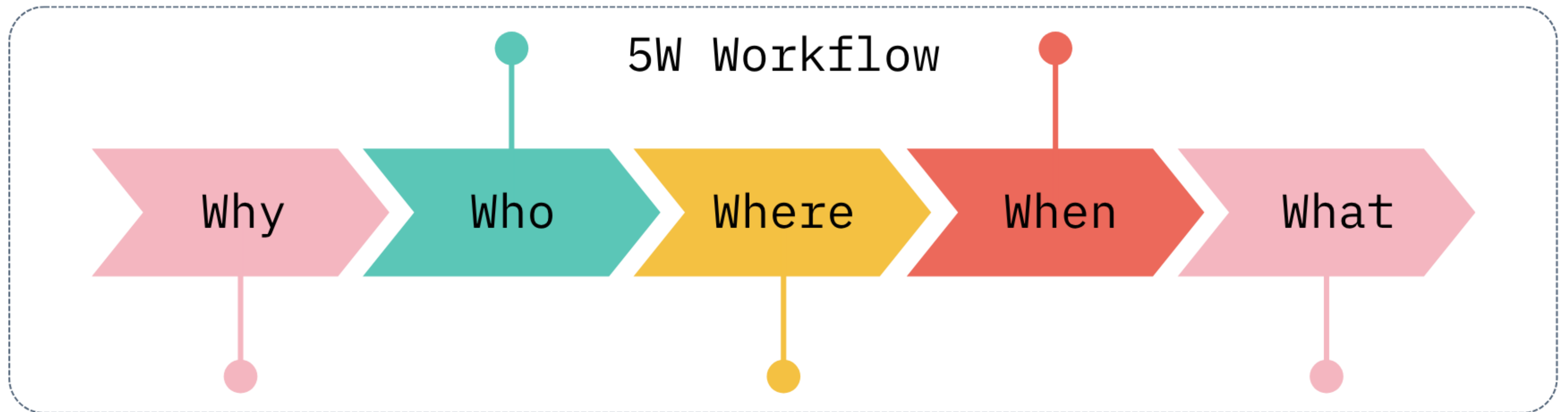
Search by properties

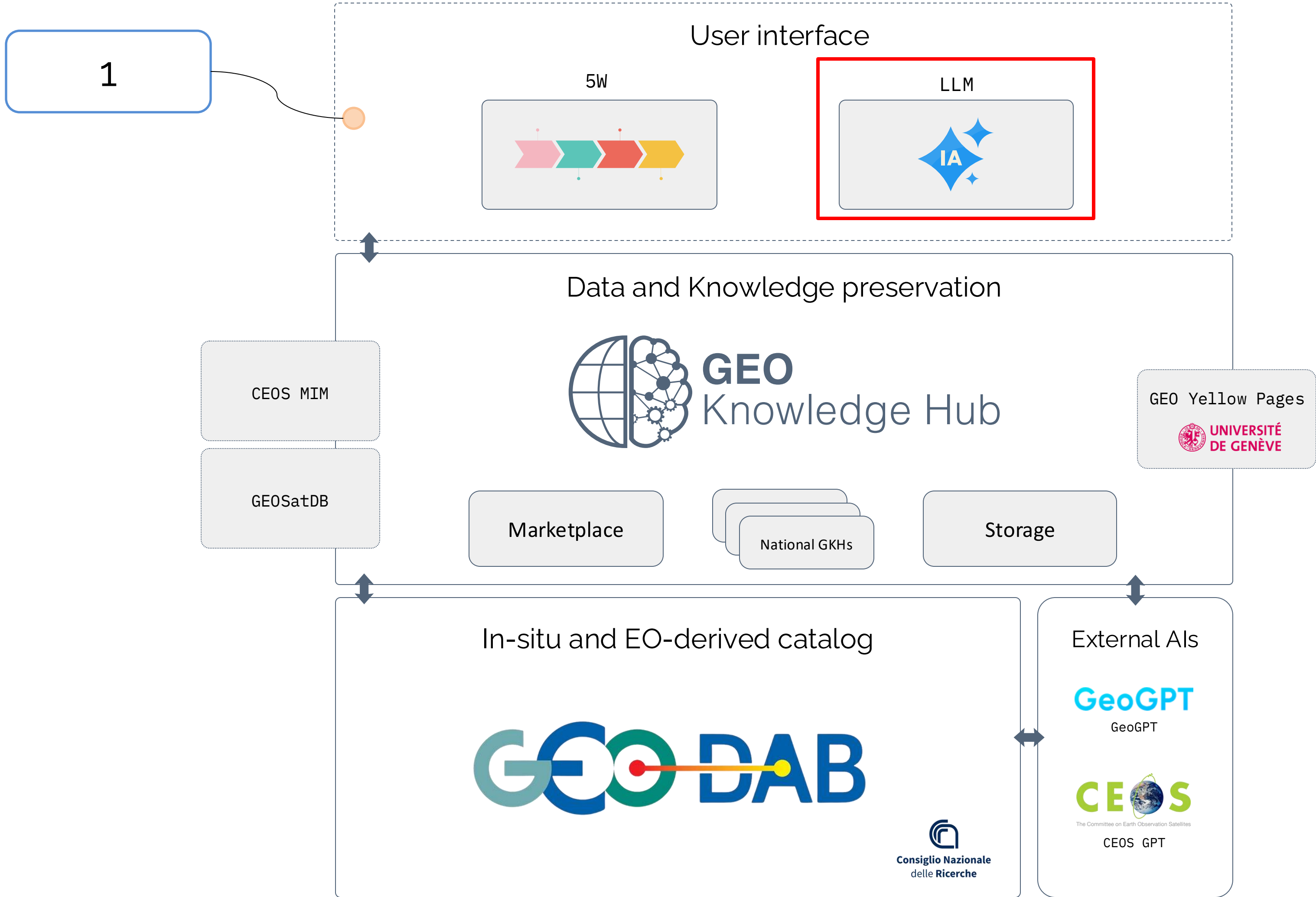
(guided search)



Search by properties

(guided search)





Search using natural language

LLM Workflow

How to do crop type mapping?



Search using natural language

LLM Workflow

How to do crop type mapping? 🔍



"How to do crop type mapping"?

Search using natural language

LLM Workflow

How to do crop type mapping? 🔍



"How to do crop type mapping?"

"What are the EO applications for Flood Monitoring? "

Search using natural language

LLM Workflow

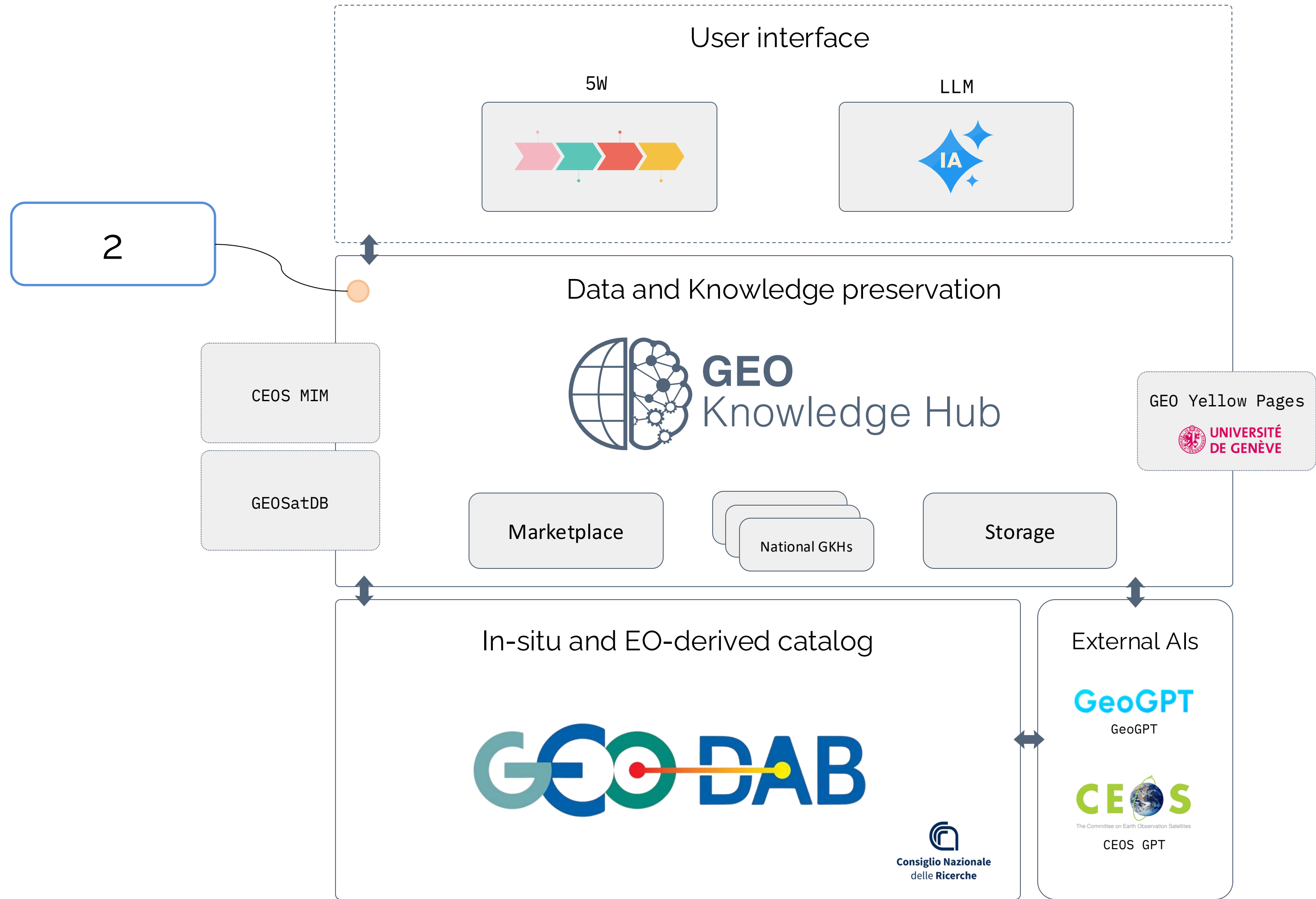
How to do crop type mapping? 🔍



"How to do crop type mapping?"

"What are the EO applications for Flood Monitoring? "





Descriptive metadata matters and enhances discoverability

Thematic Focus Areas

- AGRICULTURE & FOOD SECURITY
- WATER AND LAND SUSTAINABILITY
- ECOSYSTEMS, BIODIVERSITY & CARBON MANAGEMENT
- WEATHER, HAZARD & DISASTER RESILIENCE
- CLIMATE, ENERGY & URBANISATION
- ONE HEALTH

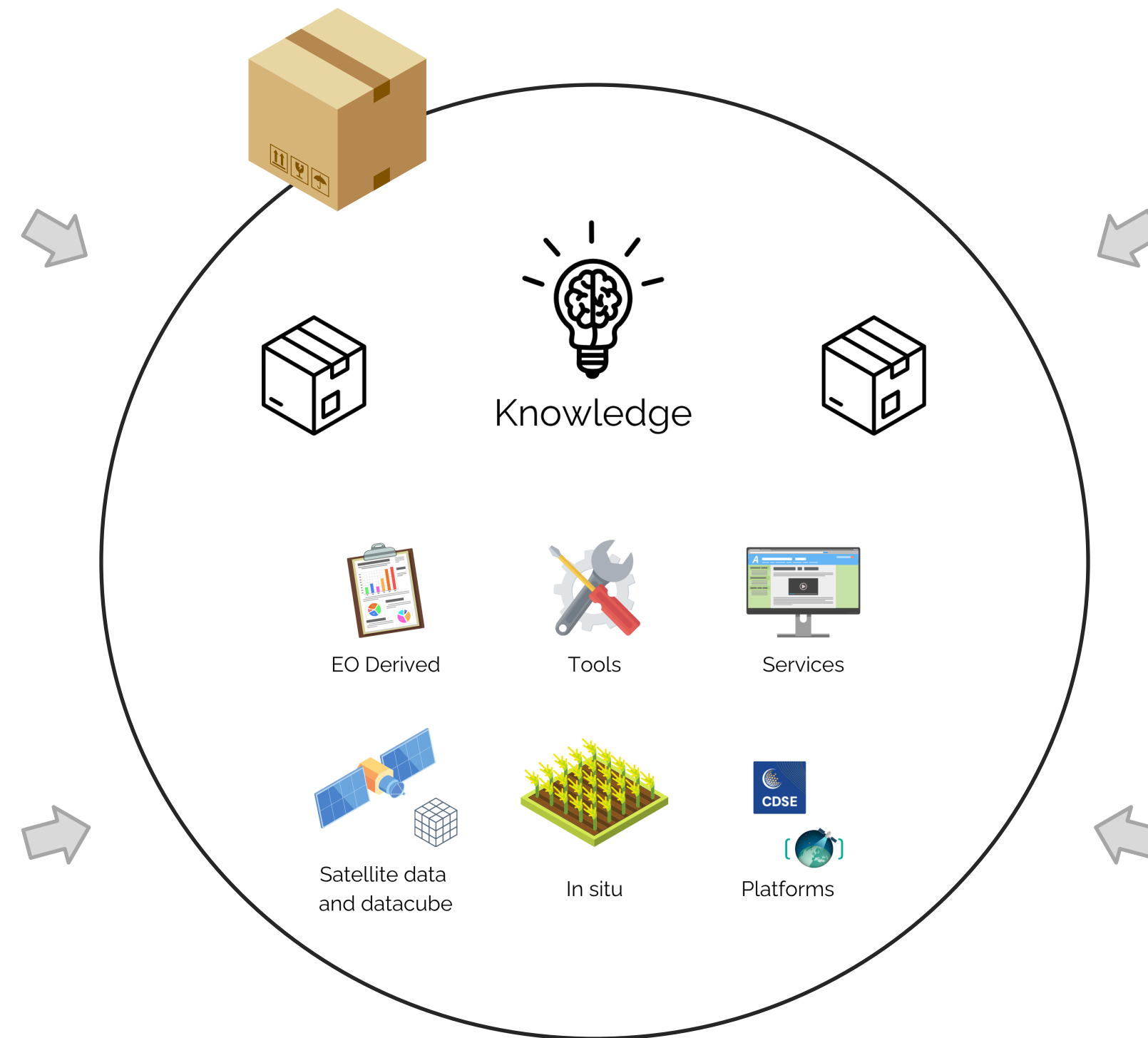
(Controlled vocabularies)

Satellite-related info

CEOS MIM

GEOSatDB

(Controlled vocabularies)



Curated, organized content
by GEO Community Knowledge Providers

Essential variables

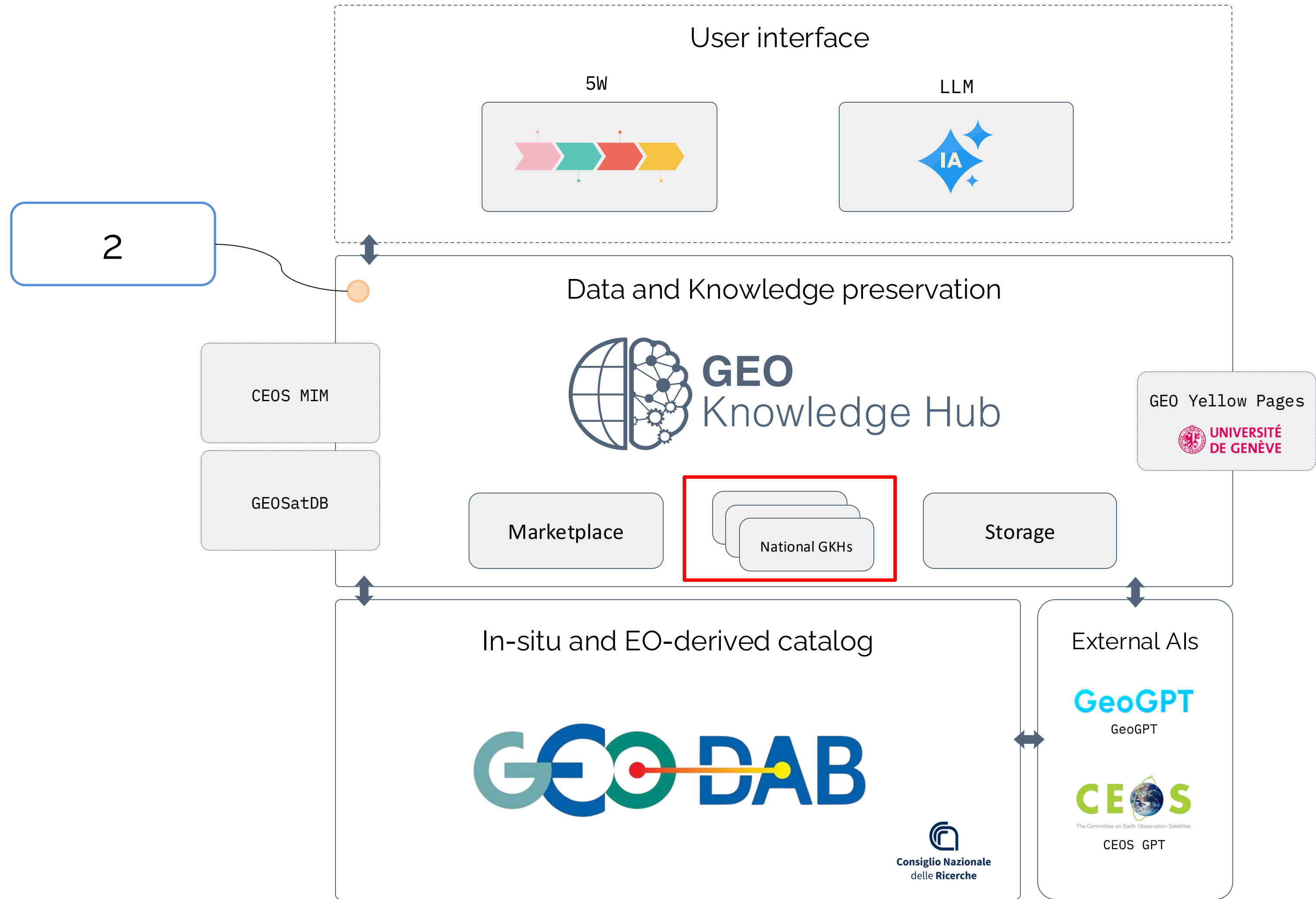
Climate Ocean
Geodiversity
Geodiversity
Agricultural

(Controlled vocabularies)

Engagement priorities



(Controlled vocabularies)



[< Back](#)

South Africa Knowledge Hub

Discover the resources available in South Africa



Explore

Find solutions in South Africa tackling the challenges of GEO Focus Areas



Agriculture and Food Security

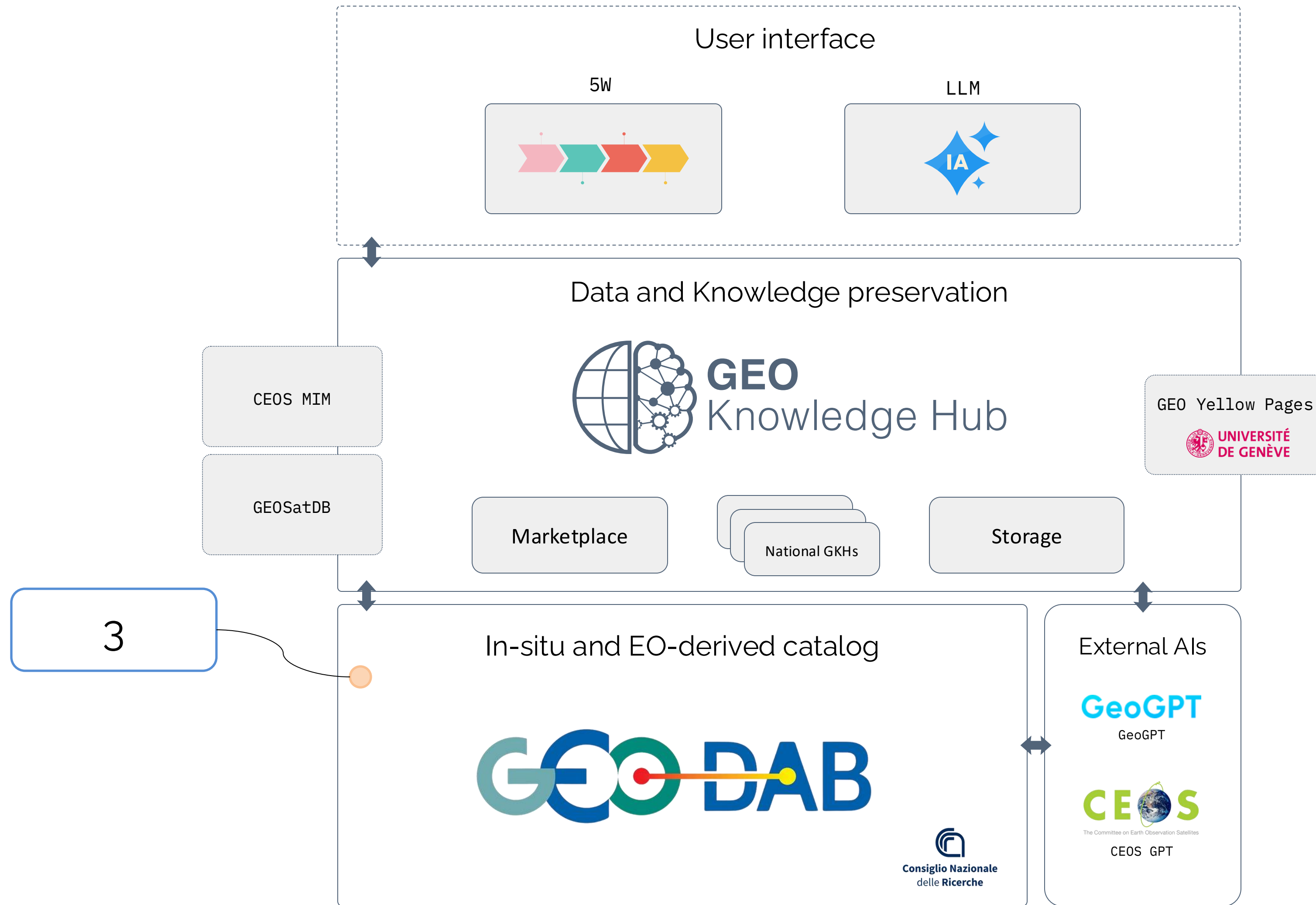


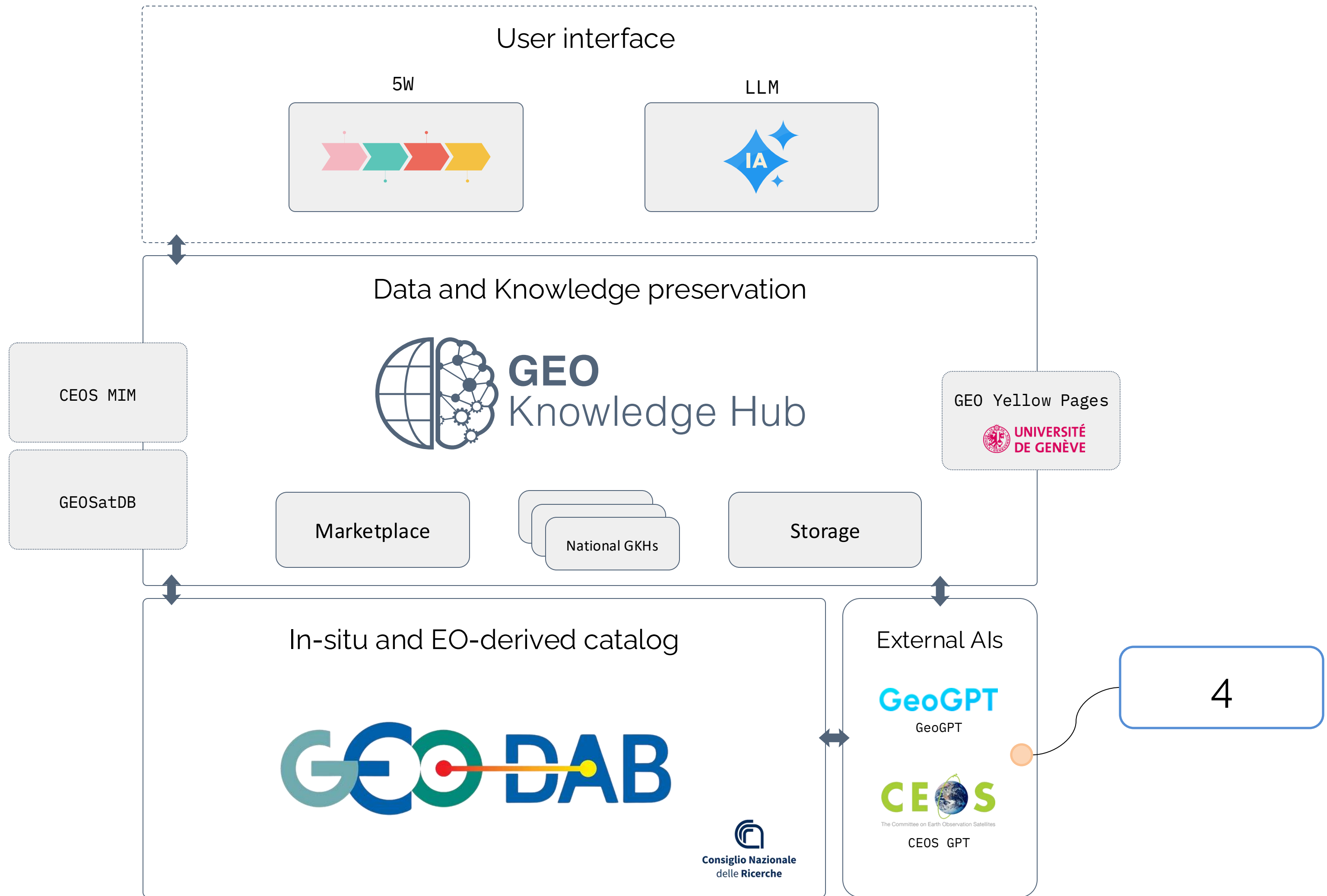
Land and Water Sustainability



Weather, Hazard and Disaster Resilience

gkhub.earthobservations.org/national/countries/south-africa





Technical architecture

(Important considerations)

Large Language Model (LLM) as an “in-house” solution

The LLM solution must be “in-house,” as it processes metadata (e.g., titles, descriptions) and content (e.g., PDFs, Jupyter Notebooks) shared by Knowledge Providers.

Also, the solution must be **fully open source** and **governed** by the GEO Community, rather than a single entity.

The Large Language Model (LLM) tech stack

LLMs are AI systems built on vast amount of data — in our case, using GKH and GEO DAB metadata to enable domain-specific understanding

Important: Current GKH tech stack already support such approach, and will be extended to make it available (as an PoC) in the following months

The Large Language Model (LLM) legal aspect

For **legal aspects**, like licenses and other aspects, the GIDTT is receiving constant support from the Law and Policy subgroup of the Data and Knowledge Working Group

GEO Infrastructure and GEO Community

The GEO Community, led by the Data and Knowledge WG, is **building an infrastructure grounded in robust transparent community support, implementing continuous technological advancement, ensuring resilience, fostering collective innovation** beyond the implementation plan

The promoting **Open Data, Open Knowledge**, and the advancement of practices of in assigning the right data licenses, data preservation, sharing, and data management.

ODOK 2023 (Switzerland)



ODOK 2024 (China)



ODOK 2025 (Italy)



The GEO Infrastructure is **more than** the **implementation plan** itself

2023: ODOK Workshop (Geneva, CH)

The first Open Data and Open Knowledge Workshop brought together experts to share insights in the topic.

2024: ODOK Workshop(Hangzhou, China)

Continued the successful workshop, building on previous discussions and fostering new collaborations.

2025: User Engagement webinars: Digital Earth Africa and SCO (Planned)

2025: ODOK Workshop (Rome, Italy)

Planned workshop to address emerging challenges and innovative solutions in EO Data and Knowledge.

2023: GEO Dialogue Series

Initiated a series of dialogues to disseminate content, knowledge, and experiences across the GEO community.

2024: User Engagement webinars: GEOGLAM and FAO Applications

2024: GEO Dialogue Series

Maintained the momentum with ongoing dialogue sessions, enriching community understanding.

2025: GEO Onboarding webinars

Dialogues to explore new frontiers and reinforce the collective expertise of the GEO community.

The **success** of the new **GEO Infrastructure** is contingent upon the **long-term, sustainable contributions of the global community**, with **all components governed by open licenses** and inclusive participation from all regions

Thank you!

Group on Earth Observations

pdsalvo@geosec.org