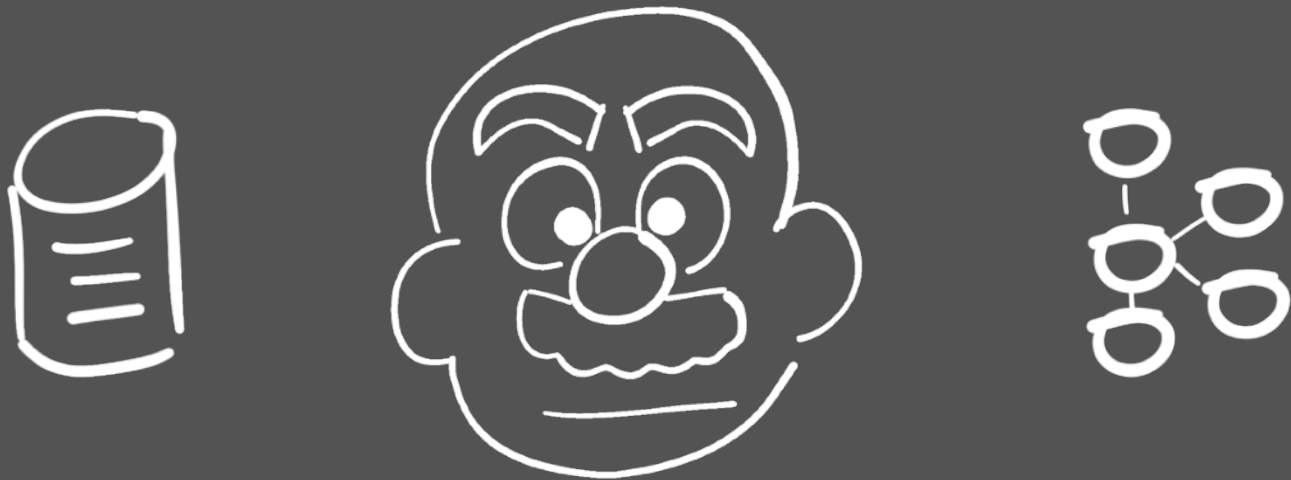
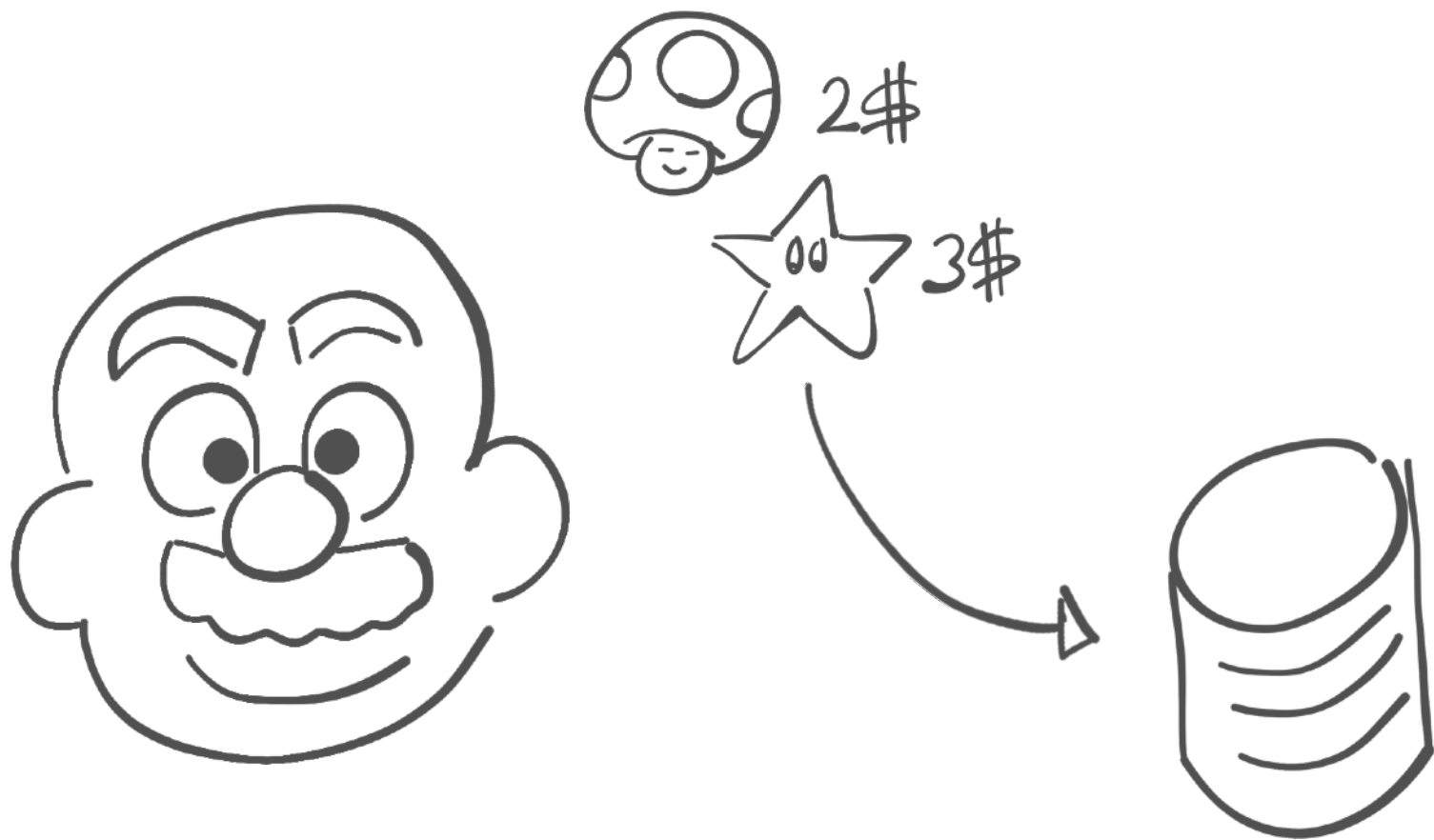
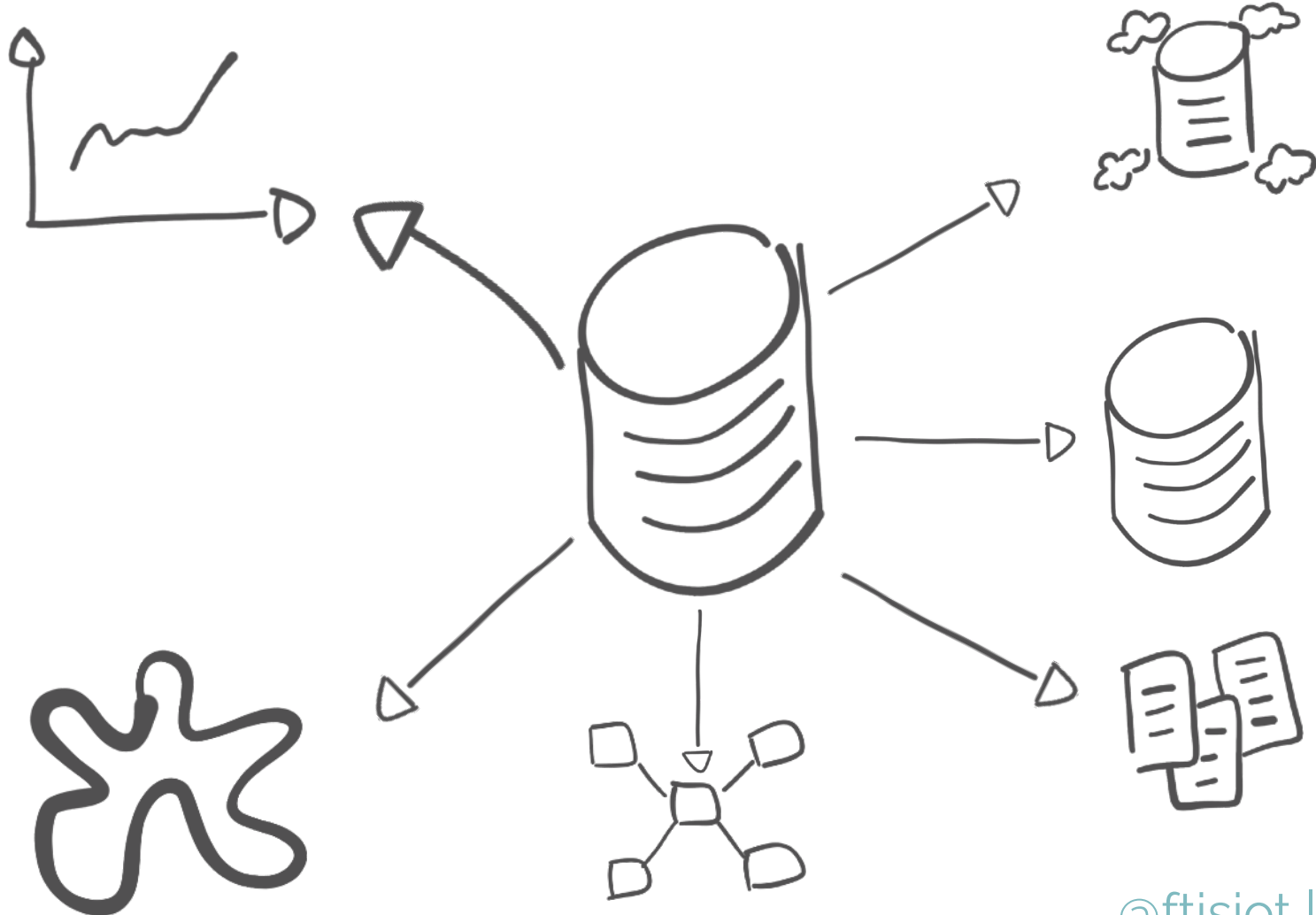


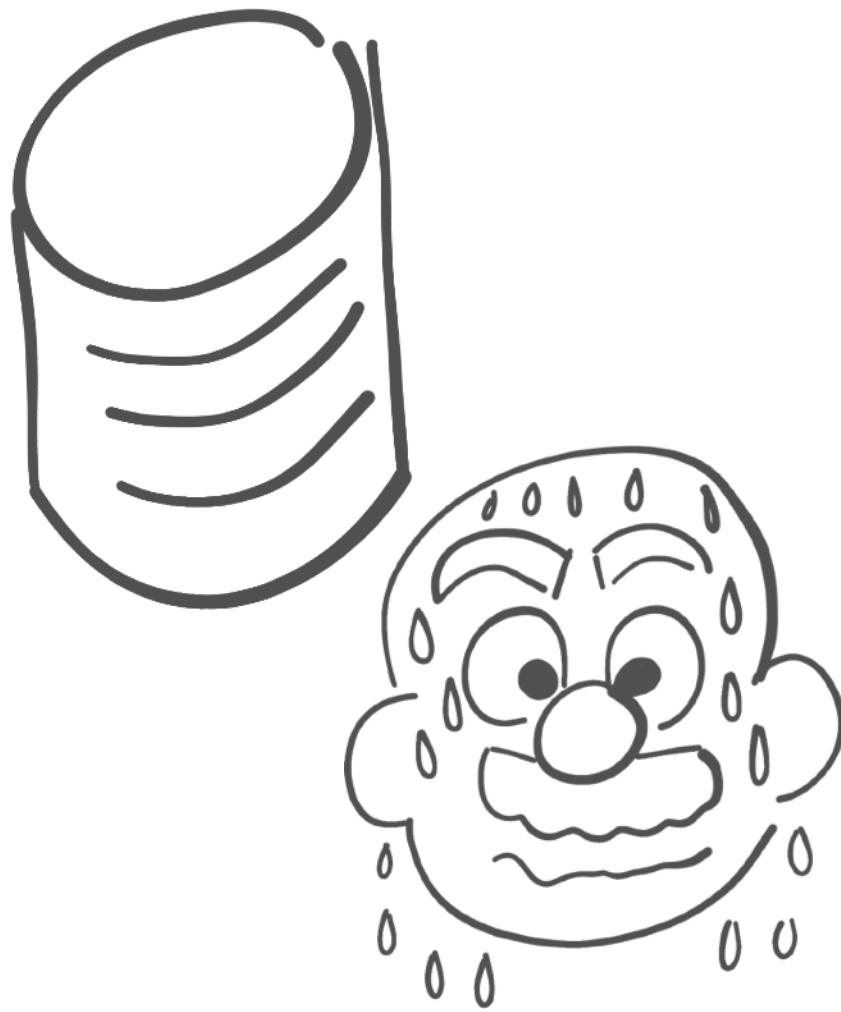
# JDBC Source Connector

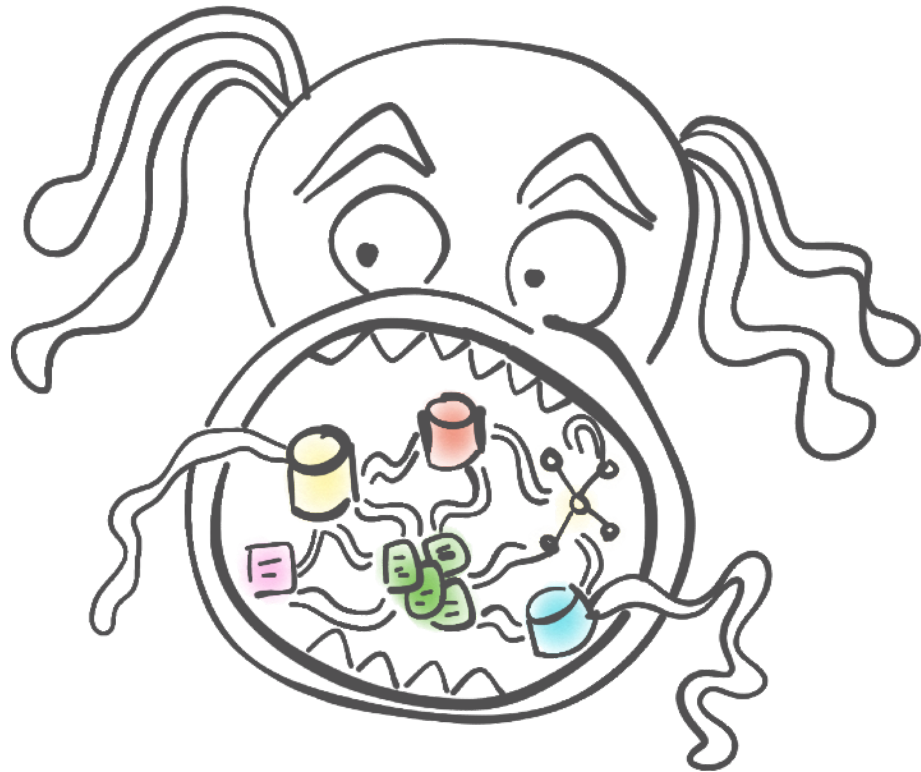


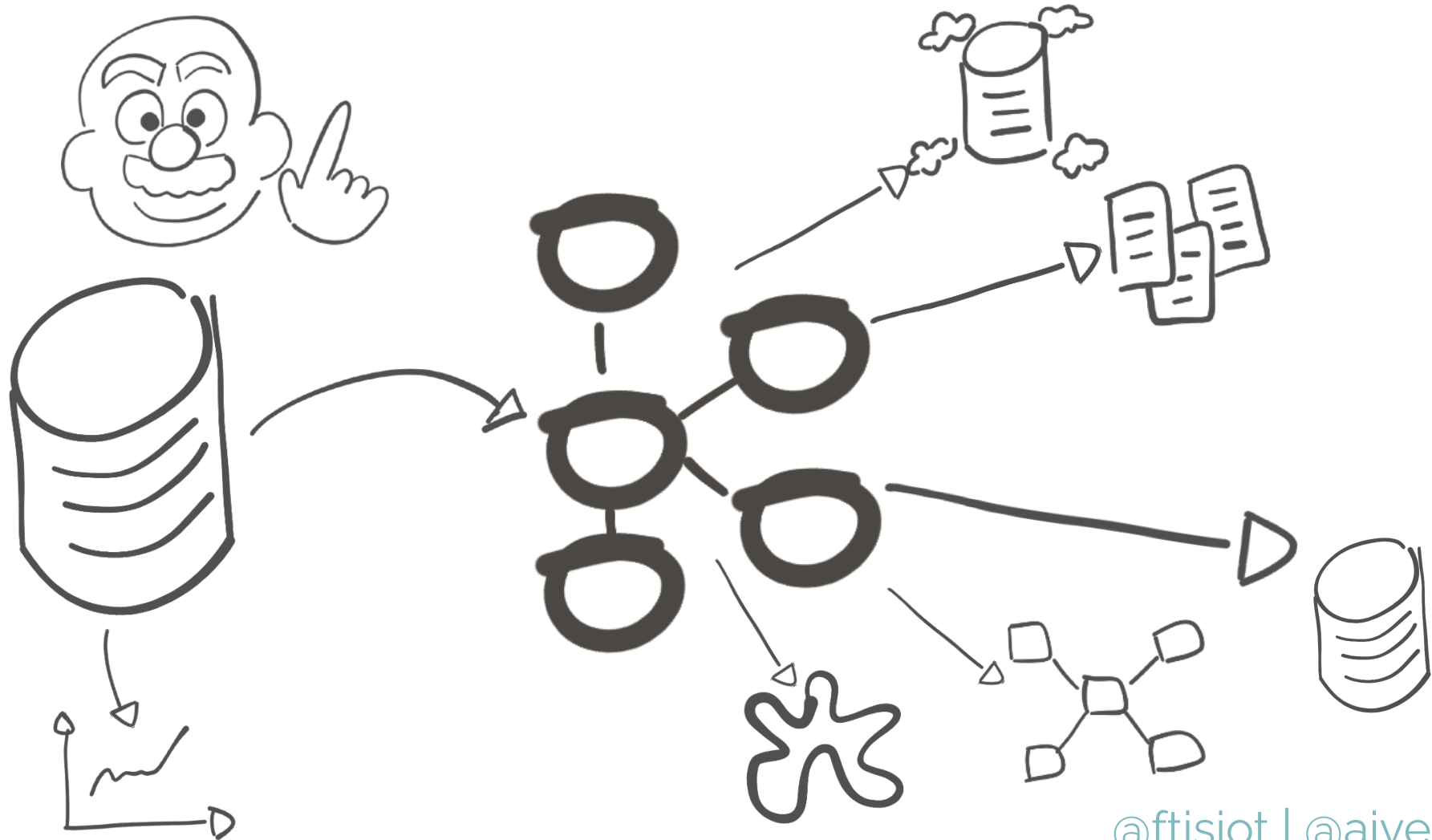
## What Could Go Wrong?

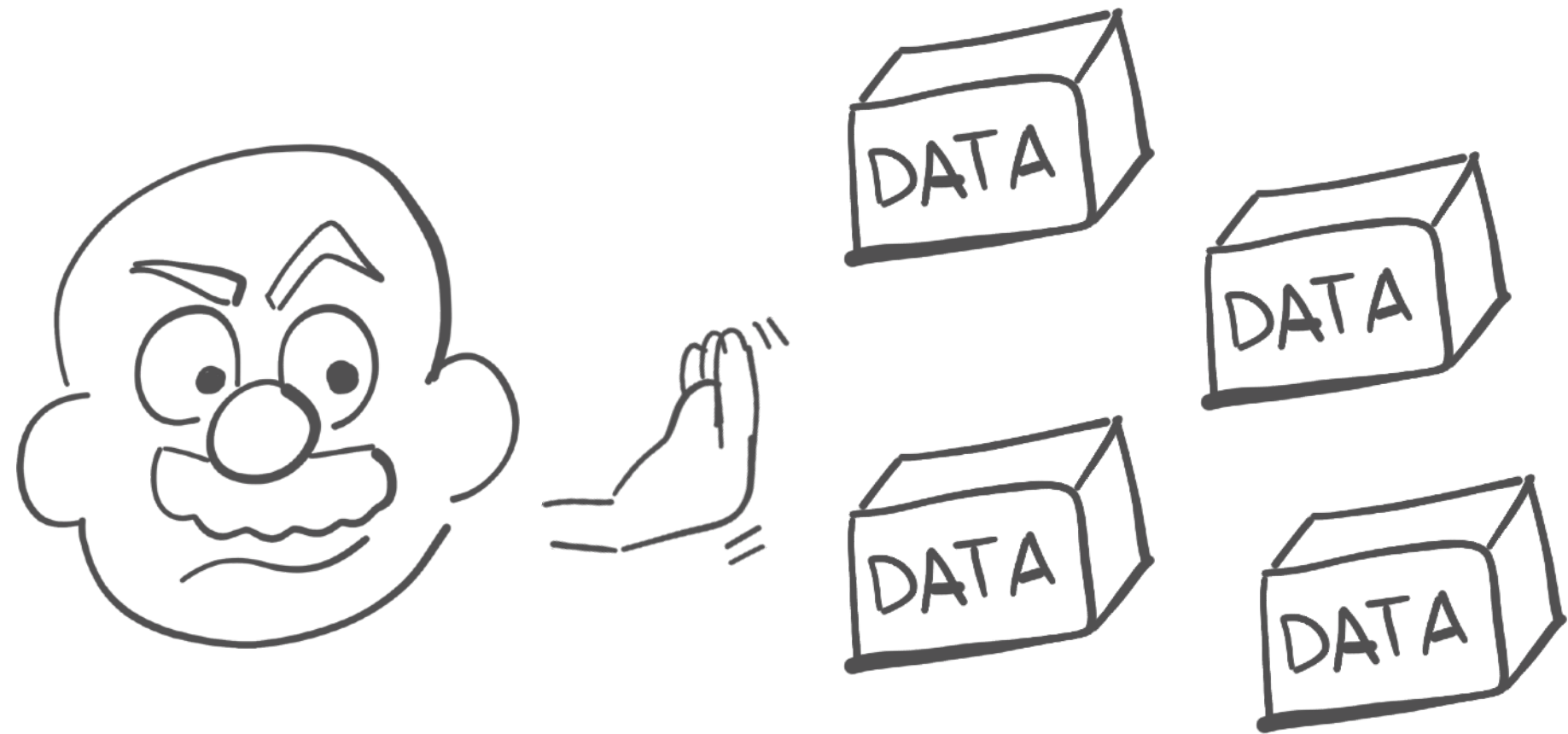


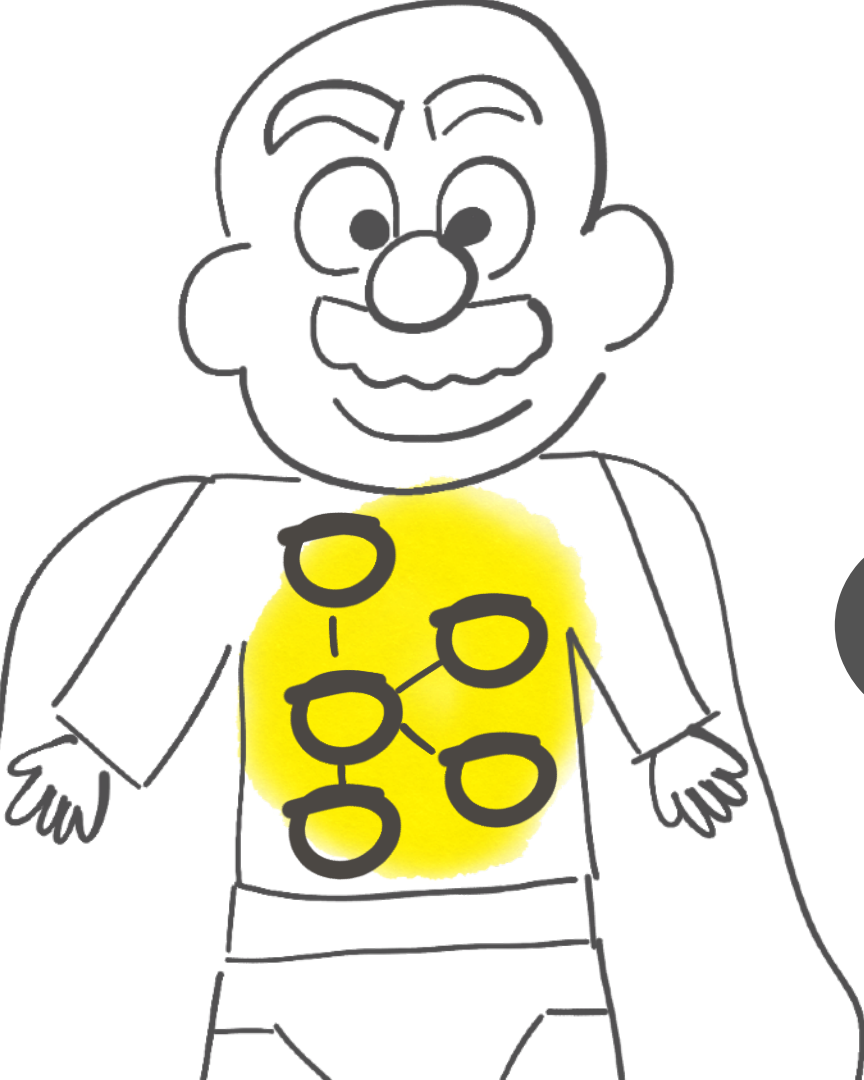






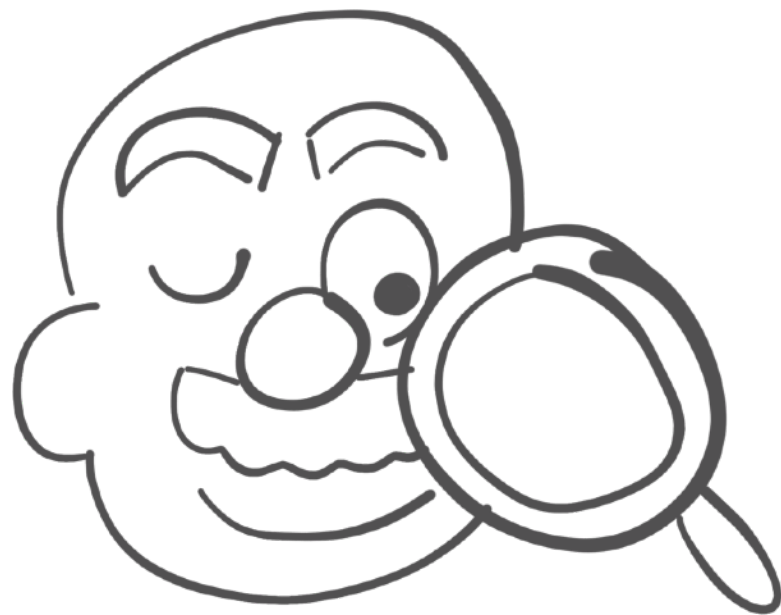






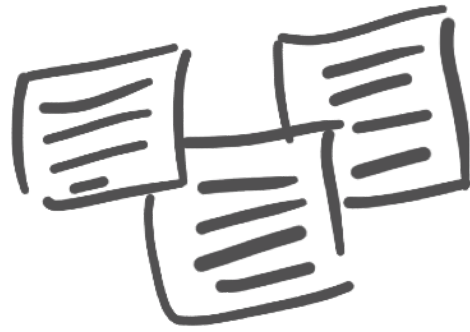
# Kafka Connect





# JDBC Source Connector

List of Tables

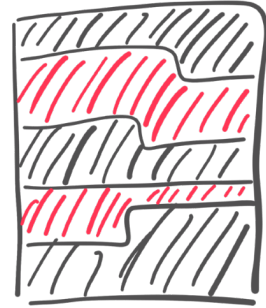
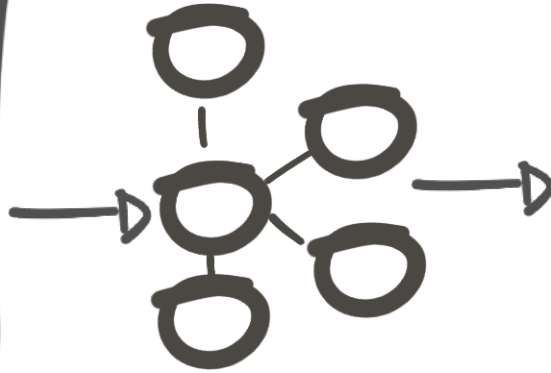
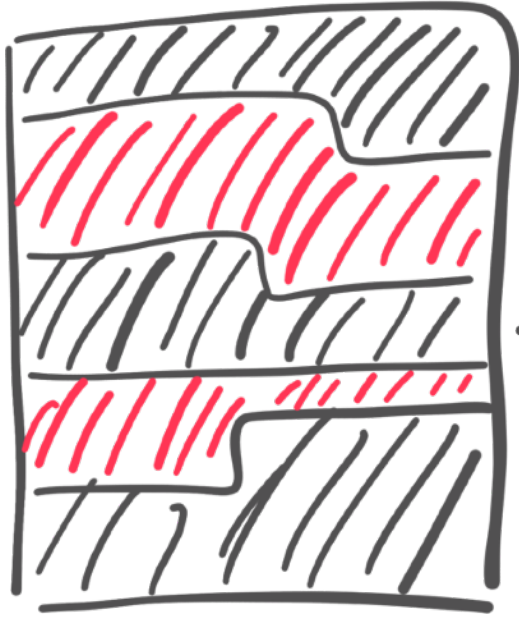


Polling Interval

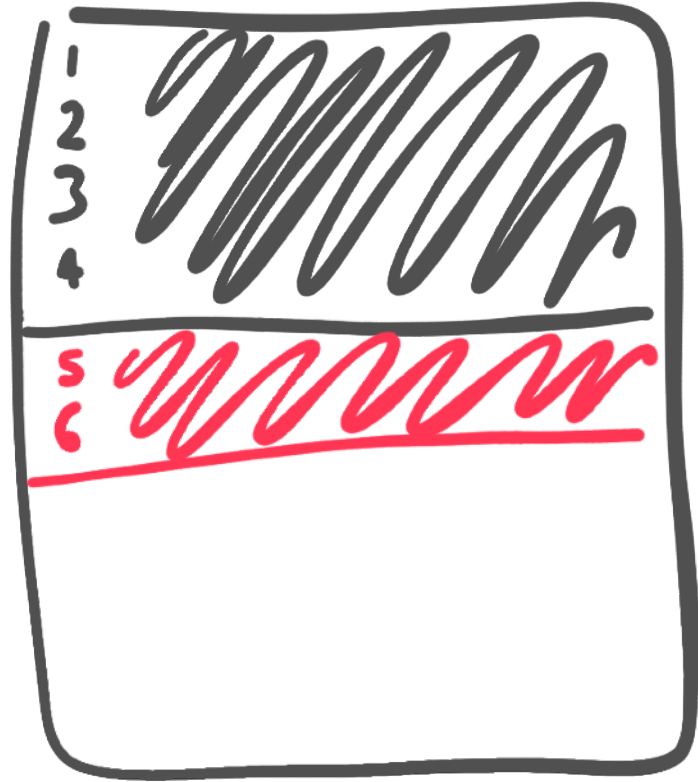


Query Mode

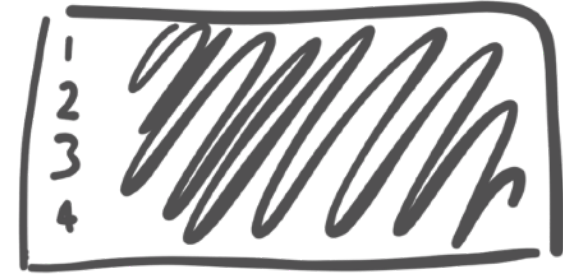
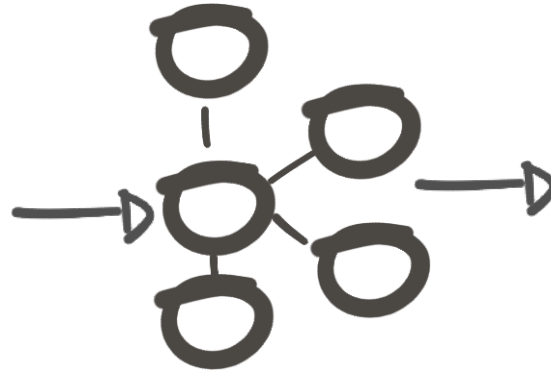
# Bulk Mode



# Incremental Mode

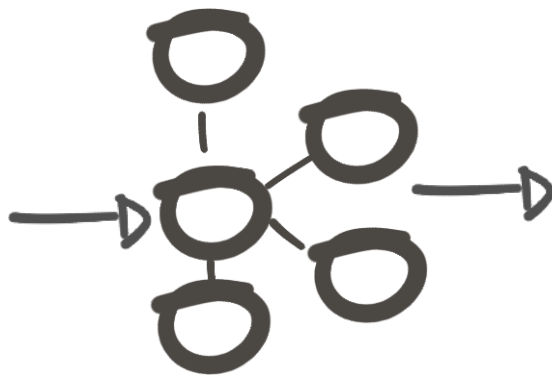


1 2 5  
3 4



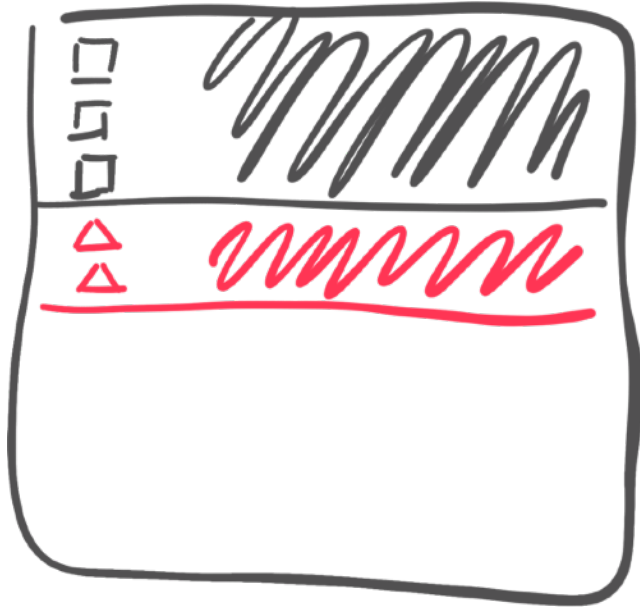
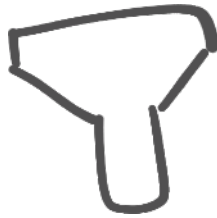
WHERE ID > 4

# Timestamp Mode



WHERE TS > 10.03

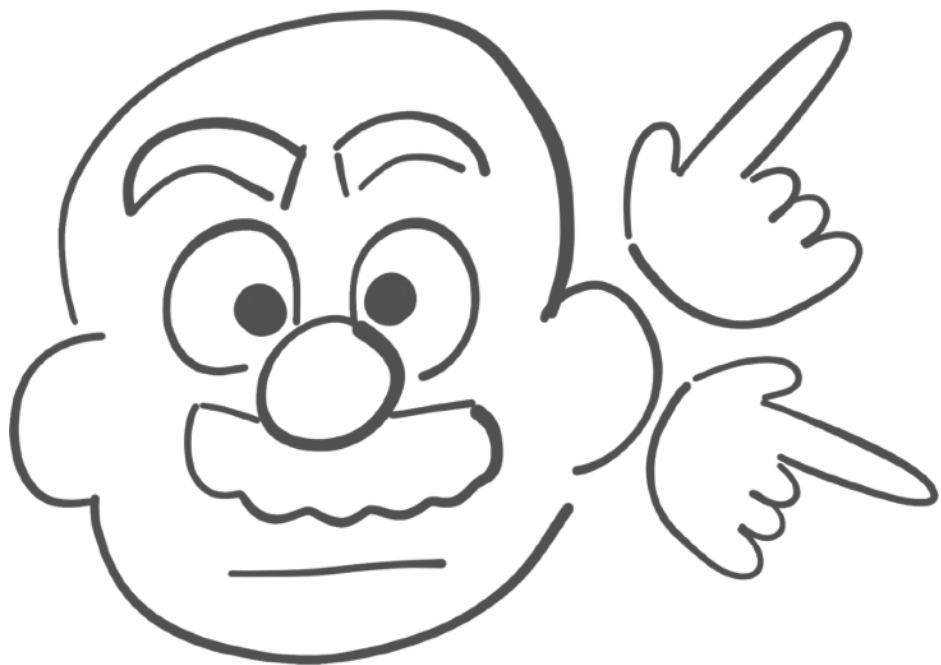
Query Mode



WHERE COL =  $\Delta$

# Problems





# Which JDBC Connector ?

<https://github.com/aiven/jdbc-connector-for-apache-kafka>

@ftisiot | @aiven\_io



# Common Challenges

Number Mapping



`numeric.mapping`

Out of Memory Errors



`defaultRowFetchSize`

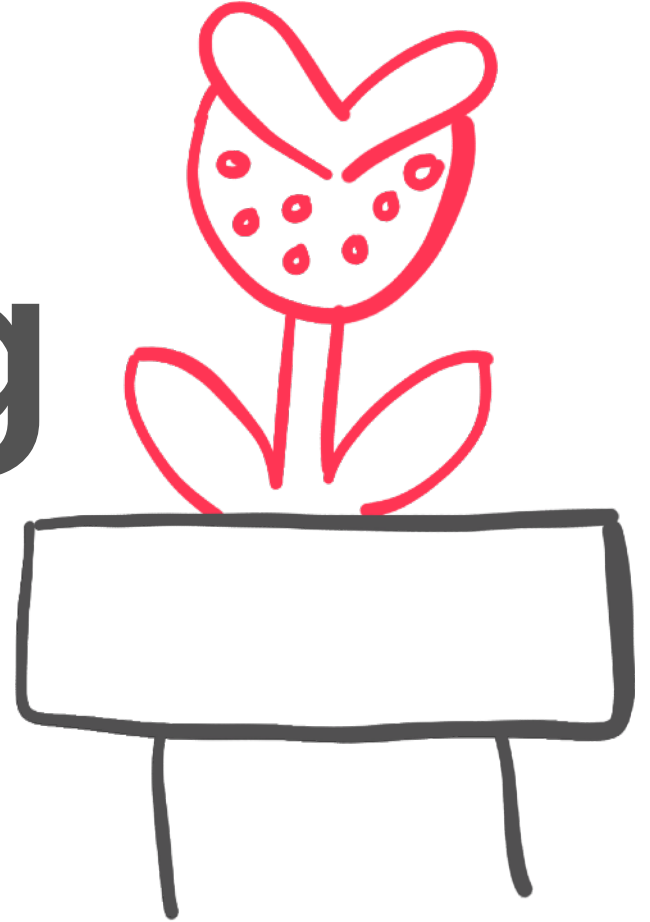
Data Types

**ERROR** java.lang.IllegalArgumentException:  
Number of groups must be positive

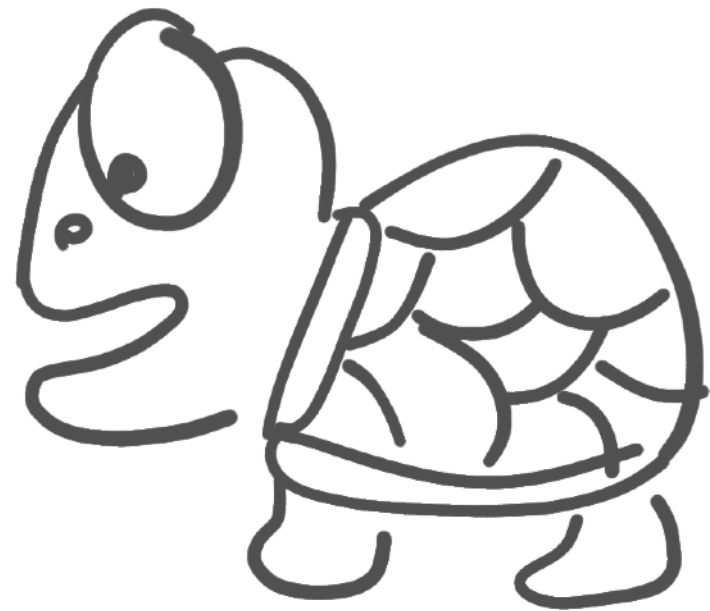


table.types

Everything  
is Fine  
**Not**



# Fast Events

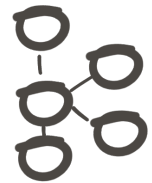


Polling Interval

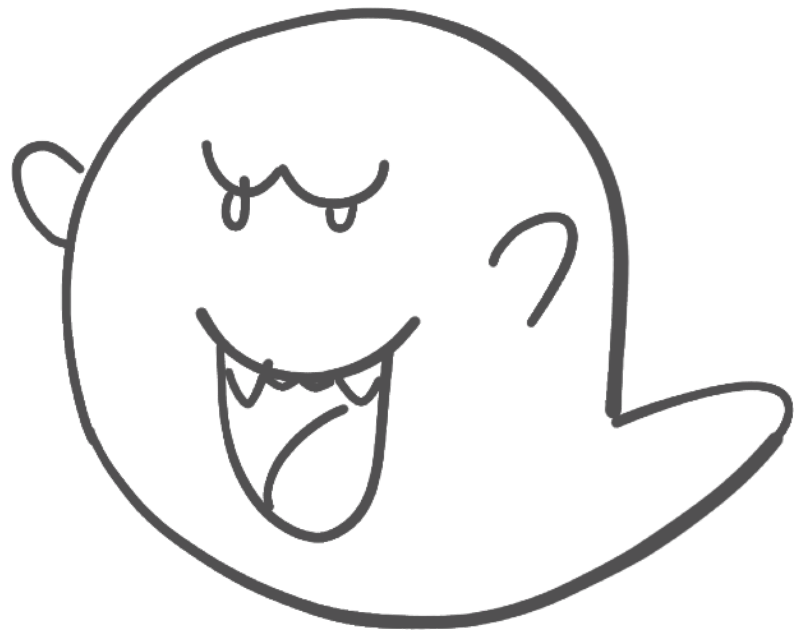
Event



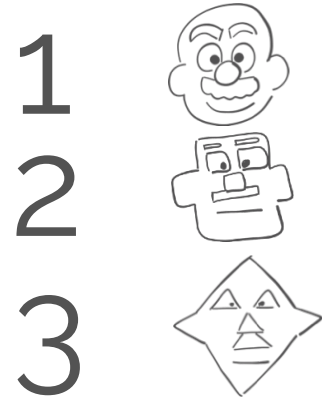
State



# Ghost Events



| Id | Name                                                                              |
|----|-----------------------------------------------------------------------------------|
| 1  |  |
| 2  |  |
| 3  |  |



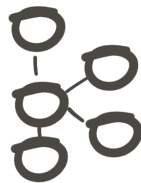
Incremental = No Updates!

Name

Change Timestamp



10:00



10:00



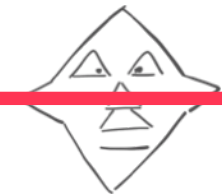
10:03



10:01



10:02



10:02

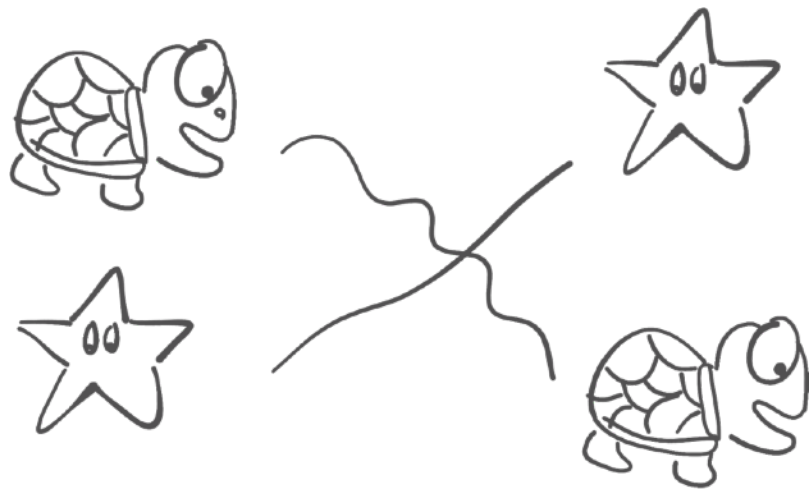


10:03

No Hard Deletes!



# Out of Order Events



Name

Change Timestamp



10:00



10:00



10:01



10:01



10:03



10:03



10:02

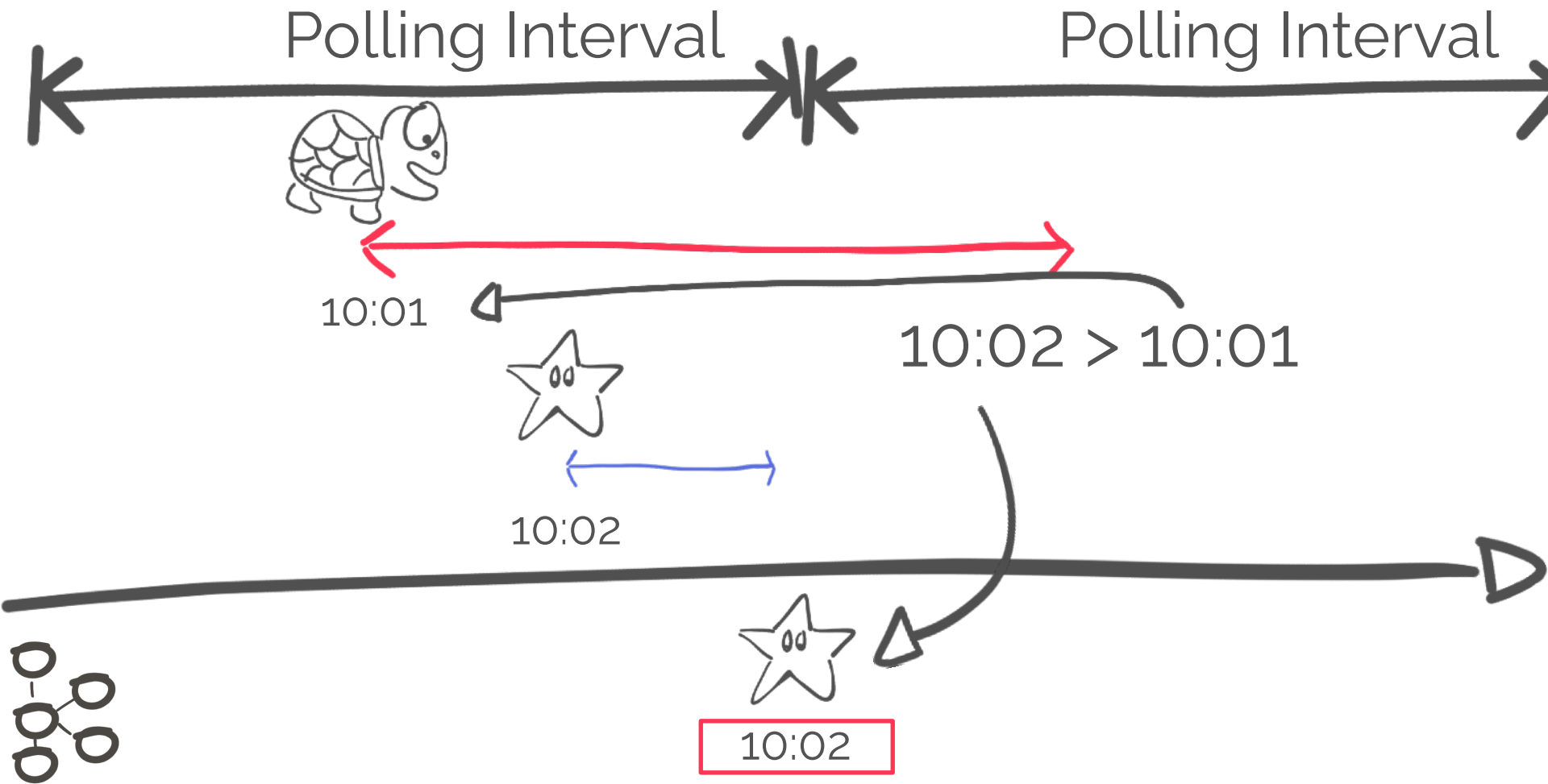
Device Clock

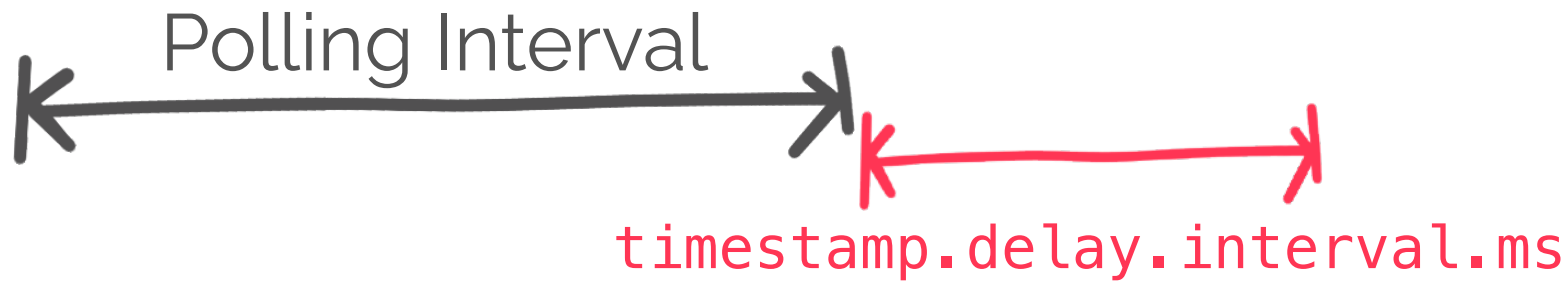
Batching

# Why?

Network Lag

Transaction Duration





# JDBC Limits

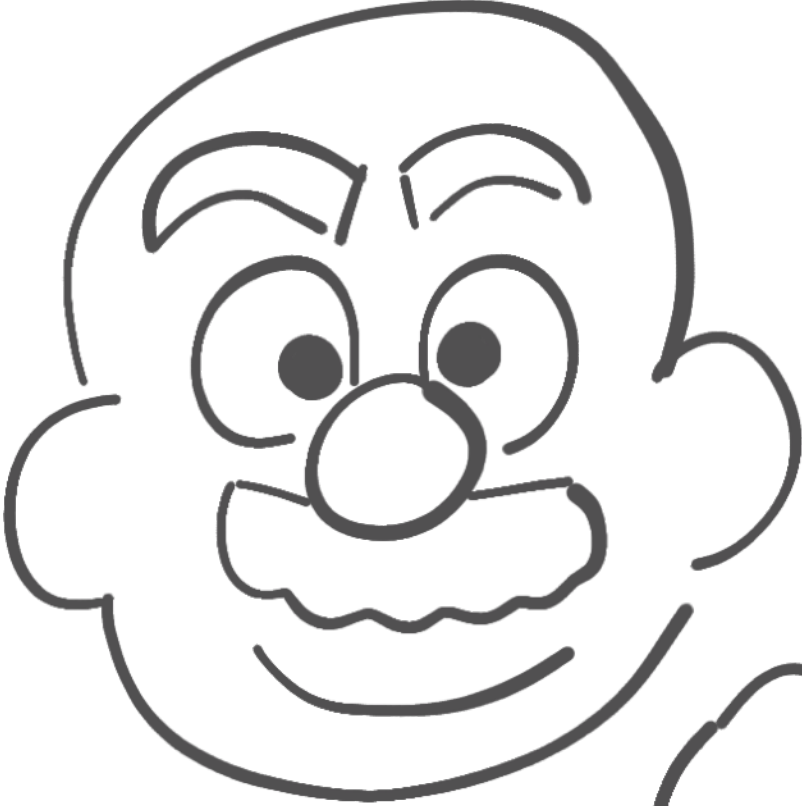
Require Extra Fields

Updates/Deletions

Load on the DB

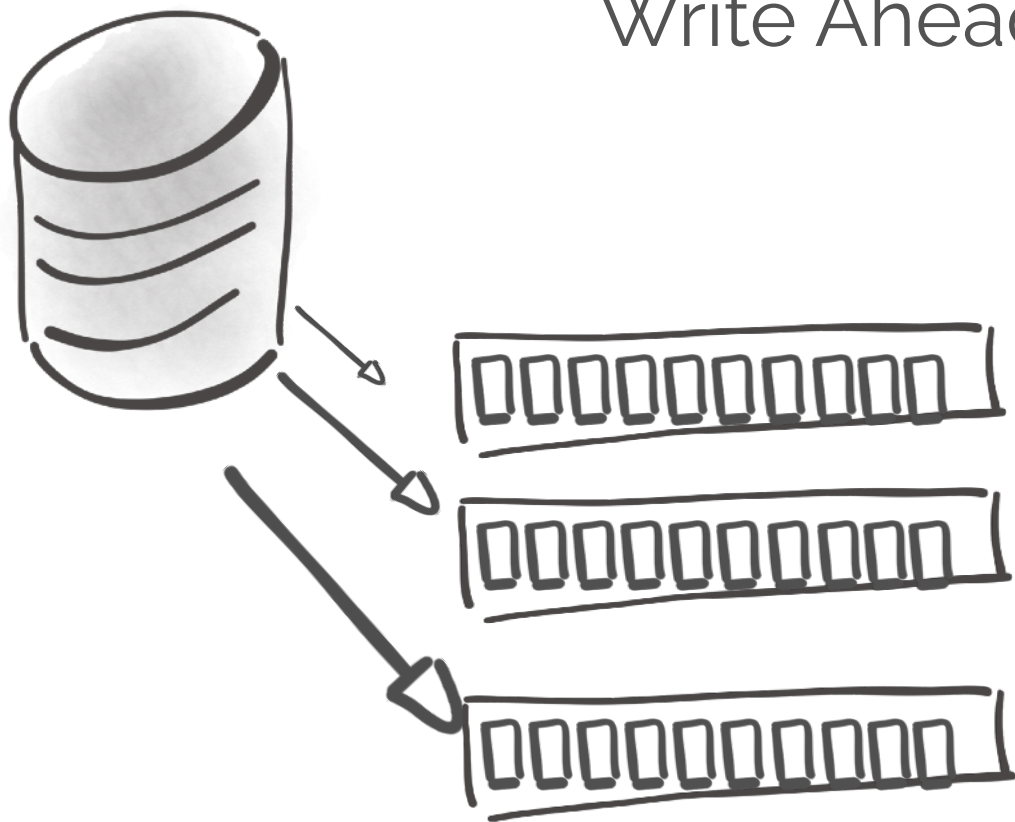
Polling Time

Out of Order Events



# Log Based Approach

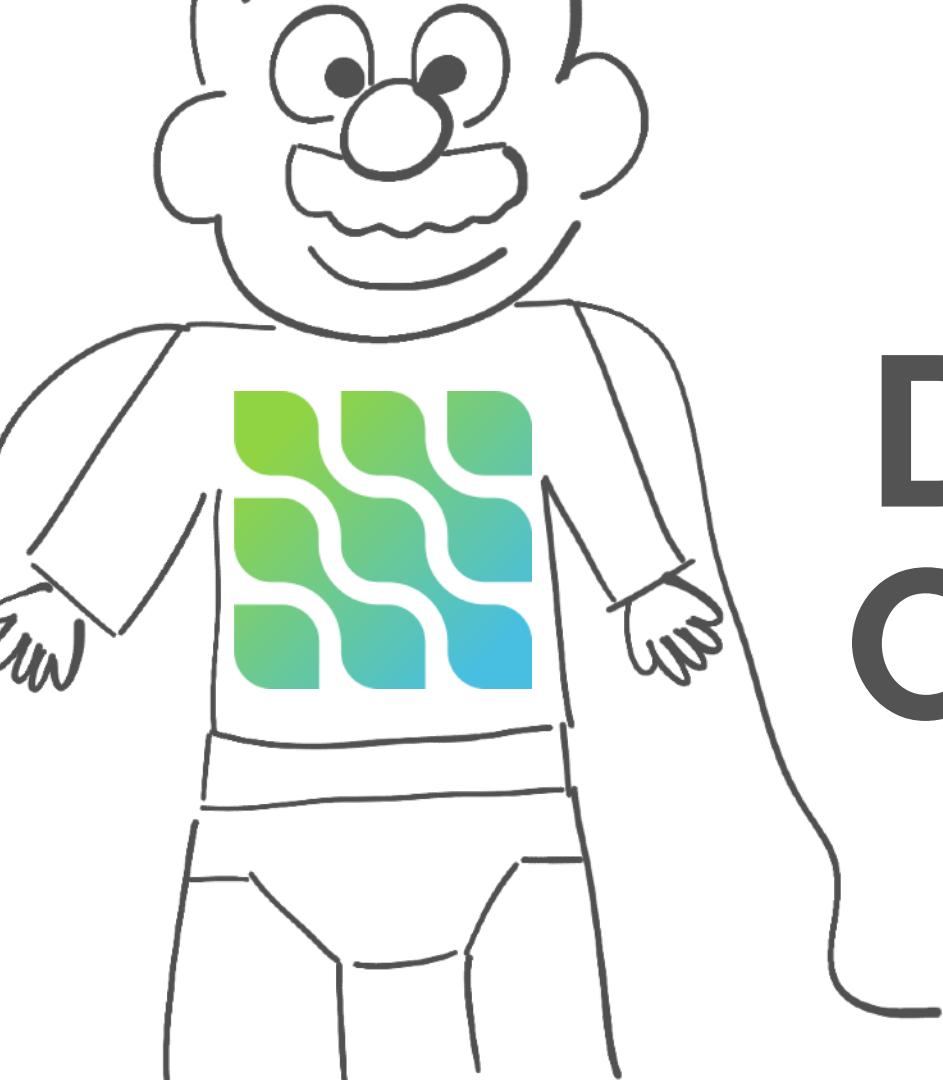
# Write Ahead Log - PostgreSQL



binlog - MySQL

oplog - MongoDB





# Debezium Connector



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-bash

℃ 81

SSL connection (protocol: TLSv1.3, cipher: TLS\_AES\_256\_GCM\_SHA384, bits: 256, compression: off)  
Type "help" for help.

```
defaultdb=> select * from players;  
code | name
```

```
-----+-----  
1 | Mario 🐸  
2 | Princess 🧚  
3 | Turtle 🐢
```

(3 rows)

```
defaultdb=> insert into players values (4, 'Mushroom 🍄');
```

```
INSERT 0 1
```

```
defaultdb=> update players set name = 'Ghost 👻' where name = 'Mushroom 🍄';
```

```
UPDATE 1
```

```
defaultdb=> delete from players where name='Ghost 👻';
```

```
DELETE 1
```

```
defaultdb=> insert into players values (4, 'Ghost 👻');
```

```
INSERT 0 1
```

```
defaultdb=> delete from players where name='Ghost 👻';
```

```
DELETE 1
```

```
defaultdb=>
```

```
defaultdb=>
```

```
"connector":"postgresql","name":"my_pgsource","ts_ms":1648798370665,"snapshot":{"string":"last"},"db":"defaultdb","sequence":{"string":"[null,\\84102280\\]"},"schema":"public","table":"players","txId":{"long":843},"lsn":{"long":84102280},"xmin":null,"op":"r","ts_ms":{"long":1648798370665},"transaction":null}  
% Reached end of topic my_pgsource.public.players [0] at offset 3  
{"code":4}  
{"before":null,"after":{"Value":{"code":4,"name":{"string":"Mushroom 🍄"}}},"source":{"version":"1.7.0.Final","connector":"postgresql","name":"my_pgsource","ts_ms":1648798390595,"snapshot":{"string":"false"},"db":"defaultdb","sequence":{"string":"[null,\\84102952\\]"},"schema":"public","table":"players","txId":{"long":856},"lsn":{"long":84102952},"xmin":null,"op":"c","ts_ms":{"long":1648798390879},"transaction":null}  
% Reached end of topic my_pgsource.public.players [0] at offset 4  
{"code":4}  
{"before":{"Value":{"code":4,"name":{"string":"Mushroom 🍄"}}},"after":{"Value":{"code":4,"name":{"string":"Ghost 👻"}}},"source":{"version":"1.7.0.Final","connector":"postgresql","name":"my_pgsource","ts_ms":1648798397130,"snapshot":{"string":"false"},"db":"defaultdb","sequence":{"string":"[\\84102952\\,\\84103336\\]"},"schema":"public","table":"players","txId":{"long":861},"lsn":{"long":84103336},"xmin":null,"op":"u","ts_ms":{"long":1648798397479},"transaction":null}  
% Reached end of topic my_pgsource.public.players [0] at offset 5  
{"code":4}  
{"before":{"Value":{"code":4,"name":{"string":"Ghost 👻"}}},"after":null,"source":{"version":"1.7.0.Final","connector":"postgresql","name":"my_pgsource","ts_ms":1648798405381,"snapshot":{"string":"false"},"db":"defaultdb","sequence":{"string":"[\\84103336\\,\\84103792\\]"},"schema":"public","table":"players","txId":{"long":867},"lsn":{"long":84103792},"xmin":null,"op":"d","ts_ms":{"long":1648798405592},"transaction":null}  
{"code":4}  
% Reached end of topic my_pgsource.public.players [0] at offset 7  
{"code":4}  
{"before":null,"after":{"Value":{"code":4,"name":{"string":"Ghost 👻"}}},"source":{"version":"1.7.0.Final","connector":"postgresql","name":"my_pgsource","ts_ms":1648798415613,"snapshot":{"string":"false"},"db":"defaultdb","sequence":{"string":"[\\84103792\\,\\84104208\\]"},"schema":"public","table":"players","txId":{"long":874},"lsn":{"long":84104208},"xmin":null,"op":"c","ts_ms":{"long":1648798416232},"transaction":null}  
{"code":4}  
{"before":{"Value":{"code":4,"name":{"string":"Ghost 👻"}}},"after":null,"source":{"version":"1.7.0.Final","connector":"postgresql","name":"my_pgsource","ts_ms":1648798415639,"snapshot":{"string":"false"},"db":"defaultdb","sequence":{"string":"[\\84104208\\,\\84104392\\]"},"schema":"public","table":"players","txId":{"long":875},"lsn":{"long":84104392},"xmin":null,"op":"d","ts_ms":{"long":1648798416233},"transaction":null}  
{"code":4}  
% Reached end of topic my_pgsource.public.players [0] at offset 10  
[
```

# JDBC Limits

No Extra Fields

~~Require Extra Fields~~

All Events

~~Updates/Deletions~~

Minimal Load

~~Load on the DB~~

Tracked as per Log

~~Out of Order Events~~

Near Real Time

~~Polling Time~~

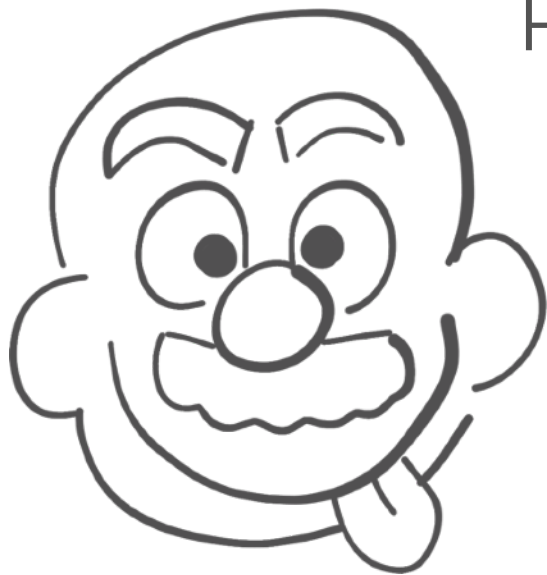
# Additional Benefit

-

## Enhanced Metadata!

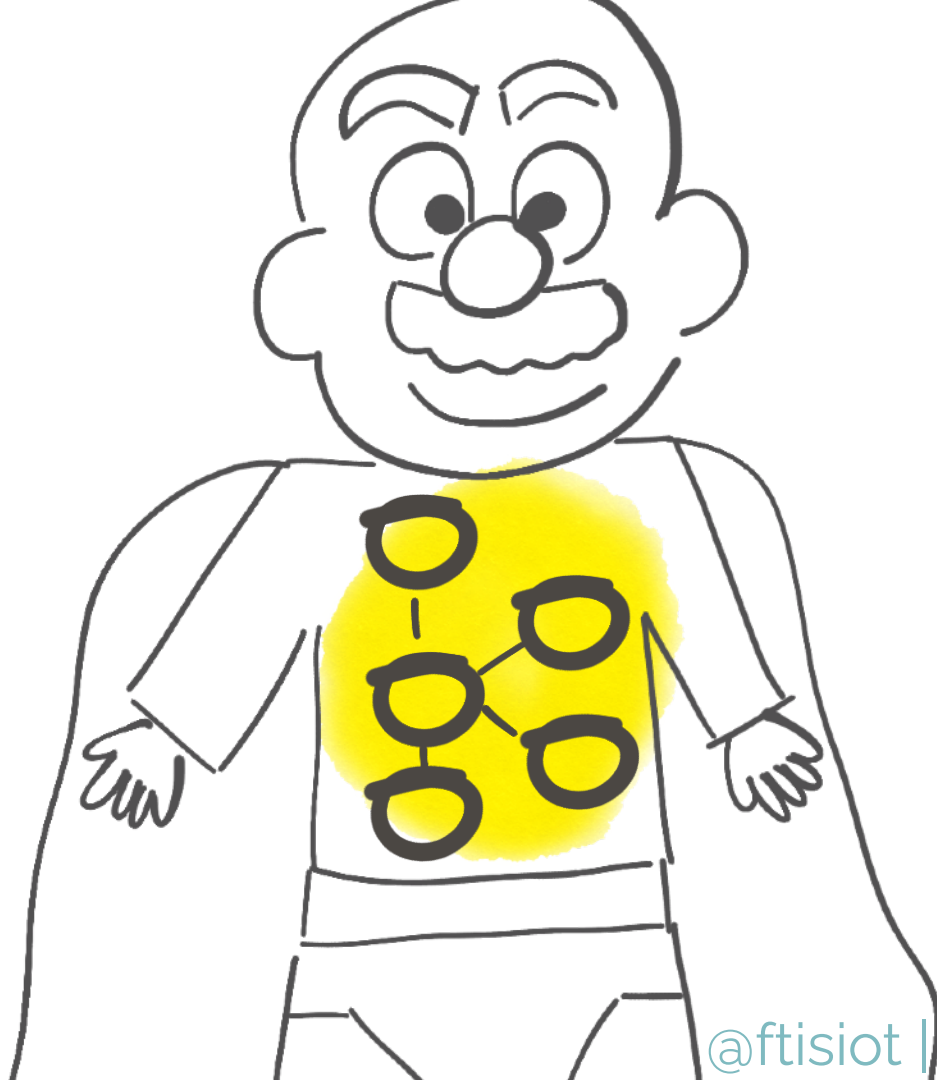
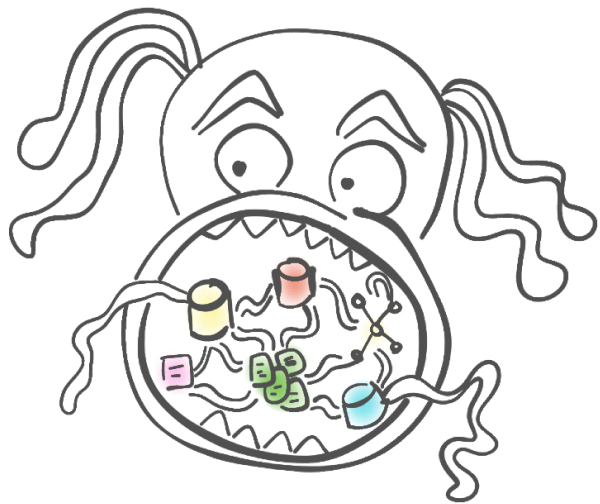
Timestamps

Pre-Post status



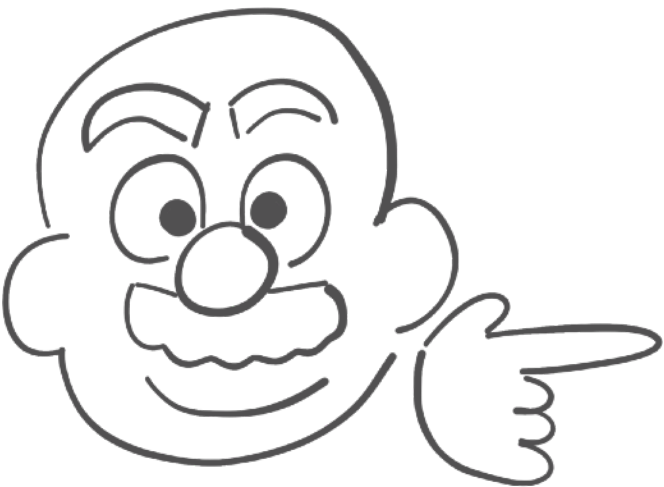
Operation Type

Sequence Number





# JDBC



# Debezium



<https://ftisiot.net/talks/kafka-jdbc-what-can-go-wrong/>

JDBC

JDBC Connector



Debezium Connector



JDBC Source Connector in Action



Debezium Connector in Action



<https://aiven.io>



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