

ECMWF Feature article

from Newsletter Number 153 – Autumn 2017

COMPUTING

RMDCN upgrade nears
completion



www.ecmwf.int/en/about/news-centre/media-resources

doi:10.21957/5t18tb

This article appeared in the Computing section of ECMWF Newsletter No. 153 – Autumn 2017, pp. 41-44.

RMDCN upgrade nears completion

Tony Bakker

The Regional Meteorological Data Communication Network (RMDCN) is currently nearing completion of an upgrade of the connections of many sites following negotiations between ECMWF and Interoute Communications Ltd in 2016 as part of a technical and commercial refresh exercise.

The RMDCN provides a computer network infrastructure for the meteorological community in World Meteorological Organization (WMO) Region VI and beyond. It was set up in 2000 and provides any-to-any connectivity between more than 50 sites (Figure 1). Among other things, the RMDCN serves to ensure the secure and timely delivery of ECMWF forecasts to its Member States and the exchange of meteorological observations between connected sites. In the framework of the WMO/ECMWF agreement on the RMDCN, the ECMWF project team manages the network and monitors the Quality of Service on a 24-hour basis for all participating centres.

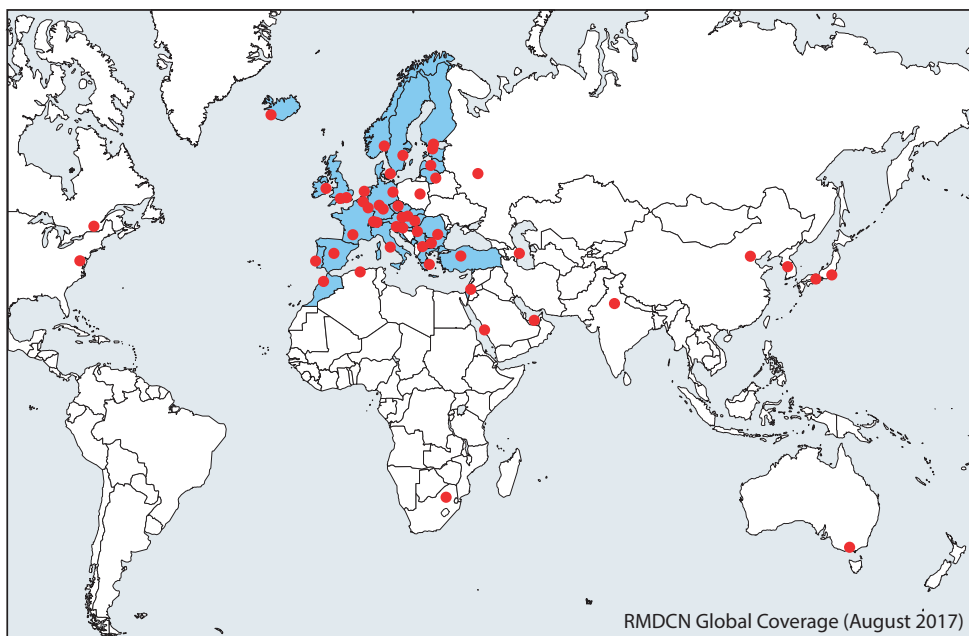


Figure 1 Currently 55 sites are connected to the RMDCN network. The shaded countries indicate ECMWF Member and Co-operating States.

Upgrade requirements

ECMWF's contract with Interoute Communications Ltd, authorised by the Council in December 2012, covers a nine-year term with the option to break after six years. To ensure ongoing value for money during this period, technical and commercial refresh (TCR) exercises are undertaken at 2½ and 5½ years following the start of the operational service on 30 June 2013. As part of the first of these TCR exercises, various elements of the service were reviewed according to technical and commercial criteria and overall value for money.

In order to support ECMWF in this process, the ECMWF Technical Advisory Committee (TAC) at its 47th session on 15 and 16 October 2015 established a subgroup on the RMDCN with Graham Mallin (United Kingdom) as Convener and with the following terms of reference:

1. to assist ECMWF with the specification of technical requirements to be considered for the Technical and Commercial Refresh of the RMDCN contract with Interoute;
2. to assist ECMWF in reviewing Interoute's offer for the Technical and Commercial Refresh;
3. to comment on any contractual changes required to implement the outcome of the Technical and Commercial Refresh;
4. to involve WMO/Regional Association VI and the WMO Secretariat as observers in the subgroup, as appropriate.

ECMWF, with the assistance of the TAC Subgroup, discussed various technical options to be included in the TCR, such as Internet backup (i.e. DMVPN), Internet Protocol version 6 (IPv6), Multicast, and Cloud Computing. It also reviewed the ECMWF-funded RMDCN Basic Package for ECMWF Member States. During the lifetime of the RMDCN, the Basic Package speed for ECMWF Member States has doubled roughly every three years while keeping the monthly recurring charges the same. When the Interoute service was deployed in 2013, the Basic Package was a Platinum service type with a 4 Mbps connection, which was a doubling of the speed compared to the Basic Package provided by the previous supplier, Orange Business Services Ltd. An upgrade of the Basic Package with a doubling of the speed to 8 Mbps while maintaining the current monthly charge was therefore in line with established practice concerning upgrades of the Basic Package.

The TAC Subgroup agreed on the following set of requirements for Interoute to review:

- investigate the current technical deployment of the network and report on any potential improvements (e.g. IPv6)
- investigate and propose the deployment of an IP multicast solution to meet a EUMETSAT requirement
- investigate and propose the deployment of an Internet backup solution to replace the current DMVPN pilot
- provide information on Interoute's cloud service portfolio available within the RMDCN footprint
- investigate the current monthly recurring charges for all sites and make proposals for both price reductions and increased bandwidth at the current charges
- provide pricing for an upgrade to 8 Mbps for ECMWF Member States where applicable.

All sites with unchanged configuration since the Operational Commencement Date (30 June 2013) were offered a discount of at least the minimum level as defined in the TCR clause of the contract. Discounts apply to the charges for Interoute service elements and exclude underlying access circuits.

Towards implementation

Following the receipt of Interoute's opening offer, ECMWF commissioned the consultancy The Network Collective (TNC) to conduct an assessment of Interoute's offer in the current market. Their findings can be summarized as follows:

- Overall the offer sits very comfortably in the lower to middle of TNC's market spread, so whilst there is room for improvement compared to some suppliers, it is nevertheless a relatively competitive deal and would beat much of the market.
- Due to the nature of the benchmarking clause within ECMWF's contract with Interoute, the focus for ECMWF should be on those elements considered to be materially out of sync with current market pricing.
- Commercially the areas in which to optimise pricing are China, Australia and, to a lesser extent, Japan. There are also more minor concerns for pricing in Italy, Israel, Morocco, Turkey, and EUMETSAT's connection in Germany.

ECMWF contacted Interoute and discussed the report. Interoute acknowledged the findings and was able to address most areas of concern. In addition to Interoute's TCR offer, the TAC Subgroup also discussed the term of the contract between ECMWF and Interoute. The contract with Interoute is for a nine-year term with a break clause at year six (Table 1).

Timeline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Full contract	Nine-year full contract term								
End of year 6 break clause	Six-year fixed contract terms						Break clause option to full contract		
Technology cycle	RMDCN three-year technology cycle			RMDCN three-year technology cycle			RMDCN three-year technology cycle		

Table 1 The full RMDCN contract term is nine years but a break clause enables termination of the contract after six years.

The break clause was agreed in order to allow termination of the contract if the TCR did not show value for money for the service. Given the long lead time required to start a tendering process, preparation for this would have to start in early 2017 if it was decided to execute the break clause. The TNC report reassured the TAC Subgroup that the contract is still “a competitive deal and would beat much of the market”. In addition, the RMDCN Operations Committee reported in the 22nd Operations Committee meeting that they were very content with the service provided by Interoute and the high level of service availability during the first 2½ years of service.

The TAC Subgroup on the RMDCN met on 20 and 21 September 2016 and concluded that:

1. The price/performance of Interoute’s offer is a good package and represents value for money for the RMDCN community as a whole.
2. The existing contract may be amended at an appropriate point in the future as additional services become sufficiently mature for inclusion in the RMDCN, for example DMVPN.
3. Access to the RMDCN from Cloud Computing systems should be subject to a design and security review to avoid adverse impact on the RMDCN operational service.
4. ECMWF should continue with the following actions independently of the TAC Subgroup:
 - (i) request that RMDCN user sites which have been offered a choice between a discount and an increase in bandwidth respond to this offer and identify their required changes to the current service based on this offer;
 - (ii) consult with the RMDCN community to establish requirements for a 24/7 operational DMVPN service provided by Interoute and take forward development of this service;
 - (iii) support EUMETSAT and Interoute in discussing potential solutions based on EUMETSAT’s requirements for a Multicast service on the RMDCN;
 - (iv) review Contract Clause 11 with a view to establishing a clearer framework for future service changes based on market rates.

The Subgroup recommended to the TAC that the service should continue for the full nine-year term, that the break clause should not be executed, and that preparations for returning to the market be initiated by the TAC in 2019. During its 48th session from 13 to 14 October 2016, the TAC unanimously endorsed the conclusions of its Subgroup on the RMDCN.

Implementation

ECMWF then started the process of implementing the conclusions of the TAC Subgroup, beginning with gathering the wishes from RMDCN members for either a discount or an upgrade of their connection. Of the 55 sites connected to the RMDCN, 19 sites opted for an upgrade of their connection speed and 23 sites opted for a discount on the monthly charge. For 12 sites there was no change as they had either changed their configuration after the Operational Commencement Date or connected to the RMDCN after this date. One site (USA) decided to terminate its connection to the RMDCN.

Once this was done the change orders were raised with Interoute by the end of December 2016. Monthly charge discounts were backdated to 13 September 2016, when Interoute’s original offer was made. Some sites requested additional upgrade requirements beyond what was presented in the TCR offer

from Interoute. By 1 September 2017 about half of the upgrades had been completed with the remaining sites scheduled to be upgraded within the following few weeks. The overall delivery process of the TCR has taken much longer than expected. Discussions are taking place with Interoute to review the TCR and delivery issues.

The overall operational performance of the network remains very high, achieving 100% global availability for 10 of the last 12 months of service. In late September 2017 the 23rd RMDCN Operating Committee Meeting took place. This gave the whole user community an opportunity to discuss and reflect on this TCR exercise and discuss with The Network Collective consultancy the future of the service in general.

Table 2 shows the current configuration of the connected sites, with the bandwidth column showing the current speed in Mbps. The TCR upgrade column shows which option each site selected.

Country/Site	City	WMO GTS	WMO WIS	Bandwidth (Mbps)	Site Type	Joined Interoute service	TCR upgrade (Mbps)
ECMWF Member States & ECMWF							
Austria	Vienna	RTH		10	Gold	May 2013	From 8 to 10
Belgium	Brussels	NMC		10	Platinum	May 2013	Discount
Croatia	Zagreb	NMC		8	Gold	Jan 2014	From 4 to 8
Denmark	Copenhagen	NMC		50	Platinum	Jan 2014	Discount
Finland	Helsinki	NMC		50	Platinum	Jan 2014	No change
France	Toulouse	RTH	GISC	100	Platinum	Jan 2014	Discount
Germany	Offenbach	RTH	GISC	50	Platinum	Jan 2014	Discount
Germany-DR	Berlin			N/A	Iron-B	Mar 2016	Discount
Greece	Athens	NMC		4	Platinum	Jan 2014	From 4 to 8
Iceland	Reykjavik	NMC		2	Platinum	Jan 2014	From 2 to 5
Ireland	Dublin	NMC		100	Platinum	Jan 2014	Discount
Italy	Rome	RTH		15	Gold	Jan 2014	From 10 to 15
Luxembourg	Luxembourg	NMC		8	Platinum	Jan 2014	Discount
Netherlands	De Bilt	NMC		8	Platinum	Jan 2014	From 4 to 8
Netherlands-DR	Woensdrecht			4	Copper	Jan 2014	From 4 to 8
Norway	Oslo	NMC		25	Platinum	Jan 2014	From 20 to 25
Portugal	Lisbon	NMC		8	Platinum	Jan 2014	From 4 to 8
Serbia	Belgrade	NMC		4	Gold	Jan 2014	From 4 to 8
Slovenia	Ljubljana	NMC		8	Platinum	Jan 2014	From 4 to 8
Spain	Madrid	NMC		4	Platinum	Jan 2014	From 4 to 8
Sweden	Norrköping	RTH		10	Platinum	May 2013	Discount
Switzerland	Zurich	NMC		20	Platinum	Jan 2014	No change
Switzerland-CSCS	Lugano			20	Platinum	Jan 2014	No change
Turkey	Ankara	NMC		34	Platinum	Jan 2014	No change
United Kingdom	Exeter	RTH	GISC	20	Platinum	Jan 2014	Discount
ECMWF	Reading	WMC		500	Platinum	May 2013	No change

Country/Site	City	WMO GTS	WMO WIS	Bandwidth (Mbps)	Site Type	Joined Interoute service	TCR upgrade (Mbps)
ECMWF Co-operating States & EUMETSAT							
Bulgaria	Sofia	RTH		10	Silver	May 2013	Discount
Czech Republic	Prague	RTH		7	Gold	Jan 2014	Discount
Estonia	Tallinn	NMC		2	Silver	Jan 2014	Discount
EUMETSAT	Darmstadt			20	Platinum	Jan 2014	Discount
Hungary	Budapest	NMC		8	Platinum	Jan 2014	No change
Israel	Bet Dagan	NMC		15	Platinum	Jan 2014	From 10 to 15
Latvia	Riga	NMC		2	Silver	Jan 2014	From 1 to 2
Lithuania	Vilnius	NMC		1	Silver	Jan 2014	Discount
The former Yugoslav Republic of Macedonia	Skopje	NMC		N/A	Iron B	Jan 2014	No change
Morocco	Casablanca	NMC	GISC	2	Bronze	Jan 2014	Discount
Romania	Bucharest	NMC		15	Platinum	Jan 2014	From 10 to 15
Slovakia	Bratislava	NMC		1	Gold	Jan 2014	Discount

Country/Site	City	WMO GTS	WMO WIS	Bandwidth (Mbps)	Site Type	Joined Interoute service	TCR upgrade (Mbps)
Other RMDCN Members							
Algeria	Algiers	NMC		N/A	Iron B	Mar 2017	No change
Australia	Melbourne	WMC	GISC	4	Platinum	May 2014	Discount
Azerbaijan	Baku	NMC		2	Copper	Jul 2017	No change
Canada	Dorval	NMC		2	Copper	Jan 2014	Discount
China	Beijing	RTH	GISC	16	Platinum	Jan 2014	Discount
China-DR	Beijing			16	Copper	Apr 2015	No change
India	New Delhi	RTH	GISC	6	Platinum	Jan 2014	From 4 to 6
Japan	Tokyo	RTH	GISC	10	Platinum	May 2013	Discount
Japan-DR	Osaka			10	Copper	Dec 2014	Discount
Jordan	Amman	NMC		1	Iron A	Jan 2014	No change
Poland	Warsaw	NMC		1	Silver	Jan 2014	Discount
Russian Federation	Moscow	WMC	GISC	10	Platinum	Jan 2014	Discount
Saudi Arabia	Jeddah	RTH	GISC	2	Bronze	Aug 2014	From 2 to 4
South Africa	Pretoria	RTH	GISC	4	Bronze	Jan 2014	From 2 to 4 (primary only)
South Korea	Seoul	NMC	GISC	4	Platinum	Jan 2014	From 4 to 6
United Arab Emirates	Abu Dhabi	NMC		N/A	Iron B	Sep 2014	No change
United States of America	Washington	WMC	GISC	50	Platinum	Jan 2014	To be terminated Dec 17

Table 2 The current RMDCN configuration including the TCR upgrade as of 1 September 2017. Platinum, Gold and Silver site types have dual connectivity. Copper and Iron A/B site types have a single connection. N/A signifies an Internet connection of unknown speed.

Acronyms:

GTS = Global Telecommunication System

WIS = WMO Information System

RTH = Regional Telecommunication Hub

NMC = National Meteorological Centre

WMC = World Meteorological Centre

GISC = Global Information System Centre

DR = Disaster Recovery

CSCS = Swiss National Supercomputing Centre

Outlook

Following the decision to continue for the full nine-year term, the contract with Interoute will now terminate on 30 June 2022. This means that a second TCR of the service will take place in late 2018 to early 2019 for implementation by mid-2019. Following this second review, ECMWF and the RMDCN community will have to start discussions on the future of the RMDCN beyond 2022.

One of the key changes that will take place in the near future is the move of the ECMWF data centre to Bologna, which means that ECMWF's RMDCN connection will move to Bologna as well. The move of the RMDCN connection to Bologna is scheduled for late 2019.

Questions about the Technical and Commercial Refresh or any other aspect of the RMDCN service can be sent to ECMWF's service manager, Tony Bakker, at rmdcn@ecmwf.int.

© Copyright 2017

European Centre for Medium-Range Weather Forecasts, Shinfield Park, Reading, RG2 9AX, England

The content of this Newsletter is available for use under a Creative Commons Attribution-Non-Commercial-No-Derivatives-4.0-Unported Licence. See the terms at <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

The information within this publication is given in good faith and considered to be true, but ECMWF accepts no liability for error or omission or for loss or damage arising from its use.