Introducing WIS2 in a box (wis2box)

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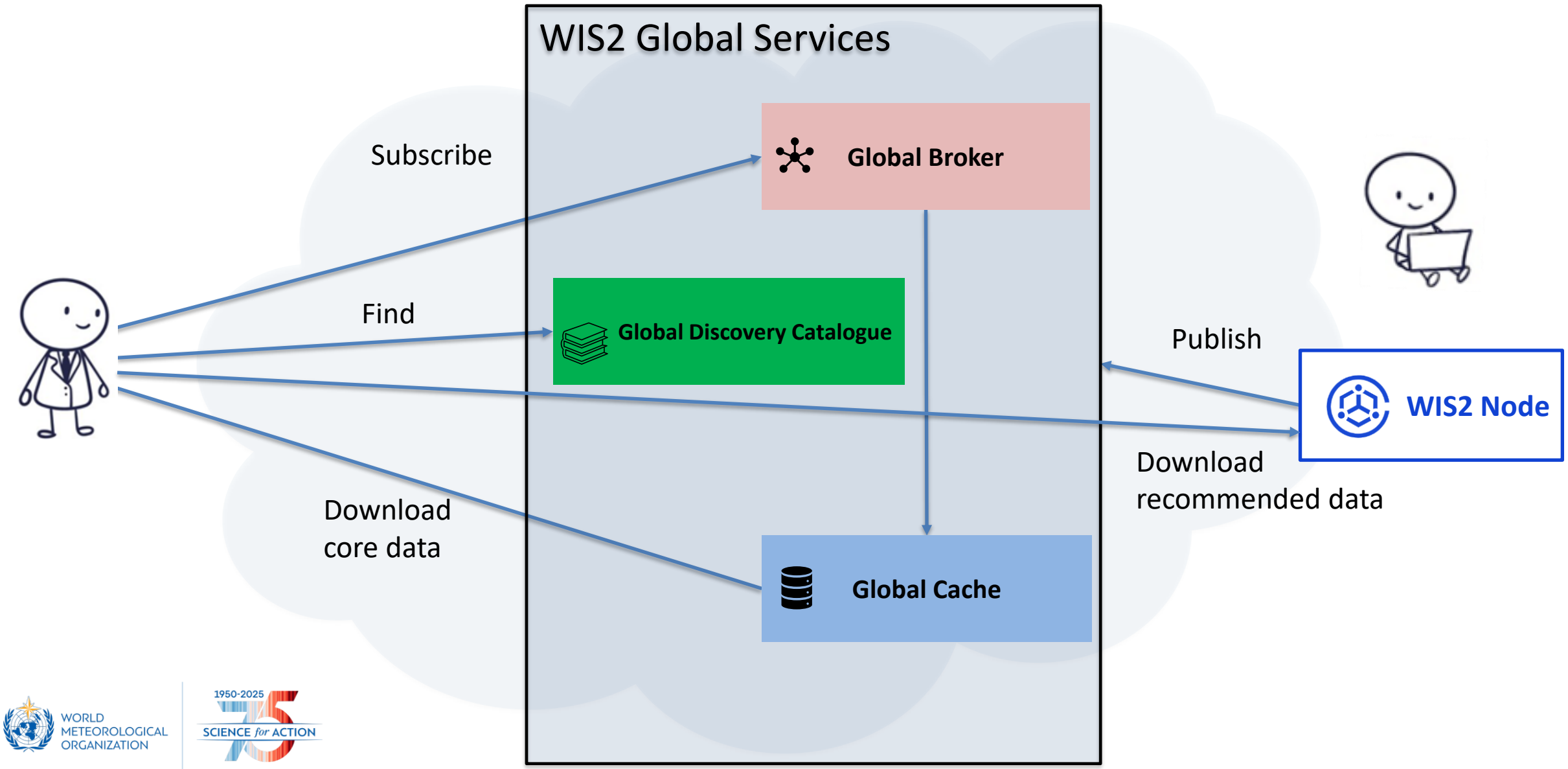
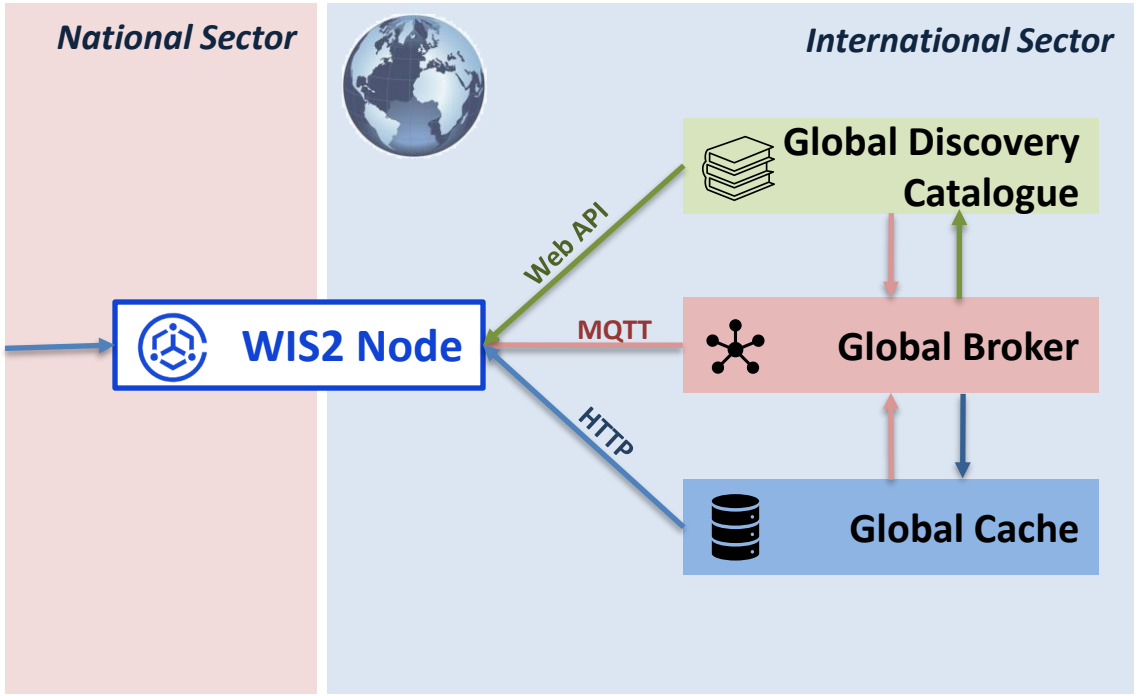
WIS2 recap


WIS2 Global Services
Global Broker
Global Discovery Catalogue
Global Cache
Subscribe
Find
Download
core data
Publish
Download
recommended data
WIS2 Node

Reminder: What is a WIS2 Node?

A WIS2 Node is composed of 2 endpoints that need to be exposed over the public Internet:

- **MQTT broker**: to publish WIS2 notifications for metadata and data
- **HTTP storage endpoint**: to enable the download of data files and metadata records



Global Discovery Catalogues download all valid WCMP2 records from the HTTP-endpoint for notifications on topic=*origin/a/wis2/+/metadata*

Global Brokers subscribe to topic=*origin/a/wis2/<centre-id>/#* on the WIS2 Node MQTT broker, and republishes all valid WIS2-notifications

Global Caches download data from the HTTP-endpoint for all notifications on topic=*origin/a/wis2/+/data/core/#*

MQTT topic defined by the WIS2 Topic Hierarchy (WTH) standard
Discovery Metadata records defined by WCMP2 standard
MQTT payload defined by the WIS2 Notification Message (WNM) standard

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What is WIS2 in a box?

- WIS2 in a box (wis2box) is a Reference Implementation of a WIS2 Node
- Developed as Docker Compose stack using existing Free and Open Source implementations and wis2box-specific components
- Free Open-Source Software (FOSS) github.com/World-Meteorological-Organization/wis2box
- Developed by WMO in collaboration with Canada to help accelerate the implementation of WIS 2.0
- Designed to be cost-effective and low-barrier to operate
- **Currently over 45 WMO-Members are using wis2box to share data on WIS2**

wis2box hosting requirements:

- minimum 2 vCPUs with 4GB Memory and 24GB of local storage
- requires Python, Docker and Docker Compose pre-installed
- HTTP and MQTT ports routed to a publicly accessible address
- See documentation at https://docs.wis2box.wis.wmo.int

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WIS2 in a box is Free and Open

Free and Open Source Software

NGINX
Leaflet
Vue.js
Grafana
pygeoapi
CODES
elasticsearch
MINIO
mosquitto
docker

Open Standards

W3C
ISO
IETF

- MQTT
- GeoJSON
- OGC APIs

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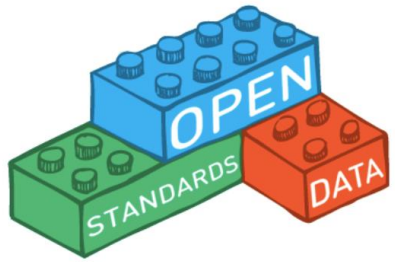
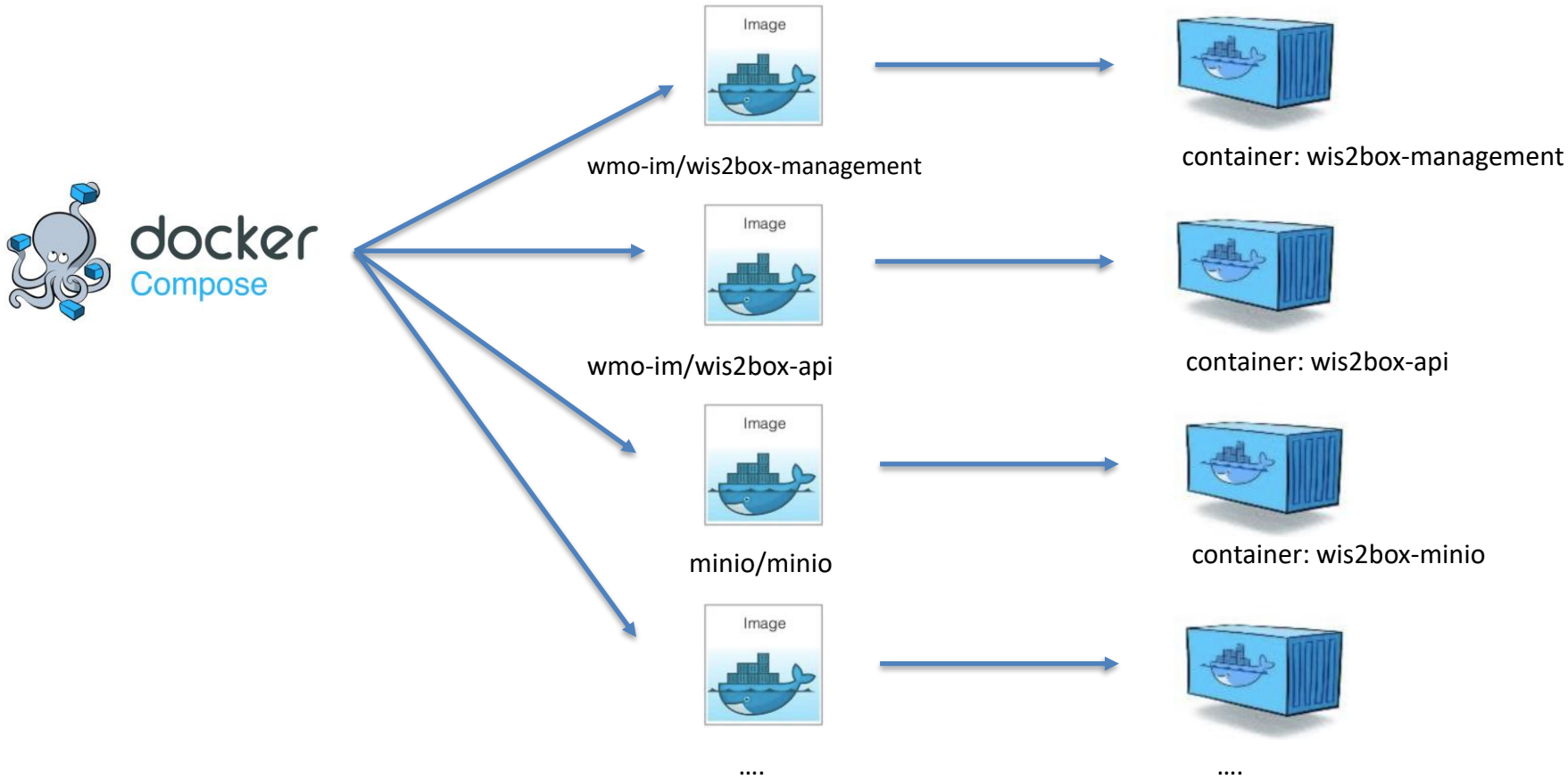


Docker and Docker Compose

wis2box uses Docker and Docker Compose to define a set of services

Using pre-built Docker images to create containers providing a specific service

NOTE: you do not need to be familiar with Docker to run wis2box



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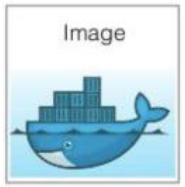
WIS2 in a box software dependencies



Why is wis2box composed as a set of Docker images?

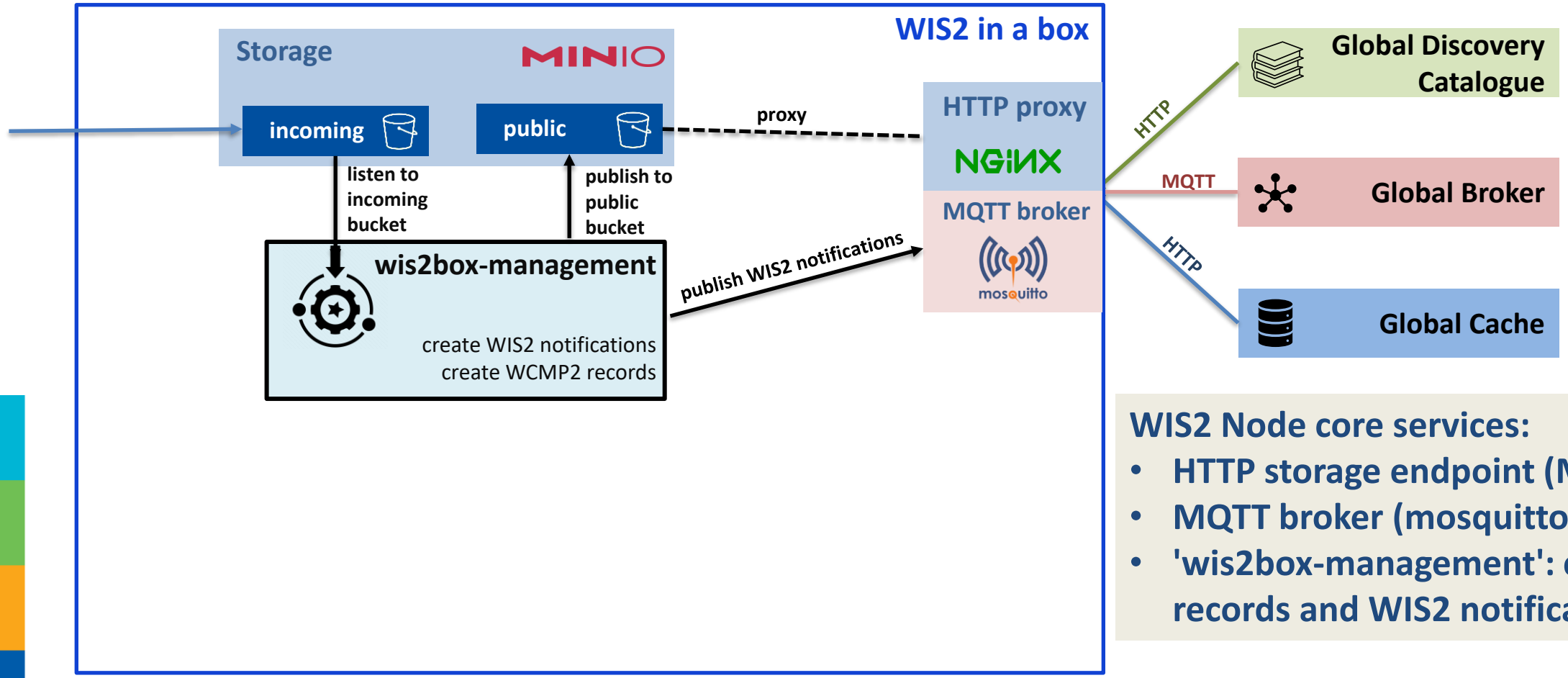
- Docker images contain all necessary dependencies, libraries, and binaries required to run the service
- Docker images are portable, and can run on any system with Docker installed, regardless of underlying hardware or operating system
- Docker images provide process and resource isolation, enhancing security

The Python script `wis2box-ctl.py` provides a wrapper around Docker Compose commands to interact with wis2box

Software required on the host to run wis2box:

- **Python**
- **Docker**
- **Docker Compose**

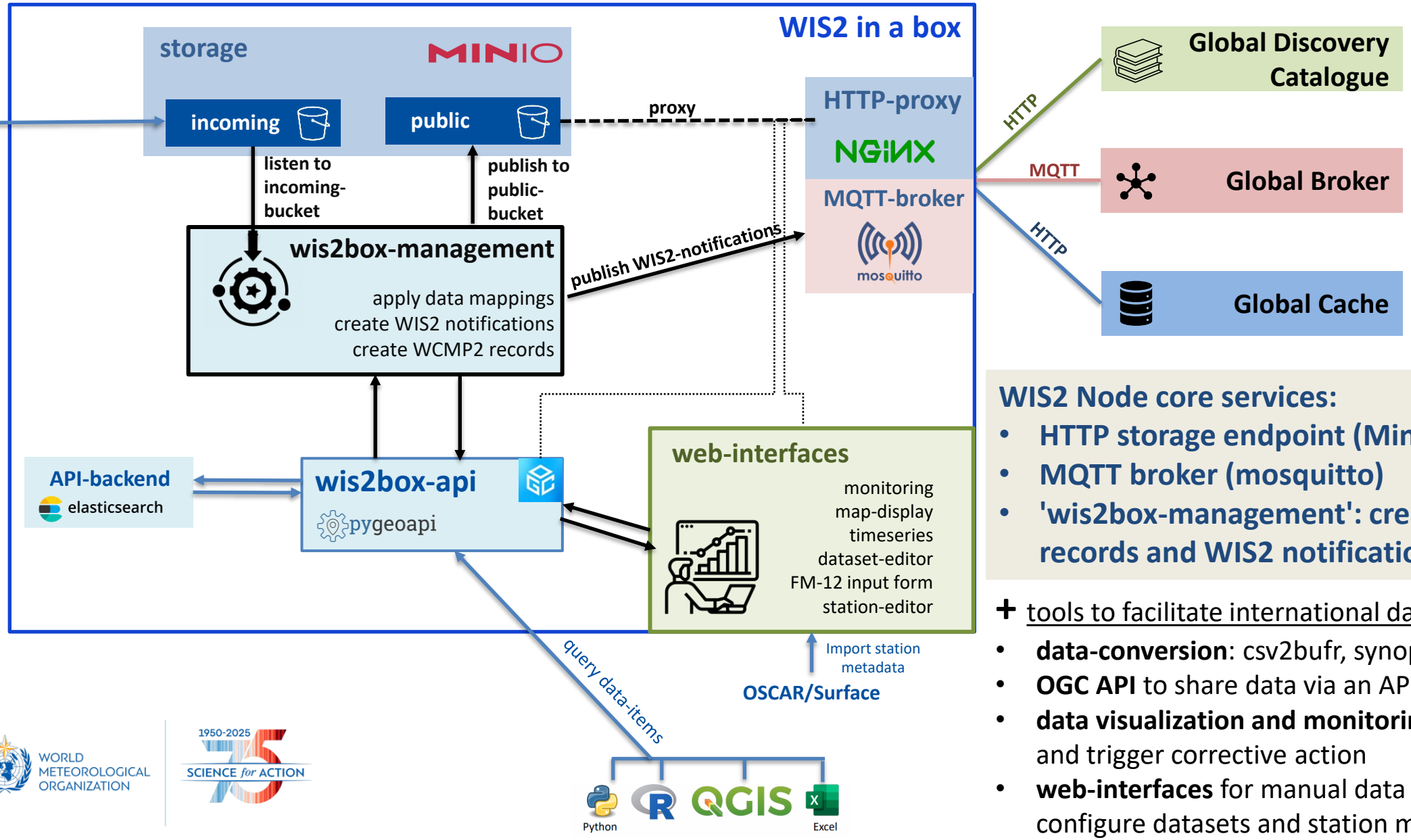
WIS2 in a box core services



WIS2 Node core services:

- **HTTP storage endpoint (MinIO)**
- **MQTT broker (mosquitto)**
- **'wis2box-management': create WCMP2 records and WIS2 notifications**

WIS2 in a box additional services



WIS2 Node core services:

- **HTTP storage endpoint (MinIO)**
- **MQTT broker (mosquitto)**
- **'wis2box-management': create WCMP2 records and WIS2 notifications**

\+ <u>tools to facilitate international data sharing</u>:

- **data-conversion**: csv2bufr, synop2bufr, bufr2bufr
- **OGC API** to share data via an API
- **data visualization and monitoring** to detect issues and trigger corrective action
- **web-interfaces** for manual data input (FM-12/CSV), configure datasets and station metadata

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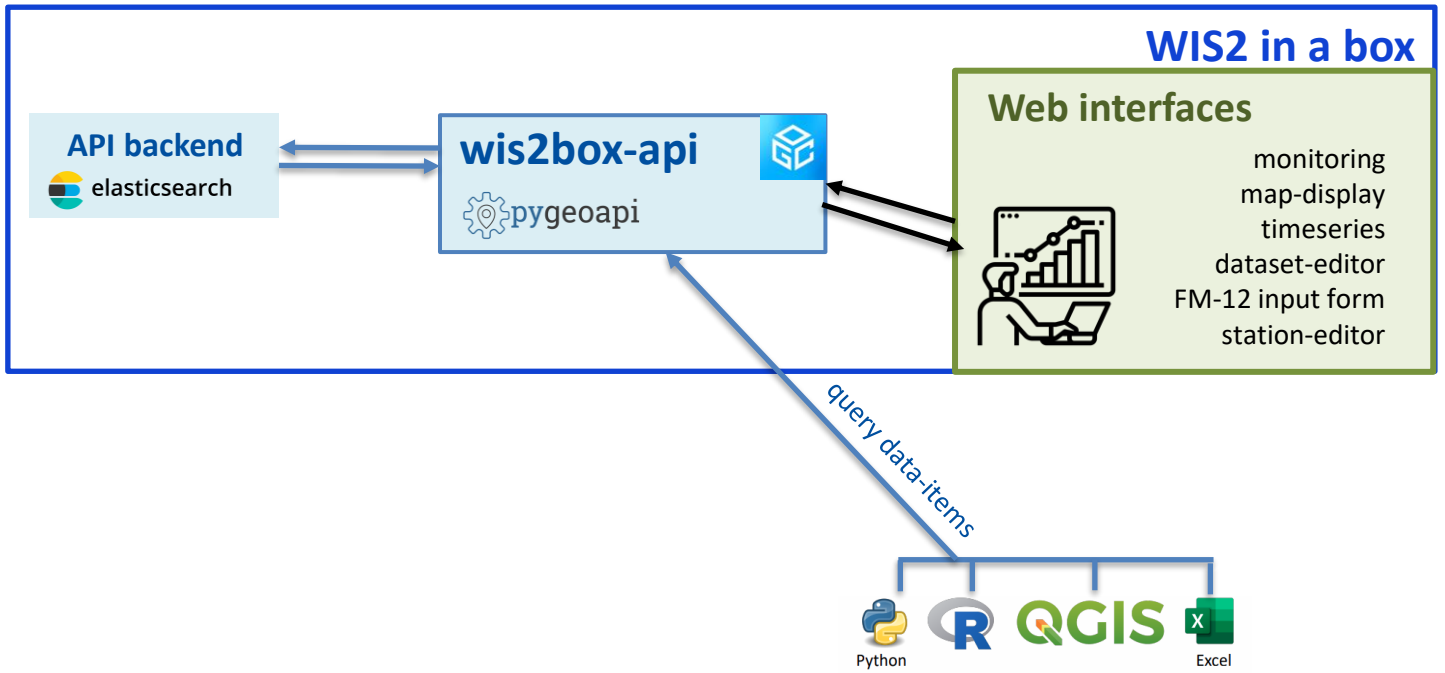
wis2box-api (Geospatial Web API)

wis2box-api provides a **Application Programming Interface** (API) within wis2box
built using **pygeoapi**: a Free and Open Source project that provides an OGC Reference Implementation of the **OGC API** standards:

- OGC API – Processes to provide additional data processing functionality
- OGC API – Features to datasets/collections stored in backend
- OGC API – Records for WCMP2 records stored in backend

Open Geospatial Consortium

wis2box-api enables users and web-interfaces to query data items programmatically using a Geospatial Web API



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Summary

wis2box is a Free and Open Source Reference Implementation of a WIS2 Node

- Developers can freely use components used inside of wis2box to adapt existing systems to be WIS 2.0 compliant
- Source code: github.com/World-Meteorological-Organization/wis2box
- **Feedback by the community is appreciated to help improve wis2box**

wis2box is software not hardware

- To be deployed on a host with Python, Docker and Docker Compose pre-installed
- Documentation: docs.wis2box.wis.wmo.int

Thank you
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