

WIS 2.0 key concepts

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WIS2 node and Global Services



Each WMO Member shall implement at least one WIS2 node to share data in WIS2



A WIS2 node replaces the GTS Message Switching System



Data and metadata are shared through a WIS2 node

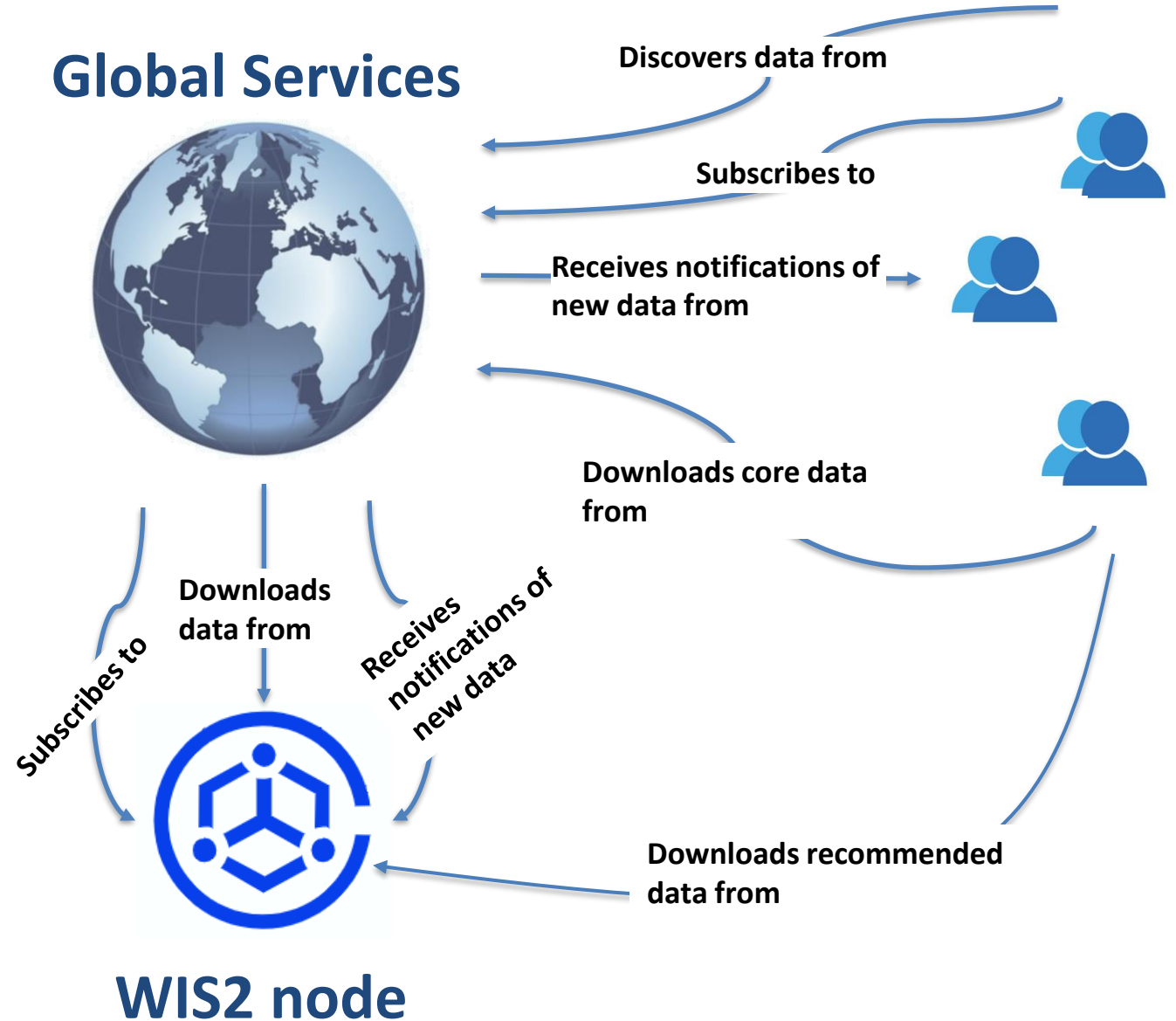


A WIS2 Node shares data via an HTTPS service and sends notifications to MQTT subscribers



A WIS2 node shares notifications with Global Broker

Global Services



WIS2 Components: Global Services



Global Services



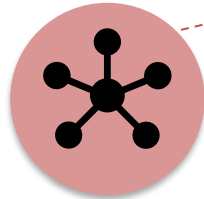
Global
Monitoring

Discovers datasets



Global
Discovery
Catalogue

Provides an API to
discover datasets and
services



Global
Broker

Subscribes to topics

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

Downloads core data



Data users

Downloads recommended data

Downloads recommended data

Downloads recommended data



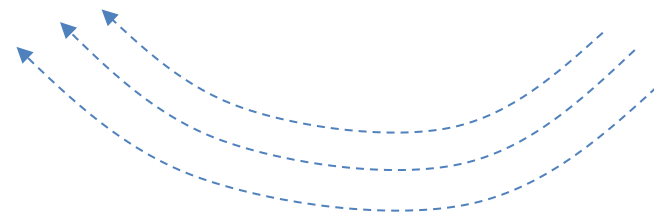
WIS2 node



WIS2 node

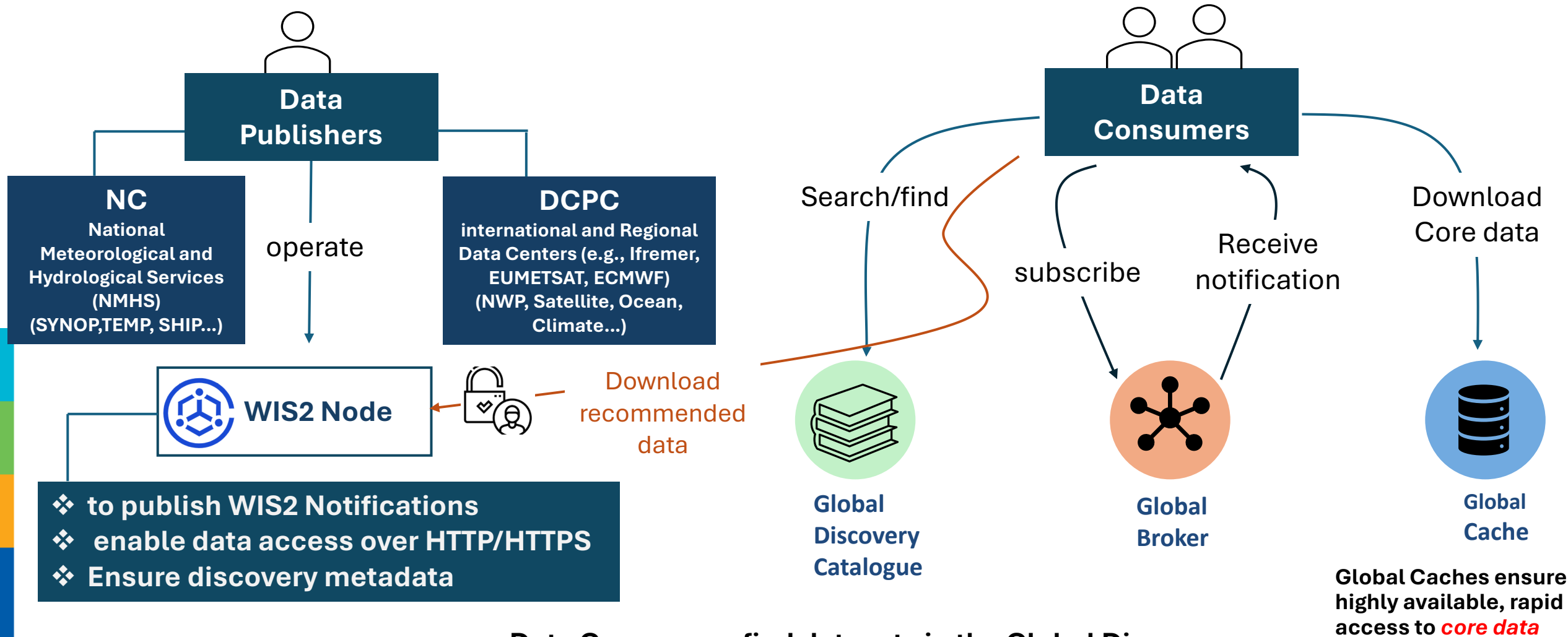


WIS2 node



Scale to highly-available, global data sharing

Sharing data on WIS 2.0

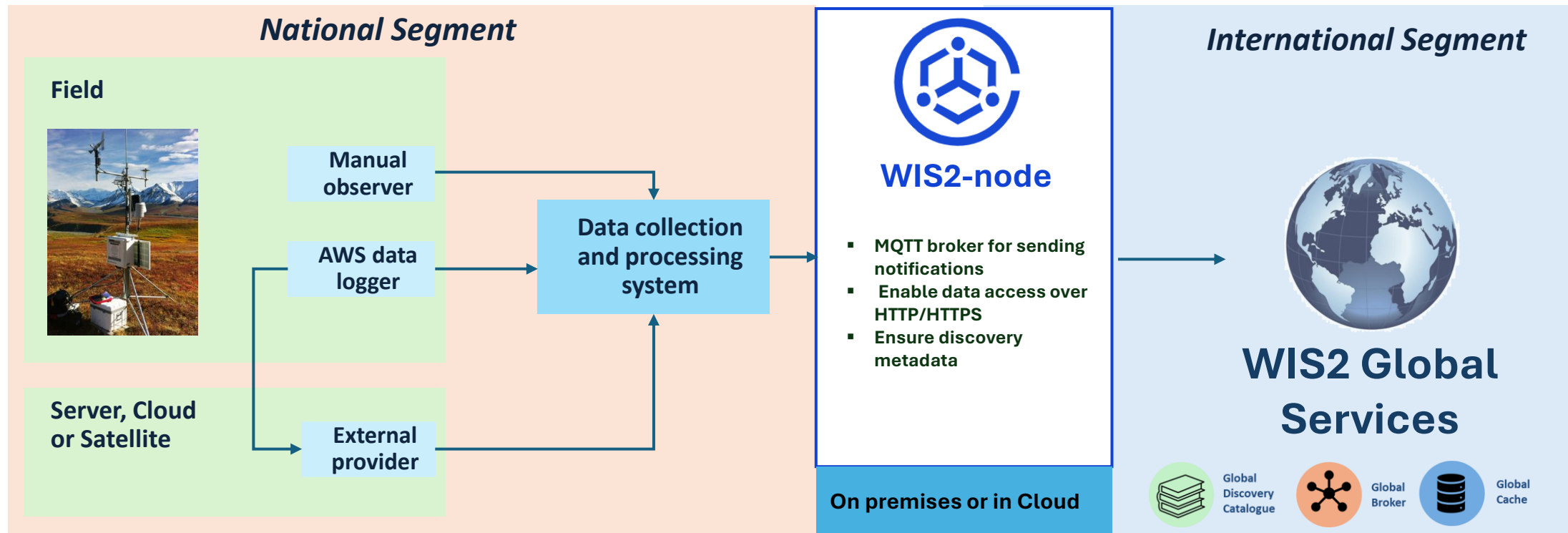


Data Consumers find datasets in the Global Discovery Catalogue and subscribe to a Global Broker to receive WIS2 Notifications

What is a WIS2 Node ?

The WIS2 Node serves as a gateway between National MET systems and the WIS 2.0 Network

How the data is collected at the source and sent into the WIS2-node is not governed by the WIS2 standard



How to Set Up a WIS2 Node



A WIS2 Node replaces the GTS Message Switching System



Each WMO Member shall implement at least one WIS2 Node to share data in WIS2

NC or DCPC

How to Set Up a WIS2 Node

Establish Data Sharing & Notification Mechanisms

- Set up an HTTP/HTTPS endpoint for sharing data.
- Configure an MQTT broker for sending notifications.

Create Metadata Records

- Generate WIS2 discovery metadata records for datasets using the **WCMP2** standard.

Publish MQTT Notifications

- Send MQTT messages to announce the availability of new metadata records and data granules.
- Structure the message payload according to the **WIS2 Notification Message standard**.
- Use a topic as defined by the **WIS2 Topic Hierarchy**.
- Include a URL that allows public internet access to download the data/metadata.

WIS2 Discovery Metadata (WCMP2)

[Link to WCMP2 documentation](#)

The WMO Core Metadata Profile 2 (WCMP2) defines the content of Discovery Metadata records in WIS2

The Global Discovery Catalogue caches WCMP2 records and enables search for datasets using an API

```
{  "id": "urn:wmo:md:mw-mw_met_centre:surface-weather-observations",
  "conformsTo": [ http://wis.wmo.int/spec/wcmp/2/conf/core ],
  "type": "Feature",
  "properties": {
    "type": "dataset",
    "title": "Surface weather observations from Malawi",
    "description": "Surface weather observations from Malawi",
    "keywords": [ "surface weather", "temperature", "observations"],
    "themes": [ { "concepts": [ { "id": "weather" } ],
                  "scheme": "https://codes.wmo.int/wis/topic-hierarchy/earth-system-discipline" } ],
    "created": "2024-03-29T00:00:00Z",
    "updated": "2024-05-19T15:08:07Z",
    "wmo:dataPolicy": "core",
    "contacts": [..]
  },
  "time": { "interval": [ "2021-11-29", ".."], "resolution": "P1H" },
  "links": [{
    "href": "mqtt://everyone:everyone@wis2node.example:1883",
    "type": "application/json",
    "rel": "items",
    "title": "WIS2 notifications for surface weather observations from Malawi ",
    "channel": "origin/a/wis2/mw-mw_met_centre/data/core/weather/surface-based-observations/synop"
  }]
}
```

The "channel" indicates the WIS2 topic for data publications



WIS 2.0 Notification Message (WNM)

[Link to WIS2 Notification Message documentation](#)

WIS2 Notification Message Encoding defines the payload of a WIS2 notification

```
{  "id": "1e2ee0a2-6b86-4bb4-9b20-11a8c5d1516b",
  "type": "Feature",
  "version": "v04",
  "geometry": {"coordinates": [-43.64827, -18.23105, 1359], "type": "Point"},
  "properties": {
    "data_id": "br-inmet/data/core/weather/surface-based-observations/synop/WIGOS_0-76-0-3121605000000209_20240521T110000",
    "datetime": "2024-05-21T11:00:00Z",
    "pubtime": "2024-05-21T11:30:03Z",
    "integrity": {
      "method": "sha512",
      "value": "nRdTEUaIF0i40VIs9k5wIU29/TJMAIsXIVJ4pn37YQ3/NeelY9hwtt+jElMwBuJAlg72VVPmXqD+mRjx4eo9Xw=="
    },
    "content": {
      "encoding": "base64",
      "value": "QIVGUgAA8AQAABYAACsAAAIAAAb/IQAH6AUVCwAAAAALAAABgMGWx1sAAMMAAATAAANDMxODkwMzAwMDAwMDIzN0uAACA0re...",
      "size": 240
    }
  },
  "links": [ {
    "rel": "canonical",
    "type": "application/x-bufr",
    "href": "http://wis2node.example/data//WIGOS_0-76-0-3121605000000209_20240521T110000.bufr4",
    "length": 240
  } ]
}
```

"links" should contain a "canonical" link to download data

WIS2 Topic Hierarchy (WTH)

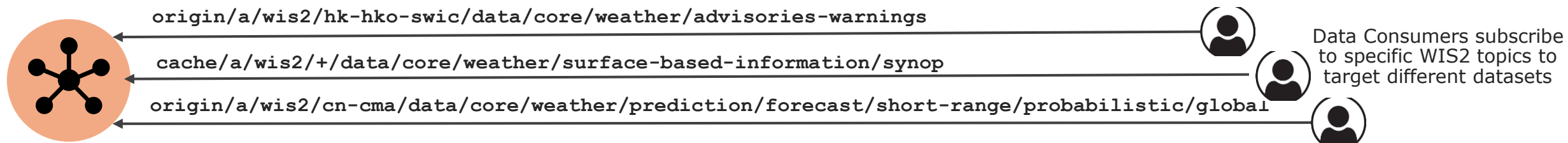
[Link to WIS2 Topic Hierarchy documentation](#)

WIS2 Topic Hierarchy defines the MQTT topics used in the WIS2 network

The WTH is composed of primary topics (levels 1-7) and sub-discipline specific topics (levels 8 and beyond)

origin|cache metadata|data core|recommended weather|climate|hydrology|atmospheric-
composition|cryosphere|ocean|space-weather

```
channel/version/wis2/centre-id/resource-type/data-policy/earth-system-domain/subcategory/...
```



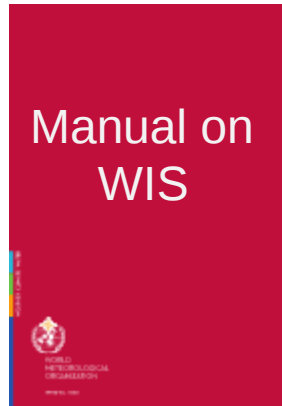
The sub-discipline topics are proposed by domain experts

WIS2 in a nutshell

- Global Services to enable the dissemination of data:
 - Global Discovery Catalogue
 - Global Cache
 - Global Broker
- WMO Members share data using a WIS2 Node:
 - HTTP endpoint to enable data access
 - MQTT endpoint to publish WIS2-notifications
- WIS2 standards to define:
 - Discovery Metadata (WCMP2)
 - Payload of WIS2 notification Message (WNM)
 - WIS2 Topic Hierarchy (WTH)

WIS2 regulatory material

June 2023 Cg-19



Manual on
WIS

Volume I
WIS 1.0

Manual on
WIS

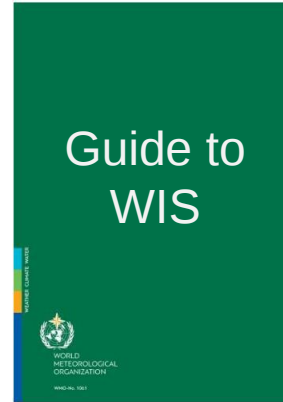
Volume II
WIS 2.0



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AMENDMENTS TO
THE MANUAL ON
THE WMO
INFORMATION
SYSTEM

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

April 2024 INFCOM-3



Guide to
WIS

[Guide to the WMO
Information System, Volume II](#)

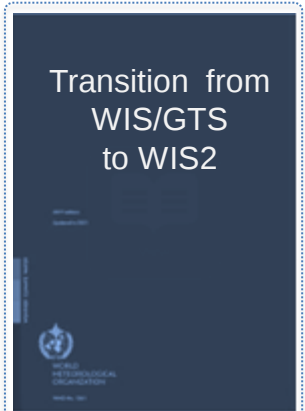
Guide to
WIS

Volume I
WIS 1.0

Guide to
WIS

Volume II
WIS 2.0

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UPDATE OF THE
GUIDE TO THE
WMO
INFORMATION
SYSTEM



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TRANSITION
FROM WIS 1.0
AND GTS TO WIS
2.0, INCLUDING
CAPACITY
DEVELOPMENT

[Provisions for the
Transition from the
WMO Information
System \(WIS\) 1.0
and Global
Telecommunication
System to WIS 2.0](#)



WMO OMM

[WMO Information System \(WIS\) | World Meteorological Organization](#)

References

- ❑ WIS Community page: [WMO Information System \(WIS\) | World Meteorological Organization](#)
- ❑ WIS2 Newsletter: [WIS2 Operational Newsletter | World Meteorological Organization](#)
- ❑ Wis2box Newsletter: [wis2box Newsletter \(2025-No.3\) | World Meteorological Organization](#)