WORLD METEOROLOGICAL ORGANIZATION
and
THAI METEOROLOGICAL DEPARTMENT

TRAINING SEMINAR ON
INFORMATION AND COMMUNICATION TECHNOLOGY FOR THE GTS
BANGKOK, 23 - 27 SEPTEMBER 2002

Recommendations

1. Connections between RTHs

Outcomes of the Implementation Co-ordination Meeting on the GTS in Region II (Southern part) (New Delhi, January 2002)

1.1 The Implementation Co-ordination Meeting on the GTS in Region II (Southern part) (RA II-ICM-GTS) (New Delhi, January 2002) recommended that, in the framework of the upgrade of the GTS circuits linking RTHs Tokyo, Bangkok and New Delhi via Frame Relay services and the resulting improvement in cost-effectiveness, the Bangkok-New Delhi connection be also upgraded and re-included into the RMTN.

1.2 The RA II-ICM-GTS recommended that the additional circuit Beijing-New Delhi, operating at 9.6 kbit/s be included in the RMTN plan as a circuit interconnecting two major RTHs in the Region and ensuring a higher reliability and capacity of the whole RMTN. It also recommended that the circuit Bangkok-Singapore be endorsed as an inter-regional circuit, noting the plans of RTH Bangkok to upgrade both inter-regional circuits Bangkok-Kuala Lumpur and Bangkok-Singapore to Frame Relay, 16 kbit/s (CIR).

Recommendations of the training seminar

1.3 The training seminar recommended that the RTHs in Region II develop plans to upgrade the circuits mentioned in Annex to this paragraph to allow the transmission of data at a minimum speed of 64 Kbits/s using TCP/IP procedures. The training seminar recommended to invite the RTH focal points for the IRMTN to investigate the feasibility of the use of managed data communication networks/frame relay services (including technical, administrative and financial aspects), and to send the results of the investigations to the rapporteur on the IRMTN (Mr Hiroyuki Ichijo, h_ichijo@met.kishou.go.jp) with a copy to the WMO Secretariat (kerherve@www.wmo.ch)

2. Connections of NMCs to the GTS

Outcomes of the Implementation Co-ordination Meeting on the GTS in Region II (Southern part) (New Delhi, January 2002)

2.1 XII-RA II (Seoul, 19-27 September 2000) endorsed the concept of an Improved RMTN using modern cost-effective data-communication network services. In view of the geographical extension of the Region, the RA II-ICM-GTS agreed that the design of the Improved RMTN could be based on the implementation of several networks grouping RTHs and NMCs as appropriate. Considering that cost-effective data network services such as Frame Relay and IP-VPN (Internet Protocol - Virtual Private Network) services were available in parts of the Region and that the administrative mechanisms for implementation would not be developed shortly, XII-RA II agreed upon a practical step by step approach for the implementation.

2.2 The RA II-ICM-GTS also considered with interest a document submitted by India proposing a mixed approach to the improvement of South Asian Segment of RMTN using Frame Relay, the Internet and Commercial Satellite Broadcast. It agreed with the general concept of upgrading circuits using Frame Relay services and of the use of Internet, including E-mail services and applications for facilitating the initial automation of NMCs and data exchange with their RTH. The RA II-ICM-GTS underlined nevertheless the inherent security risks of the Internet.

2.3 The RA II-ICM-GTS particularly emphasized the following recommendations:

- Each RTH should survey the technical status, capabilities and opportunities of its associated NMCs, as well as the data-communication network services that are commercially available and cost-effective in their respective zone;
- RTHs should assist their associated NMCs in developing implementation plans, including target implementation dates; this plans should include the migration to TCP/IP, which is a key factor for enabling the use of cost-effective systems and communications;
- As an initial step, current circuits should be upgraded as soon as possible using data-communication services that are considerably more cost-effective than conventional leased circuits, such as Frame Relay services. In this regard, the training seminar noted that the circuit New Delhi-Tokyo was upgraded to a 64 Kbits/s TCP/IP circuit in August 2002.
- Financial assistance is expected to be required for a number of NMCs for the implementation of the Improved RMTN. In addition to the development of individual VCP projects on the basis of the NMC/RTH plans mentioned above, the Secretariat was invited to establish a co-ordinated co-operation project for the implementation of the IRMTN in Region II. This project would facilitate the management and a focused use of funds contributed by donors.

2.4 The RA II-ICM-GTS noted with particular interest satellite-based digital audio broadcast systems, which provide also commercial "datacasting" services, from companies such as World Space. The data should be provided to the nearest uplink site and is distributed via the satellite at scheduled broadcast hours at a nominal cost of approximately US$10 per MB supported by the provider RTH. Data is received by the end user via a commercial radio receiver with a small L band antenna and a PC card adapter, which is manufactured by several companies at an approximate cost of US$150. The service has the additional advantage of reception at any mobile platform such as ship. RTH New Delhi was seriously considering the implementation of this system for serving users, including marine vessels. RTHs were invited to consider this very attractive technical system as a potential solution for a very cost-effective replacement of HF radio broadcasts.

2.5 The implementation and capacity of the Internet is uneven, but there are rapid developments and changes that the meteorological community should take up as an opportunity for progress. The current Internet could not generally guarantee the quality of service (reliability and committed information rate) for the operational real-time exchange, and the GTS would continue to be dedicated to the exchange of real-time and critical data and products. The Internet is however playing an increasingly important role for the exchange of less time-critical information, for the supply of data and products to other users as well as for the active participation of NMHSs in WMO and related co-ordination activities. In some cases, the Internet may be the only telecommunication means that is available and affordable for providing a connection of an NMC with the GTS. To efficiently support GTS and WWW operations, all RTHs should implement a full access (E-mail and WEB) to the Internet, including the operation of a server for facilitating the exchange of relevant information with other WWW centres, and in particular with its associated NMCs. RTHs should be capable of capturing meteorological data from e-mail with a view to its insertion into the GTS. NMCs should as well implement an Internet access and develop Internet functionality, as an integrated component of the upgrade of WWW systems. Adequate security

measures should be taken, along the guidelines developed by CBS to ensure an efficient use in a secure data-communication environment.

Recommendations of the training seminar

2.6 The training seminar noted that RTH Bangkok had the capability to receive observational data from NMCs through Internet using FTP ("put" procedure with user-id and password) and make it possible for the NMCs to retrieve files ("get" procedure with user-id and password). The training seminar recommended that RTH Bangkok implement with the highest priority this procedure for the collection of observational data from NMC Phnom Penh in co-ordination with the WMO Secretariat. This procedure should also be used as a back-up means for the collection of data from the NMCs associated to RTH Bangkok. RTH Bangkok may take the appropriate arrangements with its associated NMCs, including monthly tests of the procedures with the NMCs.

2.7 The Training seminar recommended that the RTHs in Region II develop plans to implement the procedures for observational data collection using E-mail via Internet recommended by the ICT/ISS (see Annex to this paragraph).

2.8 The training seminar recommended that the RTHs in Region II develop plans to implement a Virtual Private Network (VPN) via the Internet. A guidance document on the most appropriate practices and implementation option(s) for VPNs between GTS centres recommended by the ICT/ISS are available on the WMO server (http://www.wmo.ch/web/www/TEM/ICT-ISS2002/guideVPN.doc). It was noted that these guidelines would be further refined in light of the experience gained in implementation, including in particular the operational tests on VPNs via the Internet that were carried out by the ECMWF. The RTHs were invited to report to the WMO Secretariat on their own implementation to share the experience gained. The training seminar recommended that RTHs Bangkok, Beijing, New Delhi and Tokyo be invited to carry out a VPN pilot project for Region II and that RTH New Delhi be invited to ensure the co-ordination of the pilot project. The RTHs in Region II should develop plans for their connection to the VPN and the connection of their associated NMCs in co-ordination with them, as soon as the pilot project would be successfully implemented. The VPN should in particular be used:

- By the NMCs not connected to the GTS to transmit observational data to their associated RTHs, such as NMC Phnom Penh,
- By the NMCs to receive data and products from the RTHs in complement to the GTS point-to-point circuits, in particular by those NMCs not yet connected to the GTS or connected at low speed.
- By the RTHs as a back-up means for the exchange of data.

The training seminar recommended to invite the WWW centre to send information on the procedures to access their Internet servers and the data and products available to the Secretariat. The Secretariat will include the information in the WMO server (http://www.wmo.ch/web/ddbs/ftpsvr.html).

2.9 The training seminar recommended the use of satellite distribution systems to complement the point-to-point circuits, such as UKSF/WWW for which a pilot project was being carried out. The training seminar recommended to pay a specific attention to the development of satellite-based digital audio broadcast systems, such as the project of RTH New Delhi (see Annex to this paragraph).

2.10 The training seminar recommended that NMCs Hanoi, Yangon and Phnom Penh be connected to at least one RTH by a TCP/IP circuit. The speeds of transmission from and to each centre could be different (e.g. on an asymetric circuit), but the NMC should receive data from its associated RTH at a speed of 16 Kbits/s or higher. The meeting recommended that the RTHs Bangkok, Beijing and New Delhi develop plans with their associated NMCs to upgrade the circuits mentioned in Annex to this paragraph in this respect.

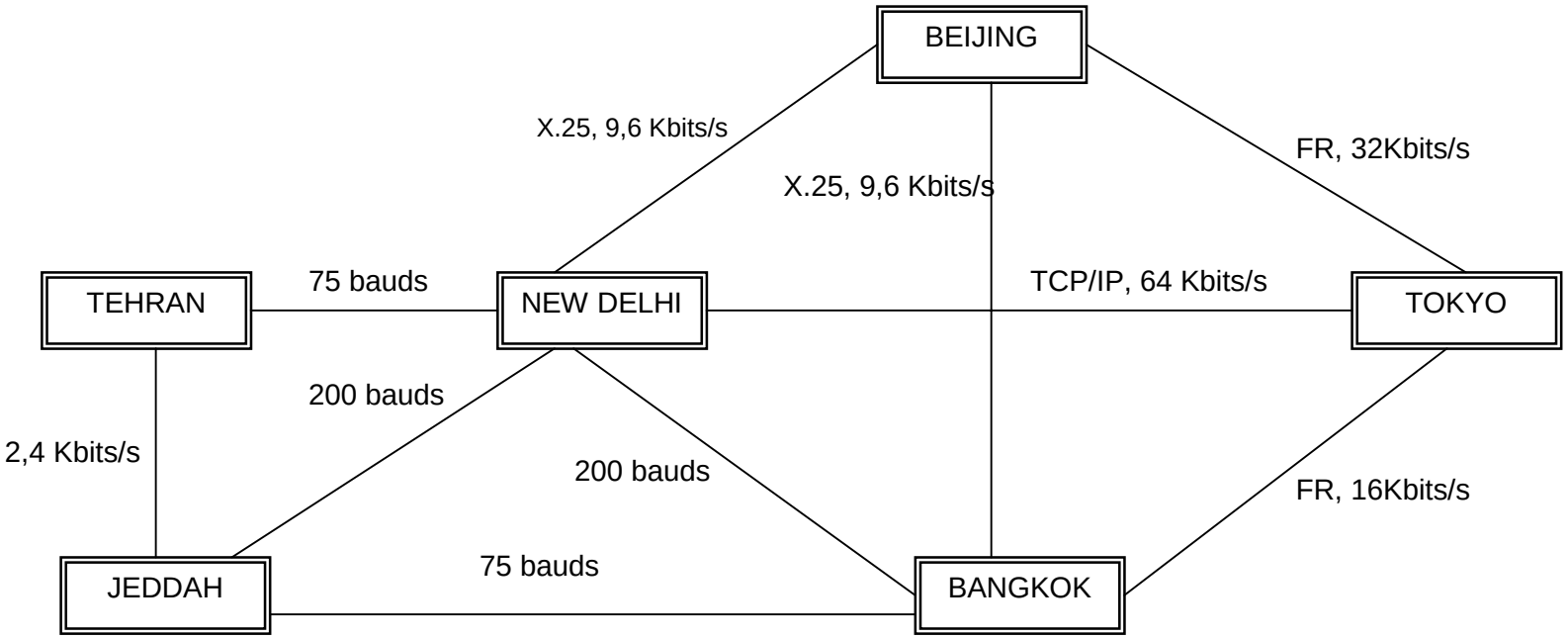
2.11 The speed of transmission of 64 Kbits/s on the circuit Bangkok – Vientiane was the minimum speed that the Lao service provider (ETL) could provide in 2001. Savings could be made in reducing the speed of transmission if feasible and appropriate. It was agreed that NMC Vientiane will reconsider the speed of transmission that ETL could provide in 2002 and afterwards, and inform RTH Bangkok and the Secretariat of the results of the findings.

2.12 The registered IP address for the host GTS centre required for the implementation of a TCP/IP connection should be provided by the local Internet Service Providers (ISP). Obtaining these official IP addresses from ISPs may be extremely difficult in several countries The training seminar felt that this question should be solved case by case and the WMO Members should inform the Secretariat of any difficulties experienced. As regards the circuit Bangkok – Vientiane, the training seminar recommended that the Secretariat consider the allocation of a registered IP address for the host in NMC Vientiane (see paragraph 3.1.1 of the report of the ICT/ISS).

2.13 The training seminar recommended to invite the RTHs and their associated NMCs to review the transmission programmes on the GTS circuits. The operational information available in the WMO server (http://www.wmo.ch/web/www/ois/ois-home.htm) such as the catalogue of meteorological bulletins and the routeing catalogues of the RTHs may be used as a reference in this respect. The training seminar recommended to expedite the use of binary code forms (GRIB, BUFR) instead of alphanumerical forms (GRID) for the exchange of products.

Annex to Paragraph 1.3

Connections between RTHs in Region II



Annex to paragraph 2.7

Procedures for observational data collection using E-mail via Internet recommended by the ICT/ISS

The document provides guidelines for using Electronic Mail as a complementary communication system for collecting meteorological data bulletins over the Internet. The purpose of this proposal is not to replace the existing data collection systems, but to serve as a complementary system to be used in test and special cases, or when a GTS link is unavailable.

Background

Electronic mail (E-mail) can be a very simple and cost effective way to exchange GTS messages. It should be noted however that e-mail is not an end-to-end service and there is no guarantee of the timely delivery of messages.
The following guidelines describe practices for sending both Data Collection Bulletins and Binary GTS Messages via E-mail.

Guidelines for sending GTS messages via electronic mail on the Internet:

1. E-mail Messages shall be sent in ASCII (plain text) with possible attachments. HTML shall not be used.
2. The GTS message(s) can be sent either as text in the body of the e-mail, or in the attachment(s) of the e-mail, but not in both. Binary data should only be included in e-mail attachment(s).
3. The body of an e-mail shall follow the following format:

<security string>

<GTS message>

…

<GTS message>

where,

<security string> is a bilaterally agreed word or series of words to help in the validation of the e-mail. The security string is optional.

<GTS message> is a standard GTS message starting with the abbreviated header line, such as

TTAAii CCCC YYGGgg [BBB]

message text

Each line of the GTS message should not exceed 69 characters.

No other information should be included in the body of the e-mail unless agreed by the receiving centre.

Note: If the GTS message(s) are included in the attachment(s), the body only contains the **<security string>**

4. The structure and *filename (to be verified to validate)* of an attachment shall be identical to that of a file transferred by FTP. The length of an attachment shall not exceed 2 MBytes or as specified in a bilateral agreement. Attachments shall be coded in Base64 (MIME standard).
5. The e-mail header “Subject:” field either:

   (a) May contain the AHL if the e-mail contains a single GTS message,

(b) is empty or,

(c) by bilateral agreement, contains a **<security string>**.

Security considerations:

6. E-mail is inherently insecure. To minimise security issues the receiving centre should only process GTS related e-mails from a pre-defined list of e-mail addresses. That is, the receiving centre should validate the e-mail header "From:" field. To avoid problems with e-mails containing manipulated "From"-fields, centres may bilaterally agree in **<security strings>** as described in the above rules.
7. It is recommended to use specific mail accounts for GTS data transfer with bilaterally agreed names and not to receive GTS data in personal mailboxes.
8. A problem with some Mail Exchangers is that by default they operate as an "open-relay". An open-relay occurs, for example, if you are on site A.COM, and you accept mail from B.NET destined for C.ORG. This means that spammers can use your mail system to distribute their e-mails. Centres should ensure that they do not operate as an open-relay. For centres using "sendmail" as the Mail Exchanger it is recommended that they use version 8.9 or later which by default denies unauthorised relaying.

Annex to paragraph 2.9

Point-to-point connections of NMCs to the GTS