International Civil Aviation Organization

WORKING PAPER

AN-Conf/13-WP/242
26/9/18
(Information Paper)
English only

THIRTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 9 to 19 October 2018

COMMITTEE A

Agenda Item 3: Enhancing the global air navigation system
3.1: System-wide information management (SWIM)

A REVIEW ON SYSTEM-WIDE INFORMATION MANAGEMENT (SWIM) INTER- REGISTRY MODELS IN ASIA-PACIFIC REGION

(Presented by the Republic of Korea)

EXECUTIVE SUMMARY

This paper presents the study on system-wide information management (SWIM) registry models, conducted by the Asia-Pacific SWIM Task Force (APAC SWIM TF). It includes three different SWIM registry deployment models, and its advantages and disadvantages, which can be referred when choosing the regional SWIM registry model.

1. INTRODUCTION

1.1 The Service-Oriented Architecture (SOA) is one of the core concepts to implement system-wide information management (SWIM), and a registry which is one of the components of SOA has a critical role in SWIM as a SWIM registry offering capabilities such as life-cycle management of metadata and publication/discovery of SWIM services.

1.2 A single global SWIM registry would be deployed to cover worldwide, but some of respective regions or enterprises would be able to deploy their own SWIM registries so that multiple SWIM registries would be able to co-exist in the future SWIM environment. Each SWIM registry could be operated independently, however, they could be inter-connected each other to exchange information. There are discussions in progress on how to inter-connect and implement between SWIM registries.

1.3 Currently, ICAO is conducting a study on SWIM registry models through relevant panels. The Federal Aviation Administration (FAA) and Eurocontrol jointly researched the deployment models of the global SWIM registry on the SWIM Common Registry (SCR) study. The joint research delivered the Registry Integration Module (RIM) for information exchange between SWIM registries and the Service Model Conceptual Model (SDCM) that defines syntax and semantic rule for common understanding of information to be used to exchange information. Since there are various considerations such as different levels of informational sensitivity and each State's interests, it will take time to define a regional or global SWIM registry for a consensus among States.

1.4 In the Asia and Pacific region, the APAC SWIM Task Force (TF) has been conducting SWIM registry tasks to define regional SWIM registry deployment model and its information model in 2017, and will propose the APAC SWIM registry model by the end of 2018. This paper presents the study on SWIM registry models, conducted by the TF, including three different SWIM registry deployment models, and its advantages and disadvantages, which can be referred when choosing regional SWIM registry model.

2. DISCUSSION

2.1 A SWIM registry can be implemented in an independent or an inter-connected model. Three available SWIM registry deployment models are described in Figure 1.

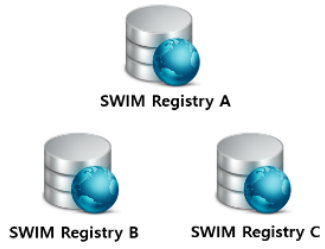	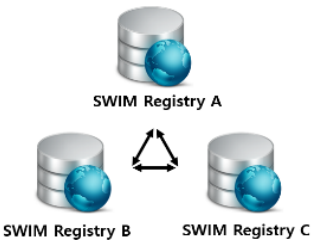	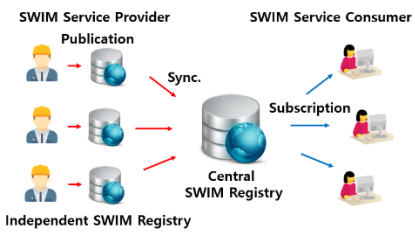
Independent SWIM registry model	Interoperable SWIM registry model	Central SWIM registry model

Figure 1. SWIM Registry Deployment Model

2.2 In the independent SWIM registry model, each individual SWIM registry publishes metadata relevant to the services, stores in its local repository and manages itself. Since each SWIM registry operates independently, there is no interface to exchange information between each SWIM registry.

2.3 The interoperable SWIM registry model comprised of inter-connected multiple SWIM registries like a mesh network. Each SWIM registry stores the published information relevant to the services in its local repository. The information can be exchanged between SWIM registries in horizontal relationship via common interface and each registry is not subordinated to another registry.

2.4 The central SWIM registry model consists of one central registry and multiple independent sub-registries. In order to guarantee the data integrity, each SWIM sub-registry operators and service providers can manage their metadata only in their independent sub-registries. Central SWIM registry automatically synchronizes data updated from independent sub-registries, and SWIM service consumers can receive all information relevant to the services through the interface on the central SWIM registry.

2.5 Moreover, the TF has defined the advantages and disadvantages of each SWIM registry model as described in Table 1.

	Advantages	Disadvantages
Independent SWIM registry model	- Common interface is not necessary - Easy to publish and manage services	- Data sharing between registries is not available - Customers who want to subscribe services registered in another registry needs to follow new subscription process in compliance with that registry's policy
Interoperable SWIM registry model	- Registries can independently be deployed and operated as long as interoperability between registries is ensured - An additional infrastructure is not necessary for inter-connection - Influence derived by malfunctioning of a specific individual registry has limited impact for other registries and total network due to the distributed (mesh) network	- Connectivity between registries are complex due to distributes (mesh) network - Difficulties exist to co-manage the assets (e.g. protocol, information exchange model, policy, regulation, etc.) stored in registries
Central SWIM registry model	− In comparison with Interoperable registry model, the architecture is simple because each registry communicates only with the central registry − Easy to co-manage the assets (e.g. protocol, information exchange model, policy, regulation, etc.) stored in registries	− Requires additional infrastructure costs to inter-connect between central registry and sub registries − Conflict may be generated, such as data ownership, share of expenses, due to co-management of infrastructure

Table 1. Advantages and Disadvantages of SWIM Registry Deployment Models

3. CONCLUSION

3.1 The Conference is invited to take note of the information contained in this paper.

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