International Civil Aviation Organization

The Sixth Meeting of System Wide Information Management Task Force (SWIM TF/6)

Video Teleconference (VTC), 17 – 20 May 2022

Agenda Item 7: State, Regional and Global SWIM updates

STATUS OF PROOF -OF -CONCEPT BASED SWIM PROJECT FOR EXCHANGING AERONAUTICAL, FLIGHT AND WEATHER DATA

(Presented by INDIA)

SUMMARY

This paper presents the Status and accomplishments of the Proof- of- Concept (POC) based SWIM project undertaken by India. This project will help INDIA to prepare a roadmap for the implementation of ground to ground SWIM infrastructure.

1. Introduction

1.1 The project scope covers building SWIM Technical infrastructure, generating digital datasets for Digital NOTAM. OPMET & flight related ATS messages. At present SWIM Services, SWIM Digital Applications, and, most notably, SWIM Gateway services with AMHS and AFTN Switch have been developed and in- house testing has been carried out successfully.

1.2 POC based SWIM project is aimed at operationally validating its deliverables developed in the spirit of SWIM core principles and capabilities, and identifying the operational potential scenarios.

1.3 Airports Authority of India (AAI) shall engage with other ANSPs in order to confirm the bi-lateral flow of aeronautical, flight and weather data over the SWIM.

2. **Discussion**

2.1 POC based SWIM project design supports Hybrid Operational Models and leverages the existing AMHS/AFTN networks to communicate with non-SWIM users. It is capable of distributing the aeronautical, flight and weather data through multiple channels subjected to operational rules and conditions.

2.2 HMI Client applications are designed to support Hybrid capabilities. e.g., The Digital NOTAM application supports generating Digital NOTAMs as well as Traditional TEXT NOTAMs. The operator can toggle between the template options to issue and view both the NOTAM types. The same philosophy is extended to other digital applications as well.

2.3 Capabilities of the prototype SWIM System

The below diagram summarizes the design philosophy of prototype SWIM system.

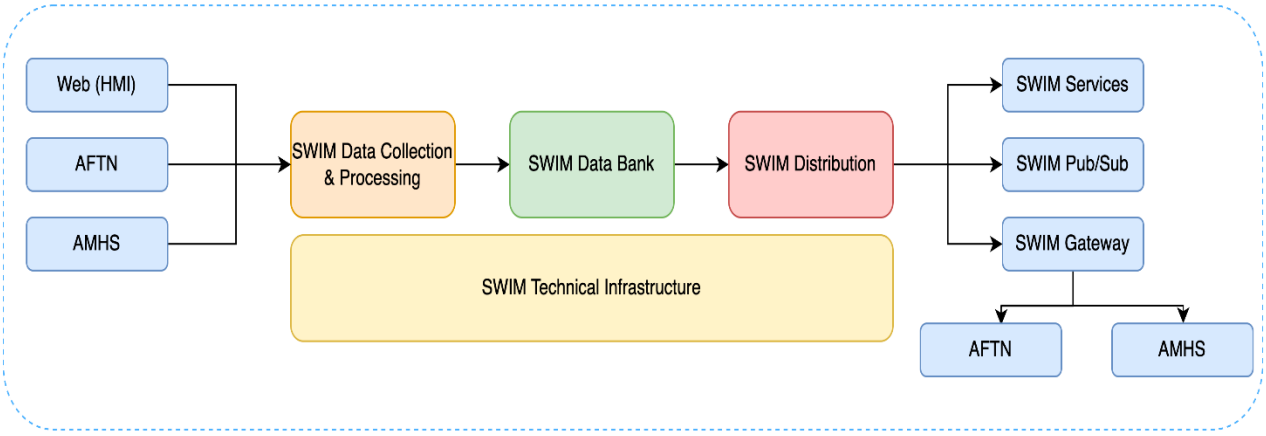

Fig. 1 SWIM Hybrid Messaging System

- **SWIM Infrastructure Developed for POC based SWM system is placed in Annexure 1. (Fig 2)**

- **SWIM Technical Infrastructure**

(1) A clustered Messaging Service uses AMQP that offers QoS like High Availability and Message Delivery to exchange the SWIM data through a publish/subscribe model. It provides highly available and secure Database Engine to store and manage operational data.

(2) Web/REST Service hosting platform to host SWIM services.

(3) A secure and reliable LDAP user registry to keep and manage SWIM system users.

(4) Message Security is achieved through Cryptography using PKI infrastructure and Digital Signatures.

(5) Information is encrypted using SSL protocol while it is being exchanged between systems.

(6) Trust framework is implemented using self-signed CA certificates to validate the client's identity and enforce trust between systems during systems integration.

Following services are part of the SWIM Architecture

- **SWIM Information Services:** FIXM Service, IWXXM Service, NOTAM Service
- **SWIM Hybrid Applications:** Digital NOTAM, Digital Flight Plan, Digital Briefing
- **SWIM Hybrid Distribution Service:** Publish/Subscribe using AMQP protocol
- **SWIM Security Service**: PKI, Server based certificate validation protocol (SCVP), Message security
- **SWIM Gateway Service:** Inter-Operable with AMHS and AFTN communication systems.
- **SWIM Message Converters:** FPL <-> FIXM, NOTAM <-> Event (AIXM), Met (Tac) <-> IWXXM
- **SWIM Governance**: Service Metadata, Discovery Service, Service Lifecycle

2.4 The project has entered into the final stage and is planned to be interfaced with Aero Thai SWIM system for testing and validation of the project deliverables.

2.5 The following datasets shall be consumed:

- DNOTAM data in AIXM 5.1.1 format
- Flight Plan data in FIXM 4.2 format
- OPMET data in iWXXM 3.0 format

2.6 Based on the successful completion of the project, future Roadmap for the implementation of SWIM in AAI shall be prepared.

3 ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) Invites other states to interface their SWIM system with Indian POC SWIM system for testing and validation

c) discuss any relevant matter as appropriate

Annexure 1.

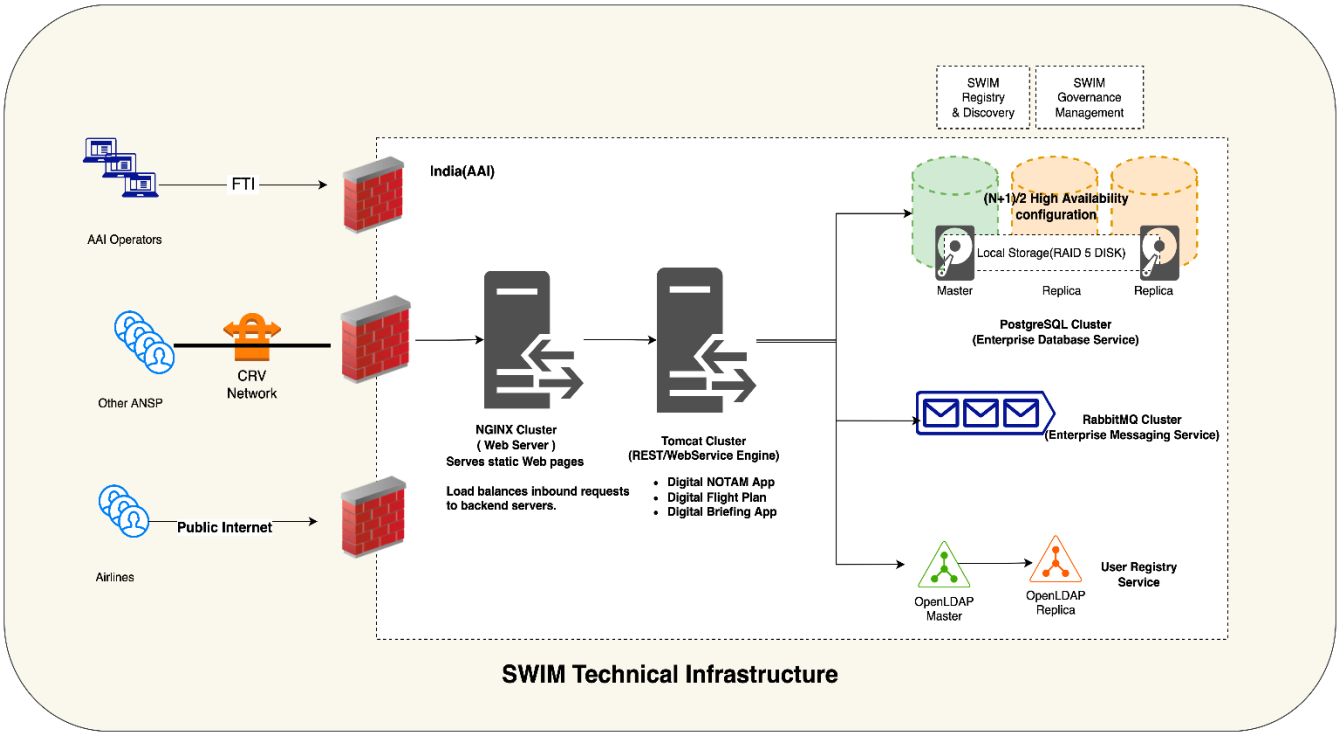

Fig.**2 SWIM Infrastructure**