Annex II C

WMO Information System 2.0

Modernizing Data Sharing for all Earth Domains

# WIS 2.0 Introduction

The Global Telecommunication System (GTS) has served as the backbone of real-time World Meteorological Organization (WMO) data transmission since 1971. While this system has proven reliable over the decades, its basic technical foundations remained largely unchanged despite significant technological advancements. The emergence of high-bandwidth internet connectivity has created new opportunities for modernization through WIS 2.0, with most centers expected to migrate by 2030 and complete system transition by 2033.

WIS 2.0 is built upon three foundational pillars. The first is simpler data exchange, which prioritizes public telecommunication networks over private networks and uses web technologies for improved discovery, access, and utilization. It implements a "publish-subscribe" pattern similar to messaging applications and enables user-controlled access and licensing mechanisms. The second pillar focuses on open standards, leveraging existing frameworks to avoid niche market solutions and reduce barriers to access for WMO Members. The third pillar encompasses cloud-ready solutions, providing a reliable environment for data sharing and processing while reducing the need for expensive local IT infrastructure.

**From January 2025, WIS 2.0 is now fully operational.**

The Global Services component of WIS 2.0 comprises four essential elements. The Global Broker ensures the accessibility of new data and metadata announcements using the MQTT standard. The Global Cache provides quick and reliable access to core data by storing information from originating WIS2 Nodes and making it available to all users. The Global Discovery Catalogue manages metadata records for all datasets using the OGC API - Records standard and provides quality assessment capabilities. The fourth component, Global Monitoring provides a visual dashboard for monitoring and issuing alerts for unexpected events.

In terms of technical implementation, each WIS Centre operates a "WIS2 Node" for data transmission and reception. Each NMHSs must implement a WIS2 Node and must conduct a transition from GTS to WIS 2.0 in the defined period.

The goal is to achieve 90% member migration to WIS2 by 2030, with complete GTS decommissioning by 2033. In addition to the four Global Services, and for the duration of the transition, two additional Global Services will gateway the data from GTS to WIS 2.0 and vice-versa. This transition strategy allows centers to switch off GTS equipment shortly after migrating to WIS 2.0, without waiting for complete system migration.

The migration to WIS 2.0 supports the growing requirements in all WMO disciplines and domains associated with the WMO Unified Data Policy and the Global Basic Observing Network. With its modern architecture and emphasis on accessibility and efficiency, WIS 2.0 represents a significant step forward in global weather data sharing and collaboration.

# WIS2 Node Deployment: Implementation Guide

The implementation of a WIS2 Node represents a critical requirement for WIS Centers to provide data on WIS 2.0. This process demands careful consideration of multiple factors and requires a thorough understanding of the organization's capabilities, resources, and available support systems. The deployment strategy must be tailored to each center's specific context, as there is no universal solution that fits all situations. This document outlines the key considerations and steps necessary for successful implementation.

# Collecting data from Automatic Weather Stations

Before providing data on WIS 2.0, data must be collected from Automatic Weather Stations into a central database often called the Data Collection Platform. It is beyond the scope of this document to describe all potential technical solutions for this concentration. Nevertheless, it is important to take into account the ongoing activity within WMO on the standardization of data collection. By the end of 2025, the task team on 1st-mile data collection will provide its recommendations on the matter, before endorsement by INFCOM-4 in 2026.

# Software Solutions and Implementation Approaches

The selection of appropriate software forms the foundation of WIS2 Node deployment. Centers can choose from several options, each with distinct implications for both immediate and long-term operations. The existing open-source solution, known as WIS2 in box, eliminates upfront software costs but requires significant technical expertise for implementation and maintenance. Commercial software solutions, while potentially more user-friendly, involve both capital expenditure for initial purchase and operational expenses for licensing, support, and regular upgrades. Additionally, partner-provided solutions, such as those available through GISCs or other partner centers, often present a middle ground with minimal upfront costs while leveraging established systems.

Deployment models vary significantly based on organizational capacity and resources. Centers with strong technical capabilities might opt for self-deployment, managing the entire implementation process internally. This approach requires substantial expertise in Linux systems, network administration, and security protocols. Alternatively, centers can engage commercial contractors for deployment, ensuring professional implementation while potentially reducing technical burden on internal staff. Partner center deployment offers another viable path, particularly for organizations with limited technical resources.

# Infrastructure and Hosting Considerations

The choice of hosting environment significantly impacts the long-term success of WIS2 Node operations. Local hosting necessitates substantial investment in server infrastructure and ongoing maintenance costs. Organizations pursuing this option must ensure reliable power supply, robust internet connectivity, and appropriate environmental controls. The technical requirements extend beyond basic IT knowledge, demanding expertise in Linux systems, Docker containerization, and comprehensive security protocols.

Cloud hosting presents an alternative that shifts the focus from infrastructure management to operational expenses. While this option provides high service level agreements, centers must understand that even cloud solutions cannot guarantee 100% uptime. The cloud model often proves particularly beneficial for organizations lacking robust internal IT infrastructure or those preferring predictable operational costs over capital investments.

Community or partner hosting through GISCs or regional partners offers a hybrid approach. This model can provide the benefits of professional hosting while potentially reducing costs and complexity for individual centers. Many GISCs have developed sophisticated hosting solutions that centers can leverage, effectively distributing the technical burden across the community.

# Operational Models and Support Structures

The successful operation of a WIS2 Node extends beyond initial deployment to encompass ongoing maintenance and support. Centers must carefully evaluate their operational model based on available resources and technical capabilities. Organizations with strong internal technical teams might successfully manage self-operated nodes, provided they can maintain 24/7 operational coverage and handle all aspects of system maintenance and security.

For centers without comprehensive internal capabilities, outsourced operational models present viable alternatives.

Commercial support through Software as a Service (SaaS) arrangements or managed service contracts can provide reliable operations with predictable costs. Community support through GISCs or partner centers often offers similar benefits while potentially providing better alignment with WIS 2.0-specific requirements and standards.

# SOFF Context and Long-term Sustainability

The Systematic Observations Financing Facility (SOFF) context adds an important dimension to WIS2 Node implementation decisions. With continuous funding available through SOFF, centers should particularly consider externally hosted or supported solutions that can ensure reliable, long-term compliance with Global Basic Observing Network (GBON) requirements. The entire communication chain, from weather stations to the WIS2 Node, must maintain consistent reliability to meet these standards.

# Conclusion and Recommendations

While local hosting and operation might initially appear attractive, centers must carefully evaluate their technical capabilities and infrastructure reliability before pursuing this option. Experience suggests that externally hosted solutions or environments with strong external support often provide more reliable long-term operations. The availability of SOFF funding makes these options particularly viable, especially when considering the imperative of maintaining GBON compliance.

Success in WIS2 Node implementation depends on selecting a deployment model that aligns with the center's capabilities while ensuring long-term sustainability. Organizations should carefully consider their internal competencies in areas such as Linux administration, network management, and security protocols. Additionally, the reliability of local infrastructure, including internet connectivity and power supply, should factor heavily into the decision-making process.

Centers should leverage available support from GISCs and regional partners, particularly when local resources or expertise may be limited.

# References

The following documents provide essential guidance for the implementation, operation, and transition to WIS 2.0:

* Manual on the WMO Information System, Volume II –  [Manual on WIS](https://library.wmo.int/records/item/68731-manual-on-the-wmo-information-system-volume-ii-wmo-information-system-2-0): Defines the regulatory framework, technical requirements, and operational procedures for WIS 2.0.
* Guide to WMO Information System, Volume II - [Guide to WIS](https://library.wmo.int/records/item/69130-guide-to-the-wmo-information-system-volume-ii) – contains additional information concerning practices, procedures, and specifications that Members are invited to follow or implement in establishing and conducting their arrangements in compliance with the WMO technical regulations and in developing meteorological and hydrological services.
* Provisions for the Transition from the WMO Information System (WIS) 1.0 and Global Telecommunication System to WIS 2.0 -[WIS 2.0 Transition Guide](https://library.wmo.int/records/item/69050-provisions-for-the-transition-from-the-wmo-information-system-wis-1-0-and-global-telecommunication-system-to-wis-2-0): Provides guidance on transitioning from the Global Telecommunication System (GTS)/WIS to WIS 2.0, ensuring a smooth and efficient migration.

For further information or to know which GISC to contact for the WIS2 implementation do not hesitate to reach out and send an email to: wis@wmo.int