International Civil Aviation Organization

The Seventh Meeting of System Wide Information Management Task Force (SWIM TF/7)

Bangkok, Thailand, 09 – 12 May 2023

Agenda Item 3: Updates on the assigned tasks by task leads/contributors including progress report and issues

SWIM DISCOVERY SERVICE DEMONSTRATION

(Presented by ROK/KAC, USA/FAA, China/ATMB, and Japan/ENRI)

SUMMARY

This paper describes SWIM Discovery Service (SDS) demonstration between ROK, USA, and Japan. It specifically provides capabilities to be used, topologies between SDS instances, and test-case for the demonstration.

1. INTRODUCTION

1.1 Since 2019, Korea Airports Corporation, ROK, and Federal Aviation Administration (FAA) held a first collaboration meeting in Washington DC, USA, to explore a regional approach for exchanging service description information, or metadata, between independently managed System Wide Information Management (SWIM) programs.

1.2 In 2020, FAA released the first version of the SWIM Discovery Service (SDS) specification, which defines a standard mechanism for exchanging service description information, or metadata, between independently managed SWIM programs (i.e., web services interface, interaction patterns, schemas, and exchange model), and the SDS specification and related WP/IPs were presented at the SWIM/TF4 meeting.

1.3 In 2021, KAC and FAA have independently developed SDS implementations to expose information about services published in their respective registries so that the services can be discovered and potentially reused by partners, and at the SWIM/TF 5 meeting, KAC, and FAA held a demonstration using respective SDS instances developed in compliant with the SDS specification.

1.4 In 2022, Air Traffic Management Bureau, China, and Electronic Navigation Research Institute (ENRI), Japan, joined the SDS development effort. There were several technical meetings in the governance task, and ATMB and ENRI have respectively developed SDS instances. And this extended collaboration also includes designing a potential use case and evolving the SDS specification to include new features to address the service discovery needs of the region. Most of the ideas were largely derived from discussions that took place on FAA SWIM Github. (see. faa-swim/swim-discovery-service)

1.5 This paper describes the SDS demonstration in the case of multiple (i.e., more than two) SDS instances environment to support the WP: Proposal of Regional Interoperable SWIM Registry

2. DEMONSTRATION

2.1 Capabilities of SDS to be used for the demonstration are as follows:

- discovery service (/discovery-service): a resource that allows a requestor to retrieve a description of a particular DS;
- peers (/peers): a resource that allows a requestor to retrieve a collection of references to peer DSs;
- services (/services): a resource that allows a requestor to retrieve a collection of references to SWIM services that meet the requestor's search criteria; and
- service (/services/{service-id}): a resource that allows a requestor to retrieve information about a specific SWIM service;

2.2 SDS instances for demonstration are as follows:

- FAA SWIM Metadata Exchange Service (SMXS);
- KAC SWIM Metadata Exchange Service (SMXS); and
- ENRI SWIM Metadata Exchange Service (SMXS);

2.3 Service registry helps the visualization of the service description exchanged through SMXSs so that the human user is able to read the description with the User Interface (UI). The service registries for the demonstration are as follows:

- FAA NAS Service Registry and Repository (NSRR);
- KAC SWIM Registry; and
- ENRI SWIM Registry;

2.4 The demonstration conducted in 2021 used two respective SDS instances developed by the KAC and FAA. The demonstration proved the feasibility of the SDS using two instances. The test case was very basic, where SDS instances exchange information in Point-to-Point (P2P) environment, as shown in Figure 1.

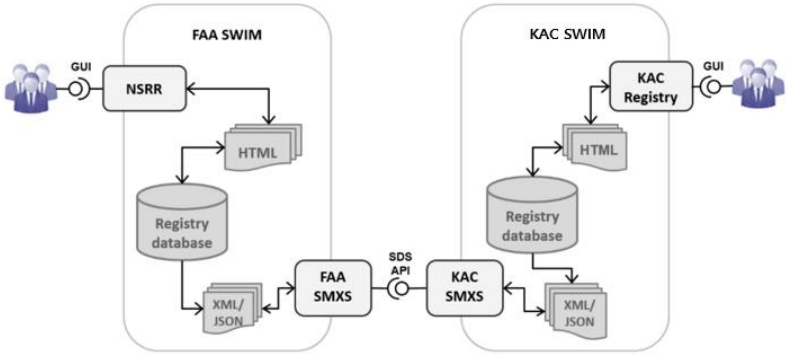

Figure 1 Demonstration Environment (2021)

2.5 The demonstration to be conducted in the meeting uses three respective SDS instances developed by the KAC, FAA, and ENRI. The test case includes a more complex environment where instance “FAA SMXS” is invisible to instance “ENRI SMXS” but the instance “ENRI SMXS” is able to discover the existence of instance “FAA SMXS” through instance “KAC SMXS” as shown in Figure 2.

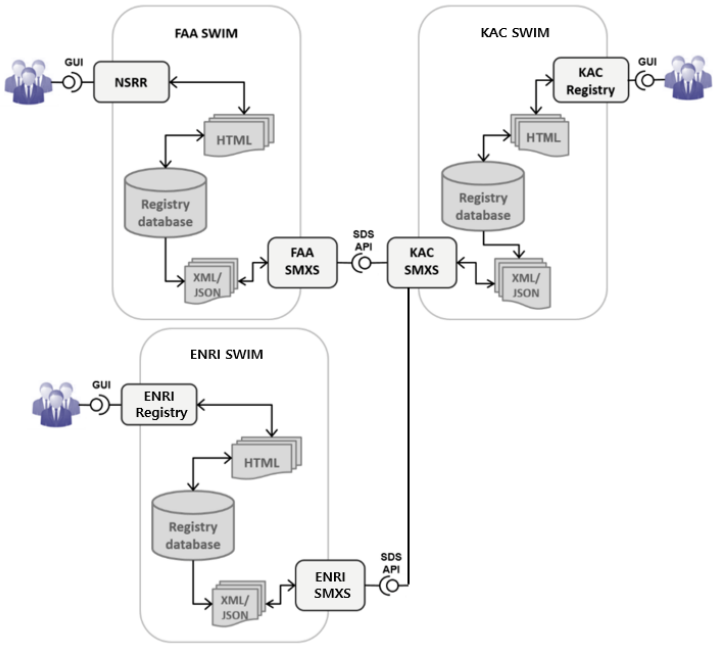

Figure 2 Demonstration Environment (2022)

2.6 The test scenario is divided into two main phases. In step 1, using GetPeers operation, instance “ENRI SMXS” discovers instance “FAA SMXS” from instance “KAC SMXS”, which it was previously unaware of, as shown in Figure 3.

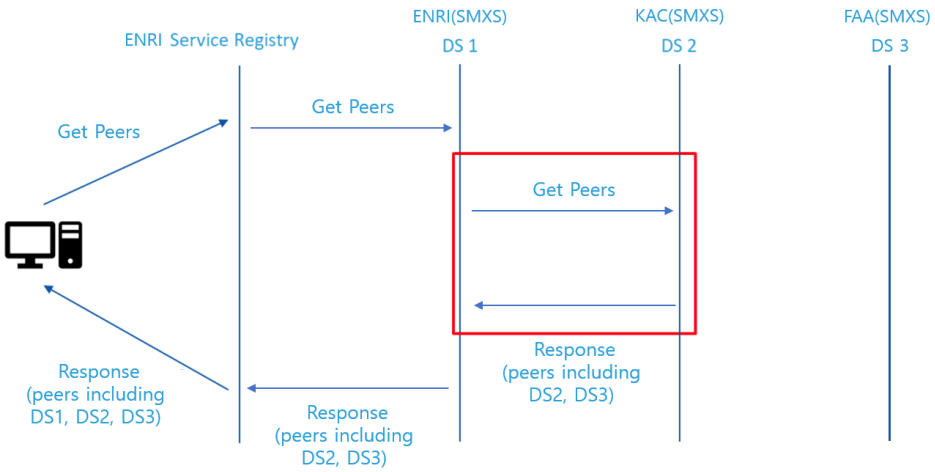

Figure 3 Data Flow Diagram #1 Get Peers

2.7 After step 1, instance “ENRI SMXS” recognizes the existence of instance “FAA SMXS”, and instance “ENRI SMXS” is able to obtain information from instance “FAA SMXS” using GetDiscoveryService operation using the endpoint address included in the returned data of GetPeers

operation. Next, instance “ENRI SMXS” receives a list of services from instance “FAA SMXS” using GetServices, as shown in Figure 4.

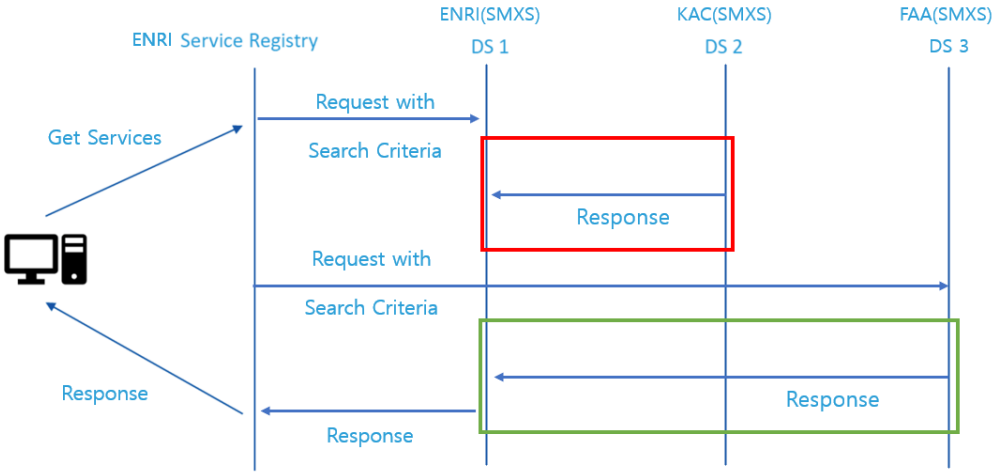

Figure 4 Data Flow Diagram #2 Get Services

2.8 More information will be provided during the demonstration.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matter as appropriate