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Expert Team on Communication Techniques and
Structure

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Consideration for a Multicast FTP solution
(Submitted by ECMWF)

Summary and purpose of document

This paper presents a solution to be used as a file transfer proposal using Multicast. Depending on the traffic flows on the WIS, such a protocol could be very interesting between some sites, e.g. between GISC when a common set of data must be sent to multiple destinations.

ACTION PROPOSED: The meeting is invited to review the document.

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1. Introduction

In the traditional GTS model, on terrestrial circuits, files are exchanged between the NMHSs and the RTH, then between the RTHs. The traffic flow of the GTS is largely based on bilateral exchanges. The two protocols defined in the Attachment II.15 to exchange data on the GTS are either using a socket based approach, or the standard FTP (File Transfer Protocol). Both protocols are perfectly suitable for these one to one exchanges. They are based on a unicast protocol.

However, in the WIS it could potentially be necessary (e.g. between GISCs) to send the same file to multiple destinations. In order to do so, and to be compliant with the standard protocols, the sending site would need to have one FTP transfer (or socket) per receiving site. This would, as a consequence, have a significant impact on the network bandwidth required at the sending side to be able to cope with these parallel file transfers.

Multicast is a way to send only once the IP packet at the source, and the network takes care of forwarding the packet to all interested receivers.

EUMETSAT, as part of the EUMETCast service has a long experience of using multicast for the dissemination of information.

In a separate paper, EUMETSAT will describe the solution they are using, Tellicast from Tellitec.

2. Looking for a standard application

For unicast file transfer there are a lot of applications that are standard: FTP, SCP, HTTP... Unfortunately, there is no such standard for a file transfer application using multicast.

Some vendors, such as Tellitec (www.tellitec.de) are proposing their commercial solution. However, it may not be the preferred solution for a standard being adopted by WMO to rely on a commercial product.

Looking for an application offering a reliable file transfer using multicast gives very little result.

In the late 90s, a company called Stardust proposed a product called MFTP (Multicast FTP). Later, the company decided to make the software available as Open Source, hoping that someone would take over and implement enhancement on the software.

This is what happened, and since then, MFTP being renamed as UFTP is available as an Open Source solution.

3. UFTP

From UFTP web site (<http://www.tcnj.edu/~bush/uftp.html>):

UFTP is an encrypted multicast file transfer program, designed to securely, reliably, and efficiently transfer files to multiple receivers simultaneously. This is useful for distributing large files to a large number of receivers, and is especially useful for data distribution over a satellite link (with two way communication), where the inherent delay makes any TCP based communication highly inefficient. The multicast encryption scheme is based on TLS with extensions to allow multiple receivers to share a common key. UFTP also has the capability to communicate over disjoint networks separated by one or more firewalls (NAT traversal) and without full end-to-end multicast capability (multicast tunneling) through the use of a

UFTP proxy server. These proxies also provide scalability by aggregating responses from a group of receivers.

UFTP has been used in the production process of The Wall Street Journal to send WSJ pages over satellite to their remote printing plants, and other users have used it to send to over 1000 receivers.

4. The IP layer

In order to use a multicast application, whatever it is, the underlying IP network must support Multicast.

Implementing multicast on the local area network is usually possible as most of the vendors support Multicast in their networking device.

However, using multicast on a wide area network require that multicast is available throughout the network.

On the Internet, in a multi-provider environment (that is different ISPs for various NMHSs), multicast is not guaranteed end to end. Some ISPs may offer multicast within their network. However, the interconnection of the ISPs may not support multicast.

On the RMDCN, currently provided by OBS, multicast is available but not enabled by default.

5. The current situation

In order to assess multicast applications: UFTP and Tellicast, ECMWF and EUMETSAT (with the support of Bulgaria, Germany, Japan and Sweden) have decided to test both applications on the current network. These tests are planned to take place in May and June 2012. They should confirm whether such applications are suitable for terrestrial networks such as the RMDCN.

6. Conclusion

A separate presentation explains the context and gives some (very) preliminary results for the UFTP test environment. More tests will take place in the coming 3 months. A report will then be prepared for both the UFTP results and for Tellicast.

Based on the various experience, it will then be decided, at a later stage, to recommend, or not, the use multicast applications for the WIS.