

**ICAO***International Civil Aviation Organization***Eighth Meeting of the Common aeRonautical Virtual Private Network Operations Group (CRV OG/8)**

Video Teleconference, 17 – 19 May 2021

**Agenda Item 9:** 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. It also requests from APAC member states to record their interest, willingness, or need for interconnection of the CRV with other regional networks such as REDDIG/ New PENS with the ICAO secretariat.

**1. INTRODUCTION**

1.1 The Air Traffic Services (ATS) relies on an infrastructure (Aeronautical Telecommunication Network - ATN) to transmit both 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). The International Civil Aviation Organization (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 CRV for APAC/MID, Pan-European Network Service (New PENS) for EUR/NAT and SAM Region Digital Network (REDDIG II) for SAM. Currently, the communication services providers for these networks are PCCW Global (CRV), British Telecom (New PENS) and Lumen (REDDIG II).

**2 DISCUSSION**

2.1 The Common aeRonautical Virtual Private Network (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 and New PENS.

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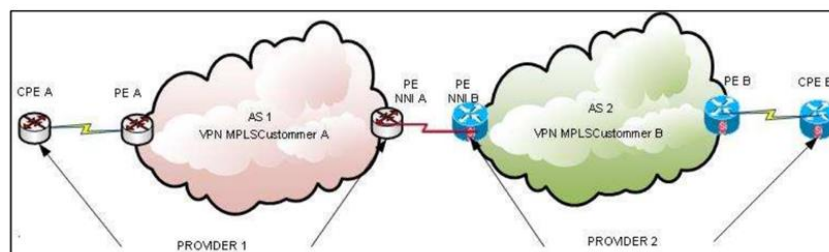
2.2 There are potentially further benefits with implementing interconnections to regional networks such as efficiency in the connection services such as SWIM, reducing costs for states that connect to other regional networks. Some states had already expressed an interest in a connection to other regional networks such as New Zealand to REDDIG II and Singapore to PENS.

2.3 There are communications requirements between Asia Pacific (APAC) ANSPs and South American (SAM) ANSPs. The regional IP networks' interconnection, CRV and REDDIG II, is required in order to set up the AMHS P1 connection between AMHS COM Centers of Christchurch (New Zealand) and Santiago (Chile).

2.4 Noting these requirements, early discussion among regional networks service providers for CRV and REDDIG II and the CRV OG has been initiated. It is also important to discuss the inter regional network connectivity with the Data Communications Infrastructure Working Group of the Communications Panel to align the implementation of this concept with the directions of the this working group.

2.5 Chile and New Zealand have adjacent oceanic FIRs and plan to implement AIDC for Air Traffic coordination between the oceanic control centers (ACCs). The automation of coordination tasks using AIDC between adjacent sectors improves the quality of information on traffic transiting between sectors and makes it more predictable, thereby allowing reduced separation minima, decreased workload, increased capacity, more efficient flight operations, and enhanced safety. To guarantee an effective AIDC connection, it is also important to have a direct AMHS P1 connection between the two AMHS COM Centers providing message service to the involved oceanic centers.

2.6 The MPLS service providers interchange IP packets carrying information of Internet applications (emails, video streaming, web services, voice communication, etc.), using the same routing protocols employed in the virtual private networks. It is technically possible for two nodes of different networks (with different providers) to set up an IP connection. In this case, the concept of MPLS Network to Network Interface (NNI) is applied and the CSPs involved with different customers establish agreements, in order to coherently interconnect their own infrastructure. This concept can be applied by the CSPs of CRV and REDDIG II, in order to connect nodes of the two networks. For instance the Auckland node of CRV with the Santiago node of REDDIG II. The Figure 1 depicts the concept of MPLS-NNI topology.



*Figure 1-MPLS NNI Topology*

2.7 The initial discussion proposed a possible way to implement communication by means of a MPLS Network NNI between the communication services providers. Figure 2 depicts this context.

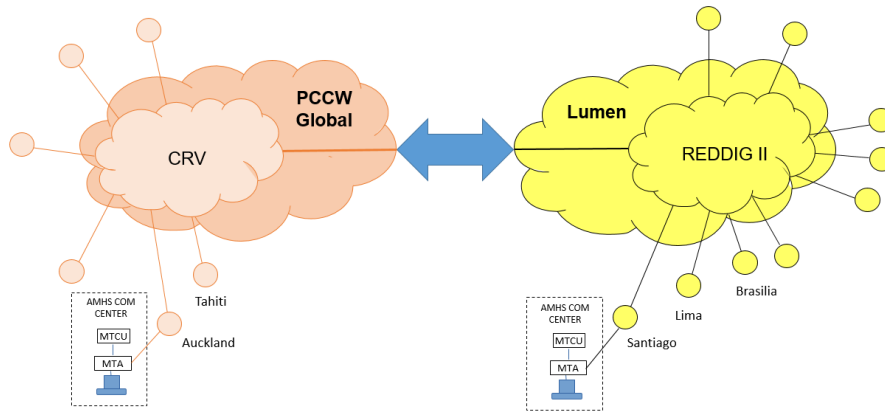


Figure 2- MPLS NNI between CRV and REDDIG II

2.8 Therefore, interconnection among regional networks may be very important to enhanced air navigation capacity and efficiency. Further discussion on the administrative and technical aspects to establish the required aeronautical communications between APAC and SAM ANSPs through MPLS NNI are in progress. Besides this, discussions are also being done for various other feasible options for CRV and REDDIG II interconnection.

### 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 any relevant matter as appropriate;

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