

CGMS-XXXIV
WMO WP-21
Prepared by WMO
Agenda item:


WMO INFORMATION SYSTEM (WIS)

(Submitted by WMO)

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Weather – Climate - Water

CGMS-XXXIV
WMO WP-21
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WMO
Agenda item: IV.1



WMO Information System

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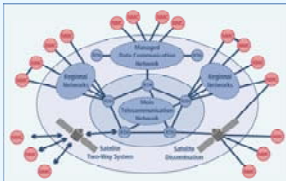
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Current situation: GTS

Information exchange – agreed procedures; real-time
Information management – agreed data formats; implicit metadata; catalogues

National, Regional, Specialized, and World Meteorological Centres
Meteorological Satellite Operator Centres

WWW GTS



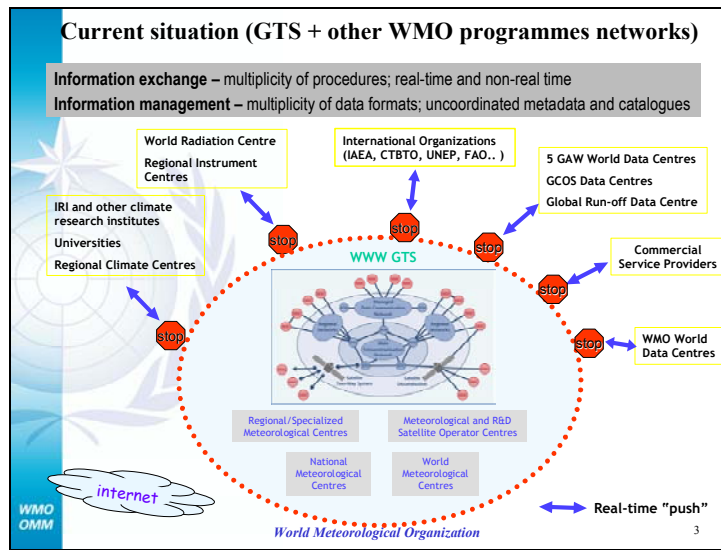
Regional/Specialized Meteorological Centres
National Meteorological Centres
Meteorological and R&D Satellite Operator Centres
World Meteorological Centres

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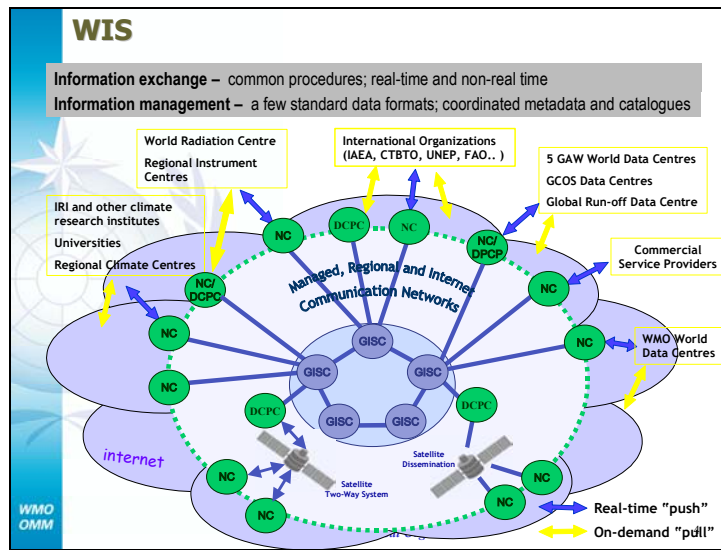
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The GTS has constantly been improved to meet the ever growing data exchange requirements of the WWW centres. Regional and sub-regional systems and networks are interconnected and standardization across the networks is achieved through coordinated telecommunications procedures and protocols and the strict application of WMO code forms for data representation within a message or bulletin. Each message has its specific type of content and routing information encoded in the bulletin header. Only centres that are able to interpret and use the bulletin header information can participate in the GTS. This is a serious disadvantage for many meteorological, hydrological and environmental centres, agencies or research institutions, which cannot participate in the GTS because they do not wish to, or are not able to, invest in the rather complex data handling computers and specialized staff necessary for access to the GTS. To overcome that drawback is the strategic goal of WIS.

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With its use of an improved GTS, WIS remove the barriers between the GTS and other WMO Programmes and will facilitate the exchange of and access to data required for all programmes and relevant centres. Common procedures for both real and non-real time data and standardization of data formats and metadata will enhance information discovery and exchange .

NMCs act as the network coordinator for connection and access rights to WIS for the “other” NC and DCPCs within their country (although the physical connection may be direct to a service provider).

WIS will provide the solution for the information exchange needs of NMHSs, relevant non-NMHS agencies/User, commercial providers, research facilities, and international programme centres. It will offer (“push” and “pull”) automated collection and dissemination of information (e.g., observations and forecast products); timely delivery of data and products (appropriate to requirements); and ad-hoc information discovery/access/retrieval services.

WIS will enhance the visibility and importance of the NMHS in the country. The NMHS will gain timely and cost-effective access to information, in particular new data and products, which will enhance its own operations. The NMC will also be able NMC to provide to other national agencies/users dealing in disaster mitigation, agriculture, energy and water management, and so forth, critical data that were, so far, not available to them. The NMC would “push” to them routine information, e.g., warnings, advisories, selected measurements, etc., and help discover, select and channel relevant information to the users, either ad hoc, in the “pulling” mode, or in reply to a non-real-time request.

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WIS brings new features and opportunities


- Common information exchange standards, functions and services for **all WMO programmes**
- **Inter-disciplinary** discovery, retrieval and exchange of information in real and non-real time
- On-line catalogues using **metadata based on ISO 19100** (geographic information standard)
- Industry standards and off-the-shelf hardware and software systems to ensure **cost-effectiveness and inter-operability**

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Structure of WIS

Functional centres:

- National Centres (NC)
- Global Information System Centres (GISC)
- Data Collection and Production Centres (DCPC)
- and*
- Data communication networks


WIS concerns only information exchange and data management functions

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National Centre (NC)

- Provides information collected/generated in the country to a GISC or DCPC
- Serves as portal for national users and/or administrates their access to WIS
- Several NCs in a country are possible (not just the NMC)

Data Collection or Production Centre (DCPC)


- Provides the programme-related data & products for international exchange
- Supports information "Push" and "Pull" mechanisms
- Generates, maintains, makes accessible and provides to GISCs metadata catalogues of its data & products

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Global Information System Centre (GISC)

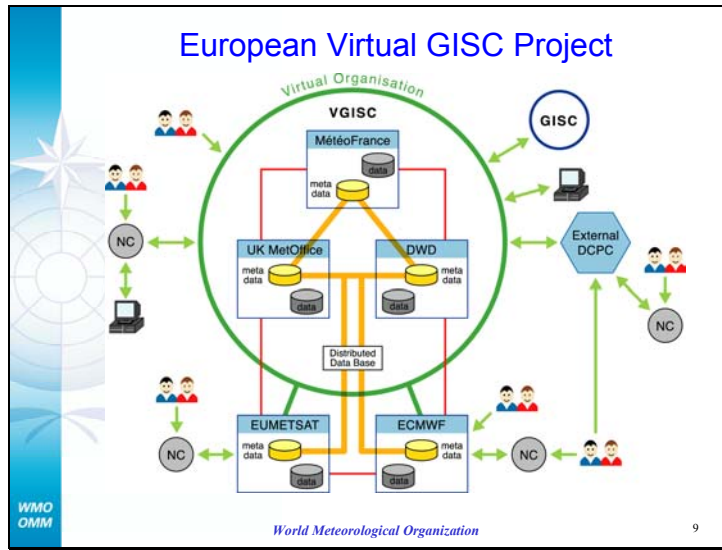
- Receives information from NCs and DCPCs
- Exchanges information (data and metadata) with other GISCs
- Disseminates, within its area of responsibility, the entire set of WMO data and products for routine global exchange
- Supports information "Pull" mechanisms
- Generates, maintains and makes accessible metadata catalogues of all data and products for global exchange
- Ensures around-the-clock, reliable and secure operations

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WIS, a key issue: interoperability

Interoperability enables the discovery, the retrieval and the usage of the data

- ✓ It needs the development and the implementation of relevant **Metadata** standards
- ✓ Development of a **WMO Metadata Profile** of the ISO 191xx series for geographic information

- Step 1: development of the WMO Metadata Core Profile of ISO 19115 for data discovery
- Step 2: Use of the ISO 191xx series for the access and use of the data

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The interoperability of information systems refers to the ability to share information in distributed computing environments, in particular:

- To find and get information, when they are needed, independent of physical location.
- To understand the discovered information, no matter what platform supports them, whether local or remote.

The interoperability of information systems within the WMO Programmes and outside the WMO Community calls for the development and the implementation of standards, based on international standards such as ISO standards.

The ISO 191xx series of geographic information standards contain a structured set of standards for information concerning objects or phenomena that are directly or indirectly associated with a location relative to the Earth. These standards specify methods, tools and services for management of geographic information, including the definition, acquisition, analysis, access, presentation, and transfer of such data in digital/electronic form between different users, systems and locations. The ISO 191xx series of geographic information standards provide a solid foundation for the development of the WIS.

A CBS team with the participation of experts of other Commissions developed a draft version of WMO Core Profile of the ISO 19115 Metadata standard. The team is working on the further use of the ISO 191xx series of standards for the access and use of the data, including the development of operational information catalogues.

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WIS DATA-COMMUNICATIONS FUNCTIONS AND SERVICES
WIS provide various types of services to meet the different requirements:

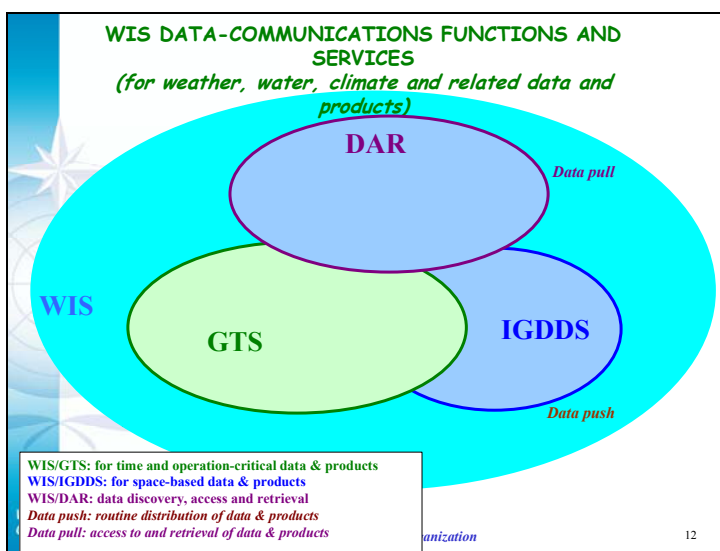
(1) Routine collection and dissemination service for time-critical and operation-critical data and products:
 Based on real-time "push" mechanism (incl. Multicast); implemented essentially through dedicated telecommunication means with guaranteed quality of service, e.g. leased circuits, dedicated data communication network services and satellite-based data-distribution systems;

(2) Data Discovery, Access and Retrieval service:
 Based on request/reply "pull" mechanism with relevant data management functions; implemented essentially through the Internet (HTTP, FTP,...);

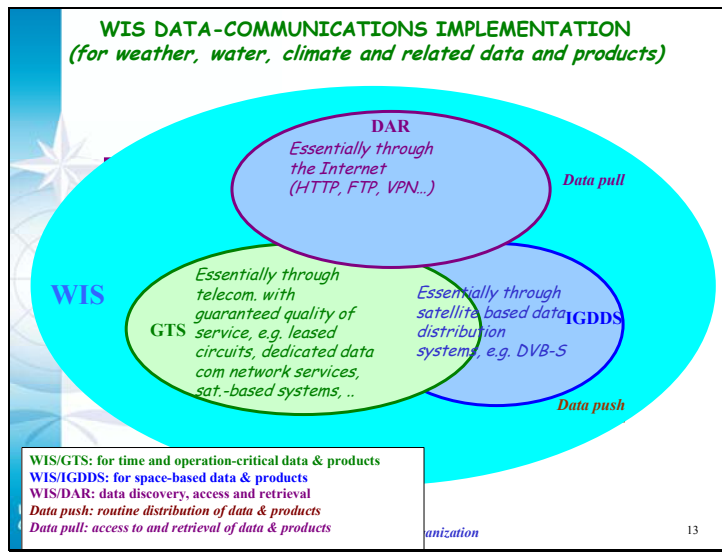
(3) Timely delivery service for data and products:
 Based on delayed mode "push" mechanism; implemented through a combination of dedicated telecommunication means and of public data networks, especially the Internet.

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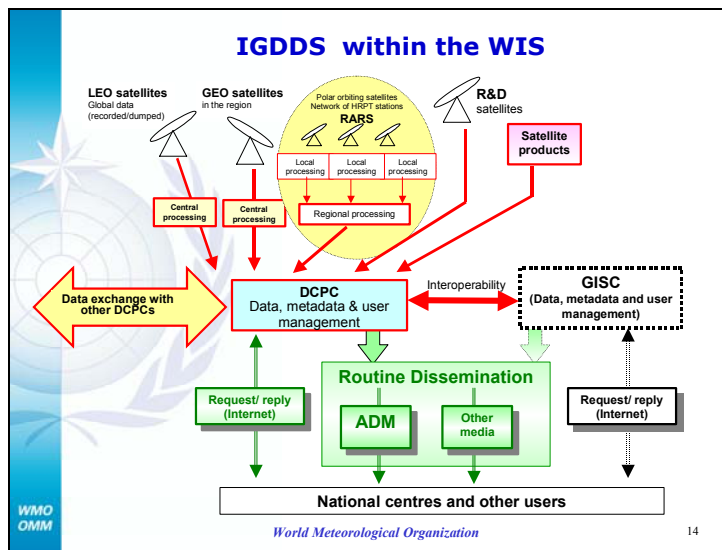
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WIS Implementation


- o Major functions needed:
 - ✓ Metadata catalogues
 - ✓ Internet portal
 - ✓ Data acquisition and discovery services
 - ✓ Data distribution service: push and pull
 - ✓ Monitoring
 - ✓ Operational aspects like data synchronisation, back-up, administrative issues, etc.
- o To that end, work is being undertaken by pilot projects in the different WMO Programmes

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Several on-going pilot projects test and evaluate functional concepts and architectures


- The WMO Core Metadata Standard
- The Virtual (distributed) Global Information System Centre (VGISC) in RA VI, including the European SIMDAT project
- RA II & V Virtual Private Network (VPN) project
- The EUMETNET UNIDART project (Portal)
- The JCOMM End-to-End Data Management Project (E2EDM) prototype
- The DMAC subsystem project for IOOS
- The Roshydromet CliWare project
- The WAMIS project for agro-meteorological information (CAgM)
- and also the Earth System GRID, the Community Data Portal, the Earth Sciences Portal
- Early application of WIS to the THORPEX Interactive Grand Ensemble (TIGGE)

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- A) WIS implementation Phase A is the continued consolidation and further improvements of the GTS for time-critical and operation-critical data, including its extension to meet operational requirements of WMO programmes in addition to World Weather Watch (including improved management of services);
- B) WIS implementation Phase B would provide for an extension of the information services through flexible data discovery, access and retrieval services to all users, as well as flexible timely delivery services (target for the GIS-CDCPC prototype demonstrations);
- The current development of IGDDS (WMO Space Programme) as a component of the WIS focusing on the exchange of space-based observation data and products contributes to phase A and B.

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WIS Implementation plan – initial phase

- ✓ Continued improvements and upgrade of GTS
- ✓ Reference implementation WMO Core metadata
- ✓ Integration of metadata structures into pilot GISCs and DCPCs
- ✓ Internet portal
- ✓ Basic data acquisition, discovery and push-pull services
- ✓ RA VI VGISC project as a GIS-C prototype
- ✓ DCPCs prototypes associated with VGISC project including the ECMWF and EUMETSAT
- ✓ NCAR DCPC prototype
- ✓ DCPC prototype for JCOMM related data
- ✓ Technical Conference on WIS (Korea, 6-8 November 2006) preceding CBS-Ext.06

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