



# ODTUG Kscope18



ORLANDO, FLORIDA • JUNE 10-14

PLEASE  
FILL OUT YOUR  
EVALUATIONS

# Visualizing streams



# Francesco Tisiot

BI Tech Lead at Rittman Mead

📍 Verona, Italy

📖 Rittman Mead Blog

💼 10 Years Experience in BI/Analytics

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🐦 @FTisiot

♠ Oracle ACE

# About Rittman Mead

Rittman Mead is a **data and analytics company** who specialise in data visualisation, predictive analytics, enterprise reporting and data engineering.

We use our skill, experience and know-how to work with organisations across the world to interpret their data. We enable the business, the consumers, the data providers and IT to work towards a common goal, **delivering innovative and cost-effective solutions** based on our core values of thought leadership, hard work and honesty.

We work across **multiple verticals** on projects that range from mature, large scale implementations to proofs of concept and can provide skills in **development, architecture, delivery, training and support**.



The Good Old Days...

# I Need This "Precise" KPI!

OK! Let's

Create  
the Model  
and ETL  
the Data!

Predefined KPIs

• Structured Reporting

Database

Batch Processing

• Overnight Load



# Self Service Analytics



Photo by Dominik Scythe on Unsplash

**Bimodal IT = Marathon Runners + Sprinters. Deeply Different, Both Essential**

	<b>Mode 1</b>	<b>Mode 2</b>	
Think Marathon Runner	Reliability	Goal	Agility
	Price for performance	Value	Revenue, brand, customer experience
	Waterfall, V-Model, high-ceremony IID	Approach	Agile, kanban, low-ceremony IID
	Plan-driven, approval-based	Governance	Empirical, continuous, process-based
	Enterprise suppliers, long-term deals	Sourcing	Small, new vendors, short-term deals
	Good at conventional process, projects	Talent	Good at new and uncertain projects
	IT-centric, removed from customer	Culture	Business-centric, close to customer
	Long (months)	Cycle Times	Short (days, weeks)



Think Sprinter

Gartner

A photograph of a scientist wearing a white lab coat and a hairnet, looking through the eyepiece of a compound light microscope. The scientist is positioned in the center-left of the frame, with their hands on the microscope's eyepiece and objective lenses. The background is a blurred laboratory setting with shelves containing various glassware and equipment.

R

Python

Data  
Scientist

Extract

Visualize

Calculate

Business Analyst



IT Driven

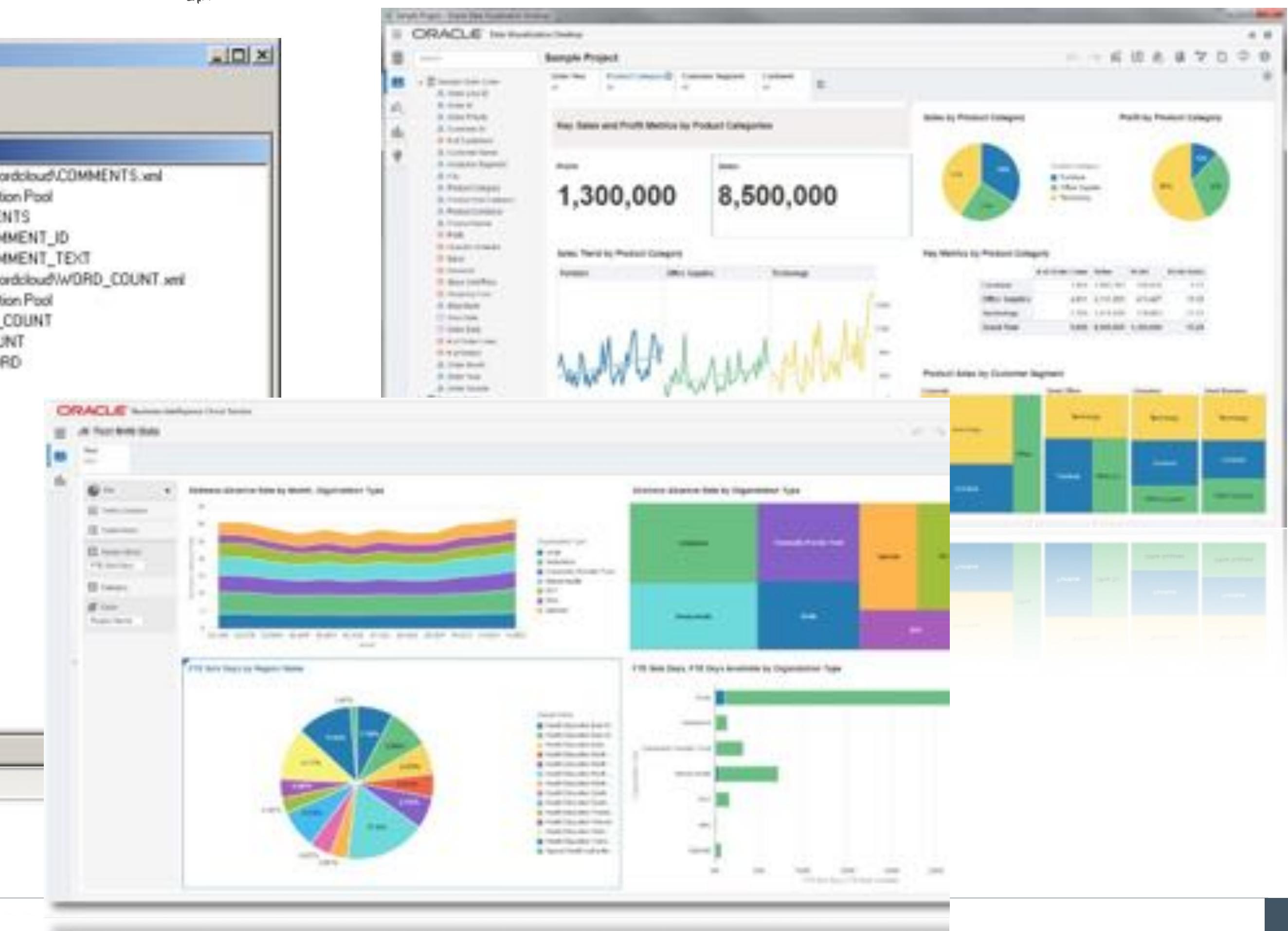
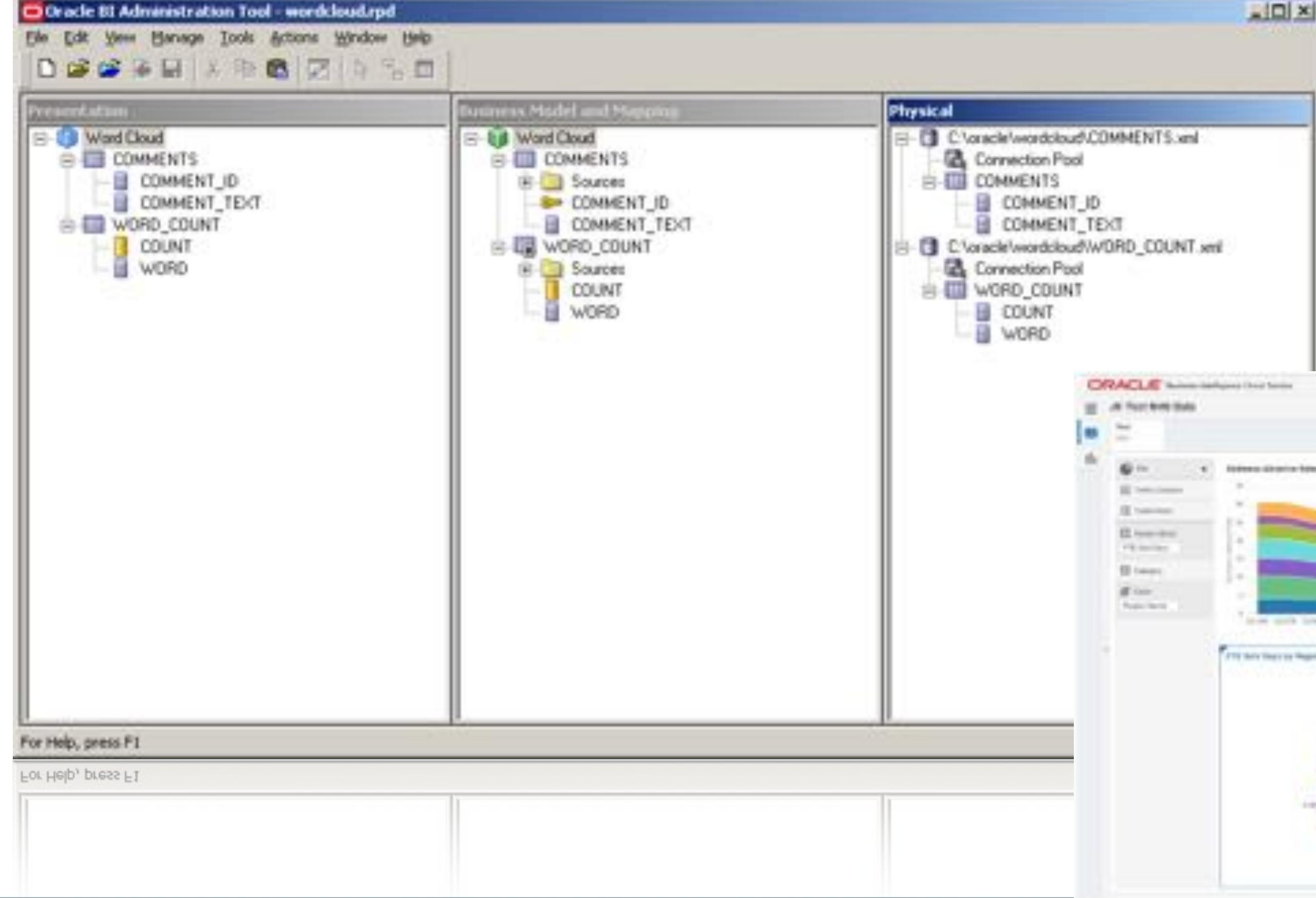
Organised

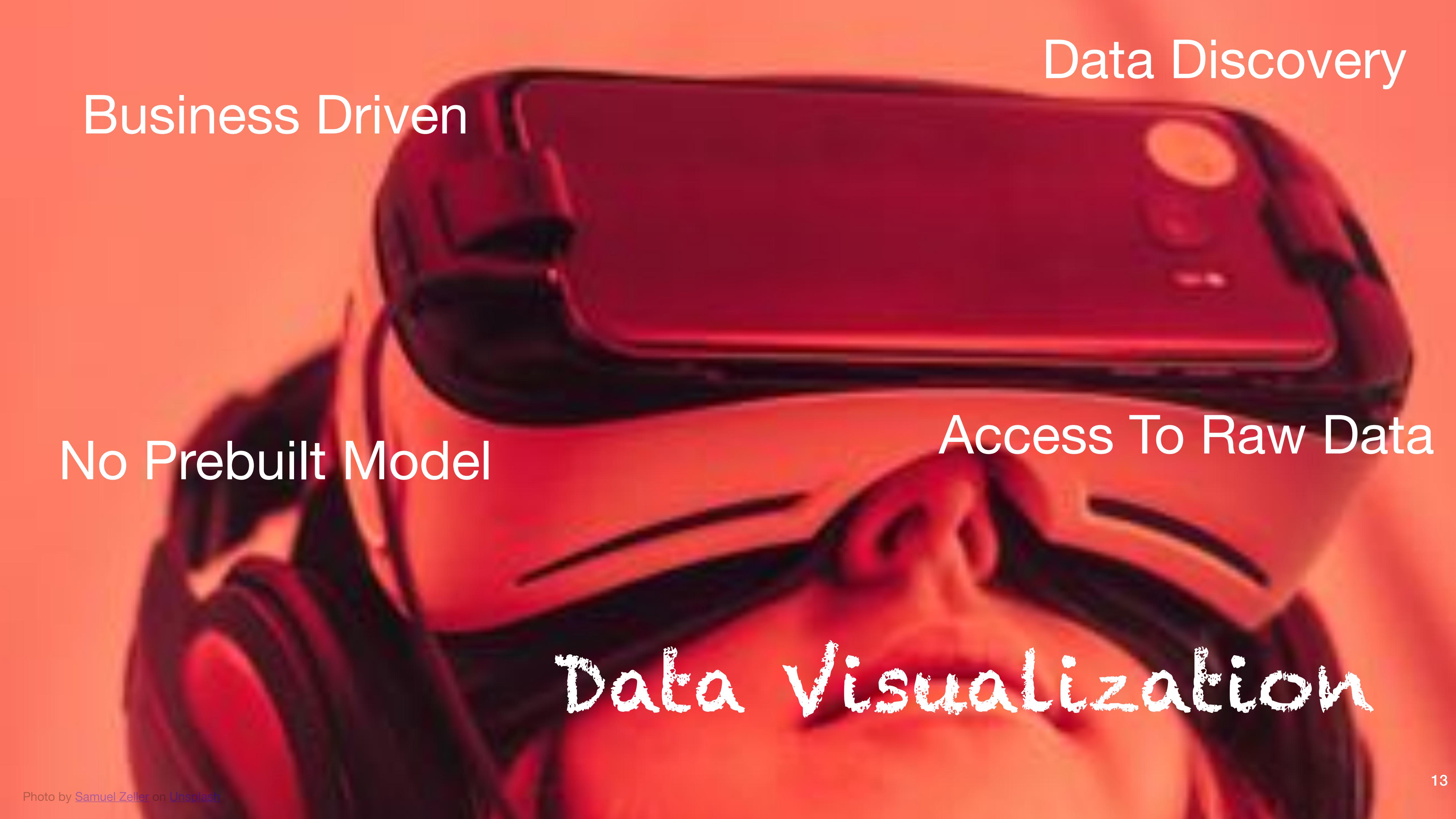
Pre-Defined

OBIEE

# Business Intelligence Tools

## Oracle Analytics



A close-up photograph of a dark red leather belt. The belt has a prominent grain texture and a silver-toned metal buckle with a simple rectangular design. The lighting is warm, highlighting the rich color of the leather.

Business Driven

No Prebuilt Model

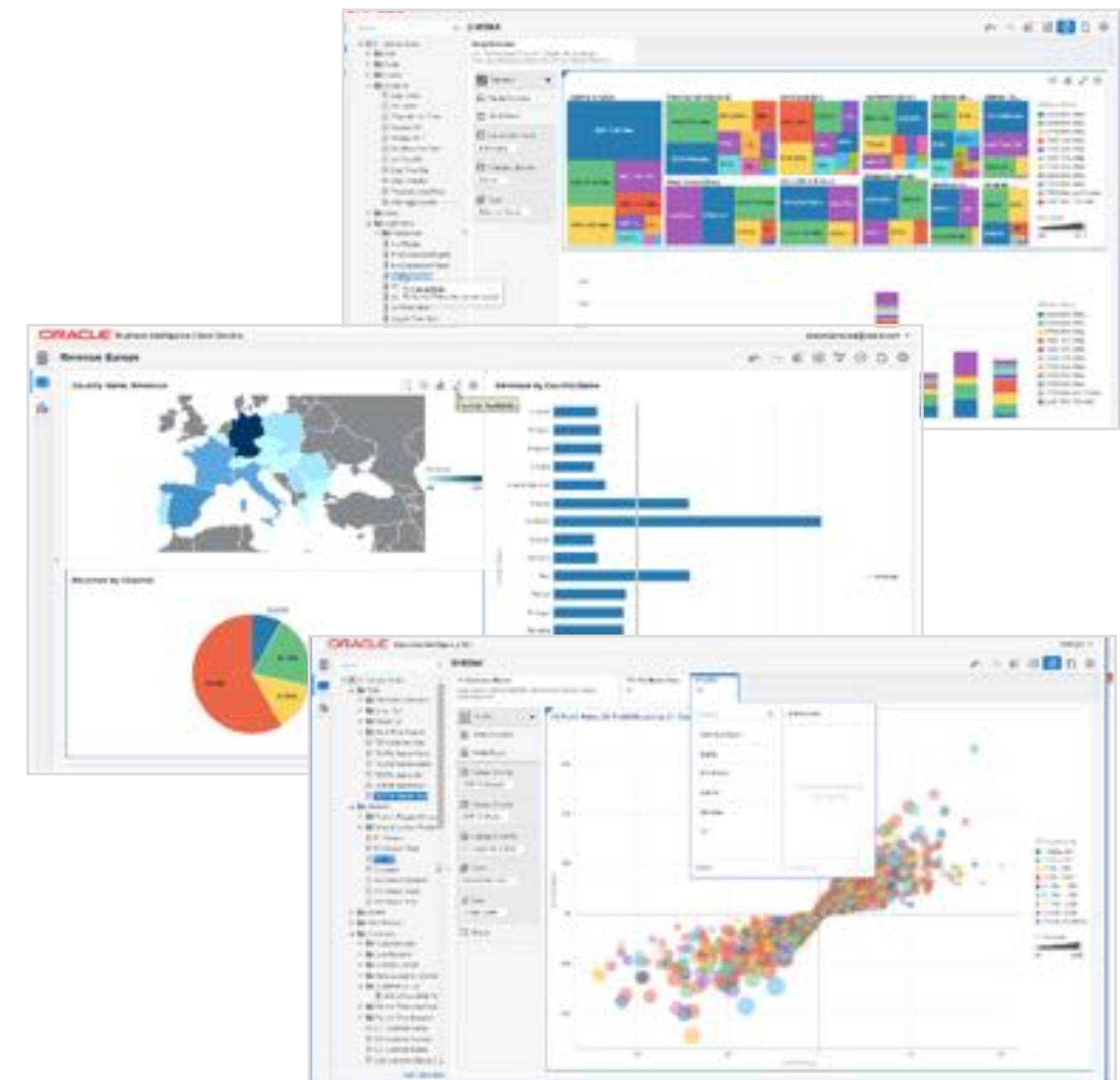
Data Discovery

Access To Raw Data

Data Visualization

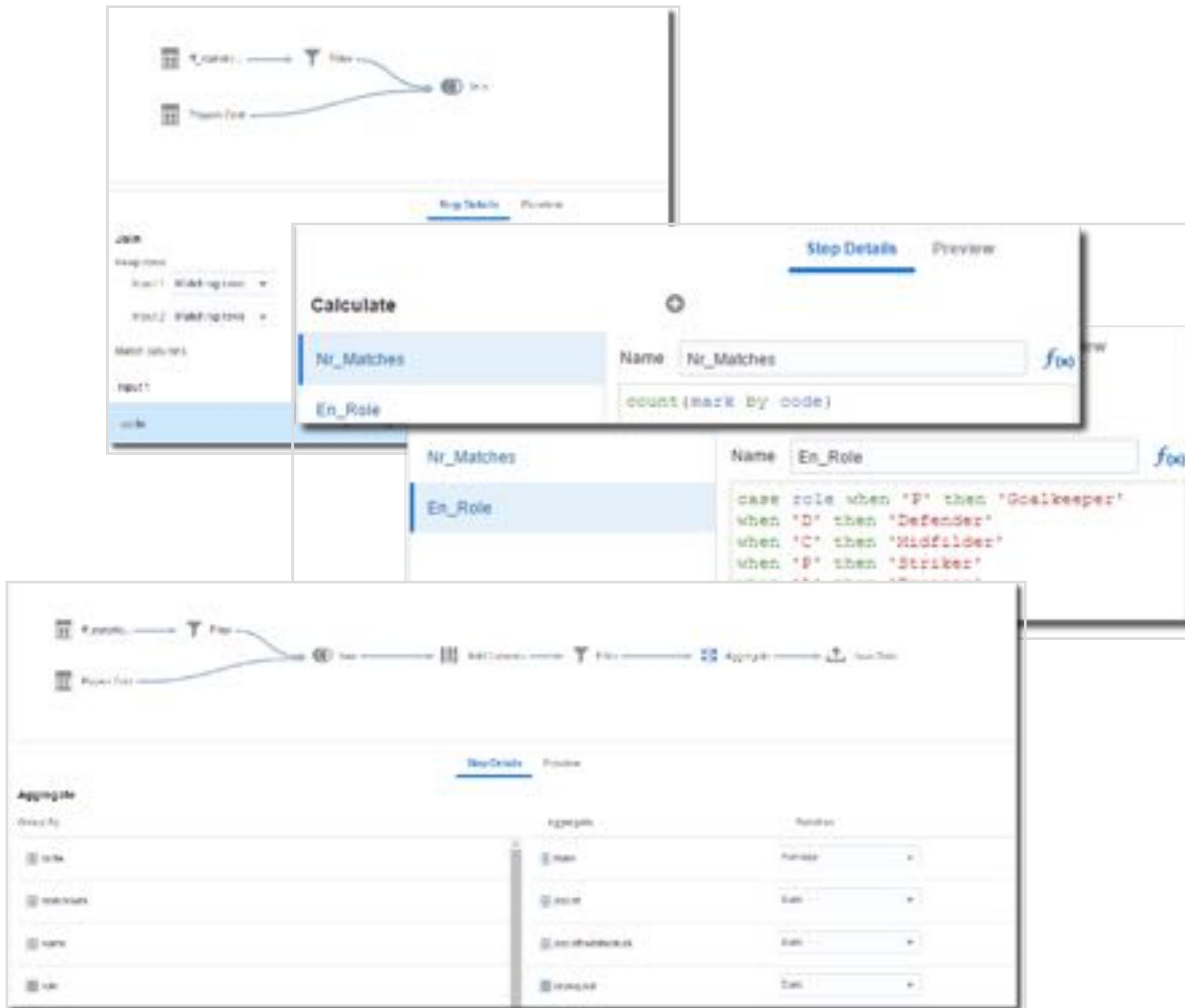
# Data Visualization

- Information Exploration and Discovery
  - Single Panel Analytics
  - Data Mashup
  - Integrated with OBIEE
  - DataFlow Component



# DataFlow Component

- Transform/Enrich Data
  - Filter
  - Aggregate
  - Join
  - Store Locally or Push Back
  - V4 Release
    - Machine Learning
    - Essbase Cube



A photograph of a man with white hair, wearing a red long-sleeved shirt and dark trousers, walking away from the camera on a light-colored wooden floor with a herringbone pattern. He is carrying a dark backpack. The background shows more of the wooden floor and a small dark square vent or hole in the floor.

Predefined KPIs

- Structured Reporting

Database

Batch Processing

- Overnight Load

Volume

Velocity

Variety

\$\$\$

BIG DATA



BIG DATA LANDSCAPE 2017



A photograph of a man with white hair, wearing a red long-sleeved shirt and dark trousers, walking across a light-colored wooden floor with a herringbone pattern. He is looking down at his feet. In the background, there are some dark rectangular objects on the floor.

Predefined KPIs

- Structured Reporting

Database

Batch Processing

- Overnight Load

# Real Time Analytics

Batch vs Stream

Any Source

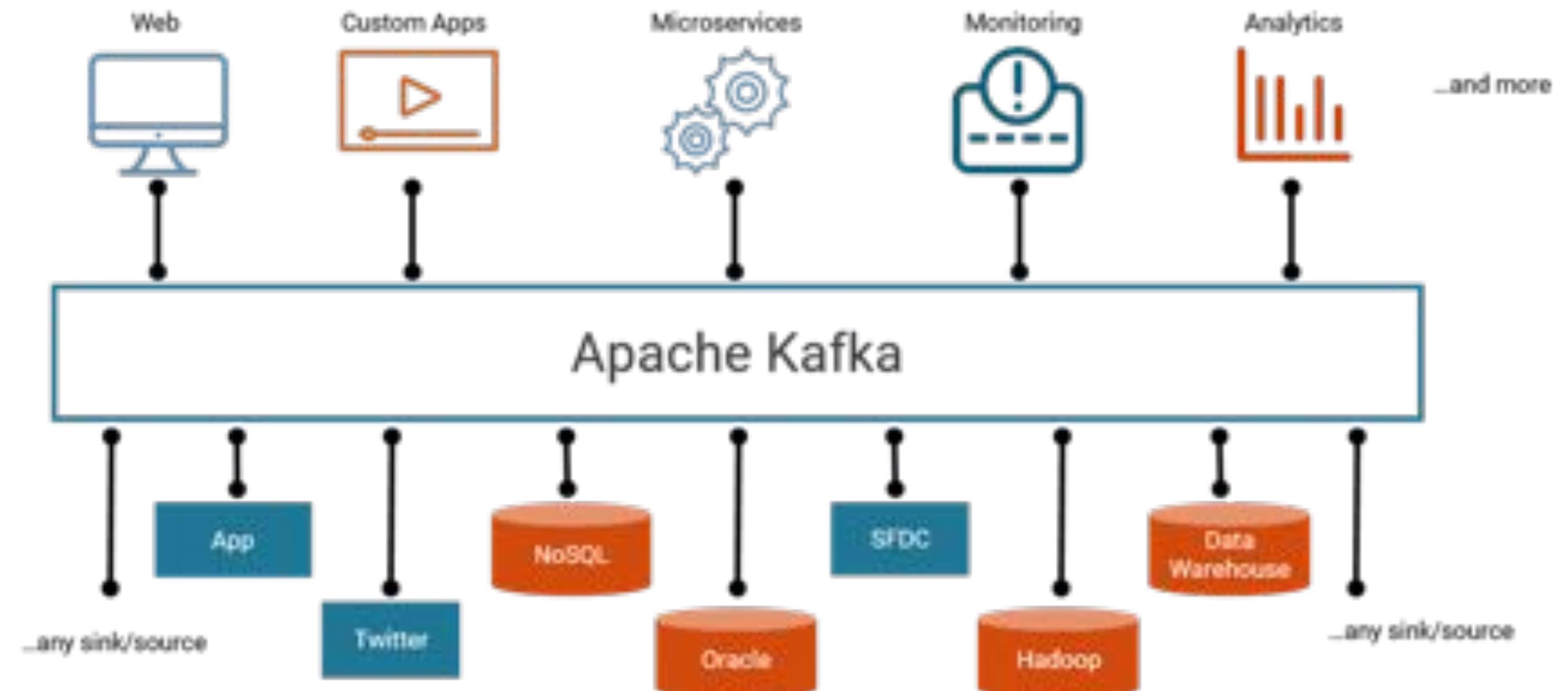
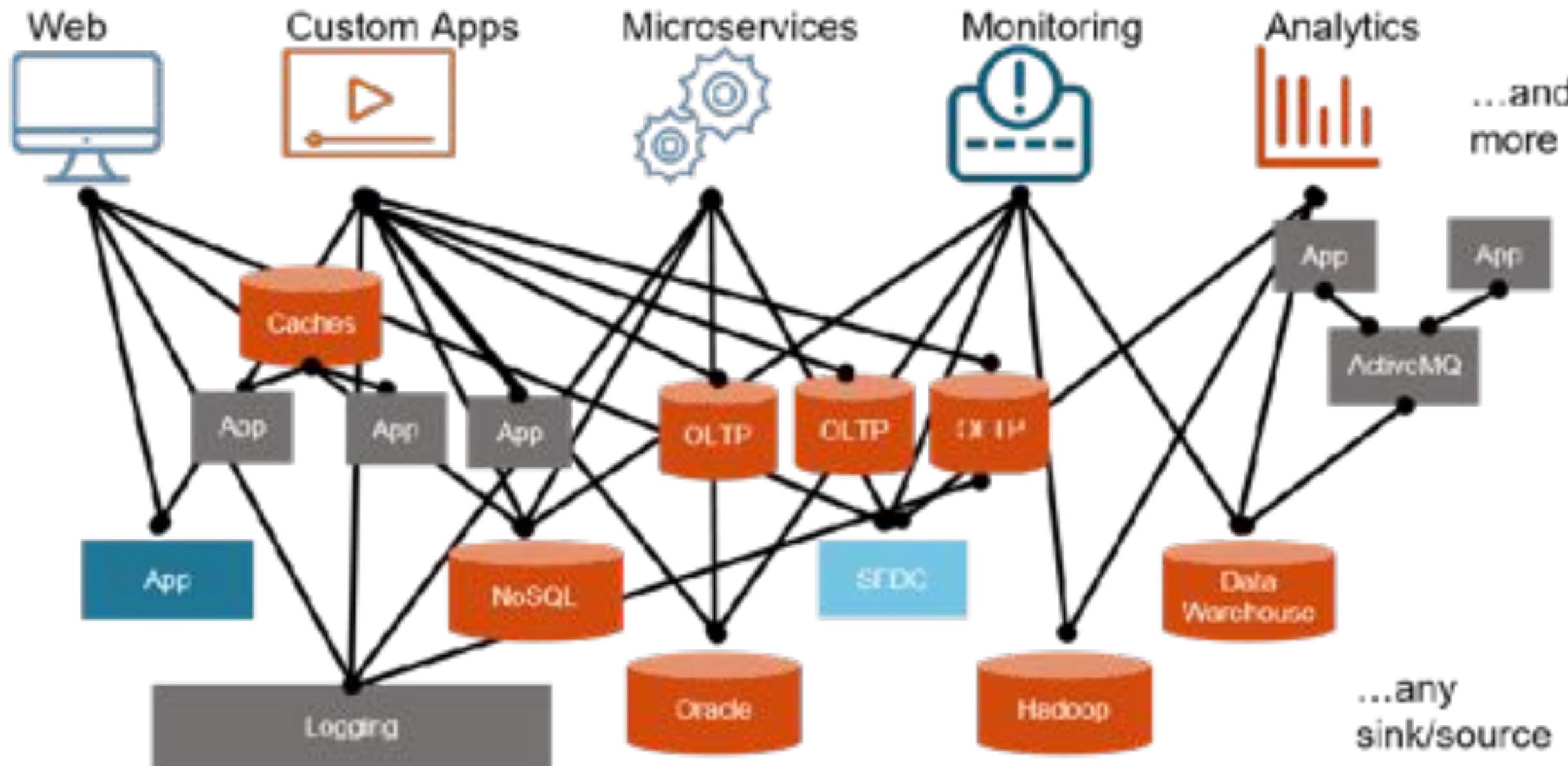
Any Target

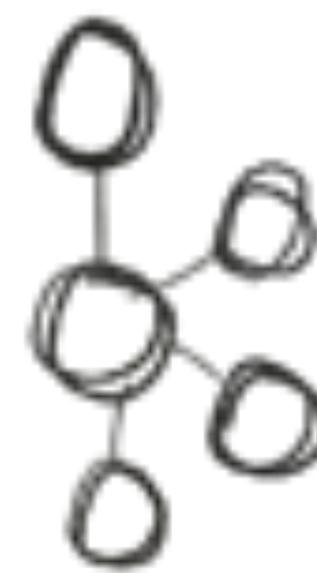


Scalable

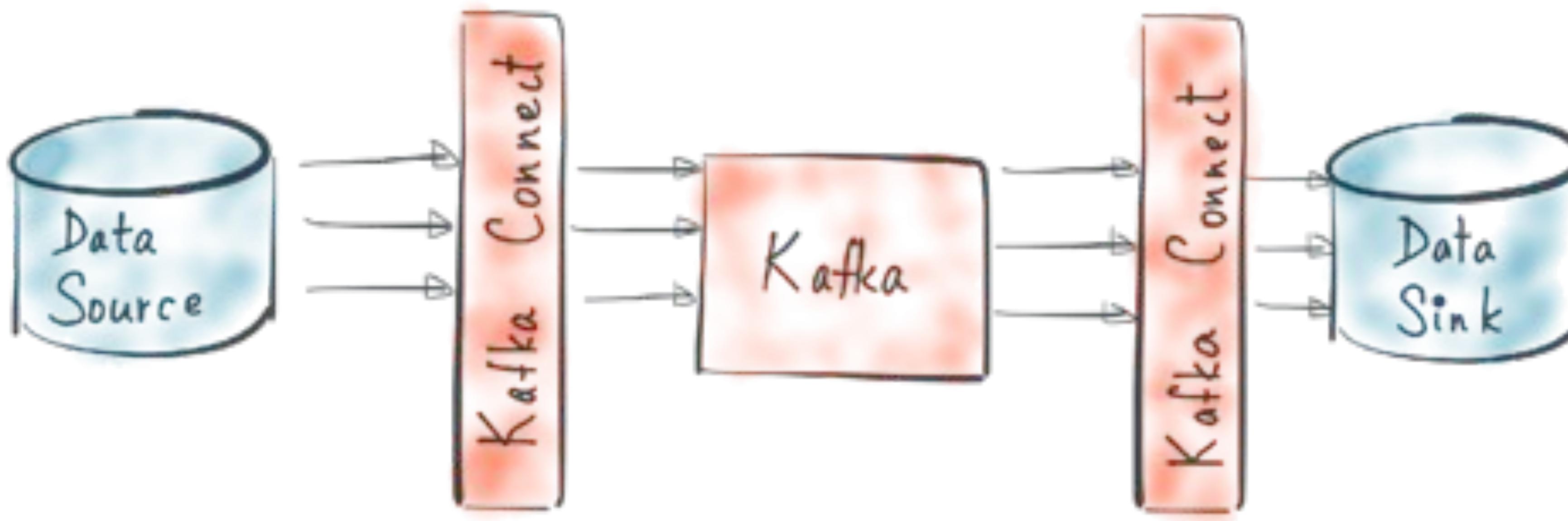
Open Formats

# Data Hub

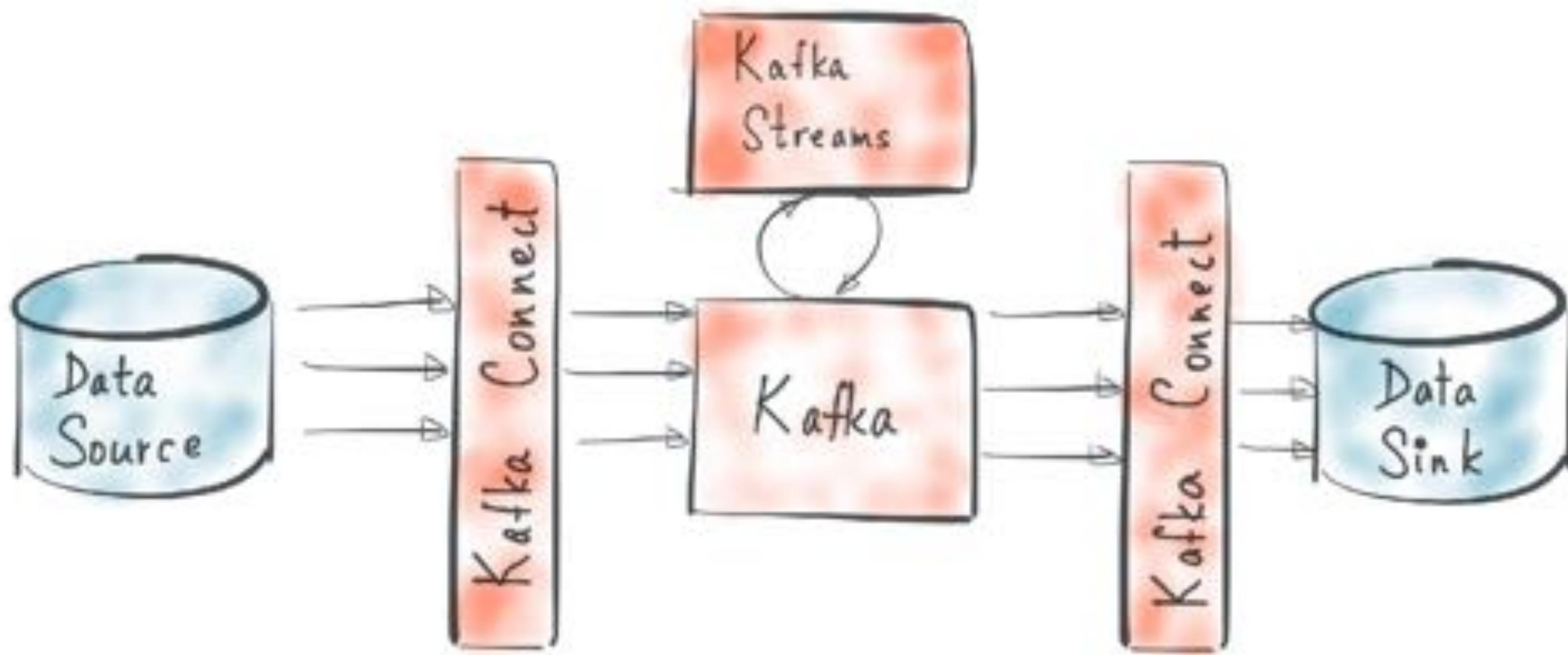




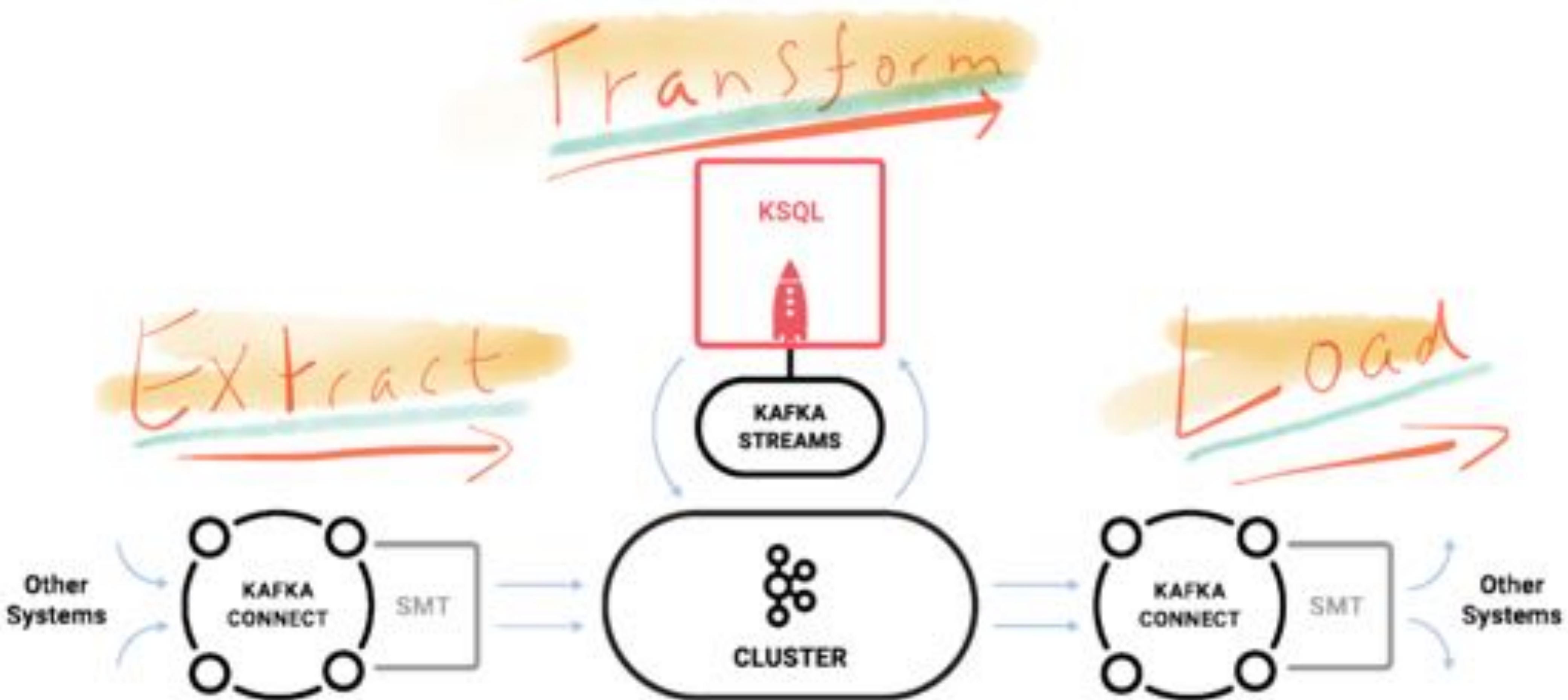
# KAFKA CONNECT



# KAFKA CONNECT + STREAMS



SQL!



confluent

<https://www.confluent.io/product/confluent-platform/>

```
CREATE STREAM vip_actions AS
    SELECT userid, page, action FROM clickstream c
        LEFT JOIN users u ON c.userid = u.user_id
    WHERE u.level = 'Platinum';
```

```
CREATE TABLE possible_fraud AS
    SELECT card_number, count(*)
        FROM authorization_attempts
        WINDOW TUMBLING (SIZE 5 SECONDS)
    GROUP BY card_number
    HAVING count(*) > 3;
```

**Tumbling**

Size=20 seconds

12:00:00 FTislot: "A"

Start  
12:00:00  
End  
12:00:2012:00:30 FTislot: "C"  
12:00:35 FTislot: "D"Start  
12:00:20  
End  
12:00:40**Hopping**

Size=20 seconds

Advance=10 seconds

Start  
12:00:00  
End  
12:00:20Start  
12:00:10  
End  
12:00:30Start  
12:00:20  
End  
12:00:40**Session**

Inactivity Gap=15 seconds

Start  
12:00:00  
End  
12:00:2515 secs after  
the last eventStart  
12:00:30  
End  
12:00:50

# KSQL

Currently Stream to Table Join

No Stream to Stream Join

Currently Limited SQL functions

String Parsing

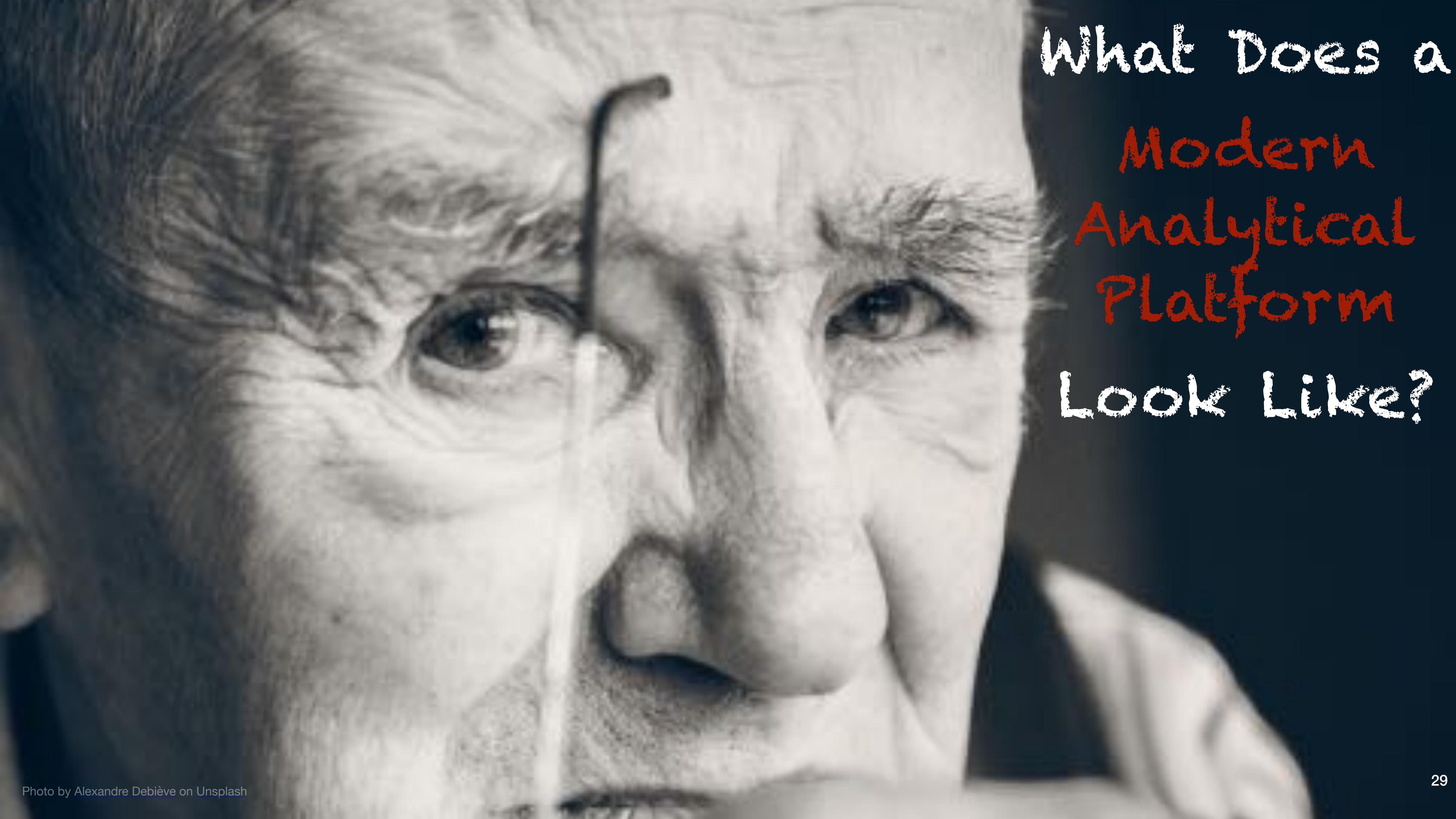
Analytic Functions

Regular Expressions

~~Still a Developer Preview~~

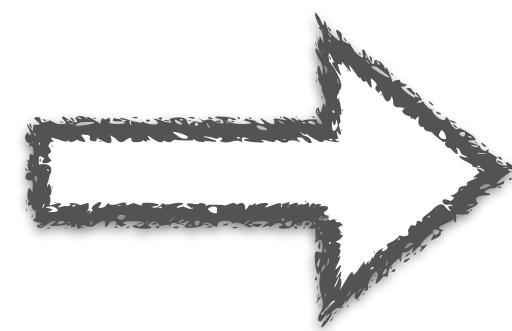
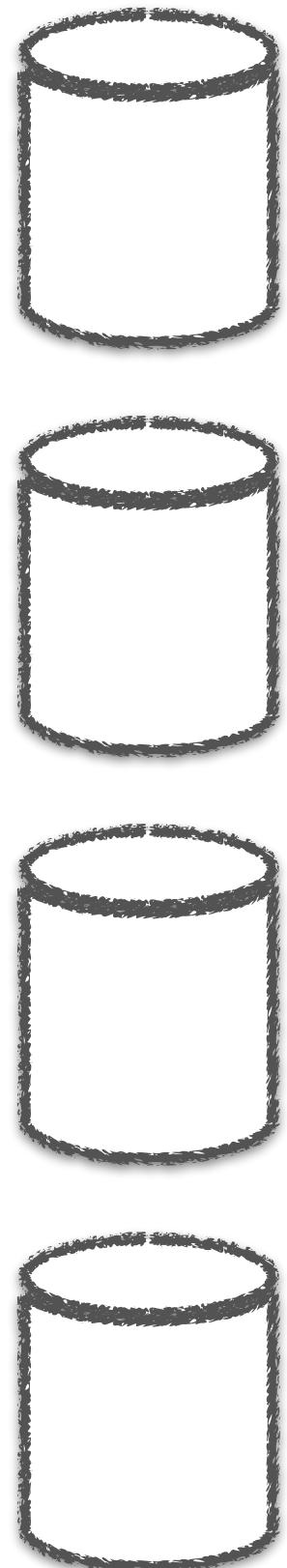
Enhancements expected

GA!



What Does a  
Modern  
Analytical  
Platform  
Look Like?

Sources



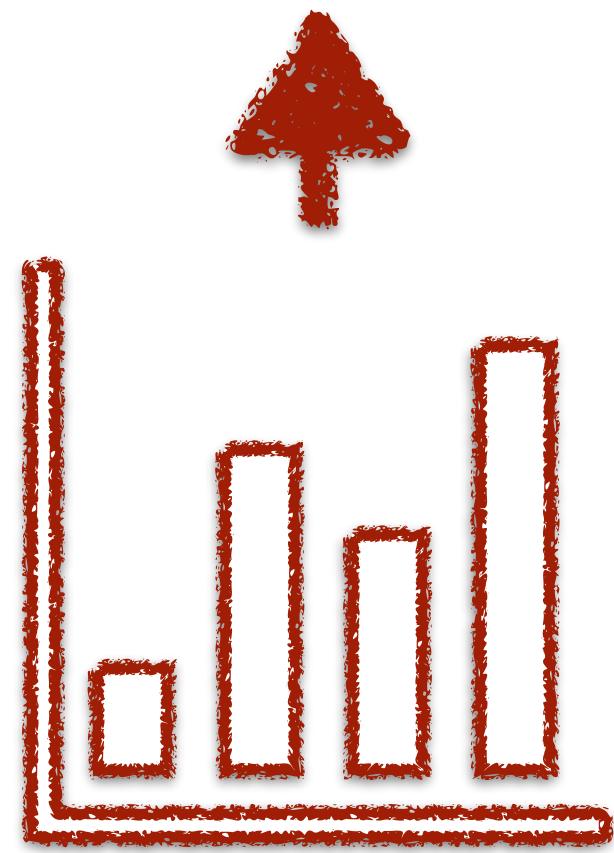
Transformations



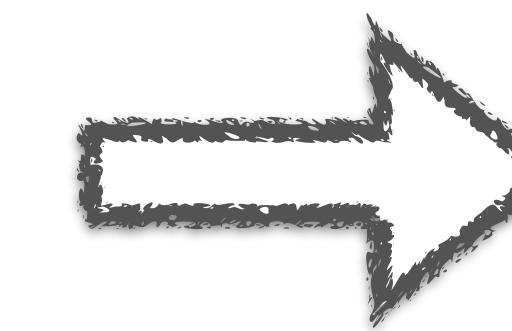
confluent

data integration

Kafka

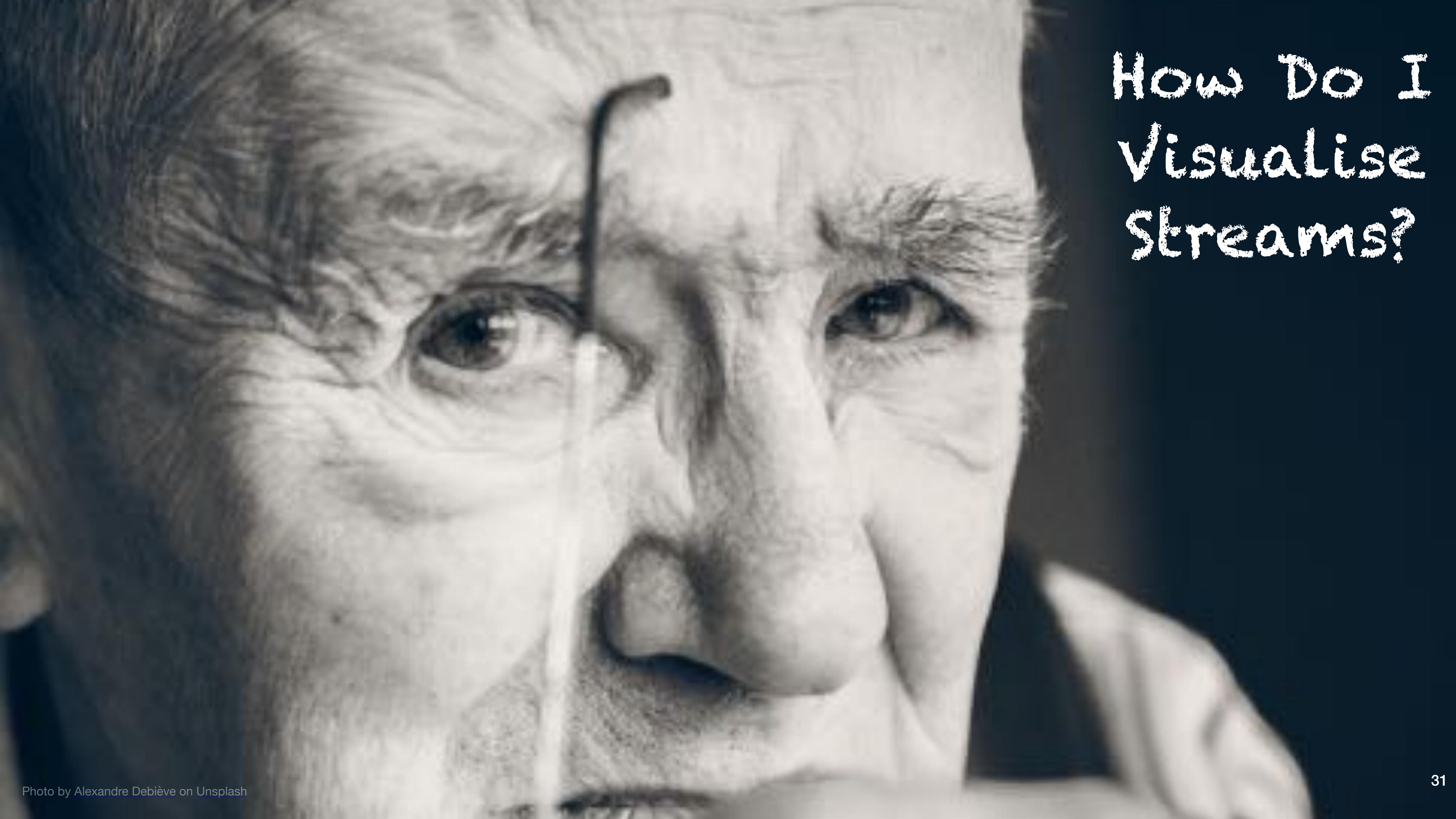


?



Targets





How Do I  
Visualise  
Streams?

# Stream

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# Time Series Visualization



kibana



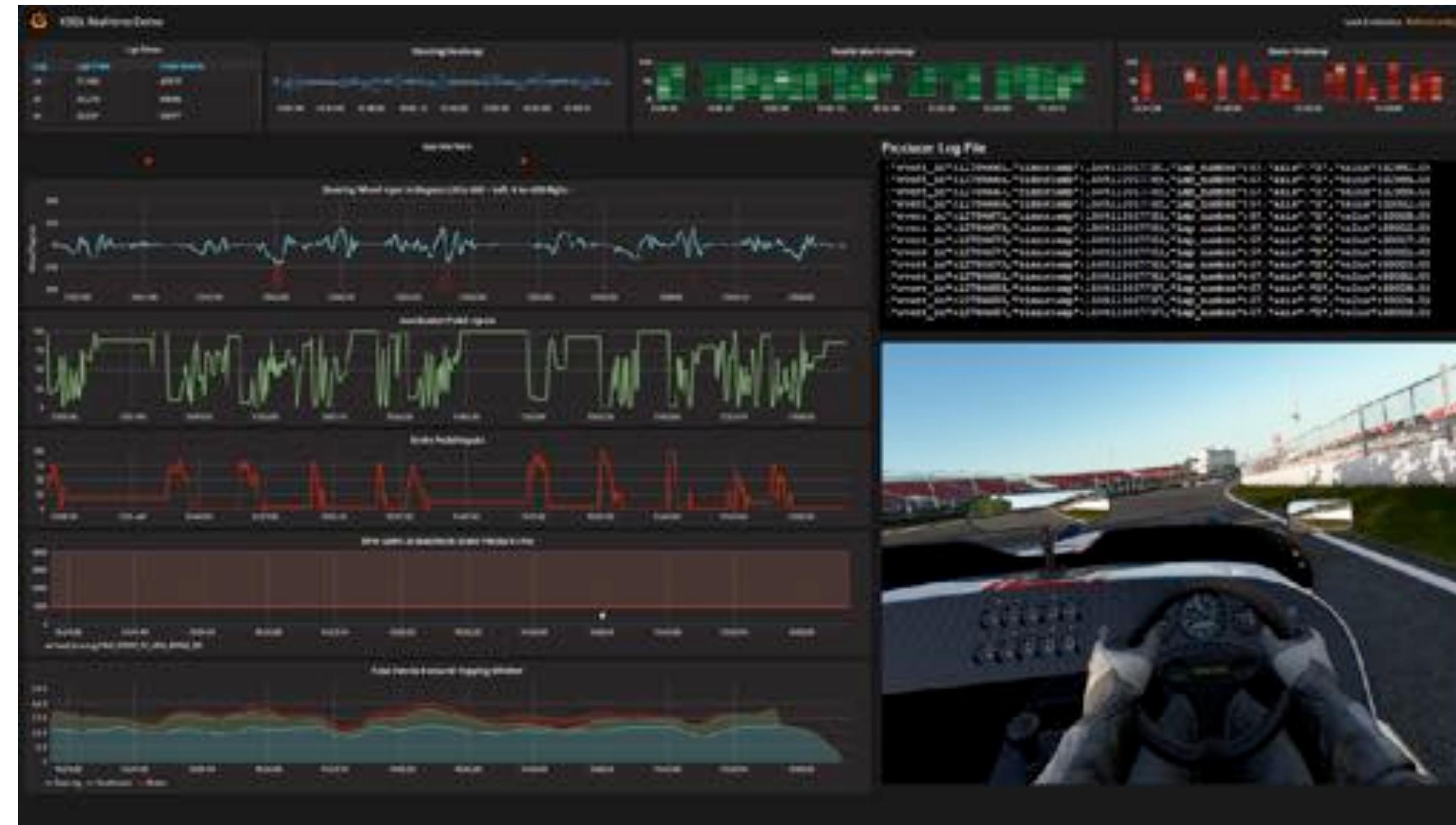
Grafana



elasticsearch

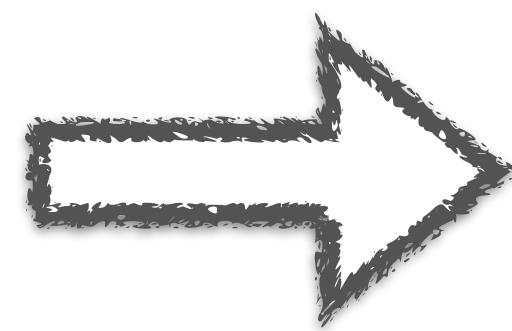
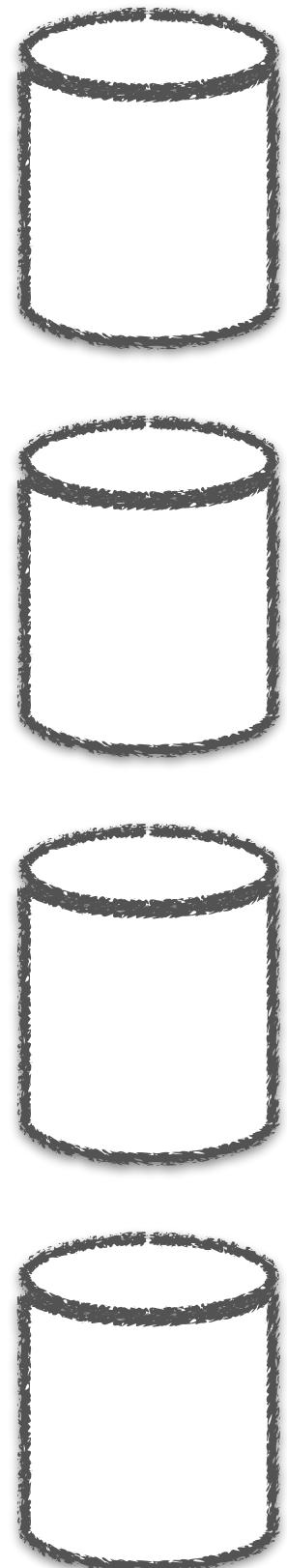


InfluxDB



<https://www.rittmanmead.com/blog/2017/11/taking-ksql-for-a-spin-using-real-time-device-data/>

Sources



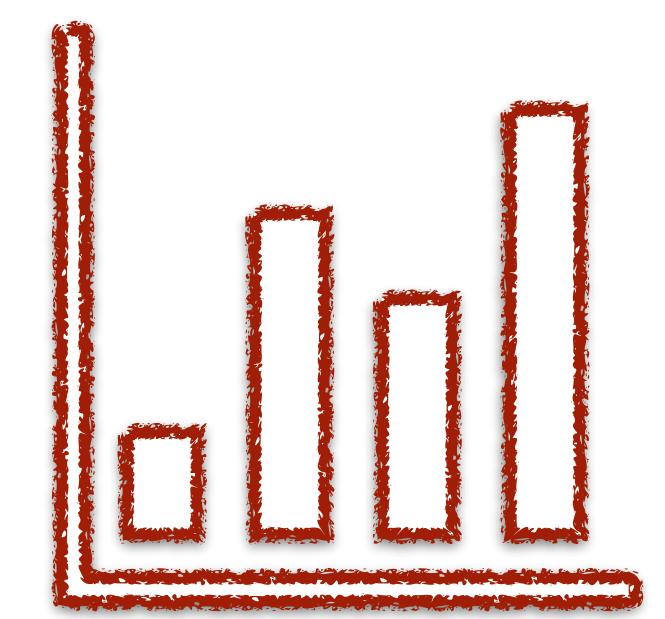
Transformations



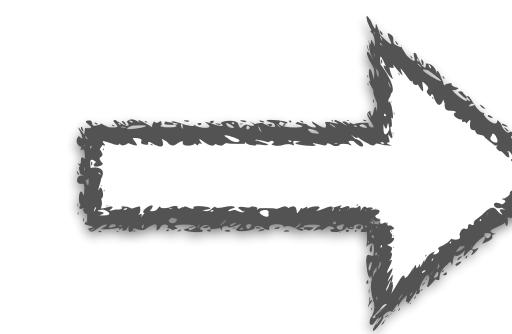
confluent  
STREAMS

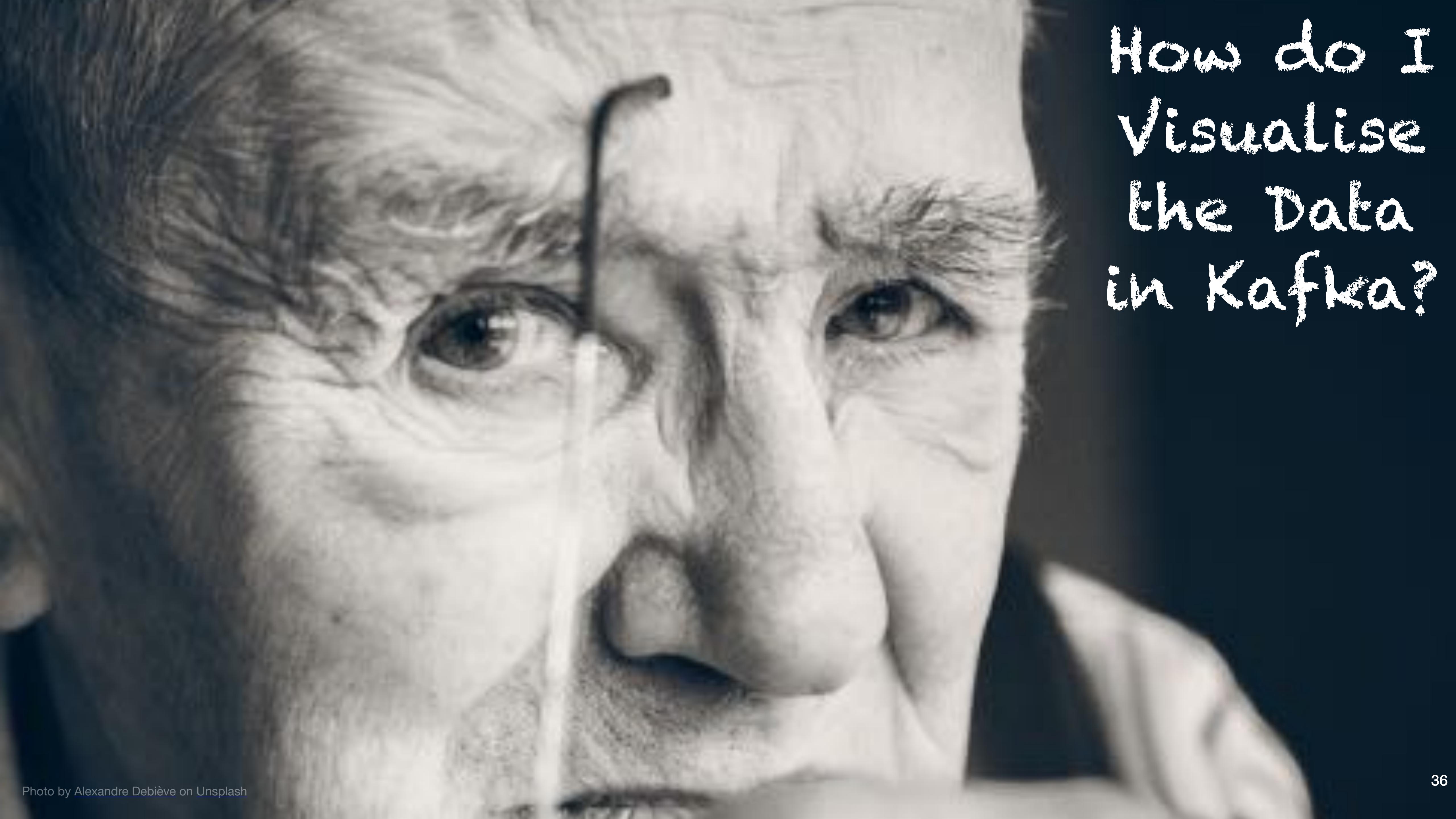


Kafka



Targets





How do I  
Visualise  
the Data  
in Kafka?

# Kafka Consumer

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```



```
913839295048147456 | RT @RunkOnCircus: Bitch you proud of that shit? You ruined the party for everyone an  
d I still got the scars on my leg from when you s...  
913839295354691585 | RT @axchristine: what kind of period you got https://t.co/9MLPMPhN6A  
913839295891591169 | RT @RunkOnCircus: Bitch you proud of that shit? You ruined the party for everyone an  
d I still got the scars on my leg from when you s...  
913839296138637824 | RT @rjefreyrfc: Got some good financial news today. Woe African boy I was sponsoring  
has been eaten by a lion.  
913839295228469768 | Want to bring a utilitarian design piece into your home? We've got just the one! http  
s://t.co/ZHnIBuf3v4 https://t.co/led0nh0T8W  
913839295639932929 | RT @CandiceAiston: Yes, I am. Especially when you win the popular vote by 3 mil. If y  
ou want to talk about someone who got smoked, Ber.  
913839296717981824 | Don't forget vindictive dishonest @SenJohnMcCain https://t.co/b2dmvTydZF  
913839296617285766 | RT @axchristine: what kind of period you got https://t.co/9MLPMPhN6A  
913839274248389121 | RT @AaronLewis555: This Teacher Got Pregnant From 13 Year Old Student. Wait. What??  
https://t.co/D5cvhn953r  
913839297216991233 | RT @IBQ_Brasil: Agora dá: Daenerys Targaryen, Filha da Tormenta, Mãe de  
Dragões, Rainha de Meereen, Rainha dos Andalos.,  
[REDACTED]
```

KSQL



```
[REDACTED] Screen(s): 8 bash 1 Zookeeper 2 Kafka 3 SchemaRegistry 4 Producer 5* KSQL 15:55 Wed, Sep 27 2017
```

# Limited set of functions

Can't be called from "outside" Kafka

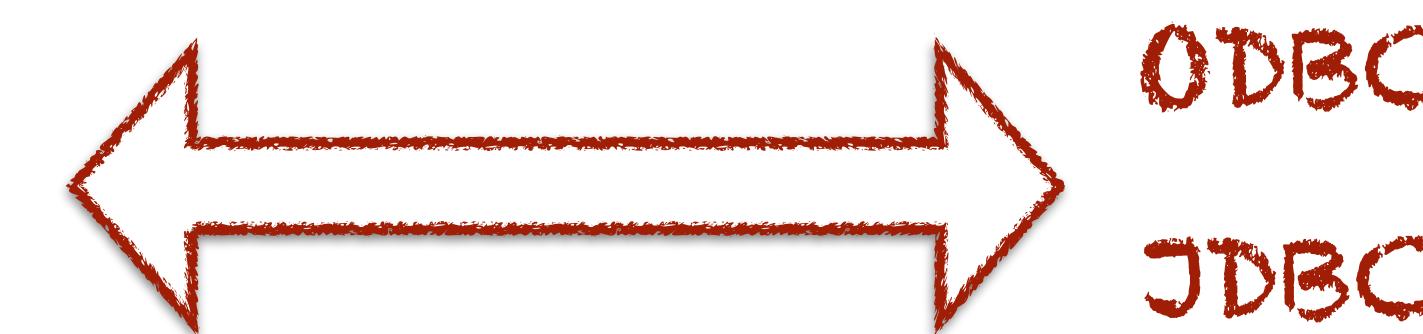


KSQL

 confluent

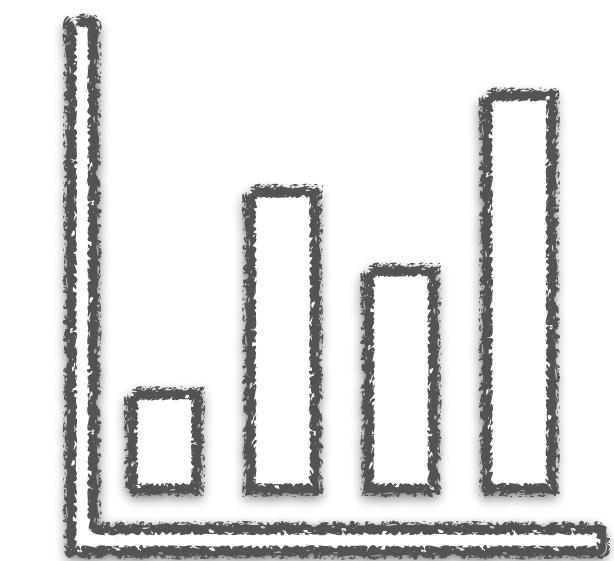


# SQL-on-Hadoop



ODBC  
JDBC

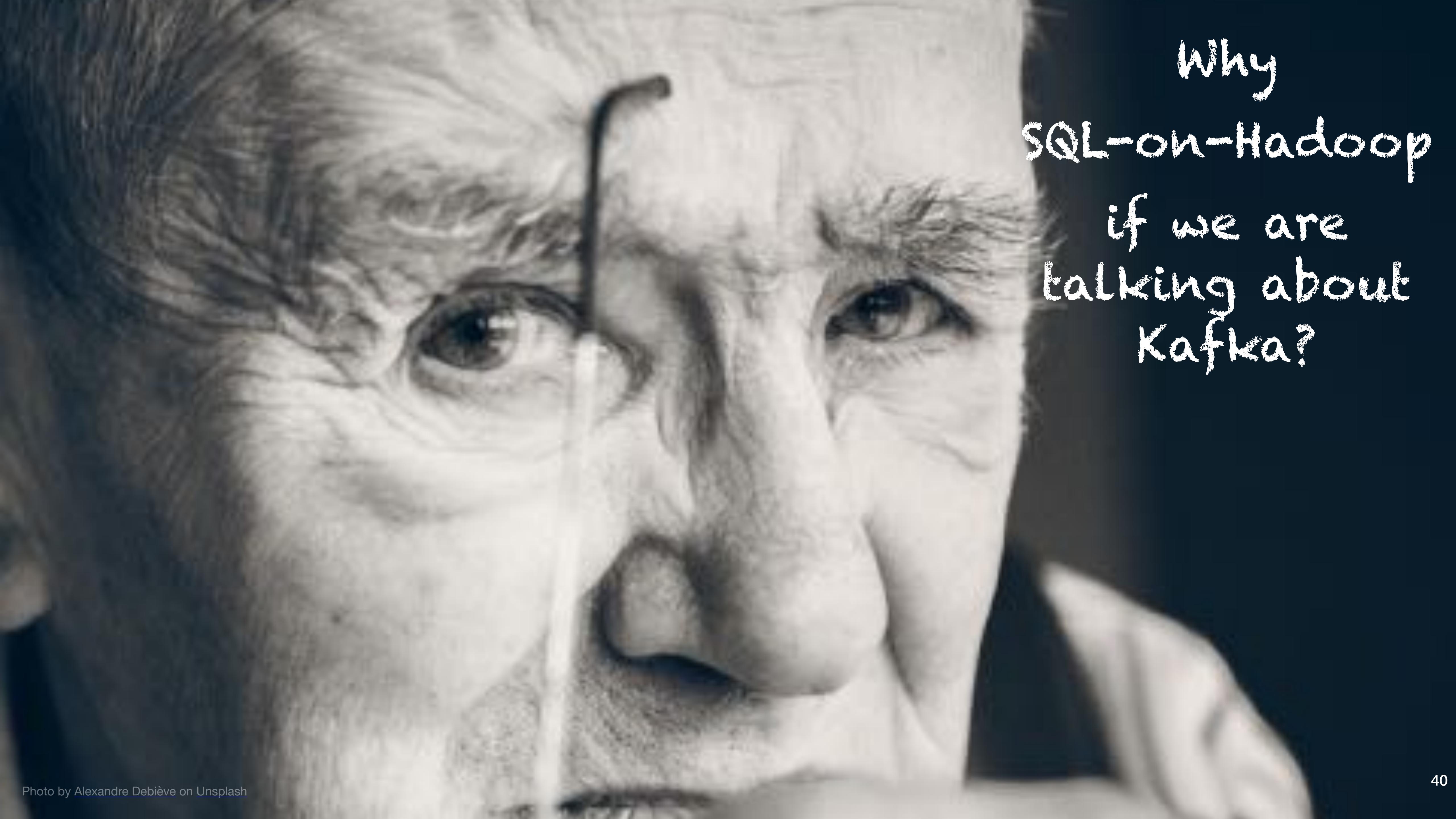
Traditional BI Tools



presto

Apache Software Foundation



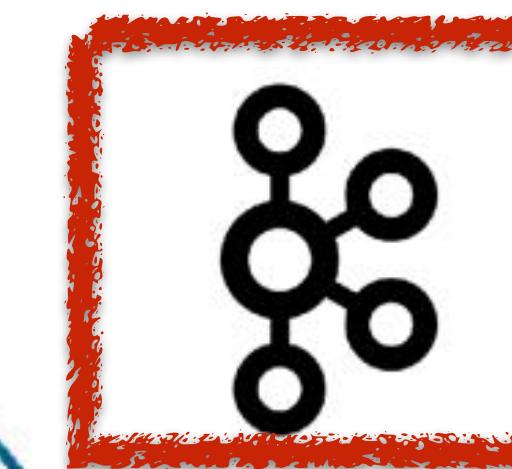


Why  
SQL-on-Hadoop  
if we are  
talking about  
Kafka?

# SQL-on-(almost)Everything



mongoDB



# Analyzing Wimbledon Twitter Feeds in Real Time with Kafka, Presto and Oracle DVD v3

17 JULY 2017 on analytics, dataviz, DVD, Oracle, kafka, twitter, presto, jdbc, wimbledo



# presto

# Limitations



Static List of Streams  
No AVRO Support



## Configuration

```
1+ {
2   "type": "kafka",
3   "kafkaConsumerProps": {
4     "enable.auto.commit": "true",
5     "value.deserializer": "org.apache.kafka.common.serialization.ByteArrayDeserializer",
6     "group.id": "drill-query-consumer-1",
7     "auto.offset.reset": "earliest",
8     "session.timeout.ms": "3000",
9     "store.kafka.poll.timeout": "20000",
10    "bootstrap.servers": "localhost:9092",
11    "client.id": "123",
12    "key.deserializer": "org.apache.kafka.common.serialization.ByteArrayDeserializer"
13  },
14  "enabled": true
15 }
```



Dynamic List of Streams

No AVRO Support



# Define a KSQL Stream as JSON Format



```
create stream irc.obihackers_Sender_stream with
(TIMESTAMP='createdat', VALUE_FORMAT='JSON')
as
select TIMESTAMPTOSTRING(createdat, 'yyyy-MM-dd HH:mm:ss.SSS') message_time,
createdat,
channel,
message,
EXTRACTJSONFIELD(sender, '$.nick') as sender_nick,
EXTRACTJSONFIELD(sender, '$.login') as sender_login,
EXTRACTJSONFIELD(sender, '$.hostname') as sender_hostname
from irc.obihackers_stream
PARTITION BY createdat;
```

# Use Kafka

```
0: jdbc:drill:drillbit=localhost> use kafka;
+-----+-----+
| ok | summary |
+-----+
| true | Default schema changed to [kafka] |
+-----+
1 row selected (0.134 seconds)
```

## Show Tables

```
0: jdbc:drill:drillbit=localhost> show tables;
+-----+-----+
| TABLE_SCHEMA | TABLE_NAME
+-----+
| kafka | TWITTER_STREAM_KEYS
| kafka | connect-configs
| kafka | irc.AvroObihackers
| kafka | _schemas
| kafka | connect-offsets
| kafka | TWITTER_STREAM_K
| kafka | connect-statuses
| kafka | TWITTER_STREAM_DETAILS
| kafka | OBTHACKERS_SENDER_STREAM
| kafka | ksql_commands
| kafka | tw.twitter_stream
| kafka | __consumer_offsets
| kafka | __confluent.support.metrics
+-----+
13 rows selected (0.448 seconds)
```



# Query Data

```
0: jdbc:drill:drillbit=localhost> select channel, message, message_time from OBIHACKERS_SENDER_STREAM limit 5;
+-----+-----+-----+
| channel | message | message_time |
+-----+-----+-----+
| #obihackers | <Dzenchik> >_<Francesco Tisiot> are you win or linux? | 2018-02-15 10:57:53.379 |
| #obihackers | <Dzenchik> >_<Francesco Tisiot> are you win or linux? | 2018-02-15 10:58:01.365 |
| #obihackers | <Dzenchik> >_<Francesco Tisiot> are you win or linux? | 2018-02-15 11:01:10.538 |
| #obihackers | <Dzenchik> Yep | 2018-02-15 11:10:59.100 |
| #obihackers | <ChristianBerg> (Photo, 582x243) http://www.obihackers.com/QNwMYmXn/file_2744.jpg | 2018-02-15 13:18:30.044 |
+-----+-----+-----+
5 rows selected (0.685 seconds)
```



# KSQL vs SQL-on-Hadoop



## Continuous Query

Data Resides in Kafka

Limited SQL

No JDBC/ODBC access officially Supported

Examining Data Streams and Stream Processing

## Static Query

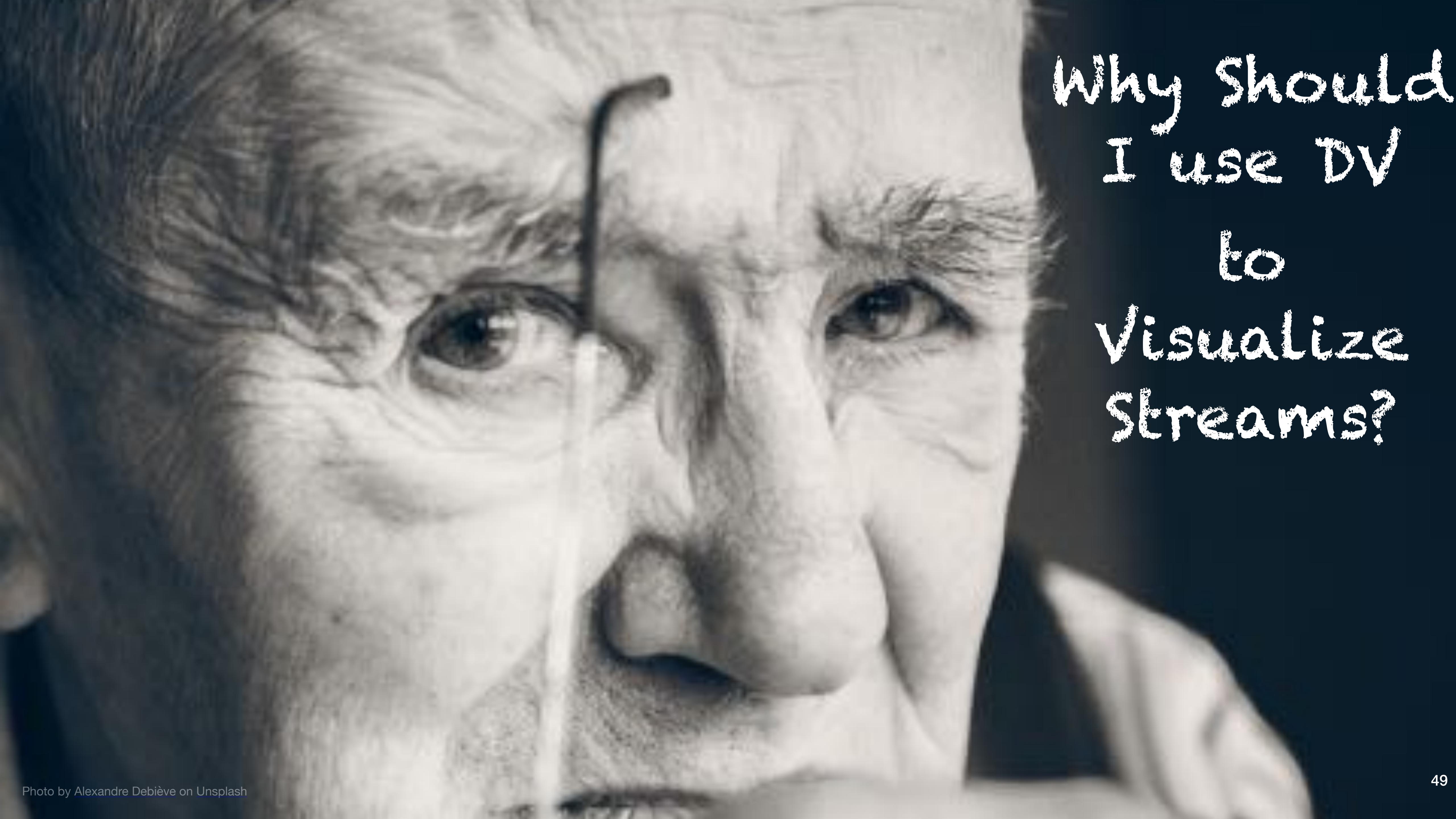
External (Static) Tables can be created

Rich set of SQL Functions (Views can be created)

Can be Accessed via ODBC

Ad-hoc Random Access





Why Should  
I use DV  
to  
Visualize  
Streams?

It's Data!

Self Service Analytics

Real Time Insights

Mash-up

Test and Apply ML



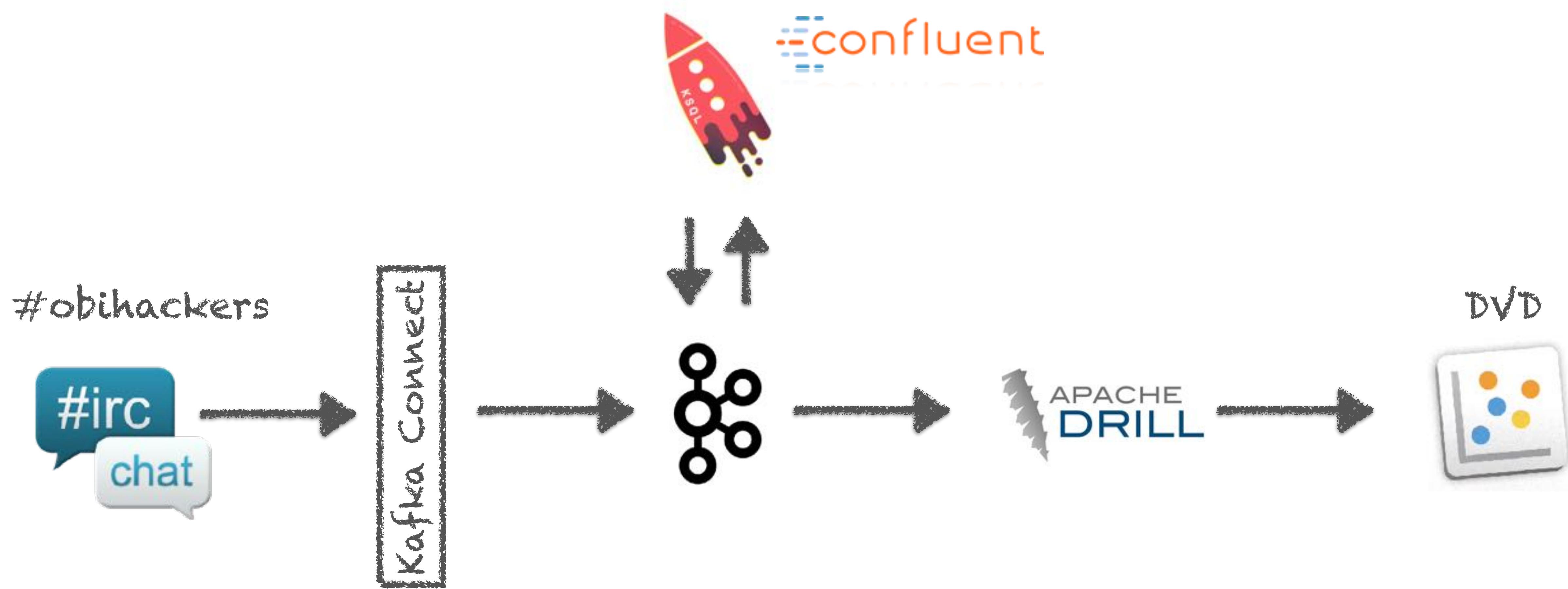


Does DV  
Provide a  
Kafka  
Connection  
?



Reiki  
can  
use  
drills!

# Example



# Use the Tools for What they are Good at!



- Stream Keys and Timestamps
- Stream in JSON Format
- Aggregated Tables



- Complex SQL Functions
- Combining Data
- Ranking/Ordering



- Visualize Data
- Mashup
- Machine Learning/Advanced Analytics



# DVD and Drill



- Install MapR ODBC Driver

- Create Connection

- Select Storage



- Select Table



- In case of Errors replace "..." with '...'

"dfs.tmp".localkafka

'dfs.tmp'.localkafka

Keyboard

obhacker

Search

Pinned message  
Topic for channel #obhacker: "Dope..."

Dope! like we'll talk again when Portugal goes out at the 1st stage 10:00 AM

true José 10:00 AM

obhacker#9749  
«Pedro! » I thought you wanted to change topics Francesco 10:00 AM

Christian Remy  
Francesco Franchi  
I believe OBEST user...  
 Didn't you read what I wrote? 10:00 AM

10:00 AM

10 Feb 2018

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# Limits



- Creation of a Kafka Consumer for each Query
- Reads all Data from Topic
- JSON format (until AVRO support)

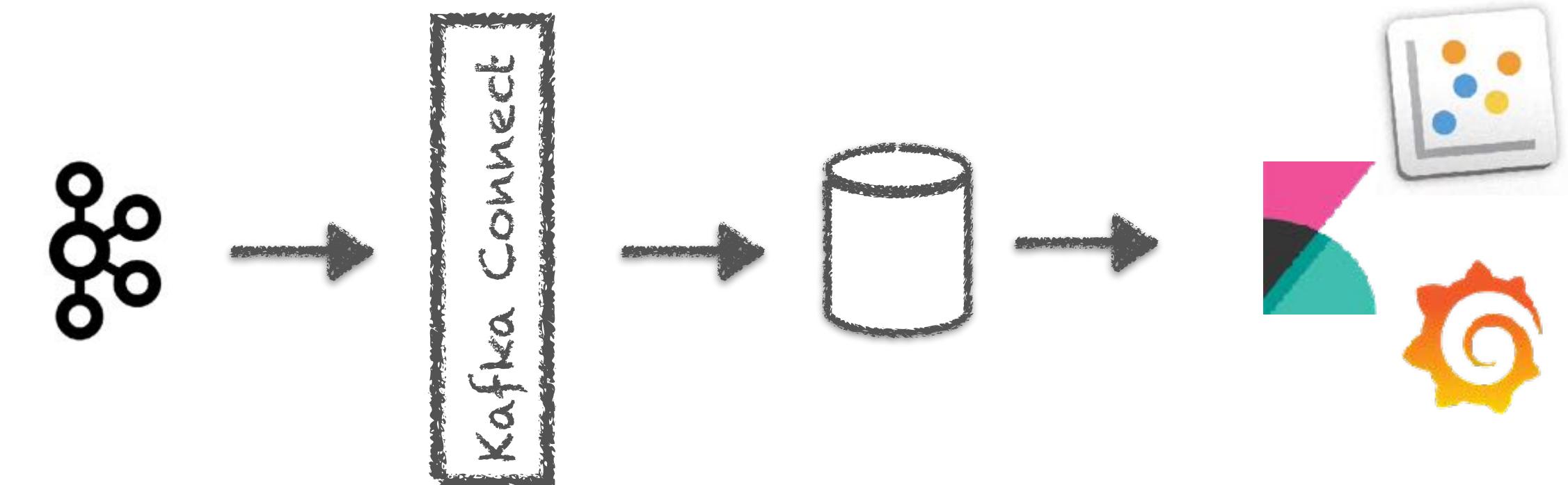
Not Suitable for  
Massive  
Dashboard Style  
Reporting

# Suggestion

...Use the Tools for What they are Good at!



- Data/Insights Discovery
- Self Service Analytics
- Data Mashup
- Small Datasets
- Prototype Building



- Monitoring/Alerting
- Dashboards
- Massive Datasets
- Consolidated KPIs
- Complex Calculations

# #Cloud



Final Suggestions...

- Kafka

- Separate Topics for direct Reporting
- Include Discovery back to Kafka

- Drill

- Prototype and Data Mashup

- DVD

- Visualizations and Personal Data Mashup

- Standardised Reporting

- Kafka Connect Sink and "Old Days" Tools



Modern  
Analytical  
Platform

# Visualizing streams



# ODTUG Kscope18



ORLANDO, FLORIDA • JUNE 10-14

PLEASE  
FILL OUT YOUR  
EVALUATIONS