Why Fuser

• One stop shopping for all your flight data needs
Fuser Helps Solves SWIM Challenges

• Problem
  – With the great new FAA SWIM feeds, your organization feels they are drowning in data that they do not understand.
  – You need to make actionable, operational information out of this data!

• Solution
  – To accomplish this, you need a framework that can mediate between disparate sources of data, pulling in the right data, at the right time.
  – Need information on which data source is best to use for a specific need.
  – Access to the information in common well defined data model
Design Motivations

• No desire to spend hours and days troubleshooting an issue
  – Less time troubleshooting = more time to create new capabilities

• More data is not a linear problem. As you get more data feeds the possible issues become exponential

• Tired of seeing same issues manifest on various efforts and phases
  – Redundant effort
  – Inconsistent behavior
  – Inconsistent definitions

• Needed a system where the data is exposed at all critical phases
  – What we received
  – What we parsed
  – How we matched/correlated
  – How we fused

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What is the Fuser

• Fuser is a system composed of multiple components providing
  – Parsers for various data sources
  – Matching Services
  – Fusion Services
    • Transformation
    • Filtering
    • Updating
    • Mediation
  – Database Loading

• Common well defined schema
Fuser High Level Architecture

External Data Feeds
- TFMData
- SFDP5
- TBFM
- STDDS – SMES (ASDE-X)

Data Collection
- TFMData Connector
- SFDP5 Connector

Raw Data Repository
- Source Format

STDDS Connector
- Source Format

Parsing and Matching
- SFDP5 XML Parser
- TBFM XML Parser

Source Parser Format
- Source Message (raw or internal)
  - Unmatched
  - Matched
  - Matched & Fused

Fusing
- Transformation Service

Sync Service
- Active Flight Repository
- Historical Flight Repository

Fusion Service

Routing Service

COMMON MESSAGE BUS
- Application #1
- Application #2
- Application #3
Technology Stack

• Java
• Apache Camel
• Spring Framework
• Apache CXF
  – Web services used for reconstitution
• Redis
  – Used for recovery
• ActiveMQ
  – Pub/Sub messaging
• Postgresql
  – Optional database loading
• Dropwizard
  – Metrics
Additional Benefits

- Flight Management
  - Fusion
  - Flight Removal
- Data Distribution
- Built in performance monitoring
- Built in recovery solution
- Reconstitution available for Fuser clients
- Pluggable
  - Pluggable architecture for new data feeds
Fuser Client API

- Quickly develop Fuser driven applications
- Handles connecting and managing the connection
- Creates an in memory repository
- Support for event listeners
• Fuser Overview
• Component Descriptions
• Fuser Data Dictionary
  – Complete list of fields found in the Fuser
  – Field description
    • Most fields were meant to be self documenting
• SWIM data to Fuser Mappings
  – Likely more valuable than the data dictionary itself
• References to other SWIM related documentation
• https://aviationsystems.arc.nasa.gov/atd2-industry-days/fuser/ATD-2-Industry-Day-Documentation-Outline_81565170.html
• Fuser currently running in the cloud
• Cloud Benefits
  – Reduce Cost by reducing ..
    • Development time
    • Operating cost
    • Maintenance
    • Enhancements
• Delta volunteered to be our first pilot user
• Willing to engage with others that want to partner
Questions