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Conceptual design for a WWW data management system

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1. INTRODUCTION

1.1 Definition and scope of WWWDM

The World Weather Watch Data Management (WWWDM) will be an integrated approach to the most effective use of the resources available to the World Weather Watch (WWW). It will embody the conception of the facilities, services and functions of the WWW as a single integrated system. The system design will enable the participation of all WMO Members, commensurate with their abilities, at appropriate technological levels and will provide suitable interfaces to enable transition. Migration to the WWWDM system will be phased over a considerable period, allowing existing systems to be replaced or superseded step by step.

1.2 Purpose and scope of this document

This paper is in response to a questionnaire from the WMO requesting suggestions concerning the WWWDM as contained in the WWW plan (WMO, 1986 - see Annex I), its objectives, its specific functions and aspects of its implementation. While accepting the WWWDM plan as an accurate, comprehensive analysis of the data management (DM) problem, it attempts to extend the process of WWWDM system design.

For completeness, Section 2 contains material which, to a certain extent, paraphrases parts of the WWWDM plan. This material is the result of a careful appraisal of the WWWDM plan, research into and re-reading of the many WMO documents on Informal Planning Meeting (IPM), Integrated Systems Study (ISS), etc. (WMO, see reforms), and some original thought. That the resulting assessment is so close to being a paraphrase of the WWWDM plan suggests not only a consensus of view between the authors concerned, but also a continuity of logical development towards the current proposals.

1.3 General principles of system design

A large data management system requires three levels of planning:

- conceptual design
- definition of shared interfaces
- technical implementation.

The conceptual design describes the processes required of the system. It does not describe how those processes will be implemented. Rather it defines a set of common concepts with system wide relevance. Such concepts allow the components of the system to be designed in a general way even if different means of implementing the concepts will be adopted at different locations.

The definition of shared interfaces is vital to the integration of a complex system. Shared interfaces will include means for data transportation, means for data access, methods for representing data and the definition of all functions shared between two or more locations. Without sufficiently defined interfaces system functions cannot be integrated. With overdefined interfaces systems functions lose flexibility, become complex and are difficult to maintain. Thus interfaces should be simple, efficient, sufficient and general. They must also be precisely defined, to avoid ambiguity and error.

The technical implementation requires that technical means be found to implement the conceptual design with the aid and within the constraints of the defined interfaces. The nature of the technical solution will depend on the means and the facilities available. Several technical solutions will be required for a single conceptual function due to differences in hardware, expertise and applicational support practice at different locations.

2.   AIMS AND OBJECTIVES

2.1   Basic objectives

The major basic objectives of WWWDM should include:

- the production of sufficient meteorological observations to an acceptable set of standards;

- the efficient global exchange of real-time observational data between centres requiring global coverage;

- the efficient and flexible supply of sub-sets of real-time observations from global exchange centres to other centres;

- the production, exchange and flexible supply of real-time products;

- the production, exchange and flexible supply of archive data, including climatological data;

- the production and exchange of information concerning data availability, data quality, observational practice, instrumentation and computational methods;

- the production and exchange of monitoring statistics, verification statistics and forecast intercomparison statistics.

In particular, WWWDM should address the problem of making as fully available as possible, in real-time or near real-time, an increasing volume of observational data and derived products.

2.2   Establishment of standards

The success of WWWDM will require the acceptance of many new standards to achieve well designed and efficient interfaces. These will include:

- standards for data representation
- standards for data transmission
- standards for on-line data storage and data bases
- standards for archive/retrieval systems
- standards for request/reply mechanisms
- standards for software development and maintenance
- standards for data presentation and graphics.

The establishment, endorsement and recognition of standards in all of these areas should be included within the aims and objectives of WWWDM. Where corresponding, internationally accepted (e.g. ISO) standards are available, appropriate sub-sets of these should be used.

2.3   Support and Coordination

Although the scope and objectives of WWWDM are such that migration to the
fully integrated system will take many years to complete, some components of the
system will be developed fairly rapidly. It is vital that such advanced
components develop within the conceptual framework, using the correct
interfaces. Thus management decisions concerning the technical and conceptual
aspects and defining the standards for the interfaces will be required to be
taken as soon as possible.   Measures will need to be taken to ensure that the
momentum of planning and recommendation is maintained.

An important additional objective, aimed at achieving the fullest participation
in WWWDM at the earliest point in time, should be to support the transfer of
technology to the developing nations. To this end provision should be made for:

- training in data processing techniques;

- consultancy and advisory services;

- software transfer;

- follow-up support.

Since WWWDM will require the development of new software packages, it will be
in the interest of all participants to reduce the duplication of effort in
producing many similar packages independently. Software development should be
co-ordinated where possible to produce robust, transportable packages. The
development and maintenance of such packages should be shared between several
centres, and centrally planned, designed and co-ordinated. Such packages should
be made widely available and maintenance information shared between users. This
should present a unique opportunity to facilitate a cost effective technological
transfer based on increasingly cost effective hardware.

3.   CONCEPTUAL DESIGN

3.1   Introduction

The conceptual design of the WWWDM system that follows indicates the
components and sub-systems necessary to create an integrated system capable of
complying with the objectives enumerated above. As a conceptual design it is
complete. As a system design it requires the addition of interface definitions,
technical specifications, implementation design and maintenance planning.

3.2   System overview

Fig. 3.1 illustrates the five major sub-systems which together comprise the
WWWDM system:

- the data collection and distribution sub-system, central to the
  concept, which moves data to and from the other sub-systems as and
  when required;

- the observing sub-system, which supplies measurements of appropriate
  meteorological values;

- the product generation sub-system, which performs analysis, data
  assimilation, forecasting and other functions resulting in the
  generation of products;

- the archive and retrieval sub-system, which stores real-time data
  resulting from the other sub-systems, and which is capable of
  supplying retrieved data from the archives;

- the data presentation system, which converts data from the standard
  WWWDM exchange formats into lists, tables, annotated values, diagrams,
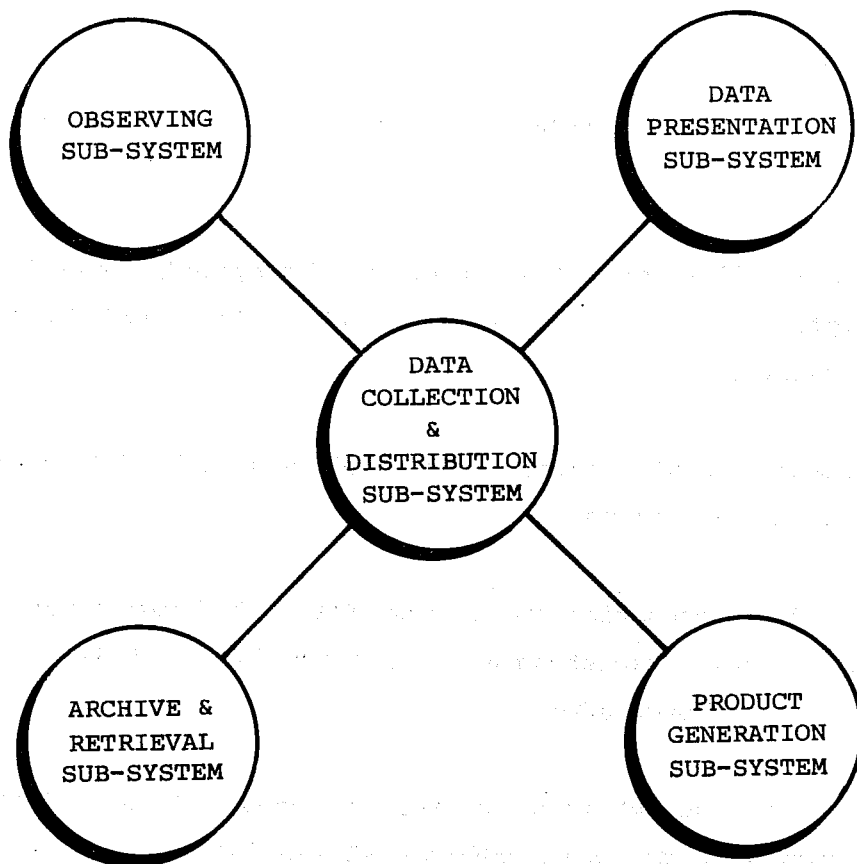 maps or plots suitable for human assimilation.

Fig. 3.1:   The WWW Data Management System

3.3   The data collection and distribution sub-system

It is envisaged that WWWDM will be centred on a Data Collection and Distribution Sub-system incorporating conceptual features considerably improved on those of the current Global Telecommunications System. Indeed, to achieve the objectives of flexibility, efficiency and sufficiency it will be necessary to achieve considerably higher transfer rates and to employ very different techniques.

The Data Collection and Distribution Sub-system will require:

- a real-time data base containing observational data and products in WWWDM standard representation form; status and monitoring information are also stored;

- a data updating function, capable of updating the data base, requesting data from other locations as necessary;

- a system status function, which logs the status of this location with respect to data, function and system availability and notes the status information received from other locations;

- a request/reply function capable of handling incoming requests from other sub-systems or locations and sending the replies and requested data via the appropriate telecommunications or transmission function;

- a data monitoring function performing real-time quality control and adding quality control information to the data base; this function should also check the real-time availability of selected data, initiating requests for untimely data via the request/reply function.

Standard, approved binary codes will be used throughout the WWWDM. Thus, during the transitional period it will be necessary to convert data received via the GTS in the character code forms. It may also be necessary, as a transitional measure, to convert some binary data to an agreed sub-set of the character code forms to feed locations connected to the GTS. These conversions are performed with the aid of the transitional GTS interface function.

3.4   The observing sub-system

The volume of observational data is expected to increase rapidly. Most, if not all of this increase will result from automated processes. It is thus <u>vital</u> that <u>all new additions</u> to the automated input of observational data <u>use standard, WWWDM defined binary representation forms</u>.

Where observations are manually produced, cost effective means should be explored to enable the conversion of the collecting process to be automated and to result in data in WWWDM standard representation forms.

Use of flexible forms for data representation will enable non-standard observations to be exchanged, assimilated and used. This added flexibility will reduce the lead-time between the conception and application of new forms of observations; it will also enable much currently measured, non-standard data to be exchanged and used.

3.5   The product generation sub-system

Generation of analysis, data assimilation and forecast products continues to be an area of rapid development. It will be the aim of the WWWDM to enable access to an increasing diversity of products made available for exchange by specialised centres, by appropriate global centres and by centres with regional or national responsibilities.

The growth of product volume will result from higher resolution numerical models and from a greater diversity of products generated. These will require flexible and efficient forms of WWWDM standard representation forms. While FM 92 GRIB will probably be extensively used for products in field form, the more universal BUFR form, when developed, will provide the ability to diversify product development.

When generating analysis and data assimilation products, where possible monitoring statistics depicting the differences between observed and computed values should be produced. These statistics should be added to the observational data within the data base and archives to facilitate non-real-time monitoring and to enable the quality of the products and observations to be studied.

Perfect prognostication methods (PPM), model output statistics (MOS) and other means of post-processing primary forecast products are playing an increasing role in making the best possible use of available data. Trajectory computation, back-tracking, etc., are important aids to the study and elimination of pollution. Generation of products from such systems would enhance their availability.

The product generation sub-system should be viewed as a 2 stage process:

- the production of primary products of general application;

- the post-processing of such products to meet specific data presentation needs, and to expand continually the wealth of useful information that can be obtained from numerical prediction.

As such it should evolve to meet the requirements of the data presentation sub-system, resulting in increasing cost/benefit with respect to the total system.

Generation of non-real-time products, such as time series, climatology and special data sets in support of specific projects (e.g. TOGA) should be additional functions of the product generation sub-system. Such products, when generated, would be passed to the archive and retrieval sub-system for storage.

3.6   Archive and retrieval sub-system

WWWDM should be capable of providing non-real-time services. The ultimate aim should be to provide such services on a request/reply basis in real-time. During a transitional period it will probably be necessary to supply data resulting from such requests in non-real-time, using magnetic tape as a transport medium.

Conceptual planning of an archive and retrieval sub-system should seek to minimise data conversion. Thus standard data representations employed in the collection, distribution and on-line data base should be carried through to the archive and retrieval sub-system. This not only results in cost effective and efficient retrieval, it minimises data transformation and will enable retrieval into the correct form for real-time dissemination when this can be achieved.

There should be a conceptual identity with respect to the requesting of data from the archive to that for requesting data from the on-line data base. This reduces the interface complexity, reduces software support and increases the usefulness of the total system. A user has only to implement one single request/reply function for real-time and non-real-time acquisition.

3.7   Data presentation sub-system

The human access to the products and data within the WWWDM system should not be overlooked. There is no point in enhancing the ability to manage observations, products, monitoring information, archival data, status information, etc., unless results can be presented in an appropriate manner.

The data presentation sub-system is a concept intended to meet the needs of automated recipients wishing to display data and of non-automated recipients wishing to receive annotated listings by teletype.

The data representation forms used within WWWDM should be designed to convert easily into annotated lists. The request/reply function will cater for routine routing of agreed selected data. Thus it will be possible to provide much enhanced support for non-automated centres, giving each such centre a tailor-made dissemination service. Further, the data will be interpretable without recourse to a thorough knowledge of a complex set of codes. Thus, less effort will be needed to train staff in the intricacies of the code forms.

It is envisaged that teletypes will gradually be replaced by terminals with some processing capability. Already reliable micro-computers are available at less than the cost of a second hand teletype. Such terminals could be programmed to prompt observers for observations, convert the typed input to the appropriate binary form and transmit the result to the collection and distribution sub-system.

The data presentation sub-system should be capable of supplying data in graphical, diagramatic or plot form and could be extended to give full interactive support to appropriately equipped users.

4. THE DEFINITION OF SHARED INTERFACES

4.1 General

The conceptual design, presented above, is invariant throughout the system. It provides the framework within which various technical solutions become possible. It would indeed be unrealistic to conceive of a single technical solution duplicated at every location within the WWWDM system. Diverse solutions with respect to differing hardware, software and level of sophistication become possible and feasible through the definition of shared interfaces. The purpose of the shared interfaces is to link the conceptual functions to the implementing software and hardware.

At this stage many of the shared interfaces necessary for the implementation of WWWDM either do not exist, or are being designed. It is beyond the scope of this paper to submit a design for each interface. Nevertheless, the design, specification and standardisation of the shared interfaces can be completed within the next 2 to 3 years. This task should be given a high priority. It is vitally important for the efficiency, viability, simplicity and effectiveness of the WWWDM during the next 20 to 25 years that well designed and universally accepted shared interfaces be available as soon as possible.

4.2 Communications standards

These should be based on the ISO/CCITT standards, such as the OSI and FTAM. For WWWDM to be capable of using modern technology to the full, considerable enhancements will be required in the communications area. To facilitate such enhancements, a reformulation of communications standards will be necessary.

It is likely that the emerging ISO standards will be extremely broad in scope. For WWWDM purposes standardisation on agreed subsets and possibly on agreed interpretations will be necessary. The aim should be to define minimum and target standards within the ISO standard, with a regular updating of the minimum as progress is made.

Standards adopted should be such that a maximum of those functions required to be performed (e.g. message routing, identification, etc.) are performed by and within the ISO protocol.

4.3 Standards for data representation

Standard, machine independent, binary forms for data representation will be required. These forms will replace the current character based code forms, enabling more flexible data representation and eliminating the need for complex decoding software. Data will be represented in the same standard representation during transmission, within data bases and within archives. Thus data transformation processes will be minimised. Transformation will be required to achieve:

- data in the format of the target processor (a process which can be generalised with higher level languages);

- data that can be viewed and understood by humans (annotated tables and lists of values);

- during migration, some data will need to be transformed into agreed sub-sets of the character code forms.

The BUFR code is currently being developed and would be well suited to the needs of WWWDM. It is a universal code, capable of describing and representing all meteorological data (observations and products). It is self defining, incorporating a means of data description; this enables the requirements for flexibility to be met.

Both BUFR and GRIB provide extremely efficient data representation and compression. Data compression is essential to achieve cost effective data transmission, and to enable data exchange to be maximised within given transmission capacities; it is also beneficial in enabling cost effective on-line and off-line data storage. The maximum gains from data compression are achieved precisely in the areas of most rapidly expanding data volumes – satellite observations and processed products.

FM 92 GRIB has demonstrated the efficiency of a binary code to represent forecast and analysis products and is currently used to exchange WAFS products.

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It is important that binary codes do not proliferate, as did the character code forms. Flexibility is diminished when a separate code form is applied for each new representation. WWWDM should aim to represent data using generalised techniques only. Thus BUFR, being completely general, would be the optimum means of data representation. FM 92 GRIB will, no doubt, also be required at first. Some attempt should be made to unify the two binary forms into a single, universal form.

4.4   Standards for data bases and archives

The data representation of the data within WWWDM data bases and archives should conform to the standards for data representation.

The retrieval interface to data bases and archives should be identical. Thus a request for data base retrieval today should conform to the requirements of a request for retrieval of the same data from archives next month.

4.5   Standards for request/reply mechanisms

If WWWDM data representation standards result in binary forms which not only contain data, but also sufficiently define the data they represent, such forms can be extended to represent data requests. Thus, standards for a request/reply mechanism can be formulated in conjunction with the formulation of data representation standards.

4.6   Standards for status information

It will be necessary to convey the status of various locations, or nodes, within the WWWDM system to enable the system to be monitored. Such information will be used to decide the need for data updating, the locations from which to request data, the back-up status, etc. Standards are required to enable such functions to be coordinated.

4.7   Standards for data presentation and graphics

Data presentation in tabular form and annotated lists can be standardised by the use of agreed character abbreviations to represent parameters and agreed character fields for depicting (decimal) numerical values. Such a set of

standard definitions would exactly parallel the universal table of elements required for BUFR representation. It would result in a trivially simple data transformation process.

Graphical depiction of observed data and products could be disseminated within WWWDM. International standards (GKS) are emerging in this field and should be adopted as appropriate within WWWDM.

4.8   Standards for software development and maintenance

Since software exchange should be encouraged within WWWDM it would be appropriate to make recommendations with respect to standards for software development and maintenance. Software is becoming more expensive than hardware. To reduce costs, especially those incurred in maintaining software systems, good standards are essential. While the strict enforcement of this type of standard would not be appropriate, guidance material reflecting the experience of the more advanced users would be a valuable aid to others.

References

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THE WWW DATA MANAGEMENT (WWWDM)

INTRODUCTION

Purpose and scope of WWWDM

148.   The WWW Data Management (WWWDM) will be an integrated approach to the most effective use of the resources of the GDPS, GOS and GTS. A primary requirement on the WWW is the timely delivery of data and products of assured quality. The WWW Data Management is concerned with the overall real-time management of data and products of the WWW system and the monitoring of the data availability and quality.

149.   The underlying principle in the WWWDM design is the need for integration of GDPS, GOS and GTS sub-systems, facilities, services and functions into a system conceived as an entity, aimed at ensuring efficiency of the WWW as a whole. In order for each Member to participate at a level commensurate with its abilities and requirements and at an appropriate technological level, it is necessary to allow for suitable interfaces and transition arrangements.

Main long-term objectives of the WWWDM

150.   The main long-term objectives of the WWWDM are:

(a)   To assure the availability and quality of WWW data and products;

(b)   To implement a flexible system for the collection and dissemination of data and products in real-time;

(c)   To use appropriate formats and codes for presentation of data and products and for real-time and non-real-time exchanges within WWW;

(d)   To establish common procedures for making available data and products from the WWW system in a rational fashion to meet Members' individual needs;

(e)   To ensure an orderly real-time monitoring of the availability of data and products within the system and of the status of WWW operations and provision of information on the non-real-time monitoring of the WWW operation.

151.   Due to the increasing volume and variety of observational data and products and the evolving methods and technologies used in the WWW, the simple injecting into the GTS of pre-determined sets of data and products, whose content and presentation conform to rigid standards, may not meet users' requirements efficiently. Therefore, there is need for co-ordination in managing the availability of data and products in a form convenient to the recipient Members through real-time monitoring, updating and amending of data, and by avoiding unnecessary duplication in data handling at centres at all levels (WMC, RSMCs, RTHs and NMCs under the GDPS/GOS/GTS activities).

152.   In order to ensure the optimum use of resources, WWW Data Management will provide functional specifications for the data formats, including codes and exchange formats, guidelines for the design of data bases and the real-time storage, monitoring and handling of data at WWW centres. This will ensure, in an efficient and convenient manner, the provision at meteorological and other centres, including WAFCs and RAFCs, of observational data and processed information in the format required.

153.   Through a set of procedural functions and definition of interfaces, particularly in the area of data processing/data communication, the WWWDM will allow Members to obtain coherent and appropriate sets of data and products they require, despite the different levels of sophistication in respect of technology and techniques used at various WWW centres. WWWDM co-ordinates the management of data supplied by the GOS (observational data) and the GDPS (processed information), and relies upon data collection exchange and distribution services provided by the GTS. Thus, WWWDM integrates the three major components of the WWW into a coherent and efficient WWW system, allowing the composition of transmission programmes with maximum flexibility to Members in respect of data and products, through interfaces and use of facilities suitable for them.

MAJOR INFLUENCES 1988-1997

154.   The total amount of observational data and products of the WWW is expected to double every 4-5 years. This increase is expected to occur from more extensive automation of surface-based observing systems, further introduction of surface-based remote sensing systems such as radars, SODAR, LIDAR and increased inclusion of automated in-situ observations such as ASDAR and drifting buoys in the GOS. The amount of satellite data will constantly increase due to improved retrieval procedures, particularly in respect of higher resolution and frequency of vertical soundings (e.g. TOVS and VAS), increase in wind vector data and possibly also in satellite cloud cover data. Ocean satellites will provide large amounts of wave and surface wind (or surface stress) data. The total amount of observational data is expected to exceed, in most cases, the requirements of any individual Member to receive these data for its own data processing activity.

155.   The number of products available from WWW centres will also increase sharply in respect of the types of analyses and forecast products, their geographical coverage and last but not least, in respect of their information content.

156.   The technology evolving for data processing and data communication allows the design of co-ordinated data processing/data communication systems which will facilitate the co-operation of Members at different levels of technical sophistication. However, systems design needs to follow a clearly defined data management concept to ensure that the flow of data and products is meeting Members' requirements with minimum redundancy and duplication.

157.   Based on the ISO Open System concept and the stated requirements, an overall logical system for handling observational data and processed products, as part of the WWW, needs to be developed. The development of functional specification to this end should be consolidated in the WWWDM.

(WWW 785)

158.   The evolution of the amount of observational data and products and the development of suitable technology for WWW Data Management will require a number of years. The implementation of the majority of WWWDM function is expected to take place in the mid-1990s. However, the concept should be laid down at an early stage, to allow Members to plan their systems for the gradual insertion of new WWWDM functions, as appropriate.

WWW Data Management Functions

159.   While most of the WWWDM functions have already been supported in some form by the current WWW, the improved WWW will need their clearer definition and enhancements in respect of further standardization and reformulation. This should be done in the light of ISO/CCITT standards, such as the OSI, in respect of data processing and data communications, the emerging of digital technology based on public data networks, satellite point-to-multi-point services or MDD missions of the METEOSAT. While the functions are clearly inter-related, it may be worthwhile to specify separately:

(a)   Data and information presentation, including exchange formats and codes and conversion between formats and codes;

(b)   Data and product selection and presentation to recipient (e.g. NMCs);

(c)   Quality control of data and products to achieve agreed quality assurance at appropriate WWW levels;

(d)   WWW data and product recovery procedures in cases major outages of key facilities;

(e)   Real-time monitoring of the operation of the WWW;

(f)   Non-real-time monitoring of the WWW of the operation;

(g)   Provision of information of WWW operation, including continuously up-dating of data flow on the GTS, taking into account the operational status of the WWW and the requirements of Members;

(h)   Provision of information on instruments and sensors in the operational systems.

Data and product service functions

160.   The above functions could be translated into WWWDM service functions. The services supported by the WWWDM are aimed at providing the selection and presentation of data required by Members together with reports on the real-time status of operation of the WWW system. Members' requirements can be divided as follows:

(a)   Routine requirements for standard applications, such as those performed by the majority of WWW centres, in particularly the NMCs;

(b)   Routine requirements for specific applications, e.g. of centres undertaking specific responsibilities for elaboration of processed products;

(WWW 785)

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(c)   Limited non-routine requirements which could be supported by selected centres under bi- or multi-lateral agreements.

161.   Three types of data selection service are supported by the centres undertaking responsibilities in the framework of the WWWDM:

(a)   Common data services. Subsets of observational data and processed information are compiled on a routine basis, each of them corresponding in respect of the parameters, area of coverage, etc. to the requirements of common standard applications. These data subsets are disseminated to centres according to their requirements; this refers in particular to agreed global and regional data sets;

(b)   Specialized data service. Specific data subsets are compiled on a routine basis to support specific applications. These specific subsets are transferred to the relevant centres on a routine basis. These services will be specified in detail by regional and sub-regional agreements;

(c)   Special data service. Centres may access to a limited extent, and upon special agreement between Members concerned, and retrieve real-time data for specific, non-routine purposes. The functions of the special data service include a mechanism for assignment of priorities and routeing in accordance with the operational status of the data handling and communication resources available.

The three data services also support the provision of data (in the internationally agreed formats) required by centres, quality control of data and products, and procedures for recovery of missing data and products and thus improve the reliability and availability of data and products.

162.   The WWW Data Management also provides for reporting in real-time the status of operation of the WWW system concerning availability of observational data and system functions as well as on operational condition of various WWW components.

163.   The WWWDM will provide the basis for the most flexible design and operation of WWW concerning the exchange and storage of data and products, supported by the required computerized data handling , management and monitoring processes.

MAIN DESIGN FEATURES OF THE WWWDM

164.   The design of the WWWDM as part of the introduction of the OSI concept may be based on the following considerations:

(a)   The WWWDM functions may be based on the operation of WWW data bases at WWW centres, performing storage of real-time observational data and processed products;

(b)   The content of the WWW data bases should be co-ordinated through the direct exchange of meteorological data and management information, to ensure homogeneity of data and operational information.;

(WWW 785)

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(c)   The content of a data base should match the most frequent requirements of centres within the area normally served, should integrate the observational data subset collected from this area and should also provide back up facilities;

(d)   Data handling should be highly flexible to accommodate varying requirements and include interfaces between data communication systems forming part of the GTS. Data presentation should be in accordance with the requirements and facilities of users;

(e)   The system should be developed in line with the relevant international standards of ISO and CCITT;

(f)   The data base should provide the background information for real-time and non-real-time monitoring of the WWW.
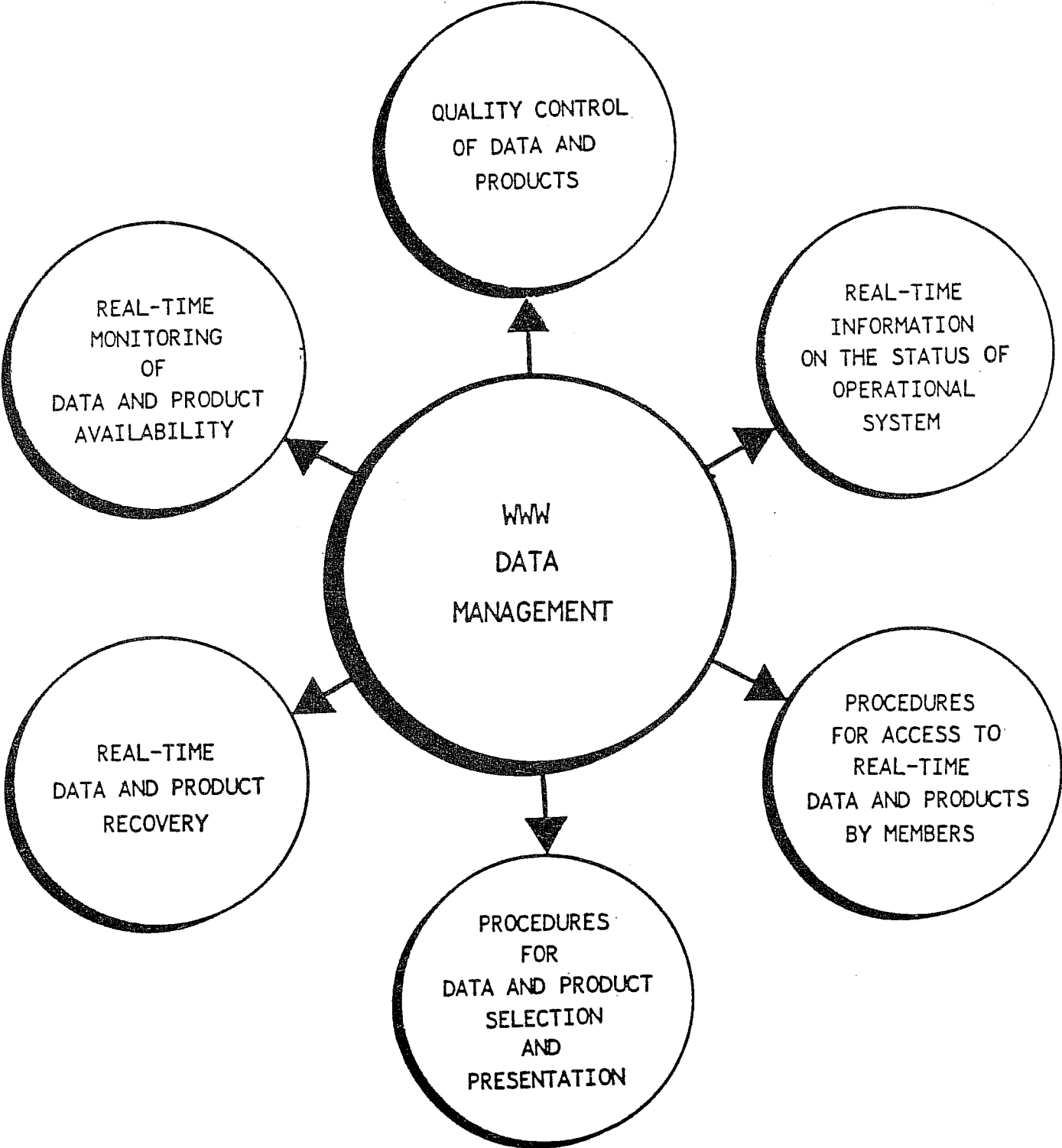
IMPLEMENTATION OF THE WWWDM

165.   The WWWDM concept is expected to develop into an important integrating systems feature of the WWW. Its effective implementation requires a careful design of the functional specification of all types of WWW centres. Through appropriate logical systems design and distribution of functions, the introduction of the WWWDM would be economically possible.

166.   In order to keep the resources required, detailed systems planning, in particular functional specification of software used by WWW centres is necessary. In particular:

(a)   Quality control procedures for data and products;

(b)   The requirement for data in varying formats requires detailed interaction between providers and users of the service;

(c)   The requirement for data services may require enhancements of computer facilities (hardware and software) at designated GDPS and GTS centres and could be considered for implementation only regionally and/or multinationally.

167.   It is therefore likely that the WWWDM implementation will be gradual and extend over a period of years. The various WWWDM functions will be introduced progressively and all aspects of operation will be closely monitored on the basis of progressive experience.

WWW DATA MANAGEMENT

QUALITY CONTROL OF DATA AND PRODUCTS

REAL-TIME INFORMATION ON THE STATUS OF OPERATIONAL SYSTEM

REAL-TIME MONITORING OF DATA AND PRODUCT AVAILABILITY

WWW DATA MANAGEMENT

PROCEDURES FOR ACCESS TO REAL-TIME DATA AND PRODUCTS BY MEMBERS

REAL-TIME DATA AND PRODUCT RECOVERY

PROCEDURES FOR DATA AND PRODUCT SELECTION AND PRESENTATION

WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS

EXPERT MEETING ON WWW DATA MANAGEMENT (WWWDM)

GENEVA, 22-25 September 1986

CBS/EMDM/Doc. 1
(29.V.1986)

ITEM, 1.3

ENGLISH ONLY

PROVISIONAL AGENDA

1.   ORGANIZATION OF THE MEETING

 1.1   Opening of the meeting

 1.2   Election of the chairman

 1.3   Approval of the agenda

 1.4   Working arrangements for the meeting

2.   FURTHER DEVELOPMENT OF THE WORLD WEATHER WATCH DATA MANAGEMENT PLAN

3.   DESCRIPTION OF SPECIFIC FUNCTIONS OF WWW DATA MANAGEMENT

4.   IMPLEMENTATION ASPECTS OF THE WWW DATA MANAGEMENT FUNCTIONS

5.   CLOSURE OF THE MEETING.

COMMISSION FOR BASIC SYSTEMS

EXPERT MEETING ON WWW DATA MANAGEMENT (WWWDM)

ITEM: 1.3

GENEVA, 22-25 September 1986

ENGLISH ONLY

EXPLANATORY MEMORANDUM RELATING TO THE PROVISIONAL AGENDA

1.   ORGANIZATION OF THE MEETING

1.1   Opening of the meeting

The CBS Expert Meeting on WWW Data Management (WWWDM) will be opened at 10 a.m. on Monday 22 September 1986 in the WMO Secretariat, Geneva, Switzerland.

1.2   Election of the chairman

The meeting will be invited to elect a chairman.

1.3   Approval of the agenda

The meeting will be invited to consider and approve the provisional agenda.

1.4   Working arrangements for the meeting

The meeting may wish to arrange the working hours and any other working arrangements.   The working language will be English with whispered interpretation from and into Russian.   The meeting is expected to work in one committee with documentation in English only.

2.   FURTHER DEVELOPMENT OF THE WORLD WEATHER WATCH DATA MANAGEMENT PLAN

The meeting is invited to consider the World Weather Watch Data Management (WWWDM) plan with a view to ensuring effective and efficient handling of WWW data and products.   The meeting may also wish to consider short and long-term objectives and other matters relating to its modular design and implementation strategy.

3.   DESCRIPTION OF SPECIFIC FUNCTIONS OF WWW DATA MANAGEMENT

        The meeting may wish to define and specify the WWW data management
functions which could usefully be introduced at the global, regional and
national levels of the WWW.

4.   IMPLEMENTATION ASPECTS OF THE WWW DATA MANAGEMENT FUNCTIONS

        The meeting will also be invited to recommend data management
functions for phased implementation into the WWW system.   The meeting should
also consider the transition from the present system into the new Data
Management arrangements.

5.   CLOSURE OF THE MEETING.

        The meeting is scheduled to close on 25 September 1986.