Guide to the WMO Information System

2013 edition

World Meteorological Organization

Weather • Climate • Water

WMO-No. 1061

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EDITORIAL NOTE

METEOTERM, the WMO terminology database, may be consulted at: http://www.wmo.int/pages/prog/lsp/meteoterm_wmo_en.html. Acronyms may also be found at: http://www.wmo.int/pages/themes/acronyms/index_en.html.

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Chair, Publications Board
World Meteorological Organization (WMO)
7 bis, avenue de la Paix
P.O. Box 2300
CH-1211 Geneva 2, Switzerland

Tel.: +41 (0) 22 730 84 03
Fax: +41 (0) 22 730 80 40
E-mail: publications@wmo.int

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CONTENTS

INTRODUCTION

Purpose of this Guide

1. In conjunction with the *Manual on the WMO Information System* (Manual on WIS) (WMO-No. 1060), the *Guide to the WMO Information System* (Guide to WIS) is designed to ensure adequate uniformity and standardization in the data, information and communication practices, procedures and specifications employed among WMO Members in the operation of the WMO Information System (WIS) as it supports the mission of WMO. The Manual on WIS, Annex VII to the WMO *Technical Regulations* (WMO-No. 49), contains standard and recommended practices, procedures and specifications. The Guide to WIS contains additional information concerning practices, procedures and specifications which 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.

2. Because WIS cuts across all related WMO discipline areas, many other WMO practices, procedures and specifications intersect WIS. Recommended, as well as standard, practices, procedures and specifications are primarily defined in their specific publications, for example the *Guide on the Global Data-processing System* (WMO-No. 305) and the *Guide to the Global Observing System* (WMO-No. 488), among others.

Benefits of WIS

3. WIS provides an overarching approach to data and information management for all WMO and related international programmes, leveraging the long-standing collaborative culture of WMO, as well as new technologies.

4. WMO Members expect to realize specific benefits from WIS:

- WIS should enhance the collection of critical data needed to monitor and predict aspects of the environment, including hazards;
- WIS should catalogue the full range of data and products, simplifying search and assuring equitable access consistent with WMO policies;
- WIS should enhance the availability of time-critical data and products at centres in all nations, ensuring the effective provision of services to their populations and economies;
- WIS should open up the WMO private network (the WMO Global Telecommunication System (GTS)) to other types of environmental data so that all programmes have stronger infrastructure support; and
- WIS should exploit opportunities as they become available with technological innovation.

PART I. ORGANIZATION AND RESPONSIBILITIES

1.1 Organization of WIS

WMO Members implement and operate WIS, using existing centres with some additional or modified capabilities. Centres participating in WIS are categorized in three types:

- Global Information System Centres (GISCs);
- Data Collection or Production Centres (DCPCs);
- National Centres (NCs).

See Part III of the Manual on WIS for a description of the functions of the three types of WIS centres.

1.2 Compliance with required WIS functions

As required by the WMO *Technical Regulations*, Volume I, Part I, 3 and Manual on WIS, Part I and Part III, WIS centres shall maintain compliance with required WIS functions. The Guide to WIS contains additional guidance on practices, procedures and specifications for WIS functions, supplementing the standard and recommended practices, procedures and specifications for WIS functions set out in the Manual on WIS.

1.3 Interaction among WIS centres

As required by the Manual on WIS, 1.3, GISCs shall connect to each other by the WIS Core Network. Data, products and metadata shall flow to a GISC from DCPCs and from NCs within its area of responsibility. An illustration of likely interaction among WIS centres is provided in Figure 1 (below). Note: Named centres are illustrative examples and do not comprise a complete list of likely WIS centres.

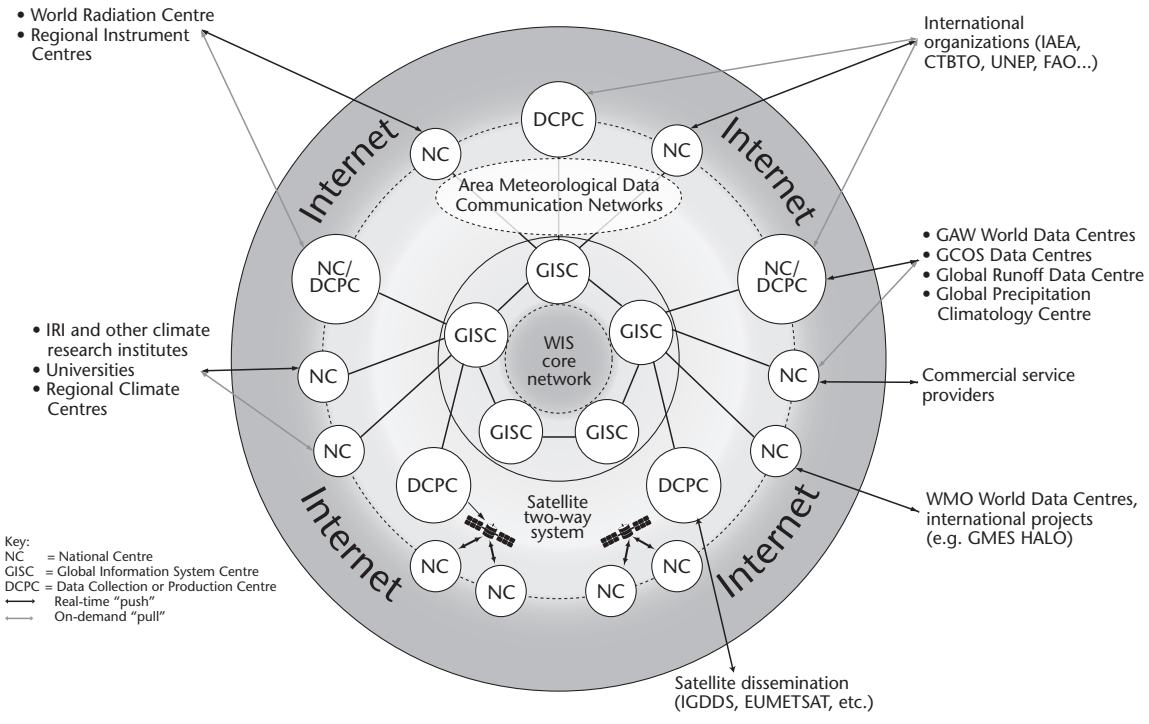


Figure 1. Types of WIS centres and typical interactions

1.4 Implementation of WIS

As required by the Manual on WIS, 1.4, WIS is implemented in two parallel parts: continued evolution of the GTS, and extension of WMO services through discovery, access and retrieval (DAR) facilities, as well as flexible timely delivery.

1.5 Discovery, access and retrieval function

1.5.1 As required by *Technical Regulations*, Vol. I, Part I, 3, and the Manual on WIS, 1.5, WIS is based on metadata catalogues describing data and products available across WMO, plus metadata describing dissemination and access options. The DAR function of WIS is the primary realization of the WIS comprehensive catalogue, maintained collaboratively by all WIS centres.

1.5.2 A typical user of WIS DAR should find available data and products using a web browser or other Internet tool. The searcher should be able to discover available data and products either by browsing the catalogue or by searching it, using discovery concepts such as subject keywords, geographic extent or temporal range.

1.5.3 A typical user of WIS DAR should first receive a list of relevant items with associated metadata such as originator, data type, generation date, use constraints, etc. Once desired data or products have been identified, a user may request immediate retrieval ("pull") or subscription for recurring delivery ("push") if locally available, or be referred to another centre holding the item. The WIS centre having the item should then facilitate delivery through any of a broad range of online and offline transmission options. In the case of a subscription, the WIS centre should maintain further information to support recurring delivery.

1.6 Robustness and reliability of components

As required by the Manual on WIS, 1.6, high robustness and reliability of WIS components are essential to the operation of WIS. Indicators of performance are evaluated in the designation procedure for WIS centres to include assurance that data content flowing via WIS network technologies fully satisfies requirements for security, authenticity and reliability. Some specifications of service levels are identified within the Manual on WIS and this Guide to WIS, but further specifications can be anticipated.

1.7 Collection and dissemination services

1.7.1 See Manual on WIS, 1.7 for standard and recommended practices, procedures and specifications on this topic.

1.7.2 With regard to satellite-based data and products, the WMO Integrated Global Data Dissemination Service (IGDDS) addresses: user requirements; data concentration: interregional data exchange; data dissemination; data discovery; data access on request; data delivery to authorized users; and data management, including interoperable catalogue, quality of service monitoring and user support.

1.7.3 In addition to satellite-based data and products, IGDDS should distribute a basic subset of the information intended for global exchange.

1.7.4 IGDDS calls for regional dissemination components linked in a global network for interregional data exchange. Each regional component should include a DCPC and should ensure routine dissemination by various means, including a satellite-based Digital Video Broadcast service covering its region.

PART II. DESIGNATION PROCEDURES FOR WIS CENTRES

2.1 General

Designation procedures for WIS centres are defined in the Manual on WIS, Part II. The Commission for Basic Systems (CBS) reviews relevant aspects of the Manual on WIS to ensure alignment of WIS user requirements, the WIS functional architecture, and the WIS compliance specifications. CBS is also developing monitoring procedures to complement the designation procedures of WIS and to ensure ongoing compliance of WIS centres with the agreed standards and practices.

2.2 Procedure for a Global Information System Centre

Procedures for designating a Global Information System Centre (GISC) are given in the Manual on WIS, 2.2, in keeping with *Technical Regulations*, Volume I, Part I, 3. During the initial phase of WIS centre designations, CBS analyses GISC service offers and formulates a recommendation for designation.

2.3 Procedure for a Data Collection or Production Centre

Procedures for designating a DCPC are given in the Manual on WIS, 2.3, in keeping with *Technical Regulations*, Volume I, Part I, 3. During the initial phase of WIS centre designations, CBS determines which centres should be integrated in WIS, analyses DCPC service offers and formulates a recommendation.

2.4 Procedure for a National Centre

2.4.1 Procedures for designating an NC are given in the Manual on WIS, 2.4, in keeping with *Technical Regulations*, Volume I, Part I, 3.

2.4.2 National Meteorological Centres are expected to be NCs. A WMO Member may also elect to designate other centres as NCs.

2.4.3 In addition to the data and metadata requirements of an NC set out in the Manual on WIS, a typical NC should: collect, generate or disseminate observational data and products; and provide certain observations and products intended for global dissemination or for regional or specialized distribution to other WIS centres.

2.4.4 The "Study on policy-level implications of the future WMO information system" (described in the *Abridged Final Report with Resolutions of the Fourteenth World Meteorological Congress* (WMO-No. 960), 3.1.2.11 of the general summary) asserts that the introduction of WIS will not result in new responsibilities or additional resource requirements for most Members. The stated expectation was that WIS would result in lower costs, especially for least-developed Members, through expanded use of commercial off-the-shelf technology and increased use of the Internet.

PART III. FUNCTIONS OF WIS

3.1 Roles in and review of WIS functions

3.1.1 Roles in and review of WIS functions are given in the Manual on WIS, 3.1.

3.1.2 Each relevant user requirements process across WMO should link into the WIS user requirements process. For instance, observing programme needs should be incorporated into WIS requirements through linkage with the Rolling Review of Requirements process in the *Manual on the Global Observing System* (WMO-No. 544).

3.1.3 Current WIS user requirements are described in a technical document available at http://wis.wmo.int/WIS-RRR.

3.2 List of WIS functions

WIS centres collectively support the major WIS functions as described in the Manual on WIS, 3.2. The required standard interfaces to these functions are described in the Manual on WIS, Part IV, WIS technical specifications.

3.3 Functional architecture of WIS

The functional architecture of WIS is provided as supplementary guidance for WIS centres in a technical document available at http://wis.wmo.int/WIS-FuncArch. As shown in that document, the following list provides one possible method for dividing the required major WIS functions into more detailed functions.

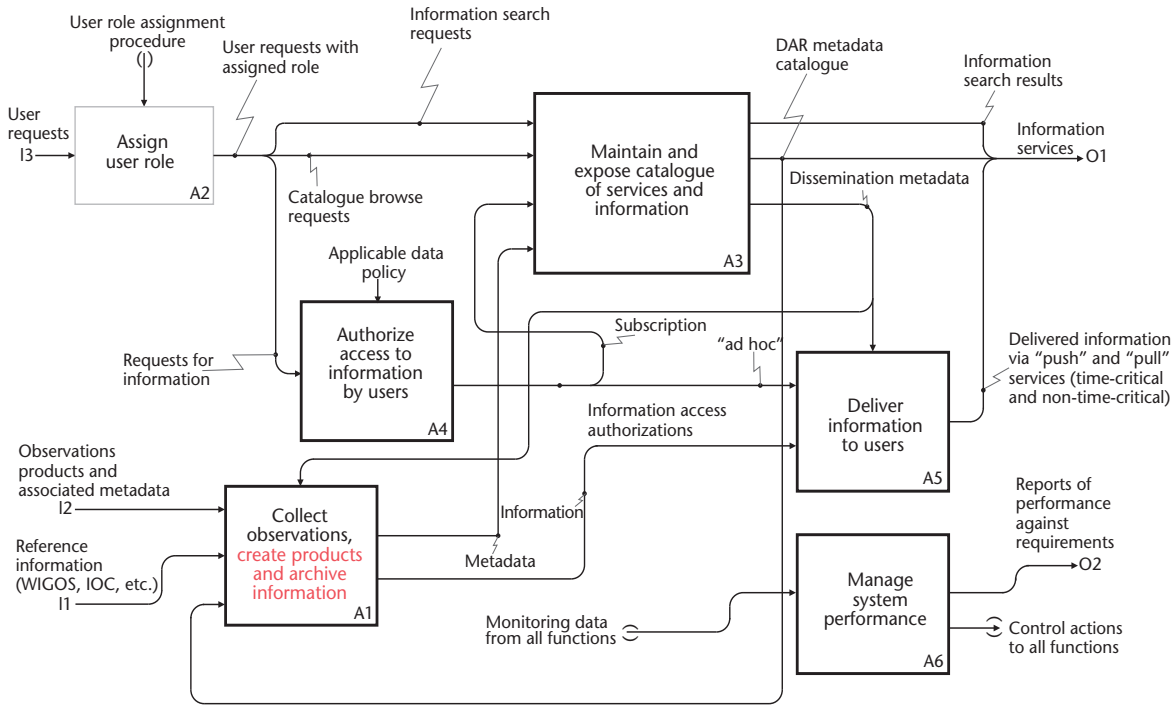
A1 Collect observations, generate products, create metadata and archive information
A11 Collect, generate and archive national information and create metadata
A111 Collect national observations
A112 Check meteorological content of products and observations
A113 Archive
A114 Generate national products
A115 Generate metadata
A116 Unpack Information
A117 Verify correct telecommunication attributes of information
A12 Collect, generate and archive regional, programme-related and specialized information and create metadata
A121 Collect regional, specialized and programme-related observations
A122 Check meteorological content of observations
A123 Archive
A124 Generate regional, specialized and programme-related products
A125 Generate metadata
A126 Unpack information
A127 Verify correct telecommunication attributes of information
A13 Collect and cache global information
A131 Unpack information
A132 Associate information with DAR metadata
A133 Verify correct communication attributes of information
A134 Maintain and make available the cache of global information for 24 hours
A2 Assign user role
A3 Maintain and expose catalogue of services and information
A31 Search DAR metadata catalogue
A32 Maintain and expose consolidated DAR metadata catalogue

A33 Maintain dissemination metadata catalogue in accordance with authorized subscriptions
A4 Authorize access to information by users
A5 Deliver information to users (internal and external)
A51 Schedule and control activities
A511 Derive time-driven (synchronous) activity schedule and list of event-driven (asynchronous) activities
A512 Monitor for events
A513 Resolve any activity scheduling conflicts, reflecting relative service priorities
A52 Package information for delivery
A53 Deliver information
A6 Manage system performance
A61 Non-real-time performance monitoring
A611 Analyse traffic trends
A612 Analyse performance against requirements and service-level agreements (SLAs)
A62 Real-time performance monitoring
A621 Real-time monitoring of telecommunication network
A622 Real-time monitoring of the application content

3.4 Data flow among WIS functions

3.4.1 The functional architecture of WIS (see 3.3 above) models data flow among required WIS functions and illustrative subordinate functions. The model uses Integration Definition for Function Modelling (IDEF0), a data-flow diagramming technique that illustrates relationships between system components, at levels ranging from general processes to specific technology interfaces.

3.4.2 Figure 2 presents an IDEF0 functional decomposition of the major WIS functions, labelled A1 to A6. Data flows are inherited between levels of the diagrams and are labelled as I1, I2, I3 for inputs and O1, O2 for outputs.



Note: Red text denotes functions which are beyond the scope of WIS.

Figure 2. Data-flow model of the WIS functional architecture

3.5 Functional requirements of a GISC

There are no general recommendations in addition to the statements in the Manual on WIS, 3.5.

3.6 Functional requirements of a DCPC

There are no general recommendations in addition to the statements in the Manual on WIS, 3.6.

3.7 Functional requirements of an NC

There are no general recommendations in addition to the statements in the Manual on WIS, 3.7.

PART IV. WIS TECHNICAL SPECIFICATIONS

4.1 General

As required in the Manual on WIS, 4.1, there are 15 WIS technical specifications (WIS TechSpecs) that should be regarded as "mandatory if applicable", i.e. the technical specification is required wherever the interface applies. A summary of the applicability of each WIS-TechSpec by type of WIS centre is given in the table below. Supplementary details of WIS technical specifications are provided in "WIS compliance specifications for GISC, DCPC and NC", available at http://wis.wmo.int/WIS-TechSpec.

Table. WIS interface technical specifications

Interface technical specification identifier	*Interface technical specification name*	*Required for:*		
		NC	*DCPC*	*GISC*
WIS-TechSpec-1	Uploading of metadata for data and products	✓	✓	✓
WIS-TechSpec-2	Uploading of data and products	✓	✓	✓
WIS-TechSpec-3	Centralization of globally distributed data			✓
WIS-TechSpec-4	Maintenance of user identification and role information	✓	✓	✓
WIS-TechSpec-5	Consolidated view of distributed identification and role information			✓
WIS-TechSpec-6	Authentication of a user		✓	✓
WIS-TechSpec-7	Authorization of a user role		✓	✓
WIS-TechSpec-8	DAR catalogue search and retrieval		✓	✓
WIS-TechSpec-9	Consolidated view of distributed DAR metadata catalogues			✓
WIS-TechSpec-10	Downloading files via dedicated networks	✓	✓	✓
WIS-TechSpec-11	Downloading files via non-dedicated networks	✓	✓	✓
WIS-TechSpec-12	Downloading files via other methods	✓	✓	✓
WIS-TechSpec-13	Maintenance of dissemination metadata	✓	✓	✓
WIS-TechSpec-14	Consolidated view of distributed dissemination metadata catalogues			✓
WIS-TechSpec-15	Reporting quality of service	✓	✓	✓

4.2 WIS-TechSpec-1: Uploading metadata for data and products

4.2.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.2.

4.2.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface should make use of a mix of dedicated and public network services, including public or private Internet with Transmission Control Protocol/Internet Protocol (TCP/IP), which may include encryption.

4.2.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to two functions: (1) "Compile observations into bulletins/files, generate metadata and archive"; and (2)"Convert products and data into bulletins/files and generate associated metadata".

4.2.4 *Additional notes*

This interface builds on existing GTS practice, adding the particular standard format for WIS metadata about data, products and services. Centres should be aware that metadata uploaded to a GISC could take up to 24 hours to be synchronized across all GISCs. Thus, when a data or product is required to be distributed less than 24 hours after publication of its metadata, a centre must transmit the metadata directly to its principle GISC via the GTS or by a method already agreed with the GISC.

4.3 WIS-TechSpec-2: Uploading data and products

4.3.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.3.

4.3.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface is associated with dedicated bandwidth and high reliability and should make use of the GTS. This can incorporate private Internet with TCP/IP and may include encryption. In some cases, IGDDS satellite uplinks may be employed.

4.3.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to two functions: (1) "Package bulletins, files and metadata according to distribution requirements"; and (2) "Convert products and data into bulletins/files and generate associated metadata".

4.3.4 *Additional notes*

This interface builds on existing GTS practice, supplemented with other file-transfer mechanisms such as the Internet. Although it is required that data arrive only after their associated metadata, a grace period of two minutes is allowed before the data file is regarded as erroneous.

4.4 WIS-TechSpec-3: Centralization of globally distributed data

4.4.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.4.

4.4.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface is associated with dedicated bandwidth and high reliability and should make use of the GTS. This can incorporate private Internet with TCP/IP and may include encryption.

4.4.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: "Maintain the cache of global information for 24 hours".

4.4.4 *Additional notes*

4.4.4.1 The set of WMO data and products required to be cached for 24 hours at the GISCs is information "intended for global exchange". This does not encompass all the material handled by IGDDS.

4.4.4.2 Although the cache of data and products intended for global exchange is required to be current across all GISCs to within 15 minutes, warnings must be current to within two minutes.

4.4.4.3 The cache size is expected to grow by one gigabyte per day. The cache needs to be highly accurate and the system for logical centralization needs to be affordable and robust; single points of failure and complex procedures are not acceptable

4.5 WIS-TechSpec-4: Maintenance of user identification and role information

4.5.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.5.

4.5.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface should make use of public network services, including Internet with TCP/IP, which may include encryption and other privacy protection for identified individuals, as required by national legislation.

4.5.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to two functions: (1) "Assign user role"; and (2) "Authorize access to information by users".

4.5.4 *Additional notes*

For updating the identification and role information concerning candidate or current users of WIS, WIS centres should support two kinds of maintenance facilities: a file-upload facility for batch updating (add, replace or delete identification and role records treated as separate files); and an online form for changing individual identification and role entries (add, change or delete elements in a record, as well as whole records).

4.6 WIS-TechSpec-5: Consolidated view of distributed identification and role information

4.6.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.6.

4.6.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface should make use of a mix of dedicated and public network services, including public or private Internet with TCP/IP, which may include encryption and other privacy protection for identified individuals, as required by national legislation.

4.6.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to two functions: (1) "Assign user role"; and (2) "Authorize access to information by users".

4.7 WIS-TechSpec-6: Authentication of a user

4.7.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.7.

4.7.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface should make use of a mix of dedicated network and public network services, including public or private Internet with TCP/IP, which may include encryption and other privacy protection for identified individuals, as required by national legislation.

4.7.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: "Assign user role".

4.7.4 *Additional notes*

In a typical design for this interface, the client sends to the authentication server an authentication request for a particular user whose identification and credentials are included in the request. The authentication server references the consolidated identification and role information resource for WIS and returns an authentication response. That response either confirms or denies that the identified user has provided sufficient credentials.

4.8 WIS-TechSpec-7: Authorization of a user role

4.8.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.8.

4.8.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, within the constraints of dedicated bandwidth and reliability service levels, this interface should make use of public network services, including Internet with TCP/IP, which may include encryption.

4.8.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: "Authorize access to information by users".

4.8.4 *Additional notes*

In a typical design for this interface, the client sends to the authorization server an authorization request for a particular user whose identification is included in the request. The authorization server references the consolidated identification and role information resource for WIS and returns an authorization response. That response either contains a list of the authorized roles for the user or denies that the identified user has any authorized role.

4.9 WIS-TechSpec-8: DAR catalogue search and retrieval

4.9.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.9.

4.9.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, within the constraints of bandwidth and reliability service levels, this interface should make use of public network services, including Internet with TCP/IP, which may include encryption.

4.9.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: "Maintain and expose catalogue of services and information".

4.9.4 *Additional notes*

The procedures for designation of a GISC or DCPC require that both type of WIS centre maintain data, product and service catalogues in the WMO-agreed standard format and facilitate access to

them. Network services should therefore be treated as a type of WIS product that can be discovered through the DAR catalogue.

Note: The WIS search and retrieval via URL (SRU) Implementors' note is available at: http://wis.wmo.int/WISSRU.

4.10 WIS-TechSpec-9: Consolidated view of distributed DAR metadata catalogues

4.10.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.10.

4.10.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface should make use of a mix of dedicated and public network services, including public or private Internet with TCP/IP, which may include encryption.

4.10.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: "Maintain and expose catalogue of services and information".

4.11 WIS-TechSpec-10: Downloading files via dedicated networks

4.11.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.11.

4.11.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface is associated with dedicated bandwidth and high reliability and should make use of GTS and IGDDS satellite broadcast. This can incorporate private Internet with TCP/IP and may include encryption.

4.11.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: "Deliver information to users".

4.12 WIS-TechSpec-11: Downloading files via non-dedicated networks

4.12.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.12.

4.12.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface should not use a non-dedicated network for operation-critical data. Otherwise, within the constraints of bandwidth and reliability service levels, this interface should make use of public network services, including Internet with TCP/IP, which may include encryption. This interface should also make use of IGDDS satellite broadcast (at radio or television frequencies).

4.12.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: "Deliver information to users".

4.13 WIS-TechSpec-12: Downloading files via other methods

4.13.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.13.

4.13.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface should not use a non-dedicated method for operation-critical data. Otherwise, this interface is associated with requirements for delivery using methods other than data-telecommunication networks. Delivery via voice lines and postal services in paper or digital media are included, among others.

4.13.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: "Deliver Information to users".

4.14 WIS-TechSpec-13: Maintenance of dissemination metadata

4.14.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.14.

4.14.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface should make use of a mix of dedicated and public network services, including public or private Internet with TCP/IP, which may include encryption.

4.14.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: "Maintain and expose catalogue of services and information".

4.14.4 *Additional notes*

4.14.4.1 For updating the dissemination metadata, WIS centres should support two kinds of maintenance facilities: a file-upload facility for batch updating (add, replace or delete metadata records treated as separate files); and an online form for changing individual entries (add, change or delete elements in a record, as well as whole records).

4.14.4.2 Initially, the first version of DAR metadata was created from Volume C1 of the publication *Weather Forecasting* (WMO-No. 9) and other sources. Because full transition of WMO centres to the DAR metadata will occur over some time, procedures are required to assure that changes are recorded in both the DAR metadata and in Volume C1.

4.15 WIS-TechSpec-14: Consolidated view of distributed dissemination metadata catalogues

4.15.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.15.

4.15.2 *Types of collection and dissemination service*

To provide a quality of service that meets user requirements, this interface should make use of a mix of dedicated and public network services, including public or private Internet with TCP/IP, which may include encryption.

4.15.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: “Maintain and expose catalogue of services and information”.

4.16 WIS-TechSpec-15: Reporting quality of service

4.16.1 *Applicable standards*

The following information for this requirement is in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, 4.16.

4.16.2 *Types of collection and dissemination service*

This interface should make use of public network services, including Internet with TCP/IP, which may include encryption.

4.16.3 *Function interfaces*

In the WIS functional architecture, this WIS technical specification acts as an interface to the function: “Manage system performance”.

4.16.4 ***Additional notes***

4.16.5.1 Agreements on service levels can be anticipated eventually for WIS operations. These should include data and network security, as well as performance and reliability.

4.16.5.2 Performance reports could be generated efficiently by having each WIS centre upload its reports to a single analysis site within a fixed-time window.

PART V. METADATA GUIDANCE

Note: Part V of this Guide is being developed and will contain information on the creation and management of discovery metadata in relation to WIS, in addition to the standard and recommended practices, procedures and specifications in the Manual on WIS, Part V. The latest guidance is available on the WIS WIKI page:

http://wis.wmo.int/MD_Index.

For more details on the WMO metadata profile, visit http://wis.wmo.int.

For more information, please contact:

World Meteorological Organization

Communications and Public Affairs Office

Tel.: +41 (0) 22 730 83 14/15 – Fax: +41 (0) 22 730 80 27

E-mail: cpa@wmo.int

7 bis, avenue de la Paix – P.O. Box 2300 – CH 1211 Geneva 2 – Switzerland

www.wmo.int

JN 131068