Paolo Patierno

"Formula 1 telemetry processing using Apache Kafka on Kubernetes"

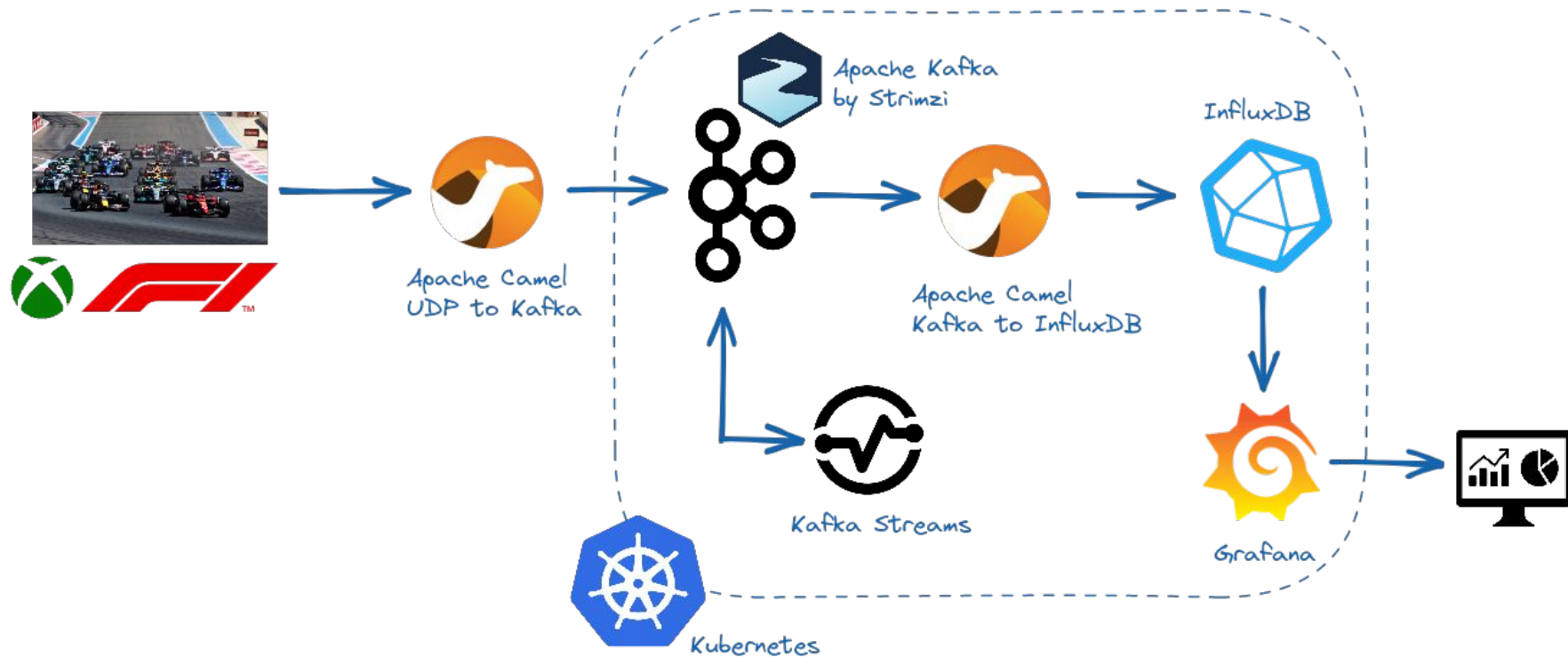DoK Day North America 2022 @ KubeCon

What's about my YAML?

```yaml
apiVersion: v1
kind: SeniorPrincipalSoftwareEngineer
metadata:
  name: Paolo Patierno
  namespace: Red Hat, Messaging & Data Streaming
  labels:
    cncf/maintainer: Strimzi
    eclipse/committer: Vert.x, Hono & Paho
    microsoft/mvp: Azure
  annotations:
    family: dad of two, husband of one
    sports: running, swimming, motogp, vr46, formula1, ferrari, ssc napoli
    community: cncf napoli, devday
spec:
  replicas: 1
  containers:
    - image: patiernohub.io/paolo:latest
```


🐦 @ppatierno

Building an events stream pipeline

- How to ingest events reliably

- How to integrate with different systems for events ingestion (UDP) and

  providing output

- How to process events in real time to get insights

- How to show data

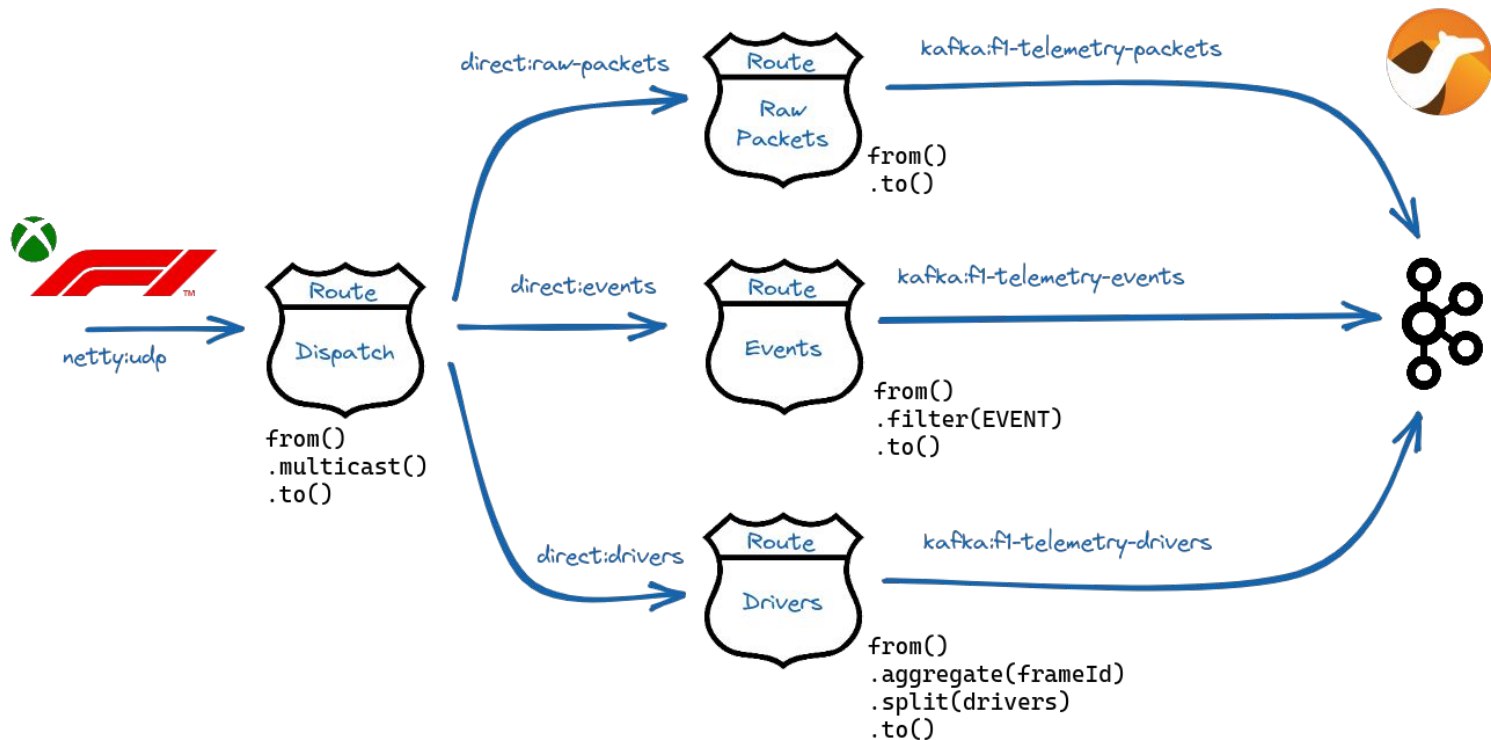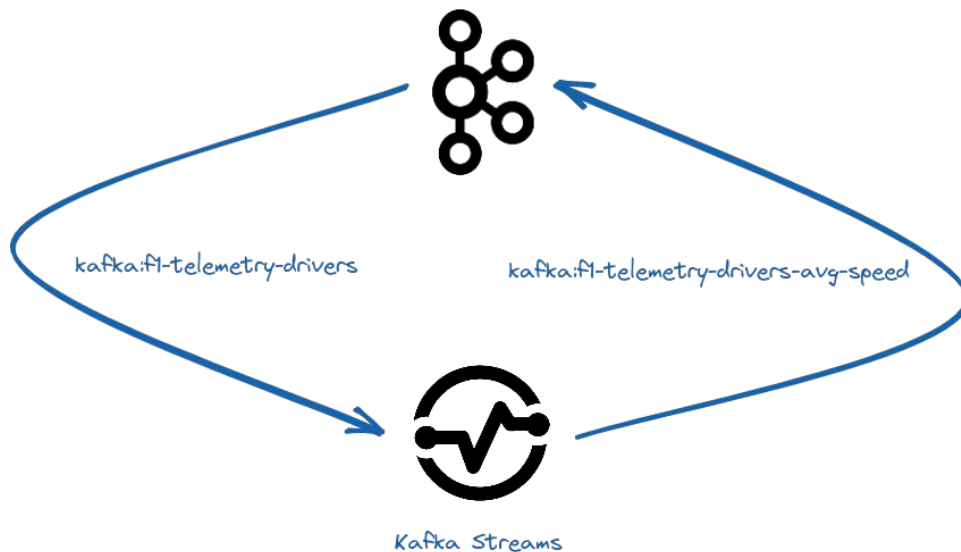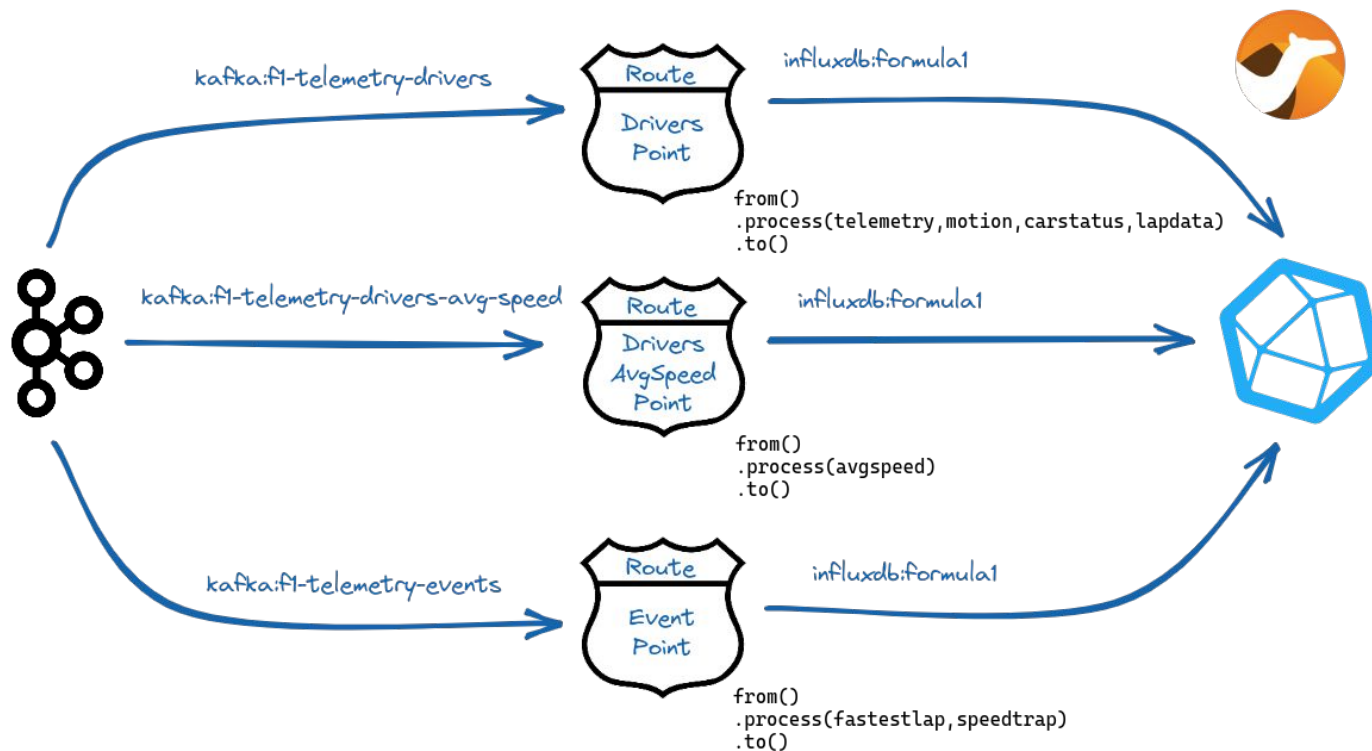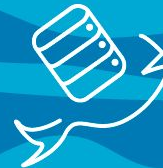- How to run and deploy the entire pipeline

STRIMZI = +

- CNCF project since 2019
- Operator pattern extending Kubernetes API with Kafka related CRDs
- Kafka cluster deployment, configuration, security, updates and …
- … topics, users, and more …
- Not just Kafka, but an ecosystem
    - Kafka Connect, Mirror Maker 2 …
    - Cruise Control, HTTP bridge, OAuth, canary, …

direct:raw-packets

Route
Raw
Packets

kafka:f1-telemetry-packets

```
from()
.to()
```

direct:events

Route
Events

kafka:f1-telemetry-events

```
from()
.filter(EVENT)
.to()
```

netty:udp

Route
Dispatch

```
from()
.multicast()
.to()
```

direct:drivers

Route
Drivers

kafka:f1-telemetry-drivers

```
from()
.aggregate(frameId)
.split(drivers)
.to()
```

kafka:f1-telemetry-drivers

kafka:f1-telemetry-drivers-avg-speed

Kafka Streams

kafka:f1-telemetry-drivers

influxdb:formula1

Route

Drivers
Point

```
from()
.process(telemetry,motion,carstatus,lapdata)
.to()
```

kafka:f1-telemetry-drivers-avg-speed

influxdb:formula1

Route

Drivers
AvgSpeed
Point

```
from()
.process(avgspeed)
.to()
```

kafka:f1-telemetry-events

influxdb:formula1

Route

Event
Point

```
from()
.process(fastestlap,speedtrap)
.to()
```

Let's see it in action!

Resources

- F1 Kafka project: https://github.com/ppatierno/formula1-telemetry-kafka
- F1 decoding library: https://github.com/ppatierno/formula1-telemetry
- Video demo: https://www.youtube.com/watch?v=Re9LOAYZi2A
- Blog post: https://grafana.com/blog/2021/02/02/real-time-monitoring-of-formula-1-telemetry-data-on-kubernetes-with-grafana-apache-kafka-and-strimzi/

Thank you!