From ICAO Provisions to Practical SWIM Implementation

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Implementation Areas of Consideration

01	SWIM Technical Infrastructure
02	SWIM Governance
03	SWIM Information Services
04	Practical Steps

Introduction

- **SWIM documents covered earlier**
  - Manual on SWIM Concept - Doc 10039
  - PANS – Information Management – Doc 10199
  - Manual on SWIM Implementation – Doc 10203
- **Agenda**
  - Detailed considerations during SWIM Implementation
  - How the 3 areas are related to each other
  - How they eventually lead to the full implementation, operationalization and maintenance of a SWIM instance
- **Q&A**
  - 30 mins Q&A session

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SWIM Technical Infrastructure

What is in the SWIM TI?

- **IP Connectivity**
  - While not officially part of the SWIM TI it is an important consideration
  - SWIM is built over an IP network, therefore wherever you want to have access to SWIM there must be IP connectivity
  - Consider how to get IP connectivity to all the places you want SWIM access
- **Enterprise Messaging Service/System (EMS)**
  - Form of middleware that enables different systems, applications and services to communicate and share data reliably
  - Independent of programming language or operating system
  - Uses open source public protocols like AMQP, JMS or MQTT

What is in the SWIM TI?

- **API Gateway**
  - This is an optional component
  - States may want to use an API Gateways to help managed HTTPS REST type interface
  - Useful for Synchronous Request / Reply type
- **SWIM Registry**
  - Necessary to fulfil PANS-IM
  - Contains all the information about available information services on the SWIM
- **Security and Identity Management**
  - Necessary to maintain Information Service integrity and security
  - Ensures that only authorised consumers can access the information
  - Reference the ACCP and MAIS on how to implement
    - Certificate based security
    - PKI infrastructure

SWIM Governance

SWIM Governance Considerations

- **The need for SWIM Governance**
  - Maintain Interoperability
  - Consistent and Efficient Implementation
  - Quality and Security
  - Operations and Maintenance
- **Governance consists of**
  - Structures
    - Collections of stakeholders that make governance policies and implement those policies
    - Responsible parties for SWIM requirements, implementation, validation, operations, and maintenance
    - Controls and approves the creation of the processes that implement the policies
  - Processes
    - Sequence of steps that need to be completed to fulfil the governance policies
  - Procedures
    - Specific actions at each process step to complete that step.

Governance at the initial phase

- **ICAO Provisions are applied at the State level**
  - Implies States have a responsibility for SWIM implementation
  - However different States have different ways of organizing service delivery.
  - The State authority may not be best placed to implement SWIM
- **Governance at this phase is focused on requirements gathering**
- **Necessary to capture requirements of the major stakeholders**
  - What operations is SWIM expected to support?
- **Need to account for ICAO provisions**
- **SWIM Planning Committee**
  - CAA
  - ANSP
  - Major Airport Operators
  - Home Airlines
  - Meteorology Provider

Governance during implementation

- **Important to decide how SWIM implementation is organized**
  - Single party implements the SWIM TI and offers it as a service to the other stakeholders
  - Multiparty implementation of the SWIM TI with a SWIM committee governing the integration
  - SWIM TI purchased as a service from a vendor
- **Regardless of implementation method, the following questions need to be answered**
  - Where are all the information sources?
  - Is there IP connectivity to all information sources?
  - How the SWIM TI should be accessed?
  - How should security on the SWIM TI be implemented?
  - How should the State SWIM TI be plugged into the regional / global SWIM?

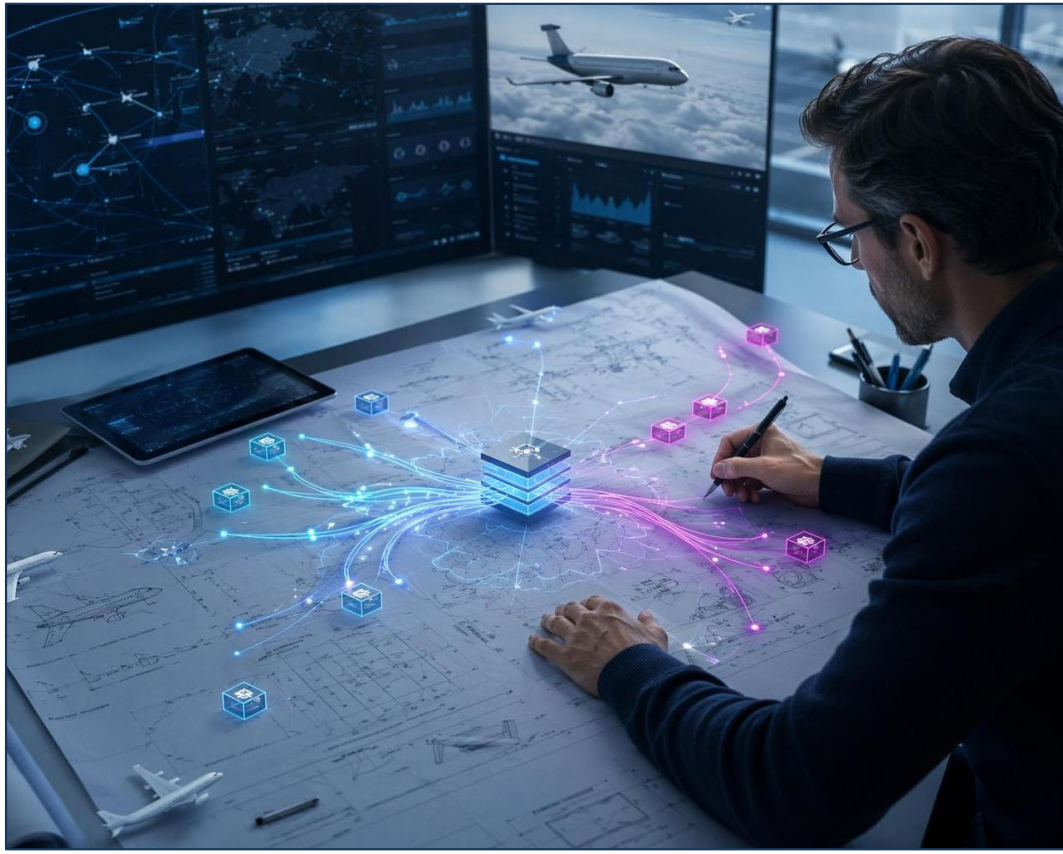
Governance during operations

- **Access to the SWIM**
  - As an information consumer
    - Restrictions on access to different types of information
    - Classification process to categorize the information
    - Process to assess the requester
  - As an information producer
    - Trustworthiness of the producer
    - Proper classification of the data being published
    - Testing of the new information service
      - Use of SWIM test bed
    - Onboarding and publication process
- **Performance Monitoring and Maintenance**
  - Overall bandwidth usage
  - Total availability of the SWIM TI
  - Routine maintenance
    - Updates of security patches
    - Software upgrades

SWIM Information Services

Creating a new information service - Initial

- **Identify the need**
  - Is there an operational need for the information to be consumed through SWIM?
  - Is there a policy direction to fulfil for putting the information on SWIM?
  - Is there a strategic objective to achieve in having this information on SWIM?
- **Identify the message exchange pattern**
  - 2 major patterns Publish / Subscribe and Request / Reply message exchange Patterns
  - Publish / Subscribe sub-patterns
    - Guaranteed delivery
    - Non-guaranteed delivery
  - Request / Reply sub-patterns
    - Synchronous
    - Asynchronous
  - Choose the pattern most suitable for the needs
- **Implement the information service according to the SWIM TI framework**



Creating a new information service - Implementation

- **New information service must fit into the SWIM TI framework**
  - Use only those protocols supported by the SWIM TI
  - Use the security mechanisms deployed in the SWIM TI
  - Only use data models compatible with the SWIM TI.
- **Testing**
  - Offline testing in a closed environment to verify functionality of the service.
    - Helps protect the data from accidental leaks
    - Helps protect the SWIM TI from rouge programme code.
  - Testbed testing
    - Testing in an environment that mimics the SWIM TI
    - A form of integration testing to ensure that the information service performs well in the SWIM TI
- **Onboarding to the SWIM TI**
  - Comply with onboarding process and procedures

Creating a new information service - Operations

- **Information service provider should be responsible for the service level**
  - Regular monitoring of the information service
  - Ensure availability, integrity of data, bandwidth usage
- **Respond to request for access**
  - Should ensure that the requester has the correct permissions to access the data
  - Provide necessary information for onboarding
  - Aid requester to start consuming data
- **Software patching and upgrades**
  - Respond to bug reports
  - Patch the information service when necessary
  - Plan for upgrades
- **Information service deprecation**
  - Inform all current consumers of plan to deprecate information service
  - Provision enough lead time for consumers to respond
  - Refer consumers to alternatives for the same data

Practical Steps

Some Practical Steps for SWIM

- **Gather your requirements**
  - Drives your SWIM decisions
  - Impacts architecture
- **Decide on your SWIM Architecture**
  - Centralized, distributed multi-nodal, hierarchical
  - Impacts your implementation planning
- **Build up your IP network**
  - Regardless of SWIM architecture you will need IP connectivity to all your information sources
  - Identify where they are and ensure that there is IP connectivity to all sites
- **Setup the SWIM TI**
  - Including the SWIM Registry
- **Identify and build the initial set of information services**
  - Test them for function and performance
- **Launch SWIM and publish the services**
  - Plan when the SWIM TI is to turn operational
  - Publish initial set of information services
- **Onboarding of consumers**

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Question & Answer