World Meteorological Organization
COMMISSION FOR BASIC SYSTEMS
Sixteenth Session
Guangzhou, China, 23 to 29 November 2016

CBS-16/Doc. 5.5(1)
Submitted by:
Secretary-General
20.X.2016
DRAFT 1

AGENDA ITEM 5:	DECISIONS ON THE WORK PLAN FOR THE COMMISSION
AGENDA ITEM 5.5:	**DECISIONS ON THE DEVELOPMENT OF WIS**

SUMMARY

DECISIONS/ACTIONS REQUIRED:

(a)   Adopt draft Decision 5.5(1)/1 — *WIS Security Incident Management Process;*

(b)   Adopt draft Decision 5.5(1)/2 — *WIS System Monitoring;*

(c)   Adopt draft Recommendation 5.5(1)/1 — *WIS Development.*

CONTENT OF DOCUMENT:

The Table of Contents is available only electronically as a Document Map[*].

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[*]   On a PC, in MS Word 2010 go to "**View**" and tick the "**Navigation Pane**" checkbox in the "**Show**" section.
In MS Word 2007 or 2003, go to "**View**" > "**Document Map**". On a Mac, go to "**View**" > "**Navigation Pane**" and
select "**Document Map**" in the drop-down list on the left.

DRAFT DECISIONS

Draft Decision 5.5(1)/1 (CBS-16)

WIS SECURITY INCIDENT MANAGEMENT PROCESS

THE COMMISSION FOR BASIC SYSTEMS,

Recalling:

(1)   That the thirteenth session of CBS emphasized the increasing security threats to networked systems that NMHSs had to face and the potential impacts to specific sites as well as other interconnected sites, in particular for WWW systems (WMO-No. 985, paragraph 5.2.18),

(2)   That the Sixteenth World Meteorological Congress requested CBS to pay particular attention to Internet security and continue to review and update related practices, procedures and guidelines (WMO-No. 1077, paragraph 3.1.2.5),

(3)   That the Guide on IT Security was established and maintained to assist Members in the management of IT security (WMO-No. 1115),

Recognizing:

(1)   That WMO Members' systems have become increasingly interconnected to facilitate the exchanging of information via private and public networks,

(2)   That responsibility for IT security is clearly with organizations operating IT systems,

(3)   That information about security incidents needs to be handled with confidentiality and within the governing principles of differing national policies and practices,

Noting the draft security incident process produced by the Open Programme Area Group in Information Systems and Services and reviewed by the Inter-commission Task Team on WIS (http://wis.wmo.int/file=3004),

Decides that there is a need for a security incident response process that can be used by organizations participating in the operation of the WMO Information System;

Requests its Open Programme Area Group on Information Systems and Services to:

(1)   Continue the development of a common security incident management process that:

   (a)   Encourages a centralized and definitive view on security incidents, reduces misinformation and prevents individual Member States from undue levels of queries;

   (b)   Provides a single and definitive national contact point for security incidents which will have the authoritative voice for organizations in that country, increasing clarity and reducing misinformation;

   (c)   Accommodates requirements relating to the security incidents of all organizations participating in the operation of the WMO Information System;

(2)   Provide a recommended process to the CBS management group for review and subsequent consideration by EC-69;

Requests the Secretary-General to provide the necessary support to the development and implementation of common security incident management process;

Urges Members to participate in the development and implementation of a sustainable security incident management process.

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Draft Decision 5.5(1)/2 (CBS-16)

WIS SYSTEM MONITORING

THE COMMISSION FOR BASIC SYSTEMS,

Recalling that the extraordinary session (2014) of CBS encouraged the implementation of a pilot WIS monitoring system (WMO-No.1140, paragraph 3.2.13),

Recognizing:

(1)   That ICT-ISS has successfully developed and demonstrated pseudo operational prototype WIS Monitoring Common Dashboard (WCD) at GISC Beijing and Tokyo, and a prototype dashboard at GISC Brasilia (http://wis.wmo.int/wis-monitor) that does not add to staff workloads in those centres being monitored,

(2)   That the proposed WIS monitoring system involves three levels of monitoring: the WIS Common Dashboard for real-time monitoring of the status of WIS traffic flow and services, ad hoc reports on incidents or interruptions to WIS services, and routine biennial reports on system performance,

Decides:

(1)   That the prototypes as demonstrated would meet the basic needs identified by CBS-Ext.(2014) for monitoring of the WIS infrastructure as a global information system;

(2)   That having at least two monitoring sites will ensure operational access to current and recent status of WIS centres;

Requests its Open Programme Area Group on Information Systems and Services to:

(1)   Make operational at least two WIS Monitoring Common Dashboards;

(2)   Propose updates to the *Manual on WIS* (WMO-No. 1060) TechSpec-15 and associated use cases and guidance in the *Guide to the WIS* (WMO-No. 1061);

(3)   Provide standard practice for inclusion in the *Guide to the WMO Information System* (WMO-No. 1061);

Requests the Secretary-General to provide the necessary support to the development and implementation of WIS system monitoring and updates to Manuals and Guides;

Urges Members operating WIS centres to:

(1)   Make WIS system monitoring operational;

(2)   Work with the GISCs to supply the monitoring files in the agreed JSON format for the systems to be included in the common dashboard and reporting.

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DRAFT RECOMMENDATION

Draft Recommendation 5.5(1)/1 (CBS-16)

WIS 2.0 STRATEGY

THE COMMISSION FOR BASIC SYSTEMS,

Noting Decision 38 (EC-68) "Development of Strategy for the WMO Information System",

Recognizing the importance of creating and delivering a long-term vision for the evolution of the WIS,

Having considered the draft WIS 2.0 Strategy as given in the Annex to this recommendation,

Recommends Executive Council to endorse the WIS 2.0 Strategy as per Annex to this recommendation;

Authorizes the president CBS to incorporate modifications to the draft WIS 2.0 strategy resulting from advice from regional associations and technical commissions prior to EC-69.

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Annex: 1

Annex to draft Recommendation 5.5(1)/1 (CBS-16)

WIS 2.0 STRATEGY

1. Introduction

1.1 The WMO Information System (WIS) was established to provide high performance and reliable information sharing and management services for all WMO Programmes and related activities. After a decade of implementation, WIS became operational in 2012 and must evolve to meet the ever growing requirements of its users. The status of WIS in August 2016 is described in Annex I, current Status of WIS.

1.2 The CBS extraordinary 2014 session in Asuncion, Paraguay requested ICT-ISS to develop and maintain a strategic plan for developing WIS over a ten year forward looking period. The sixty-eighth session of the WMO Executive Council requested that CBS present a proposal for governance structure and strategy for the evolution of WIS to EC-69. This document outlines the strategic activities for the evolution of WIS toward its next generation, "WIS 2.0", with an enhanced focus on supporting global agendas, such as GFCS, DRR, UN SDG and the UNFCCC, as well as reducing costs, facilitating NMHS activities and improving efficiency and processes. Further effort will be required to define how services will be delivered and supported to help WMO Members achieve maximum advantage from WIS.

1.3 Note that the terms "cloud computing" and "open ecosystem" are terms of limited meaning in this document as defined in Annex II.

2. Vision

2.1 WIS 2.0 will provide users with seamless access to diverse information from a wide range of sources and will enable weather, water and climate information to be related to socioeconomic and other application contexts. Through an open eco-system of tools, applications and services, WIS 2.0 will allow all information providers to manage, publish and share their data, products and services and will allow all users to develop value added services and new products.

3. Drivers and Challenges for WIS 2.0

3.1 User Expectation

3.1.1 Effective use of information, including combining data from multiple societal benefit areas, is a factor of economic growth. It is increasingly important that information becomes available in a way that maximizes uptake and business opportunities.

3.1.2 Users expect to access weather, water and climate information and services through the same mechanisms that they use for other types of information, using familiar interfaces and applications. Users will expect more social interaction and mobile delivery. They will also expect services that are built on more creative use of information, such as those that derive insight from analysis of "Big Data".

3.1.3 Key changes in the world of IT are taking place which require the traditional approach of pushing the information to be amended. It is anticipated that WIS 2.0 users will combine mobile, cloud computing and social technologies to access a much wider range of information sources and to collaborate in new and different ways. In the current design, NMHS are, in general, pushing pre-defined static set of information to the end user communities. In

WIS 2.0, this will evolve to a model where end users are pulling selected information into environments and collaboration areas of their choice.

3.1.4   WMO Members find it increasingly challenging to deliver the services necessary to meet such needs in a rapidly evolving environment. These challenges will be a result of increasing volumes and variety of information required. WIS has to evolve to provide the foundation to support these services.

3.1.5   User expectations are driven by the services provided by global companies with the financial resources to invest in innovative solutions. Public sector organizations typically cannot access funding on the same scale. As a consequence, they may need to work in close partnership to develop common components and deliver services.

3.2   Data Volumes and Complexity

3.2.1   Satellites, radars and numerical models are producing information in greater volumes than ever before. For example, the current generation of satellites produces about 50 times more data than its predecessor. Furthermore, improvements in weather science will drive demand for the exchange of weather radar data at much higher frequency and on a global scale.

3.2.2   In addition to information traditionally used by NMHSs, increasing use will be made of information from sources not previously considered, both private and public.

3.2.3   Other sources of information are becoming available that may have data volumes that exceed those of traditional data sources, such as indirect information from social networks and crowd sourcing. Some of these sources of information may contain quantitative information but will not be formatted in traditional ways using WMO code forms, and will require processing before they can be utilized.

3.2.4   Data volumes created by Earth observing and numerical prediction systems continue to grow considerably faster than the performance of telecommunications networks. This ever increasing flow of information poses significant challenges for processing, distribution and storage.

3.2.5   It will therefore be ever-more challenging to manage and share the increasing volume of data by sending it all to end users. Instead, users may want to select the subsets that meet their needs, or execute their queries and algorithms in close proximity with the data in order to reduce the volume of information to be transferred. This is described as "bringing the user to the data". For some services, however, timely provision of the underpinning data to the user will still remain critical, "taking the data to the user".

3.3   Costs

3.3.1   NMHSs face continuing pressure on budgets. It is important to remove duplication of effort, to facilitate the use of existing solutions (such as commercial, open source or off the shelf systems), and to make the infrastructure more cost effective through simplification.

3.3.2   Collaboration needs to be enhanced to reduce the number and variety of local solutions across WIS, with NMHSs working in close partnership to develop common components and deliver services, rather than being solely responsible for those services.

3.3.3   WIS 2.0 will offer mechanisms to increase collaborative development, maintenance and support of services, promote the exchange of best practices and enable the uptake of new technologies.

3.4   Policy Environment

3.4.1   Many policymakers and funders place requirements on public sector organizations to provide their information as "open data". This has led to a number of global and regional initiatives that place obligations on Members.

3.4.2   Publishers of information are being increasingly required to describe, explain and justify the workflows and methods they have used to create that information. As a consequence, WIS 2.0 will need to define an information assurance framework. This will, in particular, include a data lifecycle management that demonstrates compliance with these policy requirements.

3.5   Technology Trends

3.5.1   Technology in recent years, in responding to user needs and expectations, has moved toward a service-centric approach. WIS 2.0 needs to take these changes into account when developing services and infrastructure. Cloud computing, Web services, data analytics and other technologies are expected to offer opportunities through new paradigms and concepts that will enable users to exploit data with much lower barriers.

3.5.2   Among technical and policy changes, those in Annex III are considered as being the most relevant for WIS 2.0.

4.   WIS 2.0 Strategy

4.1   Strategy

4.1.1   Changes in data supply patterns and user expectations over the past decade present new challenges that the current WIS struggles to meet. At the same time, changes in technology (e.g. cloud computing infrastructure, messaging, search engines, web services etc.) present new opportunities.

4.1.2   WIS 2.0 will facilitate exchange of the right information at the right time with the right people. It will be built on redundant, resilient, efficient and scalable infrastructure. It will use applications and services based on standard interfaces for data exchange ready for SMAC (Social, Mobile, Analytics (Big Data), Cloud) and Internet of Things.

4.1.3   WIS 2.0 will be operated by the WMO community, built on industry standards, incorporating existing services and solutions provided by the public and private sectors. It aims to establish a 'global information management, processing and sharing platform' that will provide the following benefits:

(a)   Accessibility: a platform enhancing the collection of data and allowing applications and services to be developed, capable of working with high-volume and archived data, and operated and managed without the complexity of building and maintaining infrastructure or managing local repositories of data;

(b)   Interoperability: software components interact with the platform using industry common approaches and open standards;

(c)   Visibility: authoritative data from NMHSs are visible to government, commerce and citizens;

(d)   Utility: a focus on meeting the needs of users to exploit meteorological data in context with data from other domains, enabled through services offered by the WMO community;

(e)   Reliability: data and services are safe and accessible with guaranteed performance at any time;

(f)   Cost effectiveness: avoid duplication through use of shared components built on infrastructure of organizations that can leverage economies of scale; use of standard technology, avoiding the need for WIS-specific skills;

(g)   Capacity-building: training to enable all NMHSs, particularly from Least Developed Countries and Small Island Developing States, to use infrastructure and services of the WIS 2.0 platform to build services that meet the needs of their domestic stakeholders.

4.1.4   A core principle of the WIS 2.0 strategy is the recognition that advances in technology make it feasible for organizations to provide services and components that serve a global audience. The WIS 2.0 platform will support the provision of such shared components, reducing the need for duplication of components and the overhead of associated data synchronization.

4.1.5   WIS 2.0 encourages Members to coordinate delivery and operation of the shared components that comprise the WIS 2.0 platform. Fundamentally, the WIS 2.0 platform is intended to support the needs of the WMO community, providing the foundation that makes it simple for the WMO community to provide information and services and simple for users to find them.

4.1.6   The WIS 2.0 platform will support a change in user behaviour from downloading a copy of information for local processing to using services that process the information at its source. The WIS 2.0 platform will be complemented by a set of principles to encourage best-practice information assurance (data life cycle management) by the WMO community. This will support emergence of common approaches designed to provide users with a confidence about the quality of information utilizing user feedback mechanisms, to support continuous improvement, and to present a seamless user experience across Members' services.

4.1.7   WIS 2.0 will continue to provide data collection and distribution at national, regional and global scales.

4.1.8   Technical aspects of WIS 2.0 are anticipated to include:

(a)   Use of cloud computing infrastructure to host shared components (such as data repositories and applications) to provide low-latency global data sharing to enable the WMO community to 'plug' their components into shared infrastructure and easily deliver value-added services to their users and to provide facilities that enable users to work with high-volume data in-situ rather than require download for local usage;

(b)   Use of Web standards, Web services and well-defined APIs to enable WIS 2.0 to become 'machine interoperable' - i.e. enabling software systems to find and use the meteorological data and services hosted on the WIS 2.0 platform without requiring routine human intervention;

(c)   Use of common open data formats (e.g. JSON, CSV, XML, netCDF, HDF) complementing Table-Driven Code Forms (GRIB, BUFR), to simplify data provision and use by a broader community;

(d)   Use of analytics and user feedback to drive continued improvement of user experience;

(e)   Integration with global search engines (such as Google, Bing or Yahoo) to improve visibility of the authoritative information provided by NMHSs while retaining data sovereignty;

(f)   Integration with third-party identity management services (such as eduGAIN) to simplify authentication of users;

(g)   Retirement of traditional GTS message switching as the basis for operational, real-time data exchange in favour of industry standard data distribution methods and protocols such as secure file transfer and publish-subscribe messaging;

(h)   Fault tolerant design of WIS 2.0 components and applications to deliver high quality of service even where underlying infrastructure cannot guarantee a level of service.

4.1.9   Implementation of this strategy must be based on the most cost effective way for shared components to be provided, comparing the benefits of managed cloud computing services that are operated on behalf of the WMO community with a federated solution that takes advantage of the competencies and strengths of organizations within the community.

4.2   Governance

4.2.1   A governance regime supporting a financially sustainable WIS 2.0 platform will be developed alongside the technical aspects. National Centres and Data Collection or Production Centres remain the primary centres within WIS 2.0 as these are the centres that collect data, generate content and deliver services. WIS 2.0 will continue relying on the contribution of GISCs, including their associated collaboration and capacity development activities. Their role will evolve from infrastructure provision to focus on providing more-effective support to centres in their area of responsibility.

4.2.2   WIS 2.0 governance will need to address issues such as:

(a)   Data life cycle management,

(b)   Data licensing and access,

(c)   Information security,

(e)   Cost sharing and contract management with commercial infrastructure suppliers,

(f)   Resource allocation (e.g. compute, storage) within shared components,

(g)   Private sector participation.

4.3   Incremental change

4.3.1   Considering operational aspects of the WIS and the risks involved with a "big-bang" approach, WIS 2.0 will be implemented step-by-step with defined and manageable incremental phases.

4.3.2   Activities within OPAG ISS are providing insight into the first incremental steps to transition to WIS 2.0. For example, evaluation of the "cache in and through the cloud" is a step in this direction.

4.3.3   OPAG ISS, in collaboration with other technical commissions and programmes, will prepare an implementation plan describing the transition to WIS 2.0 that takes into account priorities based on management of risks and benefits.

5. Risk Identification

5.1 The overall strategy is ambitious, involving many contributors, new technologies and standards. Hardware, systems, development and ongoing support have to be integrated into strategic planning and system replacement processes.

5.2 Each contributor's solution has to interface with other contributors' solutions, whilst meeting local, national and regional requirements. WIS 2.0 will also invoke extensive alterations to current business processes. There is also a critical requirement for the evolution from existing information systems to WIS 2.0 not be disruptive to the present systems which have established very high availability, robustness and performance. These qualities are also required in WIS 2.0.

5.3 The successful implementation of the WIS 2.0 strategy will require the participation of experts from around the world. Many of them are not allocated full-time to the task and already face pressing operational issues as they also support critical operational systems and procedures. The WIS 2.0 implementation team will have to work as a virtual team.

5.4 WMO systems support many high profile or critical activities in Member countries such as the preparation and distribution of warnings. Failures in the new system could lead to critical information not reaching the right place at the right time, a risk that must be addressed in the implementation plan.

5.5 WIS 2.0 will provide new capabilities that could create opportunities for Members to run their operations more efficiently. Some components of WIS 2.0 such as data policy and data access via the Internet have raised concerns that will need to be addressed.

5.6 To reduce the exposure to the above risks and to ensure prompt delivery of WIS 2.0, it is recommended that a full time project manager is appointed to guide implementation of the strategy, to maintain a comprehensive risk assessment and to act as the focal point for all significant issues.

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Annexes: 3

Annex I - WIS Status

1.   WIS and WMO Programmes

1.1   WIS is the single coordinated global infrastructure responsible for telecommunications and data management functions. It is the pillar of the WMO strategy for managing and moving weather, climate and water information in the 21st century. WIS provides an integrated approach suitable for all WMO Programmes to meet the requirements for routine collection and automated dissemination of observed data and products, as well as data discovery, access and retrieval services for all weather, climate, water and related data produced by centres and Member countries in the framework of any WMO Programme.

1.2   In its current form, the WIS (and GTS) is a niche infrastructure that supports the expert meteorological community. WIS intended to support all WMO Programmes; however the reality in 2016 is that only the World Weather Watch Programme is well represented.

2.   WIS Architecture

2.1   The infrastructure used for operational exchange between WIS centres is a combination of Private MPLS Networks (such as the RMDCN), Public Network (Internet) and satellite broadcast (such as Eumetcast). Services rely largely on well-known applications (FTP and SFTP). Although operational and workable, dedicated MPLS networking is complex, has increasing IT security challenges and contractual complexities. Further, MPLS networks can offer a SLA, but at a very high cost for limited bandwidth, so the resulting operational costs can constrain bandwidth, limiting the amount and types of data exchanged through traditional GTS processes.

2.2   WIS Part A, the continued evolution of the GTS, though providing an efficient operational service, hinders the WIS by imposing "old" technologies. The mapping of the TTAAii bulletin header to metadata creates problems and imposes two rather different solutions: TTAAii on the one hand, DAR on the other hand. Both components should be merged while preserving the operational quality of the GTS and ensuring information arrives when and where it is needed.

2.3   The Functional Architecture document (http://wis.wmo.int/WIS-FuncArch) has been the baseline to design the WIS as we know it today. A large majority of the requirements have not changed and the obligations that the WIS has to fulfil are still the same. However, the topology of the WIS in 2016 is largely inherited from the pre-existing GTS[1], and the technical solutions available twenty years ago.

2.4   GISCs played a central role in building the WIS. In addition to hosting of the discovery metadata services and new functionality of WIS, they have significantly contributed to capacity development and within their area of responsibility.

3.   Strengths and Weaknesses of WIS

3.1   WIS provides access to diverse information for a broad range of users in both public and private sectors. Those data, information and knowledge enable stakeholders to improve decision-making processes.

3.2   WIS is very reliable. it has been established as the common communication infrastructure to support all WMO Programmes and related organizations. World Weather

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[1]   The GTS is a merge of technical and procedural elements involving NMHSs and RTH. The term GTS covers many different technical, functional, administrative and operational aspects. In most cases, the decommissioning of the GTS will only address the technical part of the "Manual on the GTS".

Watch data/products have been circulated through the GTS only for WMO Members. Today, the information intended for global exchange is also available to WMO Members and the meteorological communities through the WIS DAR (Discovery Access and Retrieval) service over the Internet.

3.3	WIS facilitates the sharing of weather and climate data and information collected and processed by WIS centres. It ensures that those data are discoverable and accessible to support the development of products and the delivery of information services.

3.4	WIS provides reliable service through redundant systems, e.g. Disaster Recovery Centres and backup arrangement with partner GISC(s). Area Meteorological Data Communication Networks (AMDCN) with their Area of Responsibilities (AoR) are being used not only for network infrastructure but also as a framework for capacity development with the WIS competency and training guidance.

4. Metadata

4.1	The WIS DAR Catalogue comprises around 150,000 metadata records, which is significantly larger than many catalogues.

4.2	Metadata records conform to ISO 19115:2003, encoded in XML format complying with WMO Core Metadata profile. The quality of metadata is mixed and impacts the discovery service offered to WIS users. For example when a user is searching for temperature products, they are deluged with search results of bulletins as the catalogue contains very 'fine-grained' metadata, dominated by GTS bulletins. Represented "one metadata record per TTAAii+timestep" is damaging the search experience.

4.3	With the retirement of WMO-No. 9 Vol C1, the primary function of WIS appears to have become management of operational bulletins; e.g. notification of changes between operational centres.

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Annex II – Definition of terms of limited meaning

Cloud computing: Network- or Internet-based services, computing, storage or processing that provides shared resources to WIS centres to support flexible levels of demand.

Open eco-system: Interoperable virtualized digital services focusing on maximizing re-use, agility of operations and scalability built on open standards.

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Annex III - Information and Technology Trends

1.   *Big Data*

1.1   "Big Data" is a term widely used and usually refers to new technical solutions to deal with massive amounts of data (volume), that might in addition also cover velocity (the data are being created frequently), variety (the nature of data can be very different) and veracity (can the data be trusted?). It is often referred to these elements together as the 4 V' of Big Data. In the context of WIS, we have to address these 4 V's, and this can have operational consequences. For example, transferring to users huge amount of data might no longer be possible. In the current system, the data is usually sent to the process. In the future the opposite should be possible, where the process is sent to the data.

2.   *Cloud*

2.1   The big players on the Internet (e.g. Google, Amazon) and other providers are making available to users applications, computing and storage resources to host data and process it in a shared environment called "The Cloud". Instead of using internal resources, in certain situations, it may be much more cost-effective for an organization to use a Cloud service for processing, storing and exchanging data.

2.2   Considering Big Data as described above, the Cloud and the associated services (applications, processing and storage) are likely to be a very cost-effective way for the WIS to deliver services and data to the users.

2.3   ICT ISS is investigating the applicability and potential of cloud computing services and cloud computing based data exchange in support of the WMO Information System.

3.   *Search Engines*

3.1   The current WIS is based on a catalogue of metadata. In order to find a particular dataset, users have to connect to a GISC portal and use their search tools. It means that the "gates" to enter into the WIS are the GISCs. However, nowadays, the "gates" for all content on the Internet are the search engines such as Google and Bing. Therefore, making data available to users will require the WIS to use the de facto standards and common practice of the Internet. The catalogue should therefore be searchable and accessible via the common "gates" of the Internet, the search engines.

4.   *Messaging and Social Networking*

4.1   Sharing notifications, messages and alerts has become common place through the medium of social media. Services such as Twitter are built using industry standard messaging protocols and quickly scale to support many millions of concurrent users sharing information in real-time. Social media messages often include images, the size of which easily exceeds that of a typical GTS message. These technologies offer new opportunities for sharing meteorological data in real-time based on common industry practices.

5.   *Internet of Things*

5.1   Along with available network connectivity almost everywhere (Wi-Fi, 3G, Bluetooth, very low speed networks…) and very cheap sensors of all kinds, the Internet of Things is developing rapidly. Whether it takes the form of windscreen wipers connected on cars, or weather stations for homes, the Internet of Things is creating and will continue to create a vast ecosystem of companies, which are not WIS users, but who will be nevertheless interested in exchanging data with WIS users to develop their business and in return provide an incredibly

large amount of observation data. The WIS should facilitate these interactions with weather-related Internet of Things.

6.   *API and Web services*

6.1   Application Programming Interfaces (APIs) and Web Services are now very common solutions for machine to machine interaction. By offering standard interfaces and by allowing exchange of data using official or de facto standards (JSON, XML, CSV,...), the WIS should offer, in addition of the human interface it currently has, solutions to facilitate machine to machine communication. The Open Geospatial Consortium (OGC) is developing several standards to facilitate such interactions. Along with these solutions, the WIS should provide lightweight interfaces to allow users to interact with the WIS. As such interactions often require users to be authenticated, WIS Members should be encouraged to accept validated third party authentication services, such as those provided by research network GEANT (eduGAIN) or by commercial entities like Google or Facebook.

7.   *Open data*

7.1   Open data is data that anyone can access, use or share and whose licence allows users to do what they need to do with the data without additional constraints. Many governments have decided to release data in this way, aiming to foster the development of applications and services that will benefit citizens. In addition, it is sometimes required to propose this data using standard protocols and format.

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BACKGROUND INFORMATION SUPPORTING DECISIONS/RECOMMENDATION

NOT TO BE INCLUDED IN THE SESSION REPORT

References:

1.   Abridged final report with resolutions and recommendations CBS-Ext.(2014) (WMO-No.1140).

2.   WIS Monitoring Common Dashboard demonstration pilot - http://wis.wmo.int/page=WIS-Monitoring

3.   Interim guide to WIS monitoring - http://wis.wmo.int/wis-monitor

4.   *OPAG-ISS draft* Proposed Security Incident Process for WMO Member States – http://wis.wmo.int/file=3004

Introduction

The following information provides background to the draft decisions and draft recommendation incorporated in this document.

1.   Proposed Security Incident Process for WMO Member States

1.1.   OPAG-ISS recognize that WIS currently lacks a formal (or informal) security incident response process, as well as any practical way of sharing security information.

1.2.   OPAG-ISS established an ad hoc task team on security led by ET-CTS. The task team identified that there is a need for a process to formally address security incidents, be they real or through misinformation. The resulting draft proposal for Security Incident Process for WMO Member States is online at http://wis.wmo.int/file=3004. The proposal considers the risks (see Appendix A for risk assessment), then answers pertinent questions which arose from analysis of the risks, and makes a number of proposals for adoption by WMO. OPAG-ISS is inviting CBS-16 to confirm the need for a WIS security incident management process and to approve the path for having a proposal available for consideration by EC-69.

1.3.   The following table extracted from the draft proposal outlines the recommendations of the OPAG-ISS ad hoc task team on security.

Number	Recommendation	Intended Outcome	How to Achieve it
1	Adopt a common security incident management process	Member State organizations can follow a common process.	A lightweight simple process is proposed to accommodate requirements of all WMO Member State organizations.

Number	Recommendation	Intended Outcome	How to Achieve it
2	Adopt a central WMO IT security contact point	This is to encourage a centralized and definitive view on security incidents, reducing misinformation and prevent individual Member States from undue queries.	There is a single point of contact for reporting IT security incidents, or checking the status of a specific Member State. The WMO central point can offer advice, and will prevent the affected or potentially affected site from being overwhelmed by contacts from other Member States. This contact point will also appear on the WMO IT Security Contacts List (see below). Exactly how this WMO central point of contact is to be operated is to be decided (see Actions).
3	Make the GISC role clear in this process	Reinforce the duties and responsibilities of GISCs operators in regard to this process.	Educate the GISC and RTH operators in these processes, underlining that this is a normal part of discharging their GISC, RTH and AMDCN responsibilities.
4	Adopt & maintain a list of IT security contacts (e-mail/phone) for each WMO Member State.	They will be the contact who the central WMO contact point will contact. This will be a single and definitive contact point for security incidents which will have the authoritative voice for that organization, increasing clarity and reducing misinformation.	A contact list of operational IT security contacts containing e-mail addresses and phone numbers should be maintained. These are groups or individuals who are responsible for the operational security of the Member State's meteorological department. This might for instance be a helpdesk, or a 24/7 Security Operations Centre, or an individual on-call for such events. The IT security contact point does not need to be a named individual (but does need a phone number and e-mail address). Member States need to be able to share this information freely without concern. Ideally, the list should be "self-service" where Member States can amend their own information directly. The contact list should be held centrally by WMO, but how this is to be done and who will maintain it is to be determined.

Number	Recommendation	Intended Outcome	How to Achieve it
5	Adopt a mechanism (a collaboration capability) for sharing IT security information and good practice.	Increase knowledge and awareness of IT security, including best practice.	This could be used to inform the WMO community about current security incidents, or to share information about how these have been overcome. It could also be used to share information including hints and tips on IT security. This could take the form of a "newsgroup", "forum" or other (to be defined) social media application where information can be posted (privately) by any Member State and can be read by any other Member State organization (but not the public). The collaboration capability should be managed/moderated centrally by WMO, but how this is to be done and who will maintain it is to be decided.

2.   WIS System Monitoring

2.1   CBS-Ext.(2014) (WMO-No.1140, paragraph 3.2.13) identified monitoring was a key component of the WIS that contributes to managing day-to-day operations, long-term planning and identification and resolution of problems. The Commission welcomed the interim guidance on WIS monitoring (at http://wis.wmo.int/wis-monitor) that specifies near-real-time and quarterly monitoring practices, and encouraged ICT-ISS to proceed with a pilot implementation with volunteer GISCs so that the interim guidance can be tested and updated with the aim of producing a standard practice for inclusion in the *Guide to the WMO Information System* (WMO-No. 1061) at CBS-16.

2.2   ICT-ISS established a task team involving ET-WISC and ET-CTS which established three approaches to a WIS monitoring common dashboard. These were at GISC Beijing, GISC Brasilia and GISC Tokyo. Other ET-WISC members also provided experimental monitoring sites that demonstrated the scalability and flexibility of the underlying monitoring files and using cloud based servers. These can also be seen on the WIS monitoring project page http://wis.wmo.int/page=WIS-Status.

2.3   The WIS monitoring prototypes were demonstrated to Cg-17 participants and were well received, with some Congress members wanting to see more information about the performance of WIS in their national centres. This feedback and other lessons learned were fed back into the pilot project and the JSON format of the underlying monitoring updated to allow more detail about data centres to be collected by the GISCs to support the common dashboards.

2.4   CBS-16 is being asked to consider the demonstration pilot of the prototype WIS monitoring common dashboards and, if in agreement, to authorize making them operational and to set in process the updating of the WIS Manual and Guides to reflect the practices and procedures that have been refined since first considered by CBS-Ext.(2014).

3. WIS 2.0 Strategy

3.1 CBS-Ext.(2014) (WMO-No. 1140, paragraph 3.2.25) recognized the importance of creating and delivering a long-term vision for the evolution of the WIS. It tasked ICT-ISS to create and maintain a strategy for the development of the WIS, and added this requirement to the Terms of Reference of ICT-ISS. This was endorsed by the Executive Council (Decision 38 (EC-68) - Development of Strategy for the WMO Information System) who requested CBS to present a proposal for governance structure and strategy for the evolution of WIS to EC-69. The proposed Strategy is provided as draft Recommendation 5.5(1)/1 CBS-16.

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