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Current situation on the RMDCN (Cloud II) and relationship with the IMTN
(Submitted by ECMWF)

Summary and purpose of document

This document describes the current situation on the RMDCN, it also addresses the recent connection of many IMTN sites to the RMDCN. The so-called Cloud II (RMDCN) and Cloud I (IMTN) can now be considered as merged.

ACTION PROPOSED:

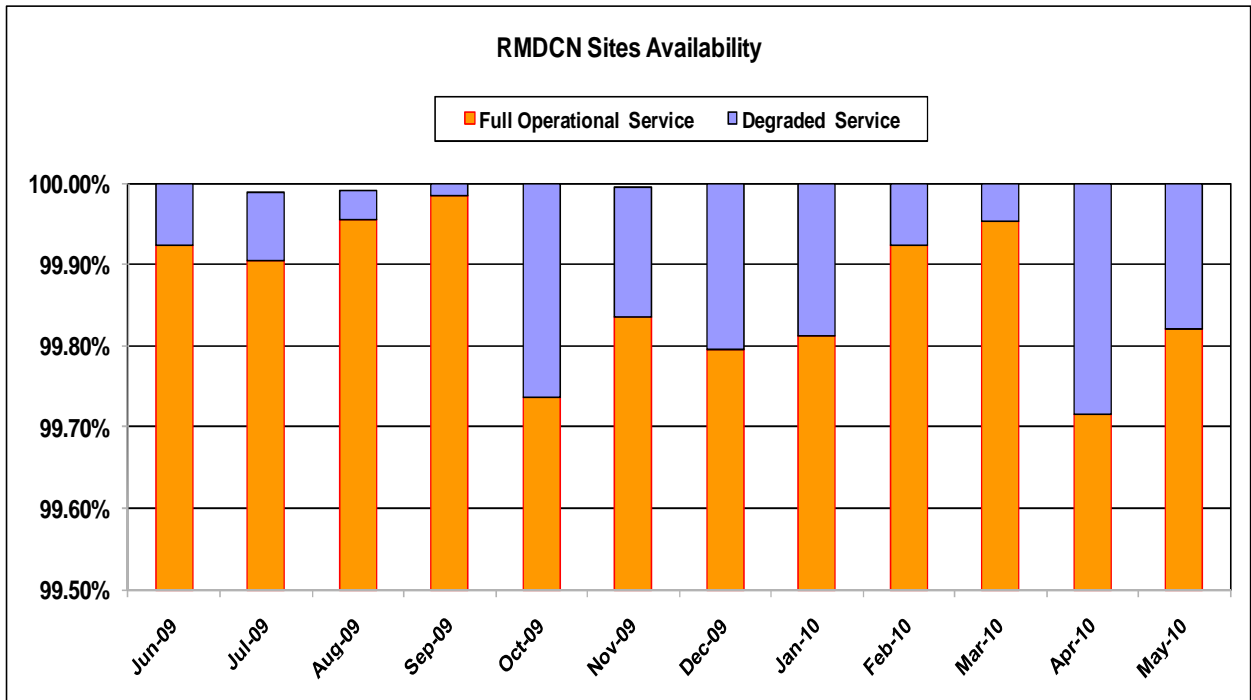
The meeting is invited to review the document.

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1. Current situation on the RMDCN

After the successful migration to MPLS network in June 2007, since then the network operates very well. The performance is good and the Service Level Agreement is reached month after month.



The orange bars above show when the service is fully available and the blue bars when the service is degraded. Degraded service means in most of the cases that either the primary or the backup access was unavailable but the site could nevertheless use the RMDCN.

In 2008, following discussions with both ECMWF committees and the RMDCN community, it was decided that a possible ITT for the provision of the next generation RMDCN should be delayed for a few years, with the view of obtaining a better understanding of future requirements, in particular from the WMO Information System.

Also in 2008, following a price review, it was decided to upgrade the minimum configuration for all ECMWF Member States to a Mission Critical Setup (2 independent Leased Lines) with a 1.5Mb/s IP bandwidth.

The upgrade is now completed and the list of accesses and their speed are listed in Annex I.

As part of the decisions regarding the RMDCN made by ECMWF Council in 2008, it was decided that the connection to the RMDCN was possible for the following categories of countries:

- ECMWF Member States and Co-operating States
- RA VI countries not currently connected to the RMDCN
- Countries operating MTN centres in the framework of the IMTN (Improved Main Telecommunications Network), including future GISCs
- Countries outside RA VI connected to a RA VI country as part of the GTS, upon request by the RA VI country concerned

Over the last 2 years, ECMWF has received quite a large number of requests for connections to the RMDCN. This document gives an overview of the current situation.

2. From BT Frame Relay to OBS MPLS

The sites connected on the BT Frame Relay network as part of the IMTN (USA, Australia, UK, Japan) were informed by British Telecom about the termination of the service in September 2009. Early 2009, with the end of the service soon to come, another solution was required.

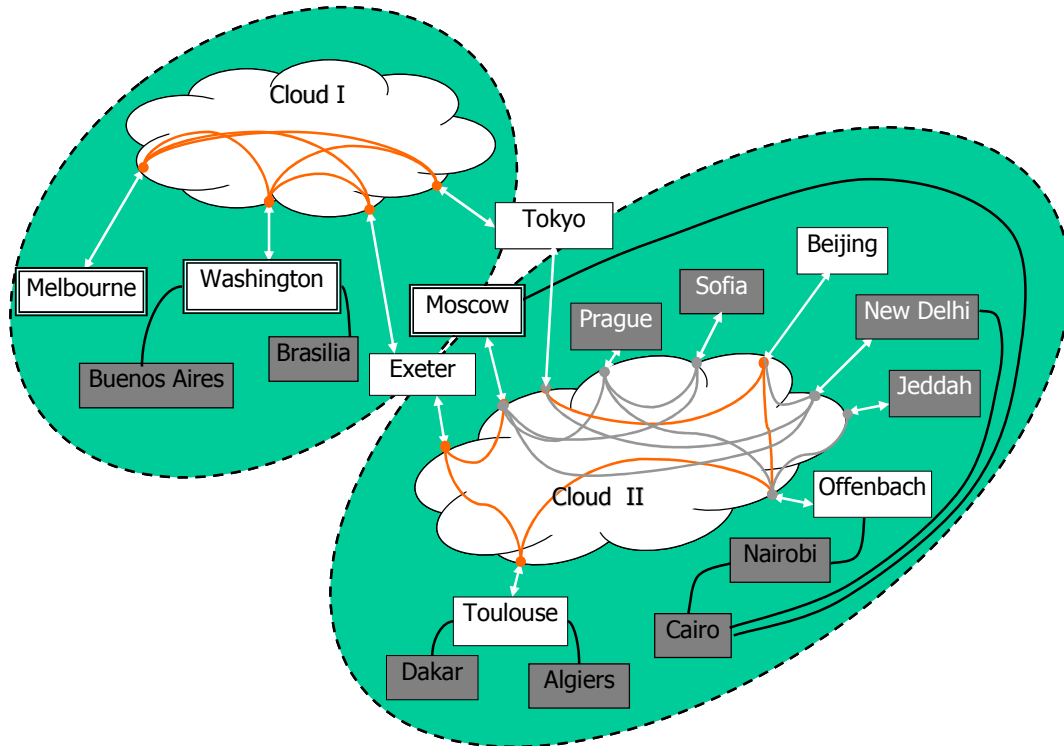


Figure 1: IMTN network situation early 2009

Some discussions regarding the potential use of the RMDCN took place late 2007, during an IMTN meeting in Washington. During that meeting various other options were considered.

Early 2009, the USA and Australia, considering that all other sites were already connected to the RMDCN, decided to join the network and formally requested to ECMWF for a connection to the RMDCN. Both connections became live during the summer of 2009.

Therefore, the IMTN network can now be seen as a single cloud:

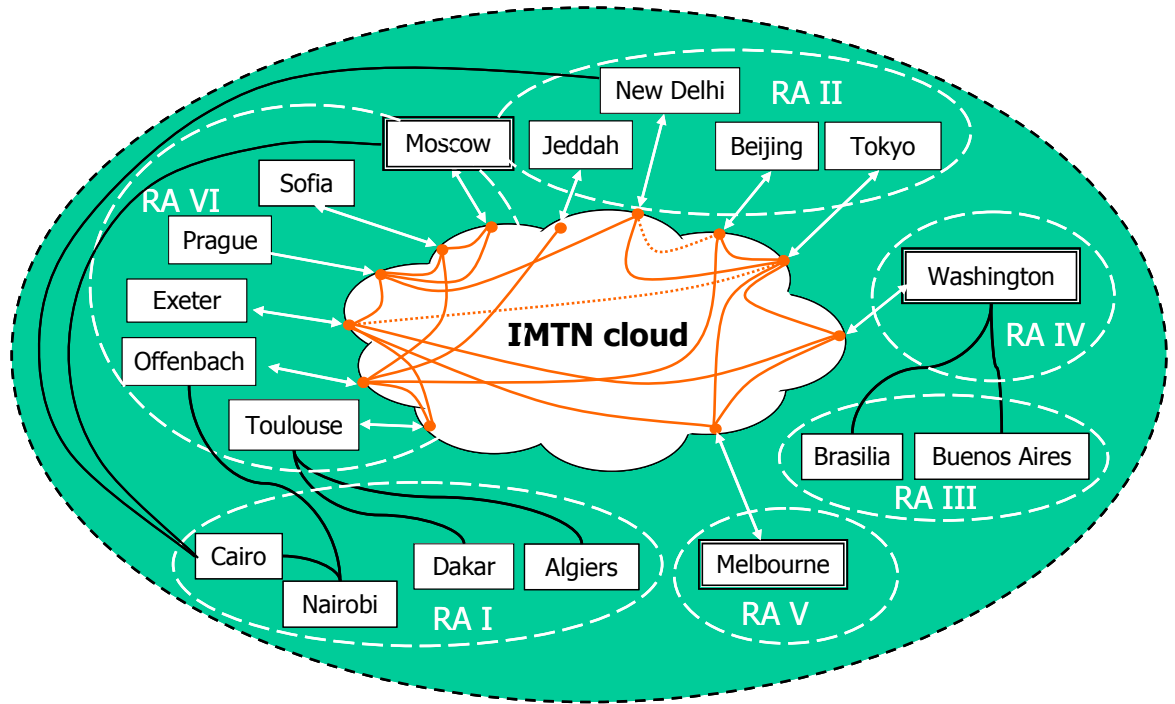


Figure 2: IMTN network situation end 2009

3. Situation for GISC candidates

Based on WIS web site: (<http://www.wmo.int/pages/prog/www/WIS/wisdb/sort-wiscentre.php?sortBy=centreType&sortAsc=true>), 14 countries applied to be a GISC. These countries are listed below along with their situation on the RMDCN.

Country name	RMDCN Connection	Type and speed
Australia	Yes	Mission Critical - 2 x 2Mb/s
Brazil	No	-
China	Yes	Mission Critical - 2 x 3Mb/s
France	Yes	Mission Critical - 2 x 8Mb/s
Germany	Yes	Mission Critical - 2 x 2Mb/s
India	Yes ¹	ISDN Backup – 1x128kb/s
Iran	No	-
Japan	Yes	Mission Critical - 2 x 3Mb/s
Korea	Yes	Mission Critical - 2 x 2Mb/s
Morocco	Yes	ISDN Backup – 768kb/s
Russian Federation	Yes	Mission Critical - 2 x 512kb/s
Saudi Arabia	Suspended ²	No Backup – 128kb/s
United Kingdom of Great Britain and Northern Ireland	Yes	Mission Critical - 2 x 2Mb/s
United States of America	Yes	Mission Critical - 2 x 1Mb/s

Out of the 14 candidates, 12 are now connected to the RMDCN.

¹ India has recently ordered the upgrade of their connection to 1Mb/s Mission Critical set up.

² Access for Saudi-Arabia has been suspended since March 9th, 2010

Some contacts have been made with Brazil. It is hoped that Brazil could be connected to the RMDCN rather soon.

Regarding Iran, getting an RMDCN connection will be very difficult. OBS do not have a licence to operate in Iran. Cisco routers cannot be imported in Iran.

4. The overall networking architecture

The Final Report of CBS-XIV says:

“6.2.16 The Commission noted the requirements for all GISCs to synchronize large volume of data and products with their metadata catalogues on a real-time basis through the WIS core network. Therefore indispensable requirements for the core network are predictability and stability in available throughput (bandwidth and network latency), reliability for continuous operation on 24 x 7 basis without interruption and security against malicious attacks such as intrusion, denial of service, tampering, spoofing and snooping.

6.2.17 To meet such requirements, a closed network services with a definite Service Level Agreement (SLA) would be needed. The public Internet cannot provide this type of service and should not be used in this case. The Commission agreed that the Improved MTN should evolve into the core WIS network.”

In relation with this decision, the concept of AMDCN (Area Meteorological Data Communication Network) was then defined. In simpler terms, the above means that each GISC will have to organize an AMDCN in its area of responsibility.

If we then try to illustrate the relationship between the various networks: RMDCN, AMDCN, IMTN, GIS Core Network and GTS this can therefore be represented as shown in figure 3 below:

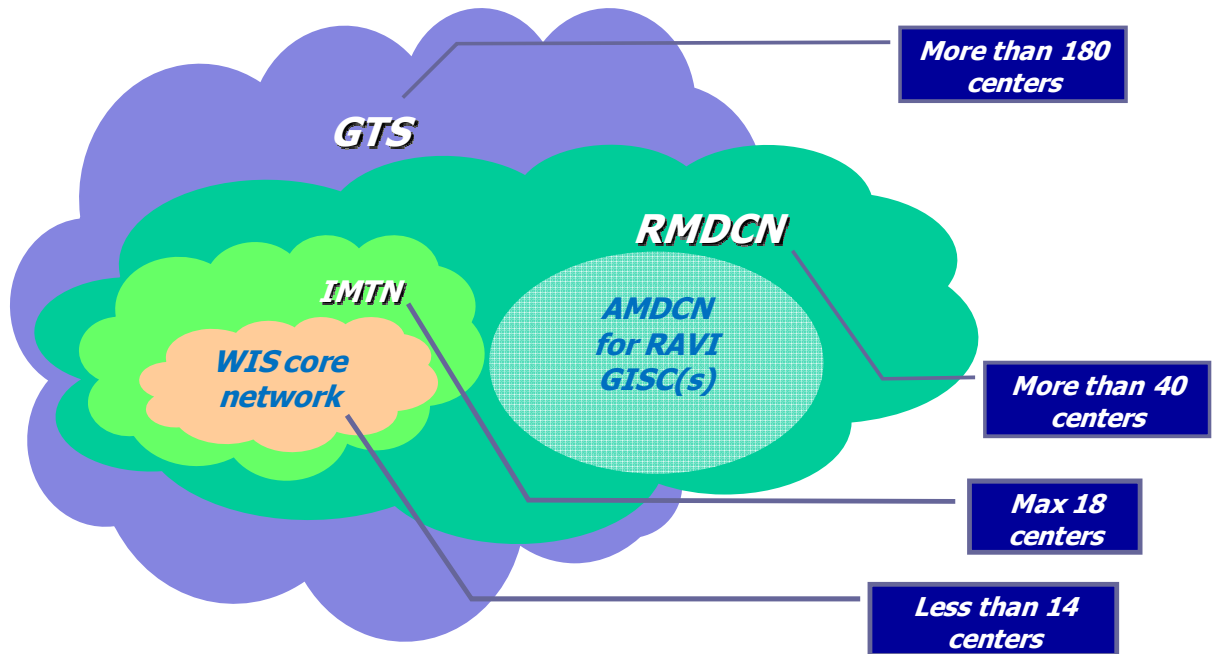


Figure 3: Relationship between WMO related networks

The current RMDCN is compliant with the Final Report of CBS-XIV considering that:

- It covers most countries of the IMTN
- 11 at of 14 GISC candidates are already connected

- It can be considered as the AMDCN for all GISCs located in RA VI.

Hopefully, in the coming months and years others GISCs will be able to establish such AMDCN networks so that the WIS will be able to rely on a homogenous network architecture for the benefit of all connected members.

The RMDCN IPVPN MPLS Configuration (1 June 2010)

Country/Site	Access Speed	IPVPN Port Speed	Resiliency	CoS	Load Balance	Help Desk Support	NAS Backup Speed
ECMWF Member States							
Austria	2M	2M	mission critical	Gold	NO	Reactive	N/A
Belgium	2M	2M	mission critical	Gold	NO	Proactive	N/A
Denmark	2M	2M	mission critical	Gold	NO	Proactive	N/A
Finland	2M	1.5M	mission critical	Gold	NO	Reactive	N/A
France	10M	8M	mission critical	Gold	NO	Proactive	N/A
Germany	2M	2M	mission critical	Gold	NO	Reactive	N/A
Greece	2M	1.5M	mission critical	Gold	NO	Proactive	N/A
Ireland	1M	1M	mission critical	Gold	NO	Proactive	N/A
Italy	2M	2M	mission critical	Gold	NO	Reactive	N/A
Luxembourg	2M	1.5M	mission critical	Gold	NO	Reactive	N/A
Netherlands	2M	1.5M	mission critical	Gold	NO	Reactive	N/A
Netherlands Disaster Recovery	2M	768k	enhanced	Gold	NO	Reactive	N/A
Norway	2M	2M	mission critical	Gold	NO	Reactive	N/A
Portugal	2M	1.5M	mission critical	Gold	NO	Reactive	N/A
Spain	2M	2M	mission critical	Gold	NO	Reactive	N/A
Sweden	8/10M	5M	mission critical	Gold	NO	Proactive	N/A
Switzerland	2M	1.5M	mission critical	Gold	NO	Reactive	N/A
Turkey	2M	1.5M	mission critical	Gold	NO	Reactive	N/A
United Kingdom	2M	2M	mission critical	Gold	NO	Proactive	N/A
ECMWF	100M	80M	mission critical	Gold	YES	Proactive	N/A
ECMWF Co-operating States							
Croatia	512k	512k	enhanced	Gold	NO	Proactive	256k
Czech Republic	6M	4M	mission critical	Gold	NO	Proactive	N/A
Estonia	64k	64k	enhanced	Silver	NO	Proactive	64k
EUMETSAT	2M	2M	mission critical	Gold	NO	Proactive	N/A
EUMETSAT-EUMETCast	4M	3.5M	N/A	Gold	NO	Proactive	N/A
Hungary	1M	1M	enhanced	Gold	NO	Proactive	256k
Iceland	128k	128k	enhanced	Gold	NO	Proactive	128k
Lithuania	128k	128k	enhanced	Silver	NO	Proactive	128k
Morocco	768k	128k	enhanced	Gold	NO	Proactive	128k
Romania	2M	256k	enhanced	Gold	NO	Proactive	128k
Serbia	512k	512k	enhanced	Gold	NO	Reactive	256k
Slovenia	256k	256k	enhanced	Gold	NO	Reactive	256k
Other RMDCN Member States							
Australia	2M	2M	mission critical	Gold	NO	Reactive	N/A
Bulgaria	512k	512k	enhanced	Gold	NO	Reactive	128k
China	4M	3M	mission critical	Gold	NO	Reactive	N/A
India	128k	128k	enhanced	Gold	NO	Proactive	128k
Japan	10M	3M	mission critical	Gold	YES	Reactive	N/A
Jordan	128k	128k	enhanced	Gold	NO	Proactive	128k
Latvia	128k	128k	enhanced	Gold	NO	Proactive	128k
Lebanon	128k	128k	enhanced	Gold	NO	Proactive	128k
FYR Macedonia	128k	128k	enhanced	Gold	NO	Proactive	128k
Poland	128k	128k	enhanced	Gold	NO	Reactive	128k
Russian Federation	512k	512k	mission critical	Gold	NO	Reactive	N/A
Saudi Arabia *	512k	128k	enhanced	Silver	NO	Reactive	N/A
South Korea	2M	2M	mission critical	Gold	NO	Reactive	N/A
Slovakia	256k	256k	enhanced	Silver	NO	Reactive	128k
United Arab Emirates	128k	128k	enhanced	Gold	NO	Reactive	64k
USA	1M	1M	mission critical	Gold	NO	Reactive	N/A

*) The connection to Saudi Arabia is suspended since 9 March 2010.