

OFFENBACH TRAINING WORKSHOP · October 2026

WIS2 Downloader

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Introduction to WIS2 Downloader

WIS2Downloader provides a docker-compose stack of services to help users download data from WIS2

- Celery tasks to manage download tasks
- Flask-based REST API
- Web-interface to setup subscriptions using WCMP2 records from the WIS2 GDCs
- Monitoring tools using Prometheus and Grafana

Available as free open-source software at:

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

Documentation at:

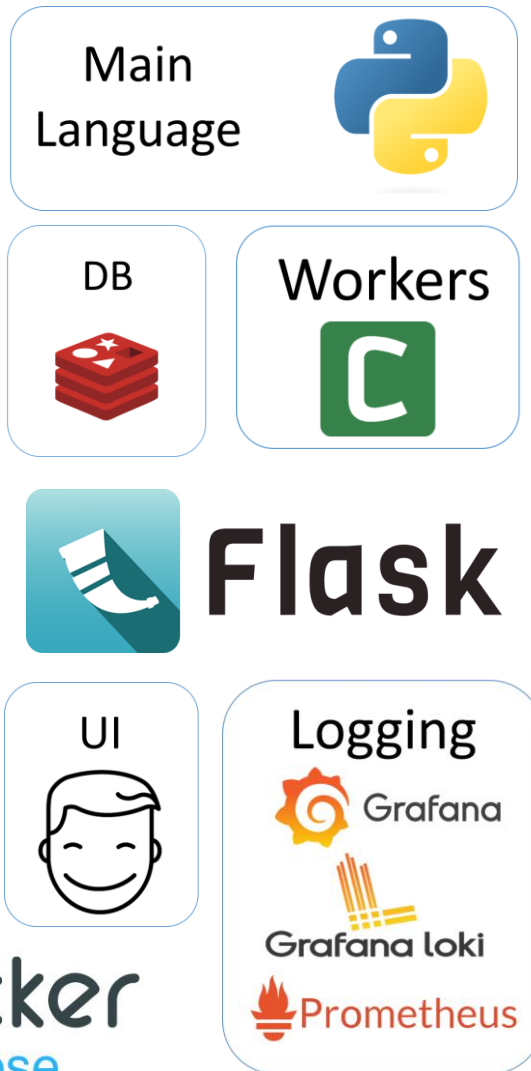
<https://world-meteorological-organization.github.io/wis2downloader/en/index.html>

Downloaded data will be made available in folder of host machine

Stack to be run on a dedicated machine within local network
(not to be exposed to public internet)



docker
Compose



WIS2 Downloader main components

Web UI (NiceGUI :8080)

reads GDC catalogue data from Redis cache
posts subscriptions to Subscription Manager API



Internal API calls

Subscription Manager (Flask API :5001)

persists subscriptions in Redis
publishes subscribe/unsubscribe commands



Redis PubSub (commands)

Subscriber (MQTT Client)

connects to WIS2 Global Broker
on notification: queues Celery download task



Celery tasks queue

Celery Workers

download file, verify hash, apply filters, save



How to install WIS2Downloader

Prerequisites:

- Docker 20.10+
- Docker Compose 2.0+
- 4GB RAM minimum (8GB recommended for production)
- Ports available on local host: 3000, 5002, 8080, 9090, 3100 (can be reconfigured as required)

1. Download latest release

```
wget https://github.com/World-Meteorological-Organization/wis2downloader/archive/refs/tags/v1.0.0b1+rc4.tar.gz  
tar -xzf v1.0.0b1+rc4.tar.gz  
cd wis2downloader-*
```

2. Run the setup script

```
bash setup.sh
```

3. Start all services

```
docker compose up -d
```



Current version is “pre-beta”, official beta-release for WIS2 Downloader to be released in November

Setup script and .env

Options to define download path and UID/GUI presented when running setup.sh

Press enter to accept defaults

```
.env created with generated secrets.  
Enter download path in host (or press Enter to use default from .env):  
Using default HOST_DATA_PATH from .env.  
Enter UID for file ownership (or press Enter to use current user's UID: 1001):  
WIS2DOWNLOADER_UID set to 1001 in .env.  
Enter GID for file ownership (or press Enter to use current user's GID: 1001):  
WIS2DOWNLOADER_GID set to 1001 in .env.  
Download path './downloads' created.
```

```
WIS2DOWNLOADER_UID="1001"  
WIS2DOWNLOADER_GID="1001"  
  
LOG_LEVEL=INFO  
  
# Public base URL – set this to your server's IP or hostname (e.g. http://192.168.1.100)  
WIS2DOWNLOADER_BASE_URL=http://localhost  
  
WIS2DOWNLOADER_SUBSCRIPTION_MANAGER_URL=${WIS2DOWNLOADER_BASE_URL}:5002  
WIS2DOWNLOADER_GRAFANA_URL=${WIS2DOWNLOADER_BASE_URL}:3000  
  
HOST_DATA_PATH=./downloads  
CONTAINER_DATA_PATH=/data  
  
# Default retention period in days  
DOWNLOAD_RETENTION_PERIOD=30
```

**.env to be edited manually
after creation as required**

Docker compose stack

Use the command “`docker ps -a`” to review the status of running containers on our WIS2Downloader host:

```
~/wis2downloader-1.0.0b1-rc4$ docker ps -a --format "table {{.Names}}\t{{.Status}}\t{{.Ports}}\t{{.Command}}" | sort
```

NAMES	STATUS	PORTS	COMMAND
grafana	Up 19 hours (healthy)	0.0.0.0:3000->3000/tcp, [::]:3000->3000/tcp	"/run.sh"
loki	Up 19 hours	0.0.0.0:3100->3100/tcp, [::]:3100->3100/tcp	"/usr/bin/loki -conf..."
prometheus	Up 19 hours (healthy)	0.0.0.0:9090->9090/tcp, [::]:9090->9090/tcp	"/bin/prometheus --c..."
redis	Up 19 hours (healthy)	6379/tcp	"docker-entrypoint.s..."
subscriber-brazil	Up 19 hours (healthy)		"/bin/bash -c 'sourc..."
subscriber-france	Up 19 hours (healthy)		"/bin/bash -c 'sourc..."
subscription-manager	Up 19 hours (healthy)	0.0.0.0:5002->5001/tcp, [::]:5002->5001/tcp	"/bin/bash -c 'sourc..."
wis2downloader-100b1-rc4-celery-beats-1	Up 19 hours (healthy)		"/bin/bash -c 'sourc..."
wis2downloader-100b1-rc4-celery-scheduler-workers-1	Up 19 hours (healthy)		"/bin/bash -c 'sourc..."
wis2downloader-100b1-rc4-celery-workers-high-priority-1	Up 19 hours (healthy)		"/bin/bash -c 'sourc..."
wis2downloader-100b1-rc4-celery-workers-large-files-1	Up 19 hours (healthy)		"/bin/bash -c 'sourc..."
wis2downloader-100b1-rc4-celery-workers-small-files-1	Up 19 hours (healthy)		"/bin/bash -c 'sourc..."
wis2downloader-100b1-rc4-wis2downloader-ui-1	Up 19 hours	0.0.0.0:8080->8080/tcp, [::]:8080->8080/tcp	"/resources/docker-e..."

The default configuration will subscribe to **two Global Brokers**:

- GB Brazil
- GB France

You can edit the `docker-compose.yaml` to change this:

```
subscriber-france:
  container_name: subscriber-france
  environment:
    GLOBAL_BROKER_HOST: globalbroker.meteo.fr
    GLOBAL_BROKER_PORT: 443
    GLOBAL_BROKER_USERNAME: everyone
    GLOBAL_BROKER_PASSWORD: everyone
    MQTT_PROTOCOL: websockets
```

```
subscriber-brazil:
  container_name: subscriber-brazil
  environment:
    GLOBAL_BROKER_HOST: globalbroker.inmet.gov.br
    GLOBAL_BROKER_PORT: 443
    GLOBAL_BROKER_USERNAME: everyone
    GLOBAL_BROKER_PASSWORD: everyone
    MQTT_PROTOCOL: websockets
```

Managing subscriptions

Subscriptions can be managed directly via the REST API:

POST /subscriptions

```
{ "topic": "origin/a/wis2/+/data/core/#", "target": "mydata" }
```

LIST ACTIVE SUBSCRIPTIONS

GET /subscriptions

DELETE A SUBSCRIPTION

DELETE /subscriptions/{id}

... or subscription can be managed via the Web UI:

Enables users to setup subscriptions interactively

“Catalogue View” uses data from the **WIS2 Global Discovery catalogues**

- On startup all WCMP2 records from all three GDCs are fetched
- WCMP2 records stored locally · used to resolve topic paths and dataset names
- Metadata can be reloaded at any time from the Settings tab
- Full-text and faceted search

Settings

Global Discovery Catalogues

Records are fetched from all three GDCs at startup and merged. Results are cached in Redis for 6 hours.

CMA: 434 records

DWD: 404 records

ECCC: 450 records

 REFRESH GDC DATA

Web UI: Catalogue View

Dashboard

Catalogue View

Tree View

Manual Subscribe

Manage Subscriptions

Settings

Documentation

Catalogue View

Free text search:
temp

Data Policy
all

Keywords (comma-se...

Bounding box:

North

West

East

South

Spatial relationship:

☒ Intersects

☐ Within

SEARCH

Page
1

Upper-level temperature/humidity/wind reports from fixed-land stations (TEMP) of Russian Federation (ru-aviamettelecom)

coreCMADWD ECCC

urn:wmo:md:ru-aviamettelecom:core.surface-based-observations.temp

Upper-level temperature/humidity/wind reports from fixed-land stations (TEMP) of Russian Federation (ru-aviamettelecom)

+

—

SHOW METADATA

Save directory

FILTERS

Dataset
Global Ensembl...

Media types

☐ Bounding box

Date & time range

PRIORITY QUEUE

☐ High Priority

☒ Small Files

☐ Large Files

SUBSCRIBE

 WORLD
METEOROLOGICAL
ORGANIZATION

Enables various search options using WCMP2 records from all three GDCs

Web UI: Tree View



- Dashboard
- Catalogue View
- Tree View
- Manual Subscribe
- Manage Subscriptions
- Settings
- Documentation

Tree View

Filter topics

▼ cache

└─▼ a

└─▼ wis2

└─▶ ae-ncm

└─▼ ag-antiguamet

└─└─▼ data

└─└─└─▼ core

└─└─└─└─▼ weather

└─└─└─└─└─▼ surface-based-observations

└─└─└─└─└─└─ synop

└─▶ ai-metservice

└─▶ ar-smn

└─▶ au-imos

└─▶ bb-barbadosmetservices

└─▶ be-rmib

└─▶ bf-anam

└─▶ bg-nimh

└─▶ bi-igebu

cache/a/wis2/ag-antiguamet/data/core/#

Save directory

FILTERS

Datasets

Media types

☐ Bounding box

☒ Date & time range

PRIORITY QUEUE

☐ High Priority

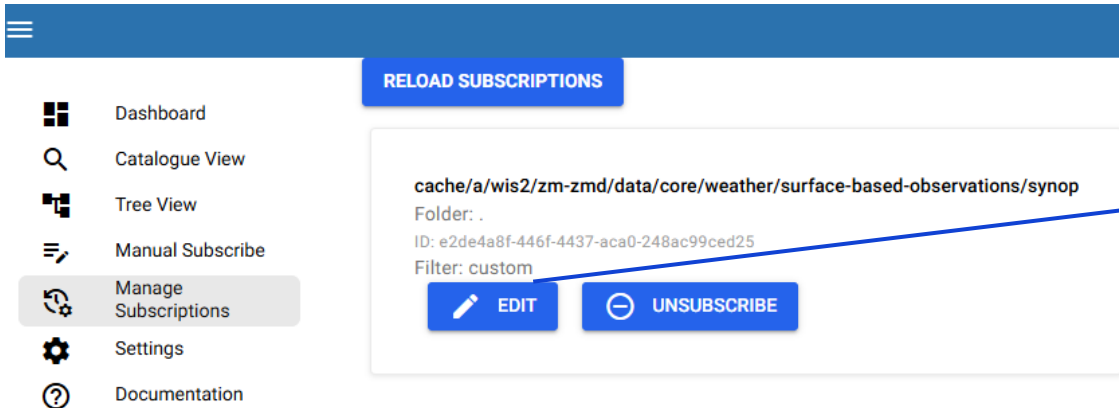
☒ Small Files

☐ Large Files

☒ SUBSCRIBE

Displays all topics available in WCMP2 records in the three GDCs

Web UI: Managing Subscriptions



Directory within download-path where data for this particular subscription will be stored

Filters to restrict downloads based on WNM-properties:

- media-type based on "type"-property in link
- Bounding box, based on "geometry"-property
- Date & time range, based on "datetime"-property

Edit Subscription

cache/a/wis2/zm-zmd/data/core/weather/surface-based-observations/synop

Save directory

zambia-data

FILTERS

Media types

☐ Bounding box

☐ Date & time range

PRIORITY QUEUE

☐ High Priority ☒ Small Files ☐ Large Files

AUTHENTICATION

☒ None ☐ Basic HTTP ☐ Bearer Token

Leave secret fields blank to keep existing credentials

CANCEL CONFIRM

File organization in WIS2 Downloader

Base directory

`/downloads-path`

Date-based sub-directories

`download-path/YYYY/MM/DD/<filename>`

Date derived from download timestamp (UTC).

Optional target sub-directory

Specified per subscription:

`download-path/<target>/YYYY/MM/DD/<filename>`

```
./downloads/zambia-data/2026/09/30:  
WIGOS_0-894-2-CECB002_20260930T055600.bufr4  
WIGOS_0-894-2-CECB002_20260930T095500.bufr4  
WIGOS_0-894-2-CECB002_20260930T105400.bufr4  
WIGOS_0-894-2-CECB002_20260930T115400.28196  
WIGOS_0-894-2-CECB002_20260930T115400.bufr4  
WIGOS_0-894-2-CEKM001_20260930T085500.bufr4  
WIGOS_0-894-2-CEKM001_20260930T115400.07373  
WIGOS_0-894-2-CEMK002_20260930T085500.bufr4  
WIGOS_0-894-2-CEMK002_20260930T095500.bufr4  
WIGOS_0-894-2-CEMK002_20260930T105400.bufr4  
WIGOS_0-894-2-CEMU004_20260930T055600.bufr4  
WIGOS_0-894-2-CEMU004_20260930T105400.bufr4  
WIGOS_0-894-2-CESB002_20260930T055600.bufr4  
WIGOS_0-894-2-CESB002_20260930T085500.bufr4  
WIGOS_0-894-2-CESB002_20260930T095500.bufr4  
WIGOS_0-894-2-CESB002_20260930T105400.bufr4  
WIGOS_0-894-2-CESB002_20260930T115400.bufr4  
WIGOS_0-894-2-CESR001_20260930T055600.bufr4  
WIGOS_0-894-2-CESR001_20260930T085500.bufr4  
WIGOS_0-894-2-CESR001_20260930T105400.bufr4  
WIGOS_0-894-2-CESR001_20260930T115400.bufr4
```

Summary

***WIS2 Downloader* provides a docker-compose stack with services to support downloading data from WIS2**

- Celery tasks to manage download tasks
- Flask-based REST API
- Web-interface to setup subscriptions using WCMP2 records from WIS2 GDCs
- No authentication, API and WEB UI should not be exposed to public internet

Questions, contributions and issue reports welcome !

<https://github.com/World-Meteorological-Organization/wis2downloader/issues>

Subscribe to WIS2 Operational Newsletter to receive updates on WIS2 Downloader from WMO Secretariat:

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Thank you.



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