Building a modern data pipeline: Lessons learned

Saulius Valatka

Adform

Full stack online advertising platform

Serving banners, real-time auctions, data management, etc.

Data driven products

- Analytics
- Algorithm optimization
- Fraud detection
- Forecasting

>1,000,000 QPS

bids, impressions, clicks, requests, ...

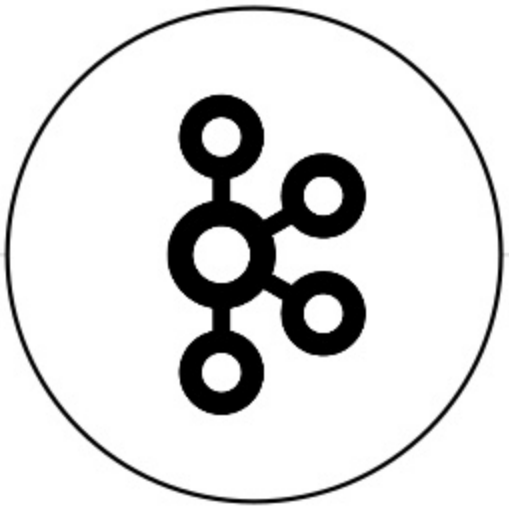
>500 MB/s

data incoming

>500 TB

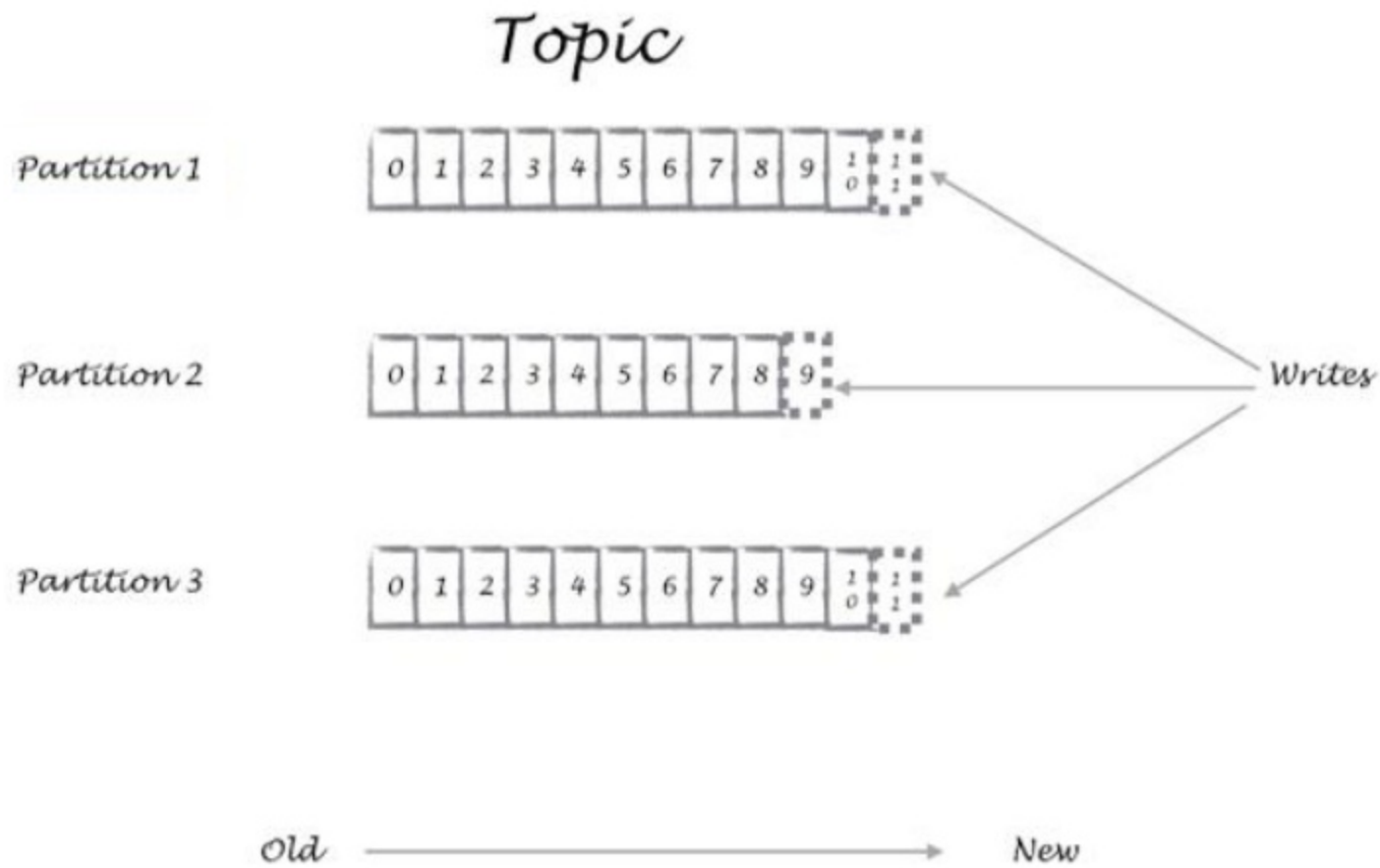
data stored


MESOS
kafka
Flink
VERTICA
HDFS
AEROSPIKE



Kafka

the backbone of any modern data pipeline


Topic
Partition 1
0 1 2 3 4 5 6 7 8 9 10 11
Partition 2
0 1 2 3 4 5 6 7 8 9
Partition 3
0 1 2 3 4 5 6 7 8 9 10 11
Writes
Old
New

Kafka Delivery Guarantees

Producing

Transactional “exactly-once”

Since Kafka 0.11

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Consuming

Consumer must implement

“atomic” offset commiting

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Long term storage loading

HDFS, Vertica and the like

Loading projects topics

_topic	_partition	_offset	cookie_id	url
impressions	*1*	*401*	123412341	http://www.reddit.com/
impressions	*1*	*402*	23412354	http://lwn.net/Kernel
impressions	*2*	*390*	234123566	http://join.adform.com/
impressions	*2*	*391*	64342453	http://www.ufc.com/rankings
impressions	*1*	*403*	341235346	http://nasza-klasa.pl/
impressions	*3*	*943*	465344354	http://www.facebook.com/


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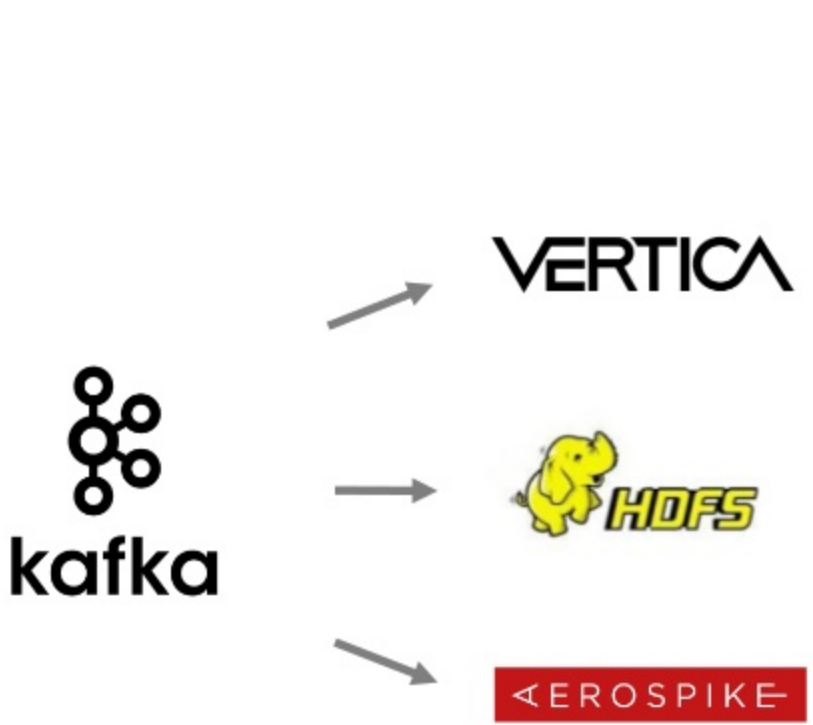

Multiple data stores

All the benefits of CQRS

But consistency is still hard

Kafka is awesome

We can achieve real-time data flow with exactly-once guarantees and have statically-typed data at every step of the way

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Kafa is our source of truth

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Stream Processing

Flink, Spark, Kafka-Streams, oh my!

The world beyond batch: Streaming 101

A high level tour of modern data-processing concepts
By Tyler Akidau. August 5, 2015

The world beyond batch: Streaming 102

The what, where, when, and how of unbounded data processing.
By Tyler Akidau. January 20, 2016

Stream processing

Modern frameworks like spark (structured streaming), flink and kafka streams allow for exactly-once stateful data processing

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Streaming should be preferred over batching

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Batch Processing

... or what we don't want to do with streams

What do we do in batch ?

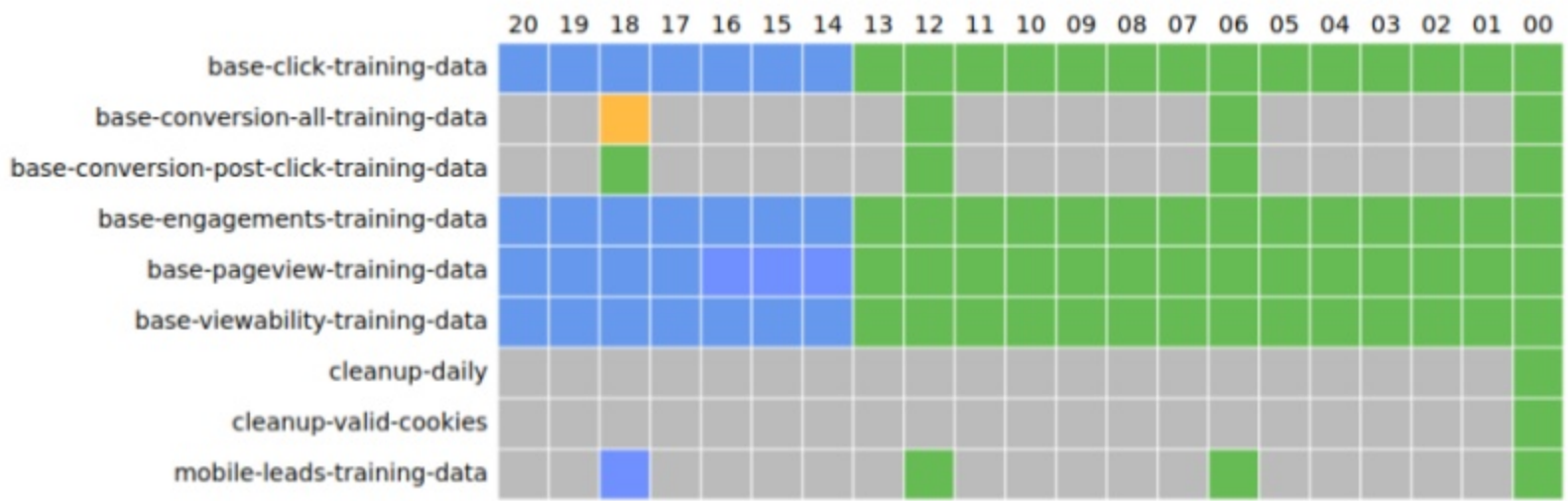
- Algorithm training
- Attributions with wide windows
- Data cubing

How do you even batch ?

azkaban, oozie, luigi, airflow ...

why do people keep reinventing this ?

Scheduling reinvented ¯_(ツ)_/¯

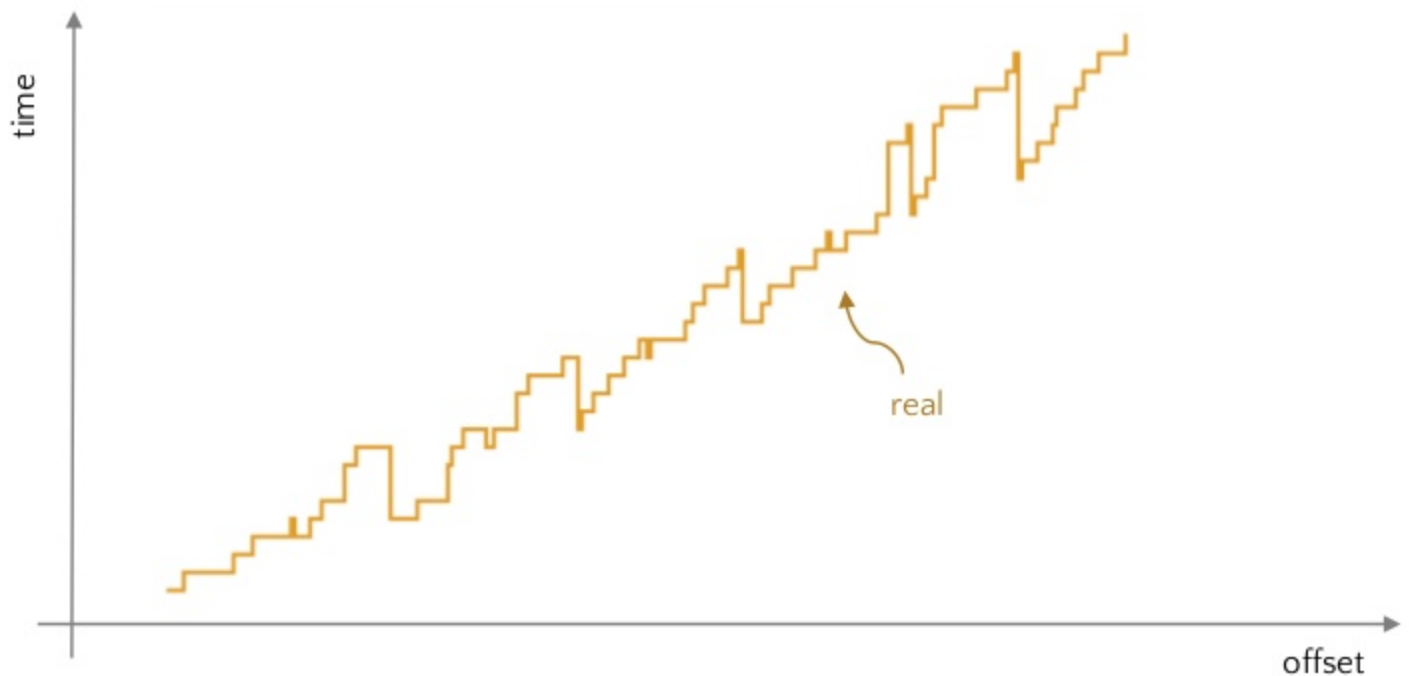


Scheduling reinvented ¯_(ツ)_/¯

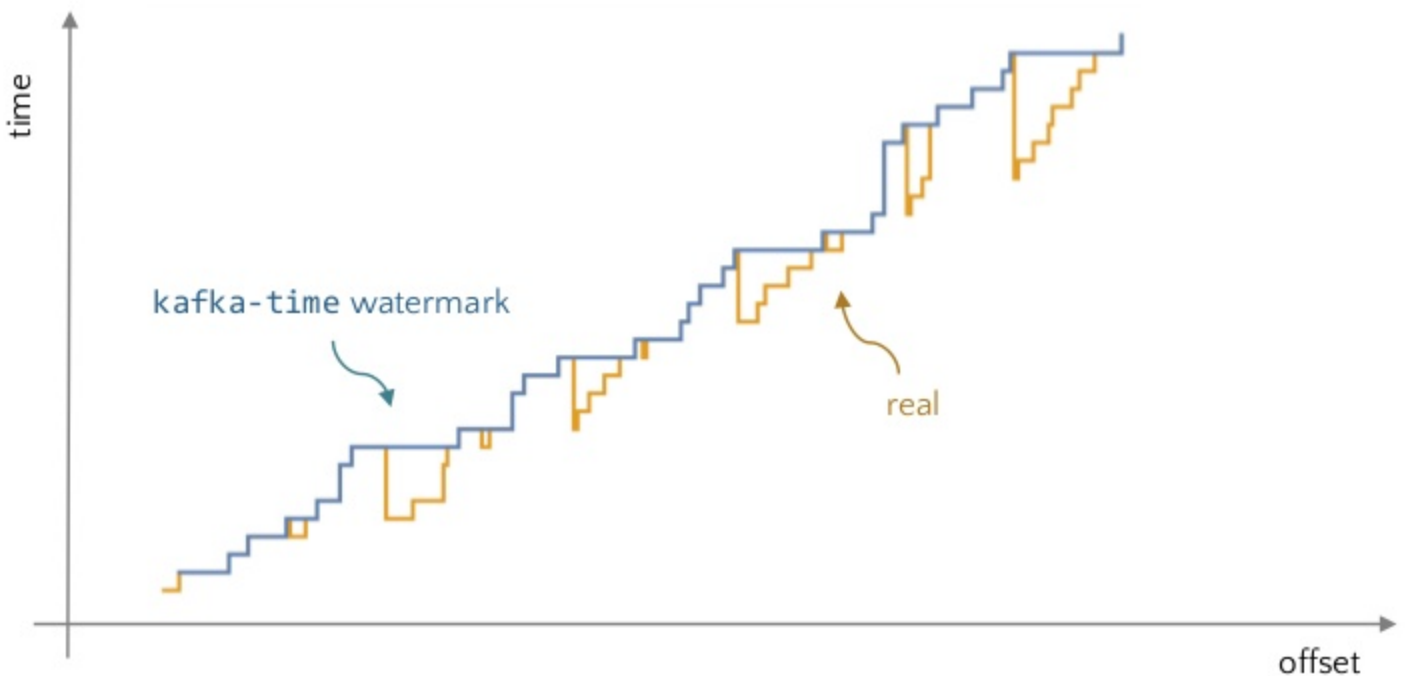
- Declarative configuration
- Runs containers (https://github.com/adform/sprint)
- Not (yet) open-sourced

Time based scheduling cannot in principle guarantee data consistency because of late data

When is it safe to run ?



kafka-time to the rescue!

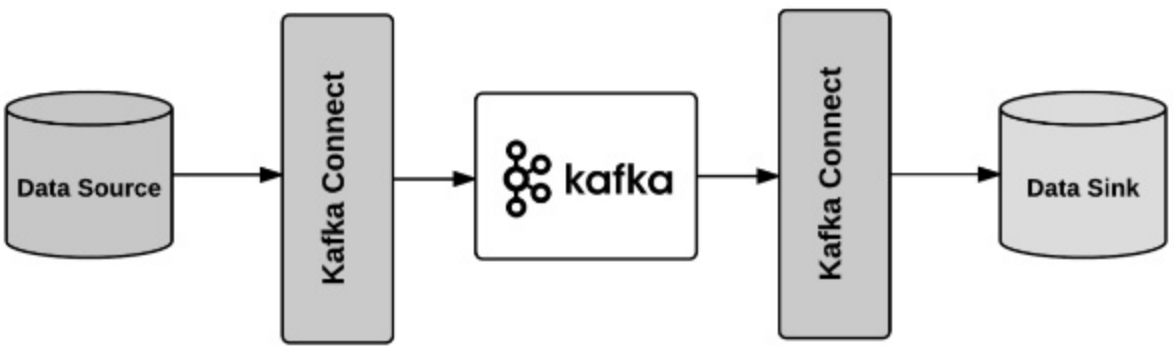


4

What about “dimensions” ?

a.k.a. metadata: clients, campaigns, etc.

Data Distribution Platform



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Reproducible, testable, auditable, other good words

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Accessible

Clearly understood, easily used and extended

Thanks!

Any questions ?

You can find me at

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