*International Civil Aviation Organization*

**Second Meeting of the Surveillance Study Group (SURSG/2)**

(Video Teleconference, 15– 17 March 2022)

Agenda Item 4: Potential issues and solutions in surveillance data sharing

# SURVEILLANCE DATA SHARING POC

(Presented by PCCW Global)

**SUMMARY**

This paper introduces the Surveillance Data Sharing POC conducted by HKCAD, PCCW Global and Frequentis ComSoft.

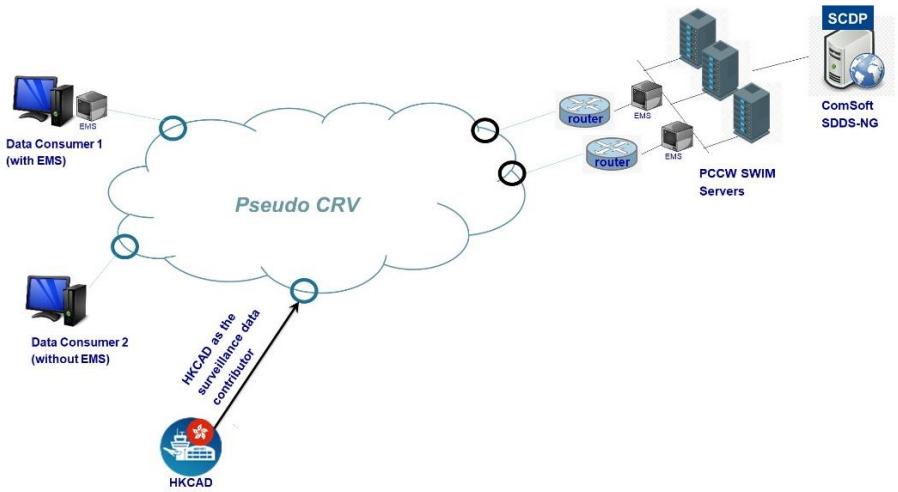
## 1. INTRODUCTION

1.1 During the SURICG/6 Meeting on August 2021, HKCAD presented WP/12 that HKCAD planned to have a Proof of Concept (POC) conducted by sharing ADS-B data collected in Hong Kong on a simulated SWIM EMS over CRV setup based on the hybrid infrastructure model.

1.2 On April 2021 SURSG/1 meeting, PCCW Global presented IP/05, proposing PCCW SWIM on CRV infrastructure with SDDS-NG platform that can serve the role of the Surveillance Central Data Processor (SCDP).

1.3 The POC was conducted on 4 March 2022. This POC was the collaboration of HKCAD, PCCW Global and partner Frequentis Comsoft. The purpose aimed to demonstrate the sharing in a simulated SWIM over CRV environment and the benefits of a Surveillance Central Data Processor (SCDP).

1.4 Below diagram is the POC Network setup:

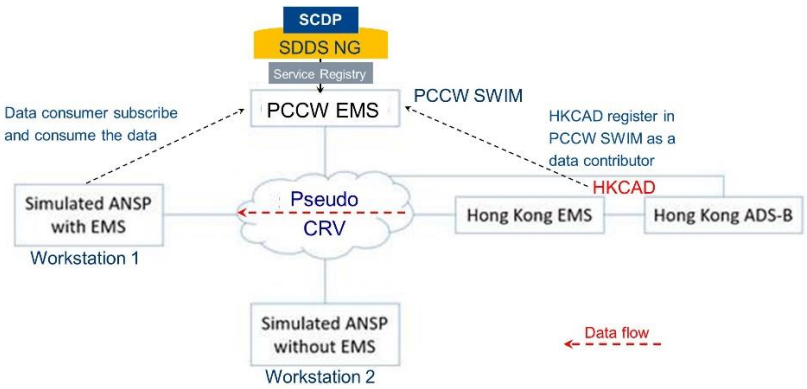


## 2. DISCUSSION

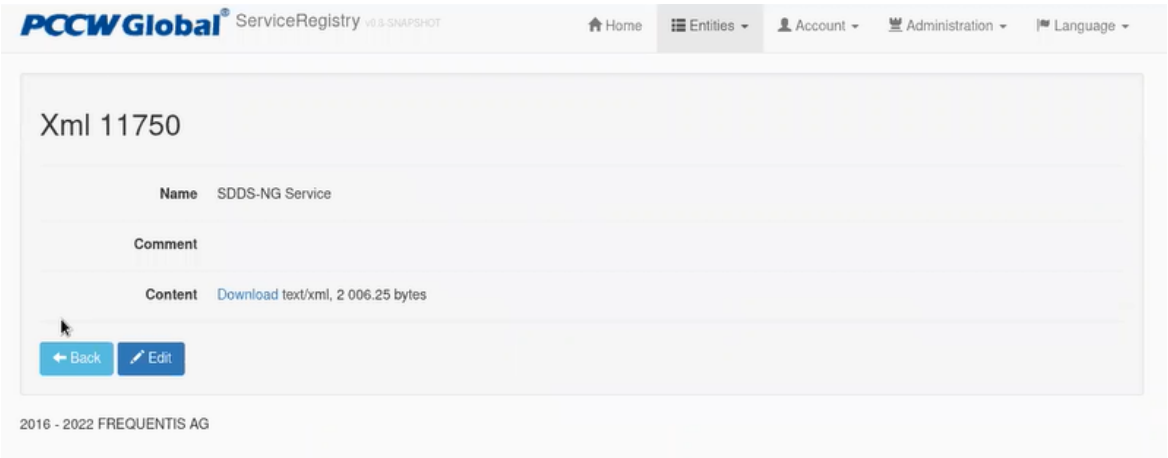
2.1 The POC focused on ADS-B Asterix CAT21 ver2.1 data sharing and AMQP 1.0 was used for EMS-to-EMS communication in below 3 different scenarios:

a. Scenario 1 - Direct surveillance data sharing through SWIM registry Publish and Subscribe mechanism.
b. Scenario 2 - Surveillance data sharing thru SCDP
c. Scenario 3 - Tailor-made services by SCDP

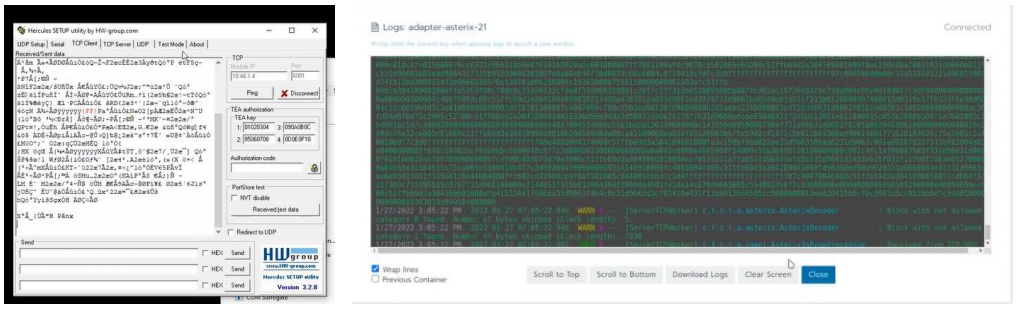
2.2 Scenario 1 - Demonstrates the Registration process and shows that the ADS-B data can be transferred via CRV network. Data rate/bandwidth is collected in this scenario for reference.




HKCAD (Data contributor) registers its service on the SWIM Registry. Data consumer browses the service list on the SWIM Registry, receives the service metadata (e.g. Which URL to use in order to access the service, who to contact to obtain login details, what kind of data formats are available etc.) and then subscribes to HKCAD's service.

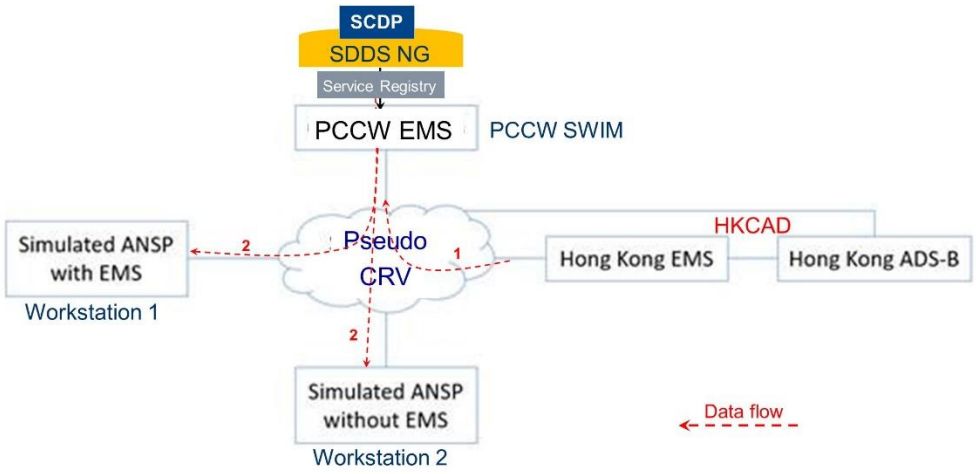


Data consumer logins and receives the data feed from HKCAD.

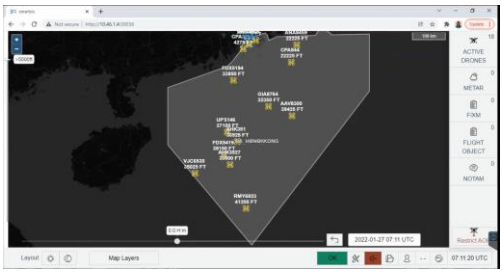


From POC Scenario 1, we can conclude that approximately 512k bandwidth is needed for a high density FIR (with around 400-500 flights simultaneously in the HK FIR during a normal day and update rate of target reports every 1 second per aircraft) to distribute the surveillance data to a single data consumer. Obviously, the combined data throughput required of the data contributor is dependent on the number of data consumers who subscribe to the service of the data contributor. If the data contributor does the data fusion of data from multiple sensors such as removal of duplicated ADS-B data, it may need a higher bandwidth to avoid a potential bottleneck in data flows.

2.3 Scenario 2 - Demonstrates two concurrent data streams – one to EMS data consumer and one to non-EMS data consumer. SCDP could support EMS & non-EMS clients as well as distributing the data feed in one-to-many mode (i.e. multi-cast mode) to relieve bandwidth requirements on the data source; Introduces a Graphical User Interface (GUI) which could help to display the Asterix data in graphical format to those ANSPs that are not ready to support Asterix data feed.



While Data Consumer with EMS can directly receive the data from the Data Contributor, the Data Consumer without EMS can use the user interface to view the surveillance data after the authorization processes.

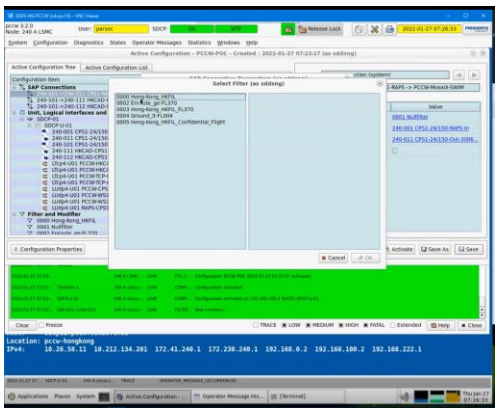


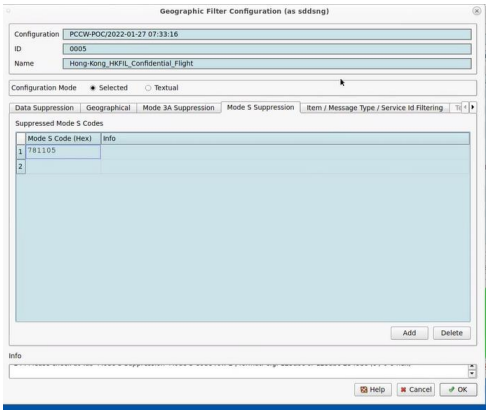
The POC demonstrated that the SCDP could eliminate the potential bottleneck and the processing efforts of a Data Contributor. Data Consumers without EMS, SWIM & Asterix capability can also receive the data by using the user interface which align to ICAO's No Country Left Behind (NCLB) initiative via 3rd party centralized EMS services.

2.4 Scenario 3 - Demonstrates the tailor-made services of the SCDP – e.g. data validation, data format conversions, data filtering by various parameters, reporting, etc.

The SCDP can provide services tailored to the needs of both Data Contributor and Data Consumer. Data Contributor can decide which of their own data are to be shared with Consumers (in general or to specific Consumers differently) and the data are then configured by Service provider using the SDDS-NG and processed accordingly. Similarly, the Data Consumers can subscribe only to the data relevant to them and in the form that can be easily integrated into their existing ATM infrastructure.

The POC demonstrated how the data from Contributor could be processed by the SCDP, such as filtering by FIR borders, by specific aircraft identification, by different flight levels and data sources.





2.5 Summary

The POC demonstrated the benefits of SCDP with SWIM over CRV:

a. To eliminate the potential bottlenecks of the data contributor and consequently the efforts of trouble shooting
b. SWIM Registry as a centralized service would help promote the service of the data contributor
c. Data Consumer without SWIM capability could also contribute their data even in legacy data formats and receive the Asterix data from the user interface
d. Tailor-made services for the data sharing could minimize the dilemma of a data contributor and expedite the surveillance data sharing enablement, while increasing the quality and usage relevance of the data at the same time.

## 3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) note that PCCW Global is open to discussing with state members to conduct trial

c) discuss any relevant matter as appropriate

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