"Where are we today – 7 years experience in SWIM development"

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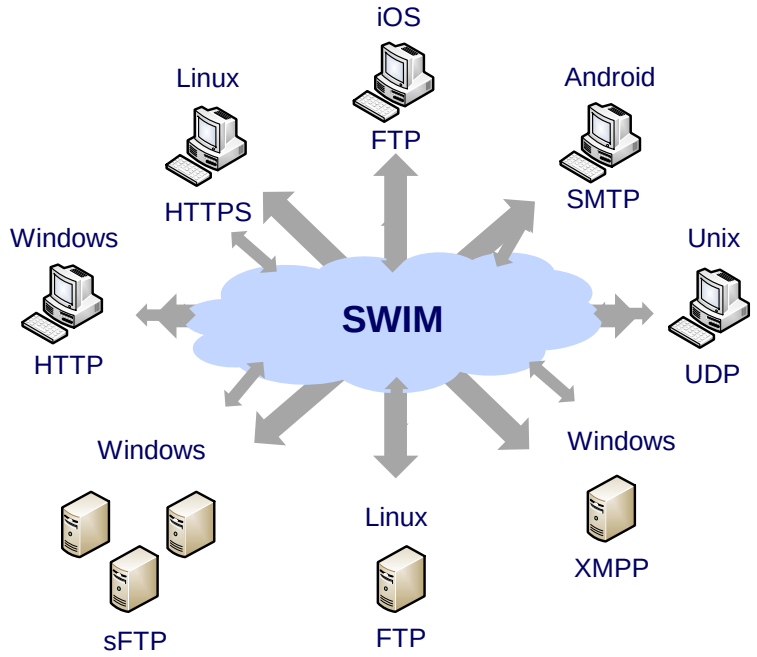
ICAO APAC/MID SWIM Workshop
Bangkok, Thailand, 16 – 18 May, 2016

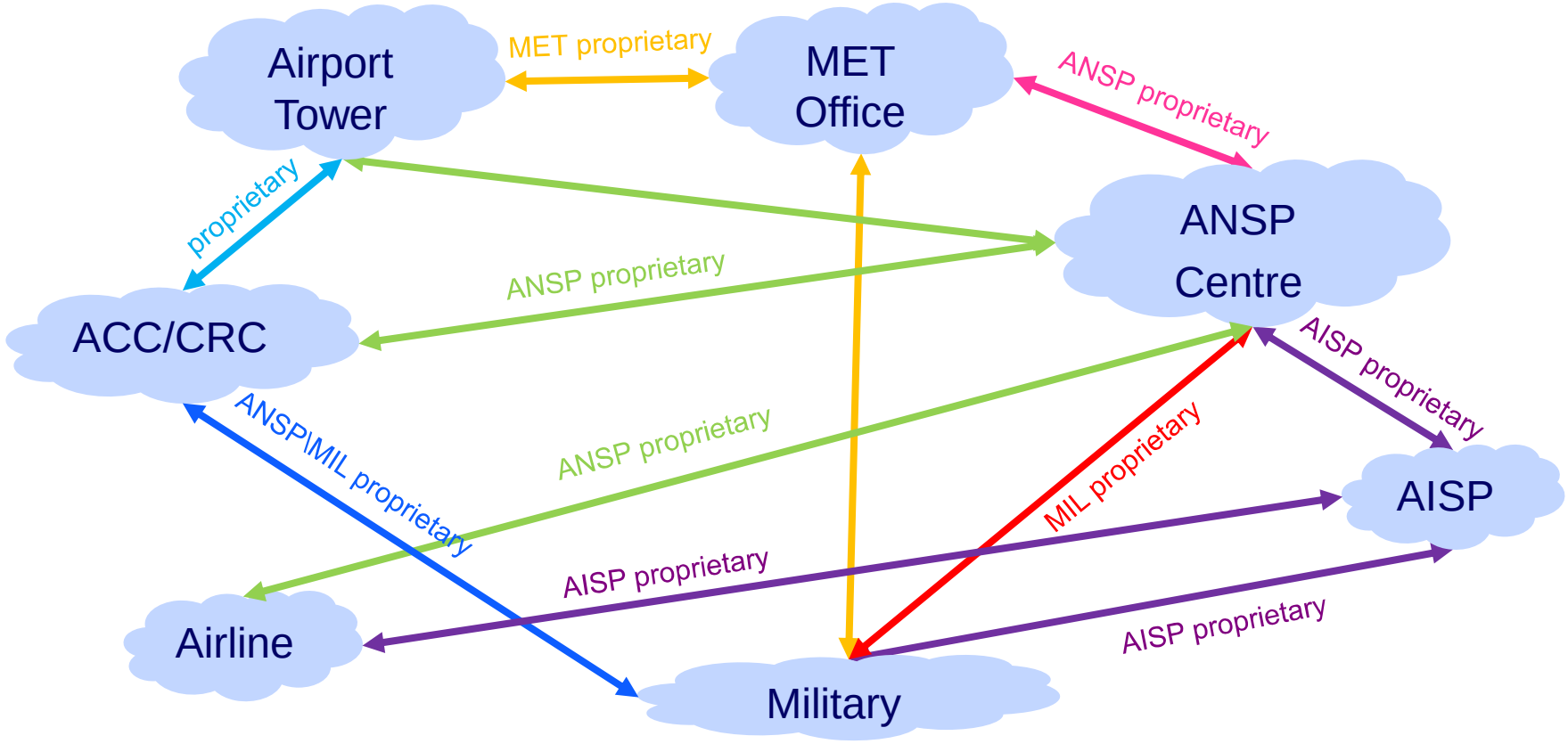
Contents

What problems do we try to solve with SWIM?

- Heterogeneous systems with different
  - Protocols
  - Operating systems
  - Requirements
  - Resources
  - Point-to-point unique interfaces
- Alleviate system from
  - Rigid applications
  - Direct connections
  - Duplicated software
  - No reusability
  - Complicated software maintenance
  - Costly development, test & configuration management
  - Cumbersome data access



Present day heterogeneous systems



- These can be any of:
  - AFTN, CIDIN, AMHS or myriads of IP-based proprietary systems

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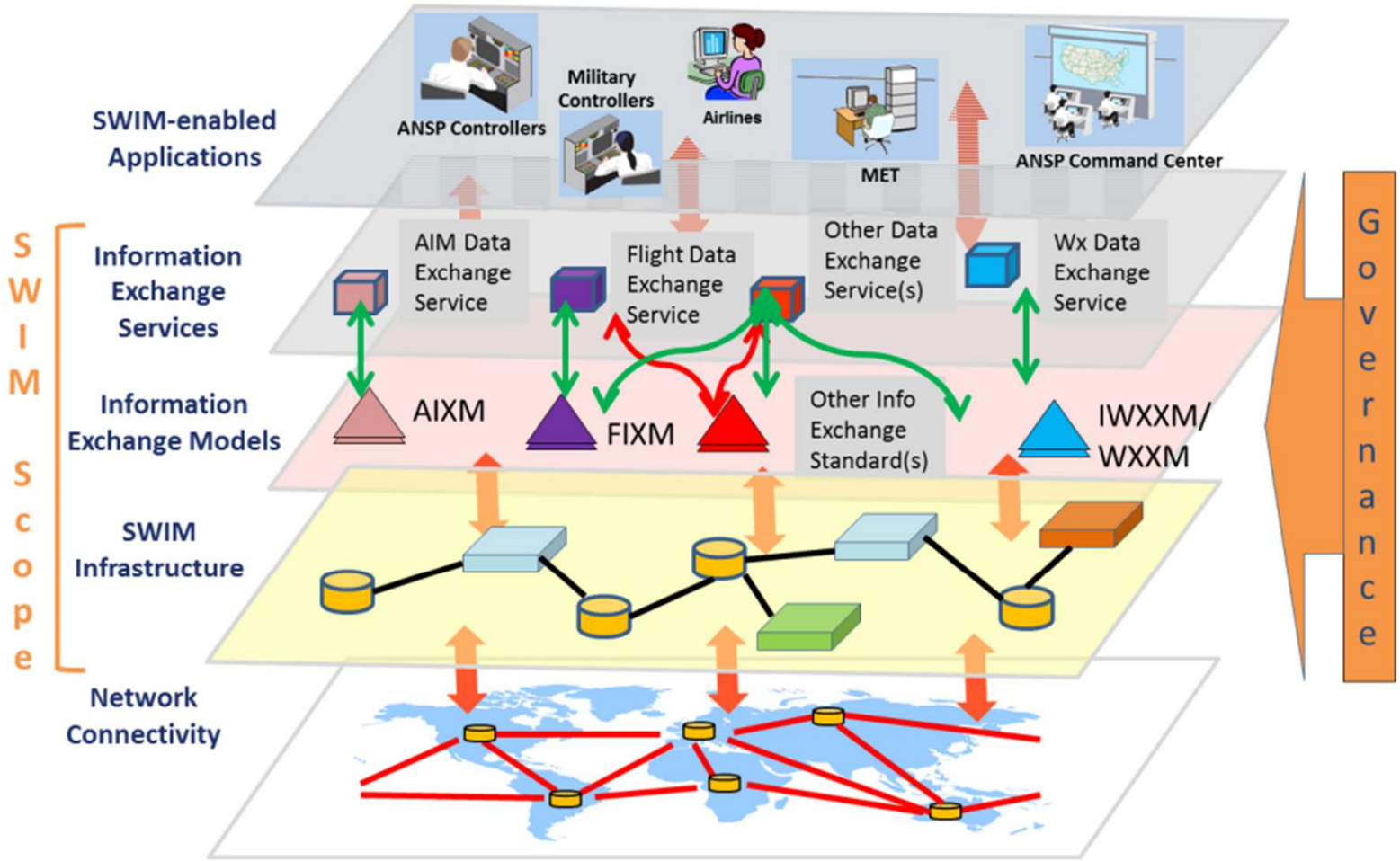
SWIM



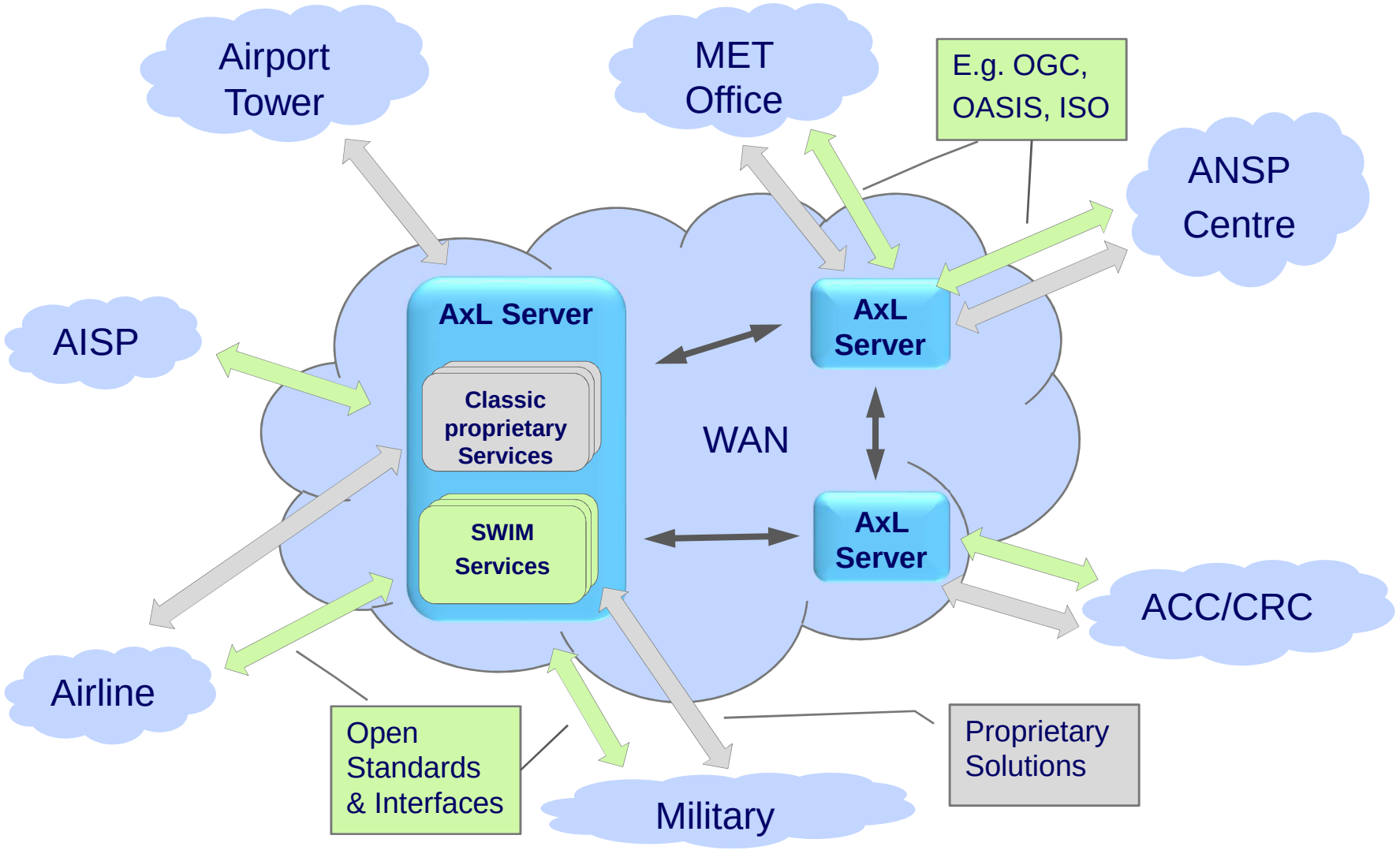
Global SWIM Frame [Doc 10039]

ICAO & SESAR SWIM vs. Avitech SWIM

SWIM consists of **standards**, **infrastructure** and **governance** enabling the **management** of **ATM information** and its **exchange** between **qualified parties** via **interoperable services**. [Doc 10039]

- Avitech SWIM
  - Provides the glue that follows the vision and enables the management and exchange of information
  - Provides interoperable implementing open standards, using COTS softwar
  - Provides historical, nt and future information to make better and faster decisions collaboratively
  - Enables automated, enterprise-wide information sharing
  - Sharing of services across the enterprise

A bridge between legacy and SWIM-enabled systems



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Lessons learnt / Required approach

- A bridge between present day systems and future SWIM
- Inline with ICAO, SESAR/NextGen vision for SWIM
- A modular system allowing a low-risk, incremental investment, for all, big or small partners
- Simplified application development and lower implementation costs
- A turnkey system which you can test from day 1
- Mature technology & Backwards Compatibility

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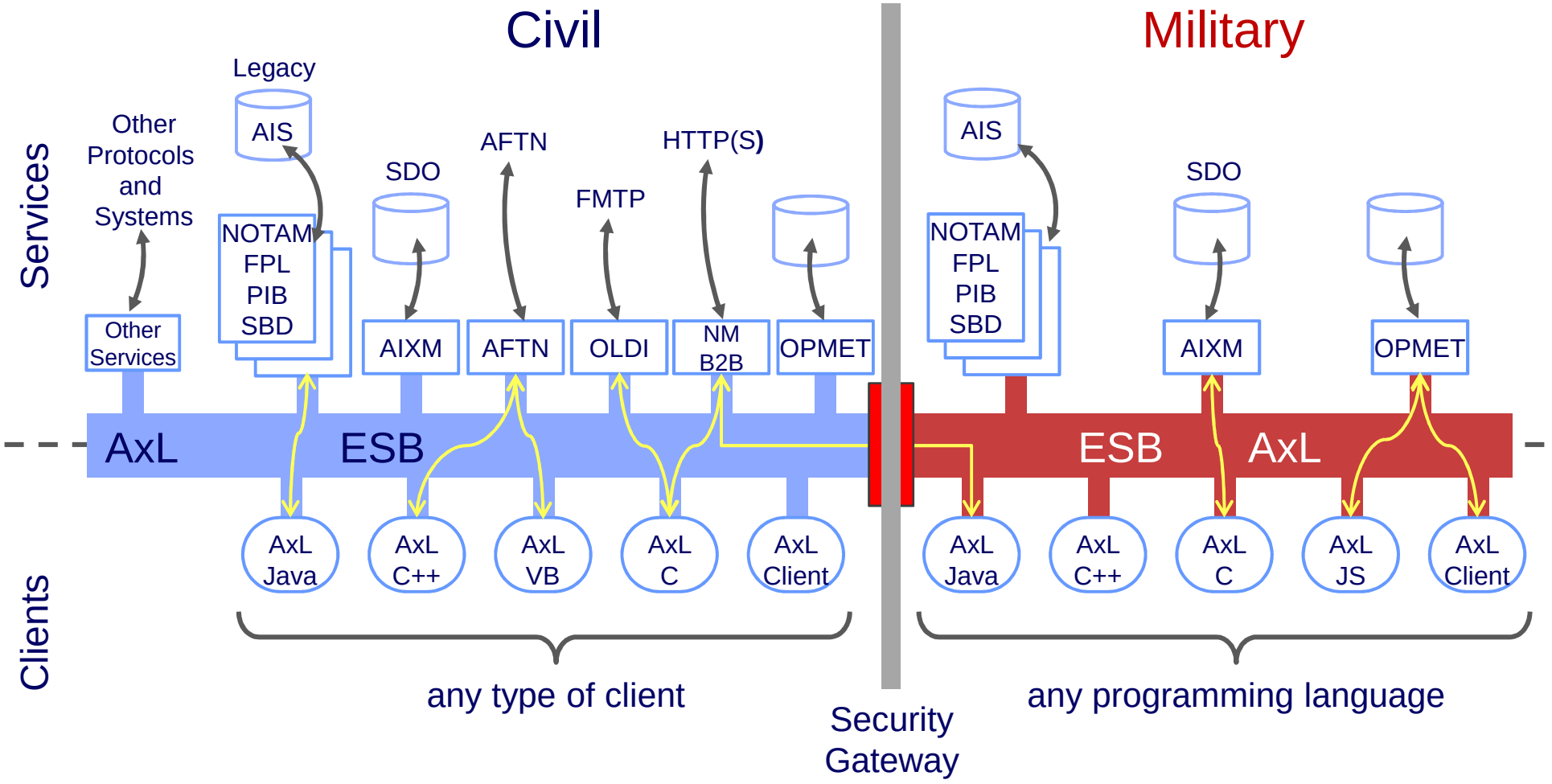
Avitech SWIM Key Features

- Network-centric, information-sharing platform
- Message-oriented Middleware, Service-oriented Architecture (SOA)
- Supports seamless, gradual transition from legacy to modern systems
- Decouples client applications from services
- Backwards compatibility
- Support for latest security protocols
- Jumpstart kit for immediate start and testing
- Follows ICAO, EUROCONTROL, ARINC, RTCA/EUROCAE, ITU-T, W3C, ISO and OGC standards and recommended practices
- Mature and proven technology: **over 7 years in operation!**

A Typical Setup | Modular System



Avitech SWIM v4.0.0 Services

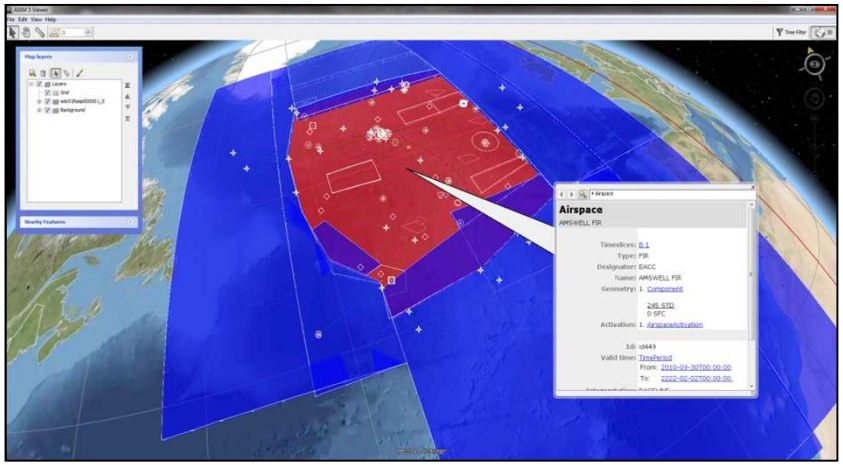
- Over 30 services, simple and complex workflows
- Native support for multiple SWIM interfaces (req./repl. & pub/sub)
- AIM Services
  - NOTAM, SNOWTAM, ASHTAM, BIRDTAM, PIB/cPIB, SDO, AIP structure/summary, Change Request
- ATM Services
  - FPL & Flow, OLDI, Non-verbal Communication, FIXM 3.0
- MET Services
  - IWXXM, Non-OPMET (METFLASH, Min QNH Forecast, BIRDTAM / BIRDTAM STRIKE Warning, BIRDSTRIKE RISK Forecast)
- Transition
  - AFTN/SWIM, AMHS/SWIM
- Other
  - WFS, MBDS, NM B2B, EAD AIMSL, User Management, etc.

CW* – Complex Workflow

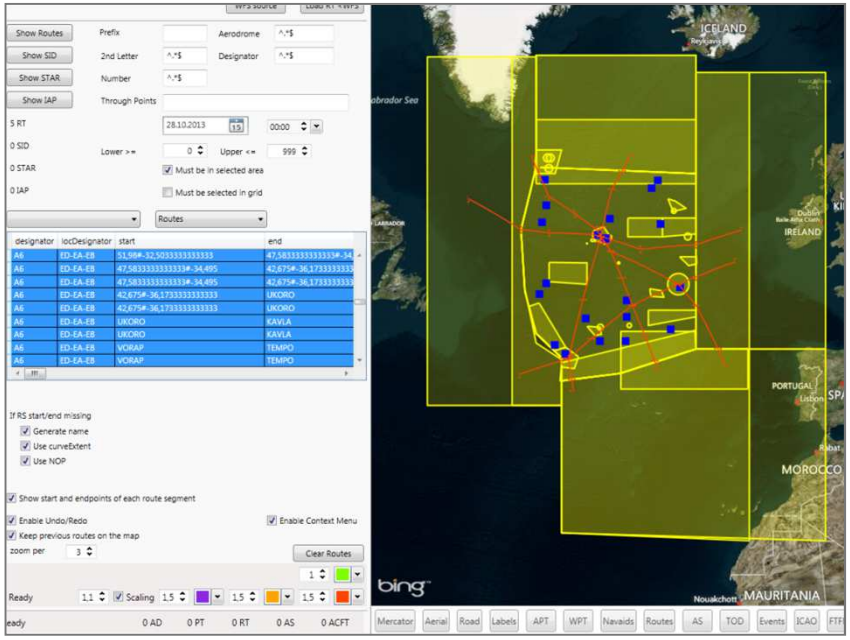
Contents

Standardization Benefits

- ✈ Seamless integration into decision support tools
- ✈ Simple integration using open data formats and interfaces
- ✈ Single access point to all Avitech and 3rd party products
- ✈ AIXM5.1 + Avitech SDO + Avitech SWIM



Luciad, FAA AIXM Viewer; Avitech AIXM5.1 Donlon & AxL



EUROCONTROL , Jumpstart Tool; Avitech AIXM5.1 Donlon & AxL

OGC Certification / Compliance

- WFS-T v2.0
  - Avitech is worldwide the first company to pass all tests in the OGC CITE WFS v2.0 test suite!
  - OGC officially announced on 20.11.2014 that Avitech is an early implementer.
  - Compliance agreement countersigned (01.12.2014)
  - Compliance extended in (December, 2015), http://avitech.aero/our-products/system-wide-information-management/
  - AxL WFS-T service is now reference implementation

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  - The need for SWIM
  - ICAO & SESAR SWIM vs. Avitech SWIM
  - Lessons learnt / Required approach
  - Avitech SWIM Key Features
  - Standardization & Compliance
- Research Projects
  - WeAC
- Product Development
- ASBU B1-SWIM
- References

Research Project WeAC

- 4th Civil Aviation Research Program, 4th call (LuFo IV – 4)
  - Weather in air traffic management (ATM) and collaborative decision making (CDM)
  - Duration: 01.10.2012 – 30.09.2015
- Participating
  - AC-B, Avitech, DFS, DWD, Selex, TU Braunschweig and TU Darmstadt
- Goal
  - New weather products and improved predictability
  - Information exchange through SWIM-based technologies

Gefördert durch:
Bundesministerium für Wirtschaft und Energie
aufgrund eines Beschlusses des Deutschen Bundestages

WeAC Architecture

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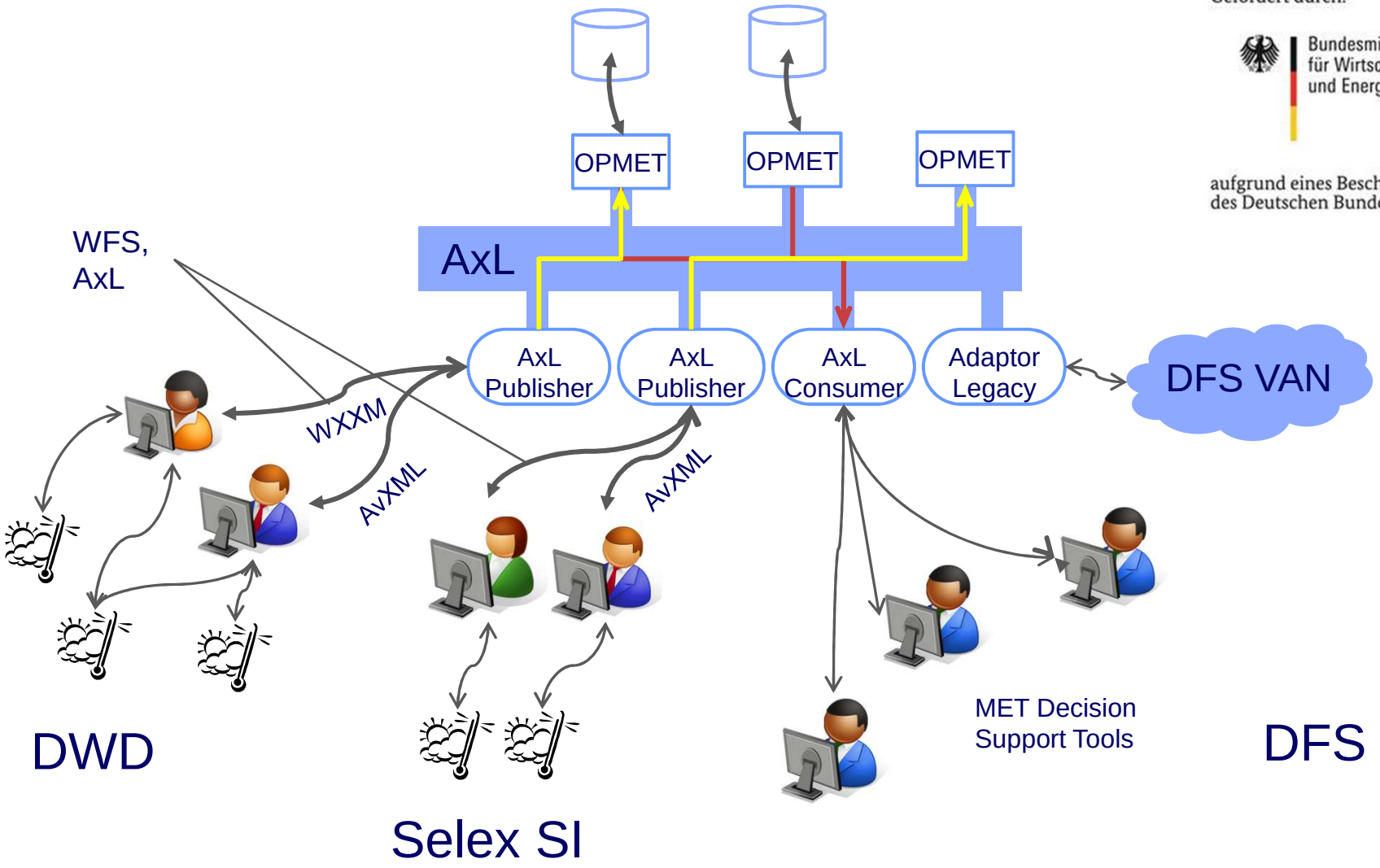

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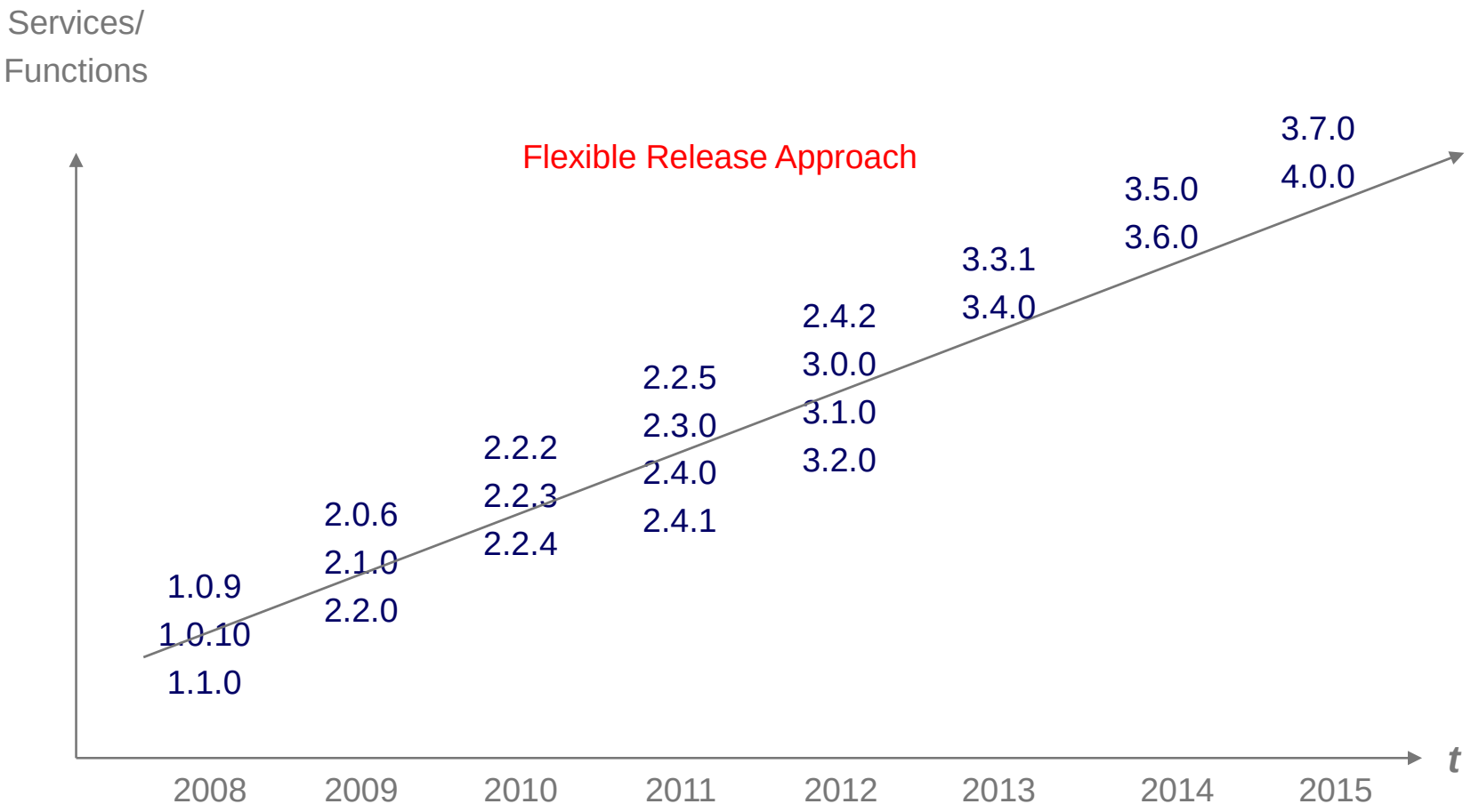
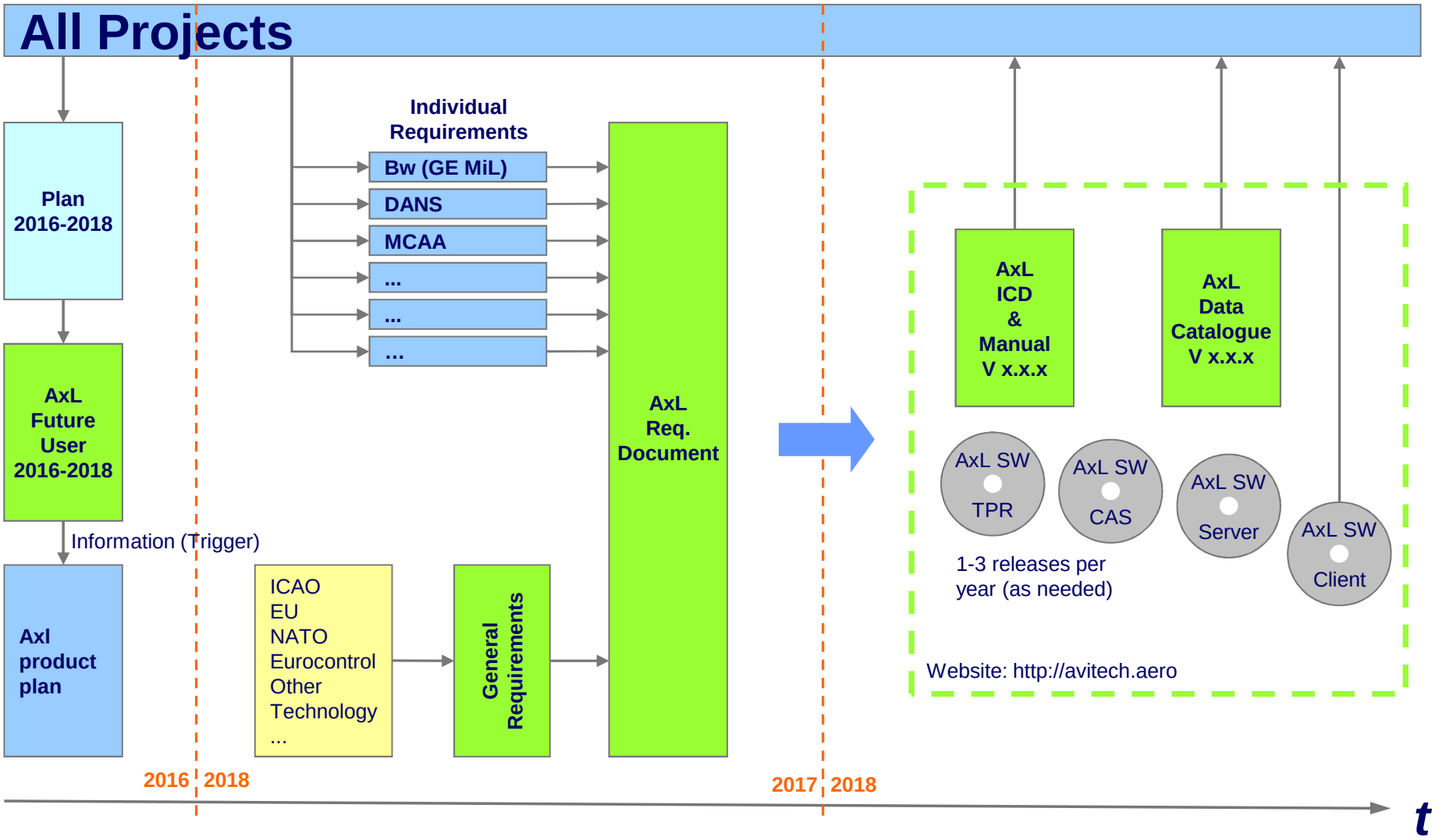
AxL history – 7 years of success



AxL 2 years planning



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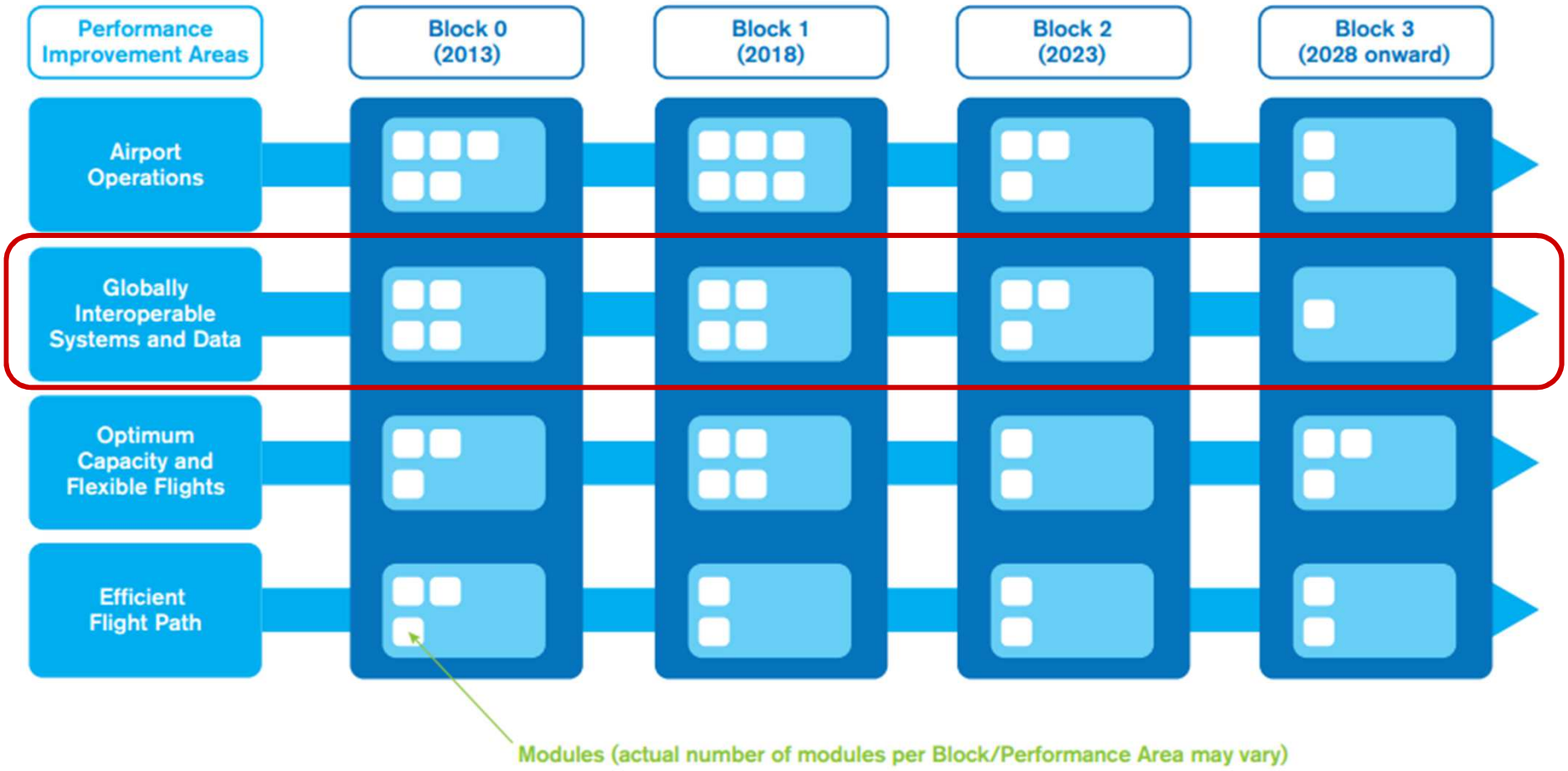
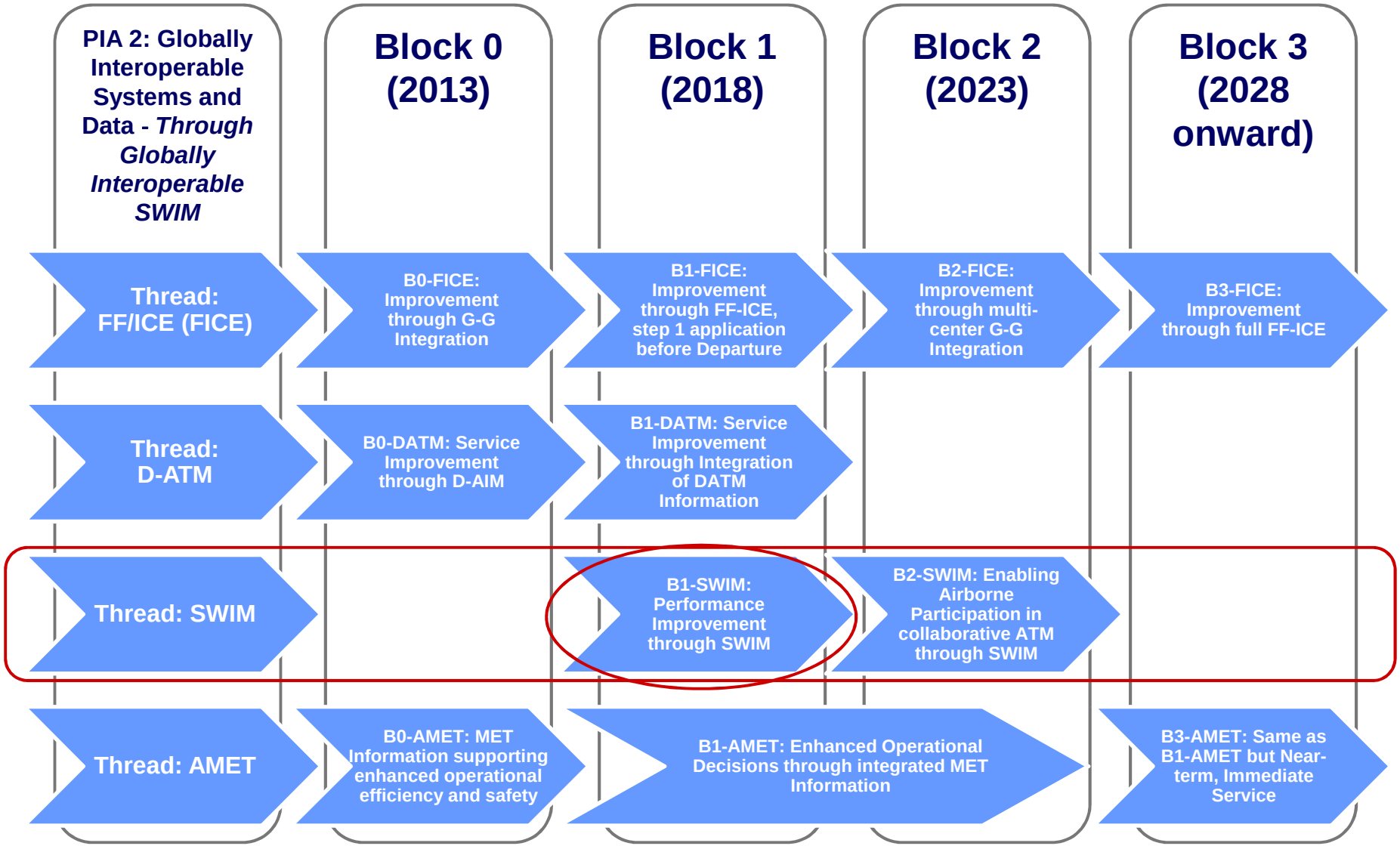
ASBU Outline



Outline



B1-SWIM: Performance Improvement through the application of System Wide Information Management (SWIM) (1)

- Baseline
  - B0-DAIM – digital information management is provided
- Goals
  - Establish the aviation intranet based on standard data models and IP-protocols to maximize interoperability
  - Ease the sharing of all kinds of information in all phases of flight
  - The right, up-to-date and accurate data is timely available to the right user with the required performance and quality
  - No bespoke developments
  - Better information enables operators and service providers to plan and execute better trajectories
  - Common methodology, suitable technology and compliant system interfaces
  - Cover the three dimensions – applications, information and infrastructure

B1-SWIM: Performance Improvement through the application of System Wide Information Management (SWIM) (2)

- Avitech SWIM
  - SESAR SWIM YP compliant!
  - Synchronous and asynchronous messa… …ange patterns
  - From 1 Byte to 10^{ths} of Gigabytes!
  - Support for international standar… …, ISO, OGC, OASIS, WMO, W3C, etc.)
    - Interfaces – web servic… …T, HTTP, publish/subscribe
    - Data formats – AIX… …XM 1.0/2.0, IWXXM 1.0, FIXM 3.0, GML-application
    - Transition – A… …HS services
    - Civil/Milita… …e gateway for two-way information exchan…
    - Service… …M, ATM, MET, Registry

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References

✈ Major Customers

- German Military - several systems. Six companies, with eleven development groups implementing clients to use AxL services.
  - ATC Information System
    - About 40 locations and 250 working positions
  - Data Distribution
    - Air Defense (OLDI and Data)
    - Airbase Radars, TWR & APP CWPs
    - Mission Planning Systems (unmanned, manned ACFT)
    - Other Units and Systems
- EADS/CASSIDIAN ATM ITB – SDO, FPL, NOTAM, PIB. Three development groups, also from outside EADS.
- Airbus ProSky
- Research

Avitech Locations

Frankfurt am Main

Thank your for your attention!

Questions?

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