

Topic-Routing Mechanism



Terminology

Comparison of terms used across common EMS

*Generated with the help of Copilot.
To be verified*

Concept	Solace PubSub+	ActiveMQ	Apache Artemis	AMQP 1.0 (OASIS)
Message destination (generic)	Topic / Queue	Destination	Address	Node / Terminus
Topic (pub-sub)	Topic	Topic	Address (multicast)	Node (distribution-mode = multicast)
Queue (point-to-point)	Queue	Queue	Queue (anycast on address)	Node (distribution-mode = anycast)
Address abstraction	Topic string	Destination name	Address (core abstraction)	Node
Producer sends to	Topic or Queue	Queue or Topic	Address	Target (node)
Consumer subscribes to	Topic or Queue	Queue or Topic	Queue (binding to address)	Source (node)
Routing entity	Broker topic matching	Broker	Address + routing type	Link routing via node
Binding concept	Topic subscription (direct or via queue binding)	Implicit (destinations)	Queue bound to address	Link attachment (source/target)
Routing types	Topic-based (wildcards), queue-based	Topic / Queue	Anycast / Multicast	Anycast / Multicast
Wildcard support	Yes (*, >)	Yes (*, >)	Yes (*, #), customisable	Not standardized (implementation-specific)
Pub-Sub delivery	Direct topic subscription or via queue	Topic subscriptions	Multicast address	Multicast distribution
Load-balanced consumption	Queue (competing consumers)	Queue	Anycast queue	Anycast distribution
Durable subscription	Durable topic endpoint / queue	Durable subscriber	Durable queue on address	Durable link (settled state maintained)
Temporary destination	Temporary queue/topic endpoint	Temporary queue/topic	Temporary queue	Dynamic node
Request-reply support	Native patterns with reply-to, correlation ID	Supported (JMS pattern)	Supported	Standard fields (reply-to, correlation-id)
Hierarchical topic support	Strong (hierarchical topics)	Yes	Yes (address structure)	Logical (not syntax-enforced)

Topic-Queue Mapping

Multiple Topics-to-Queue Mapping across common EMS

Generated with the help of Copilot.
To be verified

Capability	Solace PubSub+	ActiveMQ	Apache Artemis	AMQP 1.0 (conceptual)
Native feature name	Topic-to-Queue Mapping / Replay / Bridge	Virtual Destinations / Network of Brokers	Divert	No direct concept
Core function	Route topic messages into queues	Forward / duplicate messages across destinations	Route messages from one address → another	Abstract routing via node + links
Multi-source → single queue (fan-in)	✅ Yes (multiple topic subscriptions on queue)	⚠️ Partial (requires config/plugins)	✅ Yes (multiple diverts)	Conceptual only
Message duplication (fan-out)	✅ Topic → multiple subscribers	✅ Composite / virtual topic	✅ Non-exclusive divert	Multicast distribution
Transparent (no app change)	✅ Yes	⚠️ Often requires config changes	✅ Yes	✅ Yes (protocol-level abstraction)
Routing control location	Broker config (topic subscriptions, bridges)	Broker config (destinations, plugins)	Broker XML (divert)	Link + node definitions
Cross-broker routing integration	✅ Dynamic Message Routing / event mesh / Bridges	✅ Network of brokers	✅ With bridges	Implementation-dependent

Terminology Choice

Explanation for deck of slides - Use of Solace terminology for wildcard.

1. When * appears by itself at a level within a topic subscription (as in, `animals/*/cats` , or `animals/domestic/*`), it indicates a wildcard match at that level.
A * wildcard at the end of a topic subscription performs a wildcard match only at that level.
Example: `animals/domestic/*` matches the topics `animals/domestic/cats` and `animals/domestic/dogs` , but it doesn't match the topic `animals/domestic/dogs/beagles` .
2. When * is preceded by a topic prefix at a level within a topic subscription (as in, `animals/red*/wild`), it indicates a "prefix and 0 or more" match at that level.
Example: `animals/red*/wild` matches both the topics `animals/red/wild` and `animals/reddish/wild` .
3. The * may be used at multiple levels within a topic subscription, with or without topic prefixes.
Example: `animals/*/cats/*` is valid and matches the topics `animals/domestic/cats/persian` and `animals/wild/cats/leopard` , but doesn't match the topic `animals/domestic/cats/persian/grey` , nor does it match the topic `animals/domestic/dogs/beagles` .
4. Use of * in an arbitrary location within a level, and not covered by the previous rules, is treated as a literal character; general sub-string matching is not supported.
Example: The * in topic subscriptions `animals/*bro` and `animals/br*wn` is treated as a literal * , not a wildcard.

Terminology Choice

Explanation for deck of slides

Using the > Wildcard

The > wildcard functions in the following ways:

1. When > appears by itself at the last level of a topic subscription (as in, `animals/domestic/>`), it provides a “one or more” wildcard match for any topics with an identical prefix to the subscription.

Example: `animals/domestic/>` doesn't match the topic `animals/domestic`, but it does match the topics `animals/domestic/cats`, `animals/domestic/dogs`, `animals/domestic/dogs/beagles`, and `animals/domestic/dogs/beagles/long-eared`.

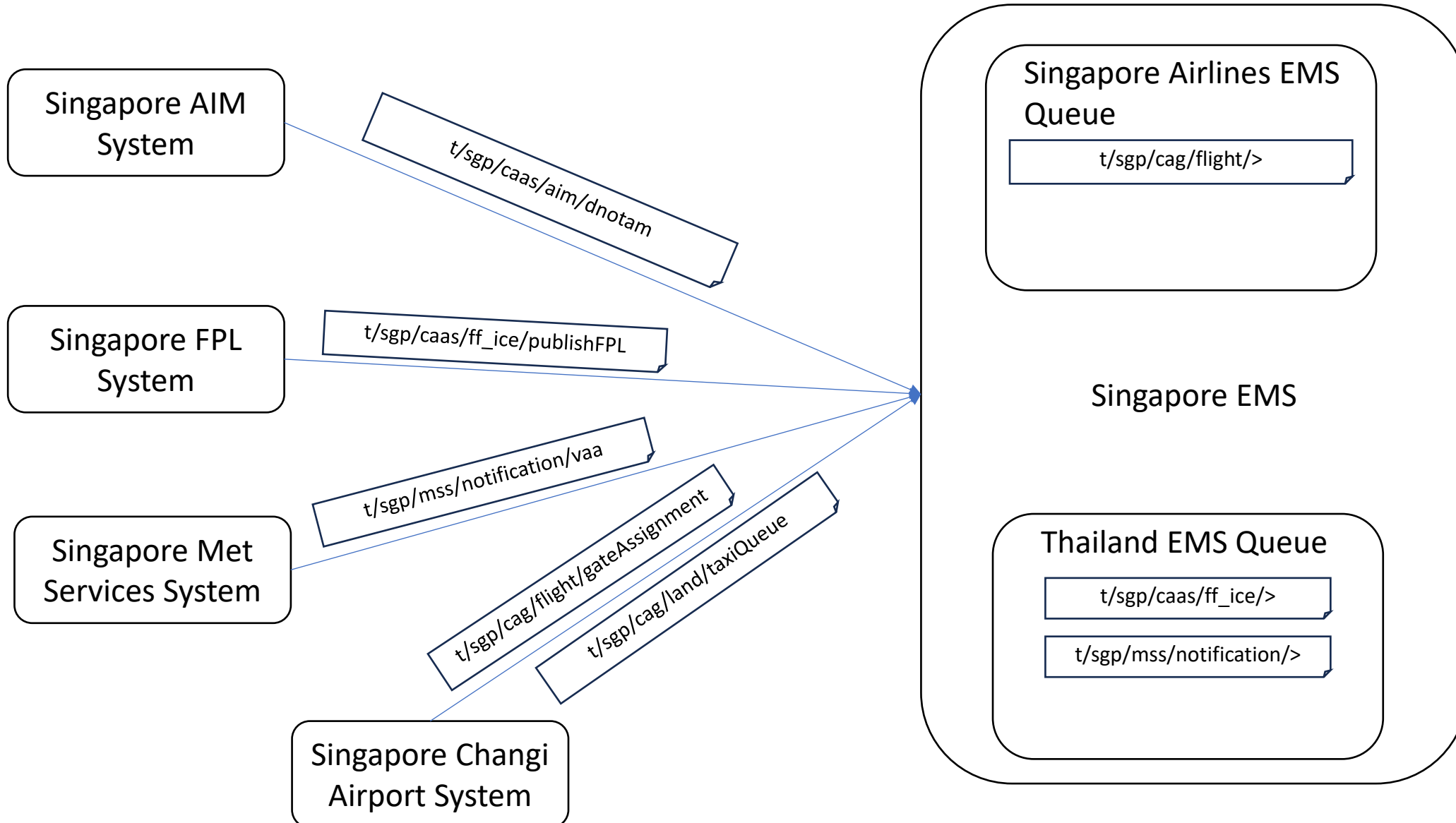
2. A > that appears anywhere other than by itself at the last level of a topic subscription in the string is treated as the > character rather than a wildcard.

Example: `animals>` and `animals/domestic>` are literal subscriptions and don't match `animals/domestic/dogs/beagles`.

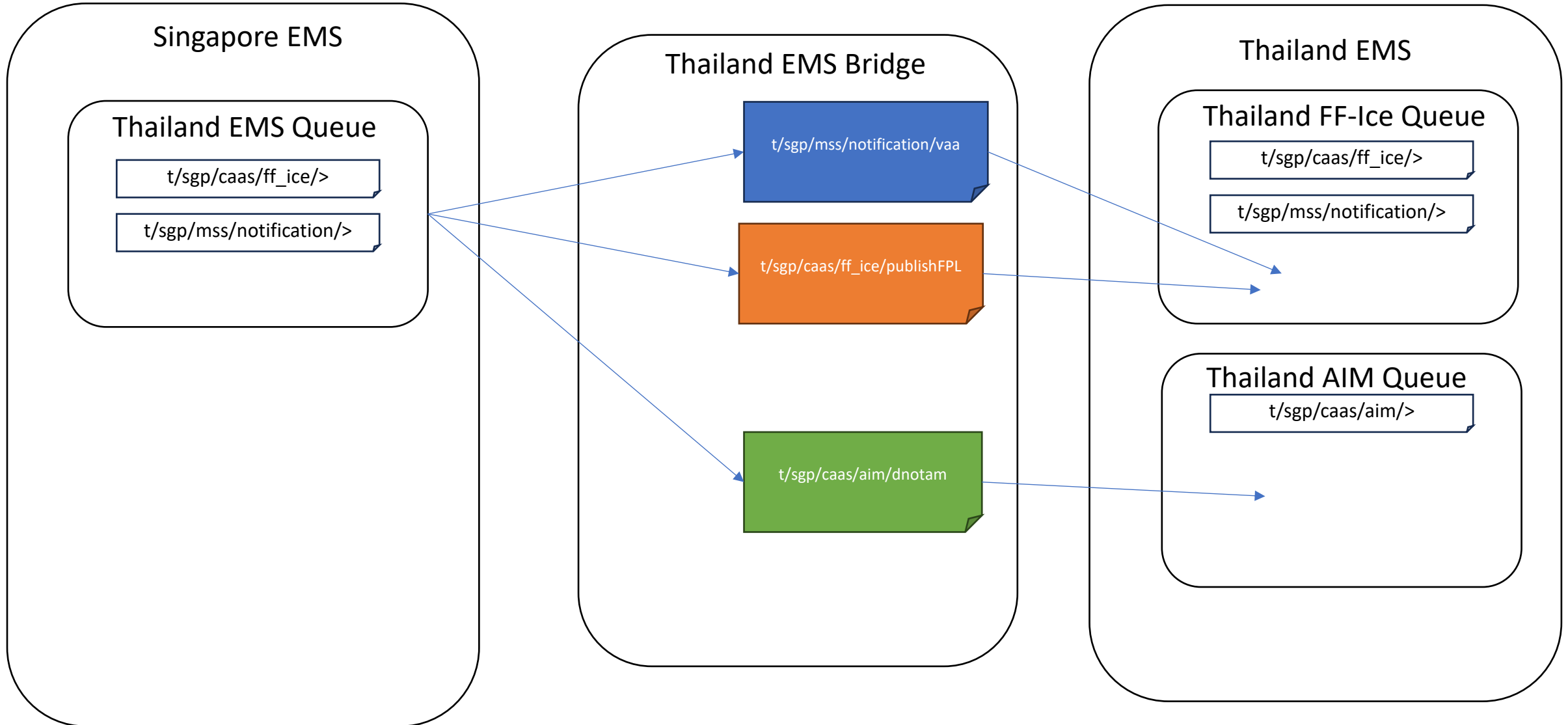
3. The > and * characters can be used together within a topic subscription.

Example: `animals/*/cats/>` matches the topics `animals/domestic/cats/persian`, `animals/wild/cats/leopard`, and `animals/domestic/cats/persian/grey`, but it doesn't match the topic `animals/domestic/dogs/beagles`.

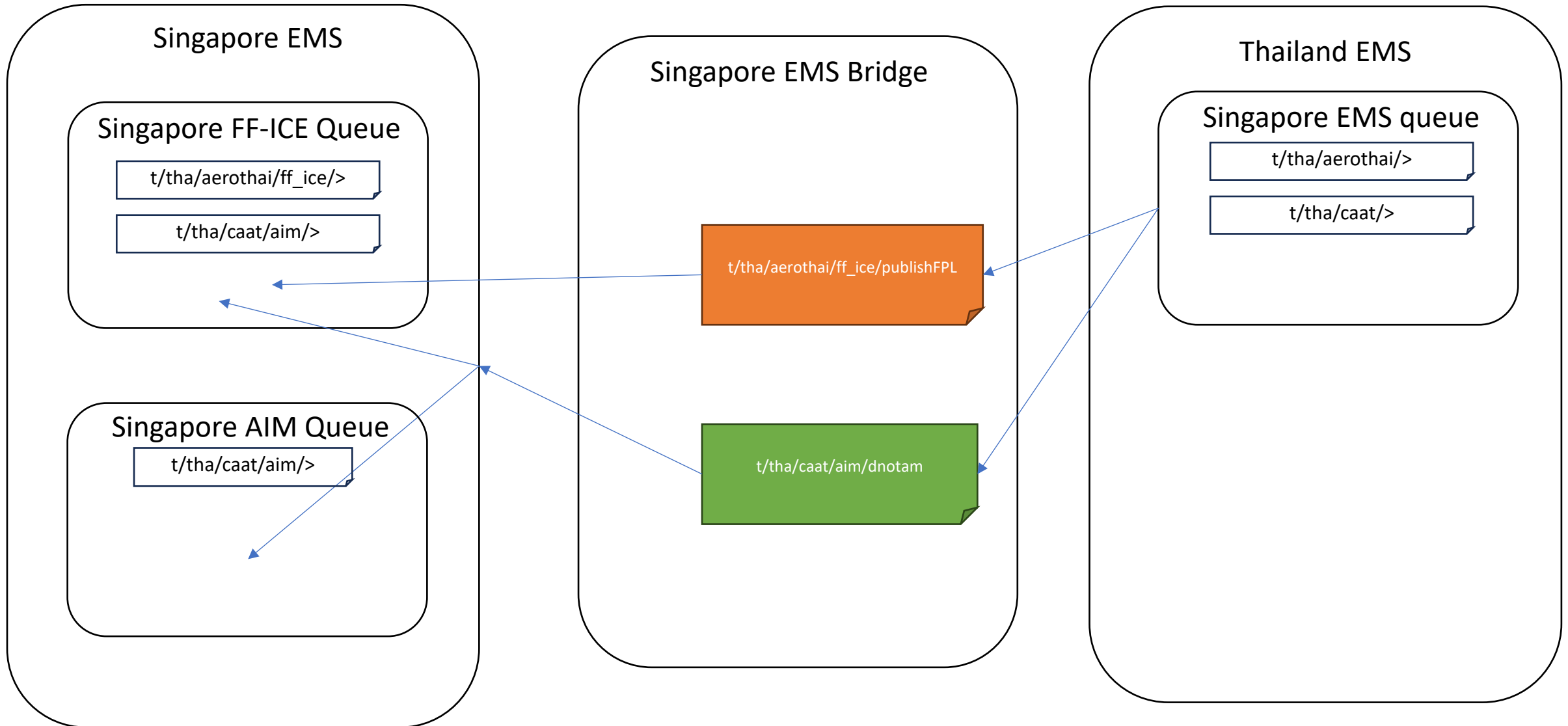
Topic-Queue Routing Scenario between EMS and Information Provider – Pub/Sub



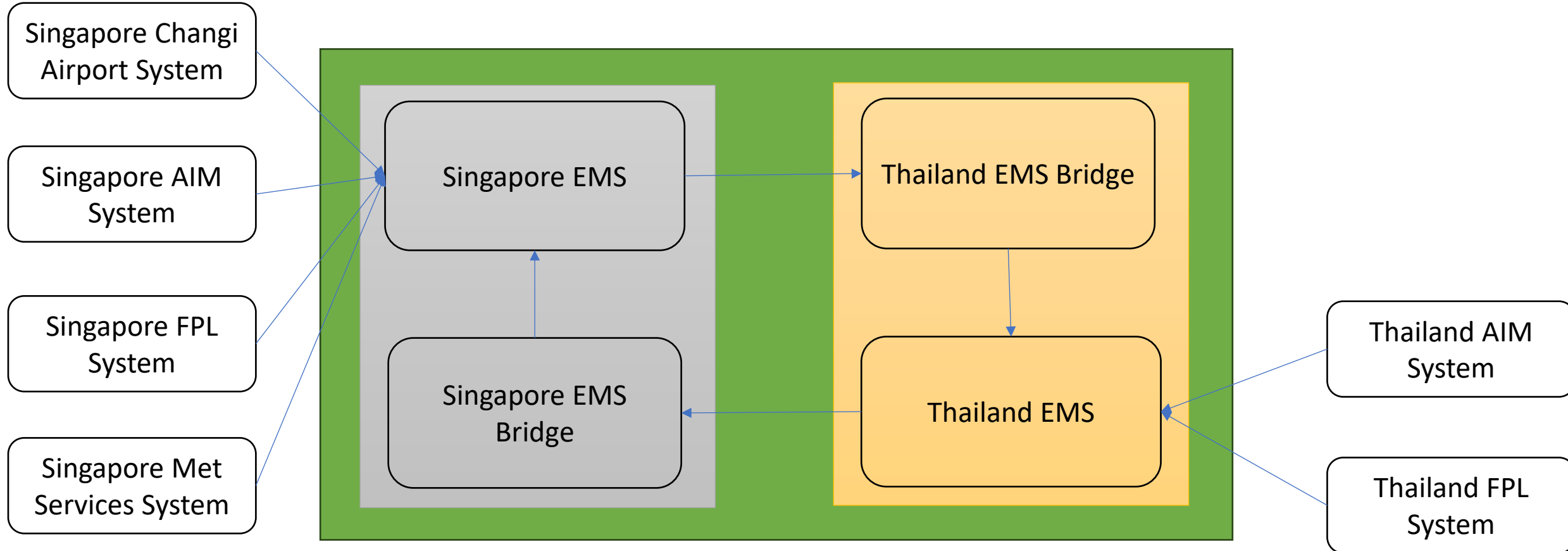
Topic-Queue Routing Scenario between EMS – Pub/Sub



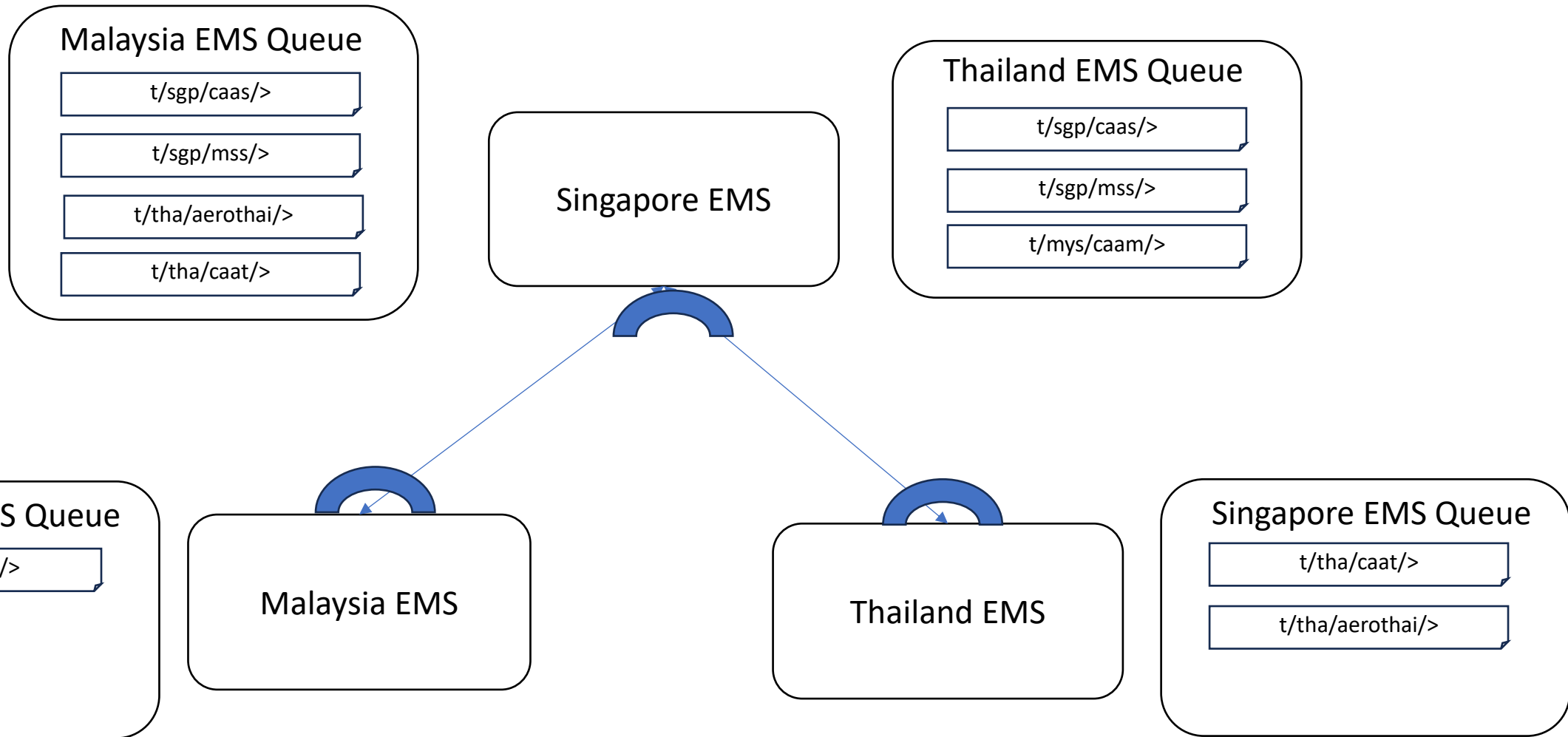
Topic-Queue Routing Scenario between EMS – Pub/Sub



Topic-Queue Routing Scenario between EMS – Pub/Sub



Topic-Queue Routing Scenario between EMS – Pub/Sub



Topic Nomenclature

Singapore's Version

Level	Topic Level Name	Description	Example
1	Type of Address	Indicate type of topic	't' – pub/sub topic 'tr' – request/reply topic
2	Country Code	The country code according to ISO 3166-1 alpha3.	sgp tha
3	Organisation	Company, corporation, agency, or an institution.	caas
3a	Recipient Country	Recipient country – For Async Request/Reply Information Services Only (Level 1 – 'tr')	tha
3b	Recipient Organisation	Recipient org – For Async Request/Reply Information Services Only (Level 1 – 'tr')	aerothai
4	Environment	It is often necessary to have multiple environments to work on. For example, production, testing, offline and others	"prod" = Production "dev" = Development "uat" = UAT / Testing "off" = Offline
5	System Name	System Name with optional service group name	atfm-fpl
6	version	Indicate the version of the API or event.	v1
>=7	System Specific Topic Hierarchy	Hierarchy and topic field is determined by system. Recommendation is {noun}/{verb}/{property}	.../fpl/publish/3.8/3.9 .../publishfpl/3.8/3.9 where 3.8 and 3.9 are examples for lat and long respectively

Async Request-Reply

Topic Structure

- **Topic Nomenclature**

- Topic Structure based on Singapore's nomenclature:

- **<type of address>/<country code>/<organisation>/<recipient country>/<recipient organisation>/<environment>/<system name>/<version>/.....**

- **e.g:**

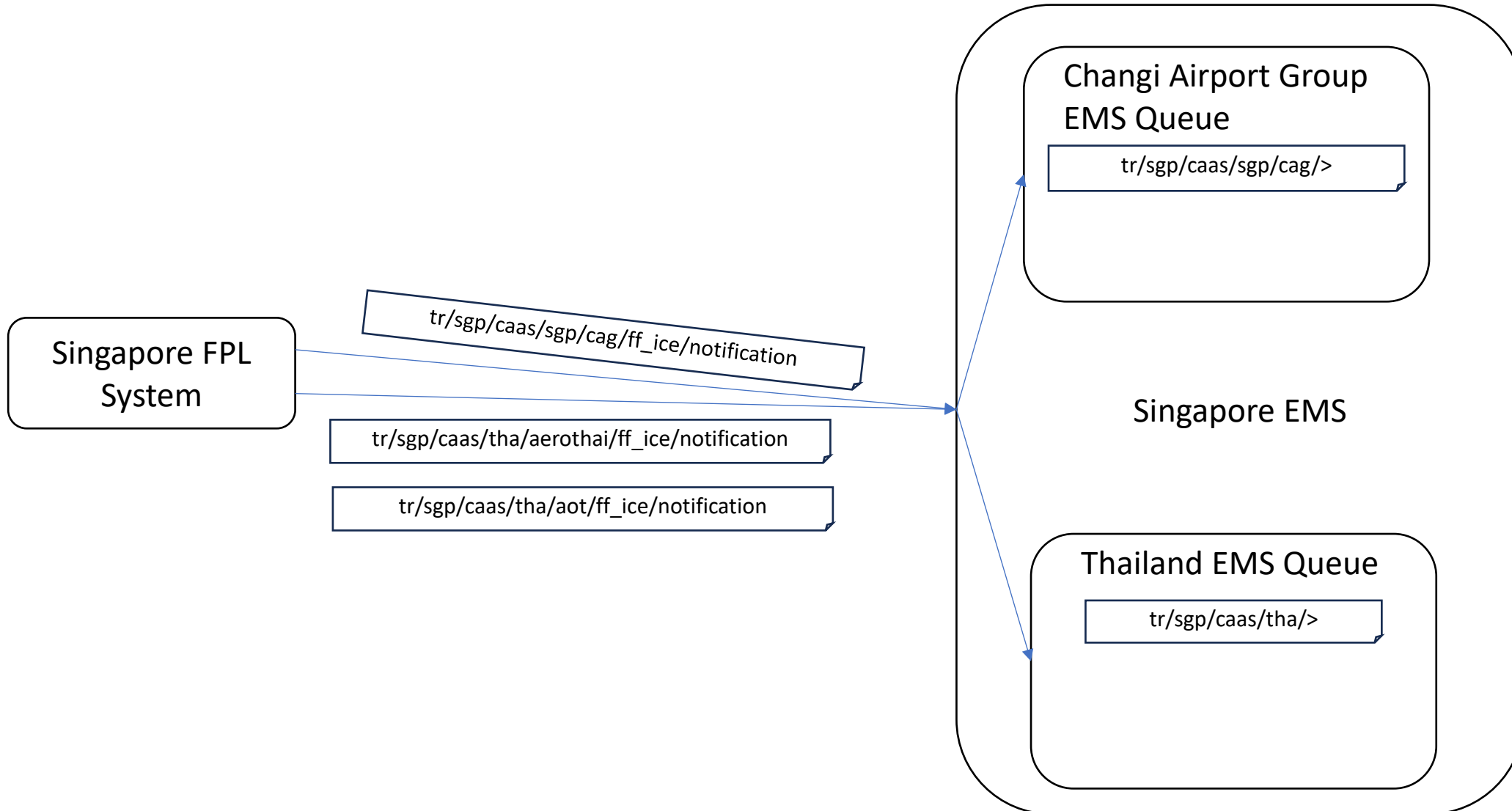
- **Request Topic**

- **tr/sgp/caas/tha/aerothai/prod/ff_ice/v1/notification/request**
- **tr/sgp/caas/mys/caam/prod/ff_ice/v1/notification/request**

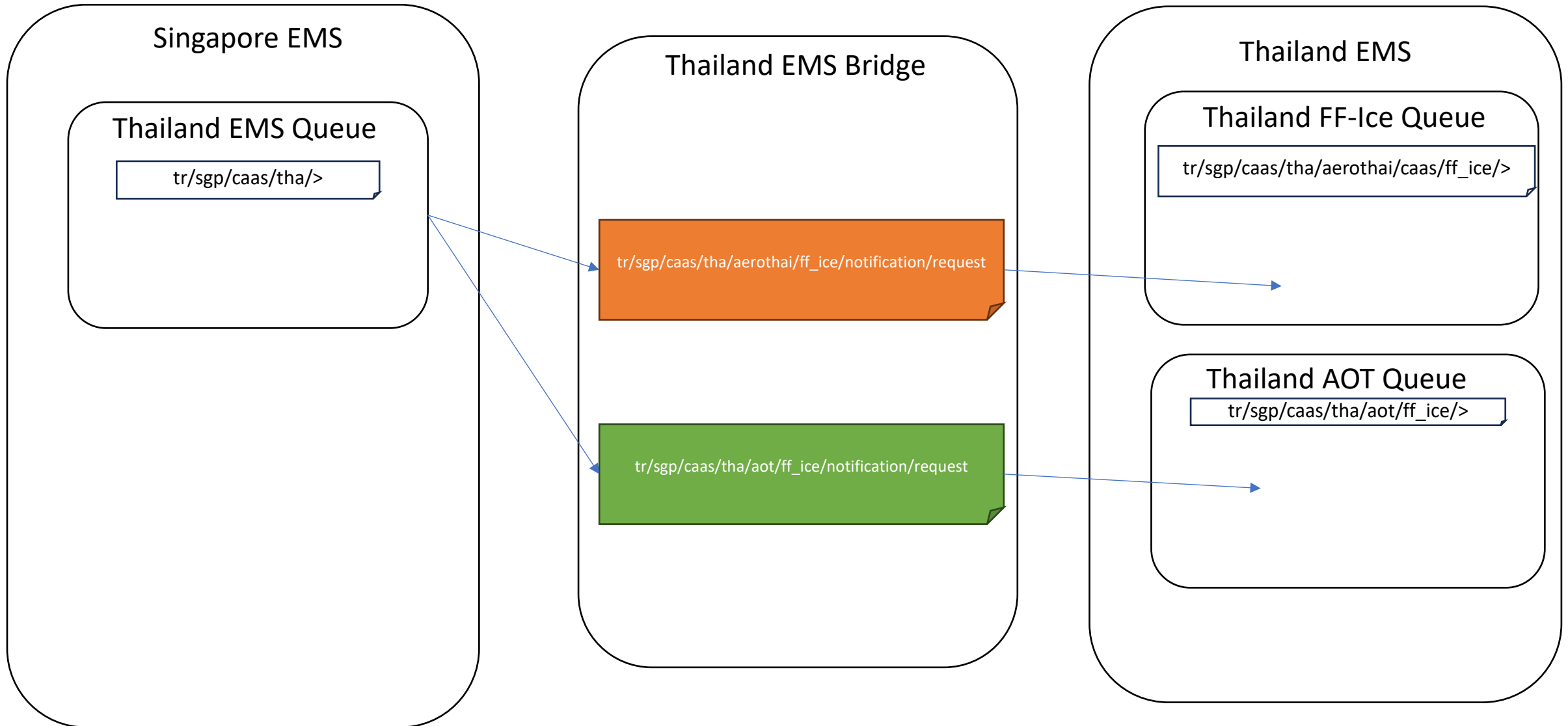
- **Reply Topic**

- **tr/tha/aerothai/sgp/caas/prod/ff_ice/v1/notification/reply**
- **tr/mys/caam/sgp/caas/prod/ff_ice/v1/notification/reply**

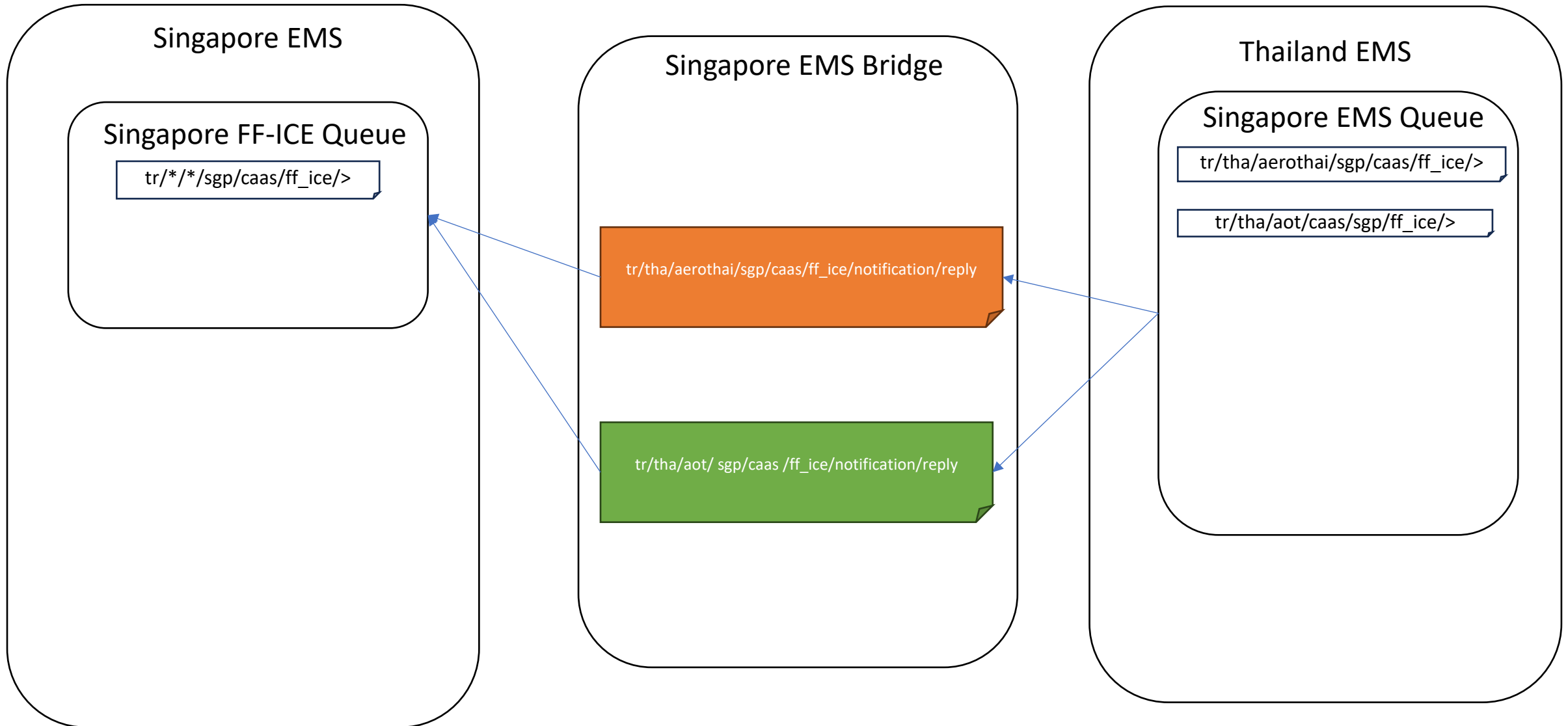
Topic-Queue Routing Scenario between EMS and Information Provider – Async Request/Reply



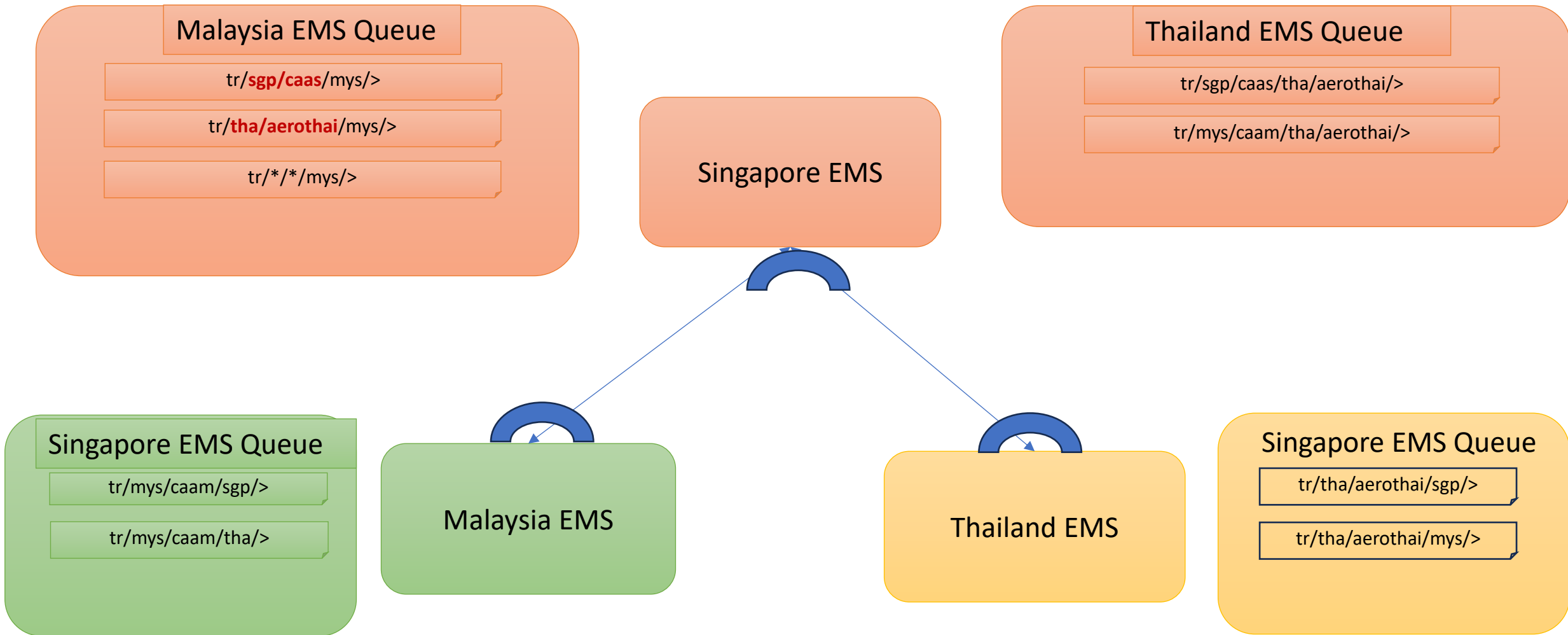
Topic-Queue Routing Scenario between EMS – Async Request/Reply



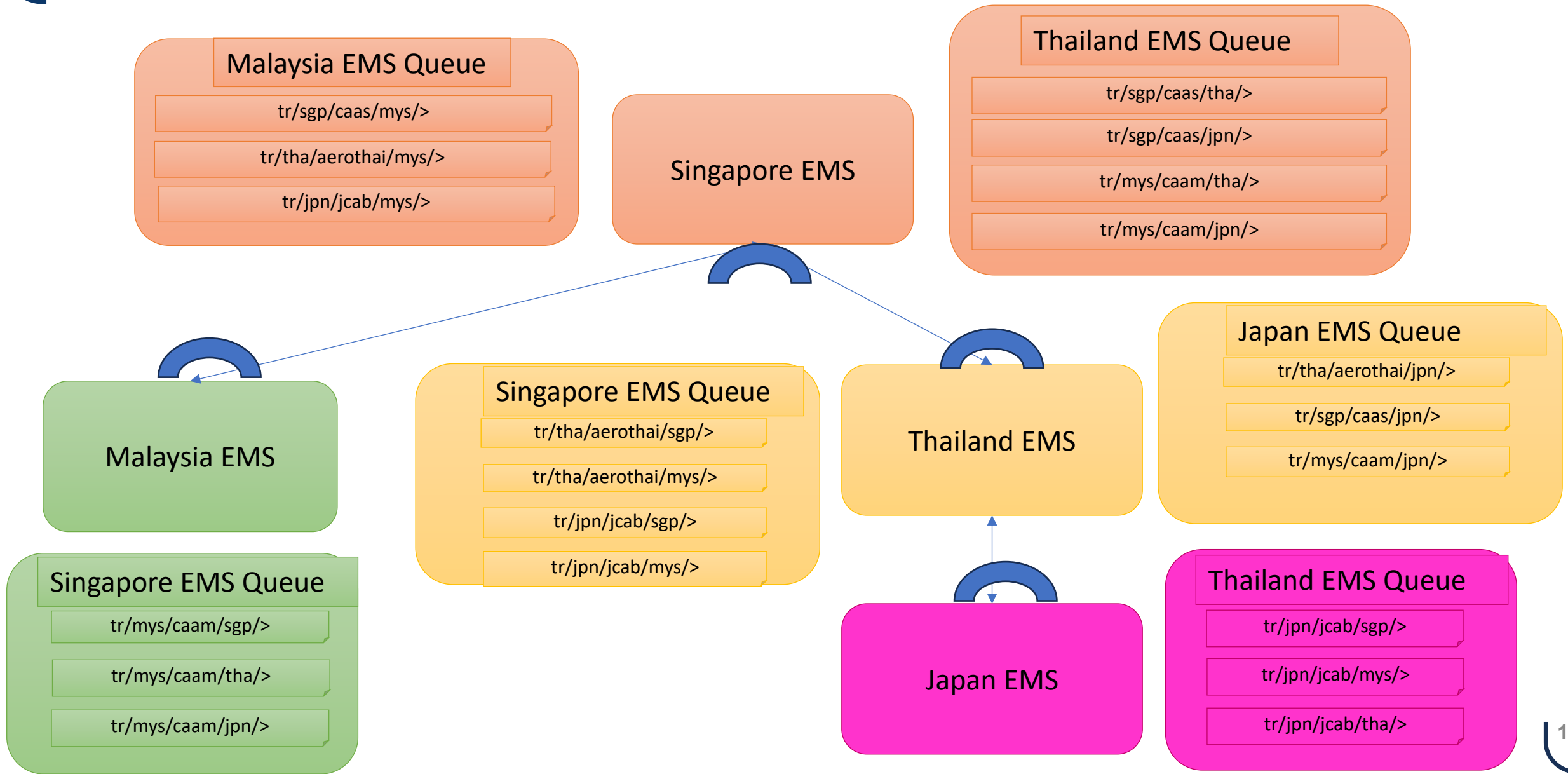
Topic-Queue Routing Scenario between EMS – Async Request/Reply



Topic-Queue Routing Scenario between EMS – Async Request/Reply



Topic-Queue Routing Scenario between EMS – Async Request/Reply





Questions?

A nighttime photograph of the Singapore Changi Airport. On the left, the iconic control tower stands tall, illuminated from within, with its top observation deck glowing. To the right, the large, modern terminal building features a distinctive, illuminated, curved glass and steel roof structure. The sky is a deep, dark blue, suggesting twilight. In the foreground, a glass-enclosed pedestrian walkway is visible, and the ground below shows some airport infrastructure and lighting.

Thank you!