ECMWF Feature article

Update on the RMDCN

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2009 has been a busy year for the RMDCN (Regional Meteorological Data Communications Network). In October 2008 the TAC Subgroup on the RMDCN reported to the ECMWF's Technical Advisory Committee (TAC) on its findings of the investigations concerning the future of the RMDCN. The TAC considered the report and concluded that the current contract for the provision of the RMDCN service represented good value for money and that, at this stage, an invitation to tender is not recommended. It also recommended a limited expansion of the RMDCN to countries outside WMO Regional Association (RA) IV and an upgrade of the basic RMDCN package. The ECMWF Council, at its 70th meeting in December 2008, unanimously agreed to the following.

(a) The ECMWF funded RMDCN basic package for Member States will be upgraded to the following configuration.

· Mission Critical set-up with 2 Mbps access lines.

· 1.5 Mbps IP (Internet Protocol) bandwidth.

· Service management and help desk charges.

· Redistribution charges (where applicable).

(b) The following categories of countries will be considered as potential future members of the RMDCN.

· ECMWF Member States and Co-operating States.

· RA VI countries not currently connected to the RMDCN.

· Countries operating MTN (Main Telecommunications Network) centres in the framework of the IMTN (Improved Main Telecommunications Network), including future Global Information System Centres.

· Countries outside RA VI connected to a RA VI country as part of the Global Communications Network (GTS), upon request by the RA VI country concerned.

Basic package upgrade

The 2008 Price Review resulted in a considerable reduction of the charges. The TAC Subgroup proposed to reinvest these savings and upgrade the basic package of ECMWF Member States connections which is funded out of the ECMWF budget. It was agreed that the connections should be upgraded to a Mission Critical set-up (i.e. a diverse dual connection) with an access circuit speed of 2 Mbps and an IP bandwidth speed of 1.5 Mbps. Consequently the connection of ECMWF was upgraded from 50 Mbps to 80 Mbps IP bandwidth. In addition, ECMWF Member States that already have connections at 1.5Mbps or higher were asked if they wished to reinvest the savings to increase their connections. Table 1 shows the current configurations for the ECMWF Member States.

Changes for other ECMWF Member States and Co-operating States

Sweden investigated various options for the upgrading of its RMDCN connection. Following discussions with ECMWF and OBS (Orange Business Services, the operator of the network) regarding diversity implications, Sweden ordered an upgrade to 5 Mbps IP bandwidth. This upgrade was implemented in March 2010.

Météo-France replaced their RETIM (satellite broadcasting system) service with a EUMETCast-based (EUMETSAT's broadcast system for environmental data) solution and requested an upgrade of its connection to 8 Mbps. This also required the installation of an RMDCN connection to Usingen, Germany, where the ground station for the EUMETCast service is located. This site was connected with a speed of 3.5 Mbps. The upgrade for Météo-France and the installation of the connection in Usingen were completed in October 2009.

When Morocco became a Co-operating State of ECMWF it started investigating a connection to the RMDCN in order to receive ECMWF dissemination products and also to replace its private circuit to Météo-France. Following discussions with ECMWF and Météo-France, Morocco requested a 768 kbps connection to the RMDCN and a 128 kbps ISDN Backup in October 2009. The installation was finalized in April 2010.

EUMETSAT is currently investigating upgrades of its mission critical connection currently limited to 2 Mbps.

New connections

Until September 2009, part of the IMTN (Improved Main Telecommunication Network) was using a Frame Relay network provided by BT (British Telecom) to interconnect USA, Australia, UK and Japan. As this service has been terminated by BT, the countries not yet connected to the RMDCN decided to apply for membership. Hence, USA and Australia are now connected on the RMDCN:

- USA, with a 1.5 Mbps mission critical connection, was connected in September 2009.

- Australia, with a 2 Mbps mission critical connection, was connected in October 2009.

Consequently, Japan upgraded its connection to 3 Mbps in September 2009. China also ordered an upgrade of its connection to 3 Mbps IP bandwidth.

In July 2009 ECMWF received formal requests from two countries outside RA IV, Canada and South Korea, to join the RMDCN. Both requests were supported by the United Kingdom. South Korea then ordered the installation of a 2 Mbps IP bandwidth mission critical connection. This was completed on 7 December 2009. Canada has not yet decided which type of connection it would like to establish.
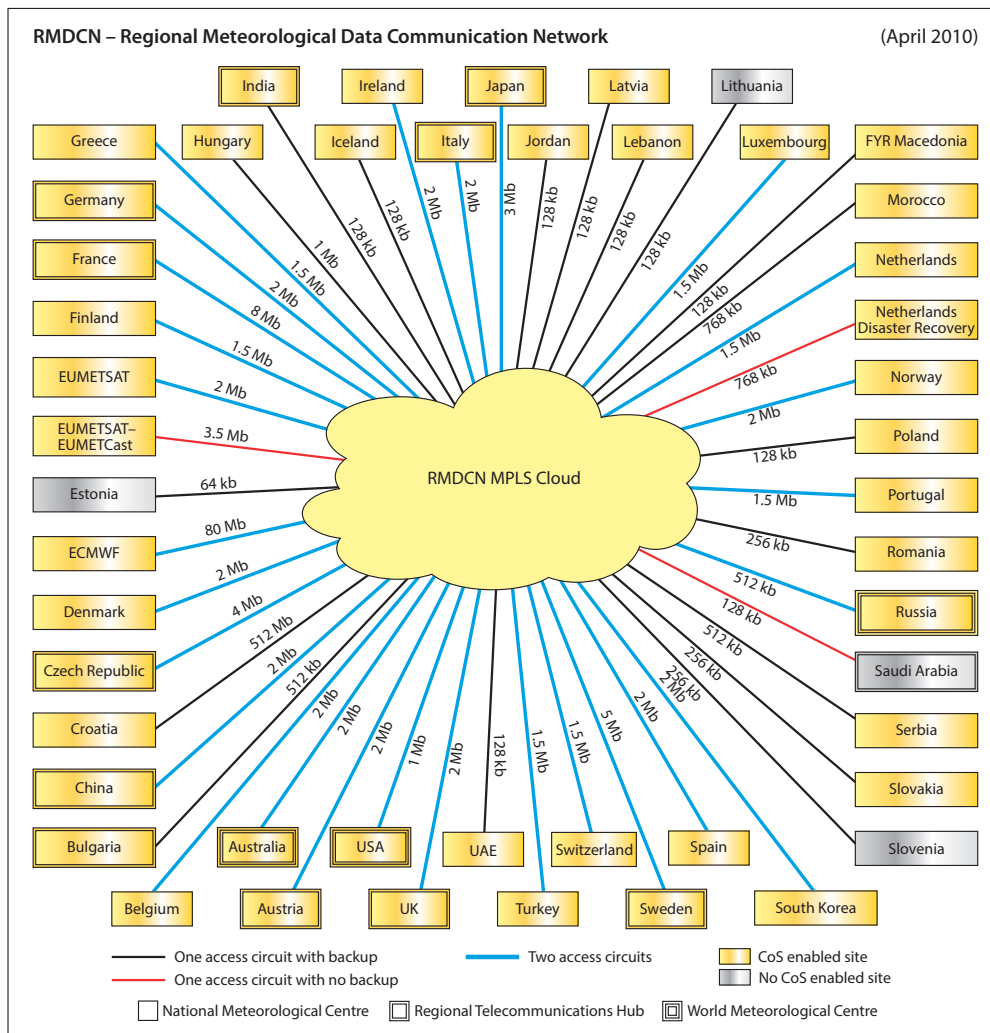

Figure 1 RMDCN configuration in April 2010.

Country/Site	Access Speed (bps)	IPVPN Port Speed (bps)	Resiliency	CoS	Load Balancing	NAS Backup Speed (bps)
Austria	2M	2M	Mission Critical	Gold	No	N/A
Belgium	2M	2M	Mission Critical	Gold	No	N/A
Denmark	2M	2M	Mission Critical	Gold	No	N/A
ECMWF	100M	80M	Mission Critical	Gold	Yes	N/A
Finland	2M	1.5M	Mission Critical	Gold	No	N/A
France	8M	8M	Mission Critical	Gold	No	N/A
Germany	2M	2M	Mission Critical	Gold	No	N/A
Greece	2M	1.5M	Mission Critical	Gold	No	N/A
Ireland	2M	2M	Mission Critical	Gold	No	N/A
Italy	2M	2M	Mission Critical	Gold	No	N/A
Luxembourg	2M	1.5M	Mission Critical	Gold	No	N/A
Netherlands	2M	1.5M	Mission Critical	Gold	No	N/A
Netherlands-DR	2M	768k	N/A	Gold	No	N/A
Norway	2M	2M	Mission Critical	Gold	No	N/A
Portugal	2M	1.5M	Mission Critical	Gold	No	N/A
Spain	2M	2M	Mission Critical	Gold	No	N/A
Sweden	8M	5M	Mission Critical	Gold	No	N/A
Switzerland	2M	1.5M	Mission Critical	Gold	No	N/A
Turkey	2M	1.5M	Mission Critical	Gold	No	N/A
United Kingdom	2M	2M	Mission Critical	Gold	No	N/A

Table 1 RMDCN configuration for ECMWF Member States at April 2010 (Member States with orange background were upgraded to a Mission Critical configuration as part of the Basic Package Upgrade). *Access Speed*: Speed of the physical connection to the network. *IPVPN Port Speed*: IP Bandwidth available. *CoS*: Class of Service (Gold: three Classes of Service defined, Silver: one Class of Service). *Load Balancing*: Possibility of using the two physical connections to share the traffic load. *NAS Backup Speed*: Speed of the available backup using ISDN.

Country/Site	Access Speed (bps)	IPVPN Port Speed (bps)	Resiliency	CoS	Load Balancing	NAS Backup Speed (bps)
ECMWF Co-operating States						
Croatia	512k	512k	Enhanced	Gold	No	256k
Czech Republic	6M	4M	Mission Critical	Gold	No	N/A
Estonia	64k	64k	Enhanced	Silver	No	64k
EUMETSAT	2M	2M	Mission Critical	Gold	No	N/A
EUMETSAT-EUMETCast	4M	3.5M	N/A	Gold	No	N/A
Hungary	1M	1M	Enhanced	Gold	No	256k
Iceland	128k	128k	Enhanced	Gold	No	128k
Latvia	128k	128k	Enhanced	Gold	No	128k
Lithuania	128k	128k	Enhanced	Silver	No	128k
Morocco	1M	768k	Enhanced	Gold	No	128k
Romania	2M	256k	Enhanced	Gold	No	128k
Serbia	512k	512k	Enhanced	Gold	No	256k
Slovakia	256k	256k	Enhanced	Silver	No	128k
Slovenia	256k	256k	Enhanced	Gold	No	256k
Other States						
Australia	2M	2M	Mission Critical	Gold	No	N/A
Bulgaria	512k	512k	Enhanced	Gold	No	128k
China	2M	2M	Mission Critical	Gold	No	N/A
FYR Macedonia	128k	128k	Enhanced	Gold	No	128k
India	128k	128k	Enhanced	Gold	No	128k
Japan	10M	3M	Mission Critical	Gold	Yes	N/A
Jordan	128k	128k	Enhanced	Gold	No	128k
Lebanon	128k	128k	Enhanced	Gold	No	128k
Poland	128k	128k	Enhanced	Gold	No	128k
Russian Federation	512k	512k	Mission Critical	Gold	No	N/A
Saudi Arabia*	512k	128k	Enhanced	Silver	No	N/A
South Korea	2M	2M	Mission Critical	Gold	No	N/A
United Arab Emirates	128k	128k	Enhanced	Gold	No	64k
USA	1M	1M	Mission Critical	Gold	No	N/A

* Saudi Arabia does not yet have a backup connection in place. Please also note that from March 2010 the connection to Saudi Arabia has been suspended.

Table 2 RMDCN configuration for ECMWF Co-operating States and other states at April 2010. The corresponding configuration for ECMWF Member States is given in Table 1. *Access Speed*: Speed of the physical connection to the network. *IPVPN Port Speed*: IP Bandwidth available. *CoS*: Class of Service (Gold: three Classes of Service defined, Silver: one Class of Service). *Load Balancing*: Possibility of using the two physical connections to share the traffic load. *NAS Backup Speed*: Speed of the available backup using ISDN.

Future developments

From April 2010 there are now 48 sites connected to the RMDCN. These are 44 National Meteorological Centres (NMCs), 1 NMC disaster recovery site, EUMETSAT (HQ and EUMETCast uplink site) and ECMWF. The current configuration is detailed in Tables 1 and 2. And the current geographical coverage of the RMDCN can be seen in Figure 2.

In the near future, new countries should join the RMDCN. South Africa has been investigating a connection to the RMDCN for quite some time. After extensive discussions with ECWMF and the UK Met Office, South Africa has now started the process of requesting membership to the RMDCN and is discussing the details of the Accession Agreement with OBS. Preliminary discussions have also started with Brazil.

Lastly, the DMVPN project, which investigated the use of Dynamic Multipoint Virtual Private Network connections over the Internet for providing a backup of the RMDCN connections, was a success. It provides a good, scalable and secure alternative backup method for the RMDCN. The RMDCN Operations Committee agreed to continue the project and start a large scale operational pilot open to all members of the RMDCN. The service went operational on 1 February 2010 with ECMWF and Sweden (acting as the DMVPN backup hub). Various NMCs (Bulgaria, Norway, Romania and Italy) have already shown an interest and it is expected that the first connections for this service will soon be established.

Since the migration to MPLS (Multi Protocol Label Switching) completed in June 2007, the RMDCN has changed a lot. With many more countries, implementation of more resilient solutions and higher bandwidths the RMDCN is larger and has an even more important role in supporting ECMWF activities as well as the meteorological community, both in Europe and elsewhere. There is no doubt that in the coming months and years the RMDCN will continue to evolve and be able to support successfully the coming changes in the WMO Information System.
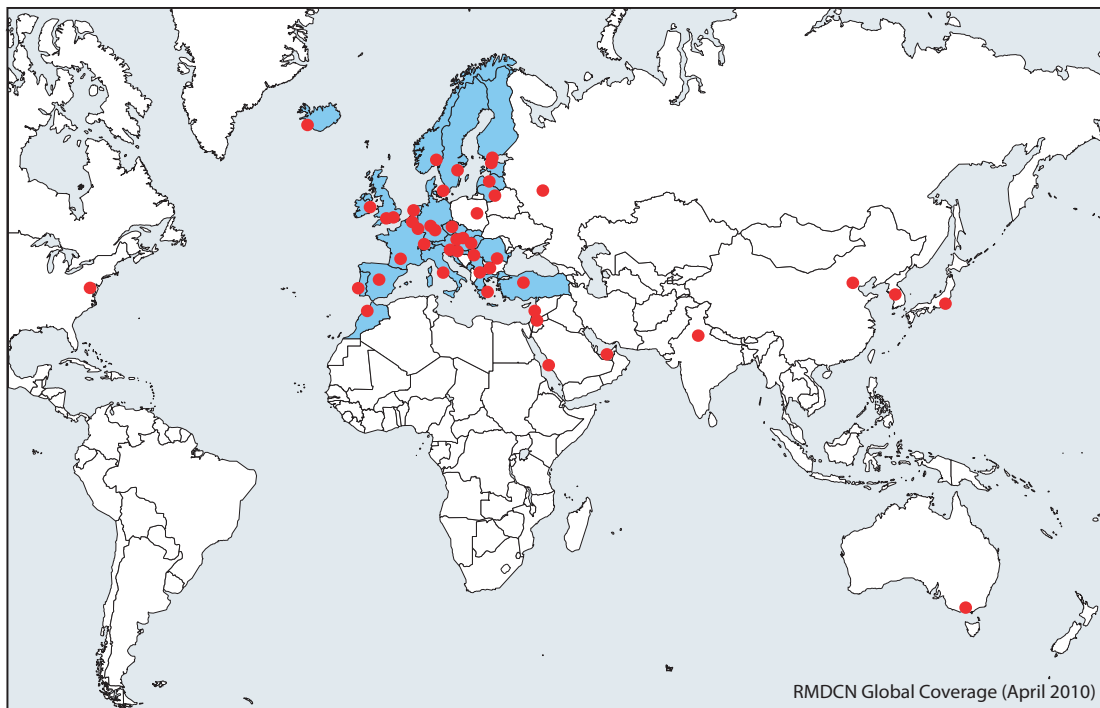

RMDCN Global Coverage (April 2010)

Figure 2 RMDCN global coverage in April 2010.