AOMSUC-15 2025 FYSUC

THE 15TH ASIA-OCEANIA METEOROLOGICAL SATELLITE USERS' CONFERENCE (AOMSUC-15)
2025 FENGYUN SATELLITE USER CONFERENCE (2025 FYSUC)

# Global Satellite Data Exchange Using WIS 2.0

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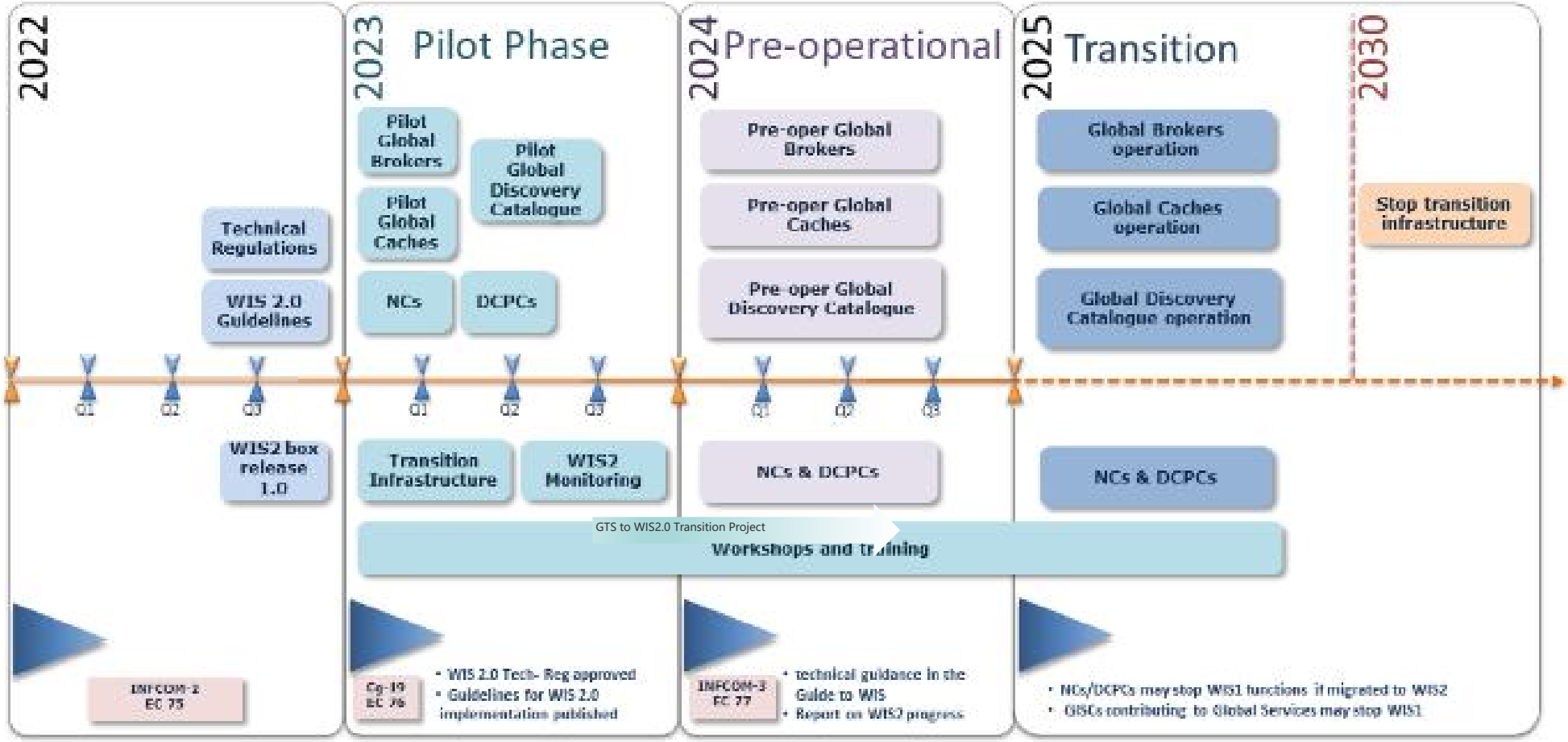
# Abstract

The WMO Information System 2.0 (WIS 2.0) has been designed to address the limitations of the current WIS and Global Telecommunication System (GTS). Unlike GTS, which relies on private dedicated links, WIS 2.0 uses the public Internet and employs a publish-subscribe model using the MQTT protocol; it also presents a number of other opportunities for the meteorological satellite user community.

The concepts and overall architecture of WIS 2.0 are introduced, together with a description of the successful use of WIS 2.0 for the exchange of satellite data. In addition to the global services, many WIS 2.0 nodes are providing near-real-time data, including satellite products provided by CMA, KMA, Hong Kong, EUMETSAT, NOAA/CIMSS, IMD, and Météo-France.

We will consider what changes will happen in the coming months and years, and how the global satellite data user community will be able to capitalize upon them. Satellite data producers are encouraged to share their data with the global meteorological community using WIS 2.0, and data consumers are encouraged to take advantage of WIS 2.0 as a reliable source of key data.

- WMO WIS 2.0 implementation timeline is as follows:



# Ongoing global migration from GTS to WIS 2.0



- **Pre-operational phase concluded** at the end of 2024;
- **Now in transition phase** 2025 to 2030;
- Manual on GTS is frozen, together with associated GTS catalogue:

  **No new data on the GTS**

  **No new abbreviated bulletin headers**

*Satellite data providers are providing data via WIS 2.0*

*FY-3E GNOS data from **CMA***
*INSAT-3DR winds from **IMD***
*DBNet data from **NOAA/CIMSS, HKO, and MétéoFrance***
*GEO-KOMPSAT-2A AMV and CSR from **KMA***
*All GTS traffic from **EUMETSAT***

# WIS2 Components: Global Services



## Global Services

Global Monitoring

Global Discovery Catalogue

Provides an API to discover datasets and services

Global Broker

Sends notifications of new data to be downloaded from Global Caches or WIS2 nodes

Global Cache

Provides users HTTP download of core data cached from WIS2 nodes

Discovers datasets

Subscribes to topics

Downloads core data

Data users

Downloads recommended data

Downloads recommended data

Downloads recommended data

WIS2 node

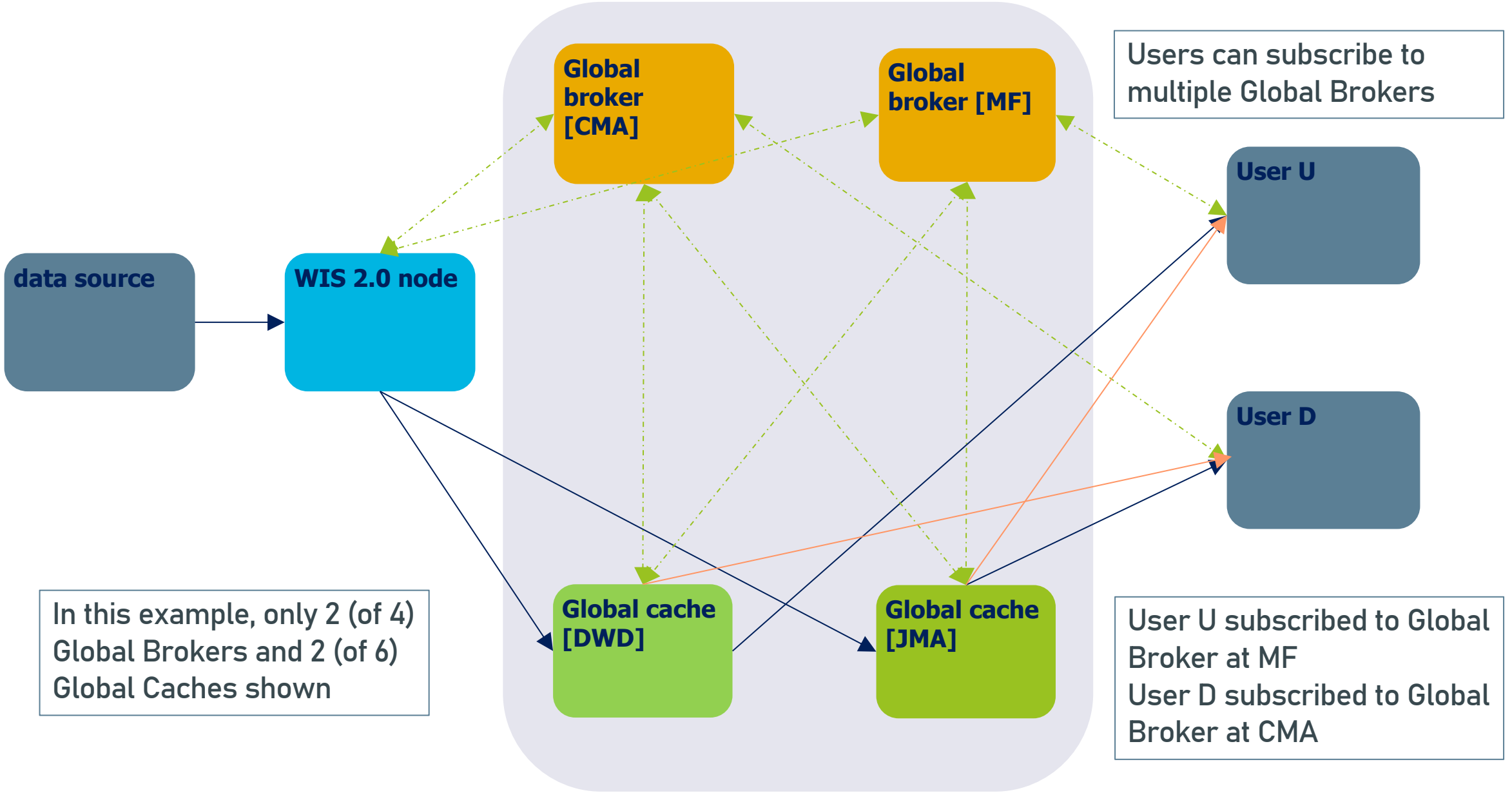
WIS2 node

WIS2 node

Scale to highly-available, global data sharing

# Core data from source to WIS 2.0 users via node and cache





# Impact for data consumers and providers



- **Incoming** data flow from GTS to ground segments to be replaced with subscriptions to global brokers and ingestion scripts;
- **New outgoing** "GTS" data flows starting after **2024** have to be made available via WIS 2.0;
- **All outgoing** GTS data flows to be made available via WIS 2.0 by **2030.**

*Data via WIS 2.0 can be larger than GTS limits and is not limited to BUFR/GRIB. This will bring many users and simplify data access.*

# Current status



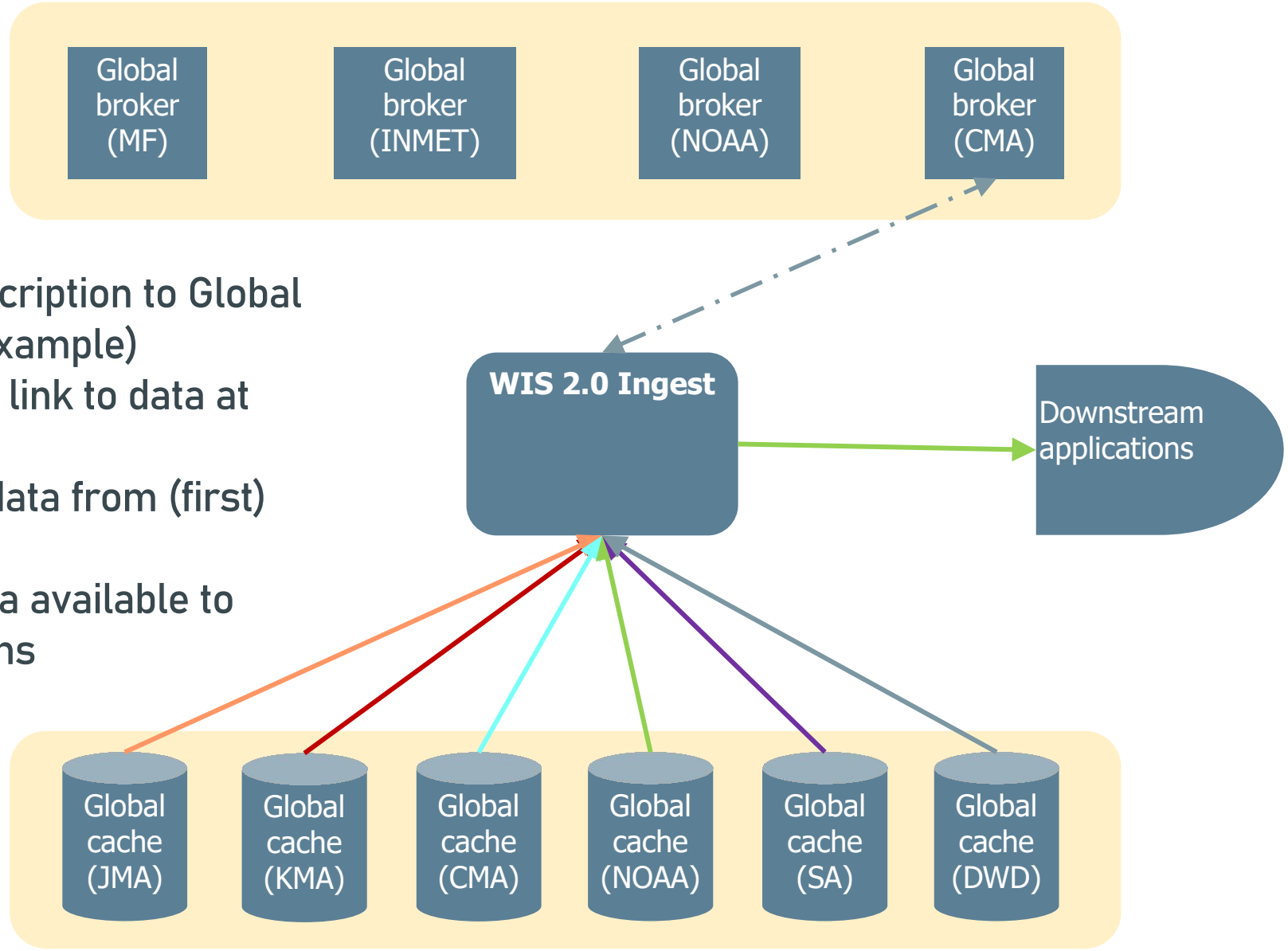
- Operational WIS 2.0 centres:
  - 4 Global Brokers, 6 Global Caches, 3 Global Discovery Catalogues and 2 Monitoring Centres. CMA provide all global services, JMA and KMA provide Global Caches
  - 88 WIS 2.0 nodes providing core (and sometimes recommended) data
  - There are plenty of data already available on WIS 2.0

- Since **17 October 2025**, EUMETSAT is providing all satellite it distributes via the GTS also from its WIS 2.0 node

# Generic WIS 2.0 incoming data flow – block view

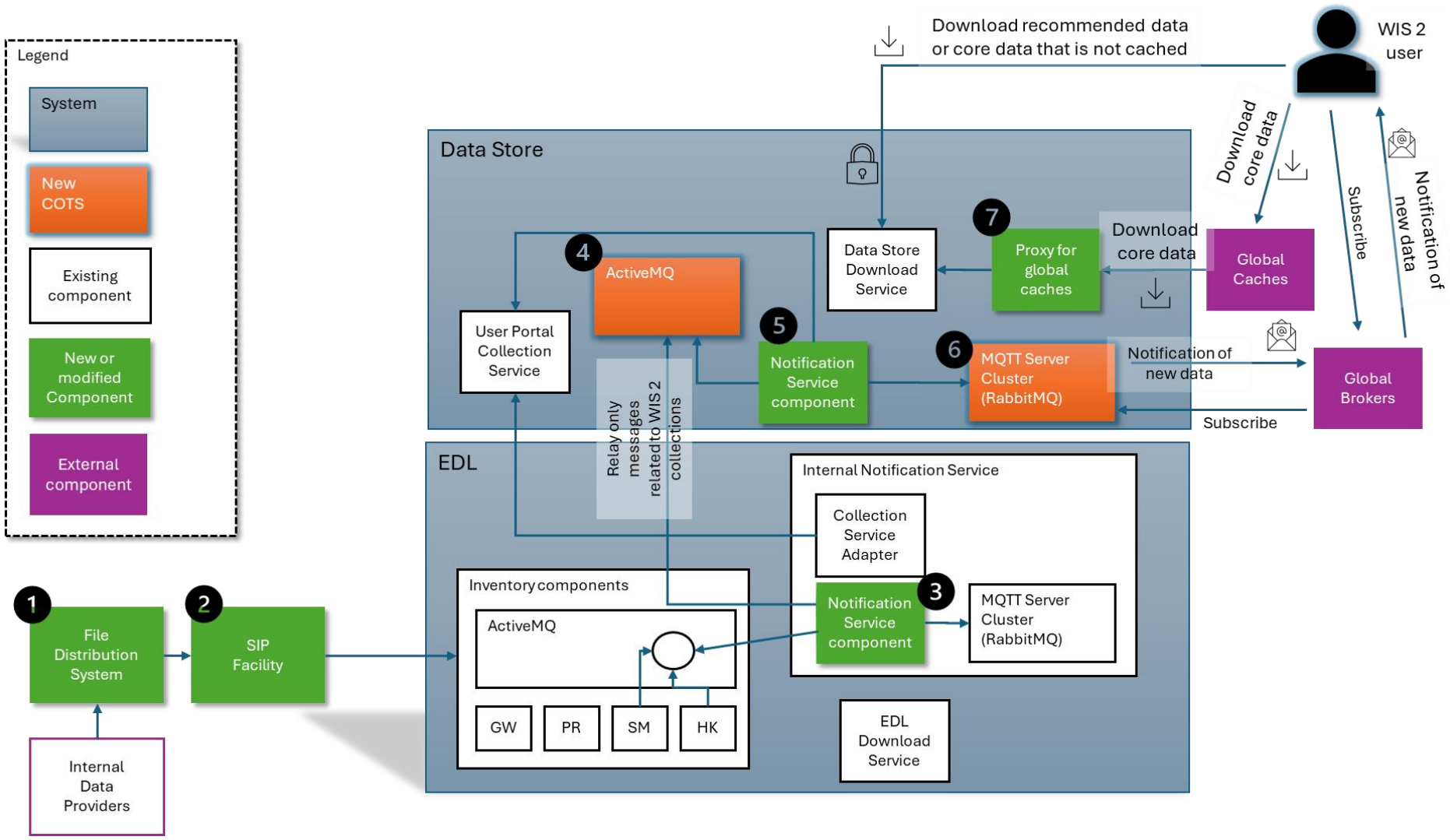


- Example showing subscription to Global Broker (here CMA as example)
- Global Broker provides link to data at multiple Global Caches
- Ingest client retrieves data from (first) one of these
- Ingest client makes data available to downstream applications



# EUMETSAT WIS 2.0 node using existing infrastructure





# Participation criteria for WIS 2.0



**Technical part (WIS 2.0 provider)**:

- Make sure a data server is visible publicly via the internet (web page or FTP site for example)
- Install an MQTT broker (e.g. Mosquitto, RabbitMQ, Active MQ, Hive, et c.)
- Inform WMO of the node, and they will inform Global Brokers, who may subscribe to the node
- Publish a metadata record for the Global Discovery Catalogues
- Upload products to data server, and "publish" a message on the MQTT broker

**Technical part (WIS 2.0 consumer)**:

- Make sure have access to internet
- Install an MQTT client (e.g. Mosquitto, RabbitMQ, Paho, etc)
- Subscribe to a Global Broker
- Upon receiving notifications from the Global Broker, extract the URL pointing to the data and retrieve the data.

**Formal part**:

- To be **WIS 2.0 provider**, one needs to be either a National Centre (**NC**) or a Data Collection or Production Centre (**DCPC**). Those entities are designated via a formal WMO process via the Permanent Representatives of Members with WMO.
- Note: some WIS 2.0 nodes are operational, but are still in the process of formal registration as WIS centres

# Thank you!

Questions are welcome.

# Official project poem



**The end of WMO's GTS and advent of WIS 2.0**

The GTS has served the world for years
But sure enough its glory days are done.
And as the end of store and forward nears;
Bulletin headers will set with the sun.
WIS2 will let the world collaborate
And share their data unreservedly.
The GTS will slowly hibernate
And close for good in twenty thirty-three.

(with scansion)
The **G-** | **-TS** | has **served** | the **world** | for **years**
But **sure** | en**ough** | its **glor-** | **-y days** | are **done**.
And **as** | the **end** | of **store** | and **for-** | -ward **nears**;
Bull**et-** | **-in head-** | -ers **will** | set **with** | the **sun**.
WIS**2** | **will let** | the **world** | co**llab-** | **-orate**
And **share** | their **da-** | **-ta un-** | **-reser-** | **-vedly**.
The **G-** | **-TS** | will **slow-** | **-ly hi-** | **-ber nate**
And **close** | for **good** | in **twen-** | **-ty thir-** | **-ty-three**.