

PORT OF SPAIN WIS2 TRAINING WORKSHOP · June 2026

Monitoring and debugging data-flow in wis2box

Maike Limper

WMO Secretariat · WIS Section · ESDP Department

Data publishing checklist

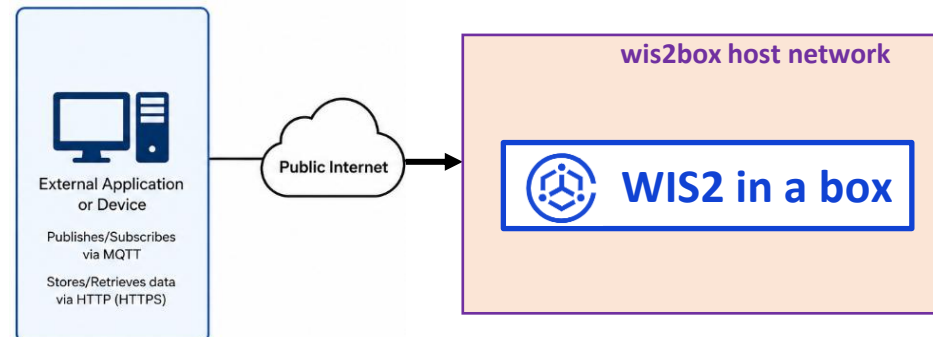
Once datasets are configured data can be uploaded to start the wis2box publishing process

Upload your data into wis2box (pushing data into MinIO or using the interfaces in the wis2box-webapp)

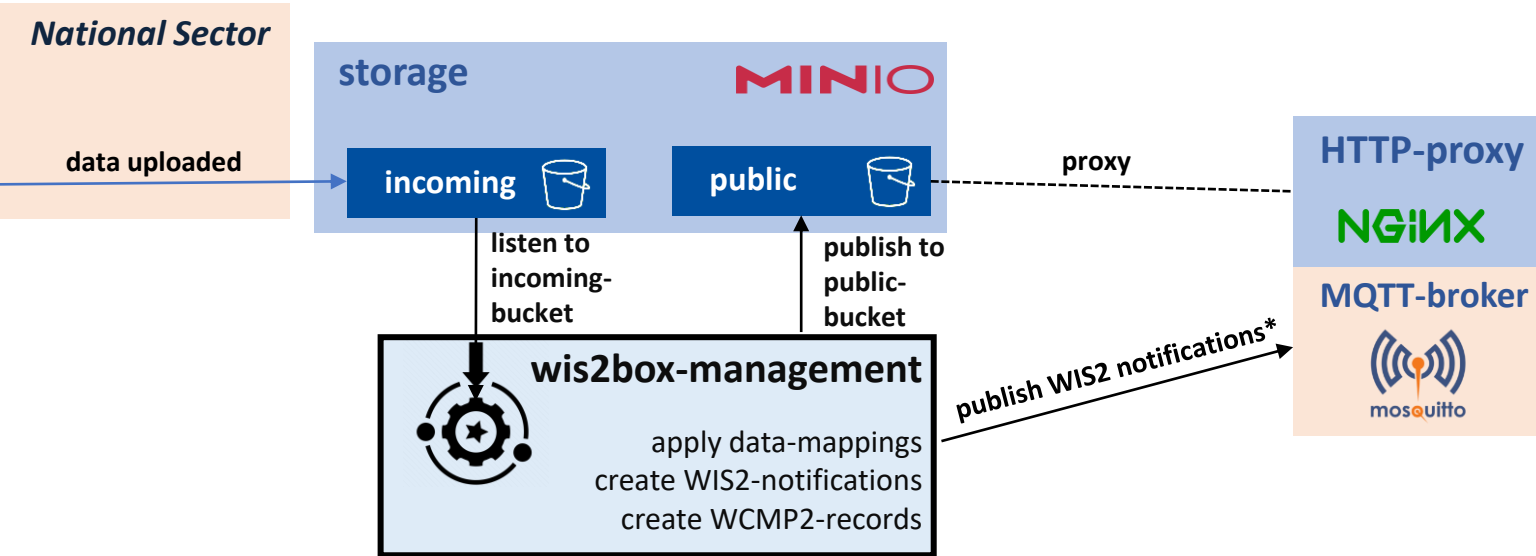
wis2box is correctly configured if:

- 1. WIS2 data notification is published on your MQTT-endpoint after you upload (new) data**
- 2. The data-URL in your WIS2 data notification enables you to download the (converted) data**

Both steps should function from an external network (outside your internal network)



1. Check MQTT Notification



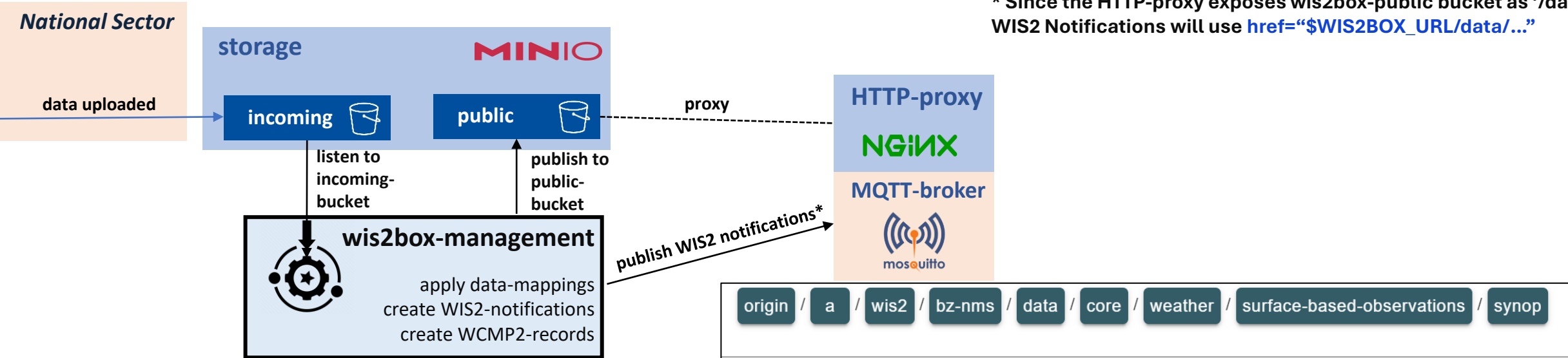
Use MQTT explorer to see the WIS2-notifications for your data

The screenshot shows the MQTT Explorer interface with the following structure:

- MQTT Explorer
- ▼ wiscaribbeancmo.org
 - ▼ origin
 - ▼ a
 - ▼ wis2
 - ▶ **bz-nms** (2 topics, 95 messages)
 - ▶ sx-metservice (2 topics, 17 messages)
 - ▶ lc-metservice (2 topics, 15 messages)
 - ▶ gy-hydromet (2 topics, 15 messages)
 - ▶ ms-metservice (2 topics, 16 messages)
 - ▶ gd-metservice (2 topics, 16 messages)
 - ▶ bs-metservice (2 topics, 29 messages)
 - ▶ vc-metservice (2 topics, 11 messages)
 - ▶ kn-metservice (2 topics, 12 messages)
 - ▶ dm-dms (2 topics, 14 messages)
 - ▶ jm-msj (2 topics, 7 messages)
 - ▶ vg-metservice (2 topics, 10 messages)
 - ▶ tc-metservice (2 topics, 11 messages)
 - ▶ ky-cinws (2 topics, 15 messages)
 - ▶ ai-metservice (1 topic, 1 message)
 - ▶ sr-metservice (1 topic, 1 message)
 - ▶ ag-antiguamet (1 topic, 1 message)

2. Check data can be downloaded

* Since the HTTP-proxy exposes wis2box-public bucket as '/data', WIS2 Notifications will use href="\$WIS2BOX_URL/data/..."



Find the data-URL in your notification and check it enables you to download the data

```
origin / a / wis2 / bz-nms / data / core / weather / surface-based-observations / synop
```

Value

QoS: 0
06/04/2026 4:46:18 PM

```
},  
  "wigos_station_identifider": "0-20000-0-78583"  
},  
"links": [  
  {  
    "rel": "canonical",  
    "type": "application/bufr",  
    "href": "https://wiscaribbeancmo.org/data/2026-06-04/wis/urn:wmo:md:bz-nms:belize-hour",  
    "length": 316  
  },  
  {  
    "rel": "via",
```

Check data publication history

You may need to check if your data was published retroactively

(without having had an active MQTT-subscription at the time...)

wis2box stores the published notification for each dataset in the API-backend


Check messages using monitoring page in wis2box-webapp

Check messages using the link to the oapi-endpoint on the wis2box homepage

Maaike's test dataset for for wis2box-training

Topic: origin/a/wis2/maaike-test/data/recommended/weather/experimental/wis2box-training


Metadata Identifier: urn:wmo:md:maaike-test:wis2box-training

LICENSE  METADATA  **MESSAGES **

WIS2 Notifications Monitoring Dashboard

Dataset Identifier: urn:wmo:md:maaike-test:wis2box-training

Maaike's test dataset for for wis2box-training!

2026/06/04 14:49 - 2026/06/04 15:50 × WSI 100 UPDATE 

Choose the datetime range for the notifications (default: previous 24 hours) Search a WMO Station Identifier (optional) Limit



Notifications

Total number of publications with selected features: **61**

Number of publications per station:

Published Data

Search for a file...

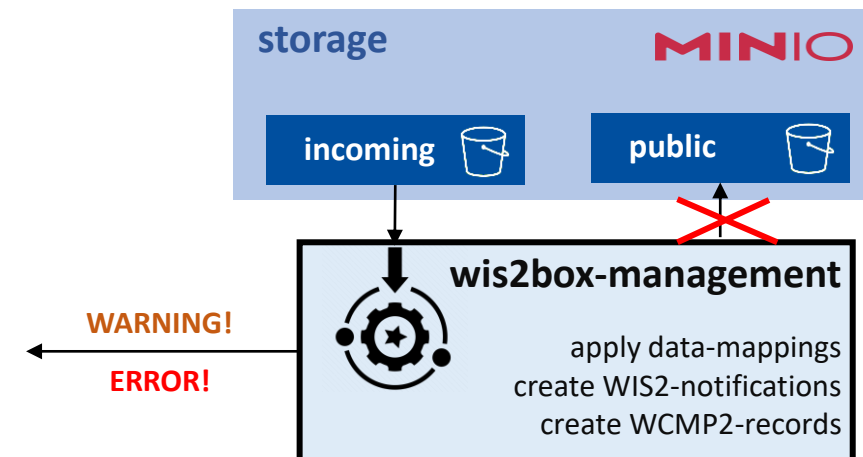
2026/06/04 13:49 UTC example_20260604T134902.txt	DOWNLOAD 
2026/06/04 13:48 UTC example_20260604T134801.txt	DOWNLOAD 

Debugging issues

If no MQTT notifications are made after you ingested some (new) data, something it is going wrong !

Various issue may prevent wis2box from successfully publishing data ...

- One or more docker containers in the wis2box-stack are unhealthy or down
- Incorrect credentials are used when uploading data to MinIO
- File-path of incoming data can not be matched with any configured dataset
- Filename of incoming data does not match file-pattern for any configured data plugin
- Transformation of incoming data fails, for example:
 - synop2bufr: FM-12 invalid, or TSI not found in station-list, or can not parse year/month from file-pattern
 - csv2bufr: input CSV does not match columns in mapping-template, or value out of bound, or location in data does not match location of station
 - for all BUFR-plugins: the station is not associated to topic of the dataset in station metadata
 - bufr2bufr: input BUFR can not be decoded, or station-id missing, or location missing
 - CAPMessageData: input data does not match CAP v1.2 schema
 - UniversalData: can not parse datetime from file-pattern
- Same data is uploaded twice, discarded as duplicate



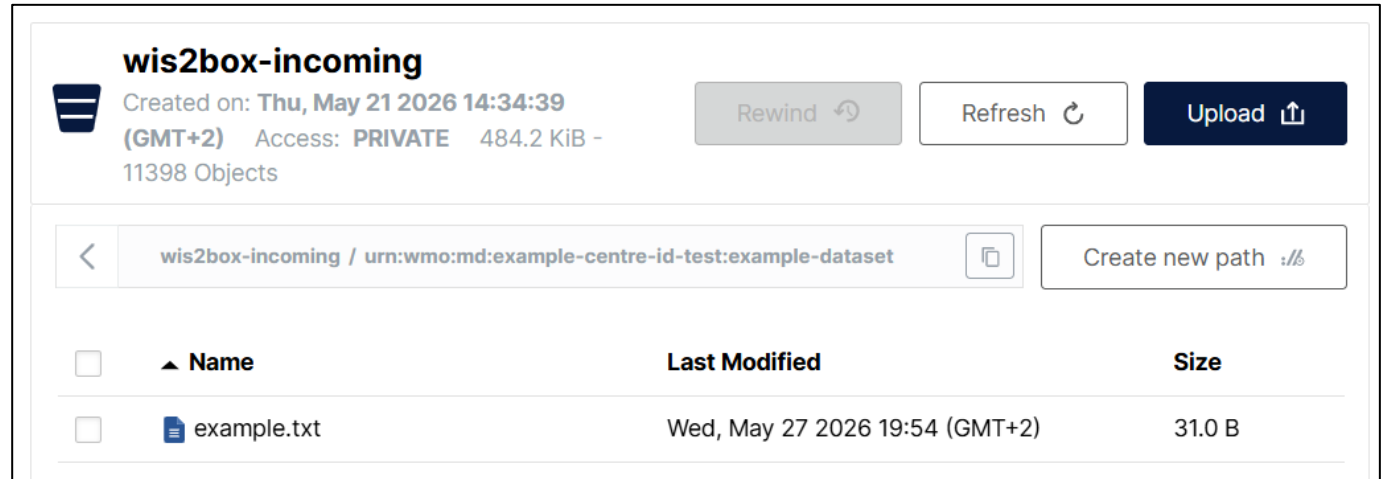
Debugging wis2box: the basics

Check that your container are running and healthy using “python3 wis2box-ctl.py status”

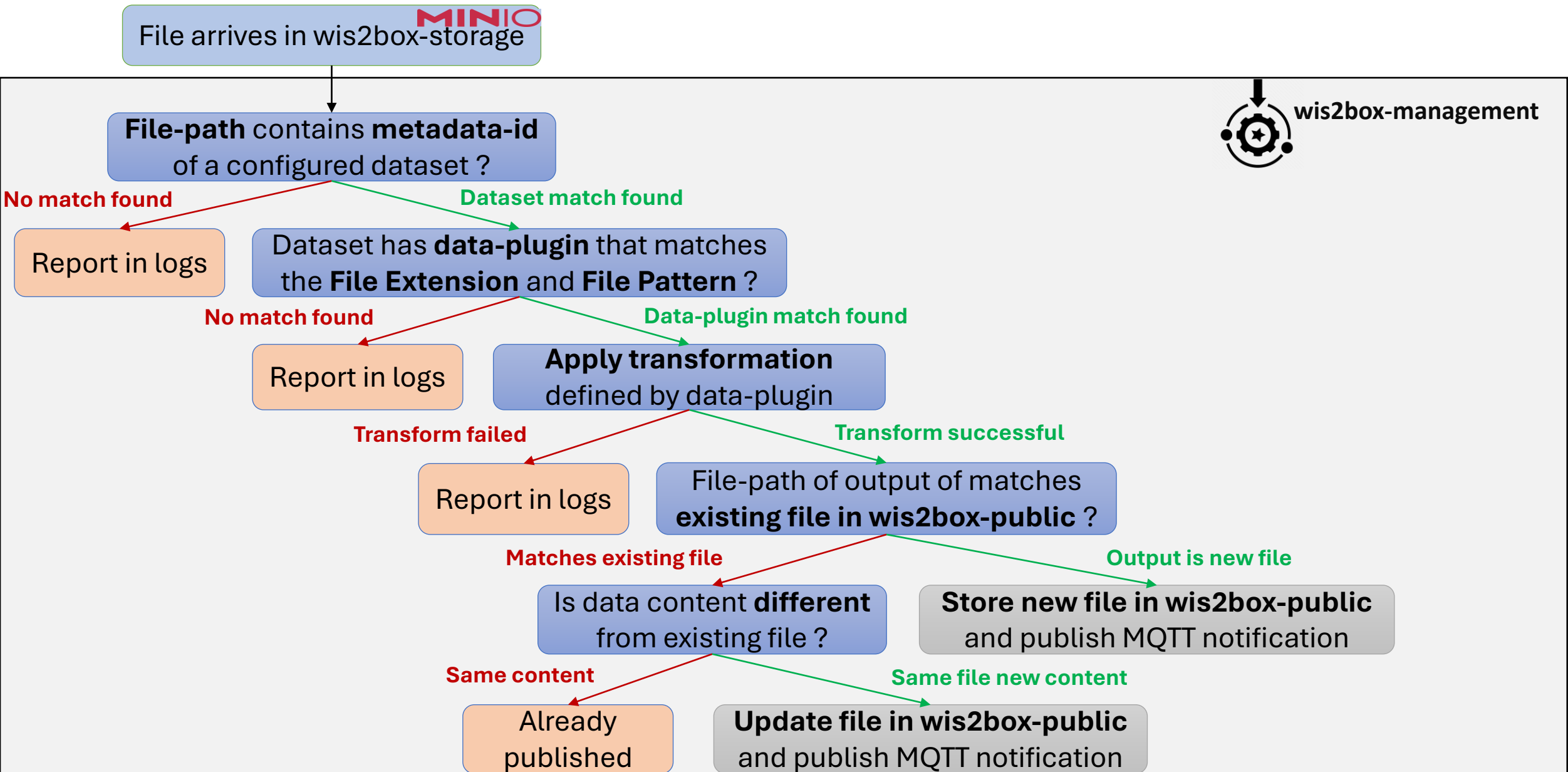
- If wis2box-management is not running no data uploaded in MinIO will be processed
- Watch out for containers that are restarting
- ElasticSearch container will become unhealthy when your host is low on disk-space

Be careful when editing wis2box.env manually as certain configuration changes can break the stack
Any changes in wis2box.env require a restart of the wis2box-stack before they take effect

When uploading data to MinIO, **check that data arrived in “wis2box-incoming”**-bucket using the MinIO User Interface at `http://<wis2box-host>:9001` login using WIS2BOX_STORAGE_USERNAME and WIS2BOX_STORAGE_PASSWORD
If no data arrived check for errors reported on the sender side ..



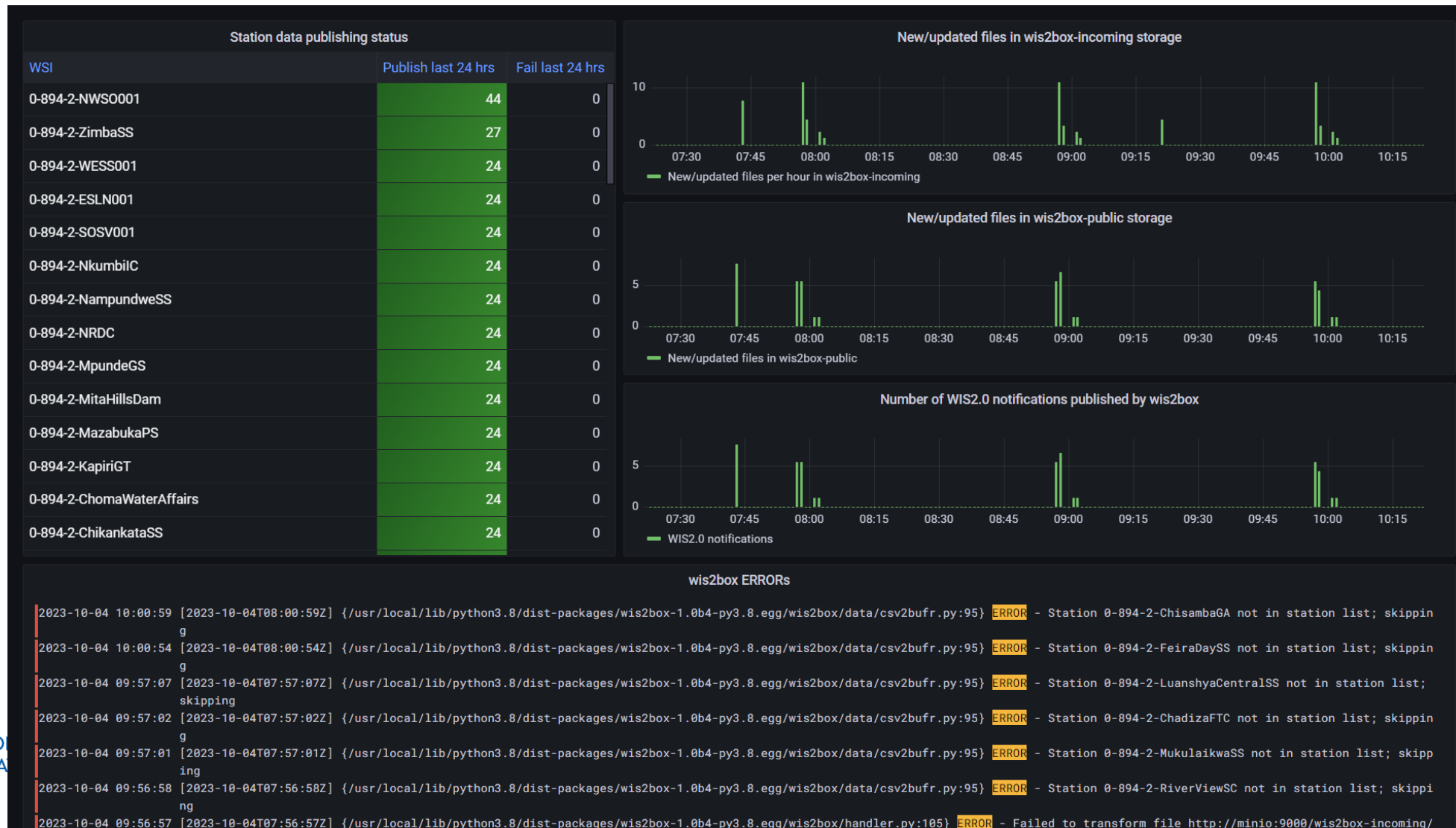
wis2box data publishing workflow



Monitoring the wis2box data workflow: Grafana

Grafana home dashboard available at <http://<wis2box-host>:3000>

Grafana data-sources: **Prometheus** (time-series metrics) and **Loki** (logs)



Exploring logs stored in Loki

'explore' option In Grafana sidebar

The screenshot displays the Grafana Explore interface. The sidebar on the left contains the 'Explore' icon, which is highlighted with a yellow box. The main panel shows the 'wis2box-loki' data source selected. The 'Labels' section is configured with 'container_name = wis2box-management', also highlighted with a yellow box. The 'Raw query' section contains the query: `{container_name="wis2box-management"} |>`. The 'Log volume' chart shows a bar chart of log volume over time. The 'Logs' section displays a list of log entries with various fields and timestamps. The 'Run query' button is highlighted with a yellow box. The 'Start of range' button is also visible in the bottom right corner.

wis2box-loki as a data source
select container
run query

Log volume

Logs

Common labels: wis2box_project wis2box-management wis2box-management ip-172-31-33-112 stdout Line limit: 1000 reached, received logs cover 1.88% (1min 8sec) of your selected time range (1h) Total bytes processed: 500 kB

```
> 2023-10-04 13:57:09 [2023-10-04T11:57:09Z] {/usr/local/lib/python3.8/dist-packages/wis2box-1.0b4-py3.8.egg/wis2box/pubsub/subscribe.py:46} INFO - Data processed
> 2023-10-04 13:57:09 [2023-10-04T11:57:09Z] {/usr/local/lib/python3.8/dist-packages/wis2box-1.0b4-py3.8.egg/wis2box/data/base.py:195} INFO - Publishing output data
> 2023-10-04 13:57:09 [2023-10-04T11:57:09Z] {/usr/local/lib/python3.8/dist-packages/wis2box-1.0b4-py3.8.egg/wis2box/data/csv2buf.py:95} ERROR - Station 0-894-2-LuanshyaCentralSS not in station list; skipping
> 2023-10-04 13:57:09 [2023-10-04T11:57:09Z] {/usr/local/lib/python3.8/dist-packages/wis2box-1.0b4-py3.8.egg/wis2box/metadata/station.py:257} INFO - Validating WIGOS Station Identifier: 0-894-2-LuanshyaCentralSS
> 2023-10-04 13:57:09 [2023-10-04T11:57:09Z] {/usr/local/lib/python3.8/dist-packages/csv2buf/_ininit_.py:909} INFO - 2023-10-04T11:57:09.335450+00:00|{'id': 'WIGOS_0-894-2-LuanshyaCentralSS_20231004T115400', 'geometry': {'type': 'Point', 'coordinates': [28.41, -13.14]}, 'properties': {'md5': '272c3fedeaee11d6463e34afb0abd5d1', 'wigos_station_identifier': '0-894-2-LuanshyaCentralSS', 'datetime': datetime.datetime(2023, 10, 4, 11, 54), 'origin_ating_centre': 0, 'data_category': 0}, 'result': {'code': 1, 'message': '', 'errors': []}}
> 2023-10-04 13:57:08 [2023-10-04T11:57:08Z] {/usr/local/lib/python3.8/dist-packages/wis2box-1.0b4-py3.8.egg/wis2box/pubsub/subscribe.py:43} INFO - Processing http://minio:9000/wis2box-incoming/zmb/zambia_met_service/data/core/weathe
r/surface-based-observations/synop/CR1000X_48229_20231004T135500Z.csv
> 2023-10-04 13:57:08 [2023-10-04T11:57:08Z] {/usr/local/lib/python3.8/dist-packages/wis2box-1.0b4-py3.8.egg/wis2box/pubsub/subscribe.py:49} INFO - Public filepath: wis2box-public/2023-10-04/wis/zmb/zambia_met_service/data/core/weathe
r/surface-based-observations/synop/WIGOS_0-894-2-NWS0001_20231004T115400-105.geojson
```

Monitoring and debugging data-flow in wis2box

After configuring dataset in wis2box, ingest data to trigger the data publication process

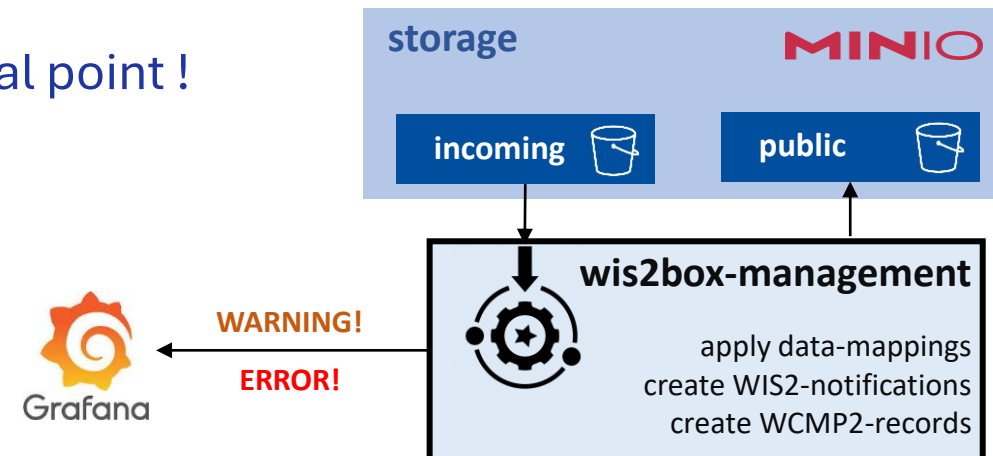
Check that your data is successfully published:

- Subscribe to our MQTT-endpoint using an MQTT-client (such as MQTT explorer)
- Check the data-URL enables you to download the data
- ... or check retro-actively by querying the messages-collection

If no data is published:

- Check your wis2box stack is running correctly
- Check for errors reported while sending the data
- Check data was received in MinIO
- Check for errors and warnings in Grafana

If all else fails ... contact your regional WIS2 support focal point !



Thank you.



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