



# Aeronautical Exchange Layer



**AxL**

## The Avitech Enterprise Service Bus

### System Wide Information Management (SWIM)

The need of seamless access to aeronautical data or aeronautical databases from the various Aeronautical Information Management Units, Flight Planning Units, Air Traffic Control Units, Air Defence Units, Airline Operations Centres, Aerodrome Operating Agencies and other stakeholders in the civil and military aviation exists over many decades.

The ICAO Global Air Traffic Management Operational Concept, the USA NextGen Concept, the EU/Eurocontrol SESAR ATM/CNS Target Architecture, and the NATO MIP underline this requirement again.

The increasingly available bandwidth within networks, the triumph of the internet protocol (IP), new software architecture approaches, and programming languages (multi-tier and service oriented architectures, Java, XML, etc.) offer new infrastructure capabilities and make it possible to open databases across a network and start implementing a network-centric architecture to give aviation applications real seamless access to existing databases, to replicate data across a network, if needed, and to keep them consistent and continuously up-to-date.

The Avitech GmbH answer to this requirement is the Avitech Aeronautical Exchange Layer (AxL), which combines the most modern software architecture with aeronautical know-how and forms a civil/military aviation **Enterprise Service Bus (ESB)** offering the following means of communication:

- Publish/Subscribe
- Request/Reply
- Replication

The interfaces to the related services are described in XML Schemas. Each service is developed for a particular type of use case(s) and usually provides access to one or more databases.

The extreme flexibility and adaptability of AxL following the Service-oriented Architecture (SOA) principles allows for:

- Seamless service location
- Sharing of services across the Enterprise
- Consistent separation of Consumers from Producers of Data

AxL provides Services for Authentication, Authorization, Auditing, Administration, and Encryption.

Altogether AxL is a SOA which consistently decouples client applications from services.

AxL is delivered as Enterprise Edition or customised for specific programs. The software bundle contains all software, manuals and test server access description.

### Features

- Multiplatform support (pure Java)
- Single access point for all Avitech products and 3rd party applications
- Access to Avitech products is more a matter of configuration rather than API programming
- XML-based data exchange using "UTF-8" and "base64"
- On-demand, automatic data format transformation through XSL
- XML-based queries with specific XML filters or XPath for generic approaches
- Authentication, Authorisation, Accounting and Encryption



## Language

AxL is pure Java. The provided client is also written in Java. JDK 1.6 or higher is needed.

## Communication

The Java client library communication with the server and its backend services is backed by means of an underlying embedded Message-oriented Middleware (MoM). Per default the communication is done with a Socket protocol with the option to encrypt all data. The server can be configured to use other communication protocols like RMI, XML-RPC, Email and others.

## Software Bundle

AxL is available as software bundle on a CD-ROM or DVD and includes:

- AxL Server
- AxL Client API
- Code examples
- Test cases
- Reference Manual
- Javadoc
- Installation guidelines
- XML Schema Definitions (XSD)
- How to get help
- Support hotline

The bundle is configured LAN depending on the End-User Licence Agreement (EULA).

## AxL Test Server

An AxL test server is located at the Avitech premises in Friedrichshafen, Germany. It is in constant operation and accessible through the Internet or other connections. On-line tests can be carried out from day one by clients who have agreed to use this service. The test service also enables the testing of a given application in the real target communication environment and with real data.

A test server support hotline, a Server Backwards Compatibility Tester (SCT), and a Client Acceptance Server (CAS) are also available.

## Security

- XML-based QoS
- Encryption
- Username/password based authentication
- LDAP-based authorisation, roll concepts
- Accounting
- Persistent communication
- Client-configurable persistency
- ITSEC E3 high valued Red/Black Gateway
- CC EAL4 certified firewall (application-level gateway and packet filter)

## Administration

The administration interface takes care of communication management so that:

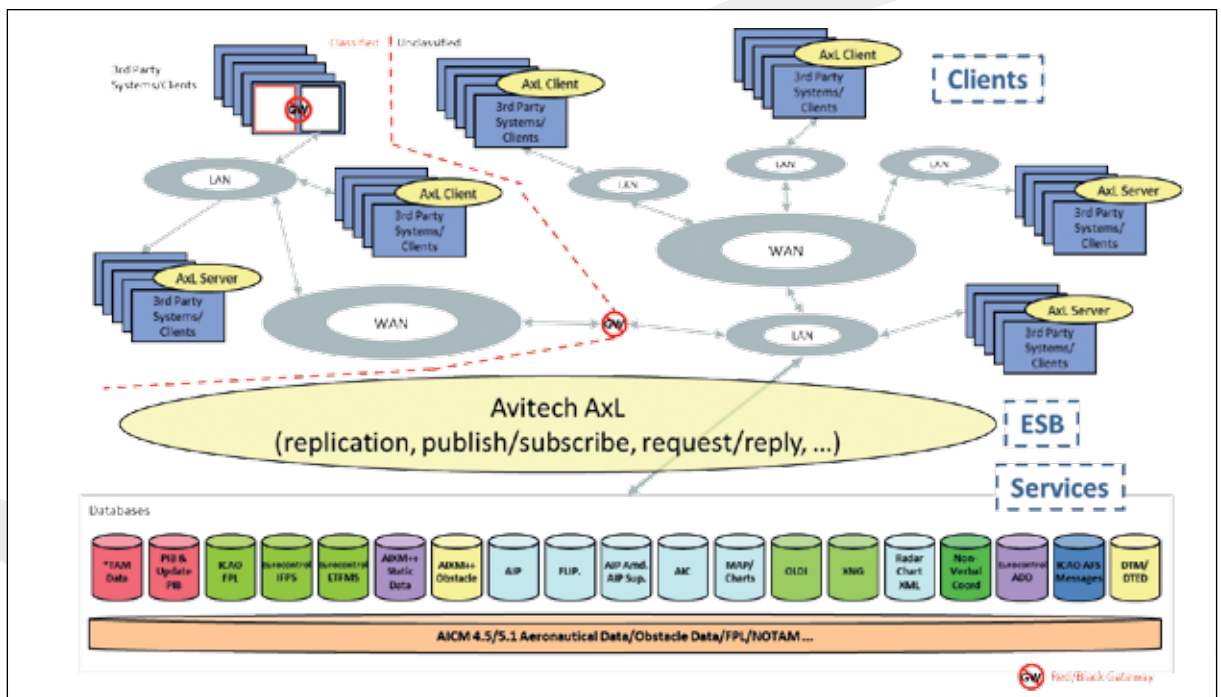
- No messages are lost
- Messages are delivered in correct sequence
- Messages are queued during downtime of any participating system
- Robust fail-safe behaviour is ensured

## Available Data Services

- WFS-T2 (R/R) – Web Feature Service Transactional for AIXM 5.1, IWXXM (OPMET) and Non-OPMET
- NOTAM, SNOWTAM, ASHTAM, BIRDTAM – all support R/R and Pub/Sub
- PIB (R/R, Pub/Sub)
- ICAO AFTN Service (R/R, Pub/Sub)
- FPL Service (R/R, Pub/Sub) – both ATS and EUROCONTROL NM Messages
- EUROCONTROL NM B2B Service (R/R) – FPL validation, ADD (R/R, Pub/Sub for CRAM, AUP, UUP)
- Static/Basic Data (reduced set for NOTAM and FPL validation, R/R, Pub/Sub)
- Static Data (AIXM 4.5/5.1)
- OLDI Service (R/R, Pub/Sub)
- PAMS, AIP, FLIP (R/R, Pub/Sub)

## Next Upgrades

- FIXM
- Further OGC-related improvements



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