CEOS Water Portal Development Status and Future Plan

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AIP-6 GEOSS Water Services

- The GEOSS Architecture Implementation Pilot (AIP) develops and deploys new process and infrastructure components for the GEOSS Common Infrastructure (GCI) and the broader GEOSS architecture.

- The GEOSS Water Strategic Target1, is stated as:
  - *"GEO intends by 2015 to produce comprehensive sets of data and information products to support decision-making for efficient management of the world's water resources, based on coordinated, sustained observations of the water cycle on multiple scales."*

- In support of this target and activities of the Integrated Water Cycle Observations (IGWCO) Community of Practice, AIP-6 is intended to provide additional operational capability, in particular for in situ water observations, to be called GEOSS Water Services, as a federated resource in GEOSS.

- The scope of the current proposal is "a global registry of water data, map and modeling services catalogued using the standards and procedures of OGC and WMO".

Participating Organizations to AIP-6 GEOSS Water Services

- University of Texas at Austin, Center for Integrated Earth System Science (UT CIESS) [LEAD]
- Consortium of Universities for Advancement of Hydrologic Science Inc. (CUAHSI)
- Brigham Young University (BYU)
- University of Saskatchewan, Global Institute for Water Security (GIWS)
- NASA / Hydrological Sciences Laboratory
- NOAA/ Data Management and Integration Team
- Joint Research Centre (JRC), Institute for Environment and Sustainability
- European Centre for Mid-range Weather Forecasting (ECMWF)
- Italian National Institute for Environmental Protection and Research (ISPRA) MWF)
- Regional Agency for Environmental Protection in Emilia-Romagna (ARPA ER)
- New Zealand National Institute for Water and Atmospheric Research (NIWA)
- Horizons Regional Council (HRC) of New Zealand
- the PYXIS innovation, Inc.
- KISTERS
- **JAXA (CEOS Water Portal)**
- ESRI

Involvement of
CEOS Water Portal in AIP-6

- Water data and its catalog of participating organizations will be exposed through OGC based web services (CSW,W*S,SOS), which then will be harvested to GEO DAB

- CEOS Water Portal will be enhanced to communicate with GEO DAB (via OpenSearch) for water services participants' metadata and data

- A set of demo scenarios for GEO Ministerial Summit is now being discussed within the GEOSS Water Services team

- Aligning with the demo scenarios, CEOS Water Portal will offer capabilities that:

  - Shows observatories on the map for user-selected variable. Once a user selects a station, search for DAB runs and the user will be able to download data seamlessly.
  - Users will be able to choose country first, Italy or New Zealand, then search and access data of their interest.

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GEO DAB OpenSearch

- GEO DAB (Discovery and Access Broker)
  - Middleware framework allowing discovery and access of heterogeneous resources from different EO data information systems (eg.GEOSS Clearinghouse, GCMD, CWIC,GENESI-DEC,CUAHSI-HIS(underway) etc)
  - GEO Web Portal as well as any other portals can access it through its catalog web service (OpenSearch, CSW, etc.)

- OpenSearch endpoint
  - OSDD URL
    http://184.73.174.89/gi-cat-StP/services/opensearchgeo?getDescriptionDocument
  - Support phrase search as well as AND and OR-search for multiple free-keywords

Challenges: GEO DAB OpenSearch Aggregated results

- The number of search results can easily become huge.
- When the number of results is too big, the OpenSearch response only contains the number of results per regular gridded area (4x4), conveying geographical distribution of the results and urging the client to refine the search
  - The "multibox" element contains information about absolute and relative data density in each cluster (gridded spatial area), as well as the cluster spatial boundaries.
  - From this single response a client could display aggregated results.
- Integrating the DAB result to the existing map interface is the challenge

```
<multibox xmlns="http://iia.cnr.it">
45.0 90.0 90.0 180.0 [hydro-0.32-25064-7843908]#
0.0 90.0 45.0 180.0 [hydro-0.32-25064-7843908]#
-45.0 90.0 0.0 180.0 [hydro-0.16-12532-7843908]#
45.0 0.0 90.0 90.0 [hydro-0.52-40729-7843908]#
0.0 0.0 45.0 90.0 [hydro-0.76-59527-7843908]#
-45.0 0.0 0.0 90.0 [hydro-0.28-21931-7843908]#
45.0 -90.0 90.0 0.0 [hydro-0.6-46990-7843908]#
0.0 -90.0 45.0 0.0 [hydro-33.59-2634464-7843908]#
-45.0 -90.0 0.0 0.0 [hydro-0.28-21931-7843908]#
-90.0 -90.0 -45.0 0.0 [hydro-0.04-3133-7843908]#
45.0 -180.0 90.0 -90.0 [hydro-40.69-3192058-7843908]#
0.0 -180.0 45.0 -90.0 [hydro-22.44-1760485-7843908]#
</multibox>
```


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Development Status

- DAB OpenSearch client enablement is in the works.

- Good communication with GEO DAB development.

- Integrating DAB's search results to the existing user interface is challenging.

- Few data can be reached from OpenSearch results at the moment; working with GEO DAB to resolve.

- Will provide feedback/lessons learned to GCI/DAB at the end the work

Renovating CEOS Water Portal : New Architecture Prototyping

Current Architecture
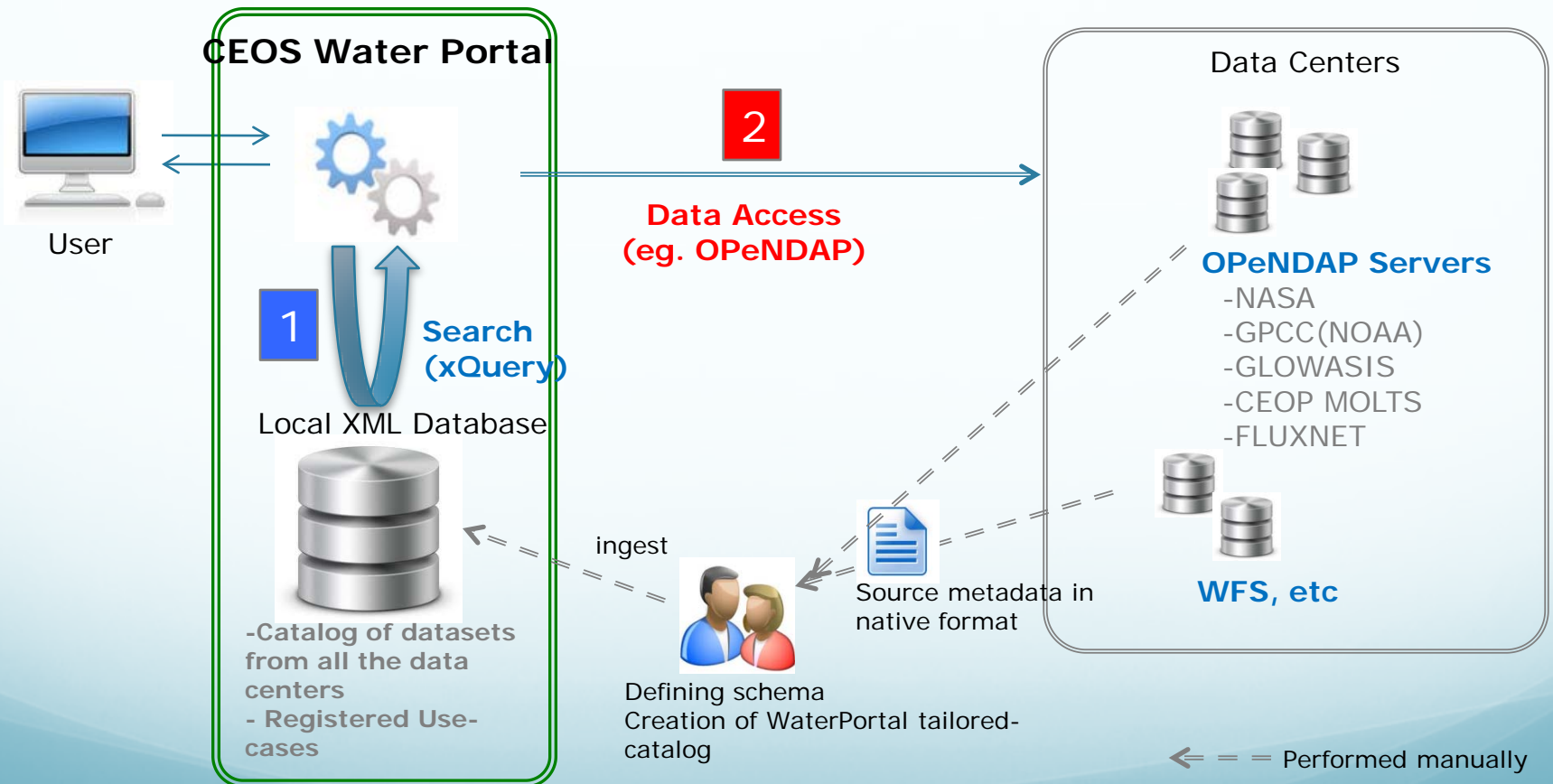
New Architecture
-2 step search based-

1 → 2 → 3

2 step search

IDN/GCMD

Water Portal Dataset DIFs

1

Dataset Search (MWS[1]) (project=waterPortal)

CEOS Water Portal DB

(**For servers not harvestable**)
-CEOP Gridded Model
-CUAHSI

CEOS Water Portal UI component

User

CEOS Water Portal catalog broker component
(OSS catalog broker)

2

Granule-level catalog

Harvest (automated process)

Data Centers

Granule Search (OpenSearch)

Local XML Database

-Registered Use cases

1 **2** **OpenSearch**

Dataset, GranuleSearch

2 Step-search-enabled OpenSearch servers

(eg) NASA ECHO

OPeNDAP Servers
-NASA
-GPCC(NOAA)
-GLOWASIS
-CEOP MOLTS
-FLUXNET

ISO19115/19139
(CEOP,AWCISatellite,AWCIInsitu)

3 **Data Access (OPeNDAP etc.)**

WFS(GEMS/Water) etc.

*1 MWS: Metadata Web Service by IDN/GCMD Can be replaced by OpenSearch once available

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New Architecture

- Open, distributed architecture
- Outsource the catalog
- Based on 2 step search (Dataset search -> Granule search)
  - Case1 (basic case)
    - Dataset Search : MWS (Metadata Web Service by IDN/GCMD)
    - Granule Search : OpenSearch (CEOS Water Portal catalog broker component)
  - Case 2 (applicable to 2-step OpenSearch-enabled partner servers)
    - Dataset Search : OpenSearch
    - Granule Search : OpenSearch
- For dataset-level catalog, create and ingest DIFs for the entire water portal datasets (except datasets of 2step-search enabled servers)
- Use GI-Cat (OSS) for brokering the granule level catalog
  - Harvest from each partner servers in an automated fashion
- DIF includes "project=waterPortal" and OSDD URL applicable for granule level search for the specific dataset
- New User Interface
  - Search & access than drill-down
  - Category search by IDN/GCMD Science Keyword as well as ECV variables
  - Support free text search

Feasibility Study First

- We will do feasibility study through prototyping the new architecture this fiscal year.

- Transition to the new architecture will happen the following year, if it yields satisfying results.

Status on the work with IDN and DIF

- IDN MWS interface specification clarified
  - Retrieval of multiple DIFs in one query
  - Quick search response

- Determined DIF(Datasets) granularity
  - Over 5,000 DIFs !

- Some DIFs being registered for tests

- All DIFs will be created and registered by the end of this year (not visible to public)

Status on the work with GI-Cat

- Good communication with GI-Cat development team (DAB development team)

- Findings so far include:
  - Temporal and geographical search works only when the source OPeNDAP server is ncISO enabled
  - Issues of database robustness

- Will provide feedback to GI-Cat, OPeNDAP, and related communities at the end of the study.

Questions ?