WIS2 Operations: Operating a WIS2 Node & the role of GISC in WIS2

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Introduction

As of the operational phase of WIS2 in 2025, the role of WIS Centres* has evolved

- **NCs and DCPCs operate WIS2 Nodes to share their data**
- GISCs provide support for WIS2 to all NCs and DCPCs in their Area of Responsibility

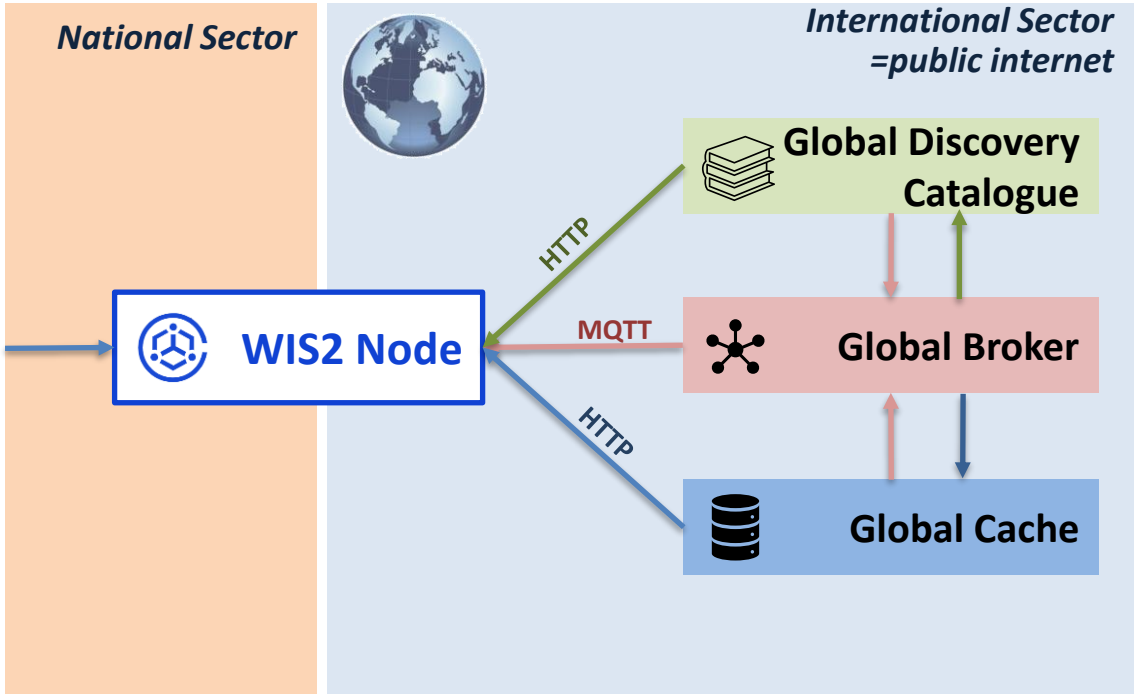
**WIS Centres types:*

- *Global Information System Centre (GISC)*
- *National Centre (NC)*
- *Data Collection or Production Centre (DCPC)*

Operating a WIS2 Node: security recommendations

The 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 endpoint: to enable the download of data files and metadata records



Security recommendations:

- Only open ports for HTTP and MQTT to external connections
- Read-only access to HTTP and MQTT
- Encrypt HTTP and MQTT using TLS
- Use firewall limit access to trusted incoming connections (Global Services and local partners)

Operating a WIS2 Node: hosting considerations

ON-PREMISE

- hosting services provided by local servers
- managed by local IT service
- accessible over the local network

VS

CLOUD

- hosting services provided by remote servers
- managed by a 3rd party
- accessible over the Internet

Public Cloud: Remote servers hosted by commercial cloud service providers, for example: Amazon Web Services, Microsoft Azure or Google Cloud Platform

Private Cloud: Remote servers hosted in a private data centre, for example: European Weather Cloud or GISC Casablanca

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Preferred hosting solution depends on local IT infrastructure of the NC/DCPC

WIS Centres with limited IT capacity are advised to use (private) cloud

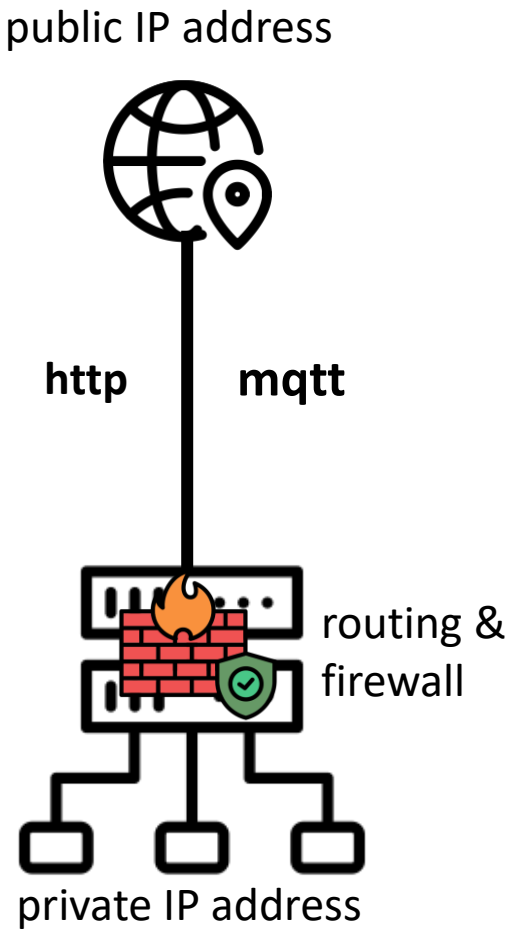
Network and security

Traffic of your WIS2 node needs to be routed to a public IP address

Incoming connections limited to MQTT and HTTP ports

Cloud: use cloud interface to request a public IP address and manage the allowed incoming connections via security groups

On-premise: work with local IT/Network Team to provide public IP address and manage routing and firewall

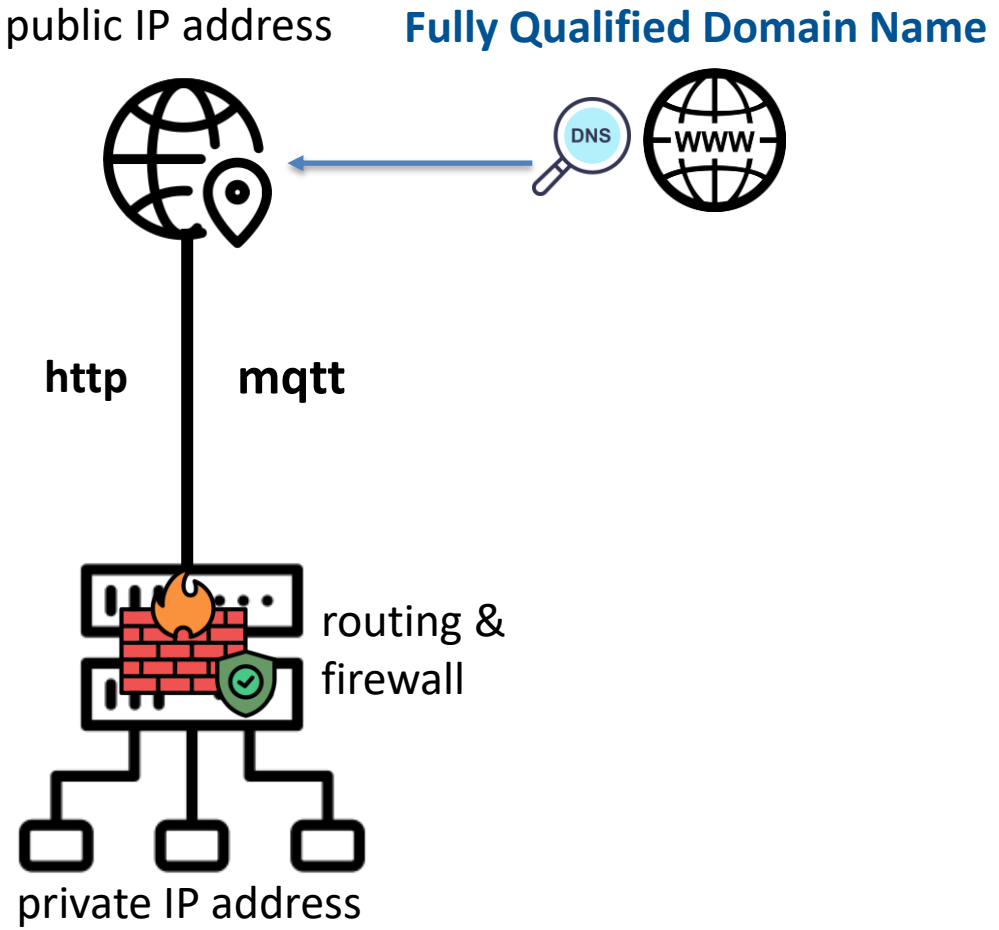


Setting up a web address for your WIS2 Node

An FQDN (Fully Qualified Domain Name) specifies the **web address** for your WIS2 Node

Coordinate with your IT/Network Team:

- Choose a specific subdomain for your WIS2 node on your organization primary domain: e.g *wis2node.knmi.nl*
- Request to create a DNS record pointing the subdomain to the public IP address of your WIS2 Node



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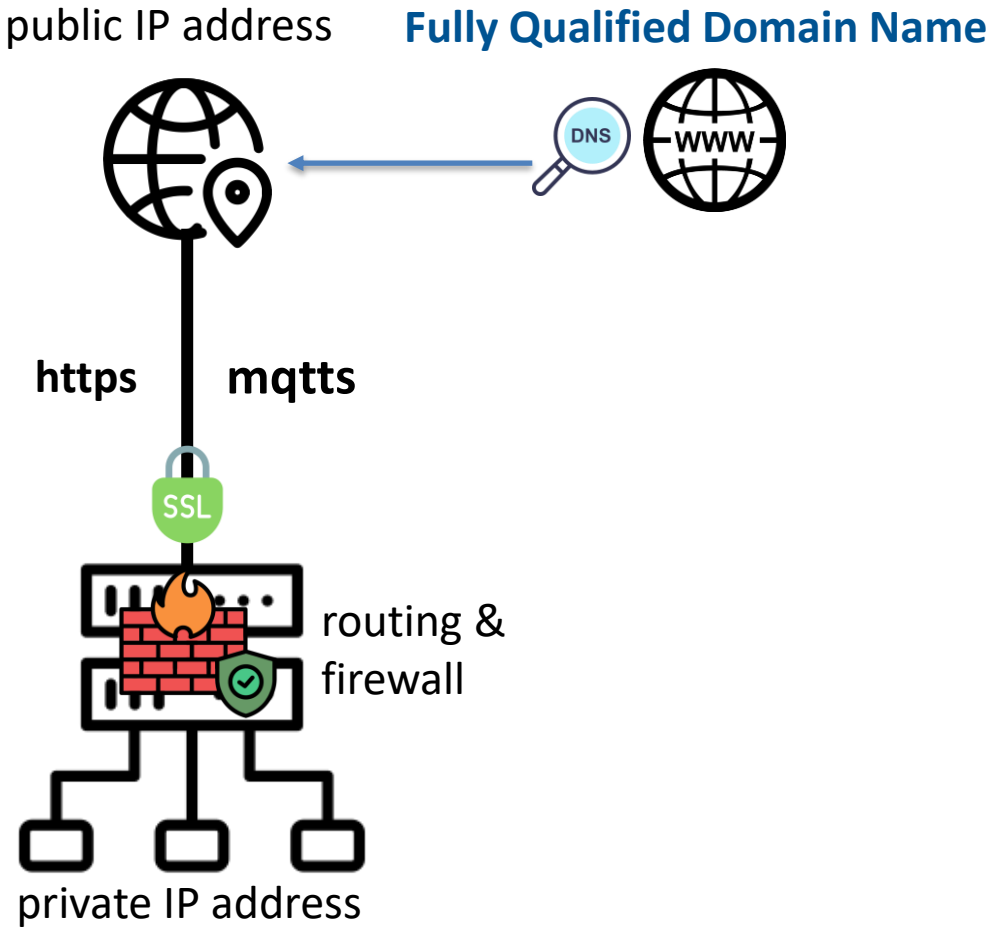
TLS/SSL Certificates for HTTP and MQTT encryption

Use TLS/SSL certificates to encrypt your data and ensure clients can validate the identify of your host

Purchase an TLS/SSL certificates from a trusted Certificate Authority (CA) or use a free CA like Let's Encrypt

TLS/SSL certificates can be installed in a proxy routing the HTTP traffic from your wis2box-host to the public Internet

wis2box can use TLS/SSL certificates installed in your host (see wis2box documentation)



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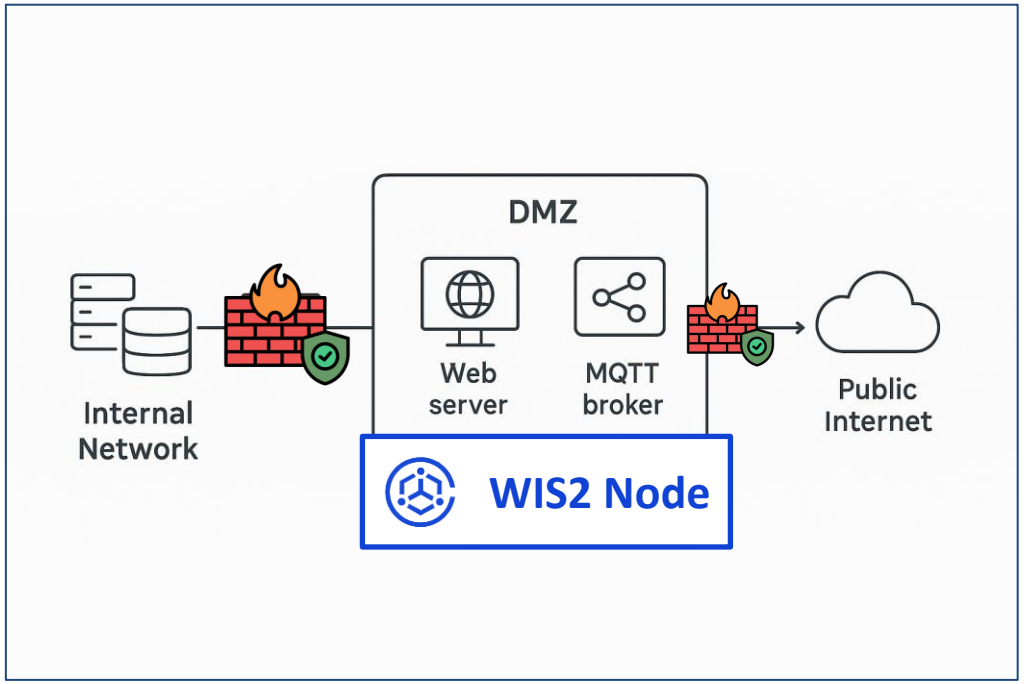
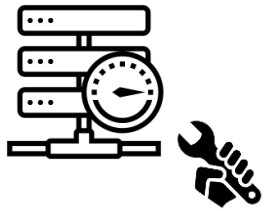
Network isolation

A WIS2 Node is ideally hosted in a DMZ (DeMilitarized Zone) to isolate the WIS2 external-facing services from the internal network



Operating a WIS2 Node: Maintenance and monitoring

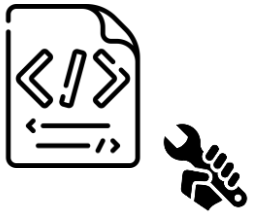


Host monitoring:

- Uptime
- Internet access
- CPU and memory
- Disk usage

Software updates:

- WIS2 Node software (e.g. wis2box, IBL MW …)
- host operating system
- any other software dependencies



WIS2 Node configuration updates:

- Datasets and associated discovery metadata
- Station list and associated WIGOS station metadata
- Regularly review data quality of published data

WIS2 Operation Model & the role of GISCs in WIS2

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The role of GISCs in WIS2

As of the operational phase of WIS2 in 2025, the role of WIS Centres has evolved

- NCs and DCPCs operate WIS2 Nodes to share their data

- **GISCs provide support for WIS2 in their Area of Responsibility :**
  - ✓ **Support NCs** and **DCPCs** to establish their data sharing on WIS2
  - ✓ Perform **WIS2 Node Assessment** prior to WIS2 Node registration in Global Registry
  - ✓ **Ensure the smooth operation of data exchange in WIS2**, using the Global Monitoring tools and participating in the GISC Watch

For Designation Procedures for WIS Centres see:
Manual on WIS, Volume I, Part II, Page 16

For list of current NC/DCPC and affiliated GISC see:
https://community.wmo.int/en/wis-centres

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WIS2 Node Assessment

The principal GISC verifies that the WIS2 Node is compliant with WIS2 requirements. This assessment includes:

- Verification of **compliance of the topics used by the centre** with the WTH specification;
- Verification of **compliance of the notification messages** with the WIS2 Notification Message (WNM) specification;
- Verification that the **data server** is correctly configured and **properly functioning**;
- Verification that the **Message Broker** is correctly configured and **properly functioning**.

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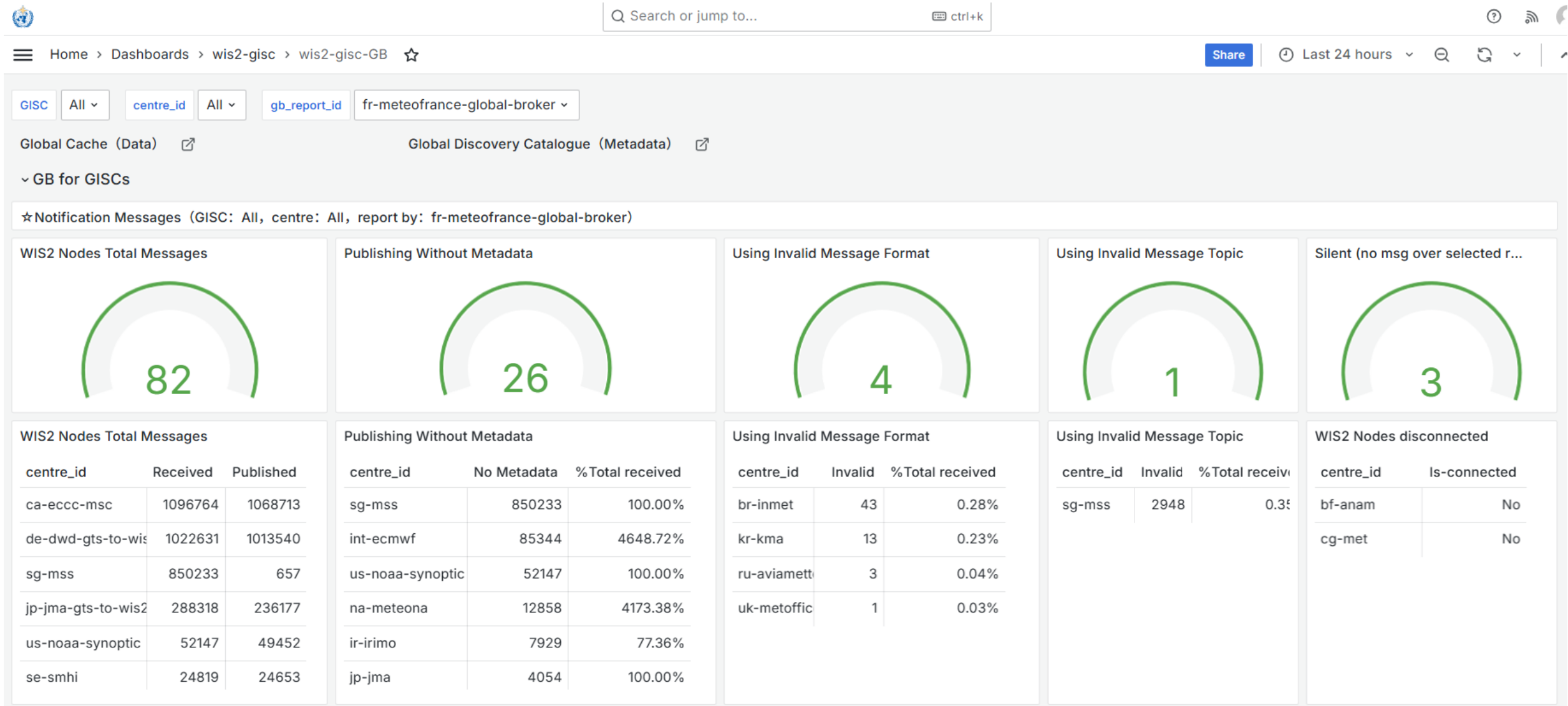
Guide to the WMO Information System, Volume II (WMO-No.10161), page 29

GISC Dashboards

Global Monitoring provides dashboards for GISCs to monitor WIS2 Operations:



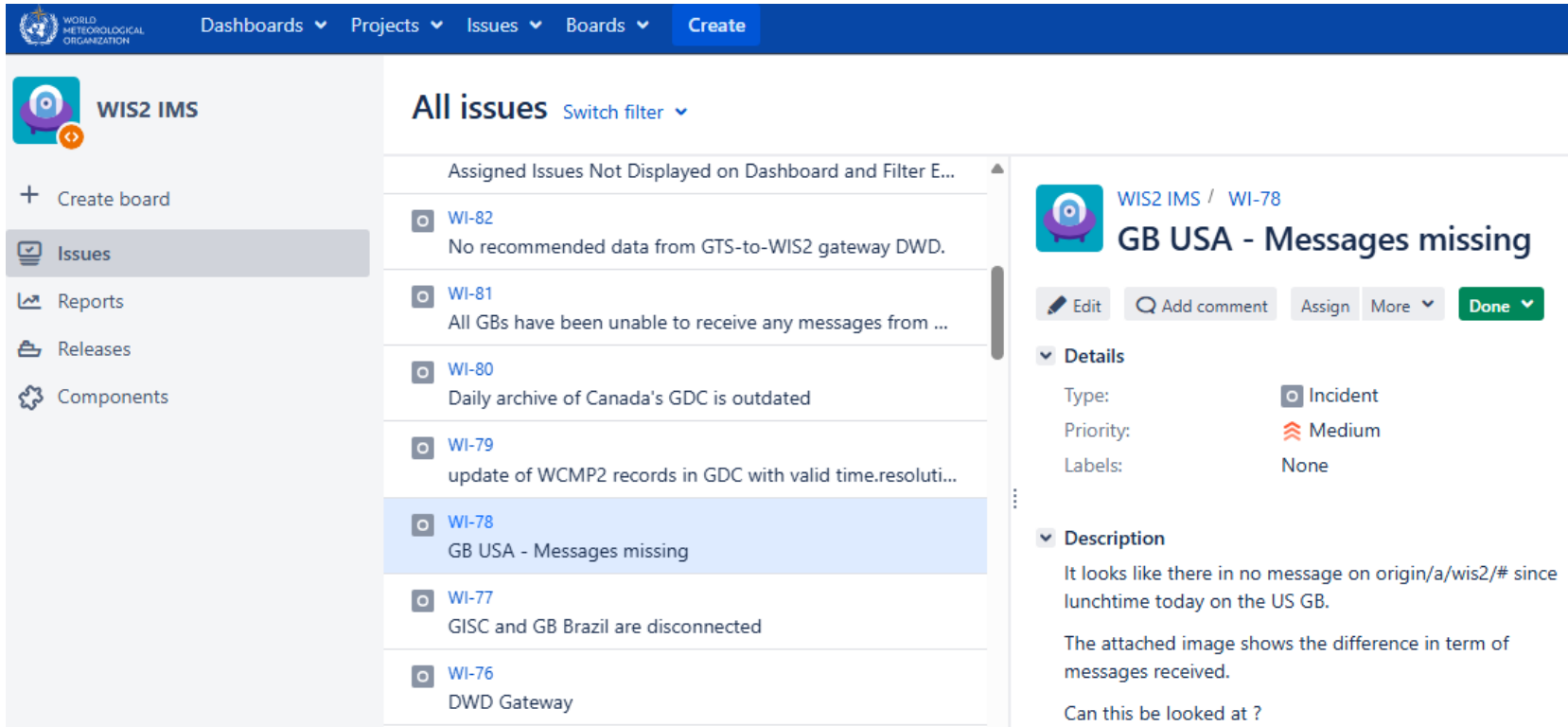
GISC Watch

New GISC Watch monitoring procedure launched in April 2025

- replacing the WIS1 Watch, which had been active from 2017 through 2024

New version of GISC Watch Guide (under development) adapting procedures originally developed for WIS1 to WIS2

GISC Watch follows-up on issues using the WIS2 Incident Management System



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Summary

GISCs support NCs and DCPCs in their WIS2 implementation

GISCs perform WIS2 Node assessment prior to registration in the Global Registry

GISCs continuously monitor WIS2 operations using Global Monitoring dashboard and participate in GISC Watch to follow-up on issues

New Expert Team in WIS2 “ET-WISOP” brings together all GISCs representatives to work consistently and coherently toward successfully implementing WIS 2.0