

REGIONAL DATA MANAGEMENT GUIDANCE DOCUMENT

1. INTRODUCTION

- 1.1 While international and cross-border data sharing and management guidelines exist for regional bodies such as APEC, OECD or ASEAN, there is currently no overarching Guidance Document for the wider APAC region. Examples of existing guidelines include the APEC Cross Border Privacy Rules, ASEAN Model Contractual Clauses, ASEAN Data Management Framework, OECD Guide to Data Governance and Policymaking.
- 1.2 In 2025, a survey conducted gathered 14 data sharing use cases in APAC, where States expressed concerns about:
 - a) the lack of clearly defined data governance measures governing the use, storage, and protection of shared data, as well as the associated risk of data misuse;
 - b) inconsistent data quality standards across participating states, with variations in timeliness, completeness, and accuracy, often stemming from technical and resource limitations; and
 - c) differing data formats, requiring substantial effort to process and standardise before meaningful analysis can occur
- 1.3 See **Appendix 1** for detailed survey findings on the use cases, challenges and additional considerations gathered.

2. PROPOSED APPROACH

- 2.1 Considering the challenges and concerns observed, and given that APAC States depend on one another for data especially when it comes to data sharing use cases on performance benchmarking and CONOPS development, a Regional Data Management Guidance Document is essential to guide APAC States to collectively work towards unlocking the value of historical data to drive impactful use cases, with a focus on implementing good data management practices.
- 2.2 To facilitate safe and efficient data sharing across APAC, the Regional Data Management Guidance Document aims to establish a trusted and interoperable guide with data management best practices and recommend standardised data semantics to promote responsible and effective use of data.
- 2.3 While this Guidance Document has been developed primarily for data sharing within the APAC Data Analytics Group (DAG), other groups within APAC that wish to adapt this document for their data sharing use cases are welcome to do so, and are encouraged to reach out to the DAG for guidance and support.

3. REGIONAL DATA MANAGEMENT GUIDANCE DOCUMENT

- 3.1 The Regional Data Management Guidance Document comprises the following key pillars: (1) Aligned with Existing Policy and Legal Requirements; (2) Good Data Management Principles; and (3) Recommended Interoperability Measures.

(1) Aligned with Existing Policy and Legal Requirements

- 3.2 As the Regional Data Management Guidance Document is developed to provide non-obligatory guidance based on best practices in data management, the Guidance Document should not be read nor constitute as legal advice or used as a tool for compliance with any law or regulatory requirements.
- 3.3 For avoidance of doubt, this Guidance Document will not take precedence over existing legal or regulatory requirements that APAC States are subject to. The data management principles set out within this Guidance Document build upon existing policy and legal foundations (see **Appendix 1** for information) and function as a complementary extension guide to data management.

(2) Good Data Management Principles

- 3.4 This section outlines data management practices and principles across the data lifecycle (see **Figure 1**) which is largely mirrored after existing APAC data sharing use cases.

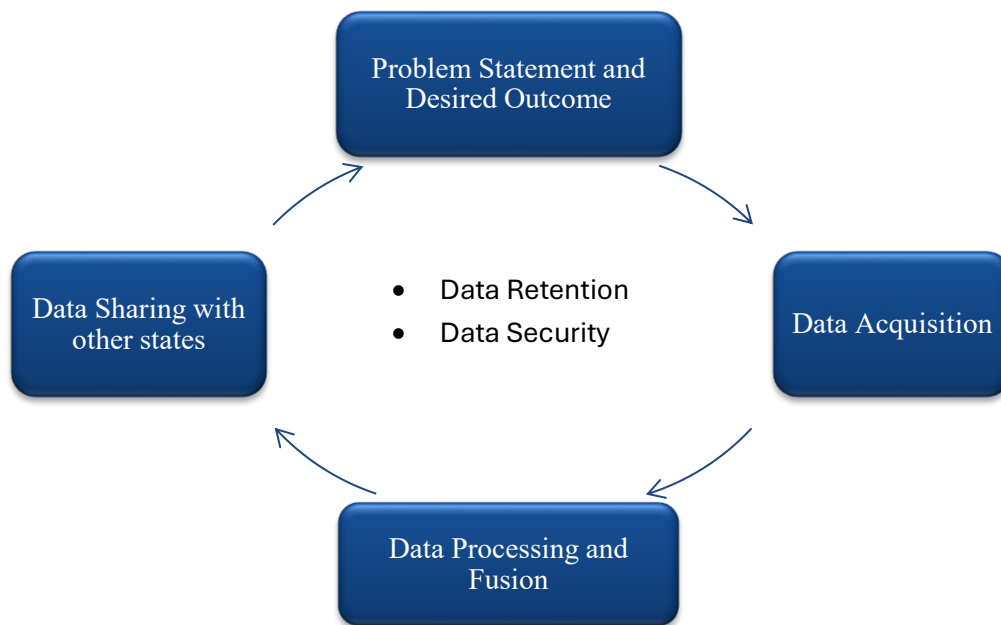


Figure 1. Data Lifecycle

3.5 **Data Acquisition**

- 3.5.1 The use case should be clearly defined with the data identified required to fulfil the use case, before acquiring data from other States.
- 3.5.2 To minimise risks of unauthorised use or disclosure, the acquisition of data should be minimised to only what is necessary.
- 3.5.3 When data is acquired from States, the data should as far as possible be acquired via electronic means.

3.6 Data Processing and Fusion

- 3.6.1 To minimise errors arising from data processing and fusing, APAC States that process and fuse data should put in place processes such as data validation checks, documentation of formulations and algorithms, and periodic review of error logs.
- 3.6.2 When processing and fusing data, APAC States should as far as possible, apply anonymisation techniques, including the alteration or removal of identifiers, to minimise the risk of unauthorised identification or disclosure of sensitive or proprietary information.

3.7 Data Sharing

- 3.7.1 Before APAC States share data with another State, they should check whether there is any law (e.g. legislation, contract, legal privilege, state-level policies etc.) governing such data disclosure.
- 3.7.2 Where APAC States receive data from another APAC State, they should not disclose the data received to other parties and only use the data for specified or directly related purpose(s), without the explicit approval of said APAC State, unless otherwise authorised (e.g. by the State) or required by law. In addition, APAC States receiving data should not publish any summary conclusions or interpretations based on the data received without the explicit approval of the APAC State which the data originated from, unless otherwise authorised or required by law.

3.7.3 Recommended Roles and Responsibilities

Role/ Definition	Responsibilities
Data Provider APAC States which the data originated from	• Communicate the known limitations of the requested data as far as practicable (e.g. completeness, accuracy, time specificity, other physical attributes including Intellectual Property rights and limitations, and contextual limitations) • Inform the Data Requestor of any issues with the publication of the requested data and/ or its statistics derived after being informed of the intention to publish • Take reasonable effort to evaluate data requests. For more complex data requests, the Data Provider, Data Controller and Data Requestor should work together to establish the time required to meet the data request at the onset • Transfer the data at the mutually agreed frequency
Data Controller APAC States that have possession or custody of the data	• Take reasonable measures to ensure that the shared data is protected against loss, unauthorised access, use, modification, disclosure or other misuse • Ensure that data and/or data or statistics derived from Data Providers are not shared with any third party without explicit approval of the Data Provider

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Role/ Definition	Responsibilities
	• Only use the data for the specified or directly related purpose(s) and seek approval from the Data Provider if it wishes to use the requested data for other purposes • Notify the Data Provider without undue delay when it becomes aware of any data breach, and in no event later than the maximum period permitted under any applicable laws, and take all reasonable measures to rectify the breach, including measures directed by the Data Provider • Purge the data when it is no longer needed
Data User APAC States	• Only use the data for the specified or directly related purpose(s) and seek approval from the Data Provider if it wishes to use the requested data for other purposes (e.g. Background Intellectual Property/ Raw data should not be shared without approval from the Data Provider) • Ensure that the Data Provider is notified at a mutually agreed timeframe prior to any publication of the requested data and/or its derived statistics (e.g. Foreground Intellectual Property/ Reports etc.) • Notify the Data Provider without undue delay when it becomes aware of any data breach, and in no event later than the maximum period permitted under any applicable laws, and take all reasonable measures to rectify the breach, including measures directed by the Data Provider • Purge the data when no longer needed

3.8 **Data Retention**

- 3.8.1 APAC States should retain data only for the period necessary to fulfil the purposes for which it was collected.
- 3.8.2 APAC States should set a retention period for each dataset. Upon the expiry of the stipulated retention period, the data shall be securely destroyed in accordance with the respective APAC State's data management policies.

3.9 **Data Security**

- 3.9.1 APAC States should consider the following data security measures to protect data and prevent data compromises:
- a) ensure that Data User (i.e. APAC States) request and retrieve only the data required for the use case and do not retrieve more data than necessary;
 - b) processes and controls to ensure that the rights to access data are granted on a need-to-know basis, where data access rights are regularly reviewed;

- c) predefined limits for volume of data to be accessed and duration of access through access control features;
- d) log and monitor data transactions to detect suspicious or risky activities and take action to prevent any data compromises;
- e) implement technical measures to protect data and render the data unusable to an attacker (e.g. field level encryption, hashing with salt, tokenization, obfuscation/ masking of entity attributes); and
- f) password protect and/or encrypt files when sharing data.

(3) Recommended Interoperability Measures

3.10 Common Data Standards and Format

3.10.1 Existing international data standards such as the following (non-exhaustive) should be used as reference:

- a) ISO/IEC 11179: Guidance Document for a Metadata Registry;
- b) UN/CEFACT Core Components Library;
- c) World Customs Organisation (WCO) Data Model;
- d) Organisation for Economic Co-operation and Development (OECD) Data Quality guidelines;
- e) DAMA-Data Management Body of Knowledge (DMBOK);
- f) IATA Airline Industry Data Model (AIDM); and
- g) FAA System Wide Information Management (SWIM).

3.10.2 To strengthen interoperability, APAC States should adhere to mutually agreed data standard and format prior to the data sharing use case.

3.10.3 Where possible, APAC States should use standard data templates which fulfil the needs of the use case when sharing data. For example, where there are joint projects, members should only share data using a common data template, whether agreed upon collectively by all members or proposed by any single member, provided that the data template adheres to an existing international data standard.

3.11 Data Quality

3.11.1 To ensure that data is reliable and fit for use, APAC States should consider the following data quality indicators:

- a) Usability (for example, APAC States to ensure that the historical data records provided are in usable formats);
- b) Accuracy (for example, APAC States to ensure that the historical data records provided are error free); and
- c) Data Error/ Discrepancy Resolution (for example, APAC States who provide data should take reasonable measures to rectify and address data errors and/or discrepancies and inform Data Controller and downstream Data Users).

4. OPEN DATA SHARING

- 4.1 APAC States should consider undertaking a stock-take of all their data and decide what data is possible, suitable and useful to be shared openly with other APAC States.
- 4.2 Where such data is identified, APAC States should make the data available in an appropriate manner to facilitate proper interpretation and meaningful use.
- 4.3 APAC States should explore the use of open source and third-party commercial data to supplement data gaps.

APPENDIX 1: DETAILED SURVEY FINDINGS

1. INTRODUCTION

This document contains the detailed survey findings for the Regional Data Management Guidance Document. The findings gathered includes: (a) APAC Data Sharing Use Cases and Challenges Faced by APAC States; (b) APAC States' Additional Considerations on Data Sharing and (c) Existing Regulatory and/or Legal Requirements that APAC States Adhere To.

(a) APAC Data Sharing Use Cases and Challenges Faced by APAC States

S/N	APAC States	Data Sharing Use Cases	Challenges Faced
1	Singapore	Singapore shares historical performance indicators on a yearly basis with APAC countries as part of our membership of the Data Analytics Group (DAG). The DAG uses the shared measures for analysis on eight Key Performance Indicators (KPIs) under the Global Air Navigation Plan (GANP), which aims to derive insights for ATM performance to support management and operational decisions.	While Singapore does not face any particular challenge when sharing historical performance measures with APAC countries, Singapore observed that there are (a) concerns on the use of shared data and (b) different data quality. For (a), APAC States have previously raised concerns on data governance, particularly regarding how shared data will be used and stored. Currently, only in-principle agreement is being sought among members of the working groups that the performance measures will not be shared beyond the group and that any documents referring to these data should be cleared through the member States first. There have been no further follow-ups from this concern, but it will be useful if a regional governance guidance document could help support these works. Having explicit data governance and protection measures as part of the regional governance guidance document will also provide greater assurance that the contributed data is adequately protected and is likely to encourage more active contribution of data.
2	Singapore	Singapore shares historical data on a yearly basis with members of the Performance Benchmarking Working Group (PBWG) which studies and benchmarks operational KPIs related to air traffic management. The PBWG intends to expand its analytical scope to include vertical flight efficiency, additional fuel burn, flight time variability, turnaround time which would require more data fields and higher granularity data to be shared.	For (b), Singapore notes that data quality varies across states (e.g. timeliness, completeness and accuracy), which could be due to technical/ resource limitations. It will be helpful if the regional governance guidance document stipulates baseline data quality standards, which
3	Singapore	Singapore shares historical data on a yearly basis with members of the Civil Air Navigation Services Organisation Global Benchmarking Workgroup (CANSO GBWG) conducts an annual global benchmarking exercise to produce the Global ANS Performance Report that measures and compares ANSPs' performance in cost-effectiveness and ATCO productivity. Singapore contributes to the following KPIs in the CANSO ANS Performance Framework by sharing data on ANS cost, IFR flight hours, number of	

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S/N	APAC States	Data Sharing Use Cases	Challenges Faced
		ATCOs in operations and ATCO in operations hours.	promotes the contribution and use of quality data. To date, while performance measures are shared between countries, the underlying data are not shared due to different data laws. Sharing of such data and having common situational insights will unlock precious value to the participating countries.
4	Philippines	Under the Framework for ASEAN Simulation and Modelling Function (ASAM), Philippines is requested to do a one-time sharing of historical air traffic data to support the establishment of an updated baseline for the ASEAN region. This initiative is coordinated by the Air Traffic Management Research Institute (ATMRI) and involves depositing national traffic data into the ASEAN Air Traffic Management Data Repository (AADR). The data will be used for regional modeling, simulation, and performance analysis.	Data Formatting requirements
5	Philippines	In accordance with ICAO APANPIRG Conclusion 16/4, Air Traffic Service (ATS) provider States (i.e. Philippines) are required to submit Traffic Sample Data (TSD) on a yearly basis. This data supports regional airspace safety monitoring, including Reduced Vertical Separation Minimum (RVSM) compliance and performance-based communication and surveillance assessments. The Monitoring Agency for Asia Region (MAAR) coordinates the collection and analysis of this data.	
6	Indonesia	Indonesia provides historical ADS-B data for use in the Altimetry System Error (ASE) analysis conducted by the RVSM Regional Monitoring Agency (AAMA) to ensure that operators and aircraft conform to ICAO standards on aircraft altimetry and Long-Term Height Monitoring.	
7	Indonesia	Indonesia provides Traffic Sample Data every semester to ASEAN ATM SPG,	Different policies governing the availability and sharing of historical data to be shared internationally Data collection and processing are currently semi-automated, where data is obtained and processed with heavy human intervention.

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S/N	APAC States	Data Sharing Use Cases	Challenges Faced
		covering the periods from 1st to 7th June and from 1st to 7th December each year.	Differences in data formats and systems create challenges in integrating data from multiple ANSPs
8	Hong Kong SAR	Hong Kong provides daily sharing of Airport Acceptance Rate (AAR) through ATFM Daily Plan (ADP) by email to certain APAC states.	Data Management: Historical data often resides in isolated systems or departmental silos, making it difficult to consolidate into a unified, accessible format for sharing. Besides, historical datasets from various sources may have different formats, structures, coding standards, or contain inaccuracies, duplicates, and missing information. This poor data hygiene requires significant effort to cleanse and standardize before it can be used effectively for analysis. Insufficient Tools and Technology: Legacy systems and a lack of interoperability standards or APIs can hinder seamless and automated data exchange between different platforms and organizations. Loss of Control: Once data is shared with external partners, companies may lose partial or complete control over how that information is used, stored, and protected, which can lead to concerns about data governance and potential misuse.
9	Hong Kong SAR	As part of the Ground Delay Programme, the compliance rates of CTOT were sent by China, Hong Kong China, Singapore, Thailand, Korea, Vietnam, Cambodia and shared among AMNAC network members. Data involved was ACFT callsign, EOBT, CTOT, ATOT, which are shared monthly through a common online platform.	
10	Hong Kong SAR	As part of the ICAO APAC ATM/SG Data Analytic Ad-hoc Group (DAG), performance data are gathered a few times per year for the group rapporteur to consolidate and generate analytical reports on various areas of concern, e.g. Airport peak capacity and throughput, Additional Taxi Time etc.	
11	Australia	Sharing of sample ADSB data between Indonesia and Australia to enable monitoring of altimetry system error as part of regional monitoring agency activities. Indonesia supplies data which Airservices processes and provides monitoring results.	The lack of central accessible systems for transfer means defining new secure data transfer systems is complex and requires repeating.
12	Cambodia	Sharing of missing flight plan from adjacent FIRs upon request	Time consuming and accuracy of data. Lack of coordination. State policy and regulation.
13	Cambodia	Sharing of missing NOTAM from originator upon request.	
14	Cambodia	Exchange of AIDC historical record between Cambodia and Thailand for reviewing of operational usage	

(b) APAC States' Additional Considerations on Data Sharing

APAC States	Additional Considerations
Singapore	Singapore suggests that the countries can identify a set of raw data to be shared with other countries. Performance measures are good but does not provide insights into the “why”. This will unlock value to operations. Singapore suggests that further efforts can be placed into organising the historical data that has been collected by Working Groups. E.g. clear folders/ documentation on what data is available and who can access this data, which will be helpful for member states who would like to review or conduct further analysis of the shared data.
Philippines	<i>N.A.</i>
Indonesia	Reciprocity and the right to access derived products resulted from the usage of shared data.
Hong Kong SAR	Resources associated with preparing, cleaning, storing, and securing data for sharing can be a major impediment
Australia	Based on sharing safety occurrence data across agencies within Australia, but would extend to any APAC framework, is ensuring that if data from the source is changed, it can be synchronised to all users, or users have a way to know that previous data has now been updated. The details of safety occurrences can change from the initial report to final review or investigation. Consideration of suitable lag times for making data available may also address this.
Cambodia	State policy/ regulation of each country.

(c) Existing Regulatory and/or Legal Requirements that APAC States Adhere To

APAC States	Existing Regulatory/ Legal Requirements
Singapore	<u>Data Sharing within APAC</u> N.A. Members adhere to the Terms of References of the Working Group. There is no legally binding agreement that Singapore refers to when sharing data to the above Working Groups. <u>Data standards/ data quality used within Singapore</u> For data sharing with the Working Groups, Singapore often collaborates with the members to develop a standard data template for all member states to adhere to, when contributing data. This ensures that the data shared is of a common standard, which facilitates the Working Group’s analysis.
Philippines	<i>N.A.</i>
Indonesia	<u>Data Sharing within APAC</u> The exchange of historical data is currently managed on a case-by-case basis, as a specific regulatory framework for such exchanges has not yet been established.

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APAC States	Existing Regulatory/ Legal Requirements
	<u>Data standards/ data quality used within Indonesia</u> There is currently no known national standard on exchanging historical data. Data are exchanged based on the mutual agreements among parties regarding data quality, exchange frequency, etc.
Hong Kong SAR	<i>N.A.</i>
Australia	<u>Data Sharing within APAC and Australia</u> Based on sharing safety occurrence data across agencies within Australia, but would extend to any APAC framework, legal and regulatory considerations included: a. Privacy and handling confidential information b. Intellectual Property rights and end-user rights, obligations and risk c. Information Security which may also consider what data can be shared and stored outside of each country d. Freedom of Information obligations and how data will be treated if subject to disclosure requirements
Cambodia	<i>N.A.</i>