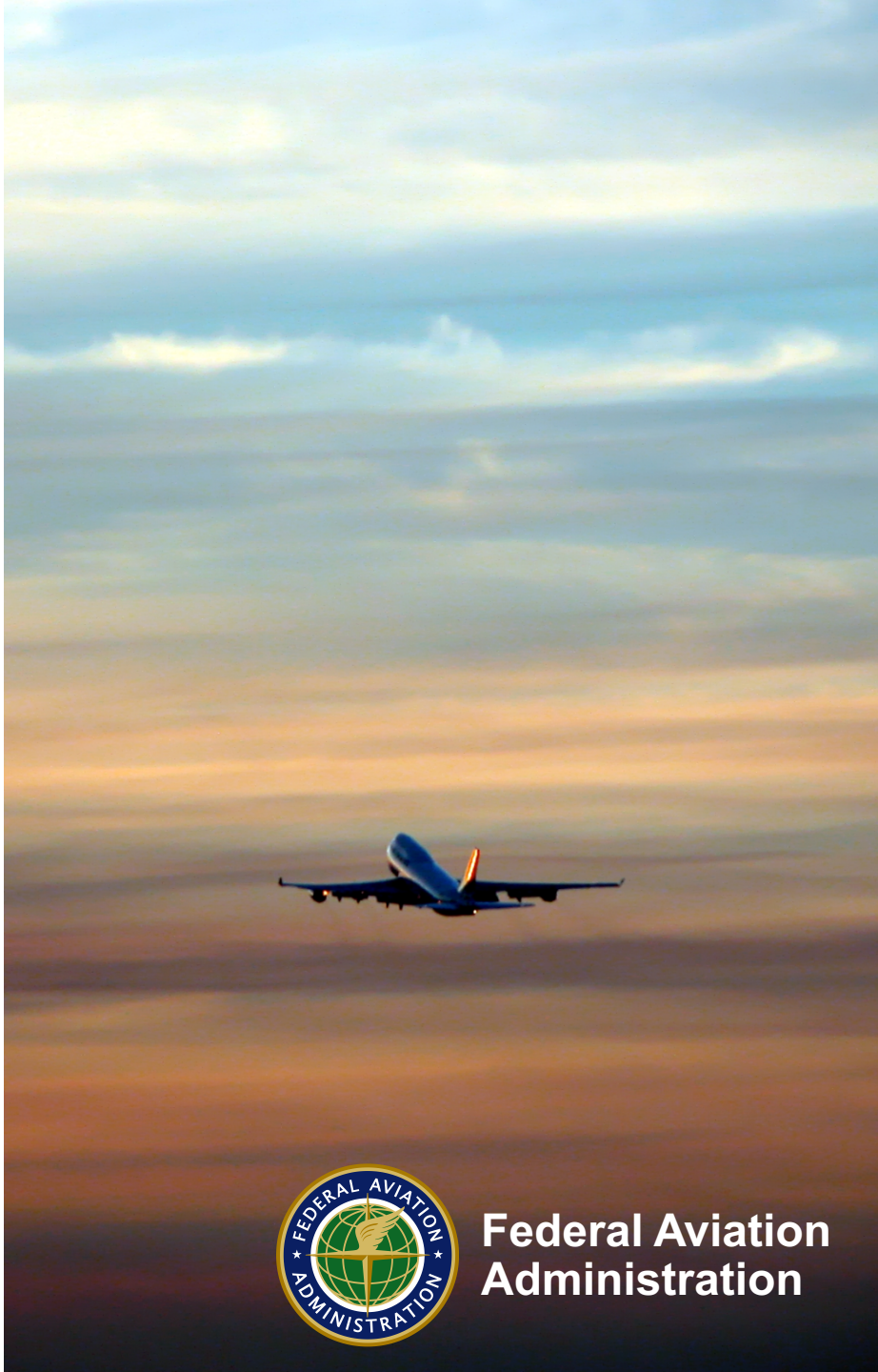
SWIM Flight Data Publication Service (SFDPS)

User Forum Webinar

Presented by: SFDPS Team

Date: August 18, 2016



Agenda

- Welcome Remarks
- SFDPS Release 1.3.0
- Consumer Migration Use-Cases
- Consumer On-Ramping Processes
- Consumer Migration Timeline
- Consumer Migration Summary
- FAA Contacts
- SFDPS User Survey
- SFDPS Website
- Volpe Center Presentation on SFDPS 1.3.0
- Q&A

SFDPS Release 1.3.0

- Provides batching of track data and other functions
- Will be configured to provide 12 second updates in operational environment
- Currently available in R&D environment
- Will become operational on February 15, 2017
- Requires consumers to update their clients to interpret the new batched message format and to connect via a Solace interface

Consumer Migration Use-Cases

- **Use-Case 1: Current 1.2.9 Solace Consumer**
  - Test client changes with 1.3.0 in R&D
  - No further FNTB testing necessary
- **Use-Case 2: Current 1.2.9 Atlantic City and Oklahoma City Consumer**
  - Migration to Solace is mandatory
  - Test client changes with 1.3.0 in R&D via Solace
  - Plan for FNTB qualification testing
- **Use-Case 3: New SFDPS Consumer**
  - Use Solace (Unless in ATL or SLC)
  - Test client changes with 1.3.0 in R&D
  - Plan for FNTB qualification testing when using Solace

Consumer Migration Use-Cases

- **Use-Case 4: Current 1.2.9 Atlanta or Salt Lake City Consumer**
  - No Solace appliances in Atlanta and Salt Lake City NESGs
  - May choose to consume 1.3.0 data from Atlanta and Salt Lake City NEMS
    - Test client changes with 1.3.0 in R&D
    - No further FNTB testing necessary
  - May choose to migrate to Atlantic City and Oklahoma City and consume 1.3.0 data via Solace
    - Test client changes with 1.3.0 in R&D via Solace
    - Plan for FNTB qualification testing

Consumer On-ramping Processes

1. R&D Environment

- Ready to accommodate consumer testing activities with both 1.3.0 and Solace
- Your assigned FAA Project Lead can assist with getting connected to R&D Solace and SFDPS
- A lead-time of 2-3 weeks is required to configure the R&D environment for consumer testing

2. FTI National Test Bed (FNTB)

- New Solace consumers are required to undergo FNTB formal interoperability testing
- A lead-time of 3-4 weeks is required to configure the FNTB environment for consumer testing

3. Operations

- After FNTB testing has been successfully completed, it takes 2-4 weeks to get connected to the Production environment

**** Note that the above timeframes are for existing consumers only. Consumers that do not have access to R&D, FNTB, and Production NEMS will require additional time to get connected.**

Consumer Migration Timeline

- **Schedule:**
  - **R&D** currently available for 1.3.0 and Solace testing
  - **9/19/2016**
    - FNTB will be ready to accept consumers for qualification testing with 1.3.0 and Solace. Your FAA Project Lead can help schedule a test session.
  - **1/31/2017**
    - Last call for FNTB testing. After this date it is too late to complete FNTB testing in time for the February 15th cut-over.
  - **2/15/2017**
    - 1.3.0 cut-over to Production NEMS. Consumers must be ready to switch from 1.2.9 to 1.3.0 on this date, or risk loosing their data feed.

Consumer Migration Summary

- Migration to 1.3.0 from 1.2.9 will be in the form of a cut-over event
- If you have not met all of the on-ramping milestones for the 1.3.0 migration, you may lose access to the SFDPS data until successful completion of the on-ramping process
- Consumers will be treated on a first-come-first-served basis
- We urge you to update your consumer client to be compatible with 1.3.0 and undergo the prerequisite testing activities early, to avoid losing your data feeds from SFDPS

Consumers, Take Note

Act early to avoid losing your feed

Update your consumer client to handle batched messages and connect using Solace

Contact your FAA Project Lead to get started

FAA Contacts

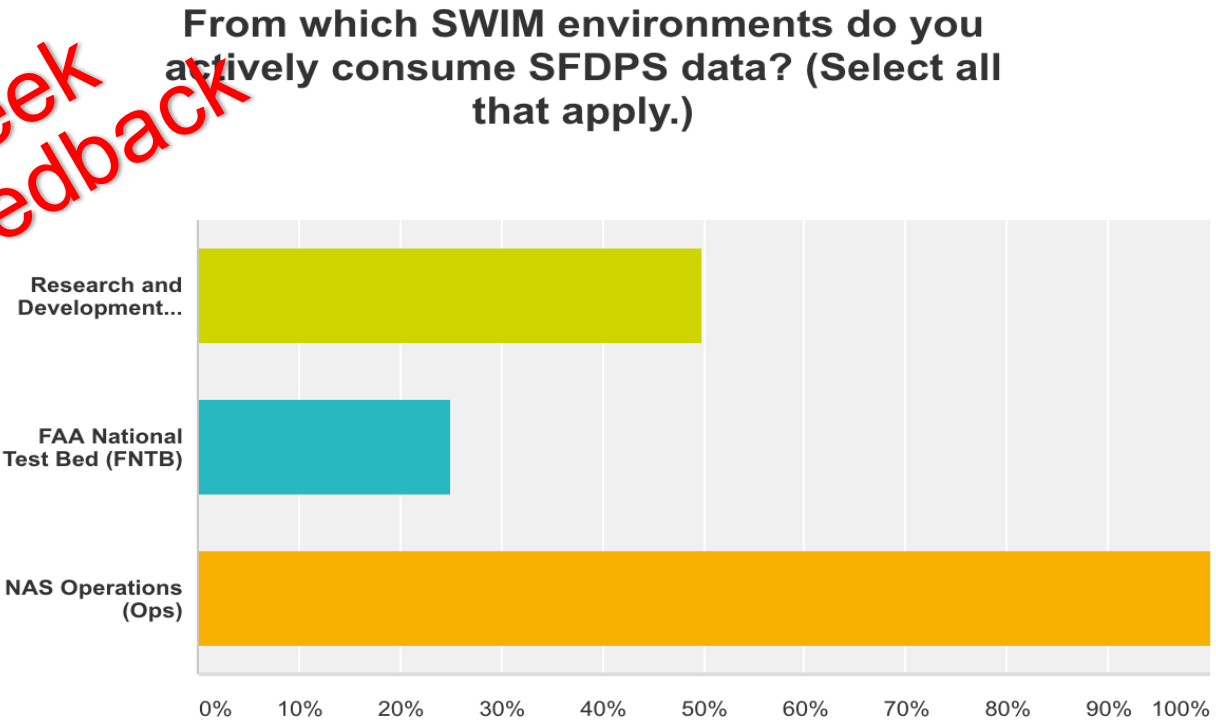
- **New SFDPS Consumers:**
  - If you have not yet been assigned an FAA Project Lead, use the Data-to-Industry@faa.gov email address to request consumption of SFDPS data
- **Existing SWIM Consumers:**
  - Work with your assigned FAA Project Lead to get started with SFDPS 1.3.0
- **For any issues**
  - Contact your FAA Project Lead

SFDPS User Survey

- Please complete the SFDPS User Survey we sent last week.

  https://www.surveymonkey.com/r/CX2FWQF

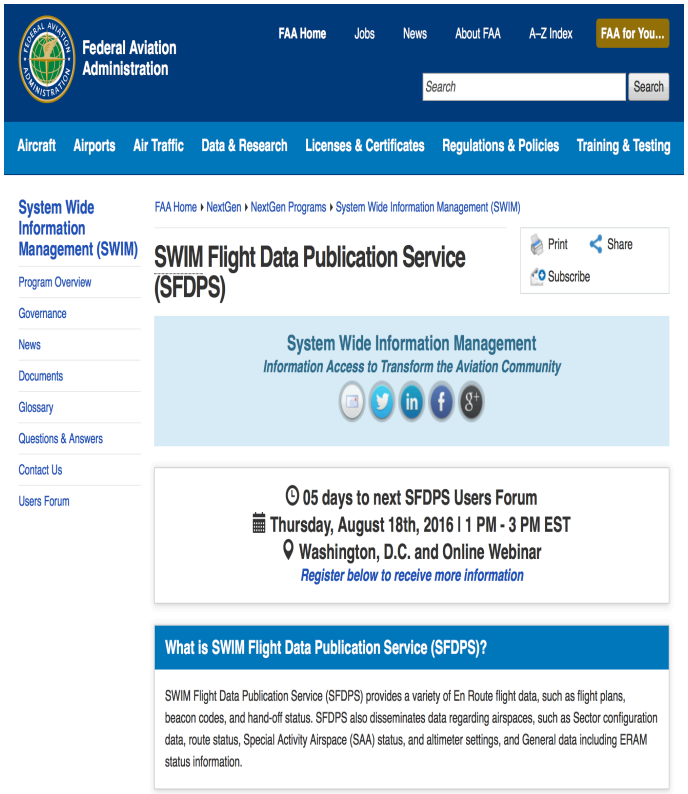
We Seek Your Feedback



Coming Soon, the SFDPS Website

- SFDPS user forum announcements
- User forum presentations
- Q&As on SFDPS topics
- SFDPSConnect tutorial videos

www.faa.gov/nextgen/programs/swim/sfdps/



SFDPS 1.3.0

- Presentation from Volpe Center

SFDPS Version1.3.0
Batched Track Messages

April 21, 2016

Volpe The National Transportation Systems Center

Advancing transportation innovation for the public good

U.S. Department of Transportation
John A. Volpe National Transportation Systems Center

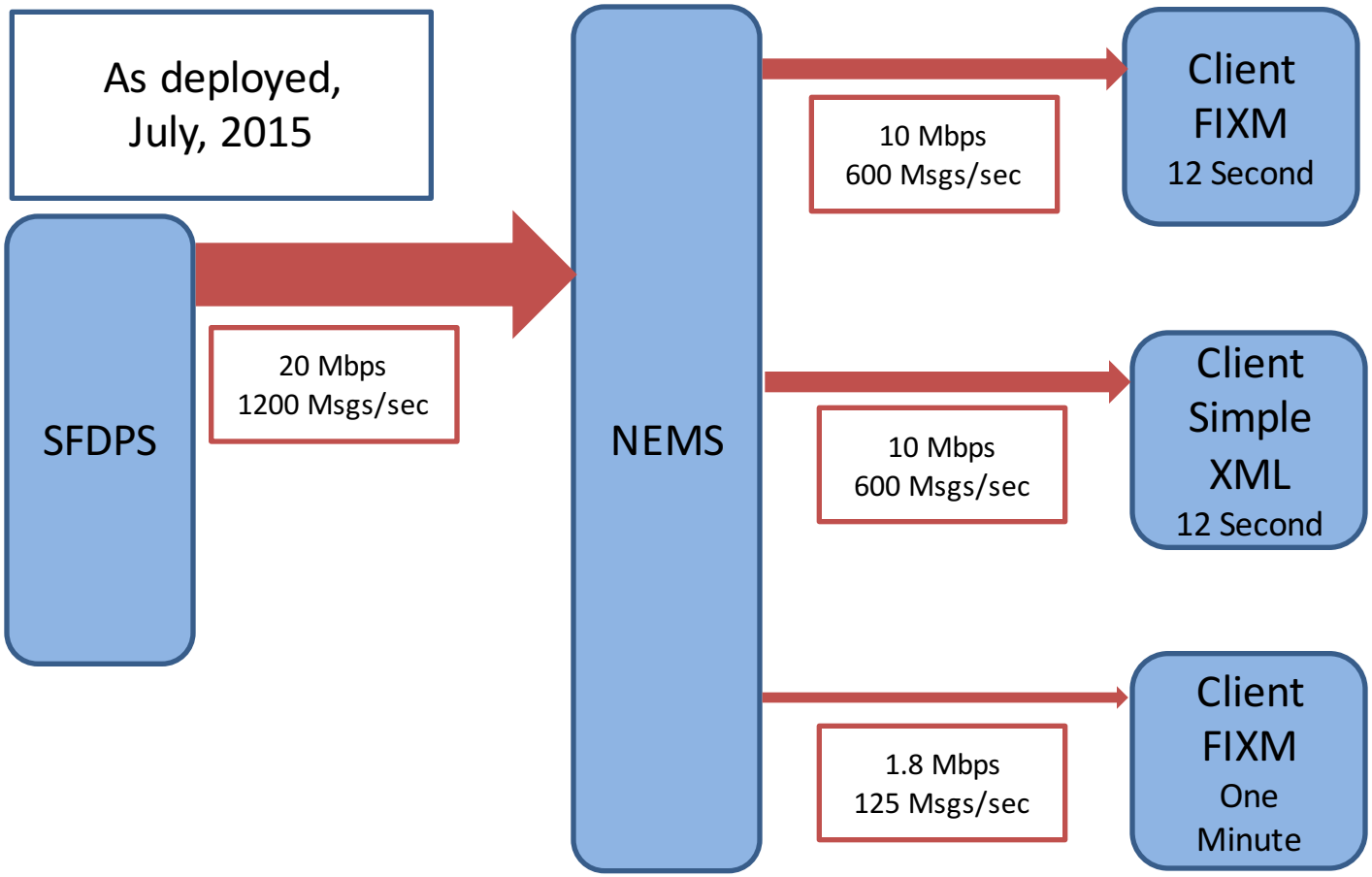
SFDPS Background

- SFDPS is the SWIM interface for ERAM
  - SFDPS receives CMS messages from ERAM via HADDS and publishes XML messages to consumers via NEMS
- SFDPS producer services include:
  - Publish/Subscribe services
  - Request/Response services
- SFDPS publishes four types of messages
  - Flight Messages in Simple XML or FIXM XML format
    - All flight messages correlated through an SFDPS flight identifier
    - Flight track update messages available at:
      - One-minute frequency
      - 12-second frequency
  - Air Space messages in Simple XML or AIXM XML format
  - Operational messages
  - General Information messages

Infrastructure Constraints

- The message rates and bandwidth usage exceeded the infrastructure capacity.
- In November, 2015, SFDPS consumers were significantly restricted in order to reduce bandwidth and message rates.
- All users were limited to:
  - Flight track updates at one-minute frequency only
  - Flight Messages in FIXM XML format only
  - Air Space messages in AIXM XML format only
  - Operational messages
  - General Information messages

Peak Bandwidth and Message Rates



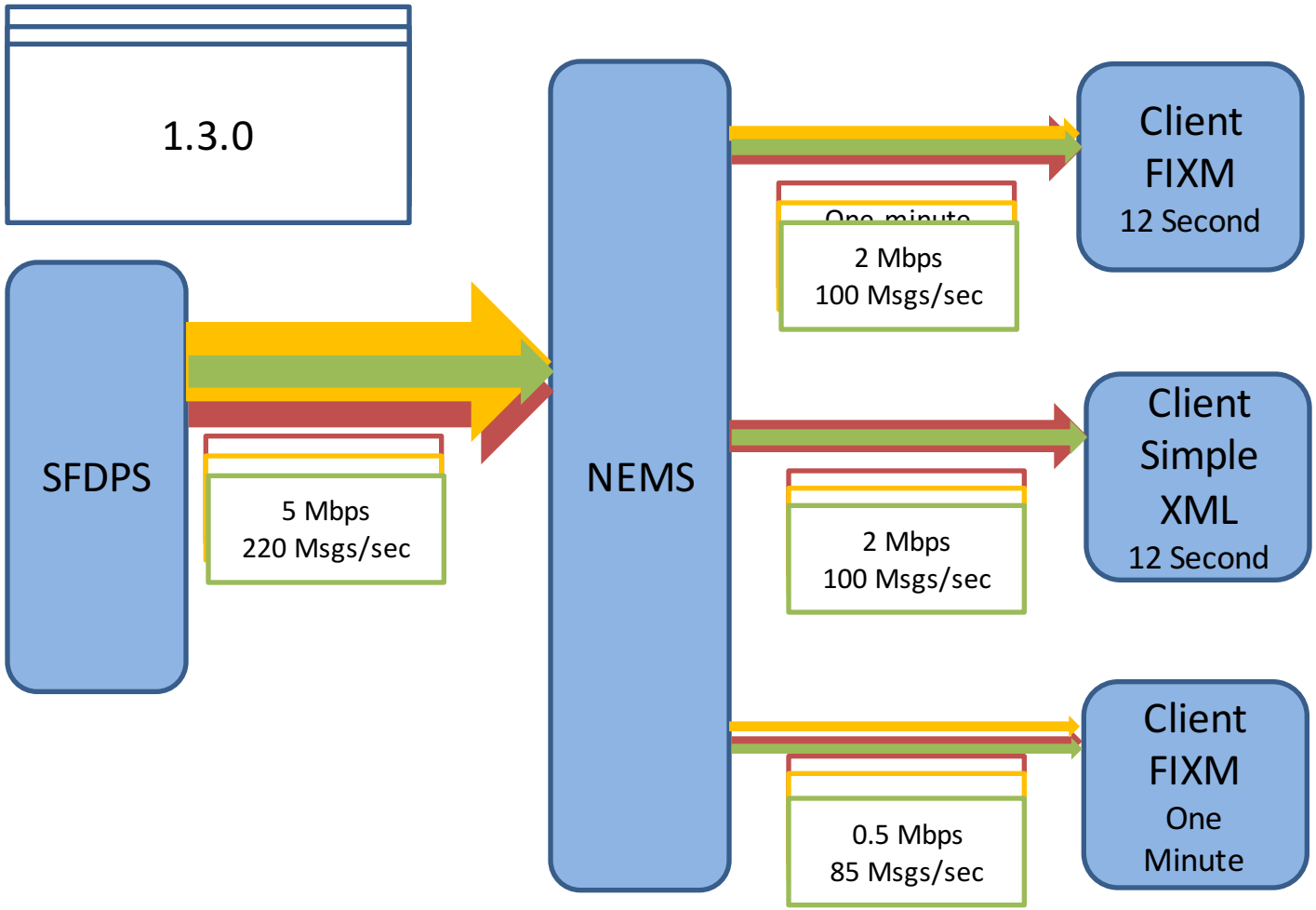
SFDPS 1.3.0 – The Solution

- SFDPS 1.3.0 solves the problem of excessive message rate and bandwidth usage by batching track messages.
- SFDPS 1.3.0 will:
  - Substantially reduce message rates and bandwidth usage
    - Achieve levels comparable to the current, restricted flow
  - Remove the need for a restricted data feed
    - Restore the 12-second track updates

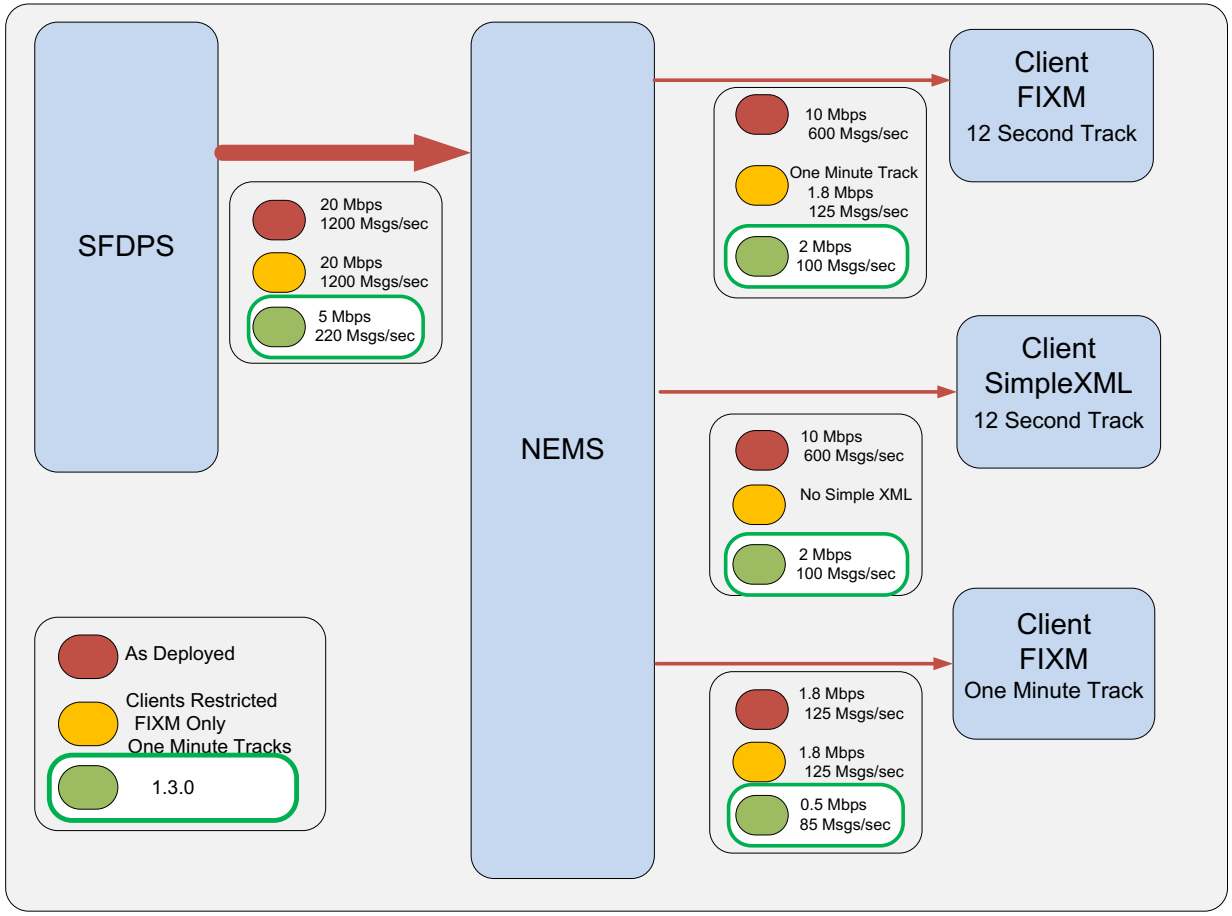
Overview of Batching in SFDPS 1.3.0

- Batching bundles many track messages with same property values together and sends them as one JMS message
- Track messages are sent from Centers for every active flight every 12 seconds
  - 90% of all messages and 90% of bandwidth
- All pub/sub track messages will be batched
  - New message types – BATCH_TH, BATCH_TH_FIXM
  - Up to 100 track updates per batch
  - Tracks returned in a request/response will not be batched
- Batching is based on properties:
  - Source Facility – The ARTCC the message came from
  - Track frequency – One minute frequency or not
  - Authoritative source – Track came from controlling ARTCC or not
  - Sensitivity – Flight is military/sensitive or not

Peak Bandwidth and Message Rates



Peak Bandwidth and Message Rates Summary



How batching works

- A Center sends track messages for all flights it is monitoring every twelve seconds.
  - One track per flight every 12 seconds.
  - SFDPS receives them all at once.
- SFDPS assigns values to the batching properties:
  - Source Facility
  - One-minute frequency
  - Authoritative
  - Sensitive
- SFDPS sorts the track messages into one of six batches based on the property values.
- If a batch fills up with 100 messages, it is sent immediately.
- Unfilled batches are sent after one second.

How batching works
One 12-second Update

15:00:00

One Minute	No	No	Yes	No	No	Yes
Authoritative	No	Yes	Yes	No	Yes	Yes
Sensitive	No	No	No	Yes	Yes	Yes

How batching works
Two flights over five 12-second updates

15:00:48

One Minute	No	No	Yes	No	No	Yes
Authoritative	No	Yes	Yes	No	Yes	Yes
Sensitive	No	No	No	Yes	Yes	Yes

How batching reduces bandwidth

- Every message is compressed.
- Compression improves with more text in a message.
  - **Especially redundant text.**
  - XML formatted messages have large amounts of redundant text.
- A single track message is compressed by half.
- A batch of track messages can be compressed by 90%.

SFDPS 1.3.0 Consumer Benefits

- Users can receive:
  - Flight Data
    - Choice of 12-second track updates or one-minute track updates
  - Airspace Data
    - Choice of AIXM format or SimpleXML format
  - Operational Data
  - General Messages
  - Request/response for qualified client programs
    - Flight and Airspace reconstitution
    - Fifteen day history

Consumer Impacts

- Client programs will need to un-batch the track messages
- FIXM flight data messages:
  - New root element – MessageCollection
    - No change to FIXM schema – remains Core 3.0/US Extension 3.0
    - Existing users must modify their code to use the new root element
  - New message type - BATCH_TH_FIXM
  - Three properties moved inside the FIXM track message
    - Flight operator, origin, destination
- SimpleXML flight data messages:
  - New SimpleXML schema – version 1.3.8 (updated 06/14/2016)
    - Existing users must replace current version 1.2 schema
  - New message type - BATCH_TH

SFDPS Connect

Version 2.1.3

SFDPS Connect Overview

- Primary goal of SFDPS Connect is to provide sample code demonstrating how users can write client applications to connect to SFDPS via NEMS, receive and process data.
- Secondary goal: SFDPS Connect can be used, as is, to receive data.

SFDPS Connect Release

- Source code package which includes source code, configuration files and build files
- Executable package which can be run without a build
- Documentation for SFDPSConnect:
  - Readme
  - Quick Start Guide
  - Users Guide
  - Consumer Reference Manual
- SFDPS documents:
  - JMSDD – detailed descriptions of all messages and fields
  - WSDD – detailed description of request/response

SFDPS Connect Release

- SFDPSConnect Release and SFDPS documents are available on NSRR
  - https://nsrr.faa.gov/sites/default/files/SFDPSConnect-Release-2-1-3-08012016.zip
  - https://nsrr.faa.gov/sites/default/files/SFDPSConnect-v2.1.3-source.tgz
  - https://nsrr.faa.gov/sites/default/files/SFDPSConnect-v2.1.3-Documentation.zip
  - https://nsrr.faa.gov/sites/default/files/sfdps-connect-tutorial-1-v2_0.zip
  - https://nsrr.faa.gov/sites/default/files/sfdps-connect-tutorial-2-final.zip

SFDPS Connect Video Tutorial Series

- **Video Tutorial 1:** SFDPS Connect Overview

- **Video Tutorial 2:** SFDPS Connect Pub/Sub code overview - including how to process JMS data from SFDPS. This session will also cover changes needed for processing batched TH messages.

Q & A

- You can ask questions by typing your question into your webinar panel. We will read your question aloud for you and give an answer.

- Or, Click on ‘Raise hand’ icon. We will unmute you and you can ask your question.