WIS 2.0 Implementation Plan
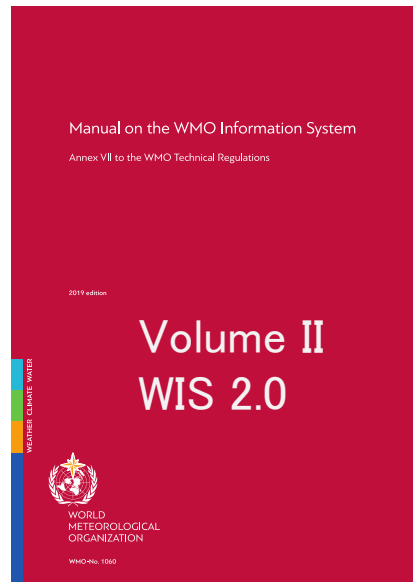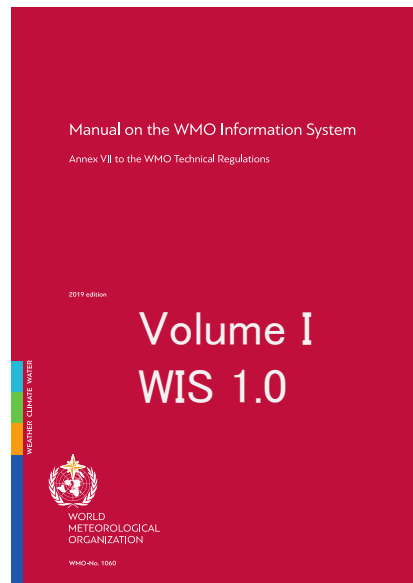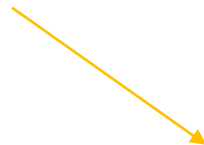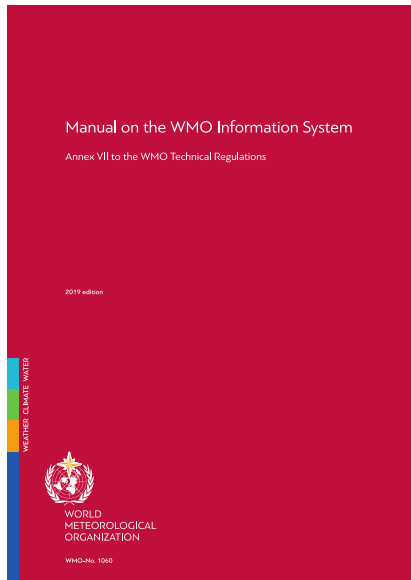
Hassan Haddouch

WIS 2.0 Manager
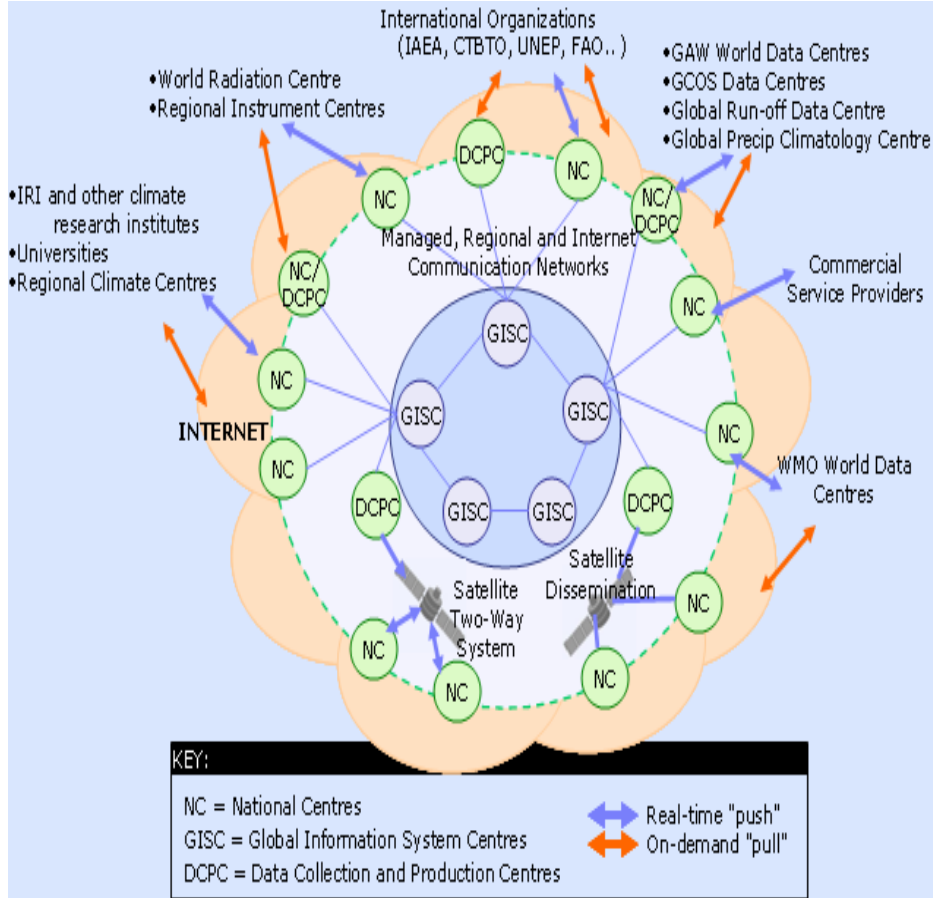
- [Manual on WIS Volume II WMO Information System 2.0](#)

- Guidance on Technical Specifications of WIS 2.0
  https://community.wmo.int/WIS2_Technical_Specification_Guidance
- Guidance on Transition from GTS to WIS 2.0
  https://community.wmo.int/GTS_WIS2_Transition_Guidance

WIS Architecture

WIS1

International Organizations
(IAEA, CTBTO, UNEP, FAO..)

- World Radiation Centre
- Regional Instrument Centres

- GAW World Data Centres
- GCOS Data Centres
- Global Run-off Data Centre
- Global Precip Climatology Centre

- IRI and other climate research institutes
- Universities
- Regional Climate Centres

Managed, Regional and Internet Communication Networks

Commercial Service Providers

INTERNET

WMO World Data Centres

Satellite Two-Way System

Satellite Dissemination

KEY:

NC = National Centres
GISC = Global Information System Centres
DCPC = Data Collection and Production Centres

Real-time "push"
On-demand "pull"

WIS 2.0

Global Services

WIS2 node

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WIS2 nodes and Global Services

- WIS2 node is the WIS2 component providing data and associated metadata
- WIS2 node replaces the GTS Message Switching System
- NCs / DCPCs must implement a WIS2 Node to exchange data in WIS2
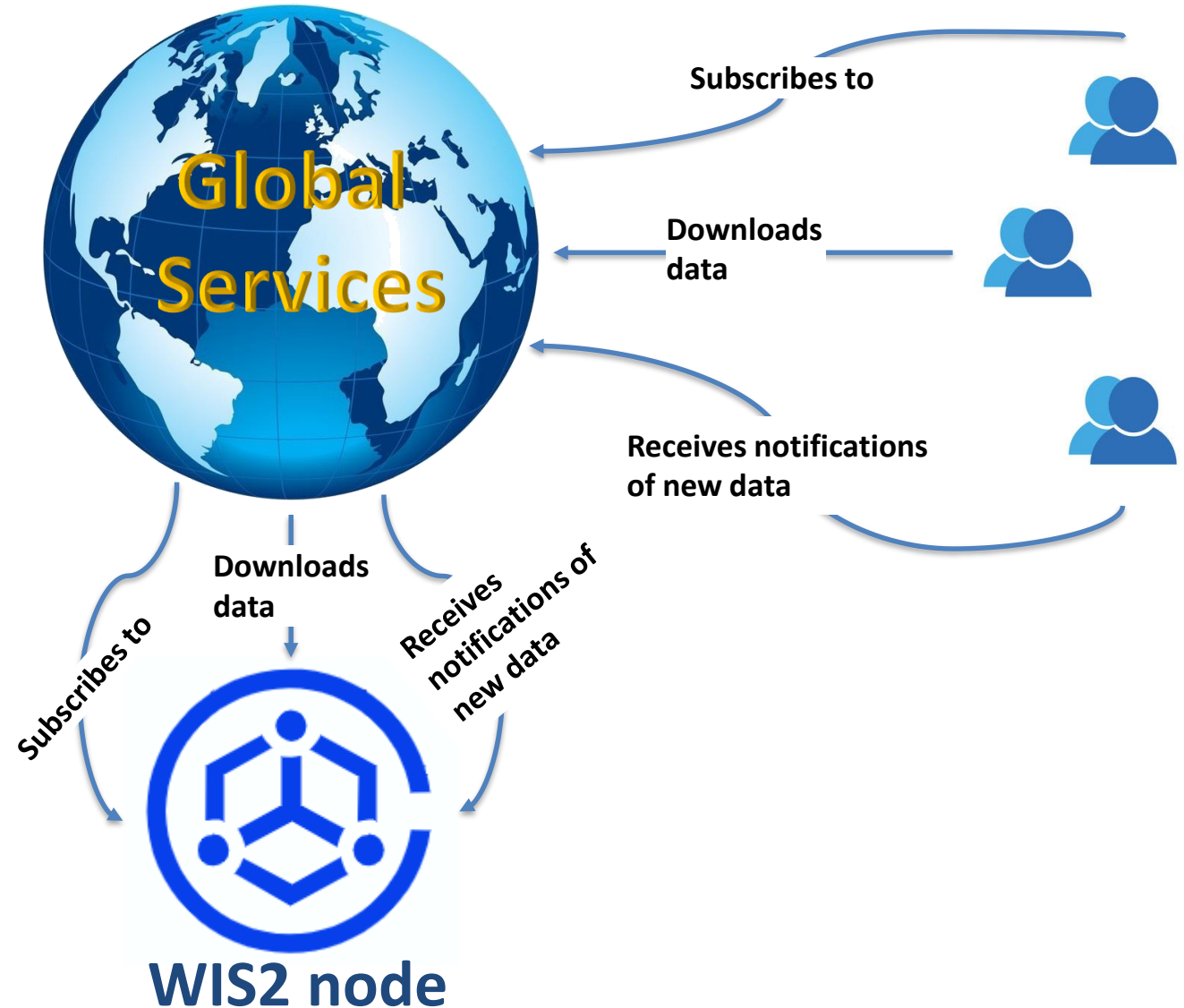- The WIS2 Node shares data from an HTTPS service and sends notifications to MQTT subscribers
- No need to provide access to all the users in the world, only to some WIS2 Global Services
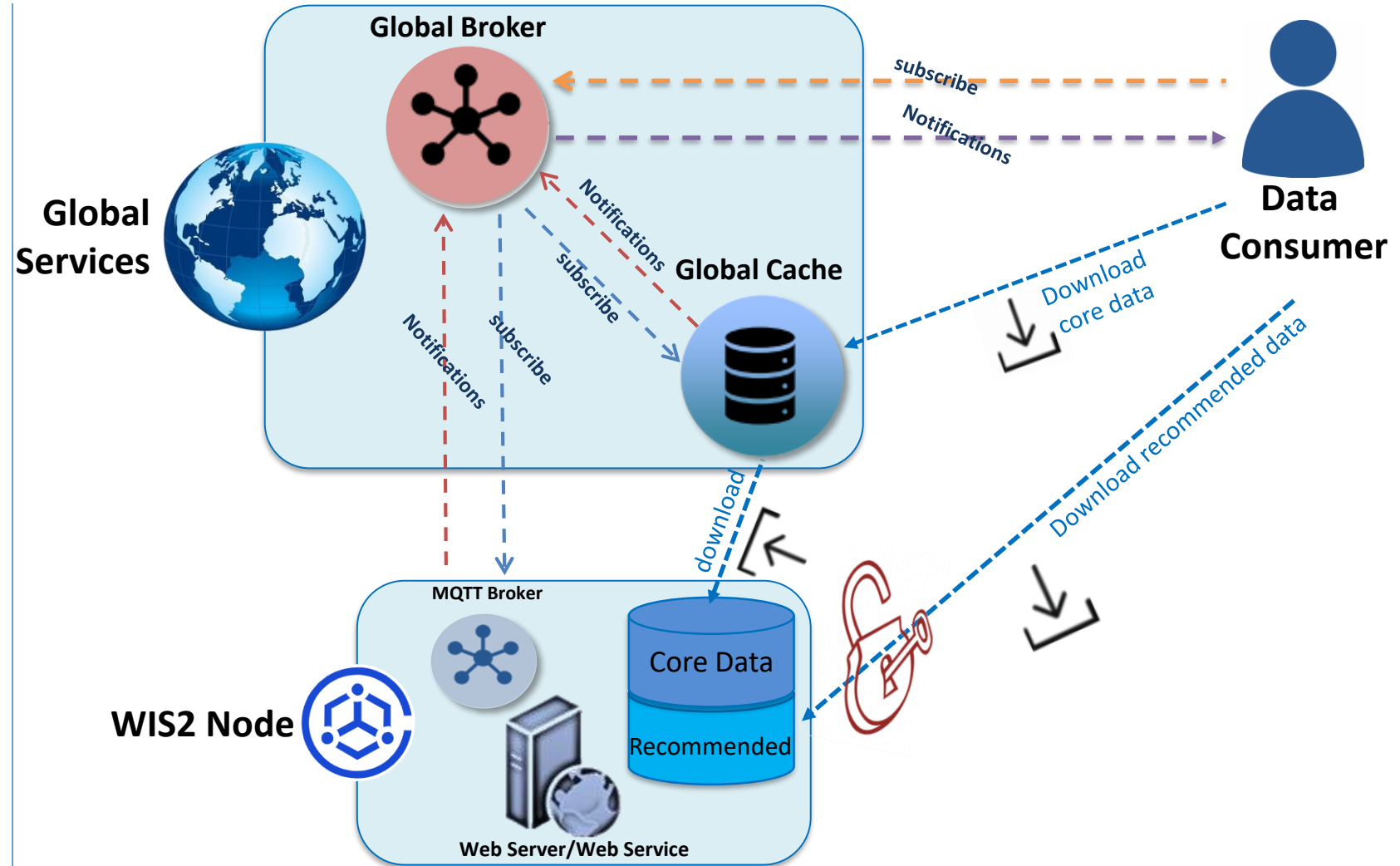
Global Services

Subscribes to

Downloads data

Receives notifications of new data

Subscribes to

Downloads data

Receives notifications of new data
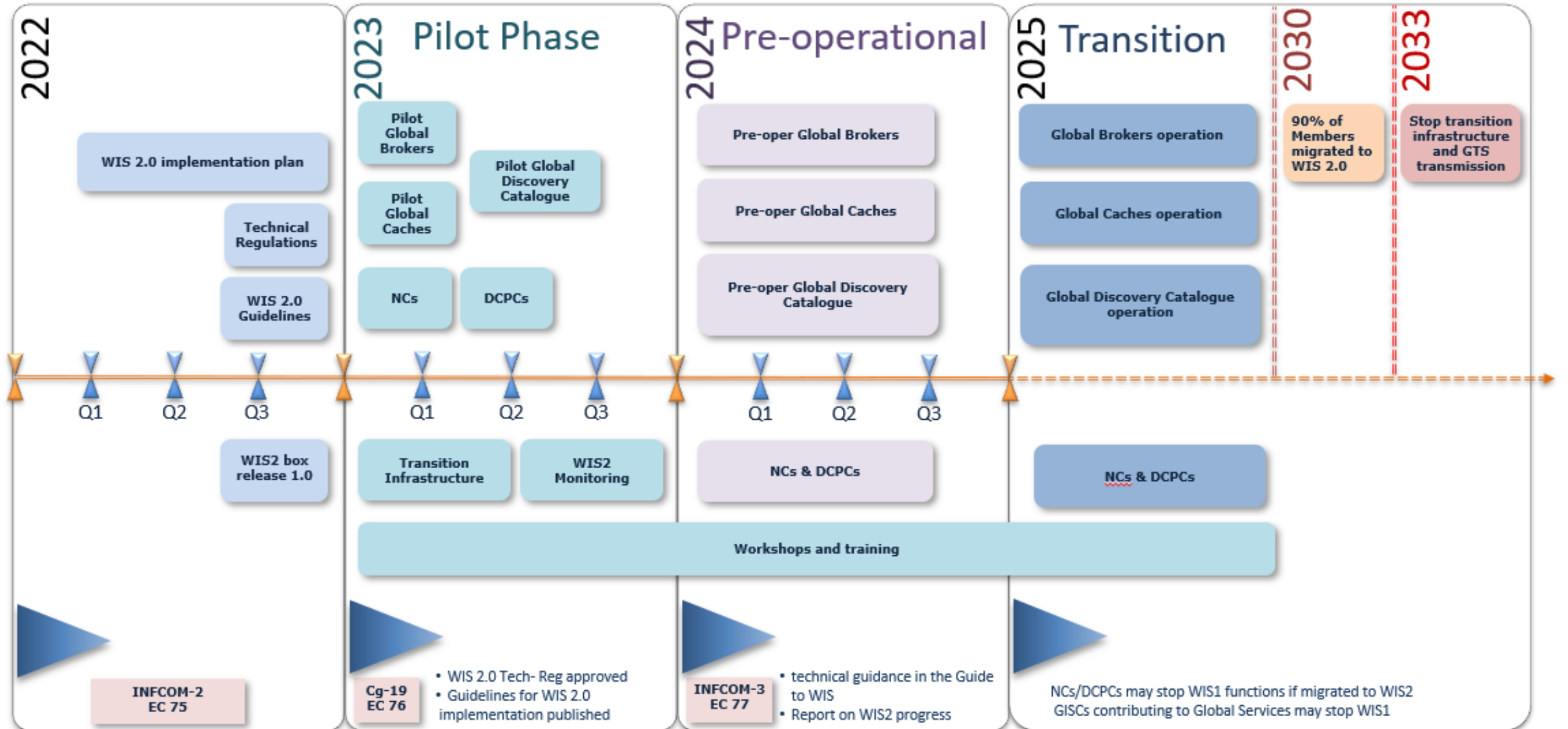
WIS2 node

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- Recognising the potential high-demand placed on a **WIS2 Node** to serve data to a global audience, WIS2 provides highly-available, high-performance **Global Services** to ensure that WIS2 meets required performance levels.

- A **Global Broker** is used to notify data consumers of availability of new data

- A **Global Cache** is used to distribute copies downloaded from WIS2 Nodes of **real-time** and **near real-time Core Data** with free and unrestricted access - as per Unified Data Policy.

- **Data Consumers** <u>will</u> download data from the **Global Cache** if possible.
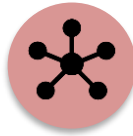
WIS2 implementation plan

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World Meteorological Organization
Organisation météorologique mondiale

WIS 2.0 implementation Timeline

Pilot phase

Global Services

Global Broker
- France
- China
- USA

Global Cache
- Germany
- Australia
- Japan
- Korea
- USA/UK

Global Discovery Catalogue
- Canada
- Korea
- China

Global Monitoring
- Morocco

WIS2 Node Earlier implementers

- Algeria
- Argentina
- Italy
- Morocco
- Sweden

- ECMWF
- EUMETSAT

WIS2 Node New implementers

- Australia
- Africa (hosted by Morocco)
  - Burkina Faso
  - Guinea
  - Cameroon
  - Nigeria
- Antigua
- Argentina
- Belize
- Brazil
- Canada
- Cayman
- China
- Congo- Brazza
- Cuba
- Germany
- France
- Eswatini
- Guyana
- Hong Kong, China (CAP SWIC)
- Iran
- Indonesia
- India
- Jamaica
- Kazakhstan
- Kenya
- Korea
- Libya
- Malawi
- Namibia
- New Zealand
- Poland
- Republic of Congo
- Russia
- Saint Kitts and Nevis
- Singapore
- Tanzania
- Trinidad and Tobago
- Zambia
- Zimbabwe
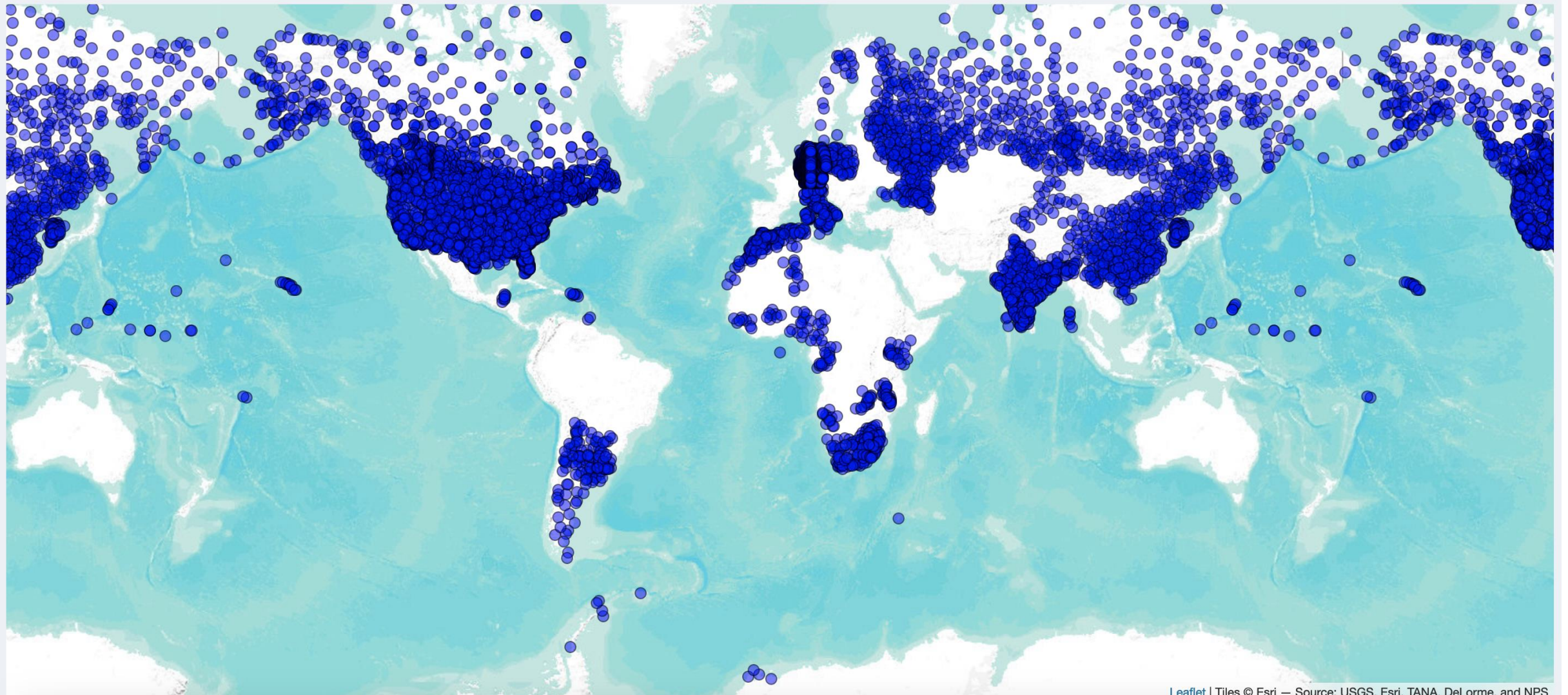- United States of America
- Uruguay

46 WIS2 node

Running
Announced

Data Exchange in WIS 2.0

WIS2.0 Pilot (Surface stations reporting past 24 hours)

Leaflet | Tiles © Esri — Source: USGS, Esri, TANA, DeLorme, and NPS

WIS2 in a Box

- **WIS2 in a box is a reference implementation of a WIS2 Node**
  - **MQTT**
  - **HTTP**
- **Software** (not hardware)
- **Publishing facility/capability** compliant to WIS 2.0 Architecture
  - Provides basic data transformation
  - Can **integrate** with existing data management systems

11
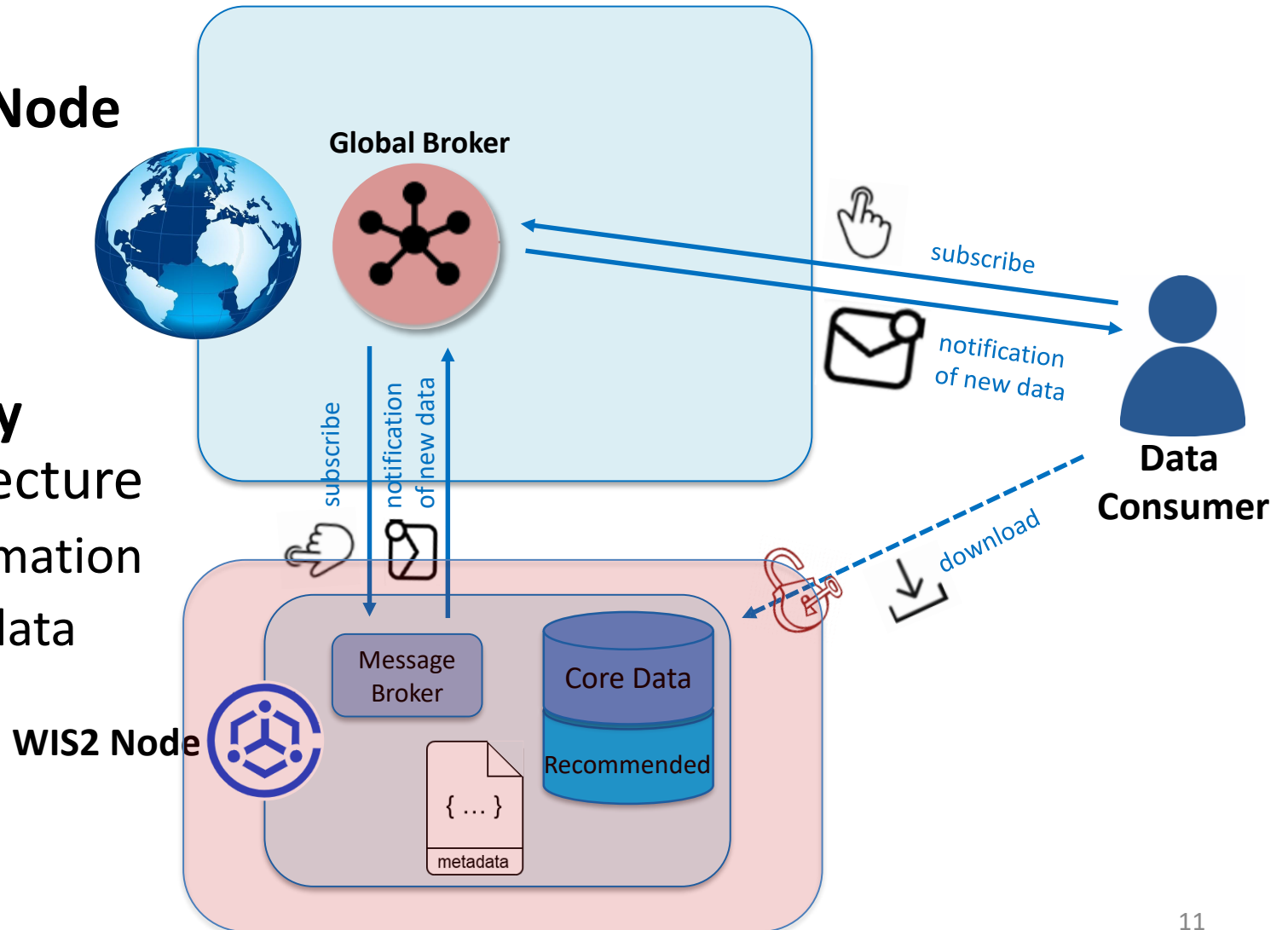
WIS2 in a box is Open

Free and Open Source Software

NGINX · Leaflet · Vue.js · Grafana · pygeoapi · ecCodes · elasticsearch · MINIO · mosquitto · Prometheus · docker

Open Standards

OGC · W3C · ISO · IETF

- MQTT
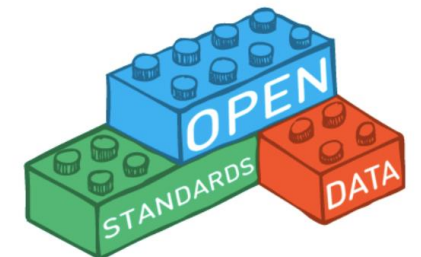- GeoJSON
- OGC APIs

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OPEN STANDARDS DATA

WIS2 in a box

gitHub repositories and docs

- Code: https://github/wmo-im/wis2box
- Documentation: https://docs.wis2box.wis.wmo.int
- Demo: https://demo.wis2box.wis.wmo.int
- Training: https://training.wis2box.wis.wmo.int

Apache license version 2.0

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Commercial use	License and copyright notice	Liability
Distribution	State any changes	Trademark use
Modification		Warranty
Patent use		
Private use		

Tiles © Esri — Source: Esri

Algeria
Argentina
Africa (Regional)
Belize
Caribbean Meteorological Organization (Regional)
China
Cuba
Eswatini
India
Kazakhstan
Kenya
Libya
Malawi
Morocco
Namibia
Poland
Republic of Congo
Republic of Korea
Russian Federation
South Africa
Trinidad and Tobago
United States of America
Uruguay
Zambia
Zimbabwe

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WIS2 node implementation

WIS2 node implementation

Software

☐ **FOSS (WIS2 Box)**   **36**

☐ **Commercial (IBL …)**   **1**

☐ **Custom (own WIS2 node) 5**

    Canada, France, Germany, Singapore and Sweden

Infrastructure

☐ **On premises**   **31**

☐ **Public cloud (AWS, Azure, Google,...)**   **10**

    The United States of America, Antigua and Barbuda, Cayman Islands, Guyana, Jamaica, Saint Kitts and Nevis, Trinidad and Tobago, Malawi, Namibia, Eswatini

☐ **Private Cloud (EWC)**   **1**

    Zimbabwe

Operations

☐ **NMHS**

☐ **Regional, sub-regional**

- **Other (GISC or organization)**

- **GISC-Casablanca: Burkina Faso, Cameroon, Guinea, Nigeria**

- **CMO: Belize, Cayman Islands, Trinidad and Tobago, Jamaica, Antigua and Barbuda, Dominica, Greneda, Guana, St. Maarten, St. Kitts, Turks and Caicos Islands**

☐ **Private company (WIS2 node as a service)**

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Practical steps to participate in WIS2

1. Implement WIS 2.0: wis2box, upgrade your system or develop your own WIS2 node
2. Check if your stations have a WSI and are registered in OSCAR/Surface. Register missing stations (more detail on OSCAR/Surface and WIGOS).
3. Configure your WIS2 node(station list, data mapping)
4. Define your centre-ID
5. Define datasets and topics:

   e.g.origin/a/wis2/mar/casablanca_met_centre/data/core/weather/surface-based-observations/synop
6. Configure data ingestion
7. Connect your WIS2 node to the internet with a fixed hostname and IP (SSL, if possible)
8. Register as a WIS2 node: provide the hostname and other required information.
9. WIS2 node will share data through WIS2 with the community

Technical Specifications for WIS 2 Nodes for the WIS 2 pilot phase · wmo-im/wis2pilot Wiki · GitHub

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Register a WIS2 node

❑ To register a WIS2 Node you need to fill in the WIS2 node registration form [WIS2 node registration](#)

❑ The Secretariat will coordinate with the Global Brokers to subscribe to it

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WIS2 node Basic Information (Required)

1. Country *

Enter your answer

2. Country (3-letter code) *

Following ISO 3166-1 alpha-3 codes. Please refer to https://en.wikipedia.org/wiki/ISO_3166-1_alpha-3

For example:
Argentina: arg
Belize: blz

Enter your answer

3. Centre-id *

The centre-id represents a unique identifier for the WIS2 node. It can be freely chosen but _must _be unique.

For example:
Dominica Meteorological Services chose "dominica_met_wis2node" as their centre-id,
India uses "india_met_centre";
Republic of Korea chose "kma".

Enter your answer

4. WIS2 node broker hostname or public IP address *

(For example: wis2-pilot.example.com or wis2box.kma.go.kr/ or 18.198.42.212)

Enter your answer

5. Port number of MQTT broker *

(1883 for MQTT and 8883 for MQTTS)
(The default unencrypted MQTT port is 1883. The encrypted port is 8883)

☐ 1883

☐ 8883 (TLS (Transport Layer Security) enabled for MQTT)

Recommendation

It is recommended to:

❖ Ensure a smooth and fast transition from GTS/WIS to WIS 2.0 to support GBON and Res.1 implementation

❖ Set up two independent parallel data circuits to avoid disrupting operations and facilitate the transition

❖ Provide training on WIS 2.0 to your staff

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Support Contact

For any question related to WIS 2.0 implementation, wis2box installation, configuration, and troubleshooting,

Contact the WMO Secretariat by e-mail:

wis2-support@wmo.int

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Thank you
Merci
Gracias
شكرا
谢谢

WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU