International Civil Aviation Organization

The Eleventh Meeting of the Common aeRonautical Virtual Private Network Operations Group (CRV OG/11)

Bangkok, Thailand, 01-03 February 2023

Agenda Item 10: MPLS/IP based inter-regional connection

MPLS/IP BASED INTER-REGIONAL CONNECTION

(Presented by ICAO Secretariat)

SUMMARY

This paper provides current status of discussion being done for potential interconnection of CRV and REDDIG II and CRV and New PENS. It also requests APAC member states to record their interest, willingness, or need for interconnection of the CRV with other regional networks such as REDDIG II / New PENS with the ICAO secretariat.

1. INTRODUCTION

1.1. The Air Traffic Services (ATS) relies on an Aeronautical Telecommunication Network (ATN) infrastructure to transmit air-to-ground and ground-to-ground applications. Currently the most common networks that uses the concept of convergence is based on the Internet Protocol Suite (IPS). ICAO has developed the Standard and Recommended Practices (SARPs) based on the referred concept which are framework to support the implementation of the System Wide Information Management (SWIM).

1.2. For providing services to the Air Navigation Providers (ANSPs), almost all Communication Service Providers (CSP) use the Multiprotocol Label Switching (MPLS) infrastructure to deliver IP applications. MPLS services are used to implement regional IP networks such as Common aeRonautical VPN (CRV) for Asia and Pacific (APAC)/ Middle East (MID), New Pan-European Network Service (New PENS) for EUR/NAT and South American (SAM) Region Digital Network (REDDIG II). Currently, the communication services providers for these networks are PCCW Global (CRV), British Telecom (New PENS) and Lumen/Cirion Technologies (REDDIG II).

1.3. The CRV was developed to improve regional connectivity and to help reduce the cost on telecommunications. In order to enhanced global connectivity among states of different regions, it was suggested to States that connect to the CRV should also connect to other regional networks such as REDDIG II and New PENS.

1.4. There are potentially further benefits with implementing interconnections to regional networks such as efficiency in the connection services such as SWIM, reducing costs for states that connect to other regional networks. Some states had already expressed an interest in a connection to other regional networks such as New Zealand to REDDIG II and Singapore to New PENS. Therefore, interconnection among regional networks may be very important to enhanced air navigation capacity and efficiency.

1.5. The paper discussed the status of discussion being held for potential interconnection of CRV and REDDIG II and CRV and New PENS.

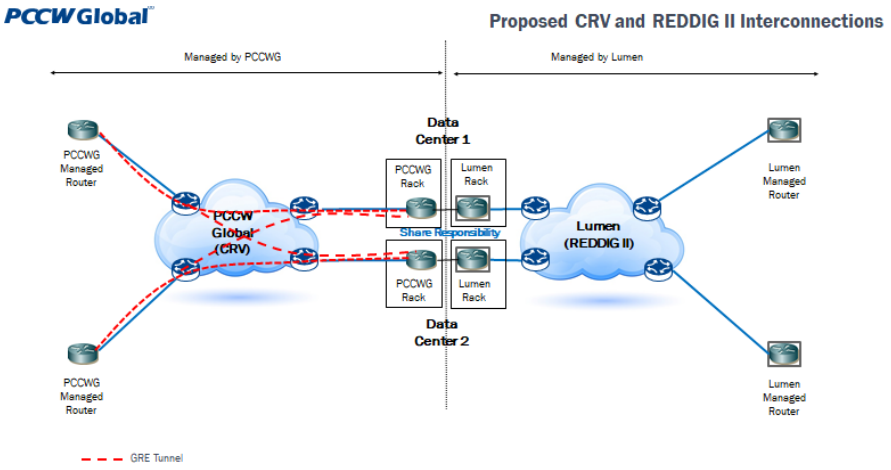
2 DISCUSSION

CRV and REDDIG II Interconnection

2.1 There were communications requirements between APAC and SAM ANSPs. The regional IP networks' interconnection, CRV and REDDIG II, may act as a potential solution in order to set up the AMHS P1 connection between AMHS COM Centers of Christchurch (New Zealand) and Santiago (Chile).

2.2 Noting these requirements, early discussion among regional networks service providers for CRV and REDDIG II and the CRV OG was initiated. The WP/12 in CRV OG/9 provided outcomes of discussion held on this matter.

2.3 By WP/07, PCCWG shared the CRV OG/9 meeting how States in CRV Network can communicate with States in REDDIG II Network. PCCWG proposed to establish two (2) Interconnection Points between CRV Network and REDDIG II Network for Primary and Backup respectively. This proposal allows the implementation of communications (voice and/or data) with other States/Organizations participating in any of both networks (CRV and REDDIG II), which have communication requirements due to Flight Information Regions adjacencies. The proposal was agreed by the meeting.



2.4 Additional resources required to build these connections were explained in the paper. PCCWG invited the CRV OG/9 meeting to confirm which States would require communication between CRV Network and REDDIG II Network and the meeting did not receive any immediate request and interest from Member States to join REDDIG II network.

2.5 As the technical proposal for interconnection of CRV and REDDIG II was ready, the ACSICG/9 meeting held from 19-21 April 2022, suggested to think about the **way forward for the business case for the proposed interconnection** along with next course of action for PCCWG and Lumen for this interconnection requirements. The potential business solutions were proposed by the ICAO Secretariat for ACSICG/9 meeting deliberation.

2.6 The ACSICG/9 meeting agreed to form an Ad-Hoc group comprised of APAC Member States having interregional connections, CRV OG Chairs, CRV and REDDIG II service providers, interested

States of SAM region, and the ICAO Secretariat under CRV OG. It was agreed that the ICAO Secretariat will coordinate with relevant APAC member states to nominate focal points for Ad-Hoc group named as **ACTION ITEM 9-4**. Additionally, the ICAO Secretariat was required to coordinate with ICAO SAM Office to get nomination from interested SAM member states for this task named as **ACTION ITEM 9-5.**

2.7 In the Twenty Eighth Meeting of the **REDDIG II Coordination Committee (RCC/28)** held in Lima, Peru from 2 to 4 May 2022, a representative of Lumen reported that they were going to propose to PCCW Global **a new, simpler interconnection scheme**, using a **Lumen data center in Santiago, Chile**, where PCCW Global uses infrastructure as a Lumen customer. According to the Lumen representative, the proposal was more economical and faster to implement, and would be discussed with PCCW Global representatives for approval and implementation.

2.8 The ICAO SAM Secretariat requested the representatives of Lumen to contact the representatives of PCCW Global as soon as possible to make possible the interconnection of the networks, informing the REDDIG Administration of the progress made.

2.9 As per the latest updates, Lumen LATAM (Latin America) has been sold to **Cirion Technologies**. Therefore, the contract of ICAO for the provision of the terrestrial segment of REDDIG II (MPLS) is with **Cirion Technologies** now that modified the solution inside the infrastructure of the new company.

2.10 Additionally, PCCW Global is a client of Cirion Technologies in Chile. This allows to build an interconnection solution using the Santiago facilities. A proposal was presented by Cirion Technologies personnel in September 2022. The presentation shared by Cirion Technologies is provided in **Appendix A.** The ICAO SAM Secretariat requested to discuss the proposal with PCCW Global personnel and formally presented it in the next meeting.

2.11 Therefore, at present there is no concert technical proposal ready to work further for CRV and REDDIG II interconnection.

CRV and New PENS

2.12 The Third Meeting of the **European Aviation System Planning Group (EASPG)** took place in the ICAO EUR/NAT premises in a hybrid format from *30 November to 2 December 2021* adopted following conclusion:

EASPG Conclusion 3/15 – Coordination on the Interregional AFS Gateways

That, the ICAO Regional Director, Europe and North Atlantic, to initiate necessary interregional coordination with other Regions (i.e. APAC, SAM) **in order to support the AFS to SWIM Transition Task Force (AST TF) to**:

a) Develop proposals for the existing system to improve the interregional AFS Gateways (e.g. in terms of bandwidth, capabilities, etc.); and

b) Discuss and propose **on the methods for inter-connection of the Regional networks, with the involvement of appropriate responsible groups (i.e. PSB).**

2.13 In response ICAO APAC Office and ICAO EUR/NAT Office coordinated internally as well as with the service providers of regional network in respective region.

2.14 The ICAO EUR/NAT Office initiated coordination with AST TF PG, ICAO HQ, APAC and SAM at the level of **the Communication Panel (CP) – WG-I**. The WG-I has agreed to hold a brainstorming session involving ICAO HQ, APAC, EUR/NAT and SAM to explore possible ways forward.

2.15 The meeting was presented with the recent exchange of IWXXM data between EUR/NAT and APAC Regions. The meeting noted that **the UK and Singapore** as Interregional AFS Gateways and Interregional OPMET Gateways between EUR/NAT and APAC had the requirement to exchange IWXXM on an interregional level since IWXXM became an ICAO standard in November 2020. It was noted that the United Kingdom in conjunction with Singapore recently established IWXXM exchange between the EUR/NAT and APAC. In order to maintain the flow of IWXXM traffic, an alternate path that was capable of transferring FTBP was required. The introduction of the operational AMHS connection between LIII and VTBB in Q1 provided this FTBP capable alternate path and procedures were agreed with LSSS, LIII, VTBB and WSSS COM Centers.

2.16 The meeting acknowledged that the connection established with APAC was an important step to improve the interregional exchange of IWXXM information in line with the EASPG Conclusion 3/15. However, connections with other neighboring Regions (NACC, SAM and AFI) would be needed. The meeting noted that the UK was in the planning phase of IWXXM exchange with NACC and SAM Regions.

2.17 The meeting adopted the following **Conclusion AST TF 03/02** - ***Coordination on Interregional AFS Gateways***

That, a) the Operations Group (OG) is tasked to:
- monitor implementation of improvements to the existing system of Interregional AFS Gateways and propose further improvements; and
- review the EUR AMRD and prepare proposal for amendment, as needed, with regard to the current interregional connections.

b) **the Planning Group (PG)** is tasked to:
- with the support of the ICAO EUR/NAT Office, **follow-up on the actions on the EASPG Conclusion 3/15, part b)**; and
- in coordination with the OG, discuss in the longer term how Com Centers should exchange with and connect to the Com Centers in other Regions, under the prism of interconnecting the regional IP networks.

2.18 In Summary, the interconnection proposal for CRV and New PENS are in progress.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) provide need/willingness/interest to join other regional networks;

c) discuss the way forward for regional interconnection; and

d) discuss any relevant matter as appropriate;

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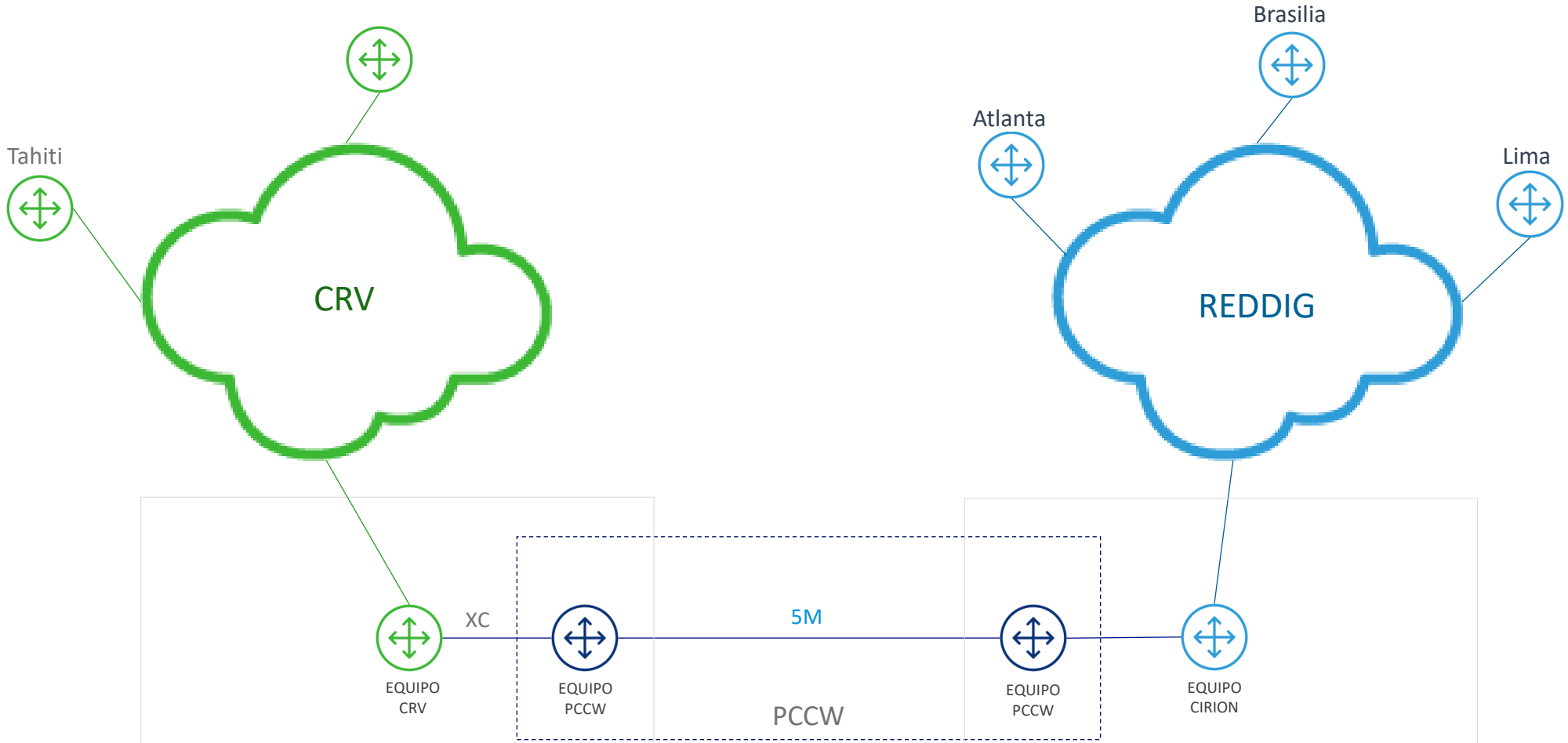
Conexión MPLS a New Zealand

CRV

Propuesta Técnica

- CRV requiere conectarse a la red de ICAO (REDDIG), desde nueva Zelandia.
- Para esto se implementará un enlace desde Auckland – Nueva Zelanda (Nodo CRV) hasta el DataCenter de Cirion en Chile a través de PCCW.
- CRV se interconectará en su nodo en Auckland con PCCW. CRV debe proporcionar espacio y energía para los equipos de PCCW.
- PCCW tiene presencia dentro del Data Center de Cirion en Chile y aquí se interconectará con la red de ICAO (REDDIG)

Topología de Red



Propuesta Económica 1

Sede	Dirección	Servicio	Ancho de Banda	Contrato por 12 meses
Chile	Santa Marta de Huechuraba 6951, Santiago/Chile	VPN	5 Mbps	Abono Mensual: USD 1,900 Costo de Instalación: USD 1,000
New Zealand	Fred Ladd Way. Auckland Airport, Auckland 2022. Coordinates: 37°00'21.8"S 174°47'20.2"E	VPN	5 Mbps	

Consideraciones:

- Precios expresados en dólares y no incluyen impuestos.
- No incluye crossconexión o derechos de paso en el lado de New Zealand.
- Incluye crossconexión en el lado de Chile
- Sujeto a factibilidad.

Propuesta Económica 2

Sede	Dirección	Servicio	Ancho de Banda	Contrato por 12 meses
Chile	Santa Marta de Huechuraba 6951, Santiago/Chile	VPN	10 Mbps	Abono Mensual: USD 3,280 Costo de Instalación: USD 1,000
New Zealand	Fred Ladd Way. Auckland Airport, Auckland 2022. Coordinates: 37°00'21.8"S 174°47'20.2"E	VPN	10 Mbps	

Consideraciones:

- Precios expresados en dólares y no incluyen impuestos.
- No incluye crossconexión o derechos de paso en el lado de New Zealand.
- Incluye crossconexión en el lado de Chile
- Sujeto a factibilidad.

Thank you!

ciriontechnologies.com