PORT OF SPAIN WIS2 TRAINING WORKSHOP · June 2026

Discovering and downloading data in WIS2

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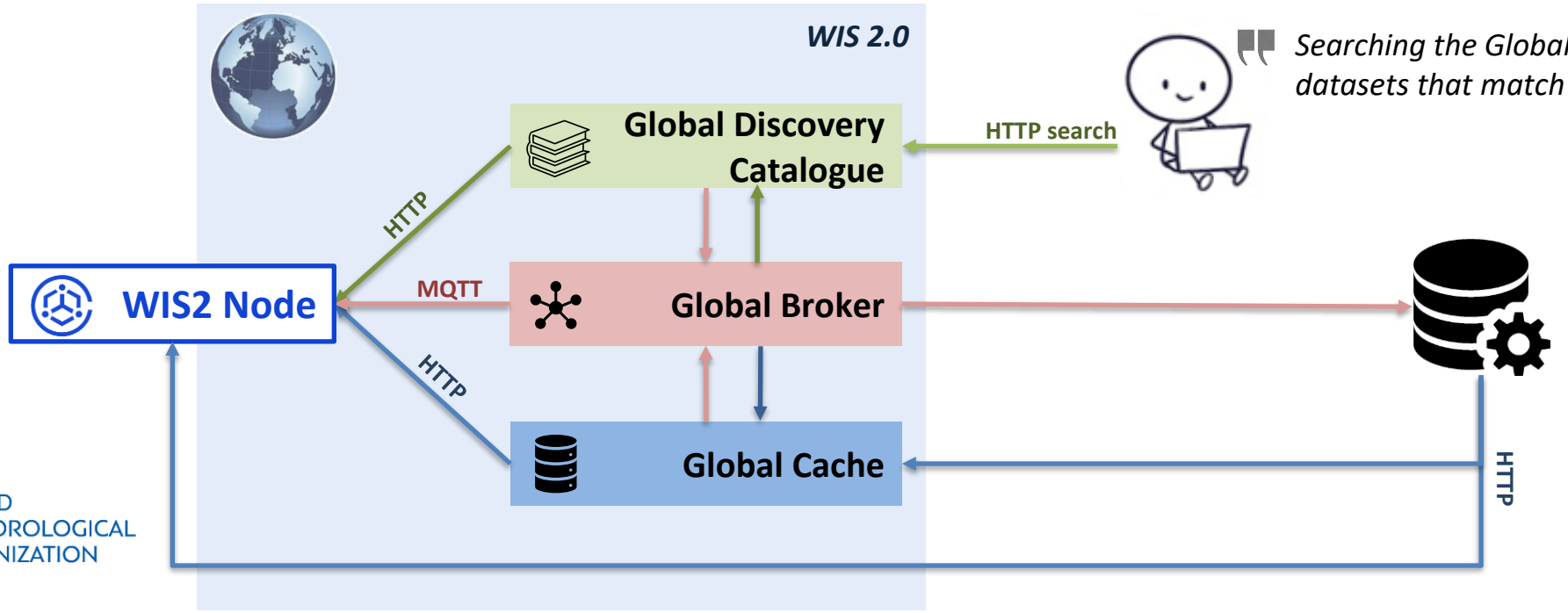
Discovering datasets in WIS2

The Global Discovery Catalogue (GDC) provides cataloguing and discovery capability for WIS2 datasets

- Web-based API facilitating search/browse data published via WIS 2.0 (OGC API - Records)
- Harvests WIS2 discovery metadata from WIS2 Nodes (WCMP2 / OGC API - Records)
- Yellow pages (discovery metadata) gateway into WIS2 data and services
- Provides indexing capability to mass market search engines
- Provides quality assessment services of discovery metadata in support of continuous improvement in alignment with WIS2 metadata Key Performance Indicators (KPIs)



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Discovering datasets in WIS2

Global Discovery Catalogues provide an OGC API endpoint to query metadata records

GDC CMA, China:

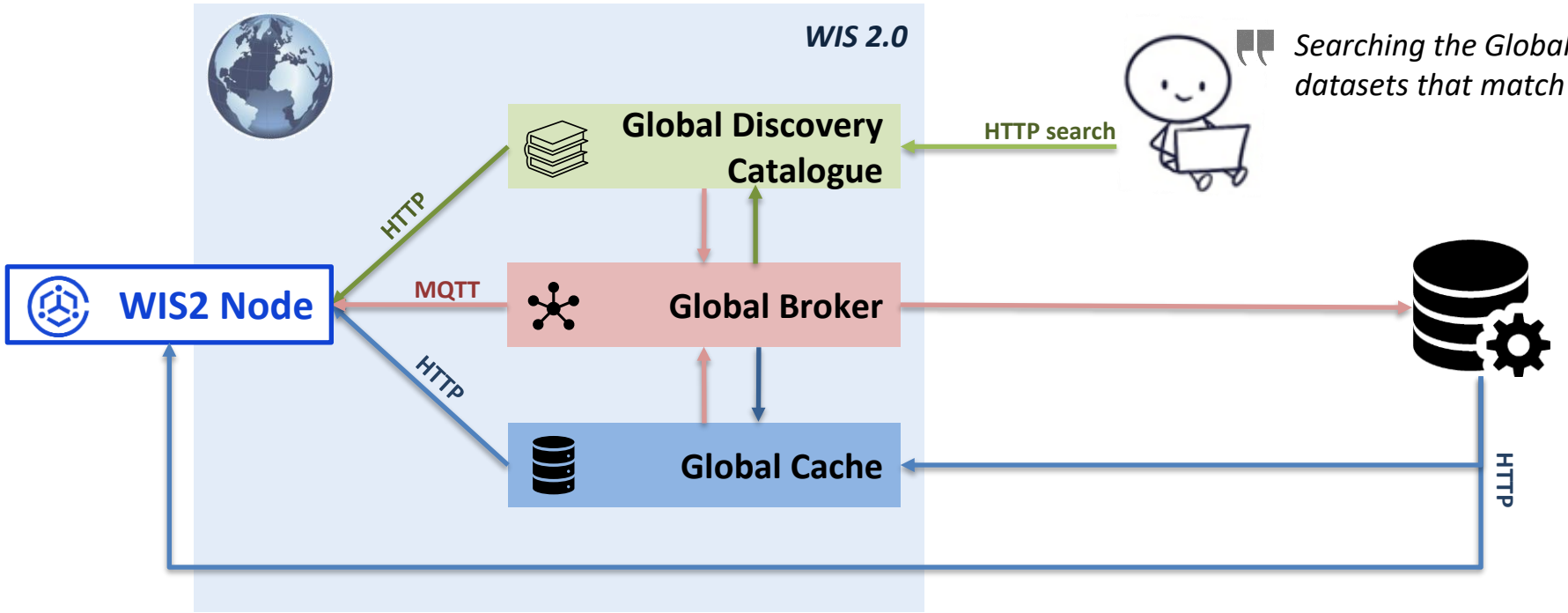
https://gdc.wis.cma.cn/collections/wis2-discovery-metadata/items

GDC DWD, Germany:

https://wis2.dwd.de/gdc/collections/wis2-discovery-metadata/items

GDC ECCC, Canada:

https://wis2-gdc.weather.gc.ca/collections/wis2-discovery-metadata/items



Searchable Catalogue

Predicate	Example(s)
Spatial	`bbox=minx,miny,maxx,maxy`
Temporal	• `datetime=t1` • `datetime=t1/t2` • `datetime=t1/..`
Freetext	`q=air+temperature`
Attributes	• `title=air+temperature` • `contacts.address.country=Oman`
Sorting/paging	• `sortby=title&limit=100&startindex=11` • `"prev" / "next" link relations`
Filter returnable properties	• `properties=title,description`

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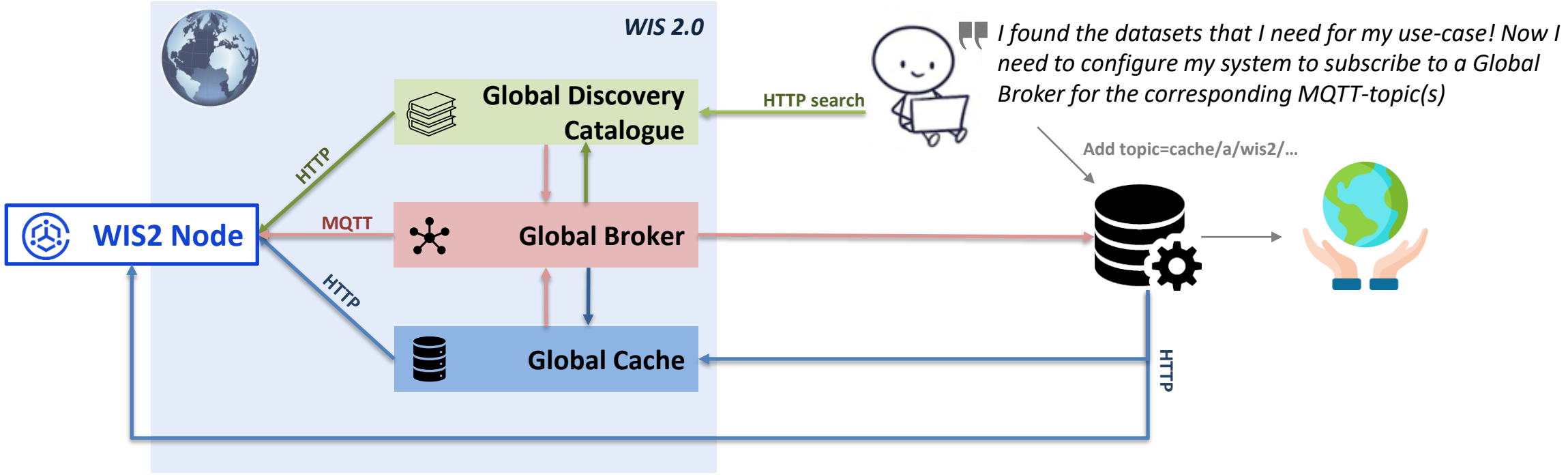
Processing WIS2 notifications as a Data Consumer

Data Consumers use MQTT client-software to subscribe to specific channels and process data in real-time



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Data access

WIS2 Notifications provide a canonical link to access data

The canonical link is a “one click” link to download data to your laptop/desktop/system

When you subscribe to data notifications, use the canonical link to download the data:

```
{
    "href": "https://example.org/data-file.bufr",
    "rel": "canonical",
    "type": "application/bufr"
}
```

Data publisher can indicate that previously published data has been updated and should be overwritten by using rel=update

```
{
    "href": "https://example.org/data-file.bufr",
    "rel": "update",
    "type": "application/bufr"
}
```

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Custom MQTT client scripting

Example Python code using paho-mqtt

```
import json
import paho.mqtt.client as mqtt_client

def on_message(client, userdata, message):
    j = json.load(message.payload.decode('utf-8'))
    for link in j['links']:
        if link['rel'] == 'canonical' or link['rel'] == 'update':
            client_specific_function(link['href'])

client = mqtt_client.Client('MyDataClientID')
client = username_pw_set('everyone', 'everyone')
client.tls_set(tls_version=2)
client.connect('globalbroker.meteo.fr', port=8883)
client.on_message = on_message
client.subscribe('origin/a/wis2/int-ecmwf/data/core/weather/prediction/forecast/cyclone_tracks')
```

Data Consumer can customize their "on_message" code to define the actions specific for their data ingestion

DEMO: python script to subscribe and download

Run the example script on your student VM

```
cd example-scripts
python3 subscribe-and-download-example.py
```

A file will be downloaded every minute until you interrupt the process …

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Options to subscribe & download on WIS2

CUSTOM DEVELOPMENT:

Data Consumers may prefer to create a custom MQTT-client based workflow to:

- **Integrate** WIS2 subscriber within **existing data processing system**
- **Parse and process data directly**, without writing to file-system
- Apply authentication for restricted datasets (data-policy=recommended)

MQTT clients are available for different software environments

One widely used client for Python is paho-mqtt

EXISTING OPEN-SOURCE SOLUTIONS:

wis2downloader: https://github.com/World-Meteorological-Organization/wis2downloader

pywis-pubsub: https://github.com/World-Meteorological-Organization/pywis-pubsub

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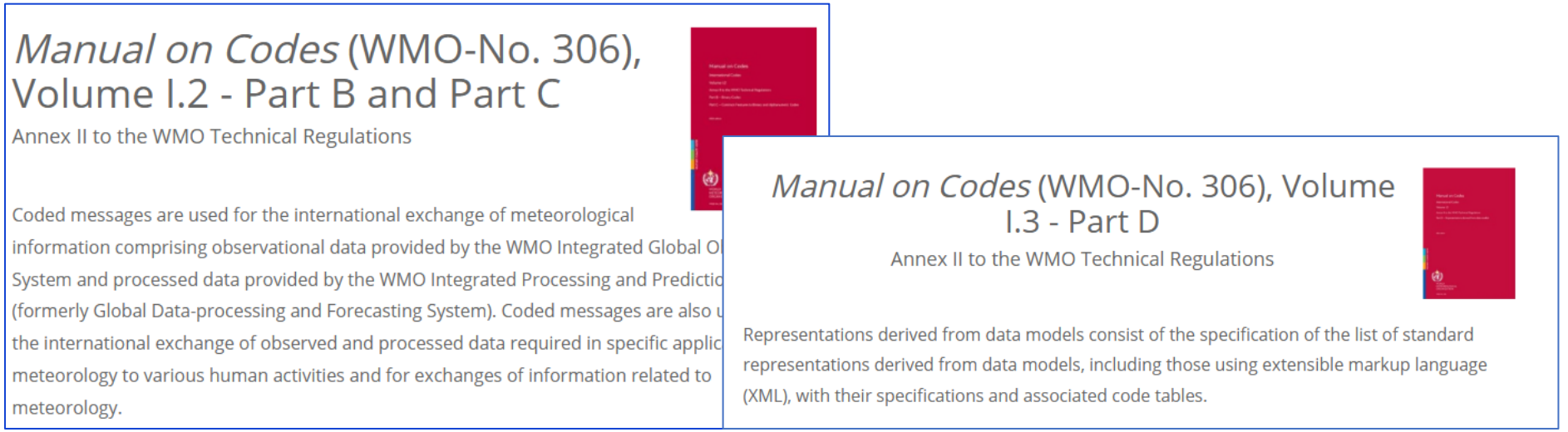
Consuming data downloaded from WIS2: data format and content

Data shared on WIS2 should use WMO data standards, e.g. BUFR4, GRIB2, NetCDF, WaterML, ...

WMO data standards are described in *Manual on Codes, Volume I.2* and *Manual on Codes, Volume I.3*

Requirements for data standards are governed by different WMO programs, such as WIGOS for observations and WIPPS for prediction-based products.

Descriptions about format and content of the dataset should be provided in the discovery metadata



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Summary: discovering and downloading data in WIS2

Find new data by searching one of the Global Discovery Catalogue

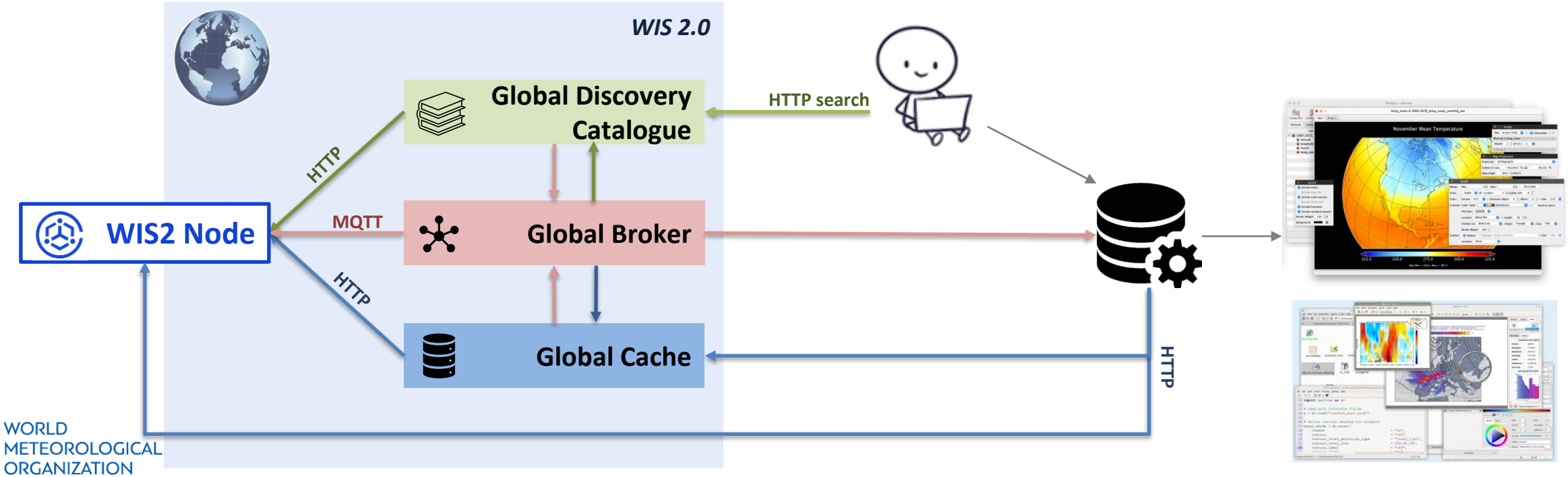
- Query the OGC API endpoint over HTTP or use tools like ‘pywiscat’

Setup an MQTT subscription and use the URL in the WIS2 notification to download the data

- Develop custom code using MQTT client libraries or use tools like ‘wis2downloader’

Process and decode the received data using different tools depending on the format

- Various software available for decoding WMO binary data formats



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Thank you.

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