

FAA NextGen

How the FAA Uses FuseSource



CHALLENGE

Streamline reliable data exchange between FAA, industry, and airline partners, while preparing to handle increased capacity and future demand.

SOLUTION

Use Fuse ESB® to create a “configure, don’t code” approach to SOA and share information across disparate systems, increase interoperability, and encourage services reusability.

BENEFITS

FAA was able to reduce interdependence of existing systems and drastically lower acquisition and development costs through use of open source licensing and leading edge integration technologies.

WHAT IS NEXTGEN?

The Next Generation Air Transportation System (NextGen) is an umbrella term for the ongoing, wide-ranging transformation of the United States National Airspace System (NAS). At its most basic level, NextGen represents an evolution from a ground-based system of air traffic control to a satellite-based system of air traffic management. This evolution is vital to meeting future demand and to avoid gridlock in the sky, as well as at U.S. airports.

The transformation to NextGen requires programs and technologies that provide more efficient operations, including streamlined data exchange between NAS users—both those internal to the FAA as well as industry and airline partners. The FAA's System Wide Information Management (SWIM) program is an integral part of this transformation.

WHAT IS SWIM?

SWIM is a technology enabler that provides the IT infrastructure necessary for NAS systems to share information, increase interoperability, and encourage reusability of information and services. SWIM facilitates the data sharing requirements for NextGen, which will increase common situational awareness and improve the ability to deliver the right information to the right people at the right time.

WHAT IS THE ROLE OF FUSESOURCE IN SWIM-COMPLIANCE?

SWIM provides the standards and governance for information exchange between many NAS systems. A key element of the SWIM standards consists of FuseSource software, which is required for use by NAS systems that are developing SWIM-compliant services.

The SWIM Program has provided FAA programs with access to FuseSource products, including four open source service-oriented architecture (SOA) components, including the Fuse ESB®, Fuse Message Broker®, Fuse Services Framework® and Fuse Mediation Router®. These four components are combined with other development and management tools to create an enterprise infrastructure that will be deployed by the FAA between 2010 and 2015 to support NextGen programs.

The SWIM Program selected FuseSource in part because the open source community produces leading-edge technology, and FuseSource offers enterprise components to connect to FAA legacy systems. In addition, the open source core drastically reduces license fee costs and future development costs.

FUSESOURCE SERVICES USED

FuseSource software, training, support, documentation, and consulting can be procured by FAA programs via the SWIM Program. FuseSource has an Indefinite Delivery Indefinite Quantity contract with the SWIM Program for a base year and 12 option years. The FAA also supports on-going programs with FuseSource training and consulting.

FAA SELECTS FUSESOURCE FOR THE NEXT-GENERATION AIR TRANSPORTATION SYSTEM

In the past, the state of the art for connecting two systems required a fixed network connection and custom, point-to-point, application-level data interfaces. Current NAS operations depend upon these legacy information systems with some systems entirely unconnected. The FAA has identified a need to reduce the high degree of interdependence among systems and move away from the proliferation of unique, point-to-point interfaces.

The FAA issued a request for proposal (RFP) to multiple vendors for the procurement of the SWIM service container software and considered many solutions. The SWIM service container software will serve as the infrastructure interface for SWIM. A service container allows the selective deployment of only the services that are really required in a business context for the FAA, unlike in the case of the traditional application server, where some unnecessary and unused functionality that is built into the application service container is deployed even when only a small fraction of that functionality is really required.

FuseSource offers multiple technical advantages. The open, community-based development model provides a sustainable model for technology innovation, and the component-based architecture ensures flexibility throughout the duration of the SWIM Program.

CHALLENGE

One of the key challenges for the FAA is transitioning from its “normal way” of doing business. The FAA has a great number and different types of interfaces and systems, and the traditional focus is on unique, point-to-point interfaces for application-to-application data exchange. The SWIM Program aims to reduce the number and types of interfaces within the NAS and support the current legacy modernization programs.

A second major challenge is scalability. The FAA has more than 35,000 controllers, technicians, engineers, and support personnel whose daily efforts keep airplanes flying. These individuals are responsible for more than 7,000 takeoffs and landings per hour, more than 660 million passengers

and 37 billion cargo revenue ton miles of freight a year, and over 50,000 aircraft through the national airspace system every day.¹

The FAA and the SWIM Program need a system that is scalable to handle increased capacity and future demand. One of the big advantages of using a service-container-based approach is simple scalability and the ability to meet the requirements of the SWIM Program.

Reliability is another nonnegotiable challenge. The selected solution should not disrupt the existing flow of information among systems. FuseSource has a proven track record in supporting mission-critical applications, and the FuseSource team backs its products with an experienced professional services organization.

Also considered were the perennial metrics of software development: return on investment (ROI), total cost of ownership (TCO), and time-to-market. FuseSource beat the competition, in part, because FuseSource products are open source and can be used without paying any license fees. More importantly, the strict adherence to standards, the component-based architecture, and the use of Enterprise Integration Patterns (EIPs) provide a modern and efficient way to build a SOA.

¹ www.faa.gov/about/office_org/headquarters_offices/ato/

SOLUTION

The solution was to base the SWIM SOA service container on FuseSource products, including the Fuse ESB. Reliable messaging is provided by the Fuse Message Broker, service-enablement by the Fuse Services Framework, and the integration of services by the Fuse Mediation Router. Policy management and system monitoring can be provided by Fuse™ HQ. Add-on modules provided by Progress Software, the FuseSource parent company, provide specialized functions, including an ESB, C++, security, and service discovery, although these are not presently being used by the FAA.

The SWIM service container software receives, processes, and delivers all messages for SWIM services. Messages can be provided in a variety of formats, which include SOAP over XML, HTTP/HTTPS, REST, etc., and are interpreted and processed by the service container software. The message can be reliably delivered to the subsequent service.

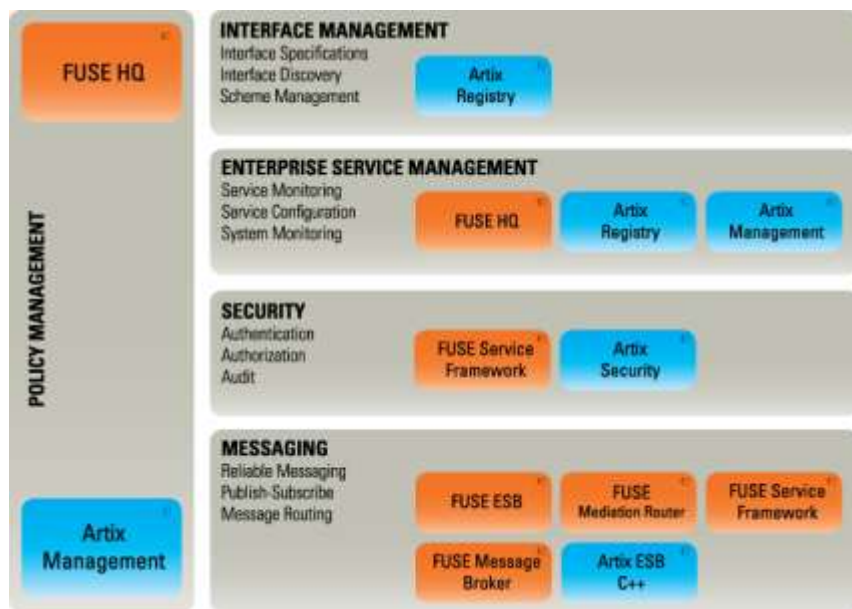


FIGURE 1

Mapping of SWIM and Artix products to SWIM core services

RESULTS

The initial design and the coding of the first SWIM prototype service were completed in August of 2008. End-to-end testing and stress testing were also completed in the same month. Three companies have agreed to participate in early testing. Results to date have been exemplary, and the FAA has successfully demonstrated a “configure, don’t code” approach to creating a SOA.

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FuseSource

FuseSource is the leader in open source integration solutions, and offers enterprise-class products, services and subscriptions used by Fortune 500 companies worldwide. The cost savings and flexibility of open source software combined with FuseSource's experience in building mission-critical applications make it possible to integrate today what was never before possible.

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