

Demonstration of the Global Discovery Catalogue, Global Broker and Global Cache

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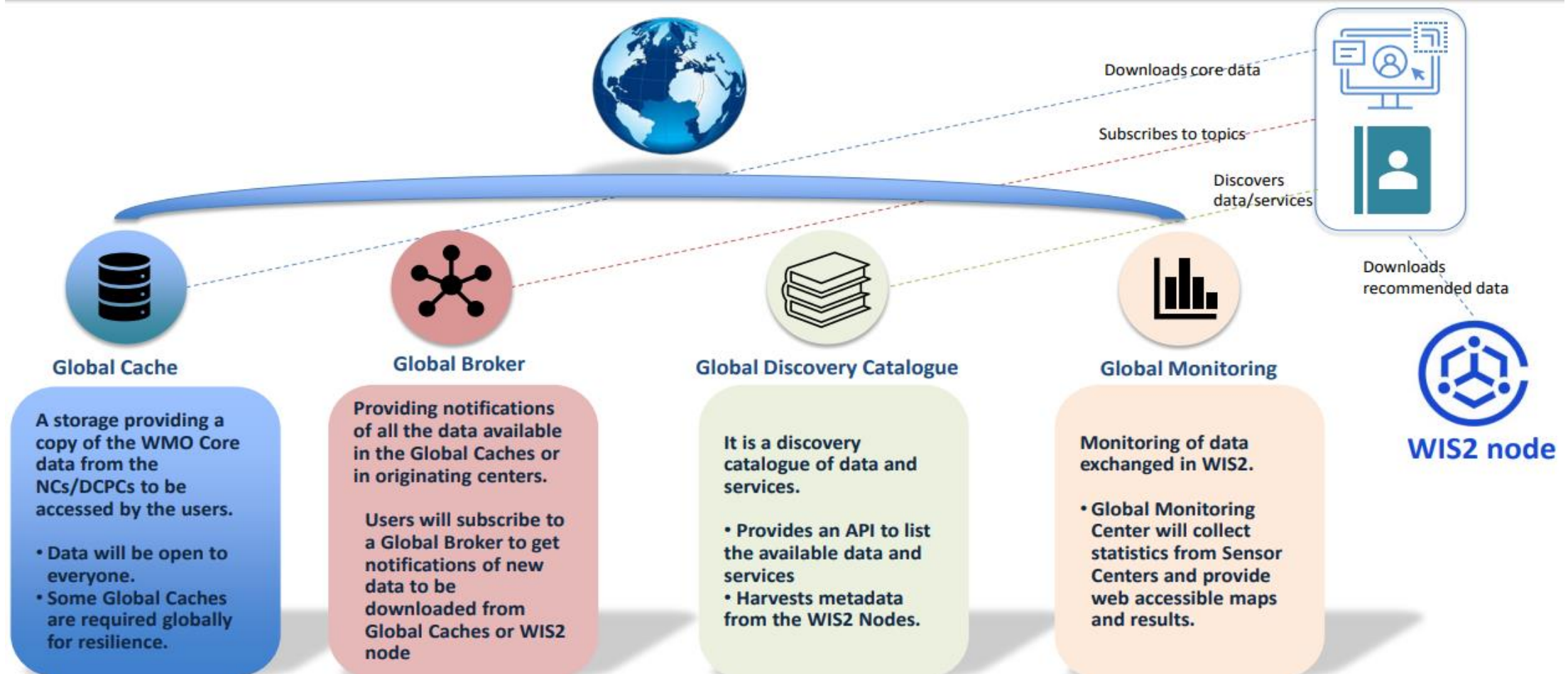
China Meteorological Administration (CMA)

September 15th, 2025

Overview

- Architecture of WIS2.0
- Demonstration of Global Discovery Catalogue
- Demonstration of Global Broker
- Demonstration of Global Cache

Architecture of WIS2.0



How to search the GDC to find datasets

How to subscribe/publish to notifications about the availability of new data

How to download data from WIS2

Demonstration of Global Discovery Catalogue

The **Global Discovery Catalogue**(GDC) provides data consumers with a mechanism for discovering and searching for datasets of interest as well as learning how to interact with and find out more information about those datasets.

WIS2.0 - Large library



*The WIS metadata describes:
What data resources can be
obtained from where and
under what conditions, for
whom*

Metadata - Index cards



Demonstration of Global Discovery Catalogue

The primary purpose of WCMP is to **describe datasets**. While WCMP can describe any resource (datasets, APIs and data reduction services, processes, analytics, etc.), the key component for international data exchange is data. Services and APIs operating on resources may be represented as part of their own metadata or associated through WCMP links.

Property	Requirement	Property	Requirement
id	required	additionalExtents.temporal	optional
type	required	properties.contacts	required
conformsTo	required	properties.version	optional
properties.type	required	properties.externalIds	optional
properties.title	required	properties.created	required
properties.description	required	properties.updated	optional
properties.keywords	optional	properties.status	optional
properties.themes	required	properties.wmo:dataPolicy	conditional
geometry	required	properties.rights	optional
time	required	links	required
additionalExtents.spatial	optional		

Demonstration of Global Discovery Catalogue

urn:wmo:md:cn-cma:data.core.weather.surface-based-observations

```
{
  "contacts": [{
    "addresses": [{
      "deliveryPoint": [
        "46 Zhongguancun Nandajie"
      ],
      "city": "Beijing",
      "administrativeArea": "Beijing",
      "postalCode": "100 081",
      "country": "China"
    }],
    "roles": [
      "host"
    ],
    "organization": "China Meteorological Administration (CMA)",
    "hoursOfService": "0700h - 1500h UTC",
    "contactInstructions": "email",
    "phones": [{
      "value": "+8601068409329"
    }],
    "emails": [{
      "value": "giscadmin@cma.gov.cn"
    }],
    "links": [{
      "rel": "canonical",
      "type": "text/html",
      "href": "https://www.cma.gov.cn/"
    }],
    "keywords": [
      "surface weather",
      "observations"
    ],
    "wmo:dataPolicy": "core",
    "wmo:topicHierarchy": "origin/a/wis2/cn-cma/data/core/weather/surface-based-observations/synop",
    "id": "urn:wmo:md:cn-cma:data.core.weather.surface-based-observations",
    "centre-id": "cn-cma"
  }],
  "time": {
    "interval": [
      "2021-11-29",
      "..."
    ],
    "resolution": "PT1H"
  },
  "links": [{
    "href": "mqtt://everyone:everyone@gb.wis.cma.cn:8883",
    "type": "application/geo+json",
    "name": "origin/a/wis2/cn-cma/data/core/weather/surface-based-observations/synop",
    "rel": "items",
    "channel": "cache/a/wis2/cn-cma/data/core/weather/surface-based-observations/synop",
    "title": "Notifications from China Meteorological Administration, Global Broker Service (cn-cma-global-broker)"
  },
  {
    "href": "mqtt://everyone:everyone@globalbroker.meteo.fr:8883",
    "type": "application/geo+json",
    "name": "origin/a/wis2/cn-cma/data/core/weather/surface-based-observations/synop",
    "rel": "items",
    "channel": "cache/a/wis2/cn-cma/data/core/weather/surface-based-observations/synop",
    "title": "Notifications from China Meteorological Administration, Global Broker Service (cn-cma-global-broker)"
  }
]
```

The **links** property describes URLs and APIs for accessing the dataset or for subscribing to dataset notifications.

Links are the primary mechanism for interacting with the data, and provide an "actionable" workflow to enhance and improve the user experience with "less clicks" for subscriptions and downloads

❑ Href: The link destination or target, or URL

mqtt://everyone:everyone@gb.wis.cma.cn:8883

mqtt://everyone:everyone@globalbroker.meteo.fr:8883

mqtt://everyone:everyone@globalbroker.inmet.gov.br:8883

mqtt://everyone:everyone@wis2globalbroker.nws.noaa.gov:8883

❑ Channel: For data made available via MQTT, the topic to which a user may subscribe for notifications and access

cache/a/wis2/cn-cma/data/core/weather/surface-based-observations/synop

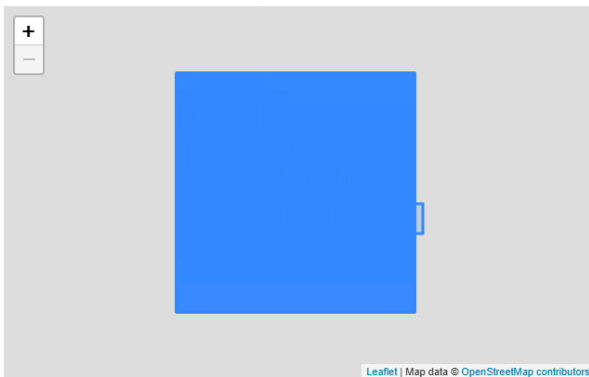
Demonstration of Global Discovery Catalogue

The first step to using data published via WIS2 is to determine which dataset or datasets contain the data that are needed. To do this, a data consumer may **browse** discovery metadata provided by the Global Discovery Catalogue.

**GDC ECCC**
Environment and Climate Change Canada
Environnement et Changement climatique Canada

Home / Collections / WIS2 discovery metadata / Items

WIS2 discovery metadata



title	description
Global Deterministic Storm...	The Global Deterministic storm...
Regional Deterministic Wave...	The Regional Deterministic Wave...
Wildfire hotspots ingested by RAQDPS	Hotspots represent active wild...
Operational Hydrodynamic...	The Operational Hydrodynamic...

**GDC CMA**

Home / Discovery Metadata / Collections

Current Location: Home > collections > wis2-discovery-metadata > items

JSON

WIS2 discovery metadata

WMO WIS2 discovery metadata (experimental)

id	Title	Type	Keywords	Format	Links
urn:wmomd:br:inmetcag	CAP bulletin Brazil	dataset	CAPAlertWarning.xmlavi so		Notifications: met Notifications from l r: metts//everyor Notifications from l ne@globalbroser Notifications from f

**GDC DWD**

Home / Collections / WIS2 discovery metadata / Items

WIS2 discovery metadata

title	type	identifier
Automatic Weather Stations...	dataset	urn:wmomd:kr-kma:surface-based-...
Hourly synoptic observations...	dataset	urn:wmomd:za-weather:saxoeh2t
Upper-level...	dataset	urn:wmomd:hk-hko:core:surface-b...
Hourly synoptic observations...	dataset	urn:wmomd:cg-met:core:surface-b...

GDC ECCC <https://wis2-gdc.weather.gc.ca/collections/wis2-discovery-metadata/items>

GDC CMA <https://gdc.wis.cma.cn/collections/wis2-discovery-metadata/items>

GDC DWD <https://wis2.dwd.de/gdc/collections/wis2-discovery-metadata/items>

Demonstration of Global Discovery Catalogue

urn:wmo:md:cn-cma:data.core.weather.surface-based-observations

1. Check the metadata through the portal.

Step1: Enter “urn:wmo:md:cn-cma:data.core.weather.surface-based-observations” into the textbox.

Id	urn:wmo:md:cn-cma:data.core.weather.surface-based-observations	Search
----	--	--------

Id	Title	Type	Keywords	Format	Links
urn:wmo:md:cn-cma:data.core.weather.surface-based-observations	ISMN SYNOP reports - China ; available from BAJ(PEKING (BEIJING)) at 00,06,12,18 .	dataset	surface weather, observations	--	Notifications: mqtt://everyone:everyone@wis2node.wis.cma.cn:8883

Demonstration of Global Discovery Catalogue

Step2: You can view the metadata information online and also access the metadata in JSON format.

Home | Discovery Metadata | Collections

Current Location: Home > collections > wis2-discovery-metadata > items > Item ISMN SYNOP reports - China ; available from BABJ(PEKING (BEIJING)) at 00,06,12,18 .

Item ISMN SYNOP reports - China ; available from BABJ(PEKING (BEIJING)) at 00,06,12,18 .

JSON



Property	Value
id	urn:wmo:md:cn-cma:data.core.weather.surface-based-observations
identifier	urn:wmo:md:cn-cma:data.core.weather.surface-based-observations
title	ISMN SYNOP reports - China ; available from BABJ(PEKING (BEIJING)) at 00,06,12,18 .
description	Surface weather observations from China
themes	concepts: [object Object] scheme: https://github.com/wmo-im/wis2-topic-hierarchy/blob/main/topic-hierarchy/earth-system-discipline/index.csv

```
{
  "id": "urn:wmo:md:cn-cma:data.core.weather.surface-based-observations",
  "conformsTo": [
    "http://wis.wmo.int/spec/wcmp/2/conf/core",
    "http://www.opengis.net/spec/ogcapi-records-1/1.0/req/record-core"
  ],
  "type": "Feature",
  "geometry": {
    "type": "Polygon",
    "coordinates": [
      [
        [73.66, 3.86],
        [73.66, 53.55],
        [135.05, 53.55],
        [135.05, 3.86],
        [73.66, 3.86]
      ]
    ]
  },
  "properties": {
    "identifier": "urn:wmo:md:cn-cma:data.core.weather.surface-based-observations",
    "title": "ISMN SYNOP reports - China ; available from BABJ(PEKING (BEIJING)) at 00,06,12,18 .",
    "description": "Surface weather observations from China",
    "themes": [
      {
        "concepts": [
          {
            "id": "weatherObservations"
          }
        ],
        "scheme": "https://github.com/wmo-im/wis2-topic-hierarchy/blob/main/topic-hierarchy/earth-system-discipline/index.csv"
      }
    ],
    "type": "dataset",
    "created": "2024-01-17T00:00:00Z",
    "updated": "2025-08-18T01:00:04Z",
    "contacts": [
      {
        "addresses": [

```

Demonstration of Global Discovery Catalogue

urn:wmo:md:cn-cma:data.core.weather.surface-based-observations

2. Get the metadata through the OGC API.

1. Get “urn:wmo:md:cn-cma:data.core.weather.surface-based-observations” from GDC CMA:

<https://gdc.wis.cma.cn/collections/wis2-discovery-metadata/items/urn:wmo:md:cn-cma:data.core.weather.surface-based-observations?f=json>

2. Get 100 metadata records from GDC CMA:

<https://gdc.wis.cma.cn/collections/wis2-discovery-metadata/items?f=json&limit=100>

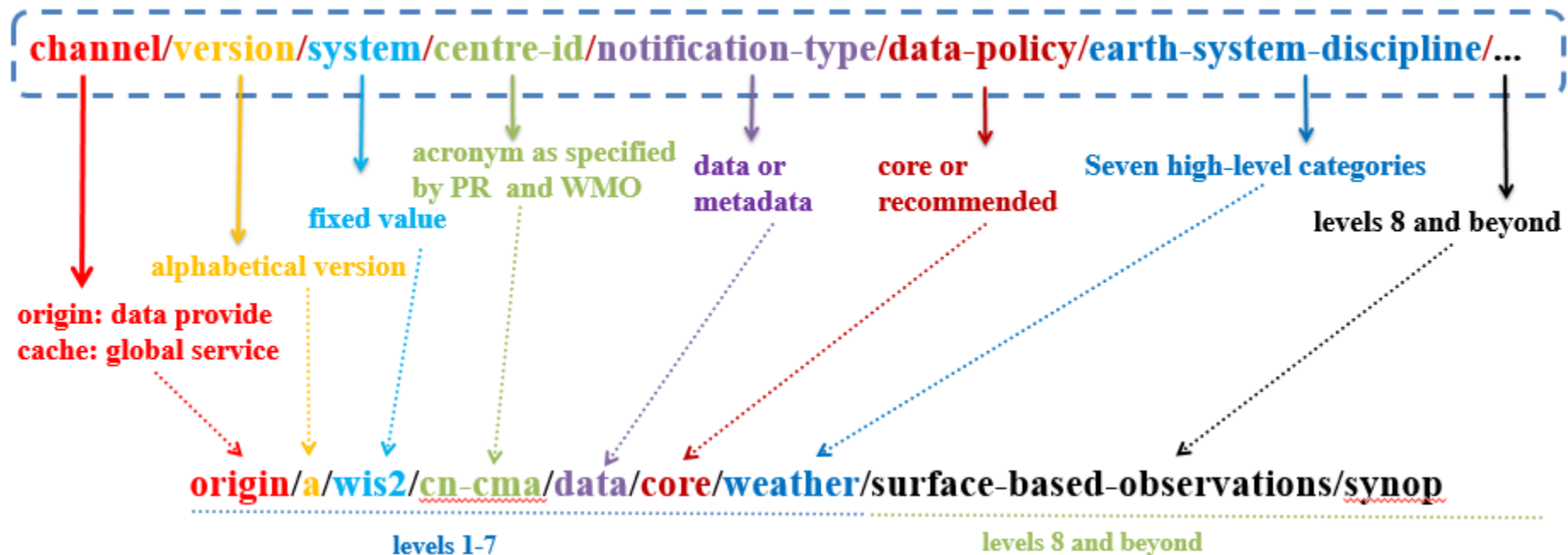
3. Get metadata records within a certain geographical range

<https://gdc.wis.cma.cn/collections/wis2-discovery-metadata/items?bbox=73.66,4,135.08,53.52&f=json>

Demonstration of Global Broker

The **Global Broker** provides MQTT(S) Broker that re-publishes data notifications of all WIS2 Nodes. Users of WIS 2.0 will be able to access data in real-time by subscribing to a Global Broker and receiving notifications when new data is available for download from a Global Cache or the data provider WIS2 Node

The WIS2 Topic Hierarchy (**WTH**) is composed of primary topics (levels 1–7) and sub-discipline specific topics (levels 8 and beyond)



Demonstration of Global Broker

WIS2 Notification Message (WNM) is an extension of the OGC API - Features standard and shall be encoded in GeoJSON

Property	Requirement	Property	Requirement
id	required	properties.datetime	optional
type	required	properties.start_datetime	optional
version	required	properties.end_datetime	optional
geometry	required	properties.cache	optional
properties.pubtime	required	properties.integrity	optional
properties.data_id	required	properties.content	optional
properties.metadata_id	optional	links	required
properties.producer	optional		

Demonstration of Global Broker

Id:6ce38020-9a50-4f0b-97ab-7a67a33e505e

Data_id:cn-cma:data.core.weather.surface-based-observations/WIGOS_0-20000-0-57265_20250907T000000

```
{
  "id": "6ce38020-9a50-4f0b-97ab-7a67a33e505e",
  "type": "Feature",
  "conformsTo": ["http://wis.wmo.int/spec/wnm/1/conf/core"],
  "geometry": {
    "coordinates": [111.73, 32.43, 129],
    "type": "Point"
  },
  "properties": {
    "data_id": "cn-cma:data.core.weather.surface-based-observations/WIGOS_0-20000-0-57265_20250907T000000",
    "datetime": "2025-09-07T00:00:00Z",
    "pubtime": "2025-09-07T00:16:03Z",
    "integrity": {
      "method": "sha512",
      "value": "VOKJkkRX + cNk / SoBQBT8tBydcCpGKosfc8s + 9 MzBoeNR95DlrKY / TxwPwPxtlQp6YB99999s9DDB1bCFxQubg == "
    },
    "metadata_id": "urn:wmo:md:cn-cma:data.core.weather.surface-based-observations ",
    "gts": {
      "ttaaii": "ISMNO2 ",
      "cccc": "BABJ"
    },
    "content": {
      "encoding": "base64",
      "value": "QLVGUGAA+gQAABYAACYAAAAAAAAIAIAH62PRAAAAAAAAAAAABgMGWx1AAAMDAOIAAANTcyNjUAAAAAAAAAAAAAHKEpiCnpCKlp6qAAAAAAAAAAAAAAAPC",
      "size": 250
    },
    "wigos_station_identifier": "0-20000-0-57265"
  },
  "links": [
    {
      "rel": "canonical",
      "type": "application/bufr",
      "href": "https://wis2node.wis.cma.cn/data/2025-09-07/wis/urn:wmo:md:cn-cma:data.core.weather.surface-based-observations/WIGOS_0-20000-0-57265_20250907T000000.bufr4",
      "length": 250
    },
    {
      "rel": "via",
      "type": "text/html",
      "href": "https://oscar.wmo.int/surface/#/search/station/stationReportDetails/0-20000-0-57265"
    }
  ],
  "generated_by": "wis2box 1.0.0rc1"
}
```

The **links** array property consists of one or more objects providing **URLs to access data**.

https://wis2node.wis.cma.cn/data/2025-09-07/wis/urn:wmo:md:cn-cma:data.core.weather.surface-based-observations/WIGOS_0-20000-0-57265_20250907T000000.bufr4

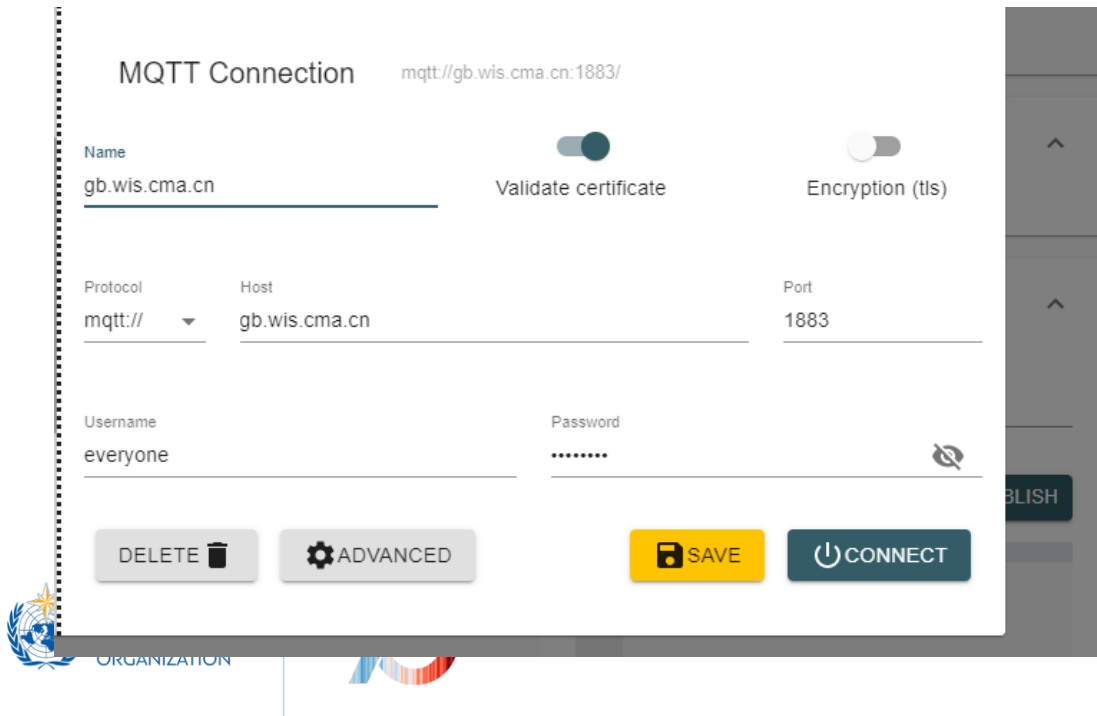
Demonstration of Global Broker

1. Subscribe by MQTT-TOOL.

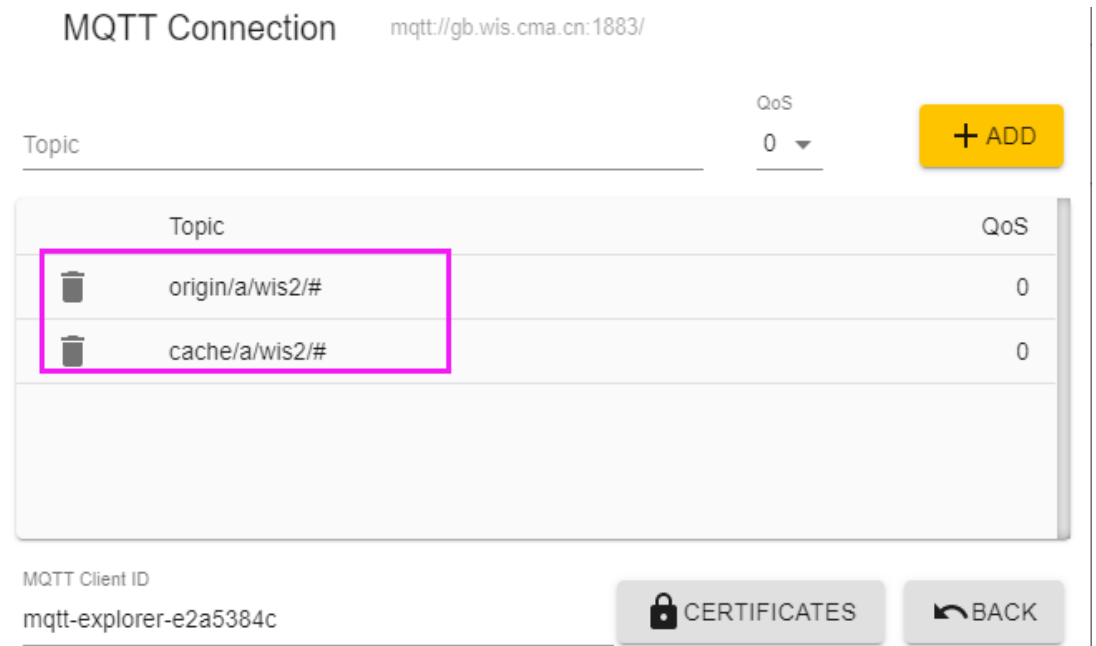
Step1: Use MQTT-TOOL(MQTT-Explorer) to subscribe Global Broker.

Broker of GB CMA: `mqtt://everyone:everyone@gb.wis.cma.cn:1883`

Topic Hierachy: `origin/a/wis2/#`



The image shows the MQTT Explorer interface for configuring a connection. The title is "MQTT Connection" with the address `mqtt://gb.wis.cma.cn:1883/`. The "Name" field is `gb.wis.cma.cn`. There are toggle switches for "Validate certificate" (checked) and "Encryption (tls)" (unchecked). The "Protocol" is set to `mqtt://`, the "Host" is `gb.wis.cma.cn`, and the "Port" is `1883`. The "Username" is `everyone` and the "Password" is masked with dots. At the bottom, there are buttons for "DELETE" (with a trash icon), "ADVANCED" (with a gear icon), "SAVE" (with a floppy disk icon), and "CONNECT" (with a power icon).



The image shows the MQTT Explorer interface for managing subscriptions. The title is "MQTT Connection" with the address `mqtt://gb.wis.cma.cn:1883/`. Below the title, there is a "Topic" input field, a "QoS" dropdown menu set to `0`, and a yellow "+ ADD" button. A table lists the current subscriptions:

Topic	QoS
 <code>origin/a/wis2/#</code>	<code>0</code>
 <code>cache/a/wis2/#</code>	<code>0</code>

At the bottom, the "MQTT Client ID" is `mqtt-explorer-e2a5384c`. There are buttons for "CERTIFICATES" (with a lock icon) and "BACK" (with a left arrow icon).

Demonstration of Global Broker

1. Subscribe by MQTT-TOOL.

Step2: Check the messages that need attention.

☰

MQTT Explorer

🔍

Search...

⏸

DISCONNECT

gb.wis.cma.cn

▼ origin

▼ a

▼ wis2

▶ de-dwd-gts-to-wis2 (162 topics, 517 messages)

▼ ca-eccc-msc

▼ data

▼ core

▼ weather

experimental = {"id": "f02e33e0-1c3d-43b8-95c3-3f78e1"}

▶ recommended (1 topic, 268 messages)

▶ se-smhi (2 topics, 143 messages)

▶ jp-jma-gts-to-wis2 (1 topic, 233 messages)

▶ cl-meteochile (1 topic, 1 message)

▶ us-cimss (1 topic, 1 message)

▼ cache

▼ a

▼ wis2

▶ de-dwd-gts-to-wis2 (34 topics, 104 messages)

▶ ca-eccc-msc (3 topics, 2594 messages)

▶ us-cimss (2 topics, 2 messages)

▼ hk-hko

▼ data

▼ core

▼ weather

▼ space-based-observations

▼ metop-c

amsu-a = {"id": "24dd518b-e63e-475b-b935-387eb03"}

metis = {"id": "1b9a2082-91e4-489e-b7d0-44a7970be"}

▶ jp-jma-gts-to-wis2 (1 topic, 1185 messages)

▶ se-smhi (1 topic, 3 messages)

▶ cl-meteochile (1 topic, 3 messages)

▶ pe-senamhi (1 topic, 11 messages)

Topic

📄 🗑

cache

/

a

/

wis2

/

hk-hko

/

data

/

core

/

weather

/

space-based-observations

/

metop-c

/

amsu-a

Value

📄

<>

☰

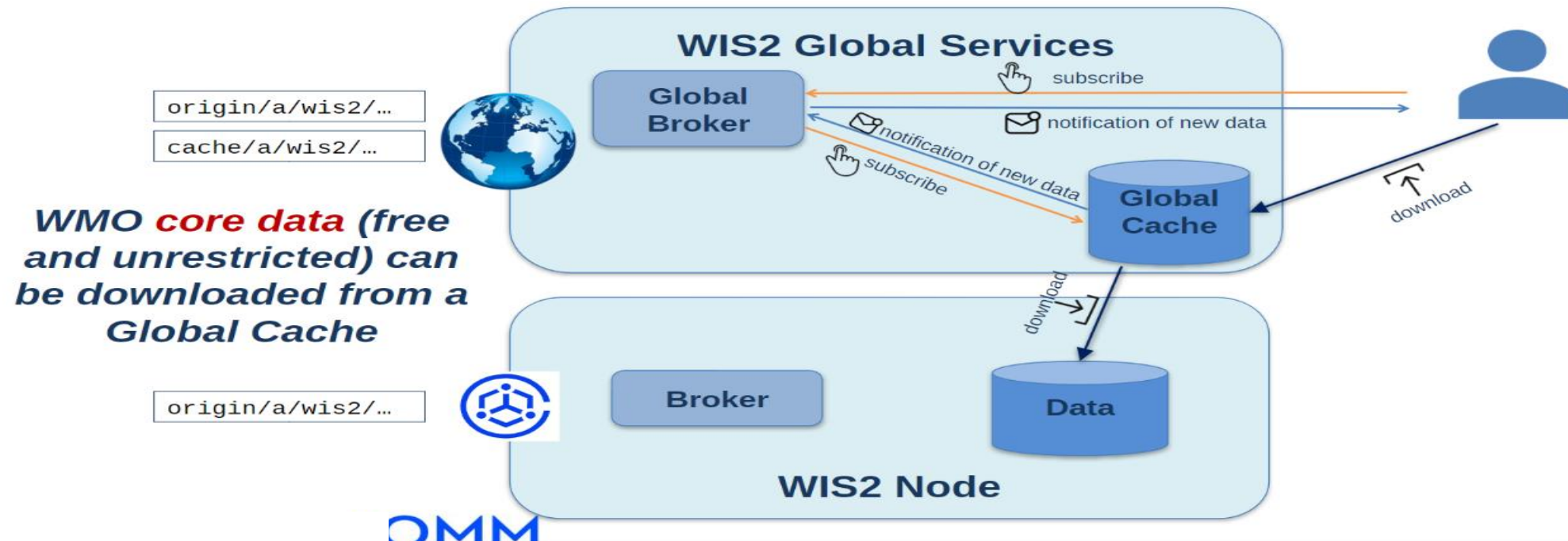
```
{
  "id": "24dd518b-e63e-475b-b935-387eb032587c",
  "type": "Feature",
  "conformsTo": [
    "http://wis.wmo.int/spec/wnm/1/conf/core"
  ],
  "geometry": null,
  "properties": {
    "data_id": "hk-hko:core:weather:space-based-observations.metop-c.amsu-a/W_cn-HKO-hkg,AMSUA,RARS+METOP03+hkg_C_VHHH_20250907144714_amsua11c_metop03_20250907_1425_35468_bufn",
    "datetime": "2025-09-07T00:00:00Z",
    "pubtime": "2025-09-07T14:50:33Z",
    "integrity": {
```

History 1

Demonstration of Global Cache

The Global Cache provides HTTP(S) server where core data (as defined in WMO Resolution 1) can be downloaded from

A discovery metadata record or notification message may provide more than one download links. The preferred link will be identified as “canonical” (link relation: “rel”: “canonical”) and provides a URL where one can directly download a data object.



Demonstration of Global Cache

1. Subscribe by MQTT-TOOL.

Download data from Global Cache.

MQTT Explorer

Search...

DISCONNECT

gb.wis.cma.cn

origin

a

wis2

de-dwd-gts-to-wis2 (162 topics, 517 messages)

ca-eccc-msc

data

core

weather

experimental = {"id": "f02e33e0-1c3d-43b8-95c3-3f78e1"

recommended (1 topic, 268 messages)

se-smhi (2 topics, 143 messages)

jp-jma-gts-to-wis2 (1 topic, 233 messages)

cl-meteochile (1 topic, 1 message)

us-cimss (1 topic, 1 message)

cache

a

wis2

de-dwd-gts-to-wis2 (34 topics, 104 messages)

ca-eccc-msc (3 topics, 2594 messages)

us-cimss (2 topics, 2 messages)

hk-hko

data

core

weather

space-based-observations

metop-c

amsu-a = {"id": "24dd518b-e63e-4756-b935-387eb0"

mhhs = {"id": "1b9a2082-91e4-469e-b7d0-44a7970be"

jp-jma-gts-to-wis2 (1 topic, 1185 messages)

se-smhi (1 topic, 3 messages)

cl-meteochile (1 topic, 3 messages)

pe-senamhi (1 topic, 11 messages)

Topic

cache / a / wis2 / hk-hko / data / core / weather / space-based-observations / metop-c / amsu-a

Value

<>

☰

```

{
  "cache-id": "kr-kma-global-cache"
},
"links": [
  {
    "rel": "canonical",
    "type": "application/octet-stream",
    "href": "https://wis2data.kma.go.kr/cache/a/hk-hko:core.weather.space-based-observations.metop-c.amsu-a/W_cn-HKO-hkg,AMSUA,RARS+METOP03+hkg_C_VHHH_20250907144714_amsuallc_metop03_20250907_1425_354_8",
    "length": 124777
  }
],
"generated_by": "wis2box 1.1.0"
}

```

QoS: 0

2025/09/07 22:52:13

History

1

Thank you
Merci
Gracias
شكرا
谢谢
Спасибо