

SWIFT Developer Series

Container Orchestration & SWIM Data

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Introductions



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Recap of the SWIFT Developer Series



SWIFT Developer Series: Objectives

- Review the basics of connecting and consuming SWIM data
- After the series, participants will:
 - Have a deeper understanding of integrating SWIM data and be empowered to develop solutions to address a problem space
 - Understand how the Automation Evolution Strategy concept will enable iterative development and common services to meet the needs of the users (internal and external)
 - Appreciate how capabilities can be collaboratively built and evolve over time





Developer Workshop Overview



- Participants will create an Application Programming Interface (API) that will drive an analytics chart
 - Consume data from a common data service
 - Process the data to make it available for table using a known schema
 - API will be deployed via pipeline
- As the exercise progresses new versions of common service will become available with more extensive data.
 - Participants will update their applications accordingly
- Participants will have some level of language choice
 - Java, Python, JavaScript



Preparing for the In-Person Developer Workshop

• Webinar 1

- Experience building and running containerized software
- Familiarity with deploying containerized software

June 21, 2022 Check your email for links to the videos!

HAPPENING NOW!

• Webinar 2

- Experience connecting to SWIM and consuming data
- Some SWIM data knowledge

• Webinar 3

- Background on the operational problem space (Trajectory Deviation Study)



Any lingering questions from Webinar 1 or the hands-on exercise?



Applying Container Orchestration to SWIM Data



Overview

- Recap of Container Orchestration
- Discovering SWIM Data
- Overview of the Enhanced Jumpstart Kit
- Demo: Container Orchestration in Action
- Assignment: Stand up the Enhanced Jumpstart Kit

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Orchestration

- Orchestration facilitates:
 - Running multiple different services in cohesive container environment (e.g., a web app with a backend API and database storage)
 - Running containers at scale (e.g., 5 versions of the same service) and load balancing
- Abstracts critical operational efforts
 - Service scaling, networking, load balancing, health monitoring
- Several tools/platforms out there for handling orchestration (e.g., Docker Swarm, OpenShift, Kubernetes, etc.)



Orchestration Provides Options





Discovering SWIM Data



Discovering SWIM Data









Overview of the Enhanced Jumpstart Kit



Enhanced Jumpstart Kit

- Starting point of this was developed by L3Harris
 - https://github.com/L3Harris/swim-jumpstart
- Out of the box, the jumpstart kit allows a user to:
 - Consume SWIM data from SCDS
 - Store data in a database (PostgreSQL)
 - View/explore data using Grafana





Containerization & Orchestration in Action



Today's Demonstration

- Use the Enhanced Jumpstart Kit as a base
- Modify it to containerize the SCDS client
 - This will be similar but slightly different than what we did for the hands-on training accompanying Webinar 1
- Use docker-compose to build the "custom" containers
- User docker-compose to orchestrate the containers
- Explore the data via Grafana





REMINDER

Data provided by SCDS is intended for development and prototyping environments and has not been authorized for operational decision making.



SCDS Subscription Information

• STDDS

- Service: Tower Departure Event Service (TDES)
- Filters:
 - Airport: All
 - Message Type: All

• TFMS

- Format: R13
- Service: R13 Flow Data
- Filters:
 - Message Type: All





Step by Step

• Prep Work

- Clone the repo (https://github.com/L3Harris/swim-jumpstart)
 - Make fix to src/main/java/com/l3harris/swim/outputs/custom/tfmsFlow/RestrictionMessage.java
- Add SCDS client services to the docker-compose.yml file
 - Double check volume mounts and port bindings
- Create an application.conf file for configuring the SCDS client
 - Make sure to replace placeholders with the credentials and information for your SCDS account and subscriptions

Using the Orchestrator

- Build the client container image
 - Run docker-compose build
- Start the PostgreSQL container
 - Run docker-compose -d postgres
- Start the remaining containers
 - Run docker-compose up -d

Explore the data

- Open a browser and navigate to http://localhost:3000 to view Grafana
- Default permissions are admin/admin



Airport Configuration





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Questions?



Homework Assignment

- Re-watch the video of this webinar and follow along with what Joey did to get the containers built, running, and interactive
- Bonus: Create a new Grafana Dashboard using the TFMS and/or STDDS data and show it off at the in-person event in August





Questions?



Upcoming Schedule

• Webinar #3 – August 16, 2022 at 1:00PM EDT

- Recapping the Trajectory Deviation Study

Developer Workshop – August 29-30, 2022

- In Person Event at MITRE McLean Campus
- Registration Deadline: August 15th!

