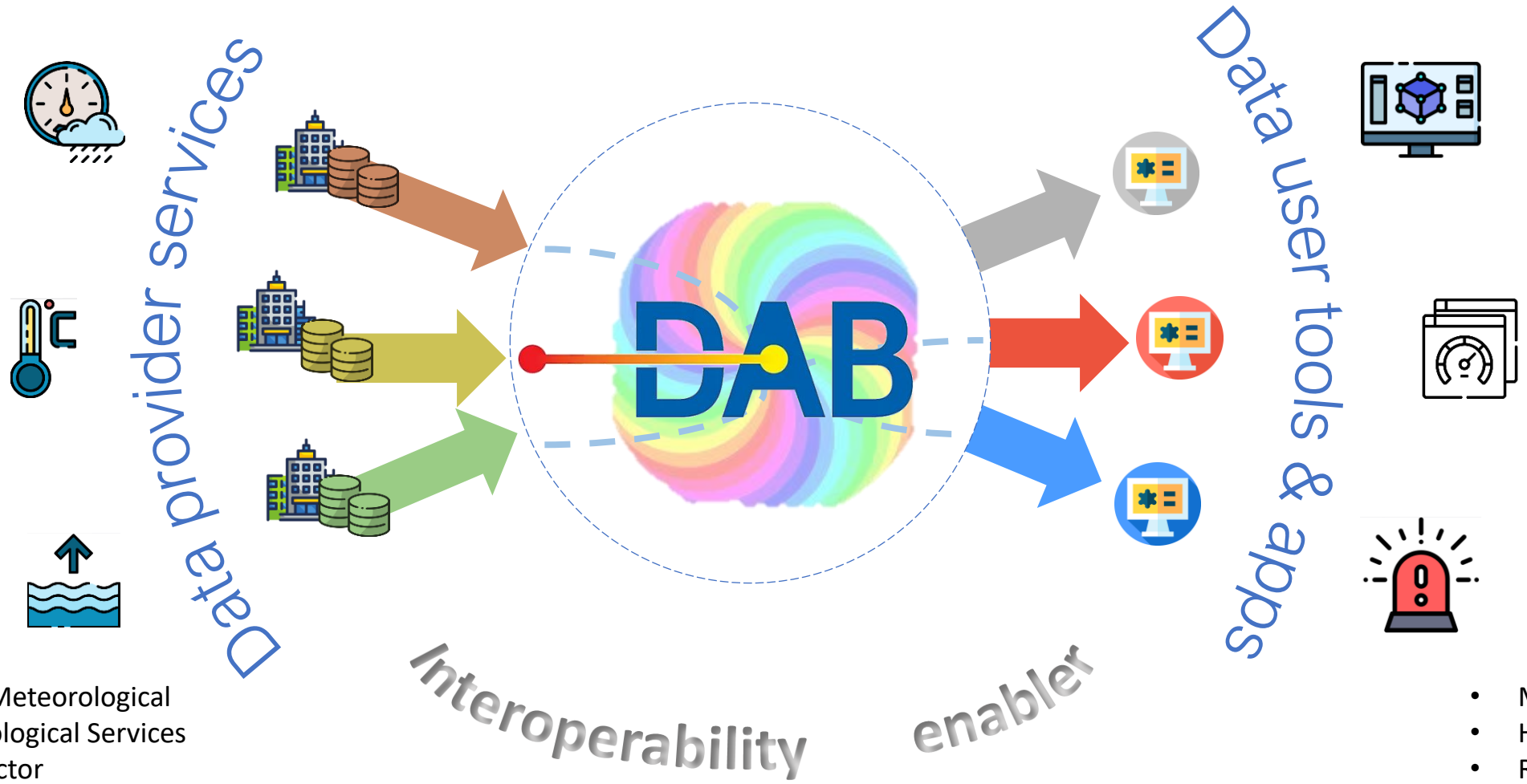
Discovery and Access Broker (DAB) technology

Enrico Boldrini, National Research Council of Italy (CNR)

WEATHER CLIMATE WATER

Geospatial resource brokering framework

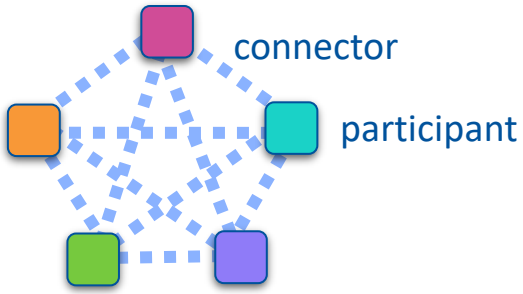


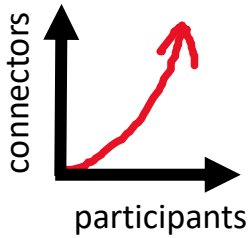
- National Meteorological and Hydrological Services
- Private sector
- Research entities
- …

- Modelers
- Hydrologists
- Researchers
- Decision makers
- …

Brokering approach benefits

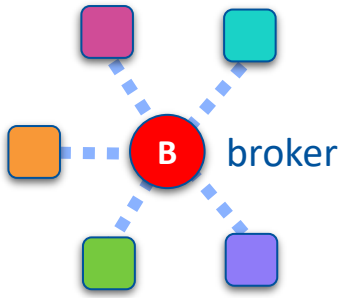
Without broker

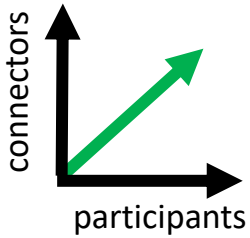




Number of connectors grows **very rapidly** with the number of participants!

With broker





Number of connectors grows **linear** with the number of participants.

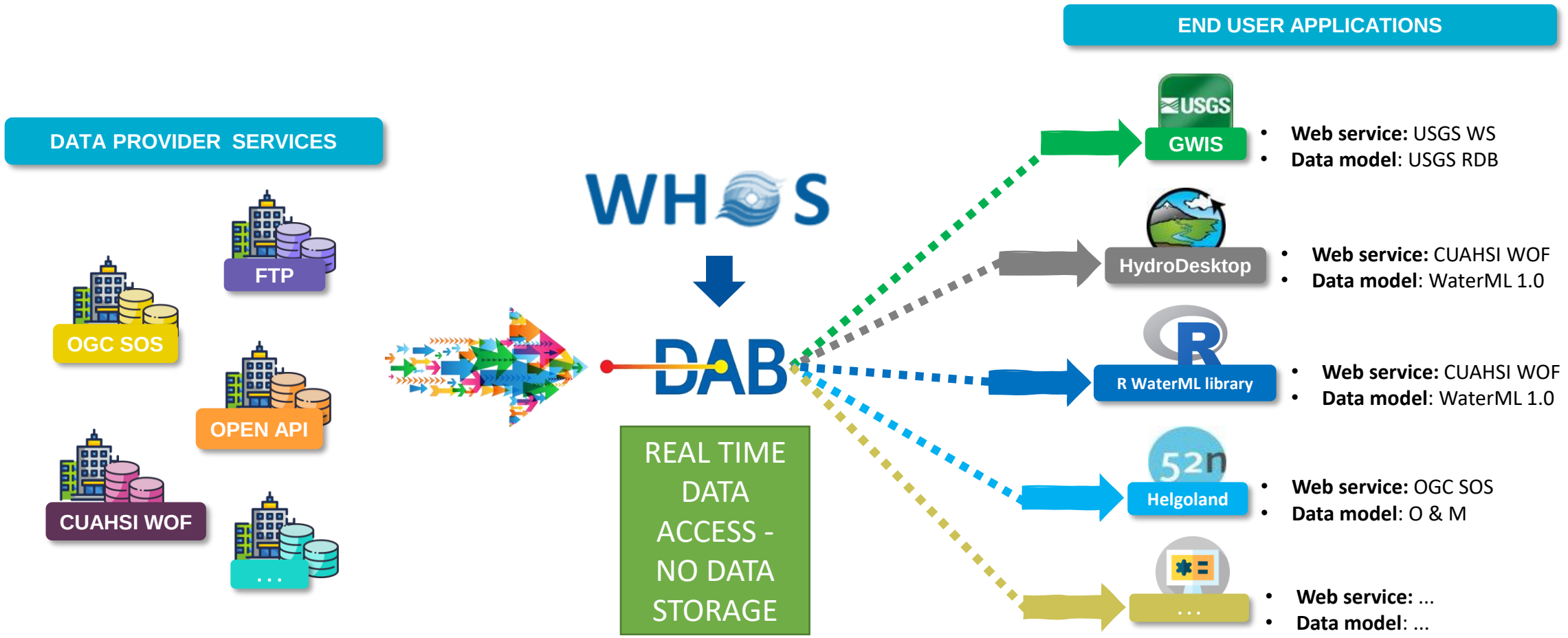
✗ Burden of creating new connectors on participants

✗ New requirements (e.g. new standard) require new implementations by each participant

✓ Burden of creating new connectors on broker

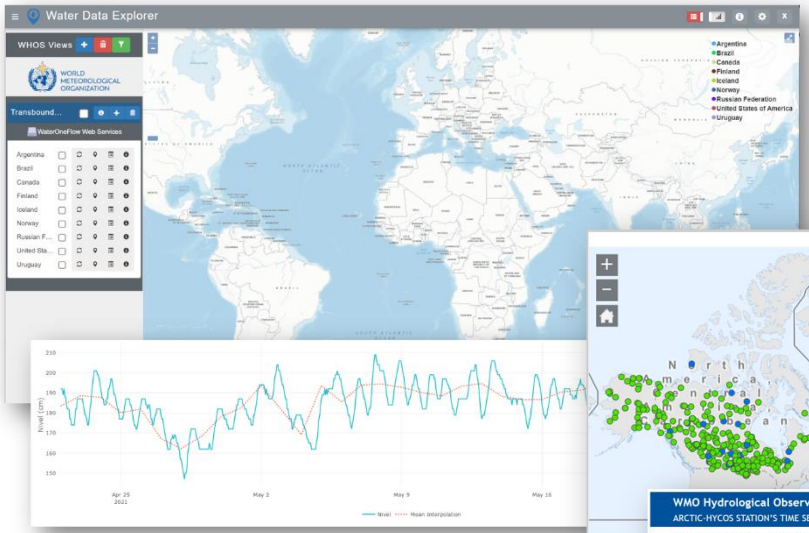
✓ Able to cope with new requirements & change of standards: more sustainable

The DAB broker powering the WHOS architecture

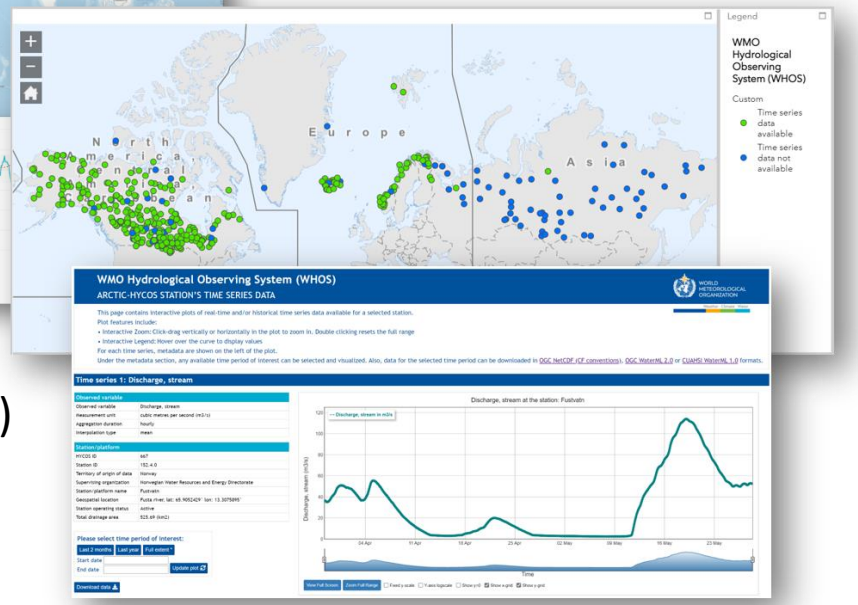


Complete list of supported standards at official WHOS home page:
https://community.wmo.int/activity-areas/wmo-hydrological-observing-system-whos

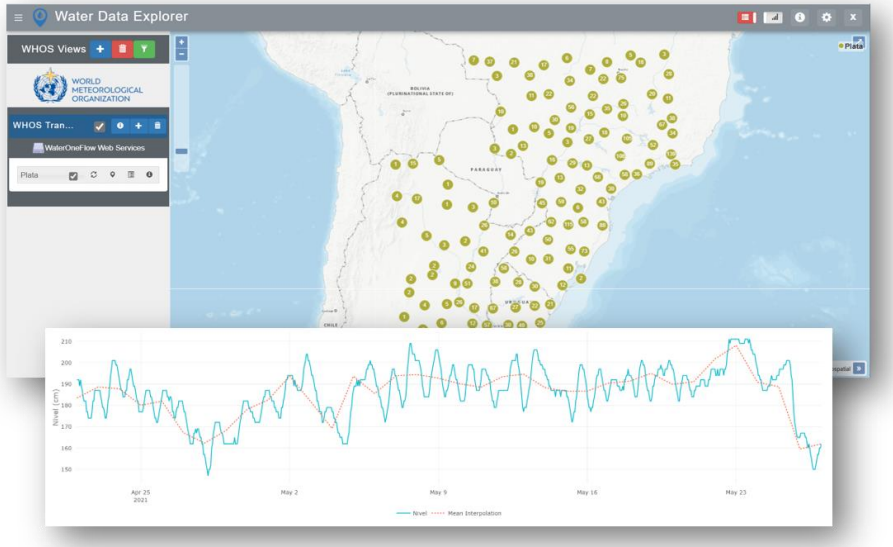
Successful pilots



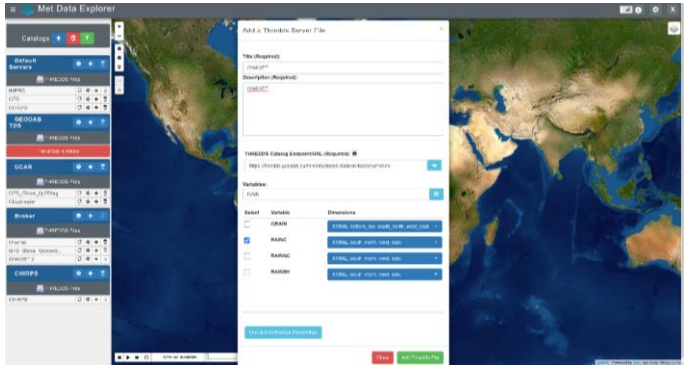
WHOS Global portal
(BYU Water Data Explorer)



WHOS Arctic
(ESRI ArcGIS online + USGS GWIS)

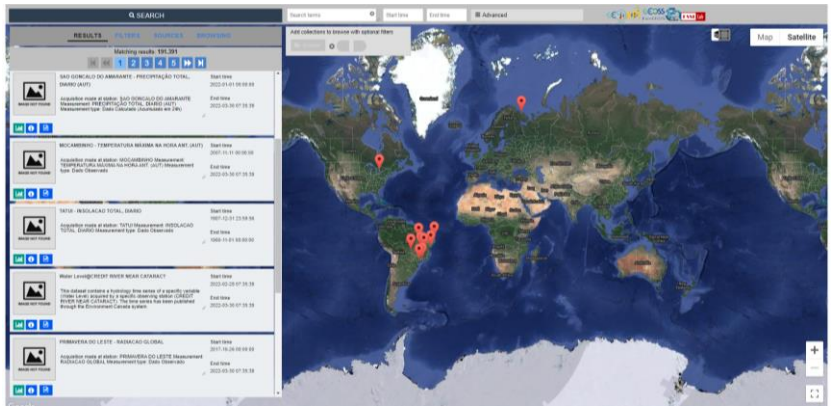


WHOS Plata
(BYU Water Data Explorer)
(HRC PROHMSAT model)

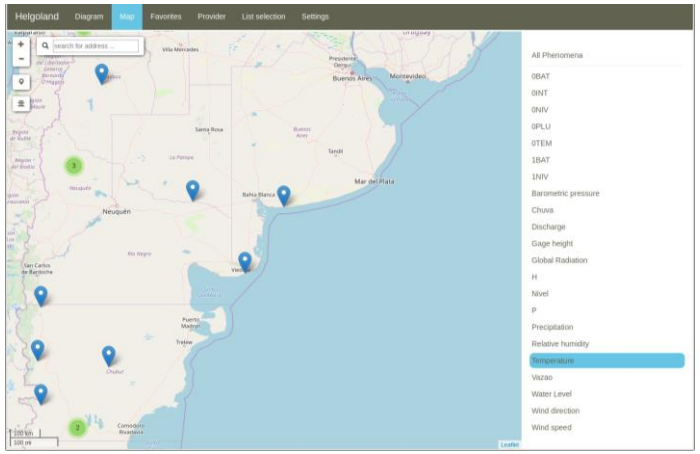


WHOS Dominican Republic
(BYU MET Data Explorer)

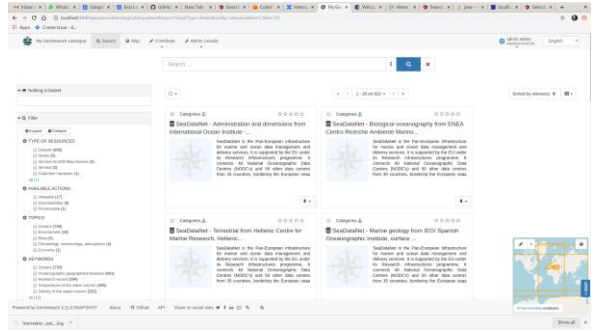
Support to well known community apps



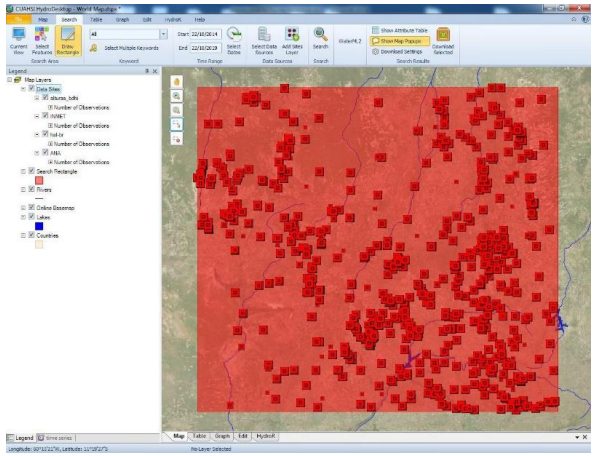
GI-portal



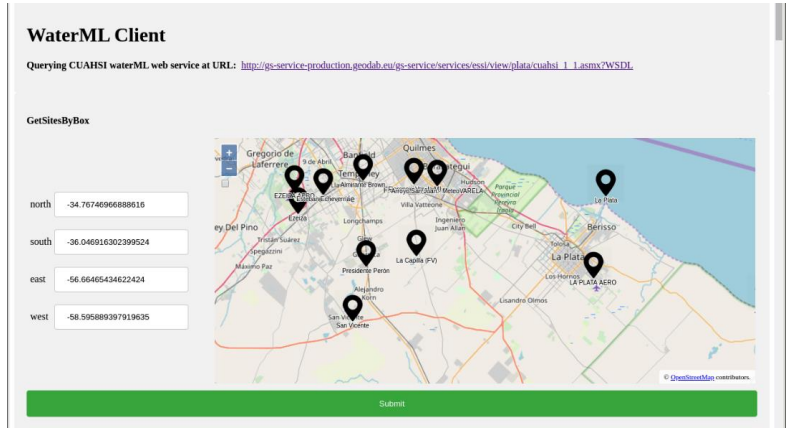
52North Helgoland



Geonetwork



CUAHSI HydroDesktop



WaterML Client

Support to programmatically discovery and access

R library

Jupyter notebooks

Node.js

OGC services

C# WCF plugin

Open API Specification

Swagger

REST API

Three brokers compose the DAB framework

Discovery Broker

Obtain **metadata**

Discovery:
To **search** for the datasets that match a set of user query terms

Semantic Broker

Augment **query**

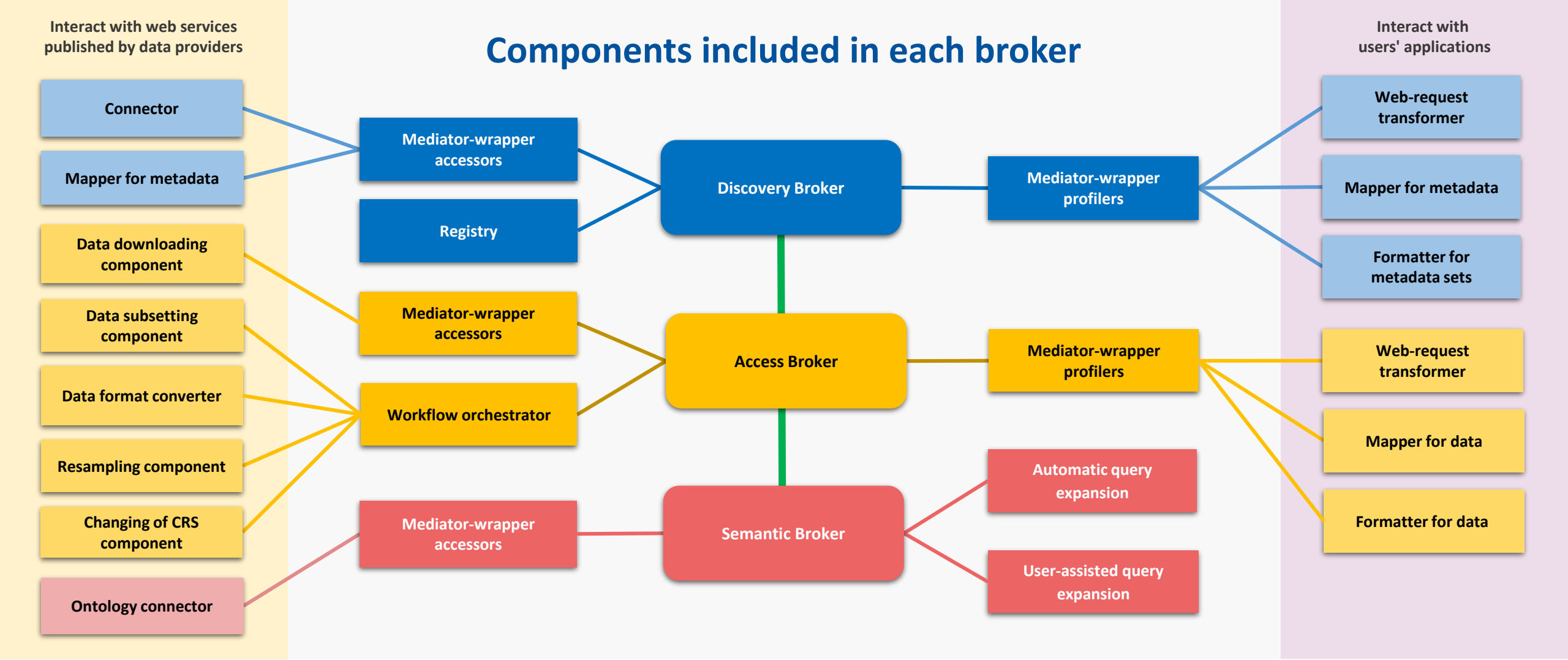
Semantic:
To **augment** user queries with additional search terms from various ontologies
To semantically **harmonize** metadata elements (e.g. metadata translation in different languages)

Access Broker

Obtain **data**

Access:
To **download** and **transform** the datasets that are the result of the discovery step

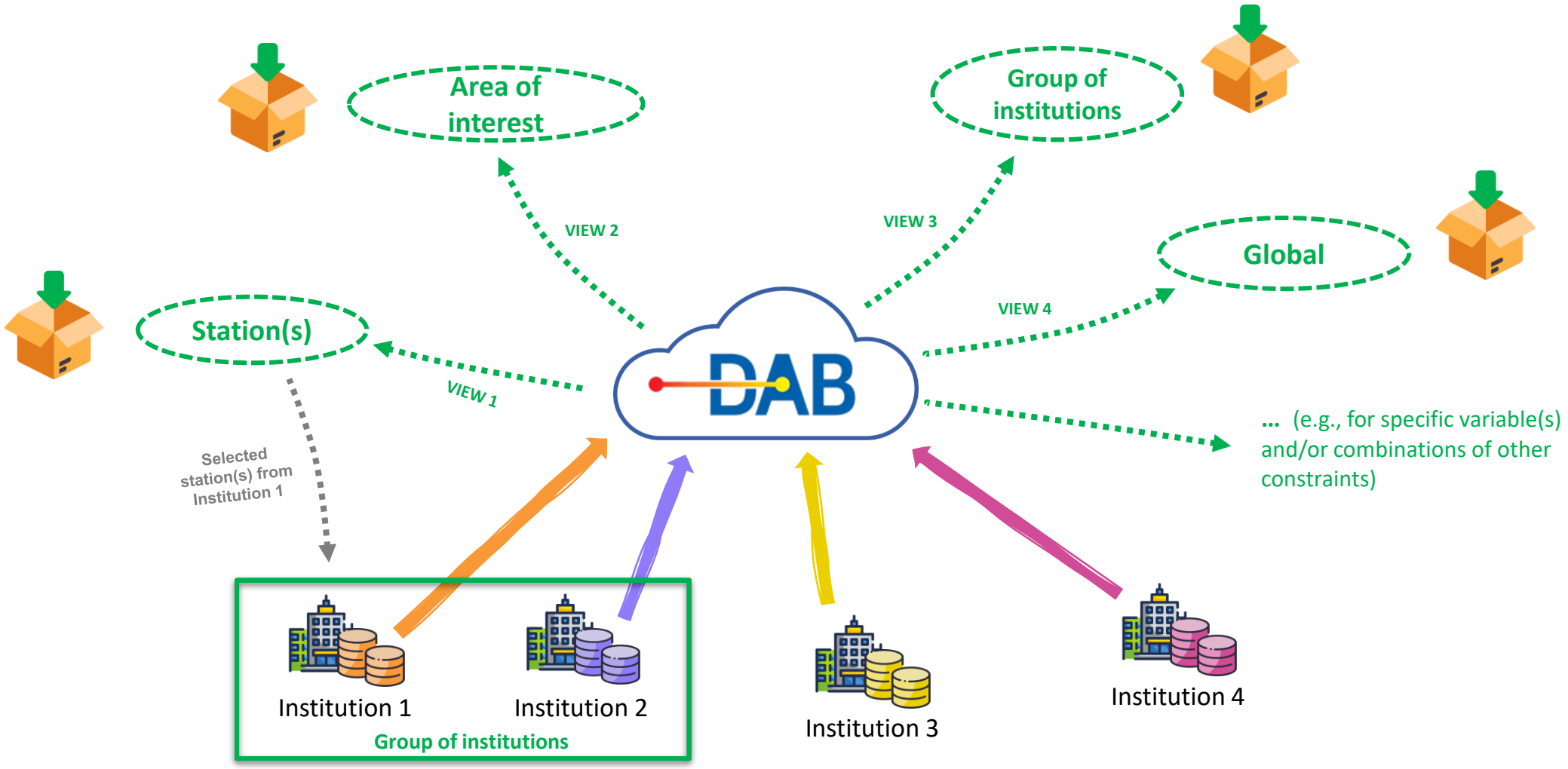
Components included in each broker



✓ Modular, flexible framework, new components can be plugged in. E.g.:

- One new **accessor** component is added to support a new **data provider** type
- One new **profiler** component is added to support a new **user application** type

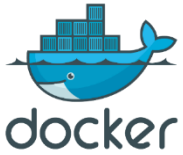
DAB customized data views



cloud based
containerized and orchestrated
middleware service

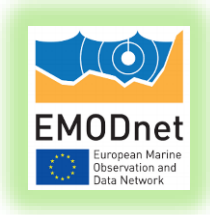
Supported cloud infrastructures:

- **AWS**
  - ECS
  - Docker



- **Copernicus DIAS** (in progress - EOSC Hub)
  - kubernetes
  - docker

Successful DAB deployments



Workshop Series on Water Quality Monitoring – Opening Workshop

WWQA
World Water Quality Alliance

Thank you!

WEATHER CLIMATE WATER

WORLD METEOROLOGICAL ORGANIZATION

WMO HydroHub

UN environment programme 50 1972-2022

UNESCO

World Health Organization

Open Geospatial Consortium