

Data Exchange using WIS2box

JMA WIS Workshop
Nov. 29, 2023

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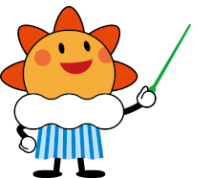
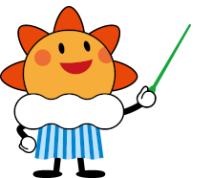


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1. What are **WIS2Node** and WIS2box?

Outline of WIS2Node



WIS2 node is the WIS2 component providing data and associated metadata



WIS2 node replaces the GTS Message Switching System



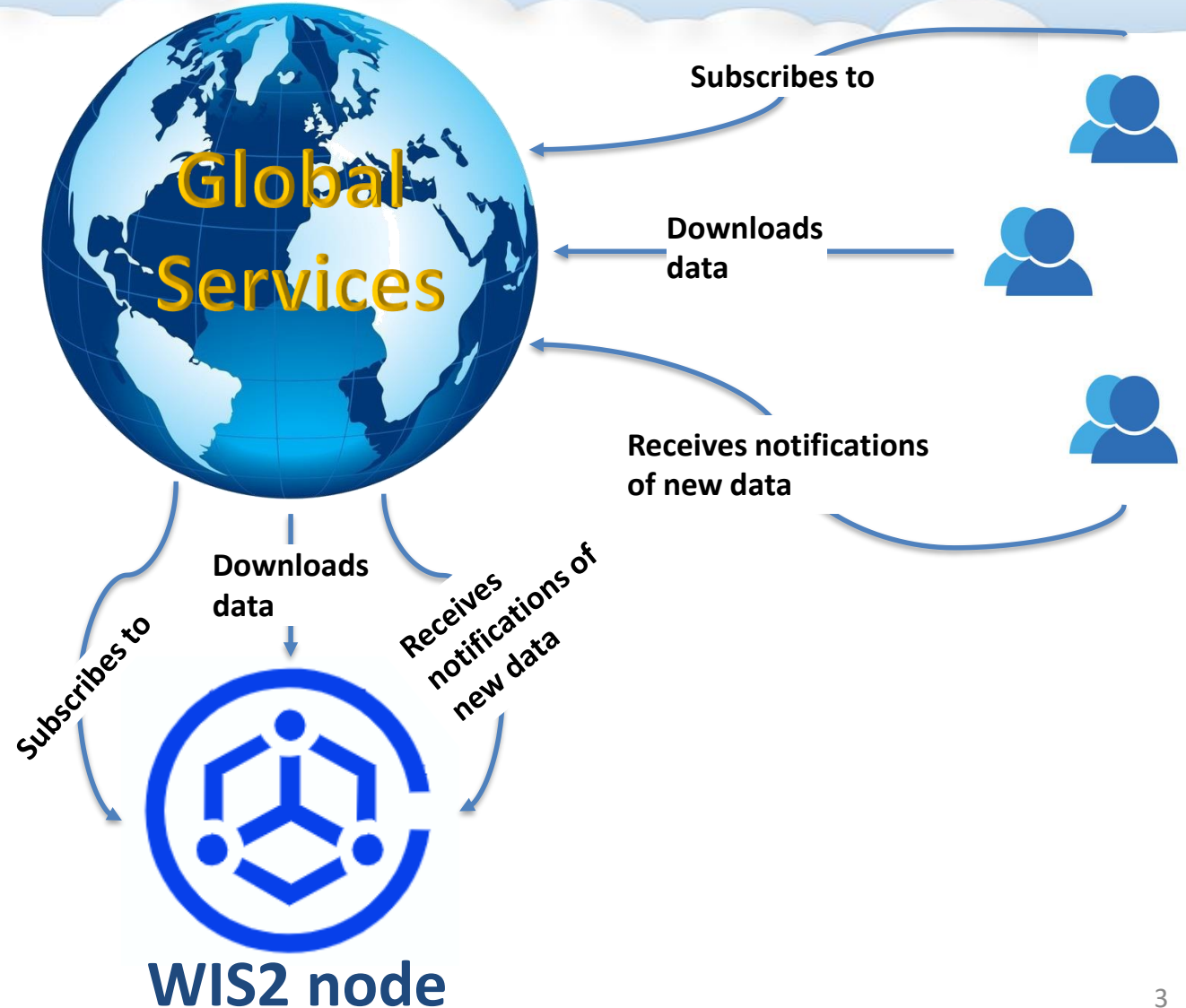
NCs / DCPCs must implement a WIS2 Node to exchange data in WIS2



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

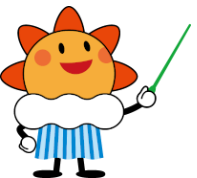


1. What are WIS2Node and **WIS2box**?

Outline of WIS2box

Free and Open-Source Reference Implementation “WIS 2.0 in a box” (referred to as wis2box)

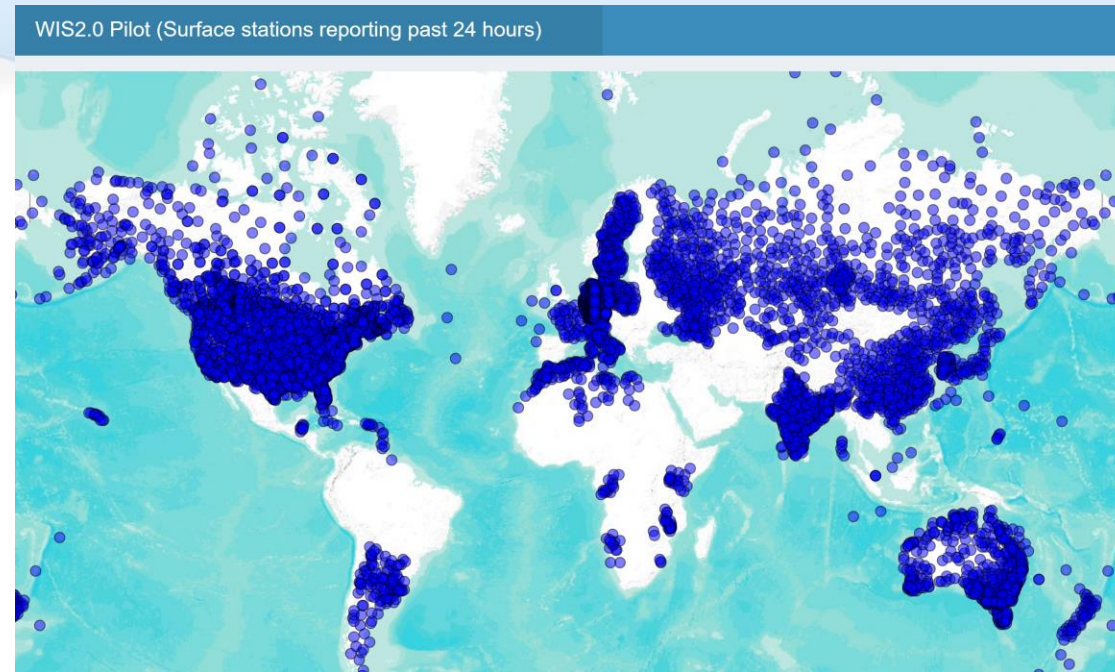
- Objective
 - To assist all WMO Members with a specific focus on LDCs, SIDS and developing countries participate in WIS 2.0
- Functions for both Data Publisher and Data Consumer roles
 - Real-time or archive data and metadata publishing to WIS 2.0 (**Publish**)
 - MQTT Message Broker and notification message publication (**Subscribe**)
 - Object storage server providing raw data access (**Download**)
 - OGC API server, providing dynamic APIs and Web services for discovery, access, visualization and processing functionality (**APIs**)
 - Discovery **metadata** curation / editing tools
- Notes
 - ❖ Members may **use whichever software components** they consider most appropriate to comply with the WIS 2.0 Technical Regulations.
 - ❖ WIS2box will continue to **evolve and develop throughout the WIS 2.0 pilot phase and beyond.**



1. What are WIS2Node and WIS2box?

List of Members running WIS2 Node

- Algeria
- Argentina
- Australia
- Belize
- Burkina Faso
- Cameroon
- Canada
- China
- Congo
- Cuba
- Cayman Islands
- Dominica
- EUMETSAT
- France
- Germany
- Grenada
- Guinea
- Guyana
- Hong Kong, China
- India
- Indonesia
- Italy
- Jamaica
- Japan
- Kazakhstan
- Kenya
- Korea
- Libyan
- Malawi
- Morocco
- Namibia
- New Zealand
- Poland
- Republic of Congo
- Russian Federation
- Saint Kitts And Nevis
- South Africa
- Swaziland
- Sweden
- Turks and Caicos Islands
- Trinidad And Tobago
- United States of America
- Uruguay
- Zambia
- Zimbabwe
- ,etc.

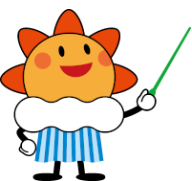


Status of participation as WIS2Node in the pilot phase
<http://wis2live.meteo.fr/>



GitHub repositories and documentation

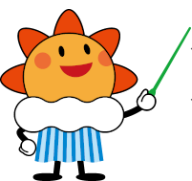
- Code: github.com/wmo-im/wis2box
- Documentation: docs.wis2box.wis.wmo.int
- Discussion Forum: github.com/wmo-im/wis2box/discussions



2. Differences in data flow between WIS1.0 (GTS/DAR) and WIS2.0

	WIS1.0		WIS2.0
	GTS	DAR	
Data Receiving	<ul style="list-style-type: none"> • Search from Vol. C1 • Request for dissemination to RTH based on GTS header • Receive via dedicated line 	<ul style="list-style-type: none"> • Search through the GISC Portal • Setup using subscription tools • Download from GISC Cache 	<ul style="list-style-type: none"> • Search from Global Discovery Catalogue • Subscribe Topic to Global Broker • Download from Global Cache
Data Sending	<ul style="list-style-type: none"> • Notification by RTH using METNO • Request dissemination to RTH • Send via dedicated line 	<ul style="list-style-type: none"> • Metadata upload to GISC catalog • Data upload to GISC cache 	<ul style="list-style-type: none"> • Placement of data/metadata in wis2box • Send notification message to Global Broker • Publish to Global Cache

- ❖ DAR: Discovery Access Retrieval
- ❖ Vol. C1: Catalogue of Meteorological Bulletins
- ❖ METNO: meteorological notifications automatically generated from advanced notifications received from the RTHs



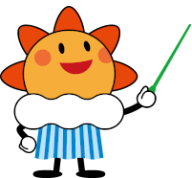
2. Differences in data flow between WIS1.0 (GTS/DAR) and WIS2.0



	Dissemination method	Data identification
GTS	Push based	GTS header e.g. HECA88RJTD (T1T2A1A2ii CCCC)
WIS 2.0	Publish-Subscribe	Topic structure

Primary topic levels (levels 1-8):
managed by the WMO Secretariat

Domain-specific topic subcategory levels (level 9 and beyond):
defined by domain experts and user communities.



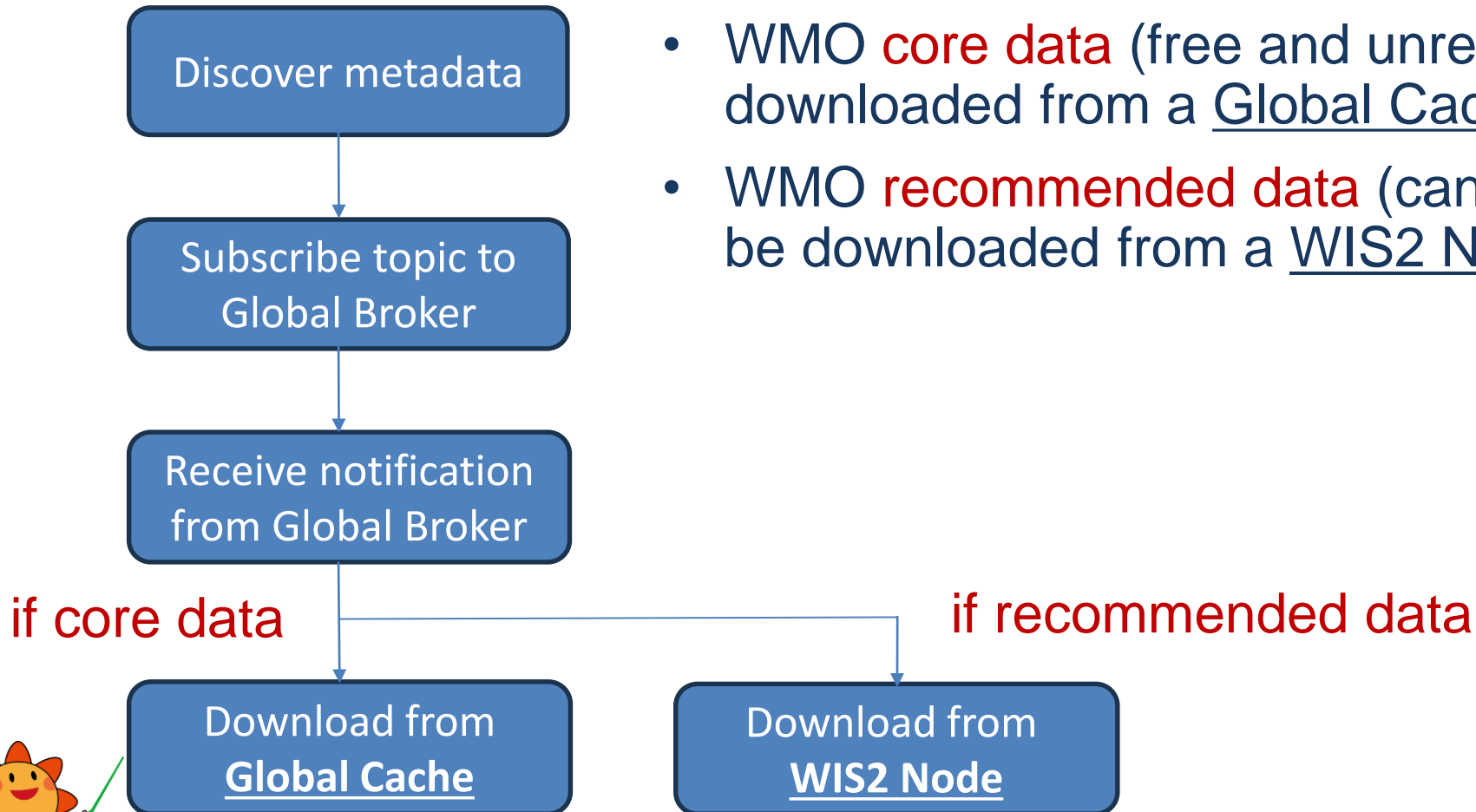
Level	Name	Notes
1	channel	Location of where the data originates from (data providers [origin] or global services [cache])
2	version	Alphabetical version of the topic hierarchy
3	wis2	Fixed value of wis2 for WIS 2.0
4	country	Lower case representation of ISO3166 3-letter code. Includes extensions for partner organizations
5	center-id	Acronym as specified by member
6	resource-type	WIS 2.0 resources types (data , metadata , reports [from monitoring activities])
7	data-policy	Data policy as defined by the WMO Unified Data Policy. core data are available from the Global Caches with open access on a free and unrestricted basis. Notifications for core and recommended data are available by subscription to Global Brokers. recommended data are downloaded from the original NC/DCPC and may require authentication/authorisation
8	earth-system-discipline	As per Annex 1 of resolution 1 Cg-Ext-2021
9	earth-system-discipline-subcategory	As defined by domain experts



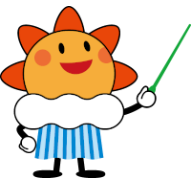
2. Differences in data flow between WIS1.0 (GTS/DAR) and WIS2.0

Essential/Additional (Resolution 40 approved in 1995)

⇒ Core/Recommended (WMO Unified Data Policy approved in 2021)



- WMO **core data** (free and unrestricted) can be downloaded from a Global Cache
- WMO **recommended data** (can be restricted) shall be downloaded from a WIS2 Node



3. Hands-on training based on WIS2.0 data flow

Outline of Hands-on Training

- Objective

To deepen understanding of the general framework of WIS2.0 data flow through hands-on experience with wis2box

- Contents

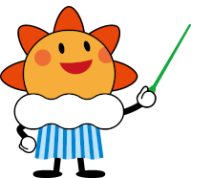
To simulate the following three tasks through hands-on use of wis2box in accordance with the procedure prepared by JMA.

- 1) Obtain data through the WIS2 global services
- 2) Make JMA sample data available for the WIS2 global services
- 3) Make data in your own country available for the WIS2 global services

- Notes

The procedure is intended for training purpose, not for real operation because of technical uncertainties at this moment.

Due to time constraints, only core data will be handled.



3. Hands-on training based on WIS2.0 data flow

WIS 2.0 Training Workshop provided by **WMO secretariat**

- Jakarta, Indonesia, 9-13 October 2023
- Trinidad and Tobago, 12-16 June 2023
- Namibia 20-24 March 2023

Procedure manual on WIS2box is available at;

<https://training.wis2box.wis.wmo.int/>



Hands-on training procedure for WIS2box has been developed by **JMA**.

- To make it simple
- To easily understand WIS2 pub/sub data flow



Workshop in Jakarta

WIS2 in a box hands-on training

Table of contents

- Part 1. Obtain data through the WIS2 global services
- Part 2. Make JMA sample data available for the WIS2 global services
- Part 3. Make data in your own country available for the WIS2 global services
- Part 4. Appendix

In this hands-on training, you will experience the world of wis2.0 by building the wis2node on your PC. The WMO community have developed a product called 'WIS2 in a box' or wis2box as an implementation of wis2node. In this training, we use two wis2box products. One is the downloader in wis2box which has functions to obtain data through WIS2 global services consisting of the Global Broker, the Global Cache and so on. This will be covered in part 1 of this document. The other one is the data provider in wis2box which has functions to make data available for the WIS2 global services covered in parts 2 and 3. In part 2, we will use JMA sample data. In part 3, we will use data in your own country.

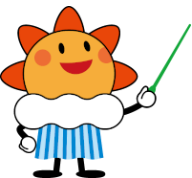
Please note that wis2box is currently under development for its official prerelease in 2025, and the procedures may change significantly from that are shown in this training. The aim of this hands-on training is to introduce the world of WIS2.0 to you.

Part 1. Obtain data through the WIS2 global services

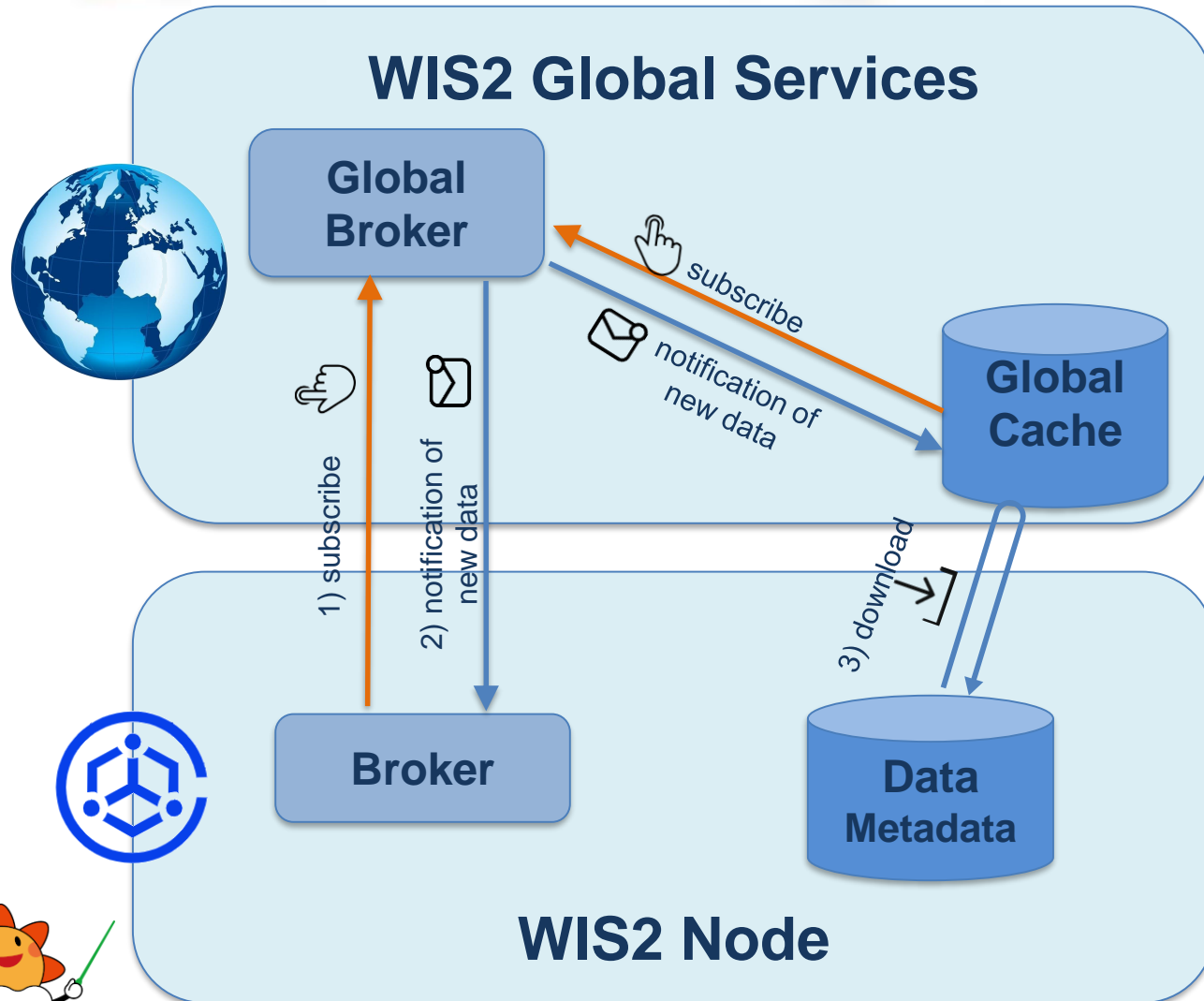
The downloader in the wis2box automatically obtains data published by national centers or DCPs through the WIS2 global services. For the starters, the mechanism of WIS2 is shown in this section.

As shown in Fig-1-1, to obtain data through the WIS2 global services:

1. The downloader subscribes to topics from the Global Broker via MQTT protocol.
2. The Global Broker publishes MQTT messages with the URL of data to the downloader via MQTT protocol.
3. The downloader extracts the URL from the message and downloads data from the Global Cache via HTTPS protocol.



3. Hands-on training based on WIS2.0 data flow

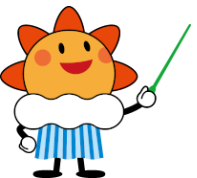


Nov. 29th 9:30-10:30

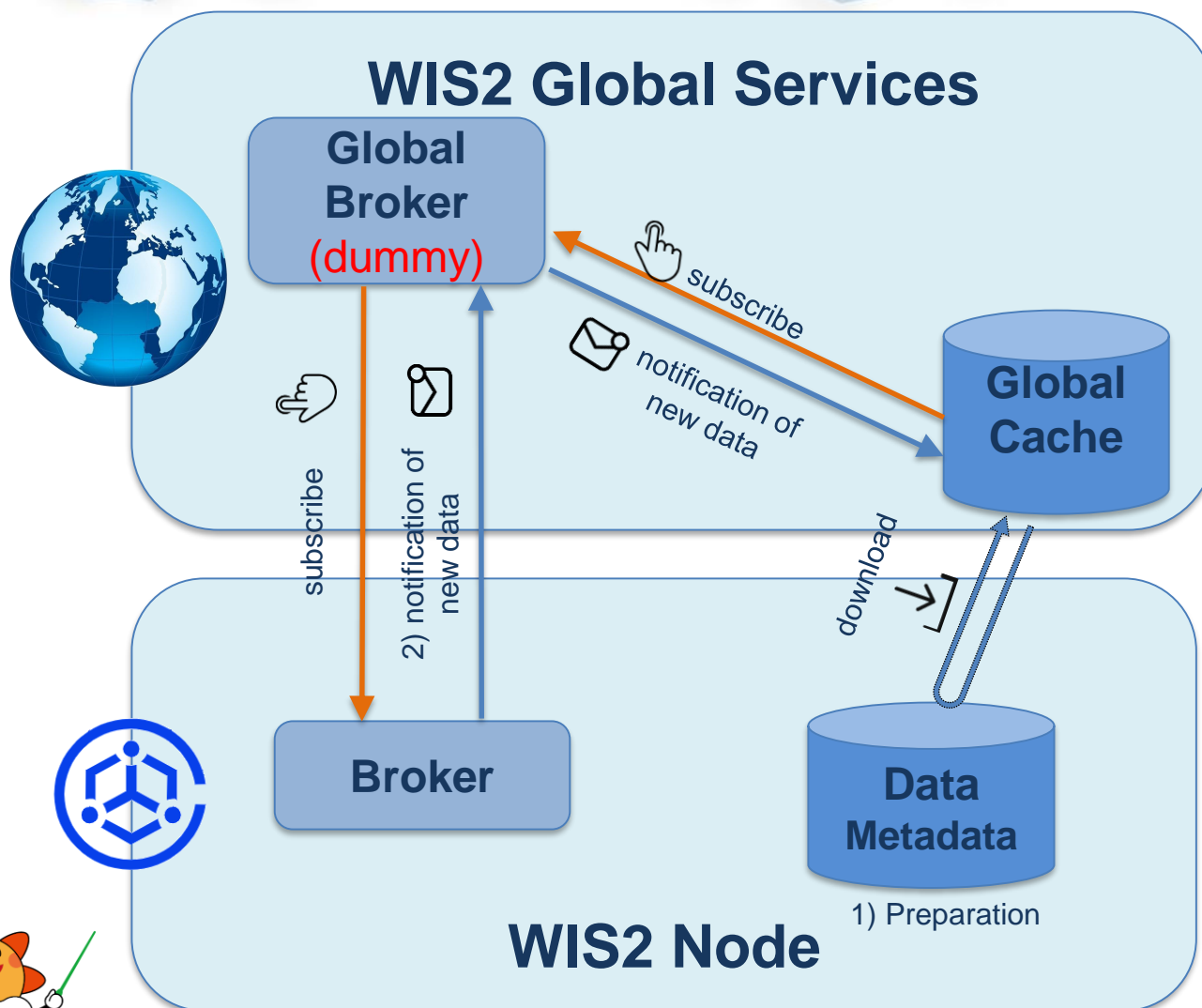
Training I : How to **download** data

Actions to be done by WIS2 Node

- 1) Subscribe to Global Broker
- 2) Receive notification message from Global Broker
- 3) Download data from Global Cache



3. Hands-on training based on WIS2.0 data flow



Nov. 29th 11:00-12:30

Training II : How to **publish** data using **JMA sample data**

Nov. 30th 9:00-10:45

Training III : How to **publish** data using **your own actual data**

Actions to be done by WIS2 Node

- 1) Preparation of data/metadata
- 2) Send notification message to Global Broker (dummy)

* During the training, data/metadata are not actually downloaded by Global Cache.

Thank you very much
for your attention

