Achieving the Benefits of SWIM with “smart” SWIM applications
John Fort & Hannes Brunner, Frequentis
## Agenda

<table>
<thead>
<tr>
<th>SWIM Building Blocks</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration Platform</td>
<td>2</td>
</tr>
<tr>
<td>Digital Briefing</td>
<td>3</td>
</tr>
<tr>
<td>Conclusion</td>
<td>4</td>
</tr>
</tbody>
</table>
Frequentis ATM vision: A new paradigm of sharing ATM information
Based on commonly agreed and understood data standards and information models

Data stored in silos
Duplicated
Inconsistently updated
Hard to access

Shared
Net-centric
Synchronised
Quality-controlled
SWIM building blocks

**SWIM Applications**
(i.e. Digital Briefing)

**Integration Platform**
(MosaiX SWIM)
Services, Information & Infrastructure

**Network Infrastructure**

**BUILD**

**GOVERN**

**DEPLOY**

**PROVIDE / CONSUME**

**SECURE**
Agenda

1. SWIM Building Blocks
2. MosaiX SWIM Integration Platform
3. Digital Briefing
4. Conclusion
Seamless, interoperable data exchange between all stakeholders
MosaiX SWIM information gateway

*) System-Wide Information Management
An end-to-end solution supporting all functions required
...from data acquisition to data consumption including billing and everything

MosaiX SWIM – Functional blocks

- Clients (Service consumers)
- Applications
- Legacy Applications
- Security
- APIs
- Events
- Data mediation
- Connectivity
- Data storage
- Service Registry
- Monitoring & logging
- Data analytics / billing
Flexible deployment options – including hybrid

MosaiX SWIM | Deployment options

Frequentis Apps | Customer Apps | Integration platform | VM or Cloud infrastructure
---|---|---|---
On-Premises

Frequentis Apps | Customer Apps | Integration platform | VM or Cloud infrastructure
---|---|---|---
Hybrid

Frequentis Apps | Customer Apps | Integration platform | VM or Cloud infrastructure
---|---|---|---
Private Cloud

Frequentis Apps | Customer Apps | Integration platform | Cloud infrastructure
---|---|---|---
Public Cloud
Supporting acquisition / processing of all types of ATM data
MosaiX SWIM | Test and demonstration system

SWIM applications
- Web client
  - ATC Display
- Web client
  - Digital Briefing
- Web client
  - smartDM / CADAS
- Web client
  - smartWeather

MosaiX
- Combined Position Data
- FIXM
- D-NOTAM
- Combined IWXXM
- AIXM

Data Storage
- Message validation
- Data mediation & conversion
- Information aggregation

Aircraft positions
- ADS-B Global Feed
- FLARM/OGN Global Feed
- NM B2B

Flight / Flow (FIXM)
- AIXM

NOTAM, FPL
- TAC, IWXXM

ARO NOF
- MET Office

EAD
Agenda

1. SWIM Building Blocks
2. MosaiX SWIM Integration Platform
3. Digital Briefing
4. Conclusion
Tested and validated within the SESAR research project
SESAR Project 13.2 | Digital Briefing validation scenario

AIXM

ISRM

AIFS/WFS
AIXM 5.1 Static data
ISRM 1.4

FIXM

ISRM

Integration Platform/
Digital Briefing
ISRM 2.0

GROUND

AIRCRAFT

AIFS/WFS
AIXM 5.1 Digital NOTAM
ISRM 1.4

AIXM

WXXM

iWXXM Service
(METAR, TAF, SIGMET)
ISRM 2.0

SWIM technical infrastructure

Ground Broker

Aircraft Broker

EFB

DATA MODELS
“Payload”

SERVICE MODELS
“How to access”

INFRASTRUCTURE
“How to transport”

MosaiX SWIM
## Select Flight

<table>
<thead>
<tr>
<th>Departure</th>
<th>Arrival</th>
<th>EOBT Date</th>
<th>EOBT Time</th>
<th>Flight Identification</th>
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<td>15:00</td>
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Flight Route
Airport MET
semantic NOTAM – Intelligent Filtering

- Intelligent and fine-grained DNOTAM filtering is not enough
  - PIBs still contain substantial number of DNOTAMs that are relevant for a specific flight
  - Missing organization capabilities of relevant DNOTAMs

- Ontology-based Representation and Semantic Querying of Digital Notices to Airman (NOTAM)
  - semNOTAM is a service not an application
  - Enable fine-grained intelligent semantic filtering and prioritization
    - Utilizing advantages of AIXM 5.1

- Knowledge-based system
  - Separating data and rules from reasoning
  - Incremental rule base
  - Based on pilot experience and feedback
semNOTAM Knowledge Base

- Background Knowledge (Aerodromes, Routes, Segments, etc.)
- DNOTAM Knowledge (recent DNOTAMs from NOTAM Service)
- Flight-Specific Knowledge (Flight Path, Enrichments, Aircraft, etc.)
- Result Set (relevant and enriched DNOTAMs)
Semantic Prioritization

Integrated Digital Briefing

- Flight Brief Info
- Map Controls
- View Controls
- Highlighted Feature
- Flight Phase Browser
- NOTAM List
- Interactive Map
- Semantic Annotations Switch

Departure Airport: KBOS

- Time filter: 16:00 - 18:00
- NOTAM List
- Generate APIS Documents
Airport NOTAM with Semantical Annotations
EFB – View Map
EFB – Map View
EFB – Airport
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Conclusion

- MosaiX SWIM provides all building blocks for the SWIM Technical Infrastructure
- MosaiX SWIM enables organisations to **unlock and monetize** their data
- SWIM Information- and Service Models allow **new services** like Digital Briefing
- SemanticNOTAM adds **additional intelligence** to Digital Briefing