

APAC Local-First Memory Harvester: Sovereign Data Residency for Multi-Regional Agent Deployments

ForceDream Research Team, Regional Intelligence Division | 2026-04-10 | v1.1 | 3 pages

Category: Compliance | Layers: L7, L8, L9

URL: <https://forcedream.com/research/apac-data-residency-sovereign-memory-harvester>

WORM ACCESS SEAL | L828

fd2026003c9a4f2d

Abstract

Data sovereignty requirements across the APAC regulatory landscape -- Singapore PDPA, Australian Privacy Act, Japan APPI, South Korea PIPA -- impose stringent constraints on cross-border transfer of agent-generated memory data. We present ALFMH, enforcing jurisdiction-aware memory write routing with a three-tier residency model. Zero cross-border leakage across a six-month production deployment serving Singapore, Hong Kong, and Sydney.

1. Regulatory Context

APAC data sovereignty requirements are fragmented and jurisdiction-specific. Singapore PDPA 2012 requires data localisation for specific personal data categories. Australian Privacy Act 1988 (APP 8) restricts cross-border disclosure. Japan APPI requires consent for overseas transfers. South Korea PIPA requires separate consent with penalties of up to 3% of annual turnover.

2. Three-Tier Residency Model

Tier 1 (Primary Sovereign Storage): all writes land in-region before any replication, with nodes in Singapore (SGP1), Sydney (SYD1), Tokyo (NRT1), and Seoul (ICN1). Tier 2 (Secondary Verified Replication): cross-region replication permitted only after jurisdiction approval logic confirms the target region is permitted. Tier 3 (WORM-Sealed Archive): long-term SHA-256-sealed storage, jurisdiction-stamped, retained per applicable statute of limitations.

3. Jurisdiction Approval Logic

The jurisdiction approval logic maintains a real-time jurisdiction map updated within 48 hours of regulatory change events, sourced from the ForceDream Atlas knowledge graph. The map encodes permitted cross-border transfer pairs as a directed graph.

4. Production Results

Zero cross-border leakage events in six-month production deployment. Compliance risk: <0.001% incident probability per 10M memory operations. Jurisdiction map update latency: 48 hours from regulatory publication. Replication latency overhead: 23ms.

5. Conclusions

ALFMH demonstrates that APAC data sovereignty compliance is achievable without sacrificing the performance characteristics required for production AI agent deployments.

Live API Endpoints

`POST /v1/memory/store`

`GET /v1/cloud/regions`

`POST /v1/compliance/audit`

`GET /v1/compliance/jurisdiction-map`

Citation

ForceDream Research Team (2026). APAC Local-First Memory Harvester. ForceDream Intelligence OS Research Series, FD-2026-003. <https://forcedream.com/research/apac-data-residency-sovereign-memory-harvester>