

The experience of GEMS provider in Mini Global II

17th May, 2016

NEC Corporation

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1 Introduction

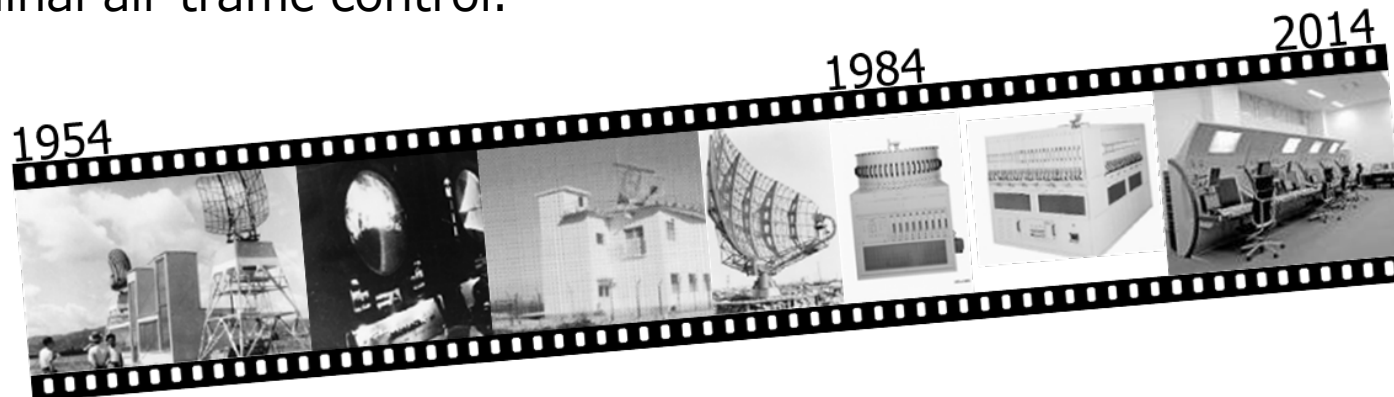
NEC attended Mini Global II as a one of the GEMS(Global Enterprise Messaging Service) provider which hold at Florida NextGen Test Bed in USA from 2016/4/20 to 4/25.

Today I will talk about that experience and NEC's idea of next steps SWIM.



2 About NEC

- Over 50 years, NEC has been working with our customers to develop and deliver innovative solutions covering critical aspects of airport operations, incorporating advanced technologies.
- In so doing, NEC has accumulated comprehensive know-how of the ATC/NAV and Airport IT systems development.
- This know-how adds value, such as high system quality, safe and flexible system operation to the customer.
- In order to enable both civil aviation and air defense authorities maintain air safety and accommodate future traffic growth, NEC offers an integrated CNS/ATM solutions including Air Traffic Control System for enroute and terminal air traffic control.



3 Why attend Mini Global 2 ?

1. SWIM Implemented Technology

- SWIM Standards
Exchange model (AIXM/FIXM/iWXXM)
Connection (REST/SOAP/JMS)
- Governance, Services



2. Included in CARATS(JAPAN)

- NEC is one of CARATS members .

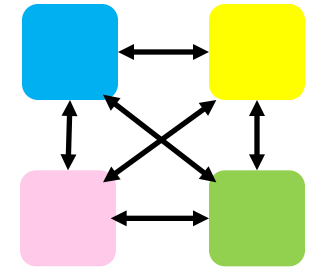
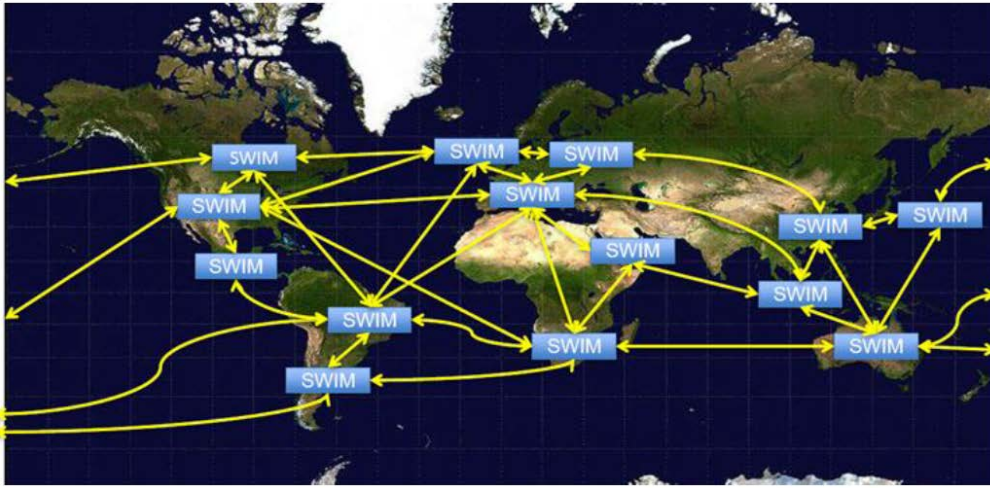
CARATS=(Collaborative Actions for Renovation of Air Traffic Systems)
ATM working group in JAPAN.

3. International Contribution

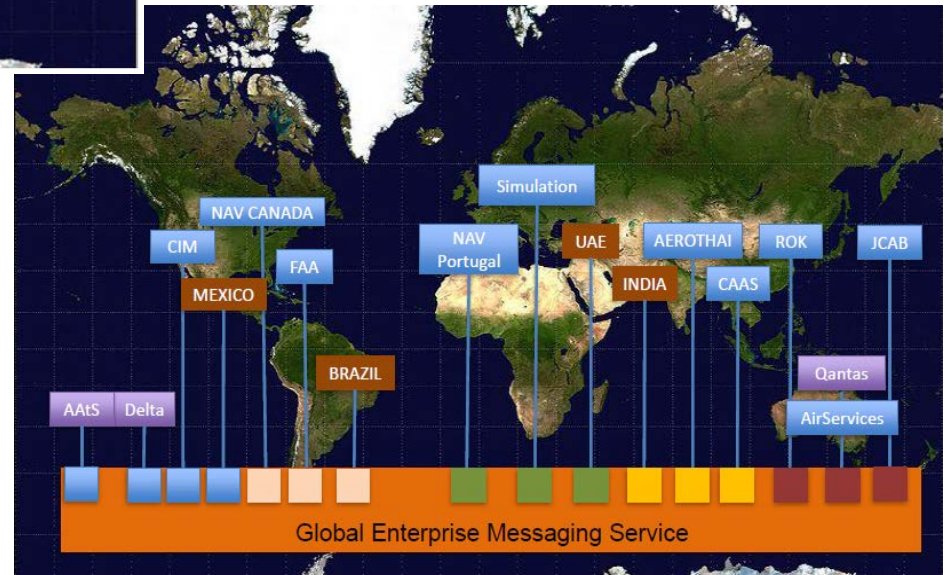
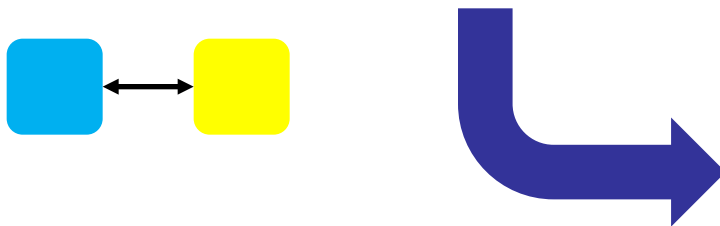
- To communicate with international companies and ANSPs.

4 Overview Demonstration-Objectives

Global Enterprise Messaging Service (EMS) Interoperability



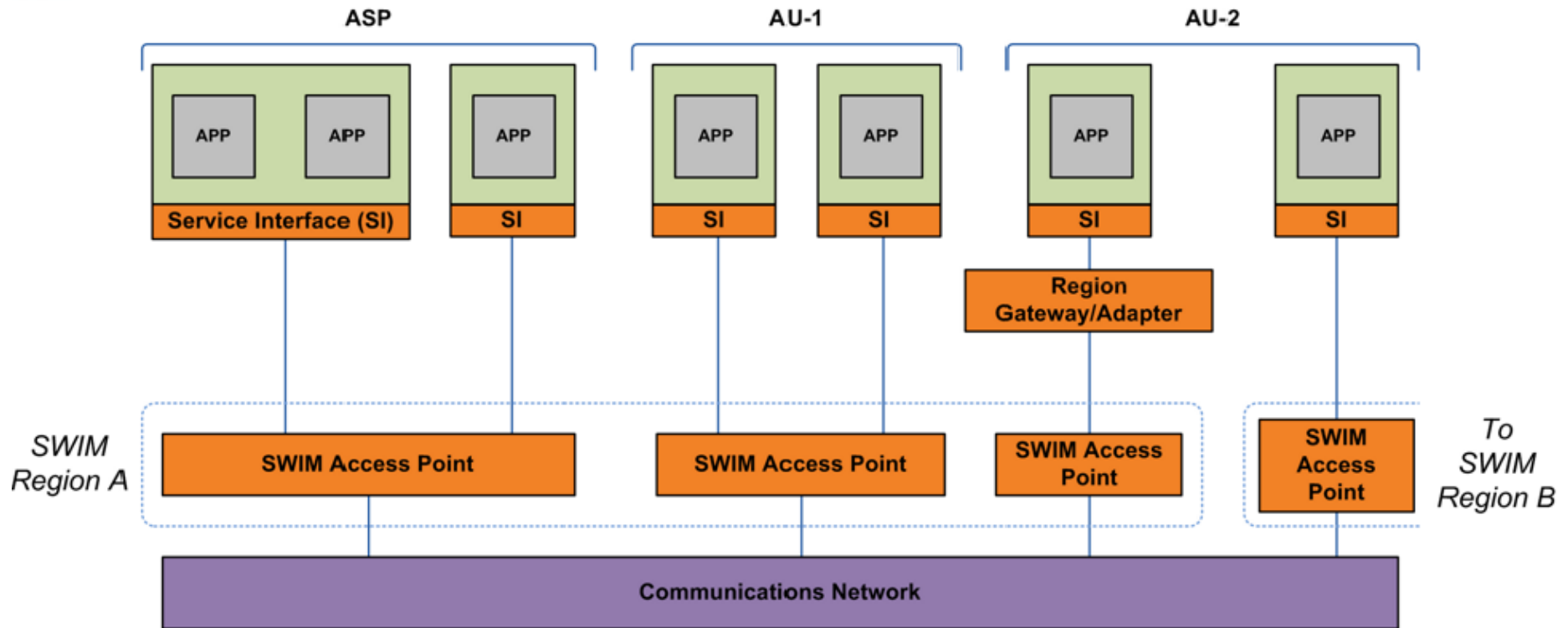
Point to Point SWIM(MG1)



Seamless SWIM with GEMS(MG2)

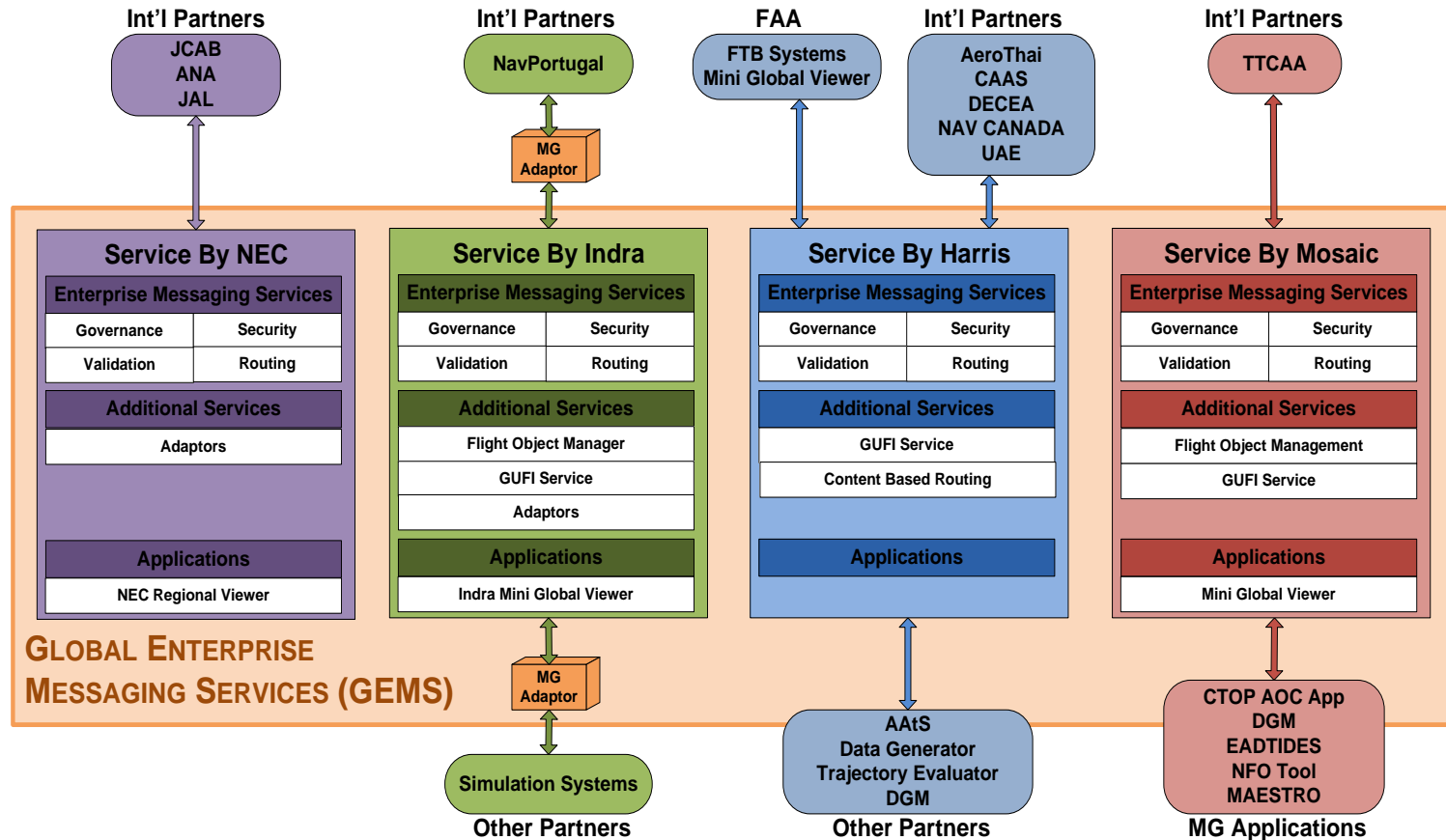
4 Overview - GEMS Architecture

ICAO SWIM Concept



4 Overview - About GEMS

GEMS: Global Enterprise Messaging Service



NEC attended as a GEMS provider.

4 Overview – NEC GEMS

➤ GEMS services

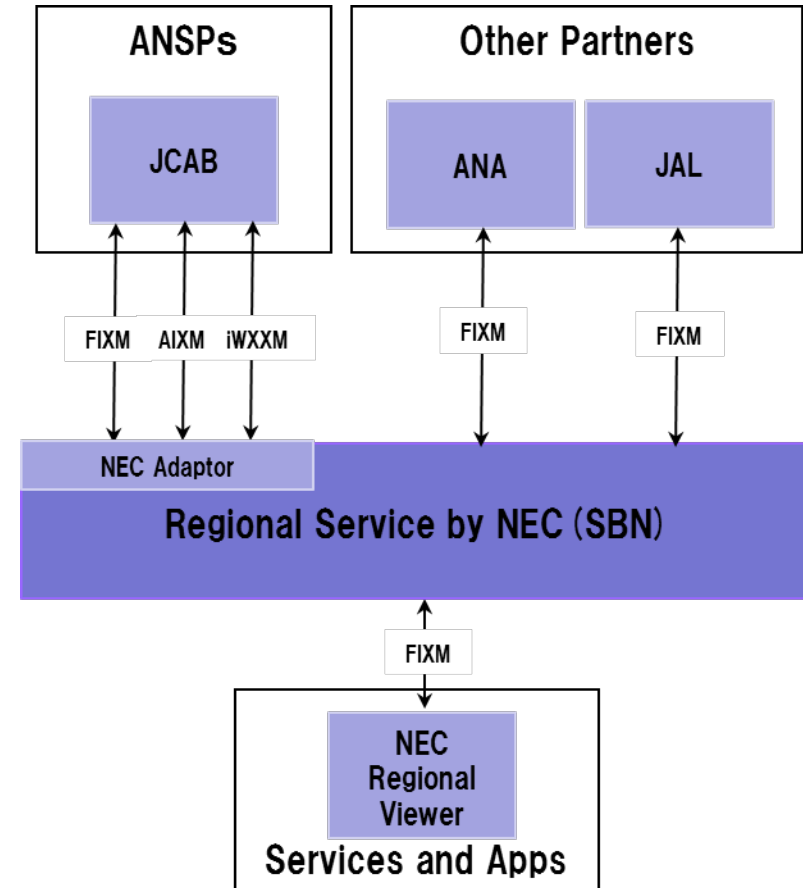
- NEC provides GEMS connection and standard services .

➤ Services and Applications

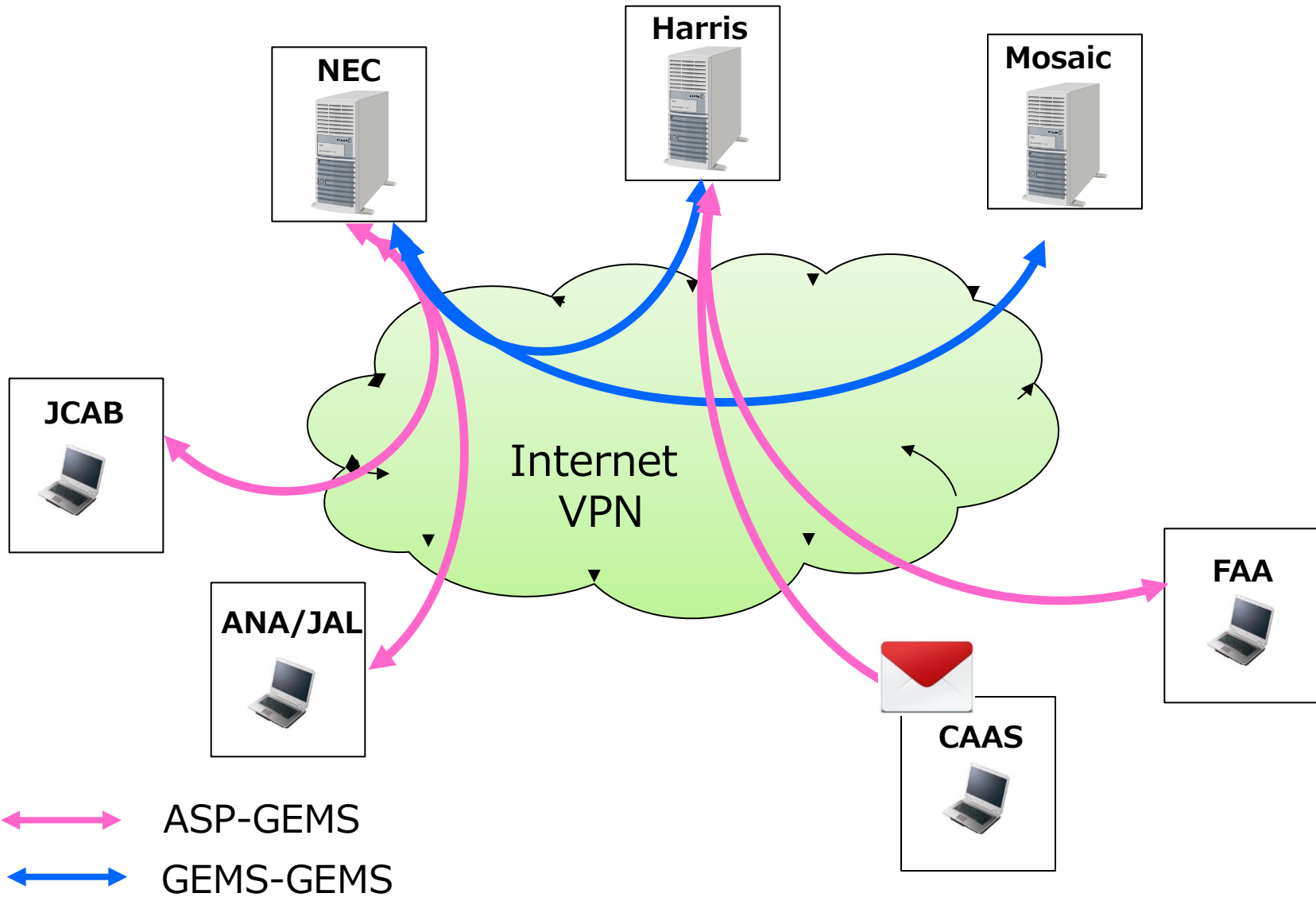
- NEC Regional Viewer
- NEC Adaptor

➤ 3 participants from JAPAN

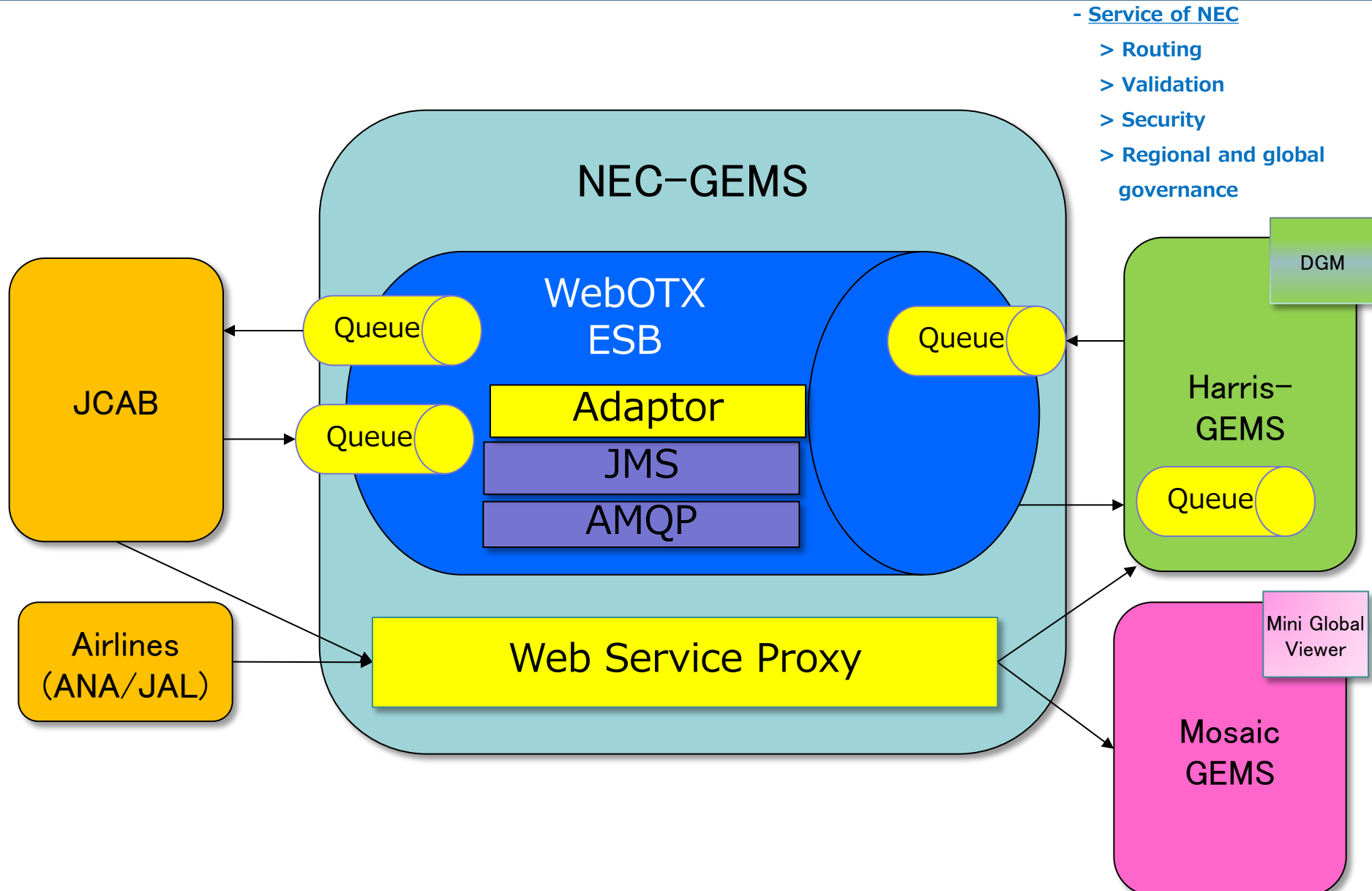
- JCAB, ANA, JAL



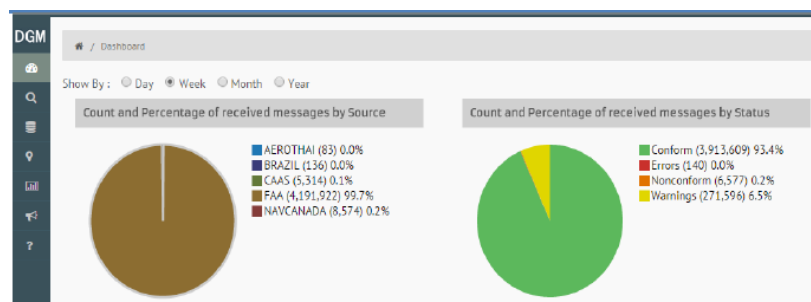
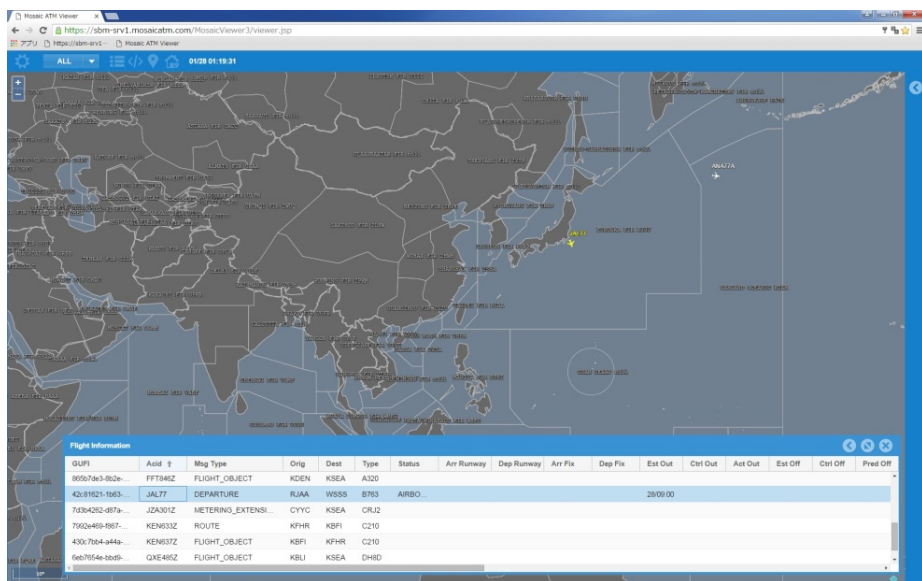
5 Technical Description - Network



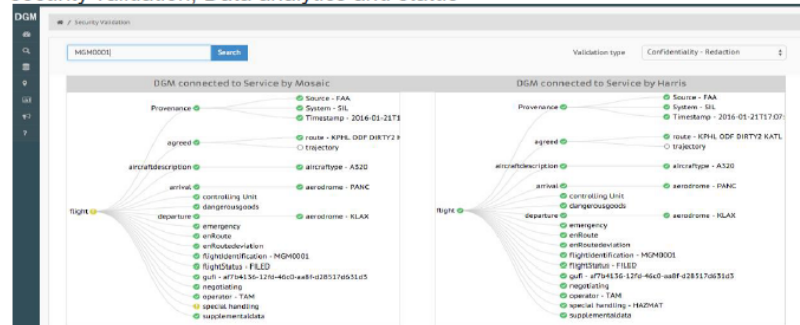
5 Technical Descriptions – NEC-GEMS Architecture



6 Services – Provided by Mosaic and FAA



DGM Tool which includes Dashboard, Conformance, Performance, Map Viewer, security validation, Data analytics and status



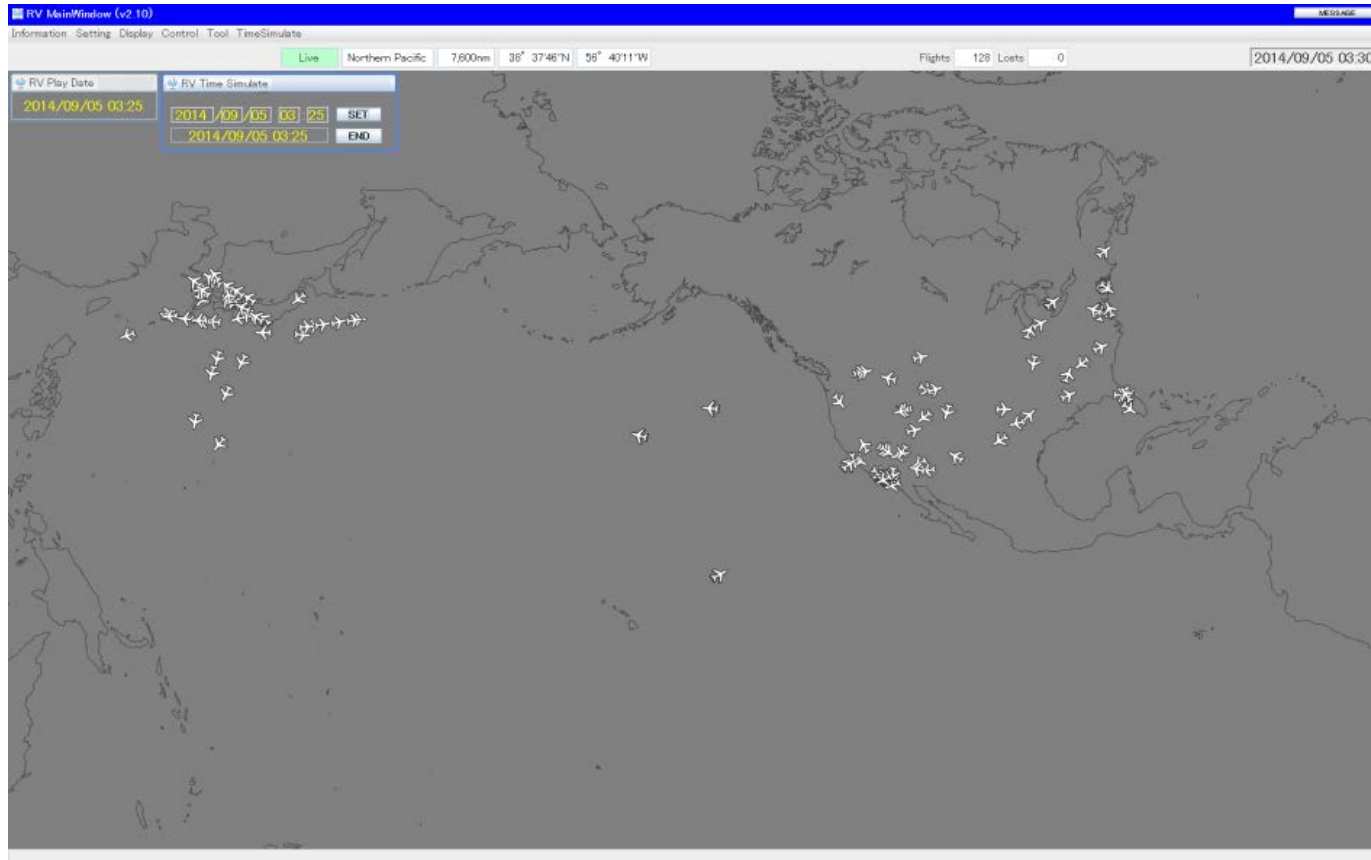
Security Validation - allows the verification of redaction technologies and the display of specific FIXM elements post comparison

Mini Global Viewer (by Mosaic)

Data Governance Module (by FAA)

JCAB and ANA/JAL access through NEC GEMS

6 Services - NEC Regional Viewer



Feature of NEC Regional Viewer

1. FIXM3.0
2. View point change easily
3. Information details of aircrafts
4. Flight history record

7 Lessons and Learned – Quick development

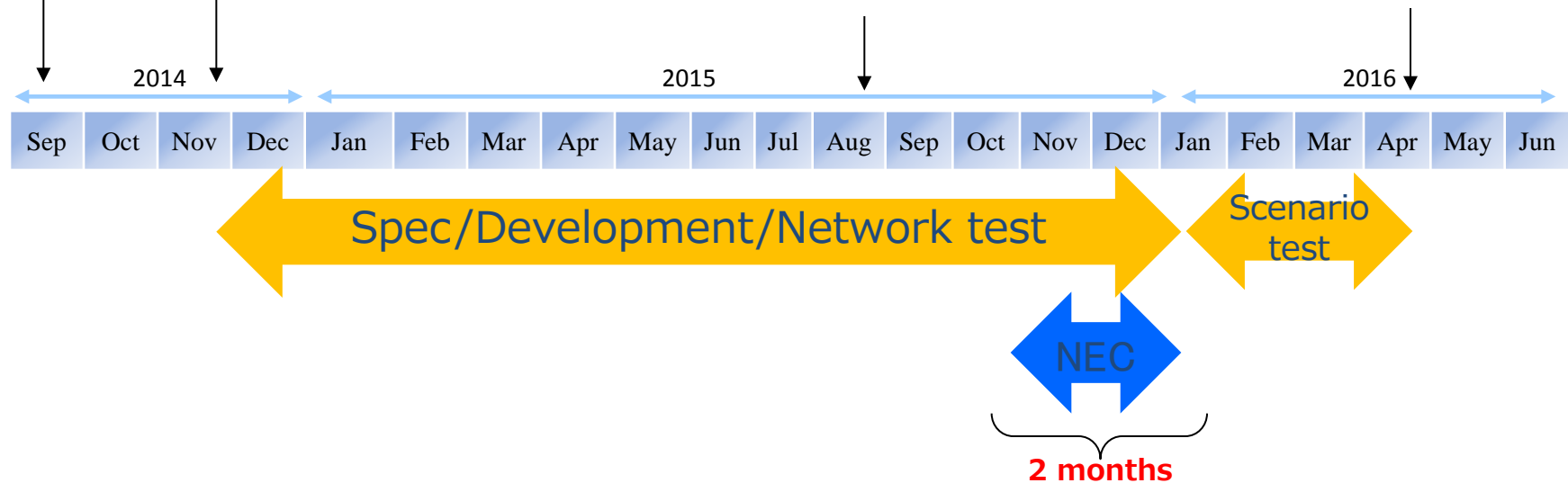
➤ Quick development NEC-GEMS .

Mini Global II Start

Collaboration with Additional International Partners

ATIEC
8/25 – 8/30 2015

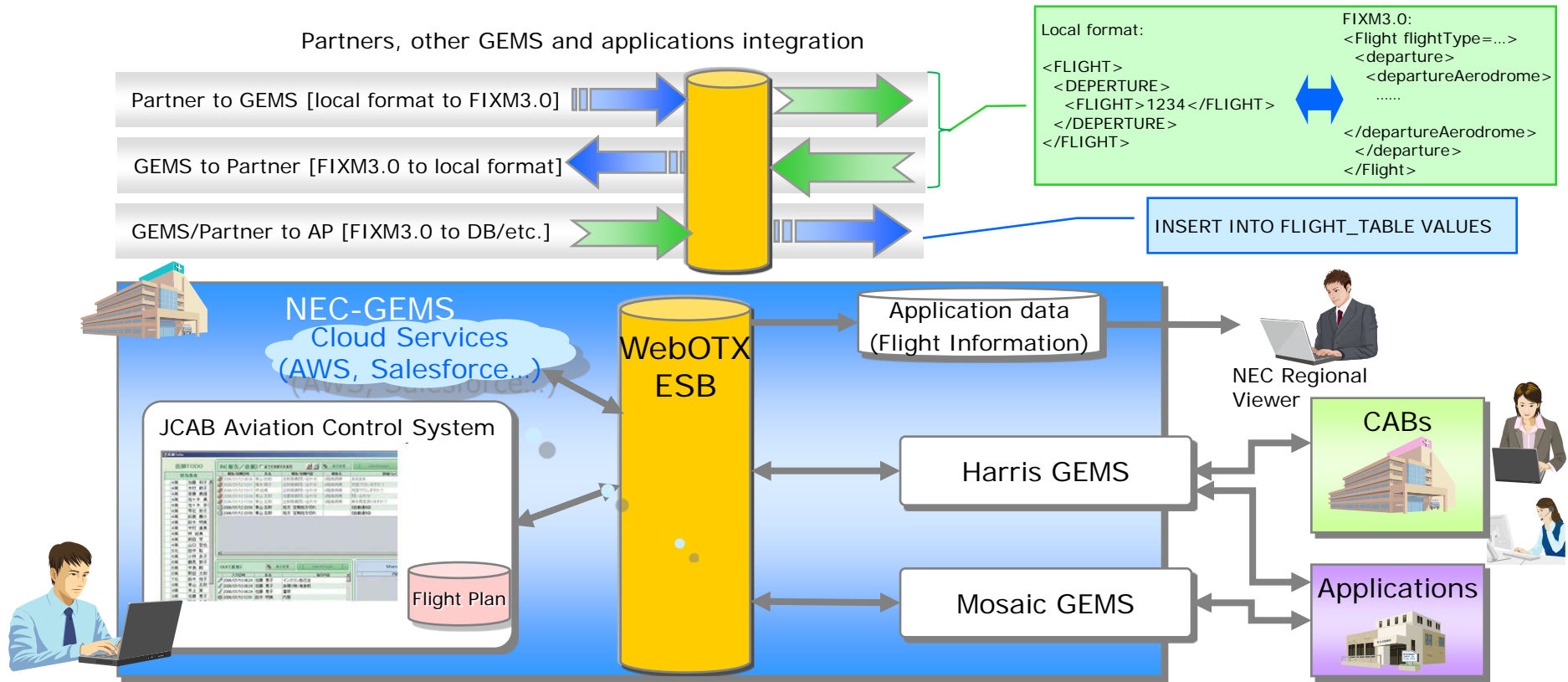
Mini Global II Demonstration
4/25-29/2016(Florida USA)



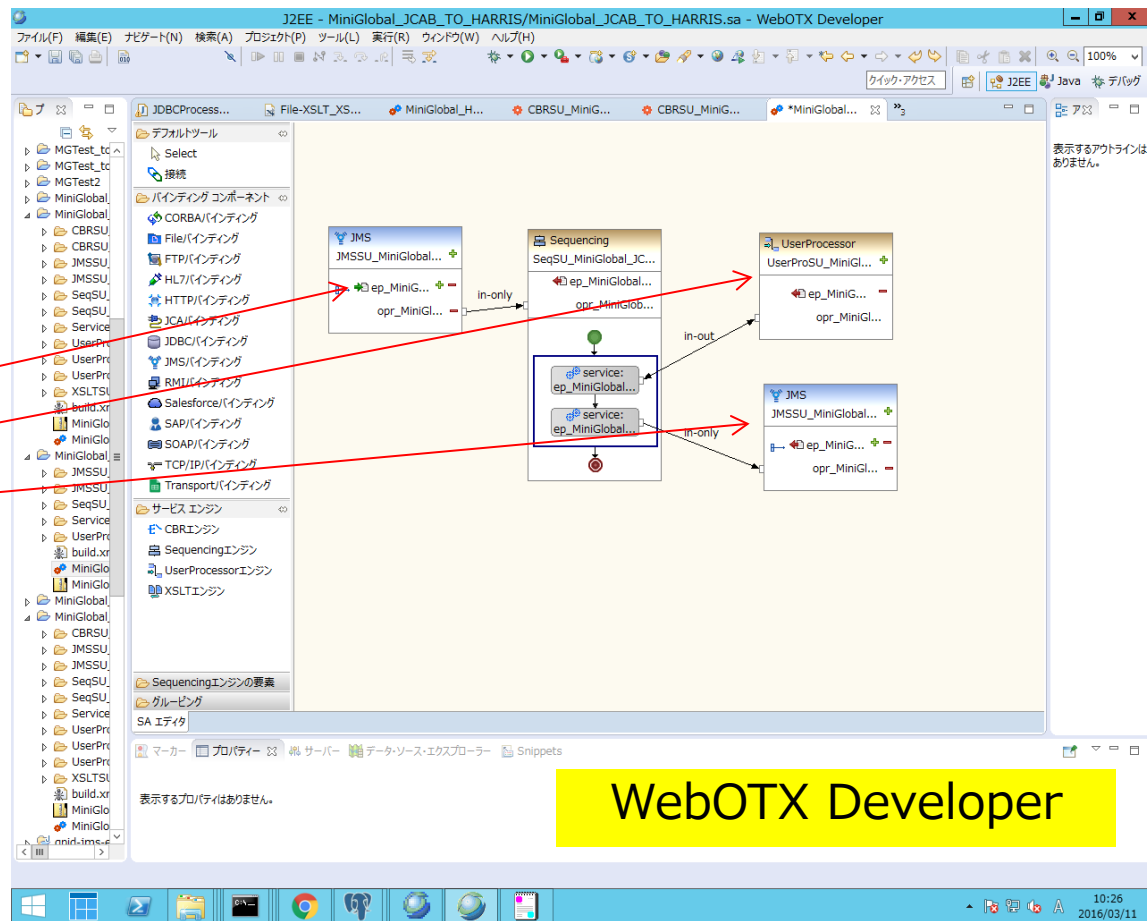
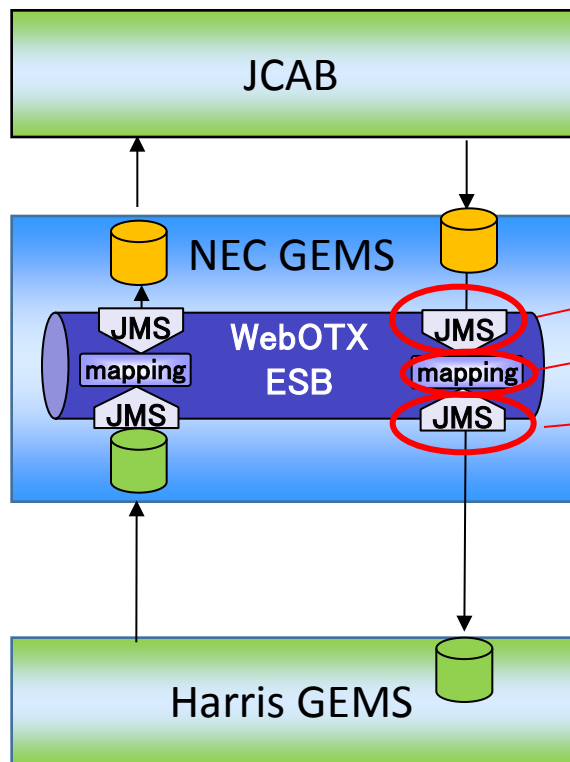
1. **GEMS architecture based on open technology.**
 - Documents were ready.
 - GEMS WG members helped NEC to catch up.
2. **NEC already has SOA products and expertise.**

7 Quick development with **WebOTX ESB**

- Relatively fast development was possible by using NEC's proprietary SOA product (WebOTX ESB) and support by integration specialists.
- WebOTX ESB provides set of adapters for Web Services, REST, JMS, database, cloud services(AWS SQS/S3/SNS, Salesforce etc.) and data mapping tools, so the necessary system development could be achieved by combining the required components.



7 Quick development with **WebOTX** ESB



Web OTX Feature

- Web Services, REST, JMS, database, cloud services
- Data integration is achieved without program coding

Issue to proceed SWIM implementation

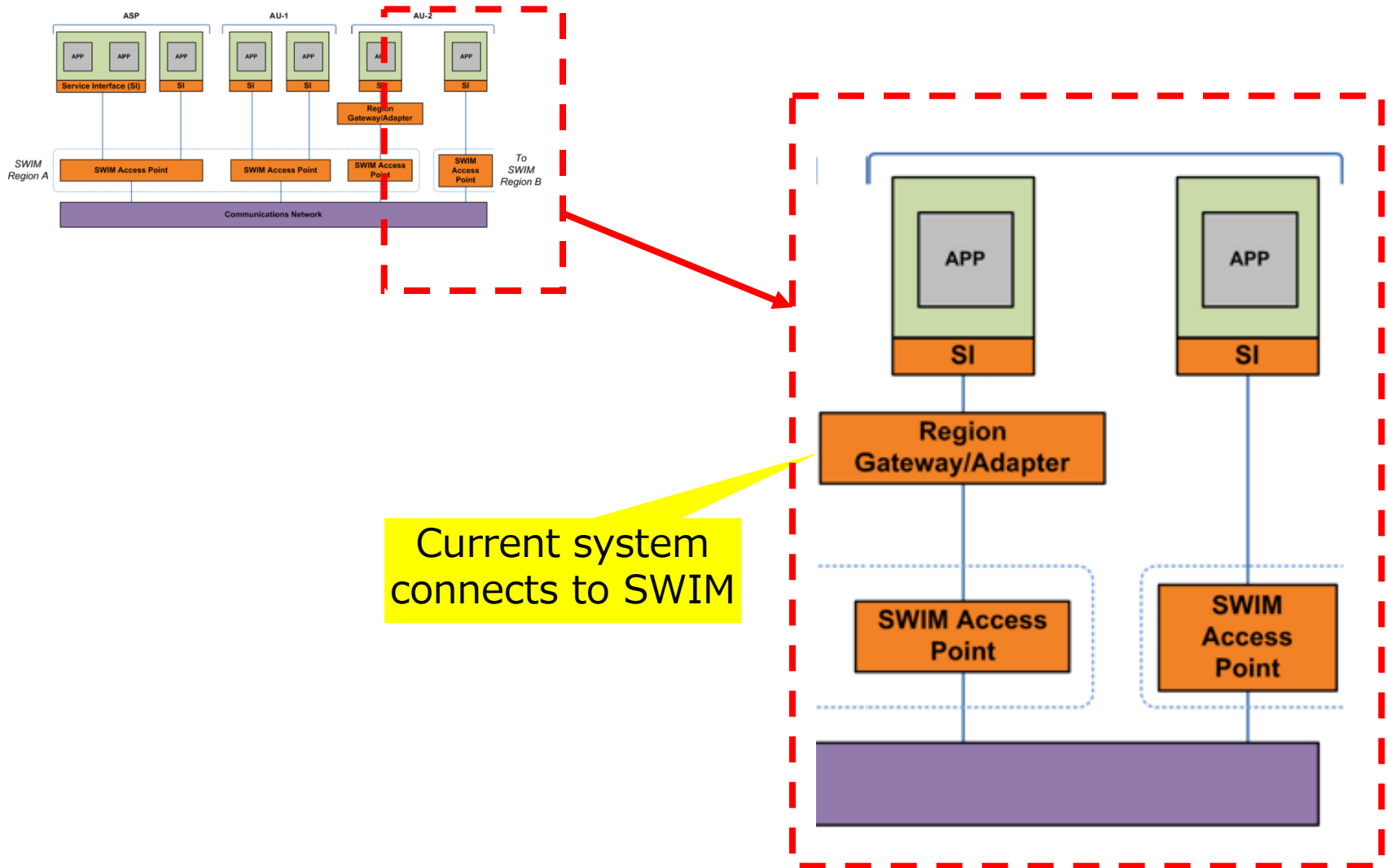
- Change from current system

It is difficult to change from all current system to SWIM simultaneously. Because of Migration-Cost, Cost-effectiveness.

- Governance

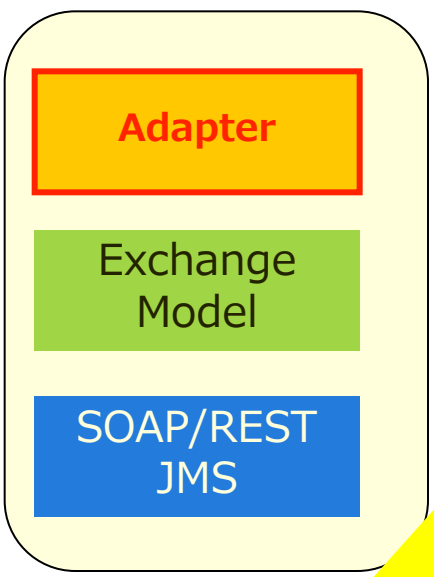
On governance and security area , there are many stakeholders . So it will be needed much time to reach a consensus.

8 NEXT steps



Current system connects to SWIM

8 NEXT steps



Technical area

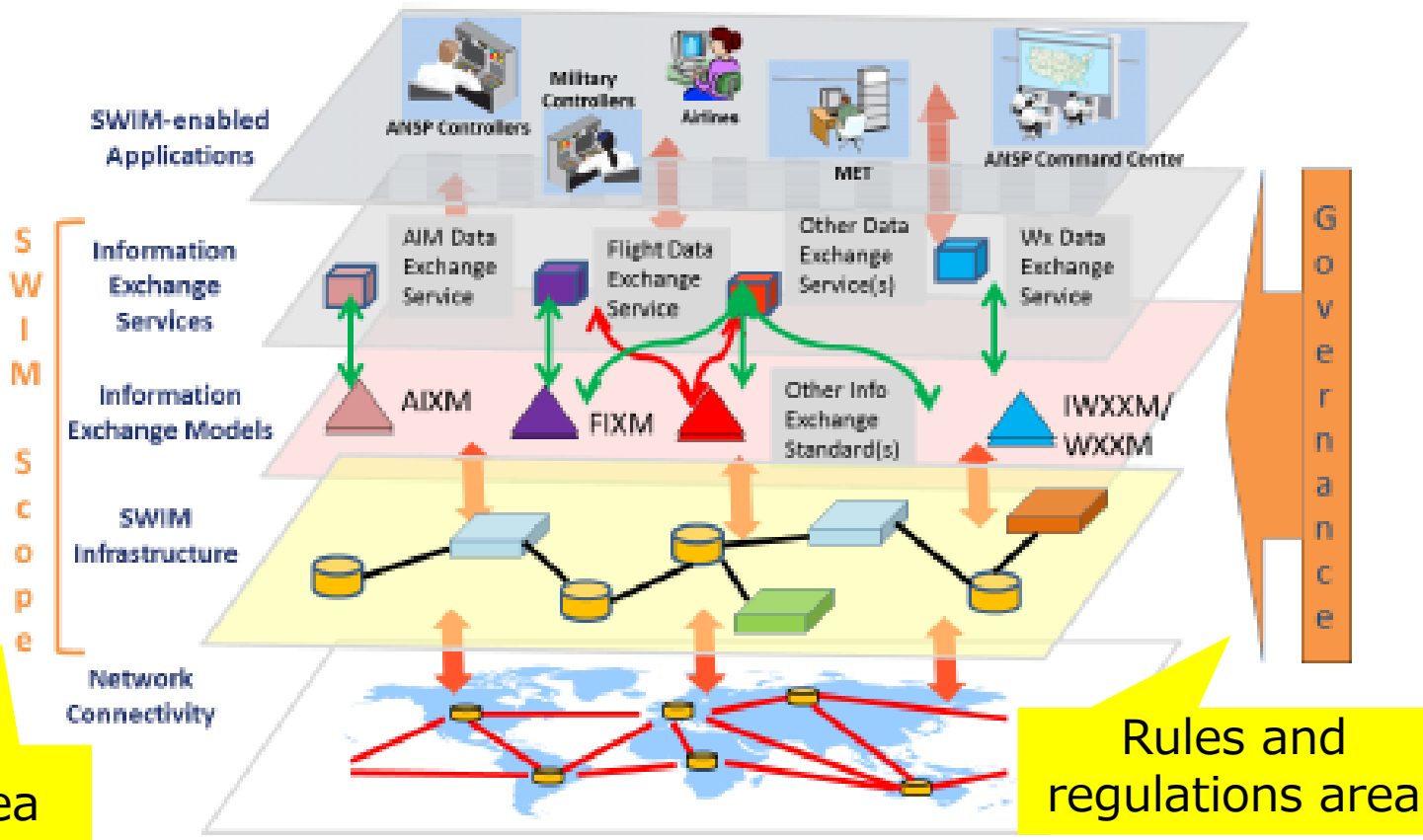


Figure 2. SWIM Global Interoperability Framework

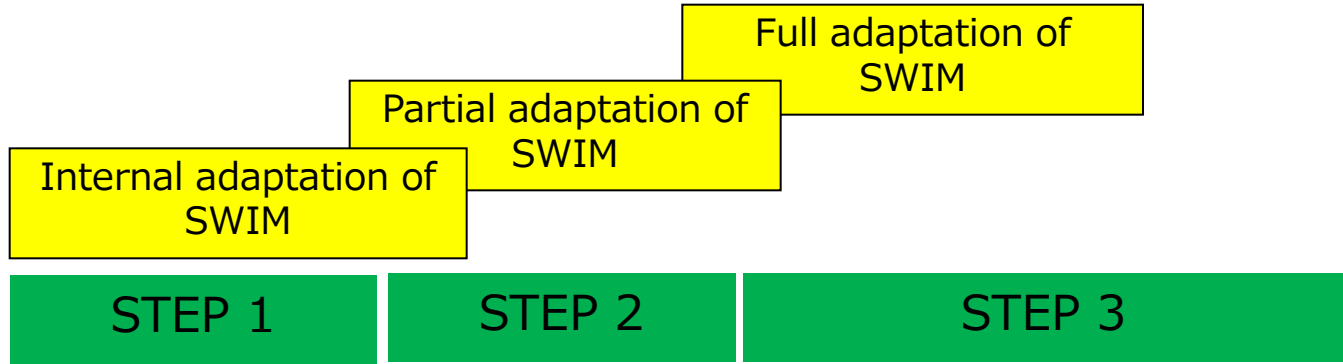
The technological aspects of SWIM can be resolved relatively fast. On the governance, there are many stakeholders and need to reach a consensus. Because it needs much time to start commercial services.

8 NEXT steps

STEP1 : Internal SWIM

STEP2 : Partial SWIM (≡MG1)

STEP3 : Full SWIM (≡MG2)

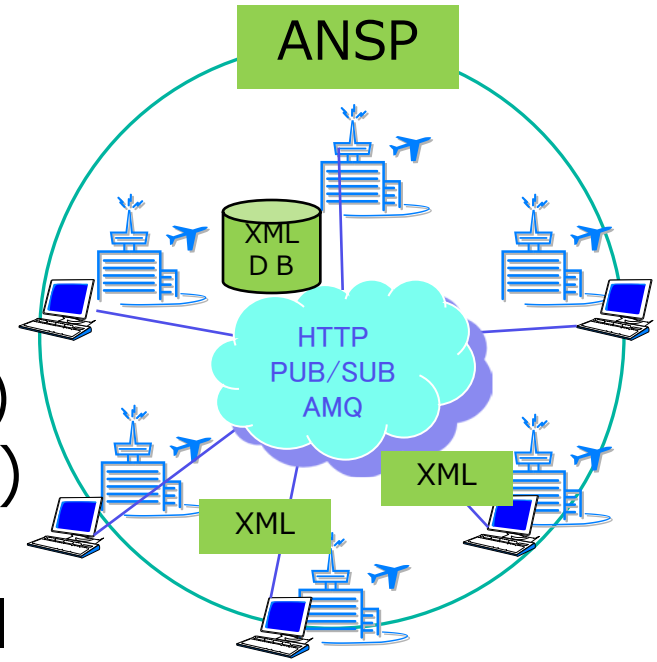


8 NEXT steps

Step1

Internal adaptation of SWIM

- IP base (HTTP , AMQ , Pub/Sub)
- Standard (AIXM , FIXM , iWXXM)
- XML based data aggregation
- XML data exchange only internal



Internal SWIM

8 NEXT steps

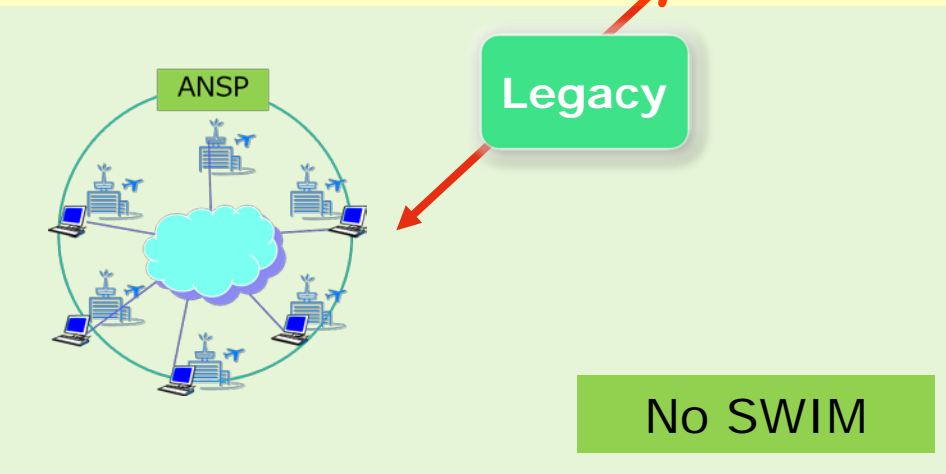
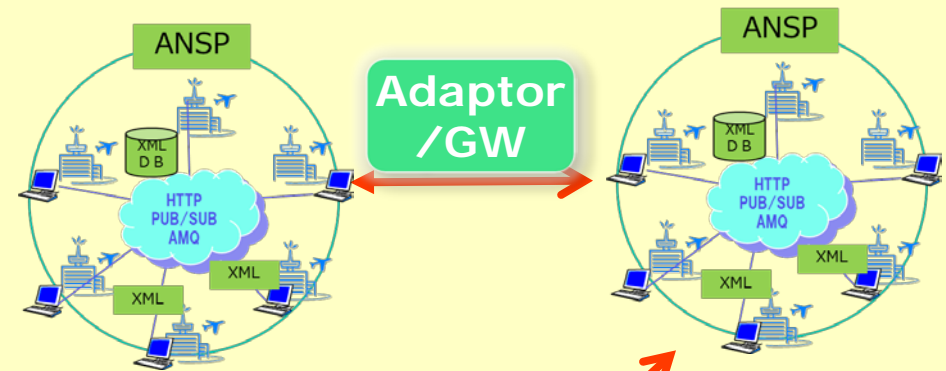
Step2

Partial adaptation of SWIM

- Governance not yet established
- ➔ Point to point SWIM connections



Partial SWIM



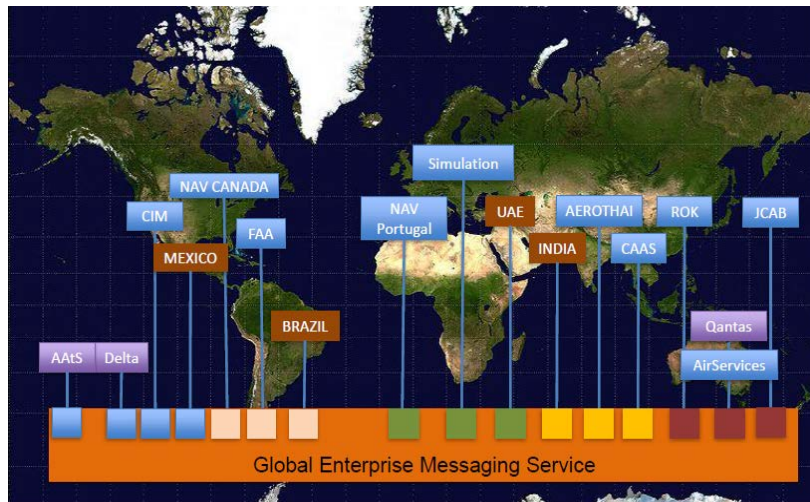
Partial SWIM

8 NEXT steps

Step3

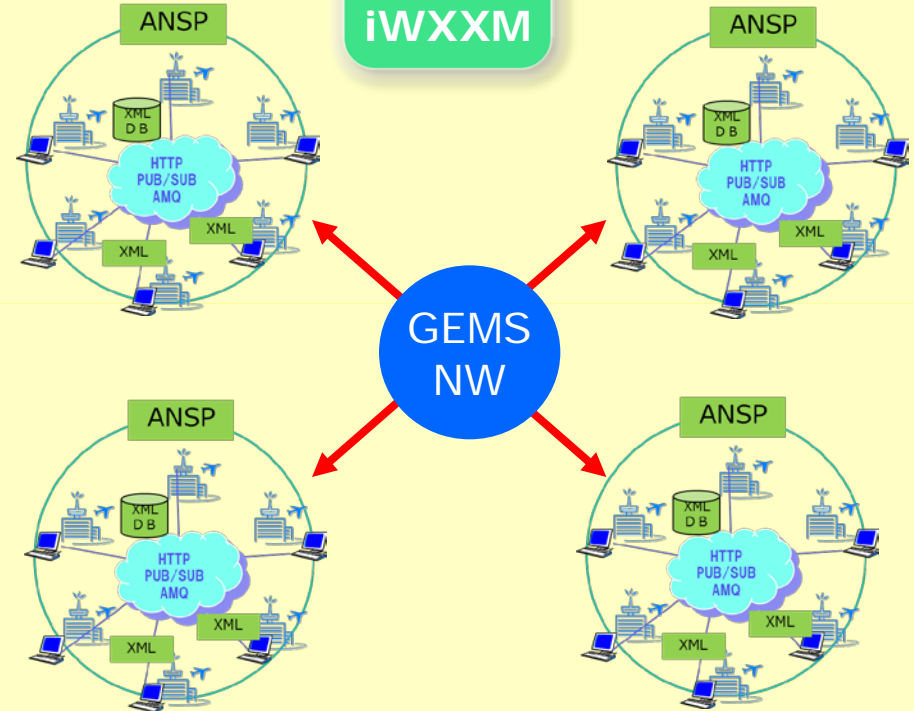
Full adaptation of SWIM

- Governance established
- ➔ commercial GEMS



Full SWIM

AIXM
FIXM
iWX XM



Full SWIM

8 NEXT steps

Japan Air Navigation Service (JANS) started operation of new flight data processing system (FACE)



JANS started operation of new flight data processing system named 'Flight-object Administration Center system' (FACE). The FACE system is provided by **NEC Corporation**.

The FACE system replaces the conventional flight data processing system. The FACE system can have the function to manage FO (Flight Object) which is **described XML format**, and can also process the conventional flight plan format simultaneously.

JANS has a plan to update all ATC systems to compatible with the 'Flight Object' (FO) over five years. The FACE system is essential core of Japanese next-generation ATC systems.

<https://www.canso.org/japan-air-navigation-service-jans-started-operation-new-flight-data-processing-system-face>



Orchestrating a brighter world

NEC brings together and integrates technology and expertise to create the ICT-enabled society of tomorrow.

We collaborate closely with partners and customers around the world, orchestrating each project to ensure all its parts are fine-tuned to local needs.

Every day, our innovative solutions for society contribute to greater safety, security, efficiency and equality, and enable people to live brighter lives.

 **Orchestrating** a brighter world

NEC