Suggestion of Regional SWIM Architecture

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Analysis of Regional SWIM Architecture

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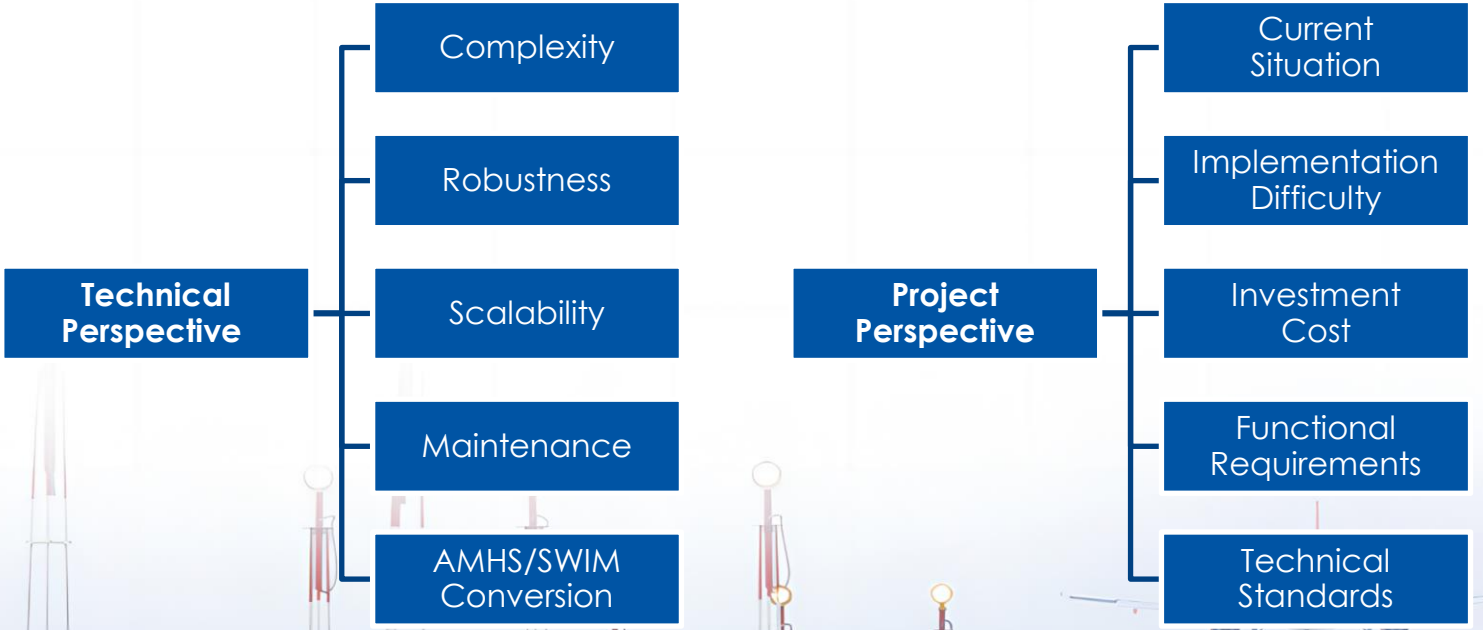
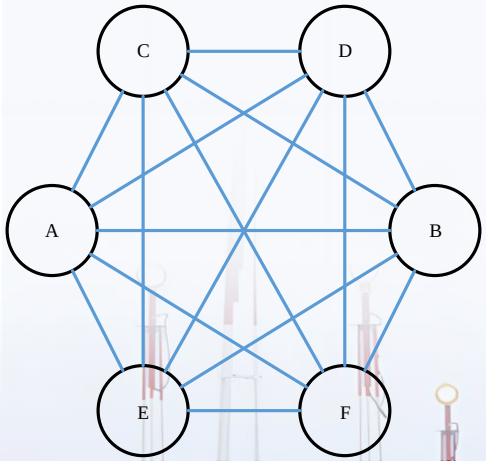
1 Analysis of Regional SWIM Architecture

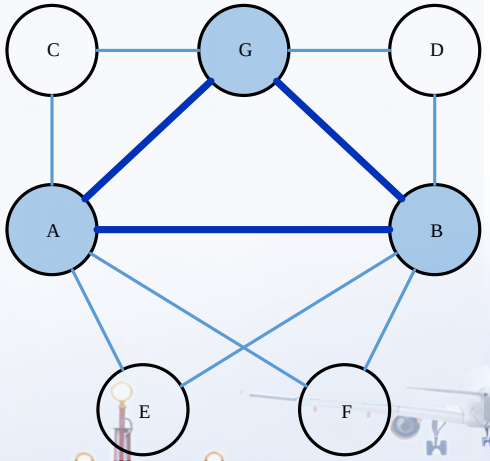
Overview



Technical Perspective

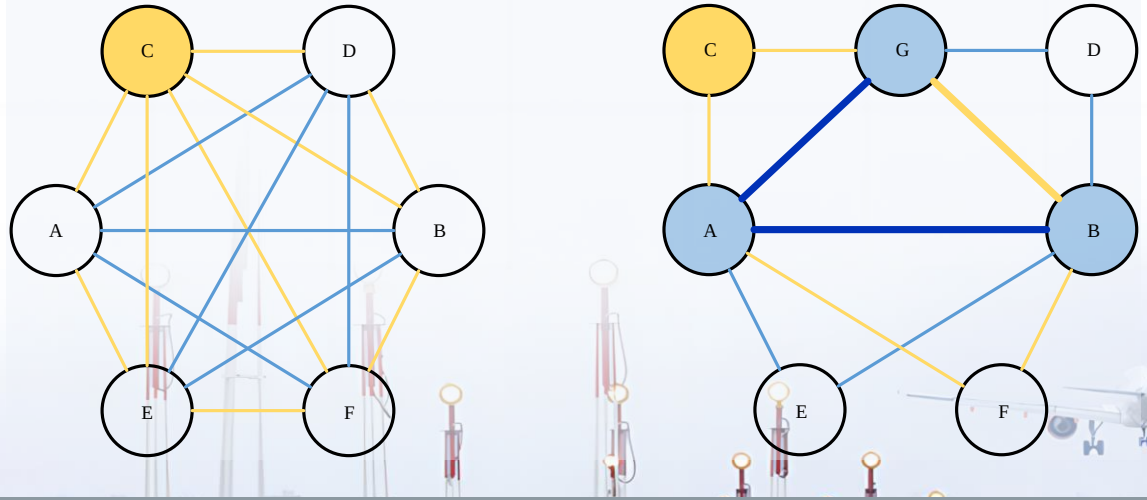
- Complexity: The level of intricacy and difficulty in understanding, designing, managing, and maintaining a network.
  - Mesh Architecture: more complex, because of full connection between nodes.
  - Hierarchical Architecture: less and it is easier to implement and expand.





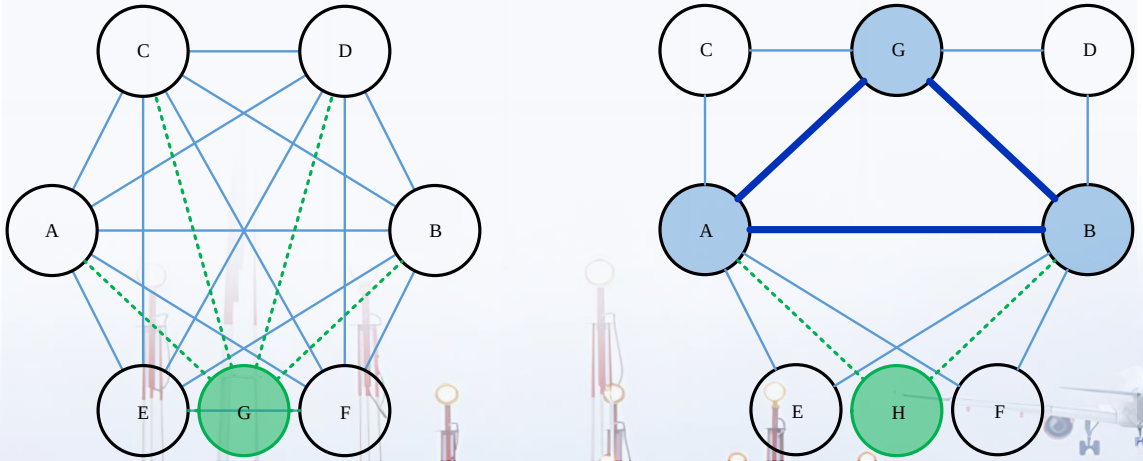
Technical Perspective

- Robustness: The ability of a network to maintain its normal operation and provide reliable services even in the face of various internal and external disruptions, failures, or changes.
  - Mesh Architecture: highest level of network robustness.
  - Hierarchical Architecture: a certain degree of robustness after a reasonable design.



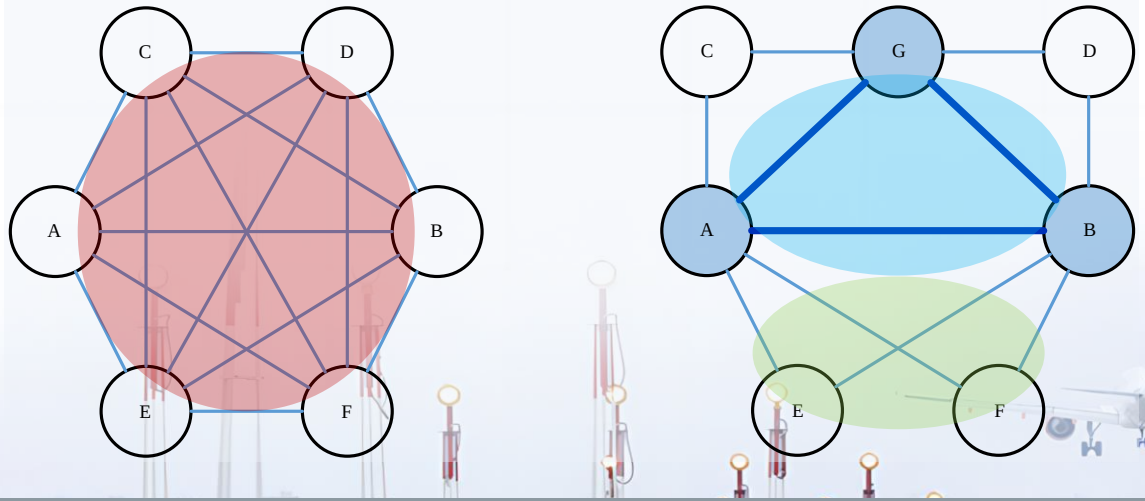
Technical Perspective

- Scalability: The capacity of a network to handle an increasing amount of work, such as more users, more data traffic, more devices, or more services, without sacrificing performance or requiring a complete redesign.
  - Mesh Architecture: large amount of implementation work, small impact on the online services.
  - Hierarchical Architecture: small amount of implementation work, large impact on the online services.



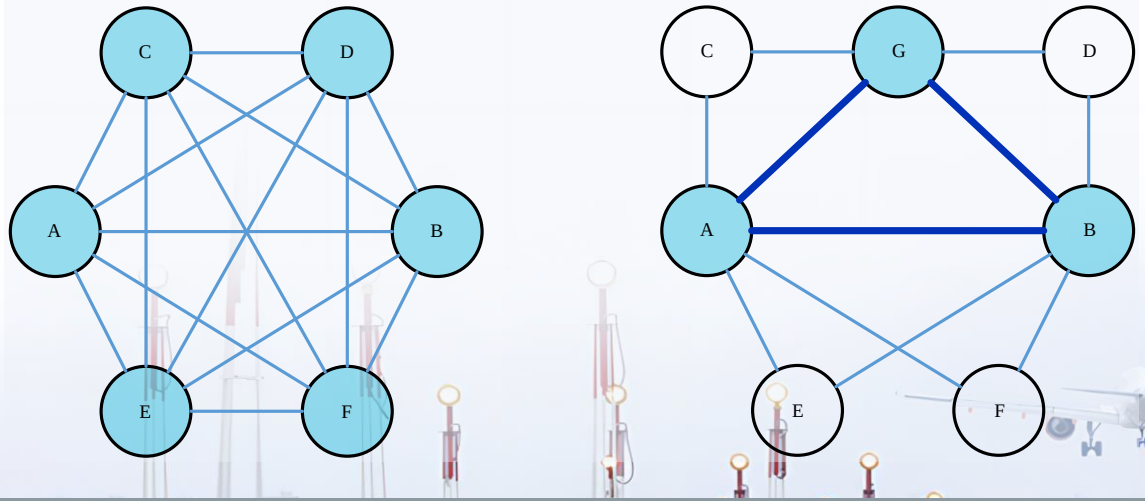
Technical Perspective

- Operation Maintenance
  - Mesh Architecture: high standards for the maintenance requirements of all nodes, complex fault diagnosis
  - Hierarchical Architecture: clear fault isolation domain, easy for fault diagnosis, efficient collaborative mechanism.



Technical Perspective

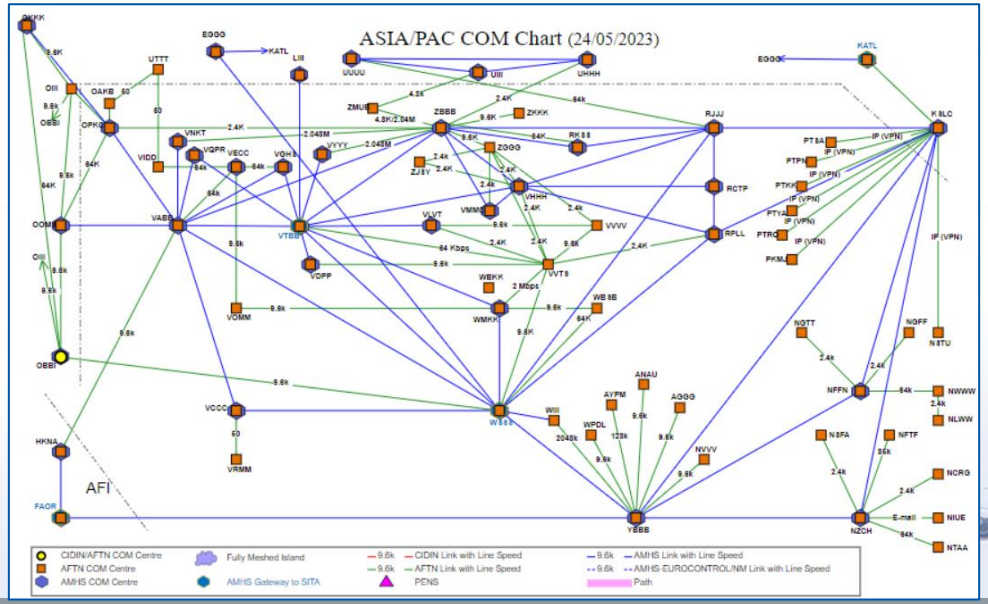
- AMHS/SWIM Conversion
  - Mesh Architecture: AMHS/SWIM conversion capability for each node, high difficulty, long cycle.
  - Hierarchical Architecture: AMHS/SWIM conversion capability for GEMS, more flexible.



1 Analysis of Regional SWIM Architecture

Project Perspective

- Current Situation in APAC Region
  - Network Infrastructure: CRV.
  - Main Business: Flight, Aeronautical and MET Information based on AFTN, ATN/ AMHS.



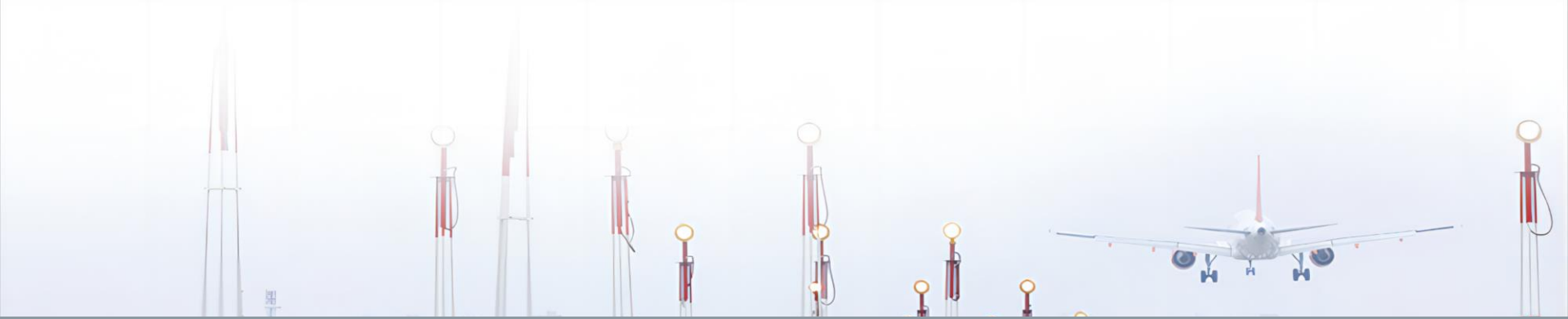
Project Perspective

- Implementation Cycle
- Investment Cost

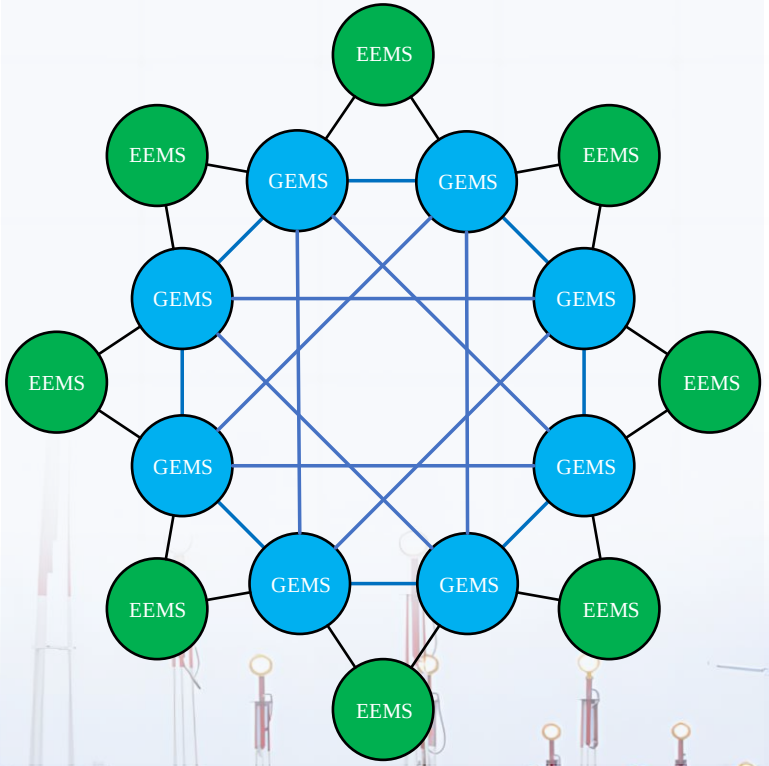
	Hierarchical Architecture Multi-connection but not fully	Mesh Architecture Full connection
Implementation Cycle	Shorter	Longer
Investment Cost	Lower	Higher

Project Perspective

- Functional Requirements
  - Mesh Architecture: same functional requirements.
  - Hierarchical Architecture: additional functional requirements for GEMS.
- Technical standards
  - Mesh Architecture: unified technical standards.
  - Hierarchical Architecture: different technical standards for GEMS and EEMS.



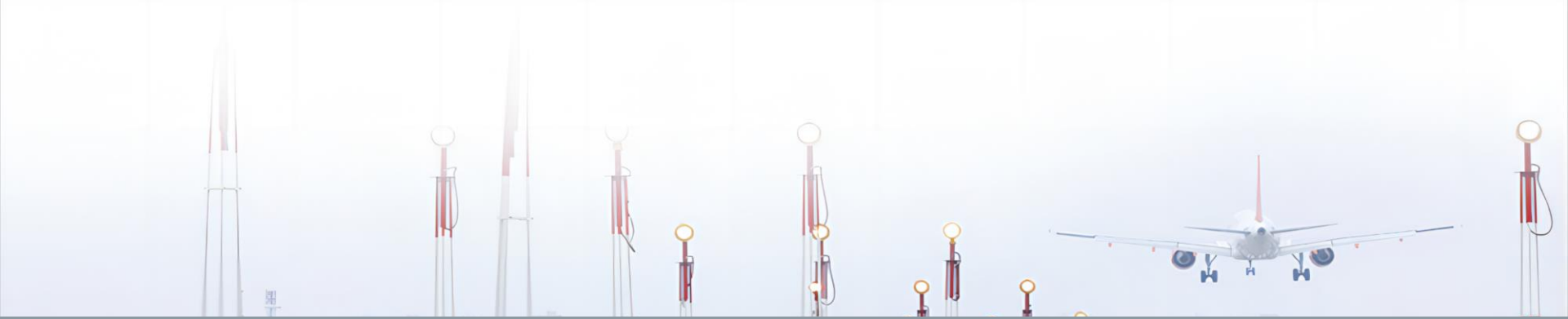
Suggestion of Hierarchical Architecture



2 Suggestion of Regional SWIM Architecture

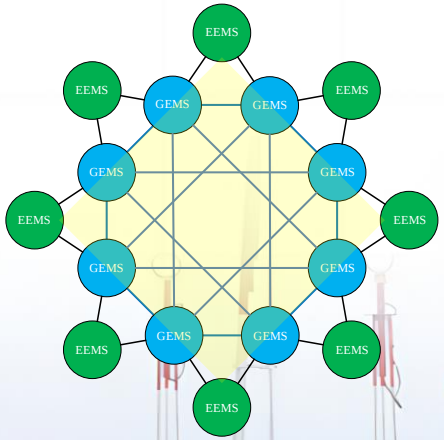
Considerations of Hierarchical Architecture

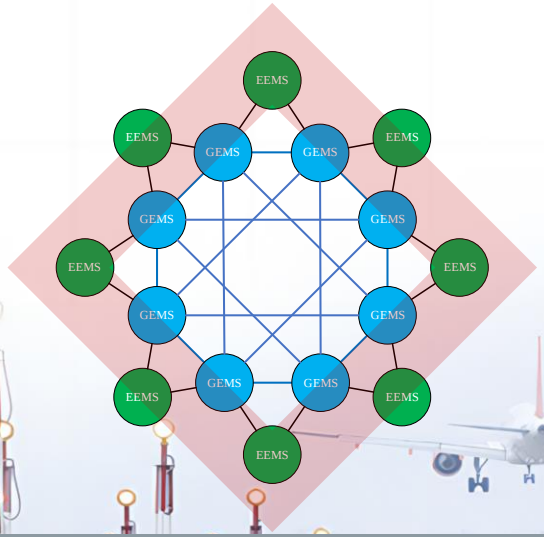
- Technical Feasibility
  - Regional SWIM prototype has proved the technical feasibility.
  - Research on implement the message routing and forwarding of gateway nodes, and ensure quality and reliability.
- Implementation Feasibility
  - Conformity with the existing network infrastructure, easier to implement.
  - Easier to promote in the AMHS/SWIM conversion.



Specific Suggestions

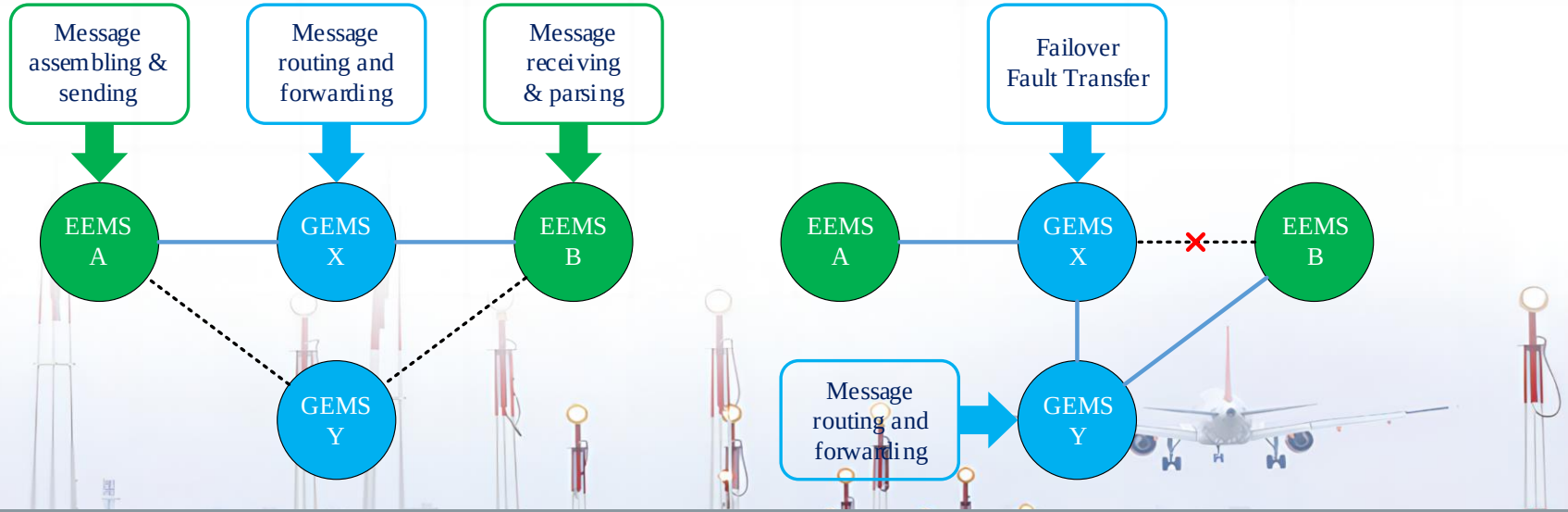
- Hierarchical Network Structure
  - First-layer Network Area: GEMS interconnection (Yellow area). Multi-connect but not fully connection.
  - Second-layer Network Area: EEMS to GEMS connection (Red area). One EEMS is connected to at least 2 adjacent GEMS to ensure redundancy.





Specific Suggestions

- Functional Requirements
  - GEMS: SWIM Registry, SDS, message routing and forwarding, AMHS/SWIM conversion, failover.
  - EEMS: Message assembling and sending, Message receiving and parsing.



2 Suggestion of Regional SWIM Architecture

Technical Requirement of GEMS

- Requirements of GEMS Nodes
  - Functional requirements
  - Operational reliability requirements
  - Message processing capacity requirements.
- Requirements of GEMS Interconnection Network
  - Network interconnection and routing redundancy
  - Network security capabilities, data security capabilities
  - Message transmission capabilities
- Requirements of GEMS Maintenance Team
  - Business continuity and fault transfer capabilities
  - Collaborative emergency response capabilities among GEMS
  - Emergency procedures


Thanks!