



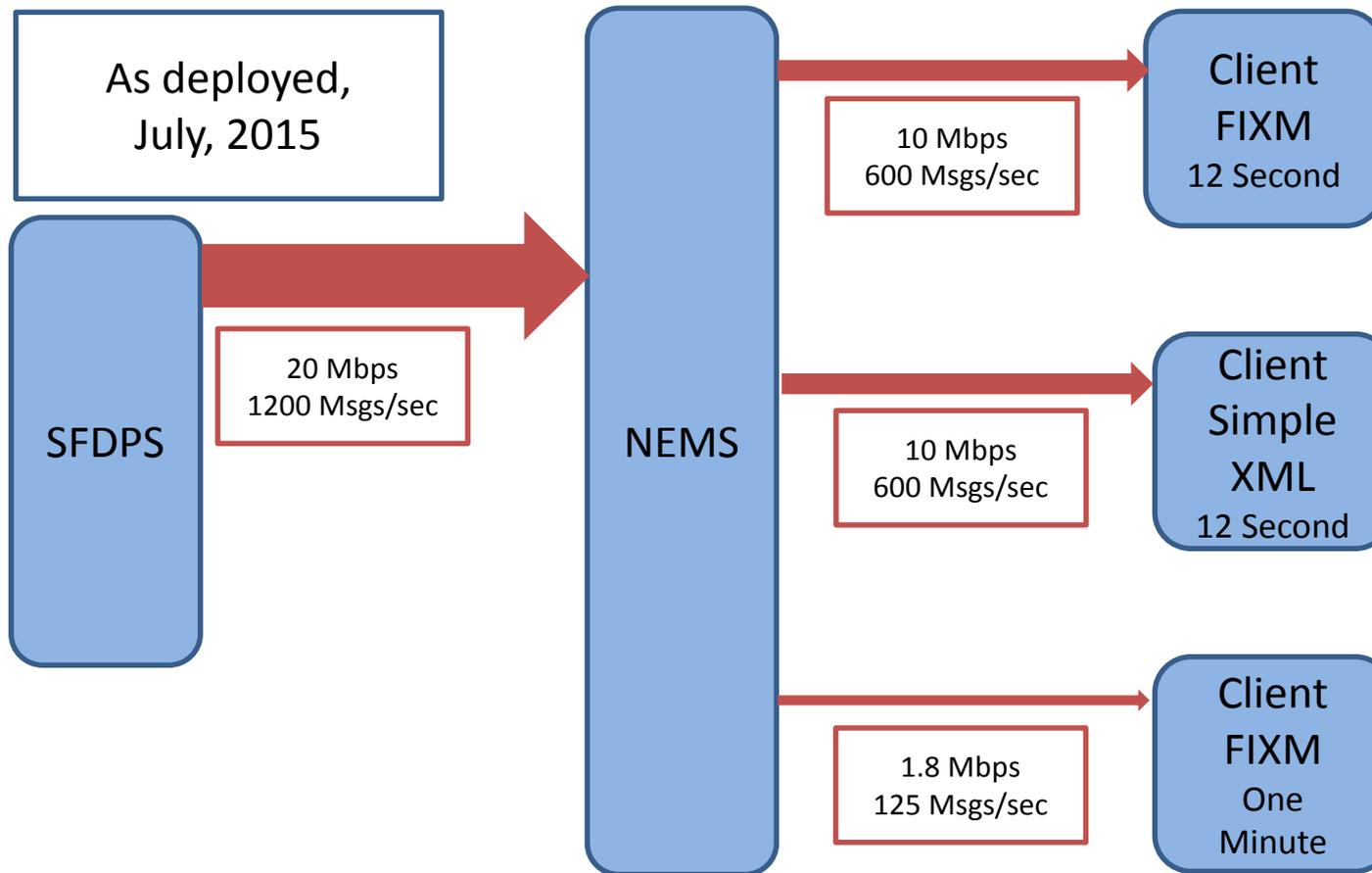
# SFDPS Background

- ❑ 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 three 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
  - 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
  - General Information messages

# Peak Bandwidth and Message Rates



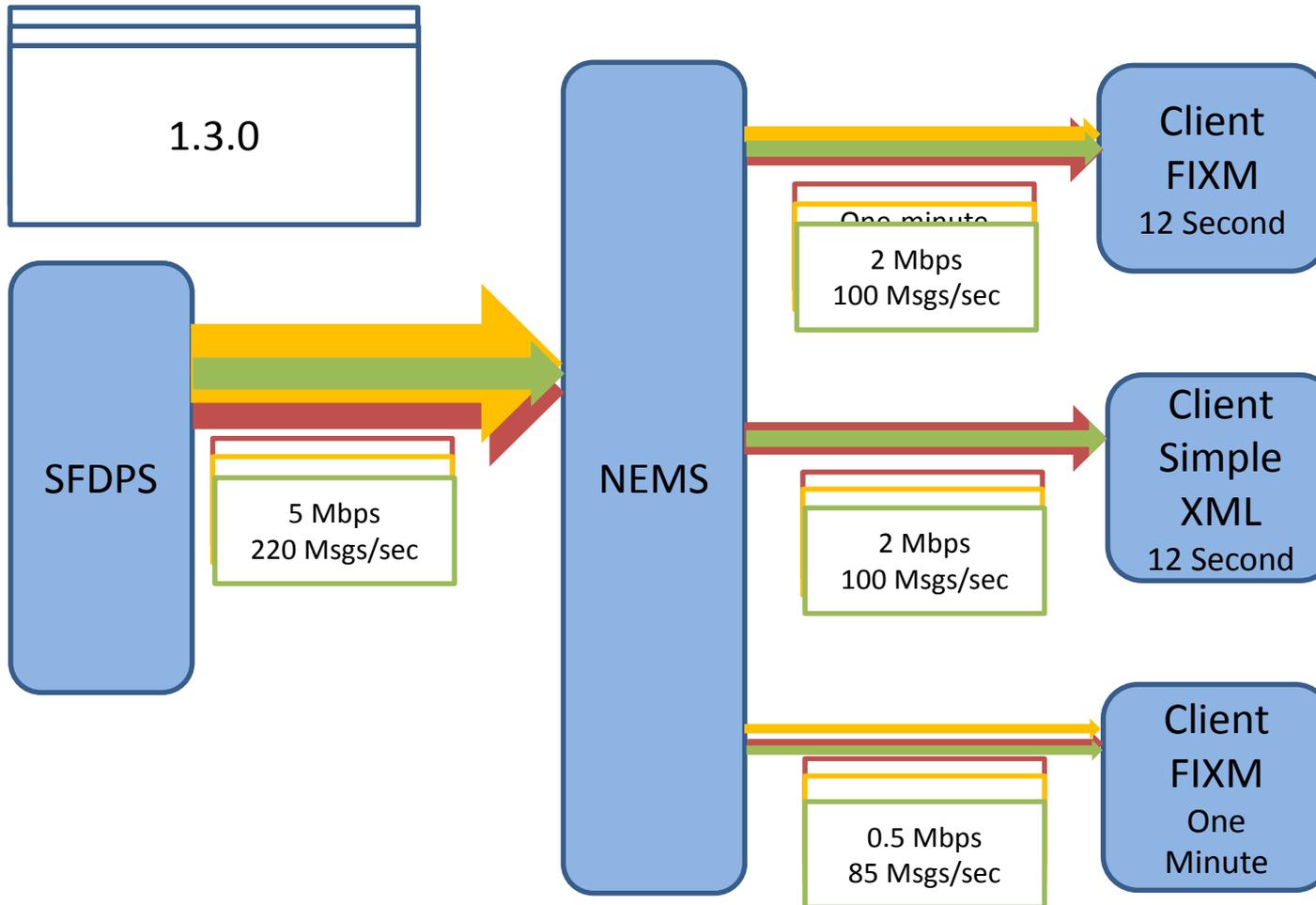
# SFDPS 1.3.0 – The Solution

- ❑ 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

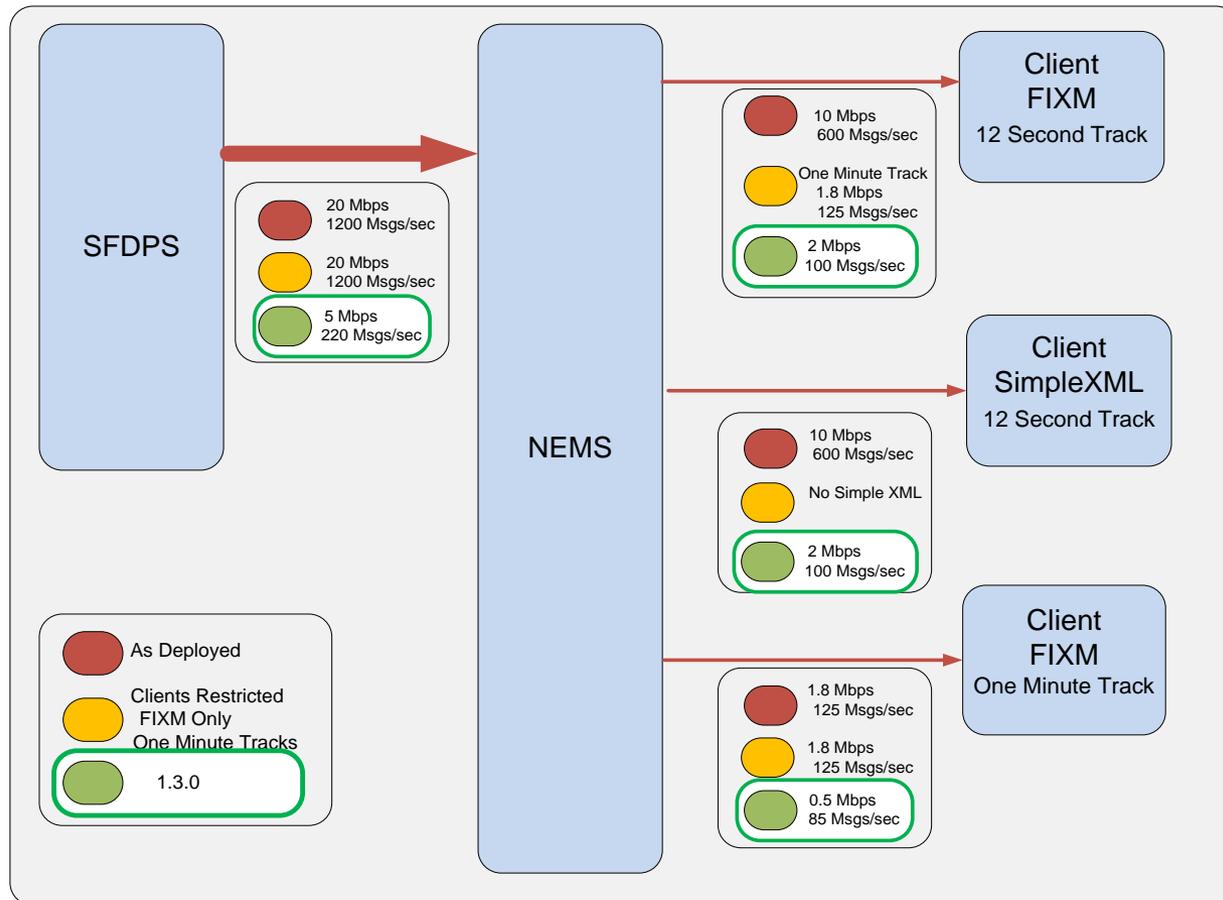
# Overview of Batching in SFDPS 1.3.0

- ❑ Batching bundles many track messages with the 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

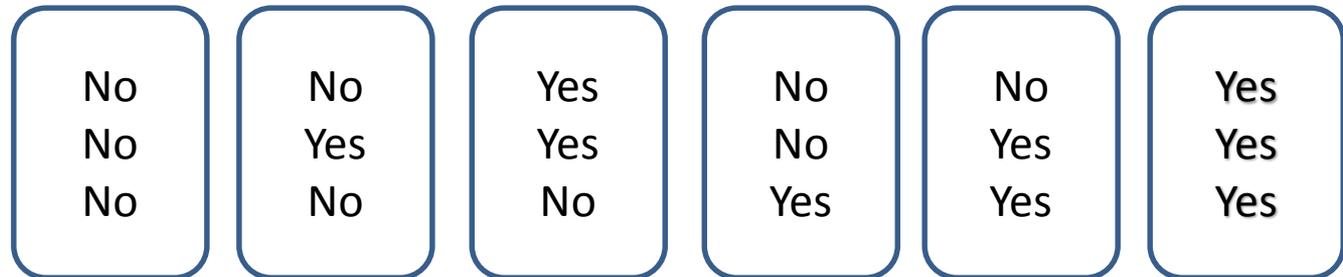


# How batching works

- ❑ 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



# 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
  - General Messages
  - Request/response for qualified client programs
    - Flight and Airspace reconstitution
    - Fifteen day history

# Consumer Impacts

- ❑ Client programs will need to process the batched track messages
- ❑ FIXM flight data messages:
  - New root element – MessageCollection
    - No change to FIXM schema – remains Core 3.0/US Extension 3.0
  - 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
- ❑ SFDPSConnect Release and SFDPS documents will be available on NSRR

# 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-1-v2_0.zip)
  - <https://nsrr.faa.gov/sites/default/files/sfdps-connect-tutorial-2-final.zip>
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  - [https://nsrr.faa.gov/sites/default/files/FIXM\\_Core\\_v3\\_0\\_Schemas.zip](https://nsrr.faa.gov/sites/default/files/FIXM_Core_v3_0_Schemas.zip)
  - [https://nsrr.faa.gov/sites/default/files/FIXM\\_US\\_Extension\\_v3\\_0\\_Schemas.zip](https://nsrr.faa.gov/sites/default/files/FIXM_US_Extension_v3_0_Schemas.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.

# SFDPS Connect Video Tutorial # 1

Video Tutorial # 1 covers the following topics:

- ❑ How to build the source code on Linux using Maven
- ❑ How to run SFDPS Connect on Linux and receive data
- ❑ How to setup the SFDPS Connect inside an Eclipse IDE and build it
- ❑ How to run SFDPS Connect from Inside an Eclipse IDE
- ❑ High Level Overview of code and packaging

# SFDPS Connect Video Tutorial # 2

- ❑ SFDPS Connect Pub/Sub JMS Processing Overview
- ❑ Overview of Message Format Changes in SFDPS Connect version 2.1.X (in support of TH message batching for SFDPS Release 1.3.0)
  - Simple XML format
  - FIXM format
- ❑ Code Walk Through