



ICAO

*International Civil Aviation Organization***The Fourth Meeting of System Wide Information Management Task Force (SWIM TF/4)**

Web-conference, 3 – 6 November 2020

Agenda Item 7: State, Regional and Global SWIM Updates**REPORT ON SWIM IN AUSTRALIA**

(Presented by Australia)

SUMMARY

This paper summaries the activities and plans for the design and implementation of SWIM services in Australia for customers and stakeholders.

1. INTRODUCTION

1.1 SWIM architecture and planning activities have been carried out by Airservices Australia (ASA) and the Australian Bureau of the Meteorology (BOM) over the past 18 months. These are described in Section 2 and Section 3 (respectively).

1.2 A number of proposals for the APAC SWIM community are proposed in these sections.

1.3 The concept of “SWIM” is used in various contexts and needs to become clarified to ensure the meaning is not lost in its’ general use by stakeholders. SWIM consists of necessary individual capabilities but needs to be collected to become sufficiently defined. Such criteria may include:

1.3.1 The data payload must follow the industry domain information models (eg AIXM, FIXM, IWXXM), including any potential extensions, and mapped to the industry reference model (ie AIRM).

1.3.2 The message exchange pattern(s) must be based on contemporary practices (eg request/reply or publish/subscribe).

1.3.3 The message protocol(s) must use common lightweight approaches (eg REST API or AMQP).

1.3.4 The message transport must be secure and encrypted (eg HTTPS).

1.3.5 The message exchange must use common distributed identity and authentication of users (eg OAUTH)

1.3.6 The data service must be registered in a commonly accessible SWIM Registry service for consumers to discover and subscribe to the data services.

1.3.7 There should be a documented SWIM Technical Infrastructure Profile that represents consensus amongst the data stakeholders for SWIM capabilities.

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2. DISCUSSION – AIRSERVICES AUSTRALIA (ASA)

2.1 Airservices, together with the BOM, developed a proof-of-concept to show the exchange of IWXXM data using current-state cloud-based services. The prototype used AWS cloud components to provide the transfer of IWXXM data to ASA (over AMPQ) and the subsequent data services being offered to downstream consumers (via AMPQ or REST). See Appendix A for the prototype architecture.

2.2 As part of the above prototype, ASA setup a prototype SWIM Data Registry to experiment with the ICAO Service Overview recommendations to describe the types of services that were being supported in the prototype. The registry was a set of static descriptive pages using GitHub. The demo is accessible at:

<<https://airservicesaustralia.github.io/registry/>>

2.3 ASA developed and endorsed a “Data Interoperability Plan and Roadmap” to capture the SWIM enterprise strategy and a target state to envision a future data ecosystem that is underpinned and driven by SWIM capabilities, including the new benefits to data customers and stakeholders. The Plan articulated the SWIM capabilities and value proposition, the current state architectures, the roadmap towards the SWIM-enabled target state, and a data interoperability governance framework.

2.4 The ASA Data Interoperability Plan focusses on the need for an enterprise-wide Integration Platform capability to ensure the benefits from SWIM are realised. The key aspects of the Integration Platform approach for SWIM include:

- Operational ATM/UTM enterprise systems feeds data to the Integration Platform
- Data is stored in (semantically) curated business-purposed data hubs
- The Integration Platform include (internal) Contracts that detail the data service from a technical perspective and include the business rules to integrate the data from enterprise services to provide the output payload data.
- The Data Services Registry detail the data service from a Consumer (business) perspective
- The Integration Platform includes an Orchestration process to perform the necessary steps to populate the data services, including model-based Transformations
- Key business services can be orchestrated by the Integration Platform (such as Event Notification)
- The Message end points exposes the data interfaces and patterns for standardised consumption for both internal and external consumers
- IDAM is necessary for authentication and authorisation
- Data Service Governance ensures the data services meet quality and conformance requirements
- An Operating Model is required to sustain the Integration Platform for SWIM services

See Appendix B for the proposed Integration architecture.

2.5 ASA is developing a new joint Civil/Defense ATM system (CMATS) and the proposed data exchange mechanisms have been assessed to ascertain compatibility to SWIM capabilities with recommendations to align in future developments.

2.6 ASA has commenced work on supporting UTM services and is investigating alignment of SWIM capabilities to support these new capabilities. The interface between UTM and ATM should

benefit from common SWIM capabilities and should become part of the overall SWIM architecture focus. **ASA recommends additional comments by APAC member States.**

2.7 ASA has developed a SWIM Technical Infrastructure Profile (the “GOLD” Profile). The objective is to document the necessary requirements and supporting capabilities for the SWIM services offered by ASA to the wider community. This is similar to the EUROCONTROL Yellow Profile, with ASA taking a more modern and narrower approach to the supported capabilities for message exchange patterns, protocols, and security. The GOLD Profile is currently in draft status. See Appendix C for the Profile capability overview.

2.7.1 SWIM Task Force Proposal – ASA proposes that the APAC SWIM Task Force develop a joint regional approach to SWIM Technical Infrastructure Profiles. Specifically, that an APAC SWIM TI Profile be developed by the member States that enable SWIM-based data interoperability amongst the State data stakeholders.

2.8 ASA has been cooperating with EUROCONTROL to pilot an Australian SWIM Data Services Registry, as a direct instance of the EURCONTROL SWIM Registry at <https://eur-registry.swim.aero/>. The phase will enable ASA to ascertain the capabilities and alignment of the Registry relevant to a local context, and review broader requirements and integration into enterprise platforms.

2.8.1 SWIM Task Force Proposal – ASA proposes that the APAC SWIM Task Force develop a joint regional approach to SWIM Registries. Specifically, that an APAC Regional SWIM Registry - based on the EUROCONTROL platform – be established by the member States to enable the common sharing of data service descriptions and future Registry interoperability.

2.9 ASA has been involved in a number of standardisation/community groups related to SWIM capabilities and provided input and new capabilities.

2.9.1 AIXM CCB - ASA has proposed new terms for NOTAM events for Airspace activation and clarified Schedule timesheets for non-UTC time-zones.

2.9.2 AIRM CCB – ASA has provided reviews of the URN naming for entities (highlighting inconsistencies) in the model and provided recommendations for standardised naming (and identification) of entities consistent with modern approaches.

2.9.3 ICAO IMP SWIM MAN 2 – ASA has provided significant feedback on the SWIM Manual Volume 2 Implementation Guidelines. **ASA recommends additional reviews by APAC member States.**

2.9.4 ICAO IMP PANS IM – ASA has provided input into the new PANS IM to ensure the requirements are clear and concise and able to be aligned to for conformance. **ASA recommends additional reviews by APAC member States.**

2.9.5 ICAO IMP/WG-A – ASA proposed the use of the W3C DCAT standard to describe the contents of Aeronautical Data Sets and Data Set Series, which was accepted by the WG. There is potential that this standard be adopted for all datasets. See Appendix D for the DCAT Profile model. **ASA recommends additional reviews by APAC member States.**

2.9.6 EUROCONTROL SWIM Community of Interest (SSCONE/SITCOM) – ASA has participated in this community and provided feedback and suggestion on mapping the XM domain models to AIRM.

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2.9.7 SWIM Registry CCB – ASA has recently joined this group to oversee the development and evolution of the EUROCONTRL Swim Registry and the ASA instance.

3. DISCUSSION – BUREAU OF METEOROLOGY (BOM)

3.1 The BOM recently started generating METAR, SPECI, TAF, SIGMET, AIRMET, Volcanic Ash Advisories, Tropical Cyclone Advisories and Space Weather Advisories in IWXXM version 3 format. The BoM has plans to generate the IWXXM from the source systems, however some IWXXM data are generated by translating their traditional alphanumeric code (TAC ie text) form to IWXXM.

3.2 The BOM has a project to distribute the IWXXM via AMQP and this capability is expected to be operational in mid-2021. The BOM is also formulating plans to make additional meteorological datasets, such as satellite imagery, thunderstorm objects, probabilistic gridded information (including volcanic ash) available through SWIM services. Further details will be shared as these plans are confirmed.

3.3 Unlike other domains, it is expected that there will be multiple providers of some of the aforementioned meteorological datasets for the same location (with potentially different quality). It would be useful to discuss any methods States are adopting to manage data access and cost recovery of SWIM services. **BoM recommends that a task team consisting of States who are implementing meteorological services within a SWIM environment to:**

3.3.1 **collate the cost recovery methods used for meteorological services (free, per product, per distance, etc.);**

3.3.2 **review available meteorological cost recovery models within a SWIM environment;**

3.3.3 **identify issues; and**

3.3.4 **make recommendations.**

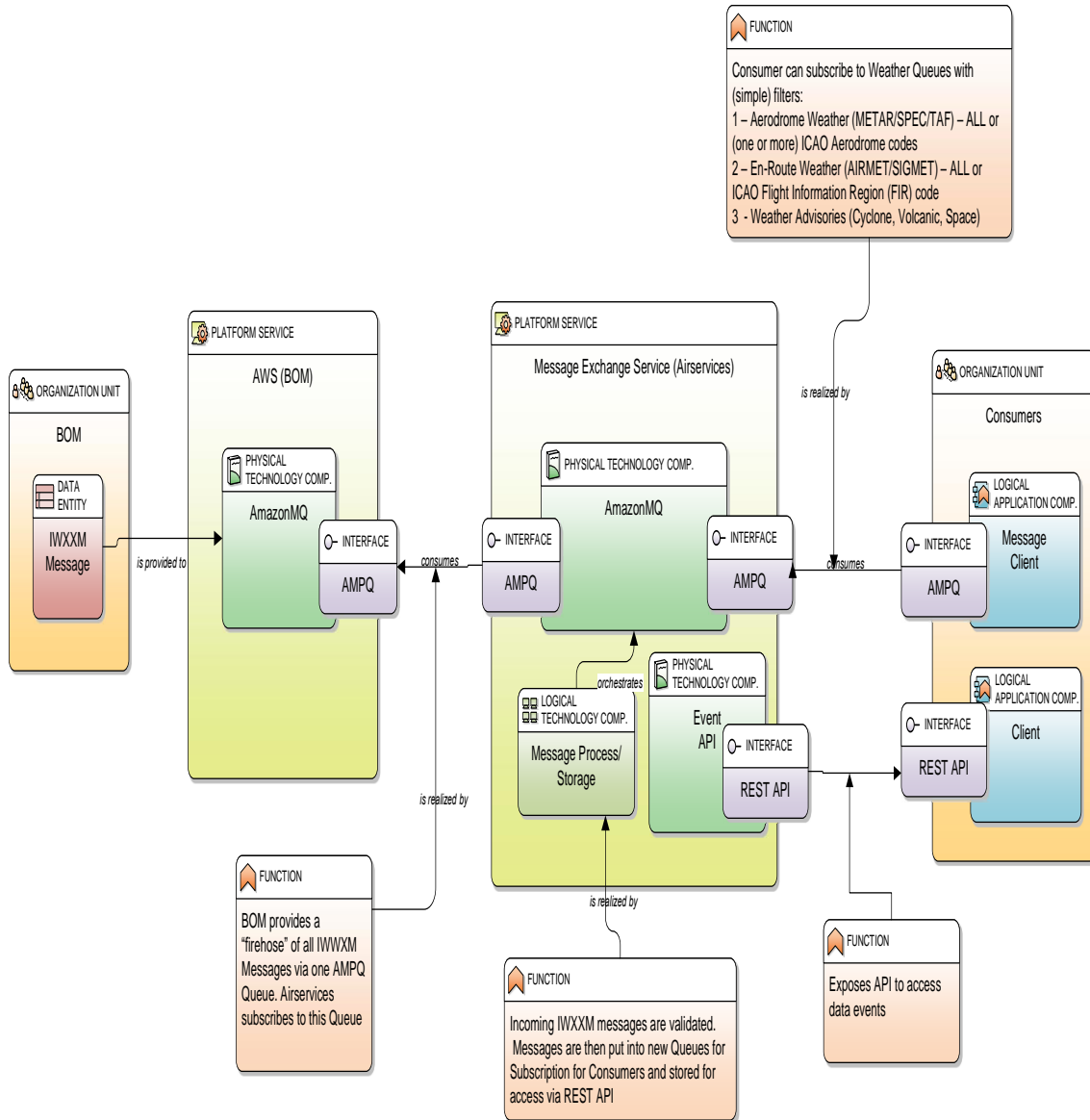
4. ACTION BY THE MEETING

4.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matter as appropriate, and
- c) discuss in detail the SWIM Task Force Proposals noted at:
 - a) Section 2.6
 - b) Section 2.7.1
 - c) Section 2.8.1
 - d) Section 2.9.3, 2.9.4, 2.9.5
 - e) Section 3.3

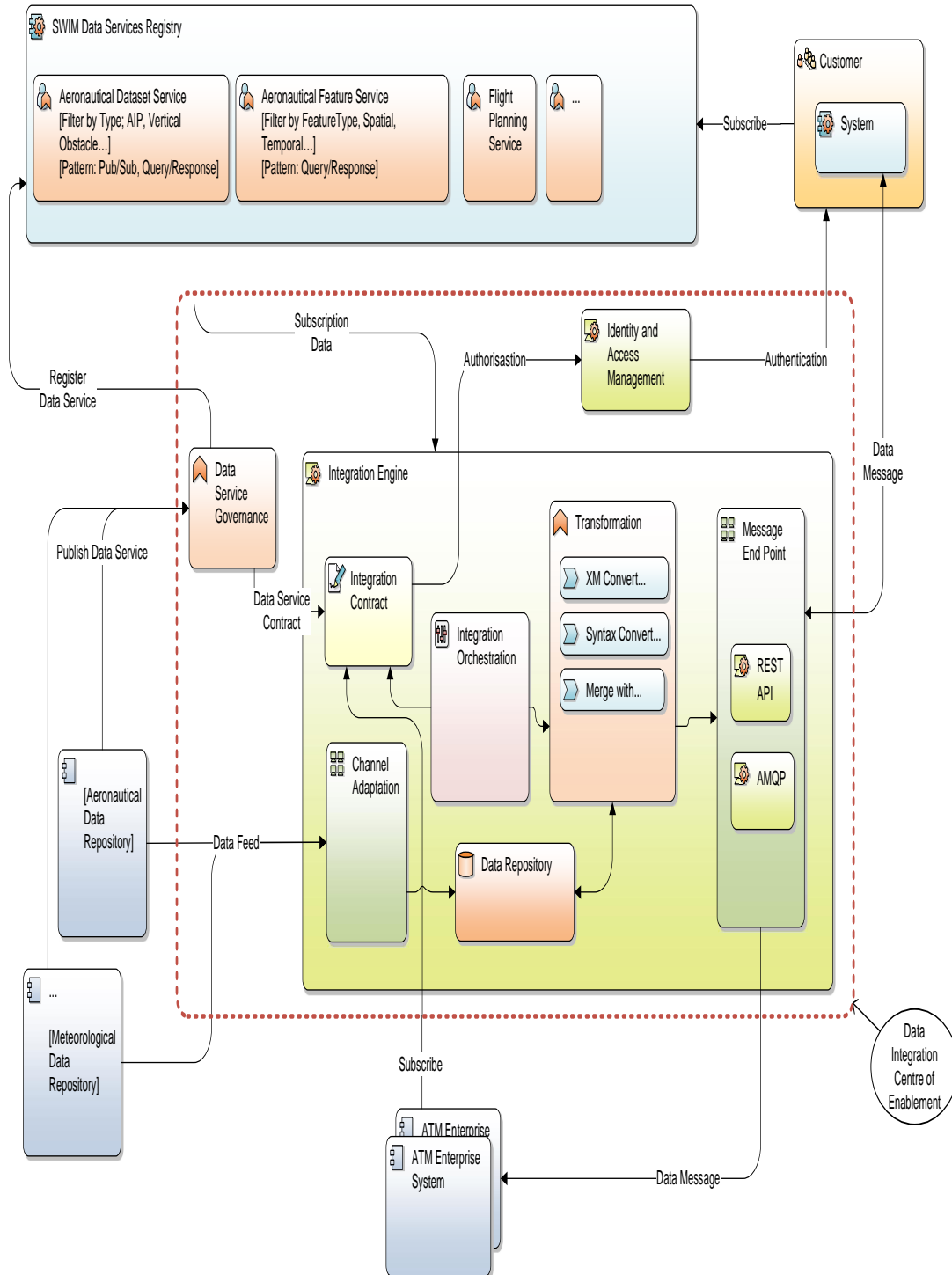
APPENDIX A – SWIM IWXXM Prototype Architecture

Airservices Weather Data Services - MVP			
Architecture design for the Airservices Weather Data Service MVP. NOTE: This only covers the messaging aspects of the MVP, not the Data Services Registry (which will be part of the MVP).	TYPE:	TOGAF 9 Diagram Template 2020	CREATED: 23/07/2019 by Iannela, Renato
	VERSION:	0.1 MVP	MODIFIED: 4/12/2019 by Iannela, Renato

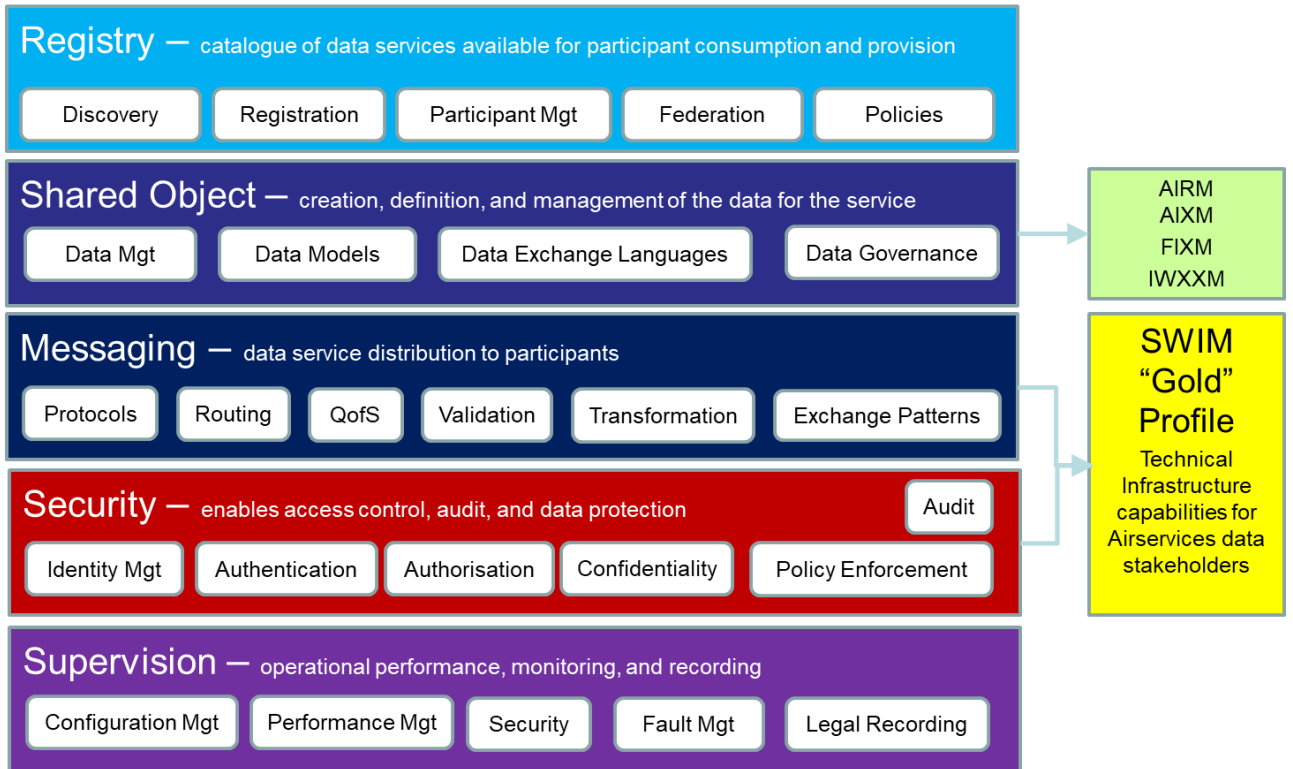


APPENDIX B – SWIM Integration Architecture

SWIM Integration Framework			
An overview of how SWIM fits in with Integration		TYPE:	TOGAF 9 Diagram Template 2020
		CREATED:	6/06/2020 by Iannello, Renato
		VERSION:	14/06/2020 by Iannello, Renato
		MODIFIED:	14/06/2020 by Iannello, Renato



APPENDIX C – Airservices SWIM GOLD Profile



APPENDIX D – W3C DCAT Profile for Aeronautical Data Sets

