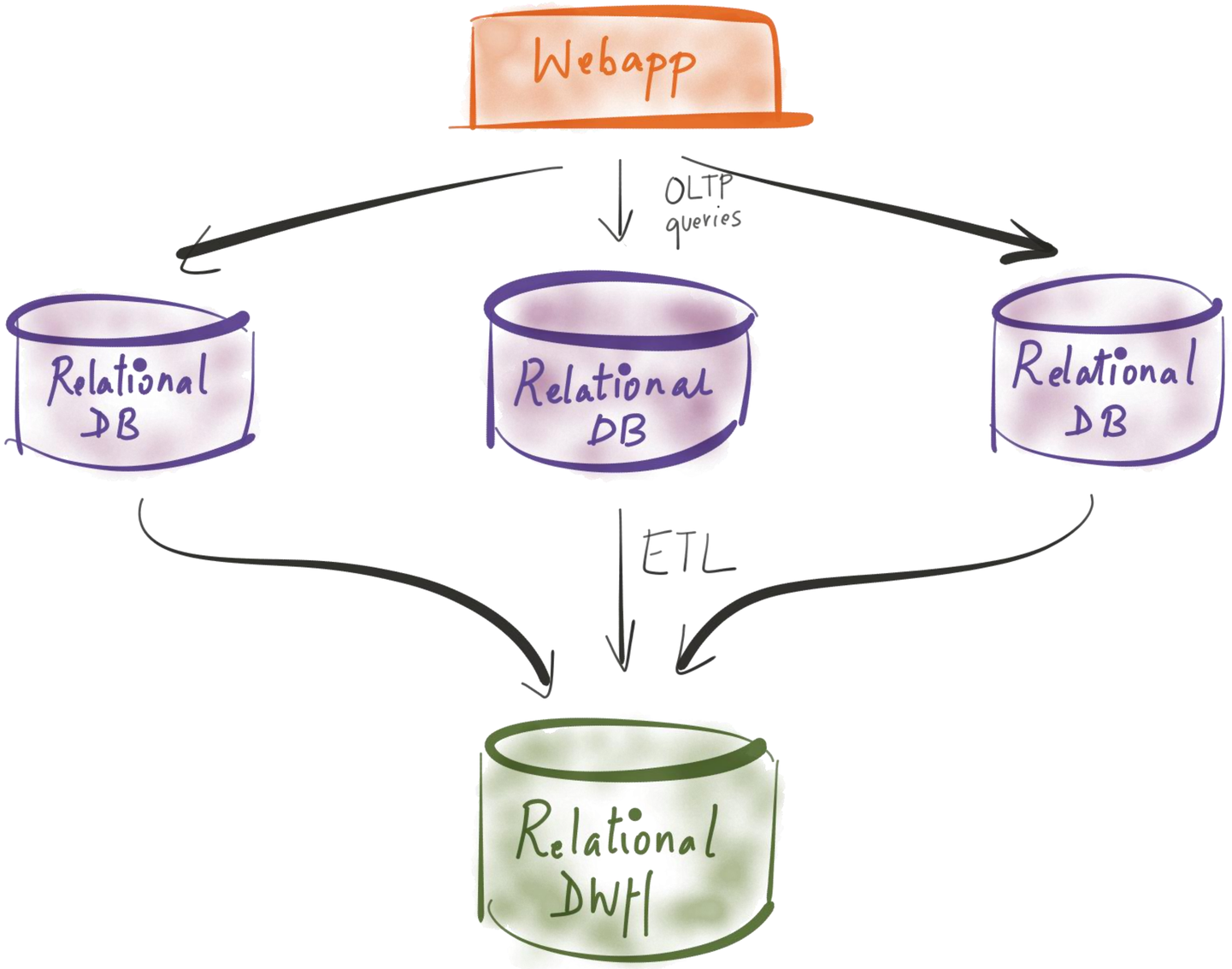
The Many Faces of Apache Kafka: Leveraging Real-time Data at Scale

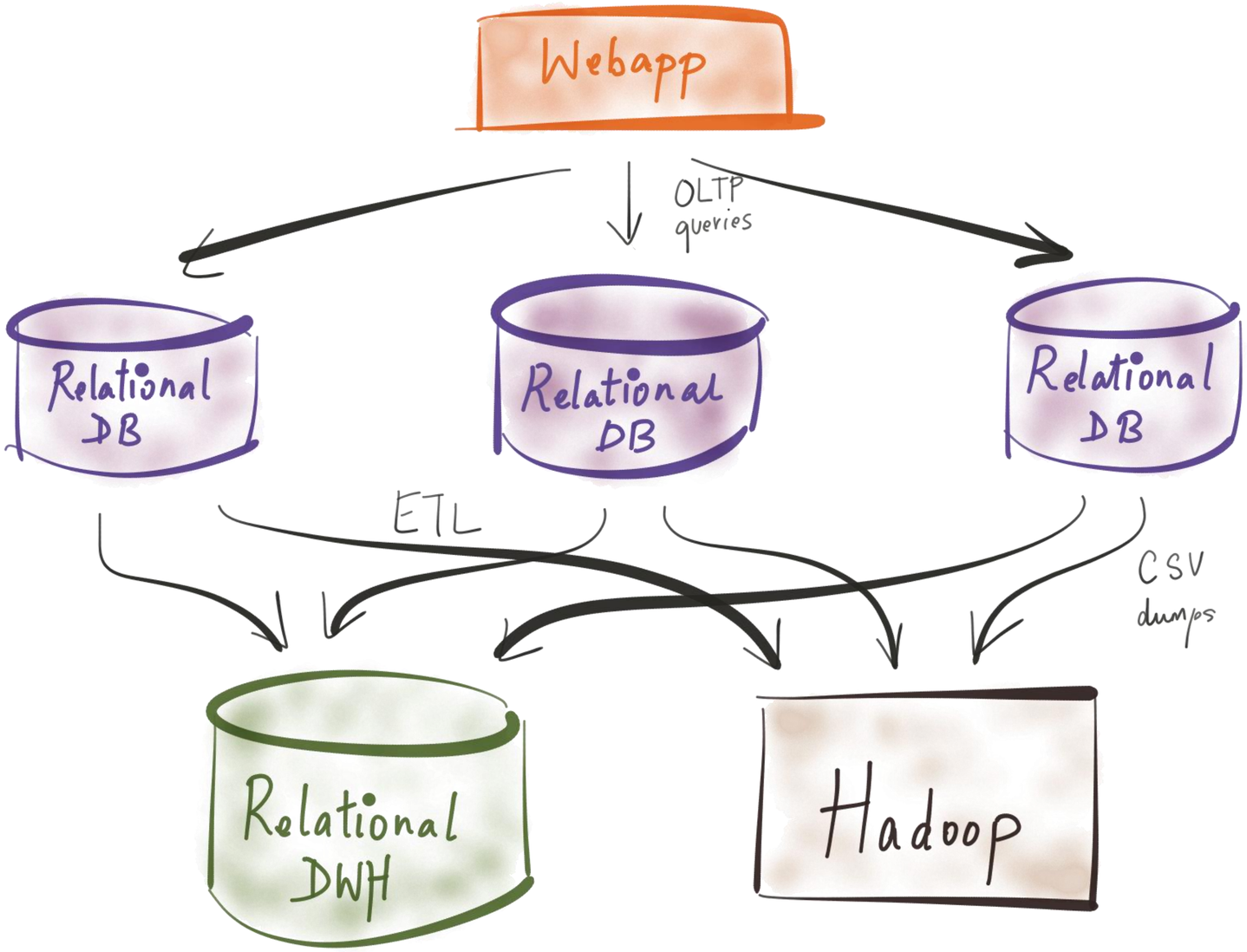
Neha Narkhede, Confluent

circa 2009

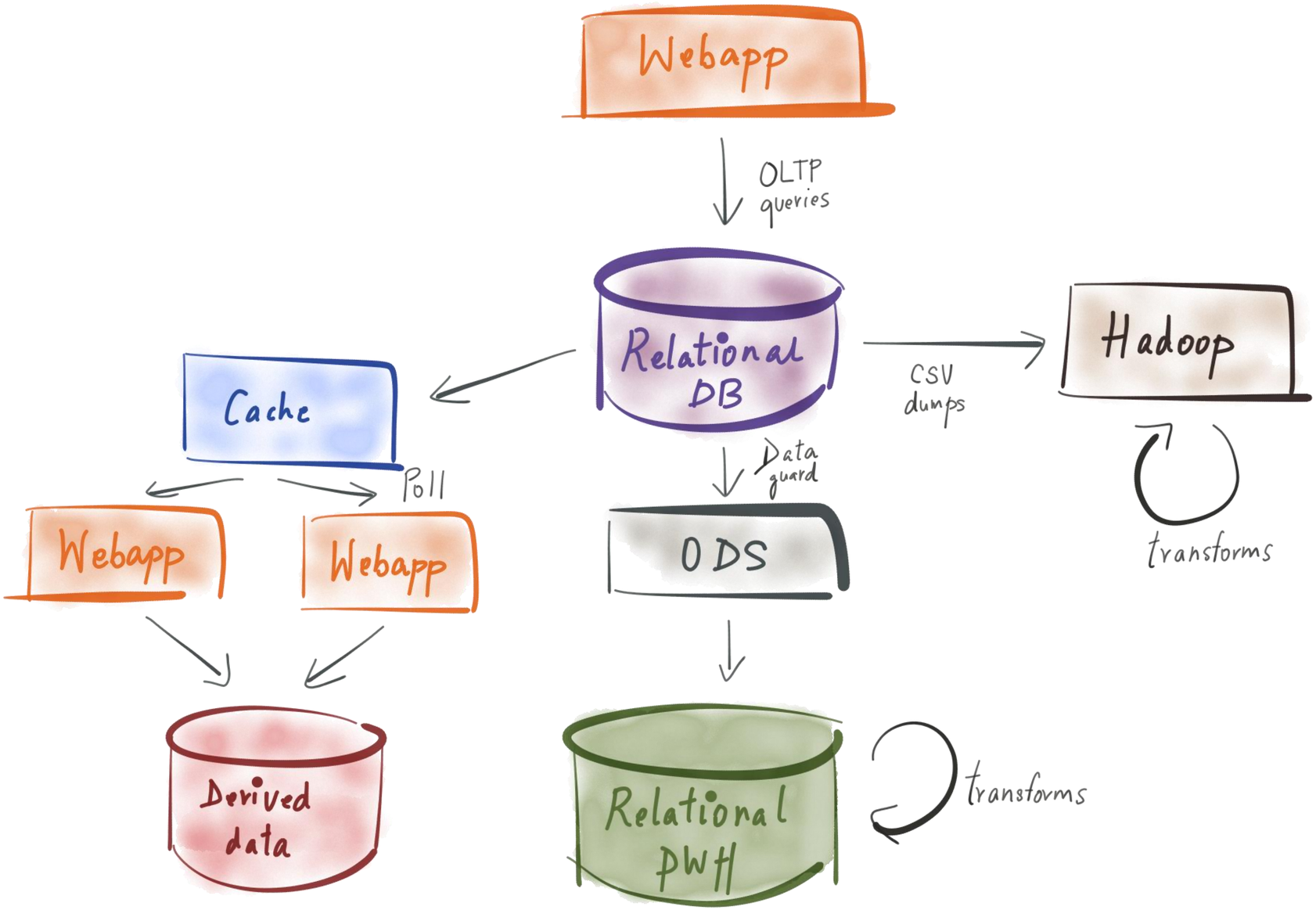
Relational DB Changes



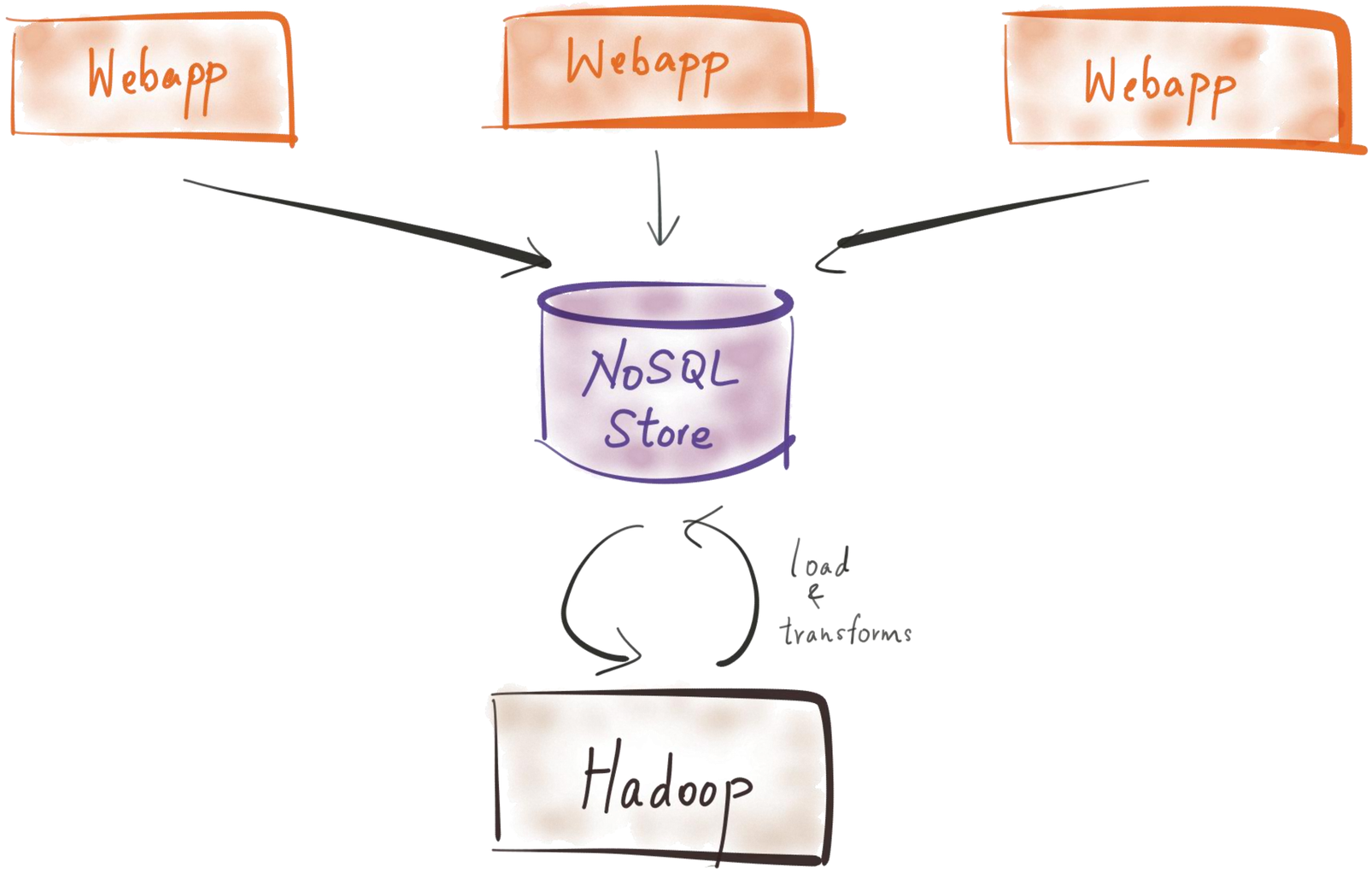
Relational DB Changes



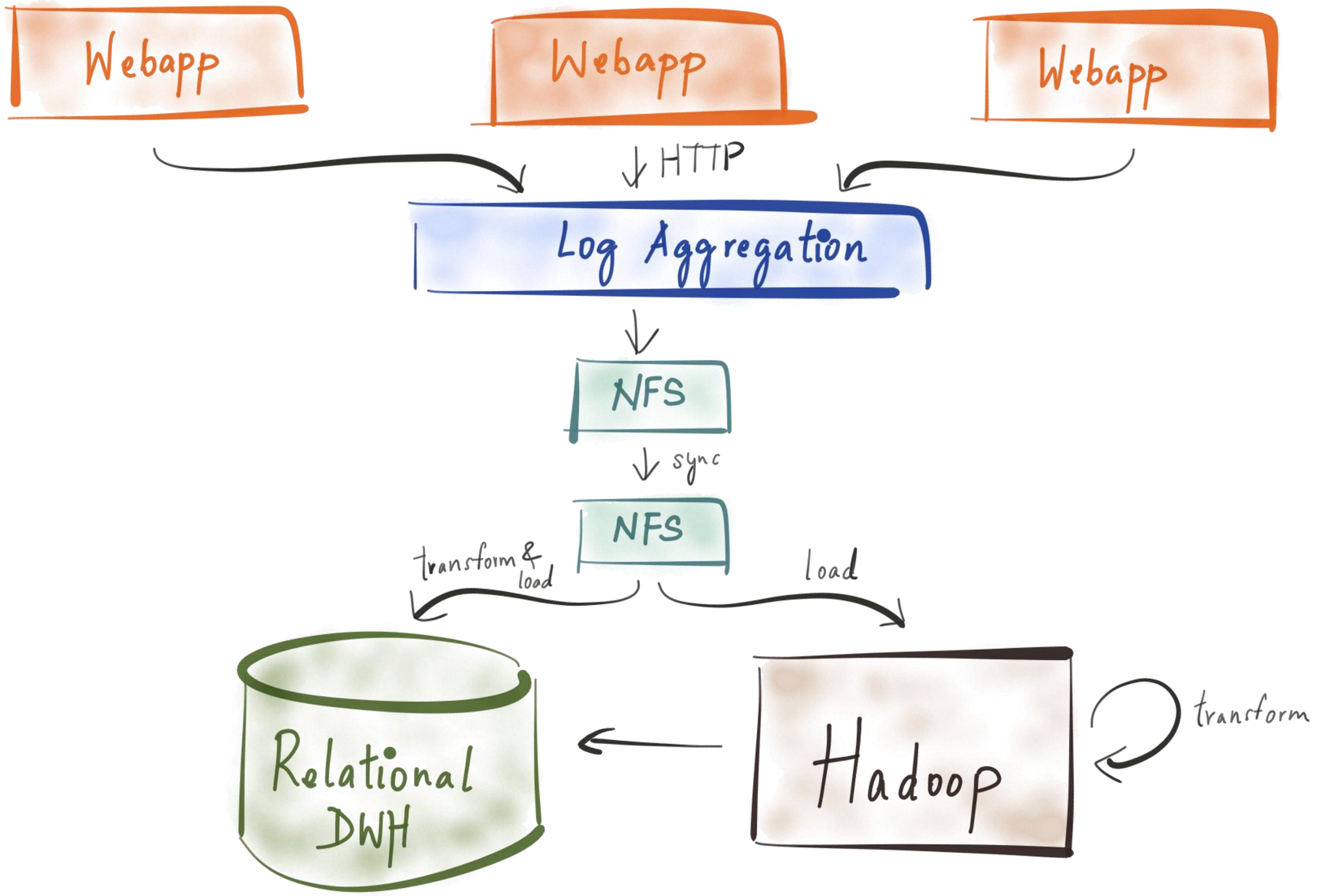
Relational DB Changes



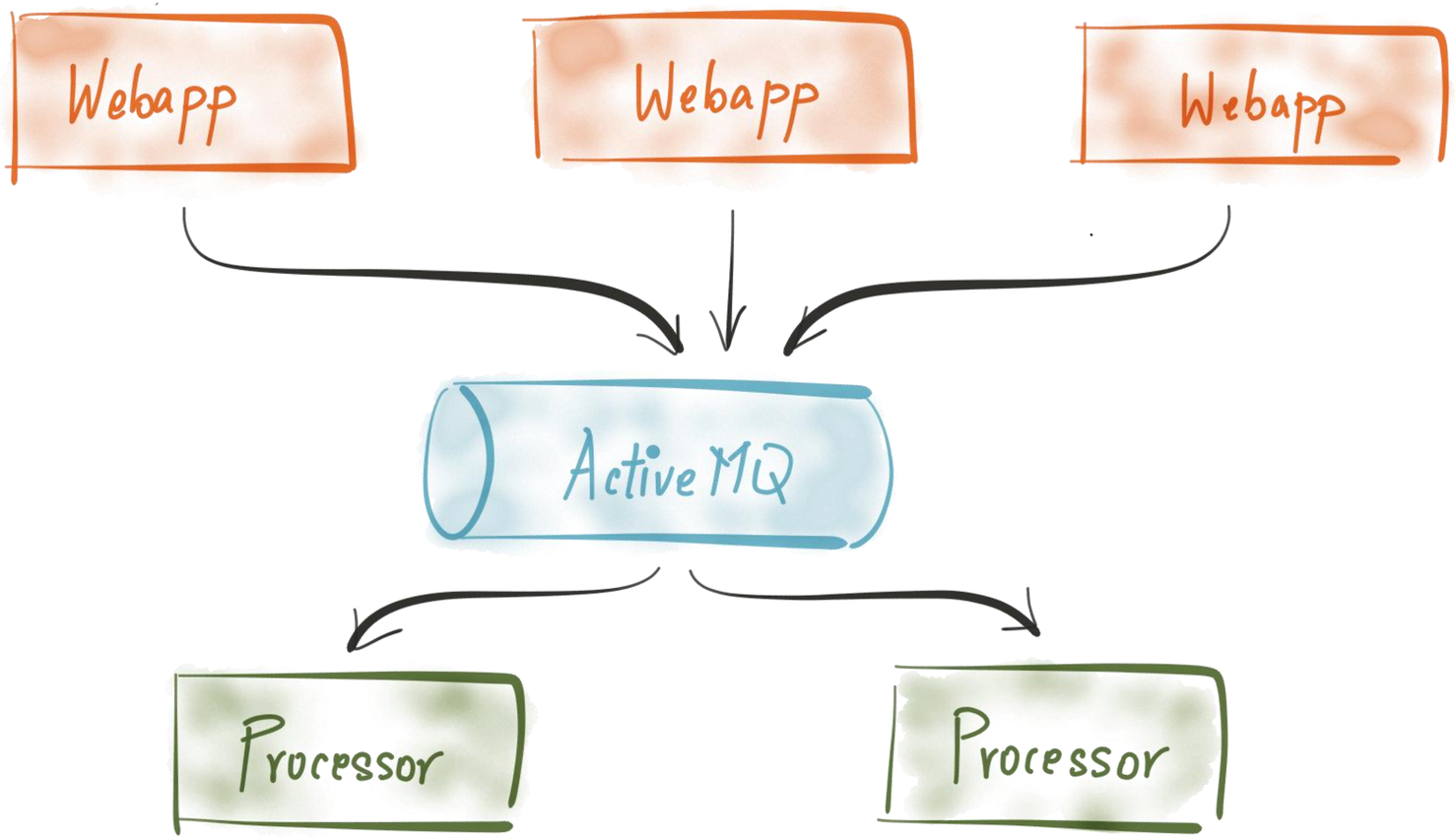
NoSQL Changes



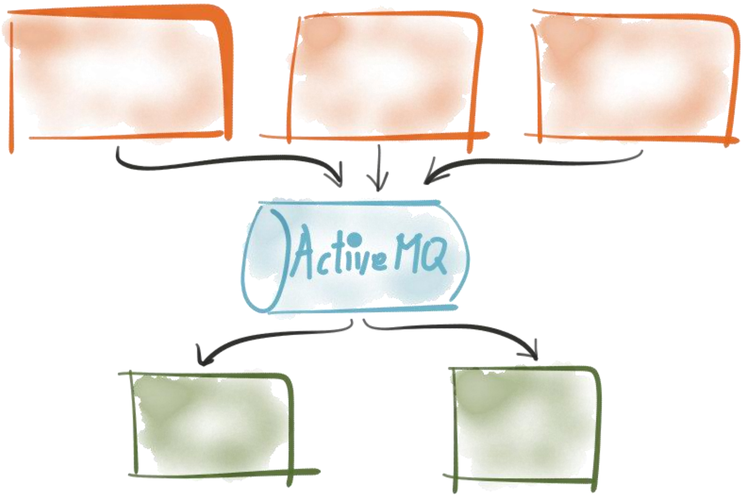
User Activity Data

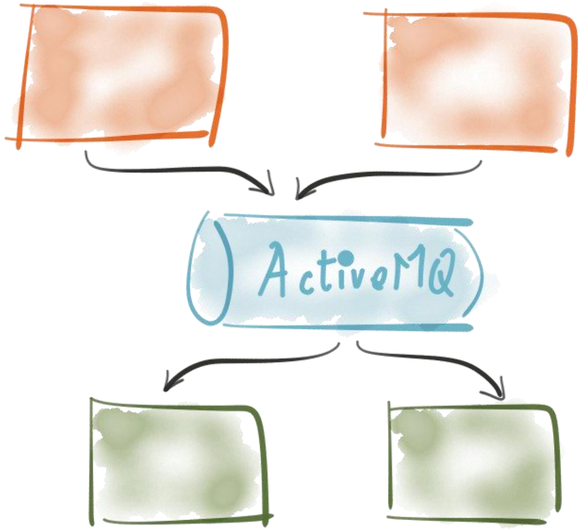


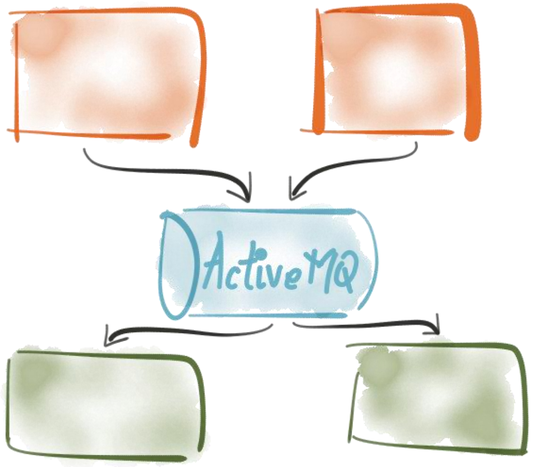
MESSAGING



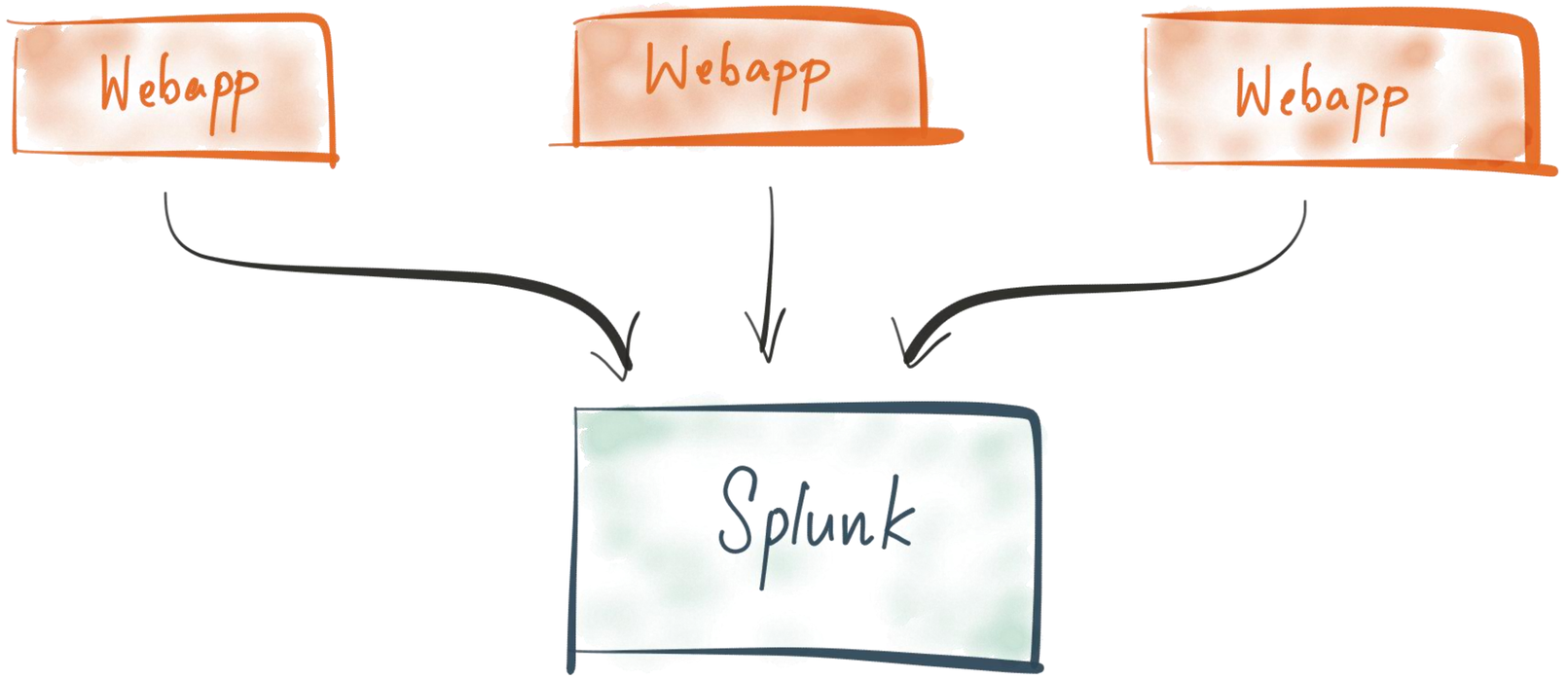
MESSAGING



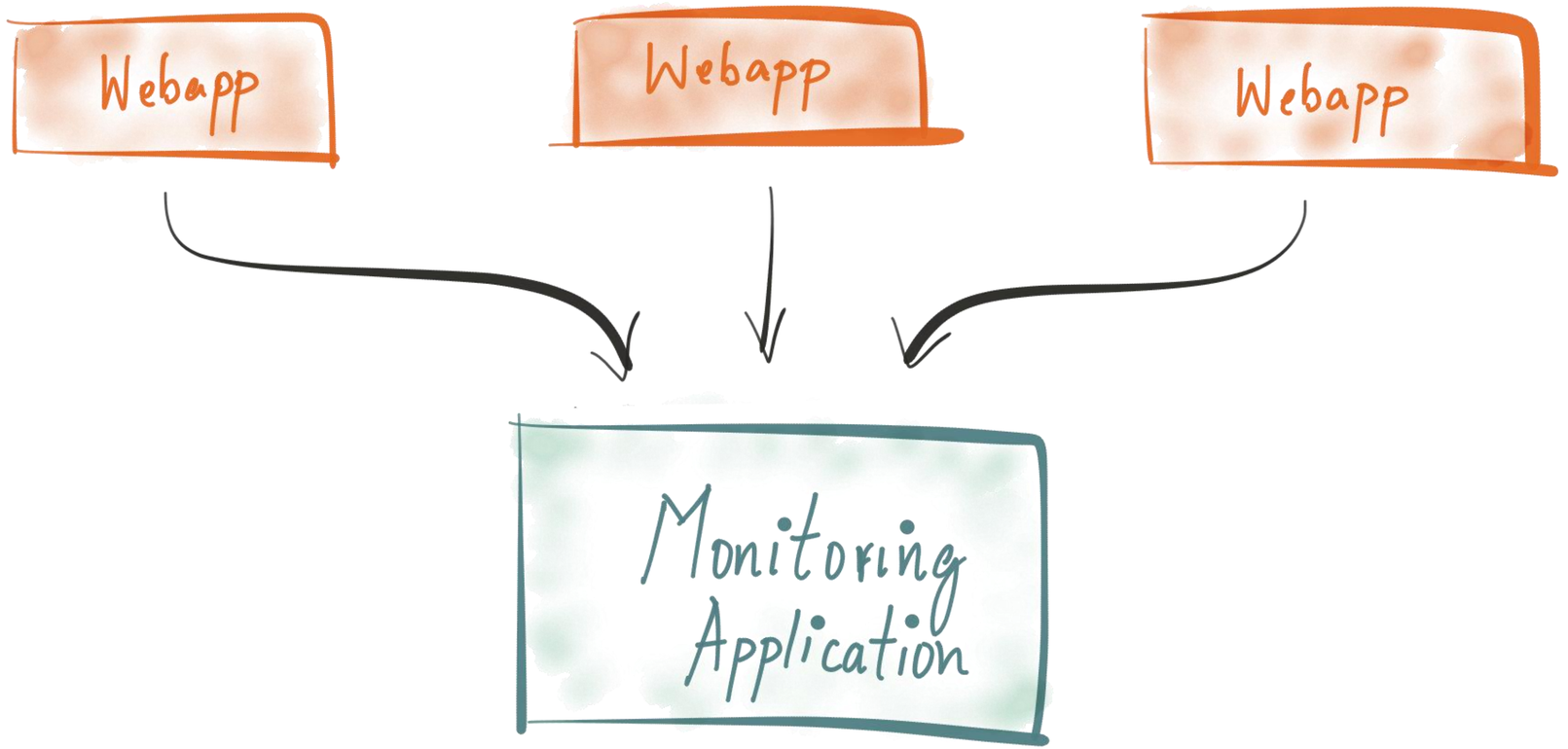


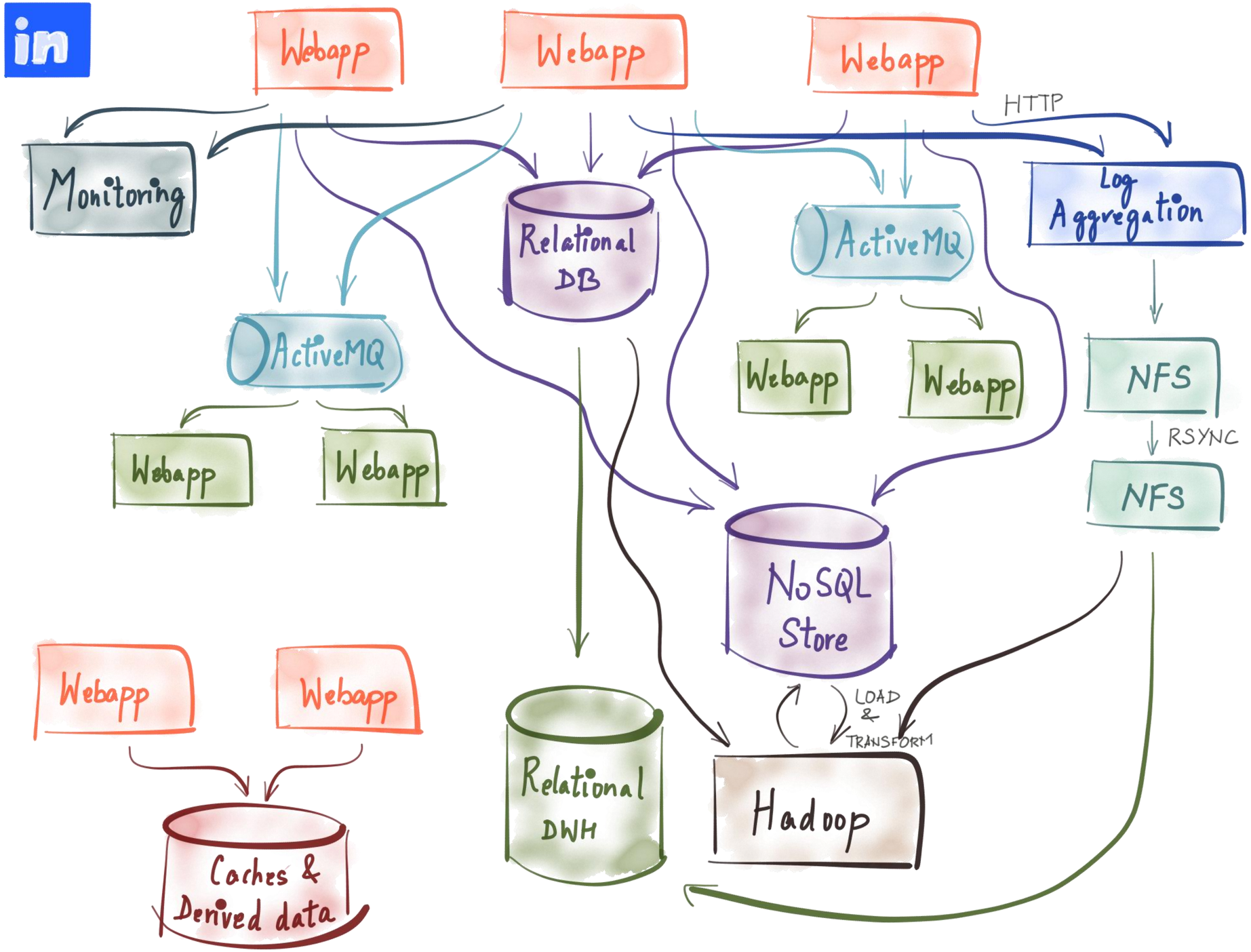


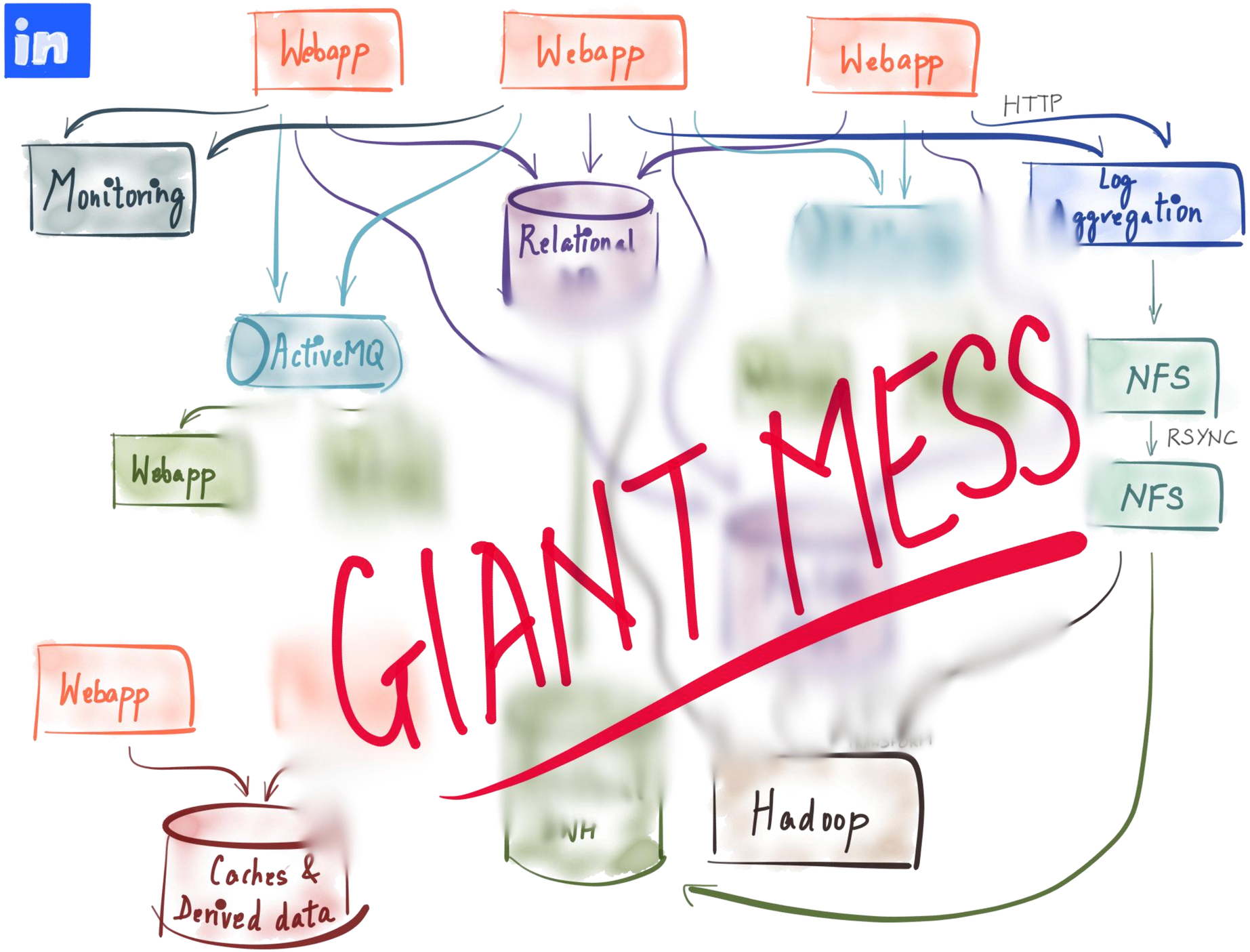
APPLICATION LOGS



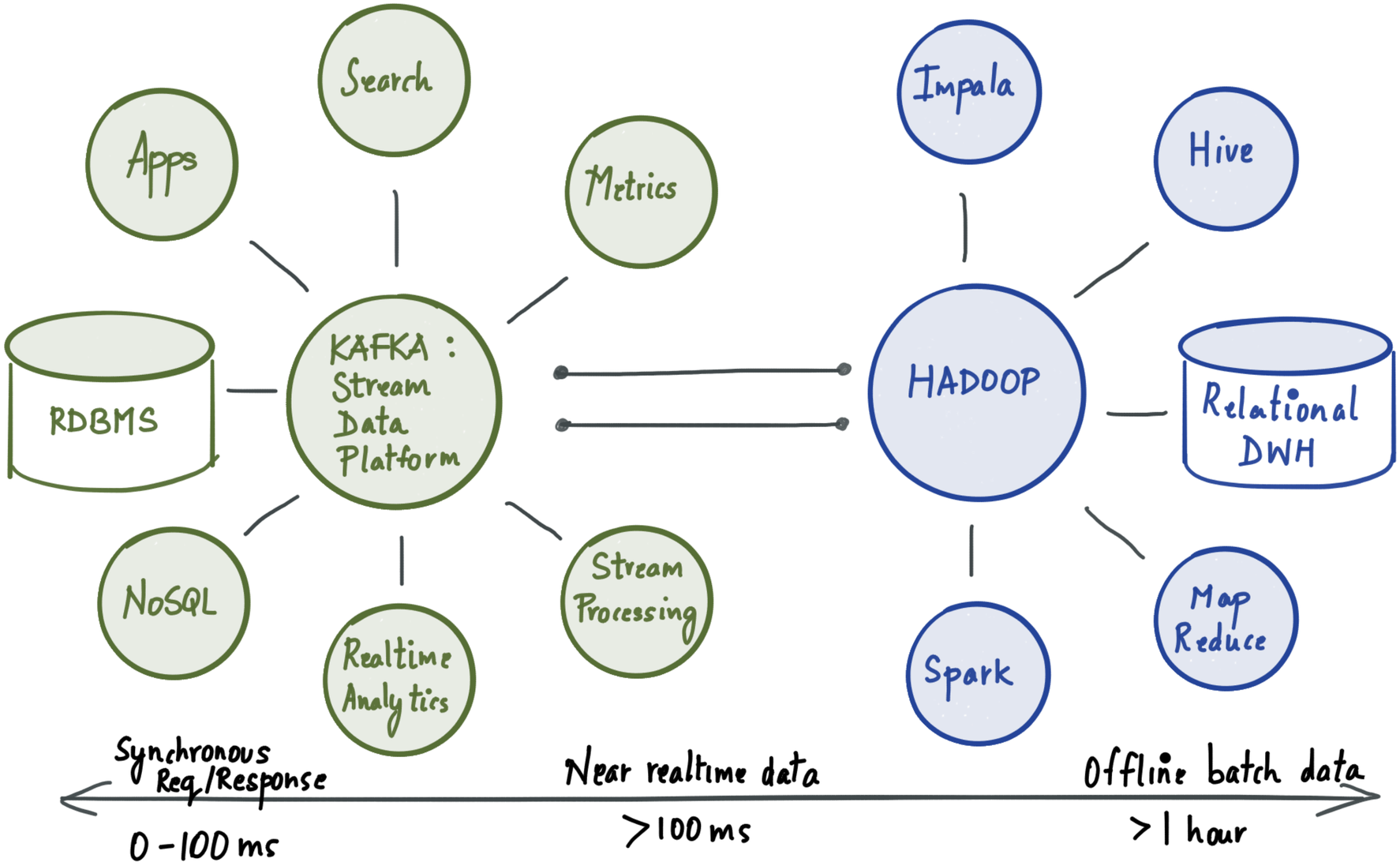
Application Metrics




Webapp
Webapp
Webapp
HTTP
Monitoring
Relational DB
ActiveMQ
Log Aggregation
ActiveMQ
Webapp
Webapp
Webapp
Webapp
NFS
RSYNC
NFS
NoSQL Store
LOAD & TRANSFORM
Webapp
Webapp
Relational DWH
Hadoop
Caches & Derived data


Webapp
Webapp
Webapp
HTTP
Monitoring
Relational
Log aggregation
ActiveMQ
NFS
RSYNC
NFS
Webapp
GIANT MESS
Webapp
Caches & Derived data
NH
Hadoop

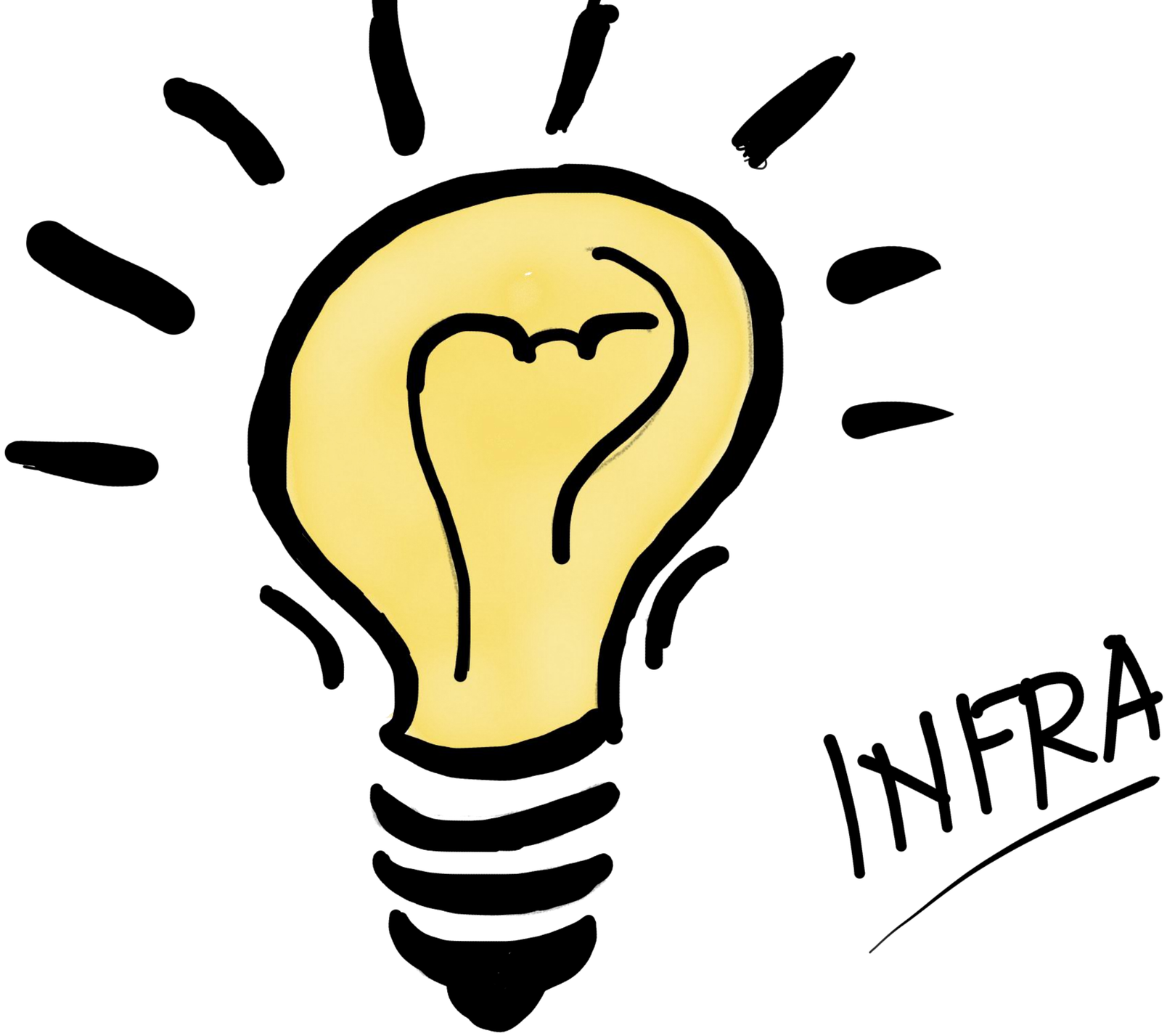
STREAM DATA PLATFORM



DATA INTEGRATION

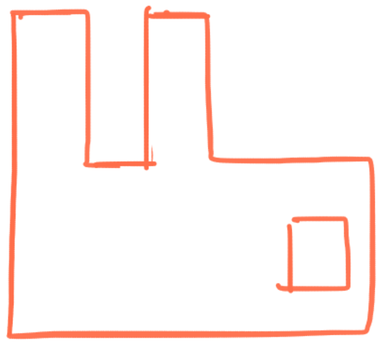
KEY CHALLENGE

"Making sure the data ends up in all the right places"


INFRA

First Attempt: Message Qs

ActiveMQ



RabbitMQ

Message Qs: Problems

THROUGHPUT

PERSISTENCE

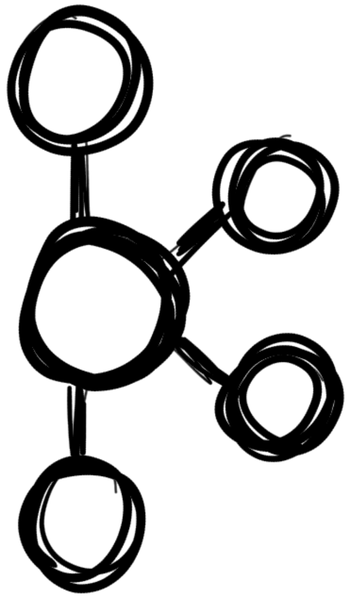
BATCH SYSTEMS

SHARDING

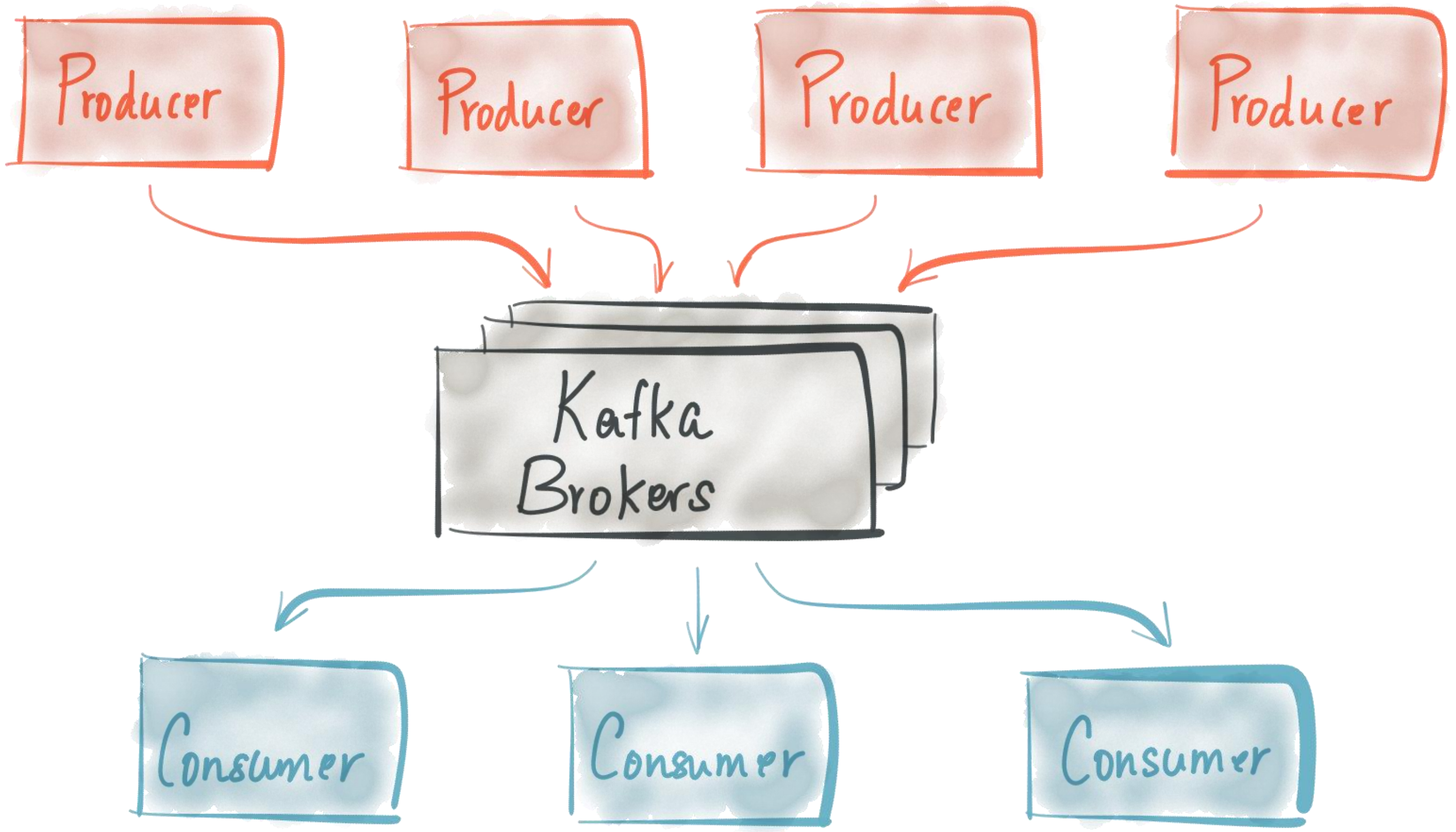
STREAM PROCESSING

ORDERING GUARANTEES

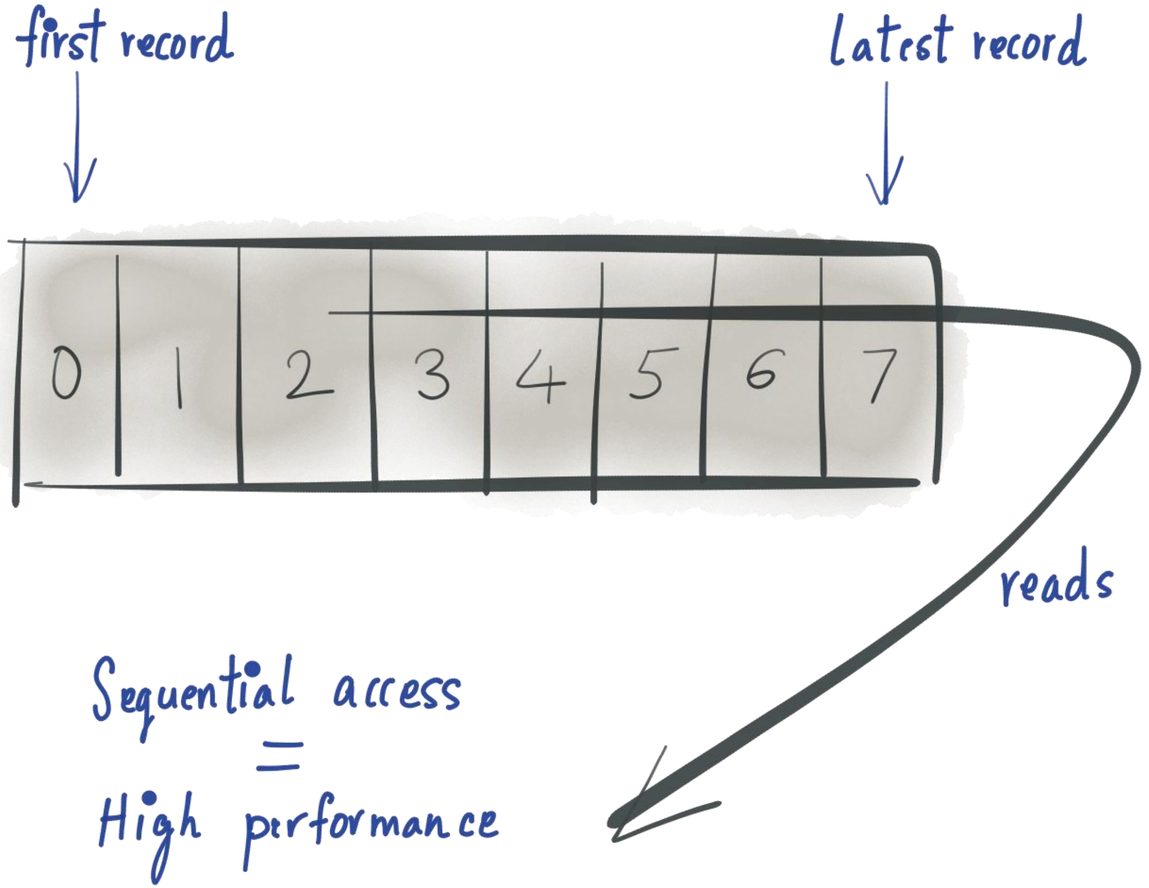
Successful Attempt: Kafka



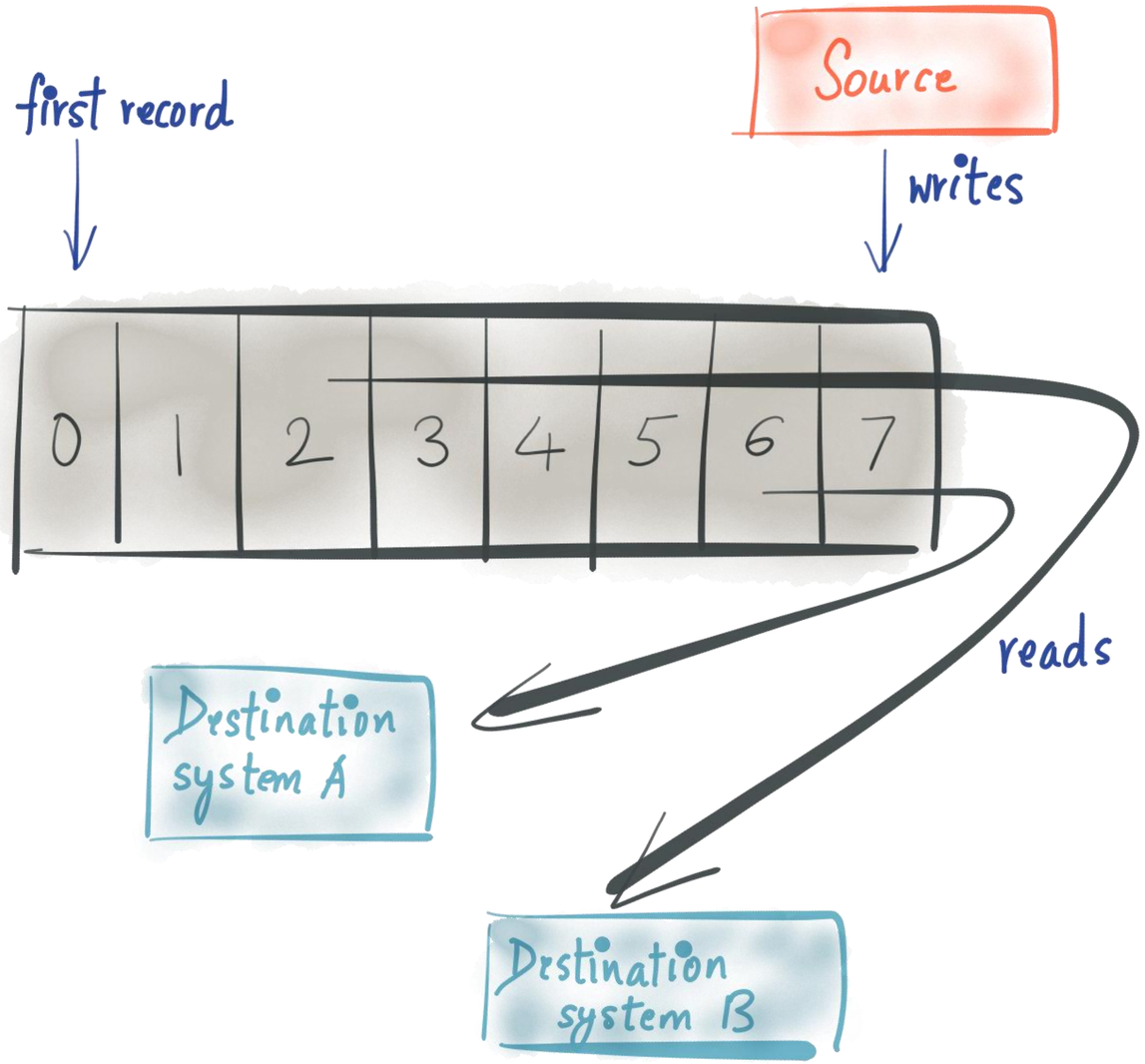
Apache Kafka : 10,000 ft view

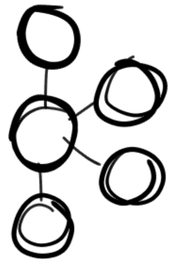


KAFKA KEY IDEA : LOG

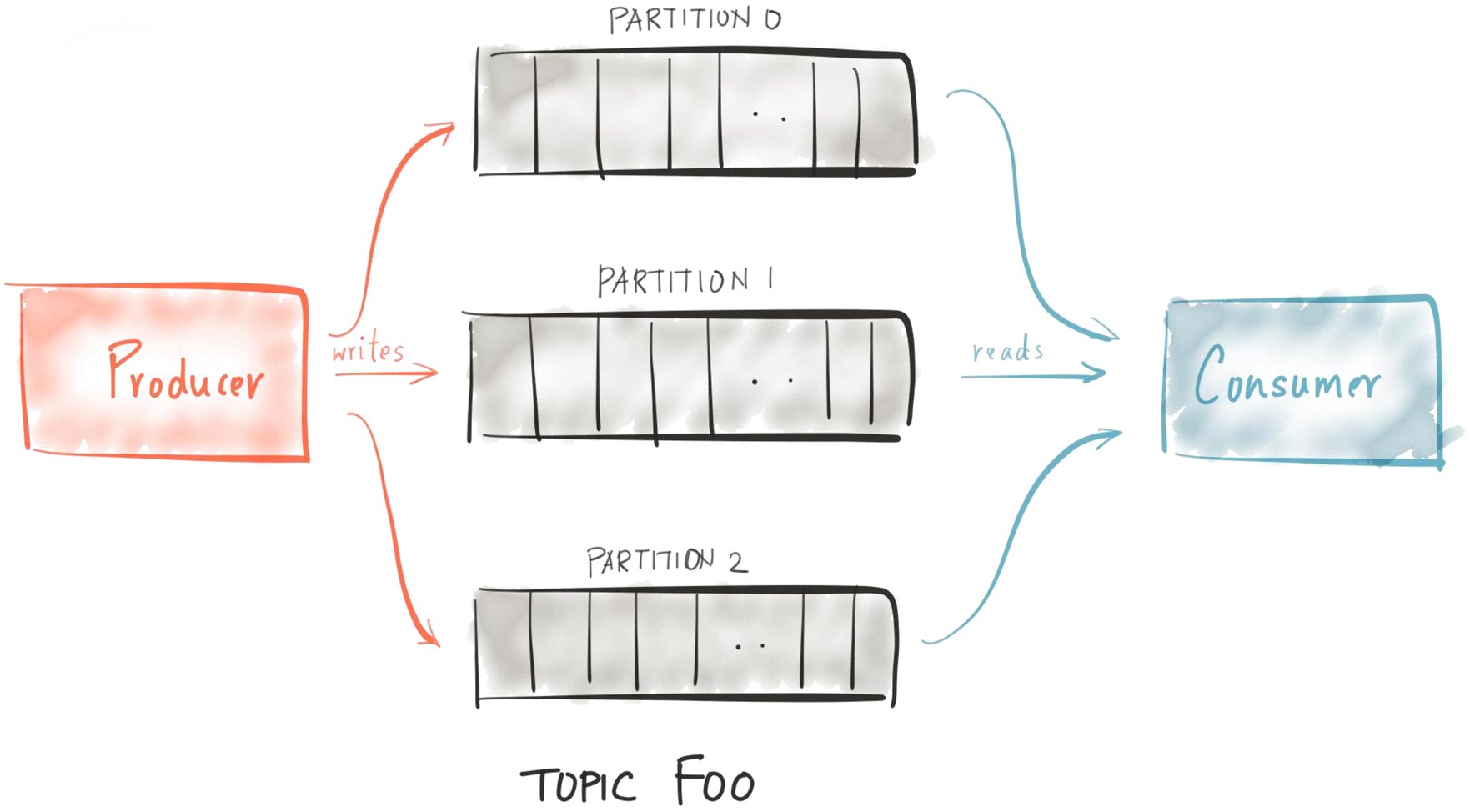


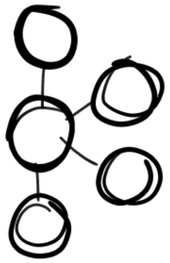
Logs & Pub-Sub


first record
Source
writes
0
1
2
3
4
5
6
7
reads
Destination system A
Destination system B

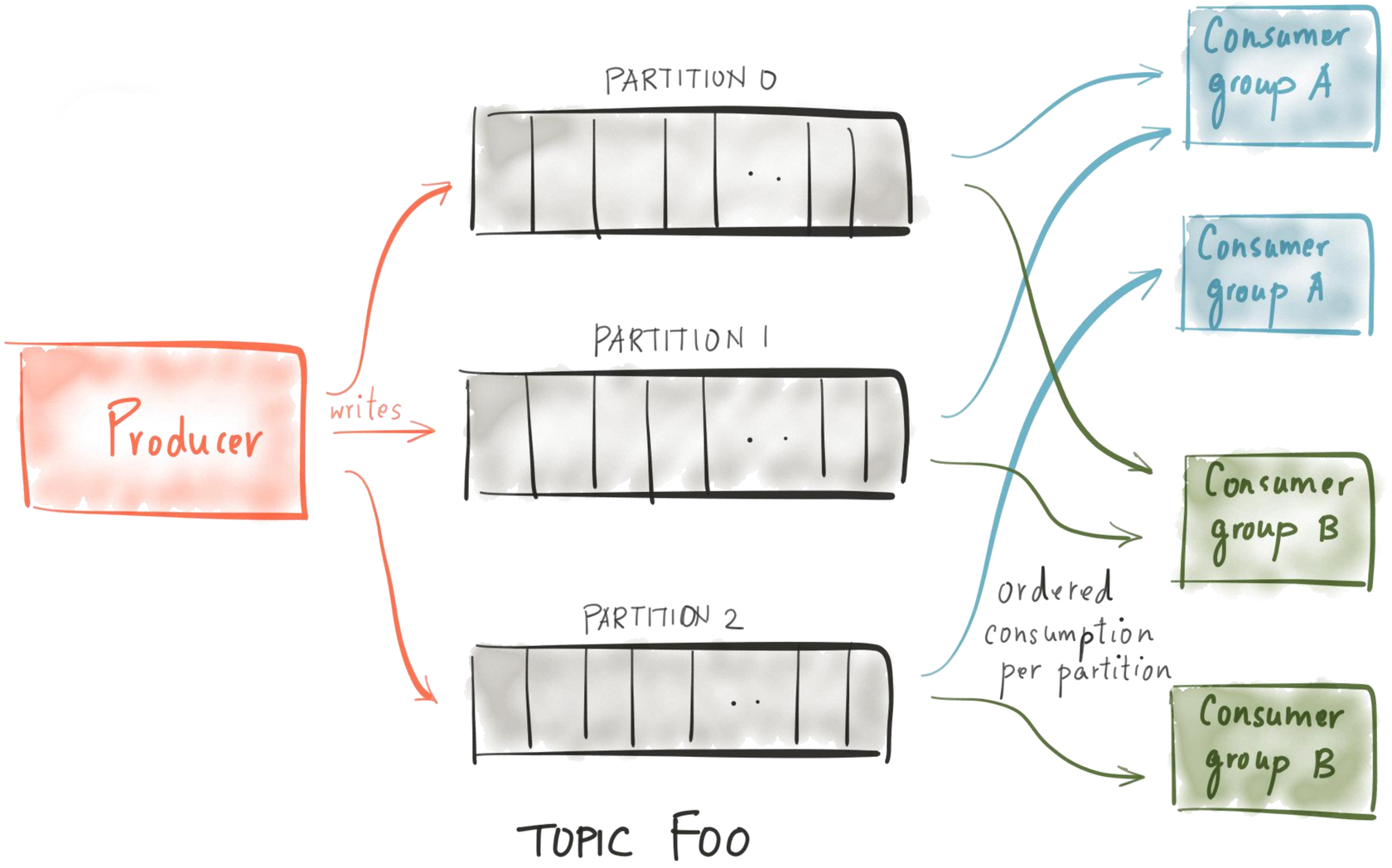


Topic ≈ Partitioned Log

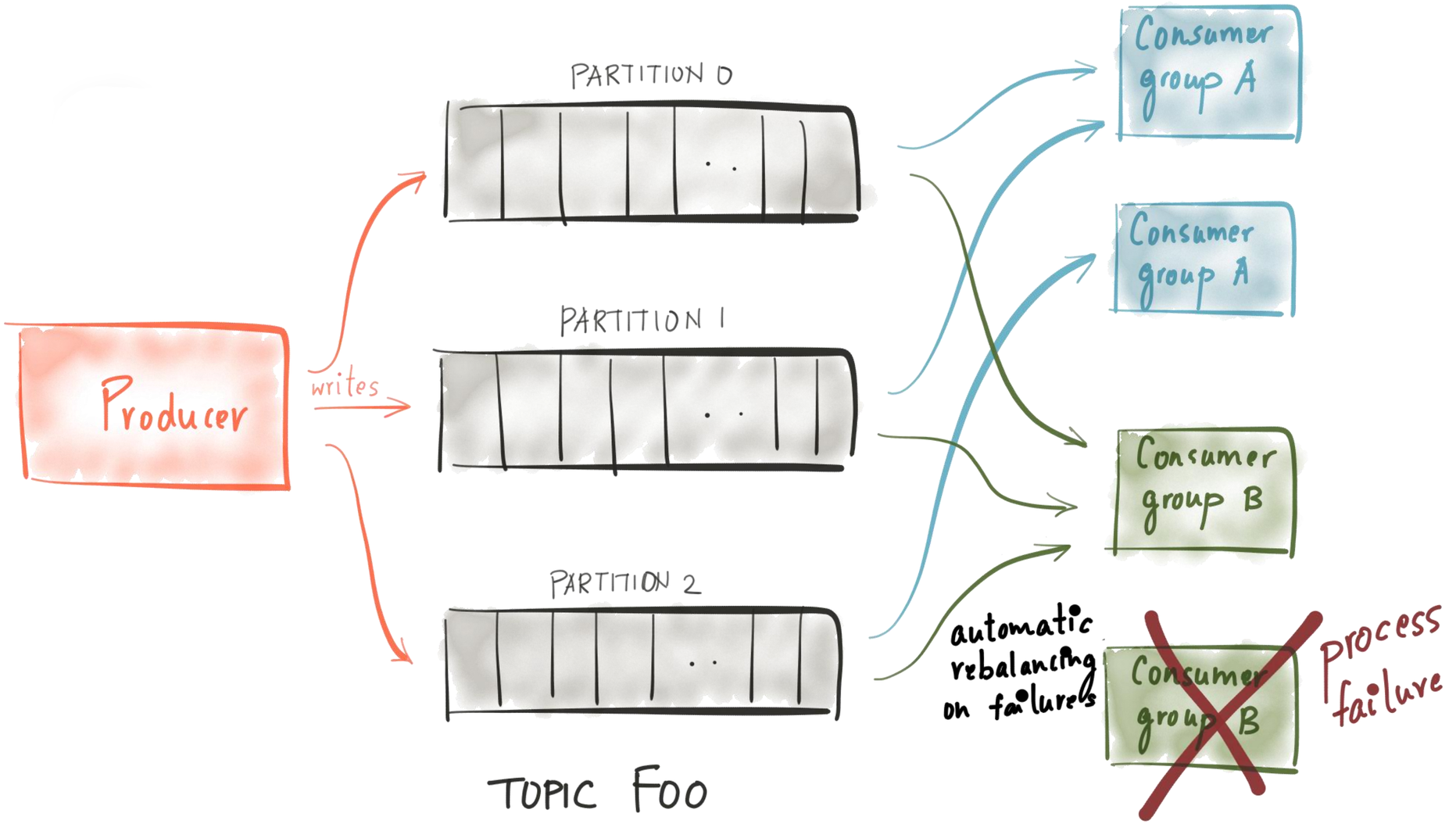


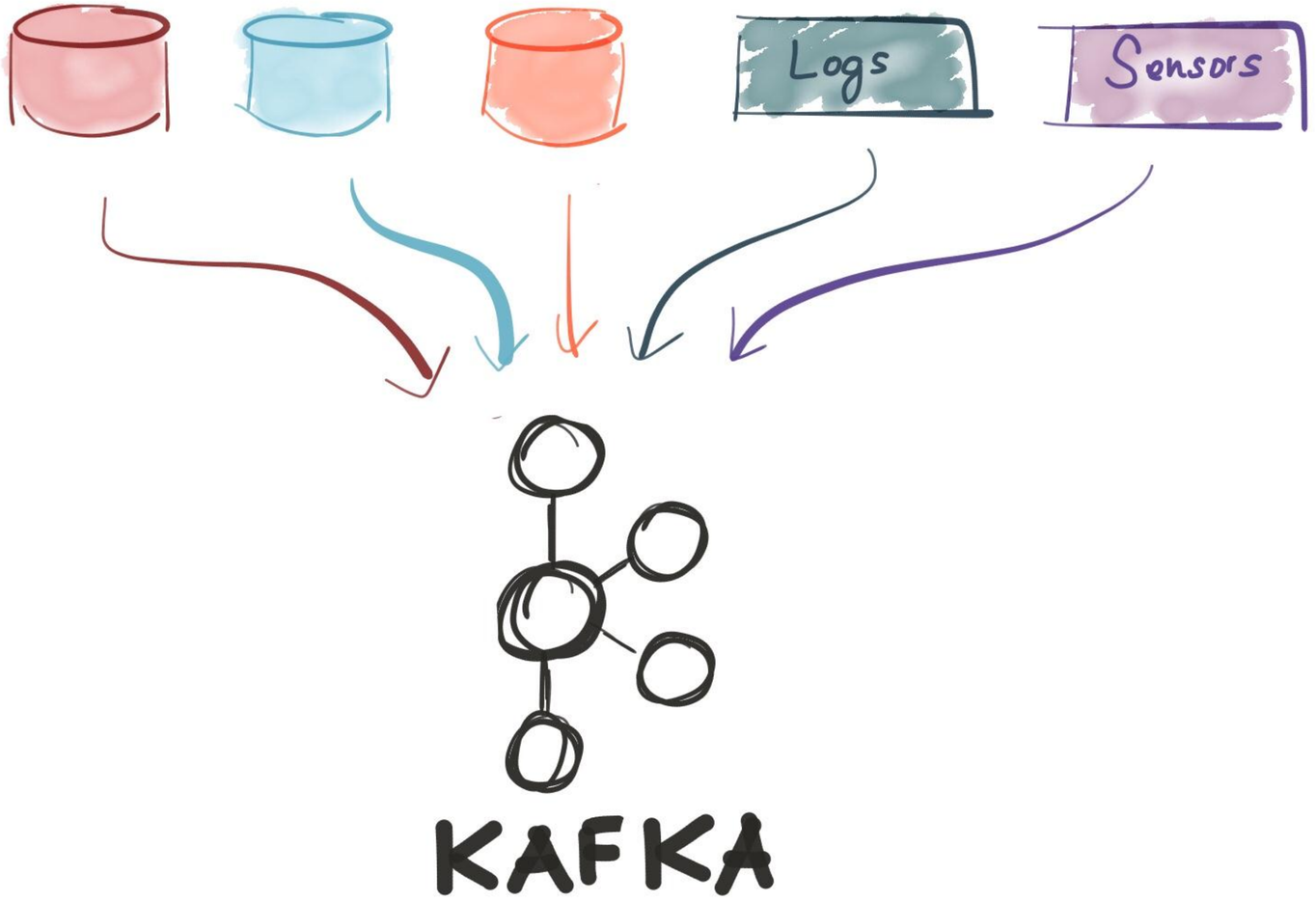


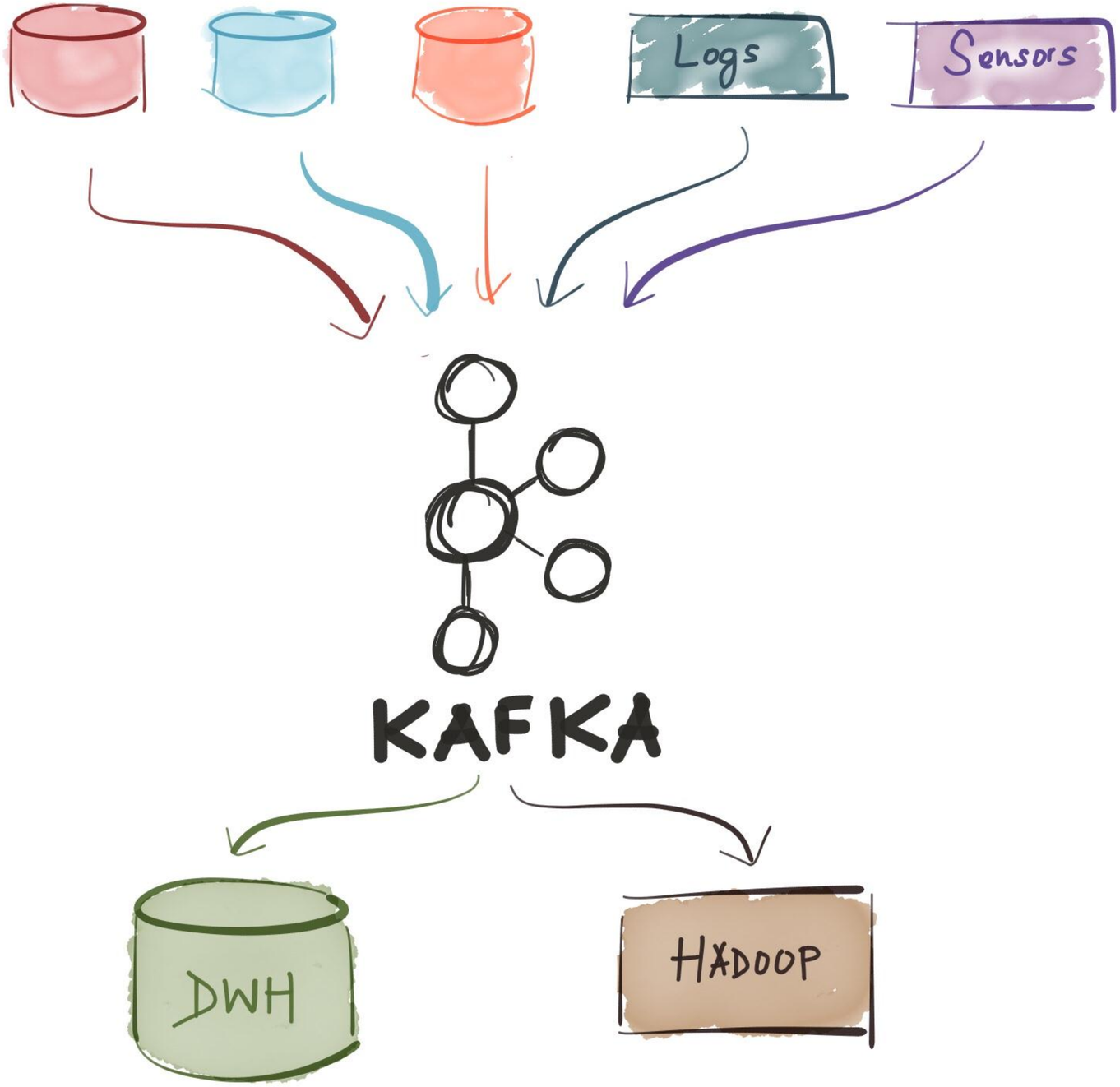
Topic ≈ Partitioned Log

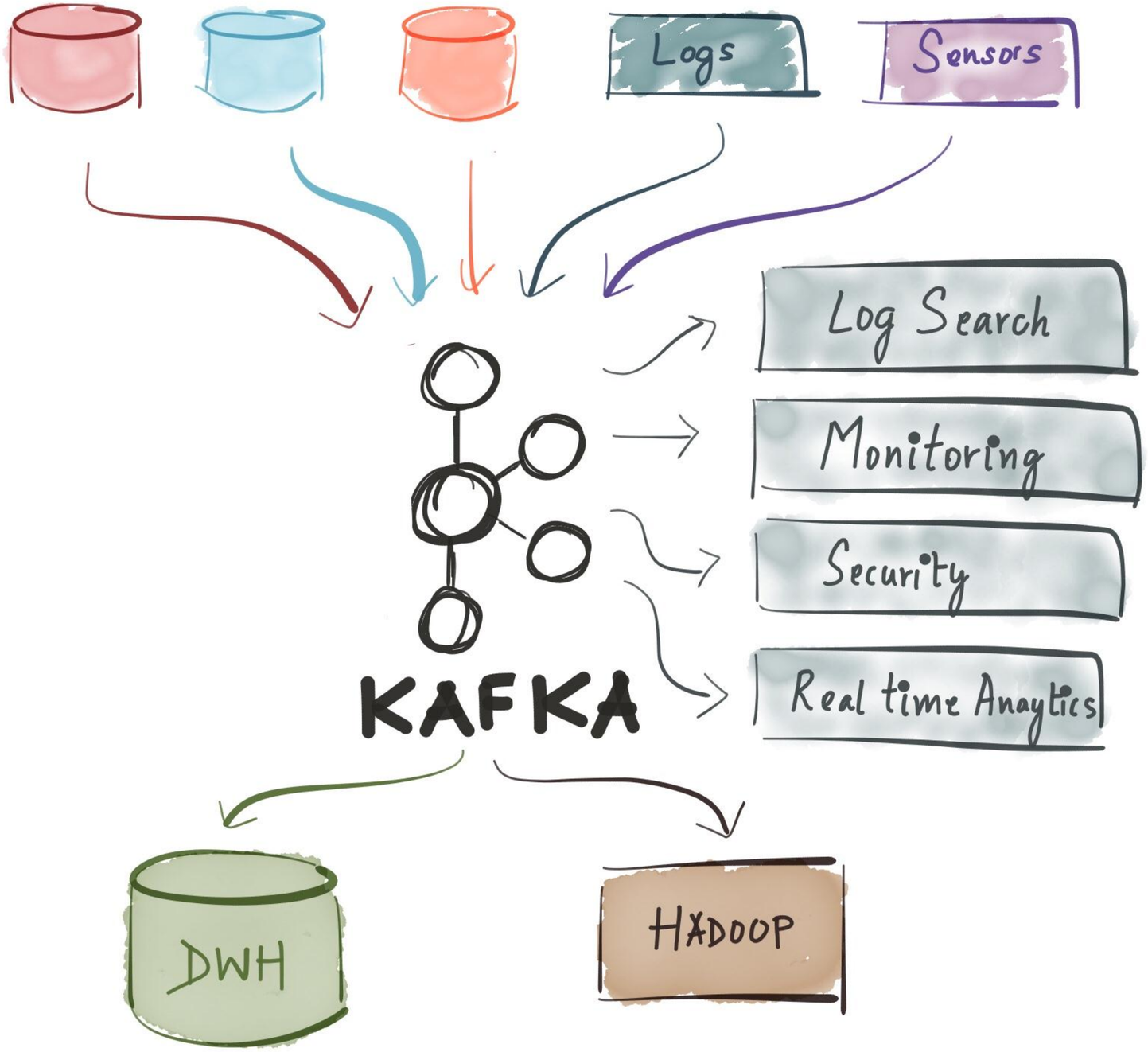


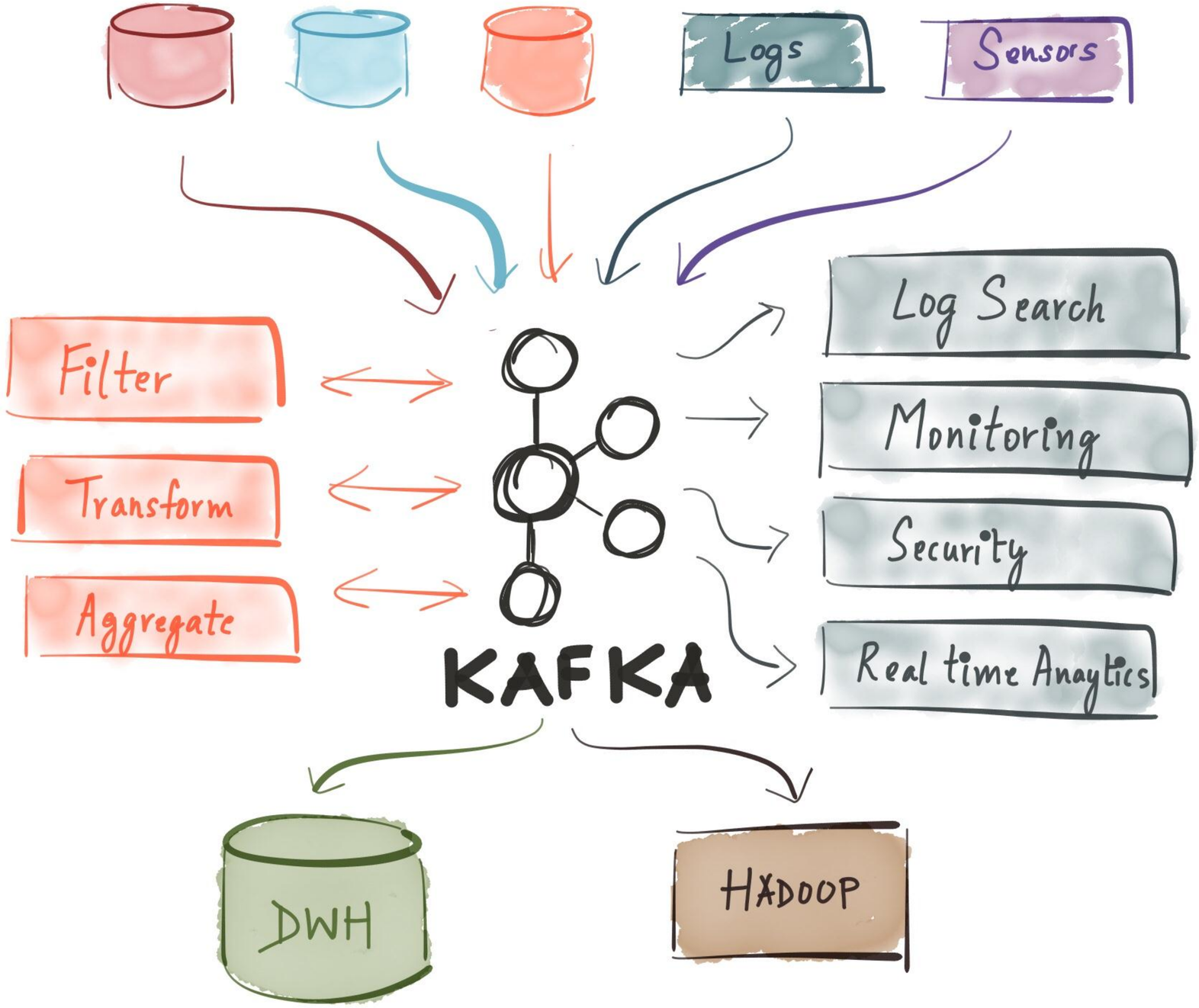
Topic ≈ Partitioned Log




Logs
Sensors
KAFKA


Logs
Sensors
KAFKA
DWH
HADOOP

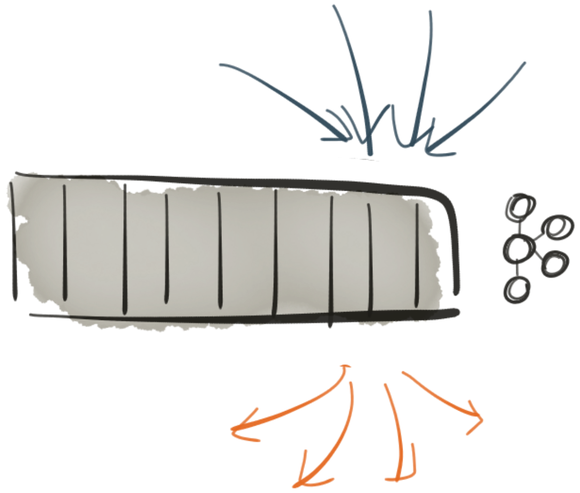

Logs
Sensors
Log Search
Monitoring
Security
Real time Anaytics
KAFKA
DWH
HADOOP


Logs
Sensors
Filter
Transform
Aggregate
KAFKA
Log Search
Monitoring
Security
Real time Anaytics
DWH
HADOOP

@ in

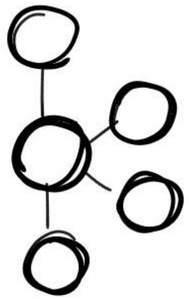
Everything is a STREAM

800 BILLION

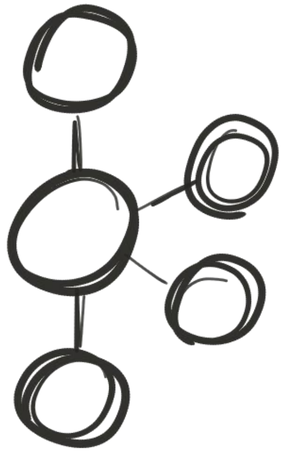


>2.5 TRILLION

MESSAGES/DAY

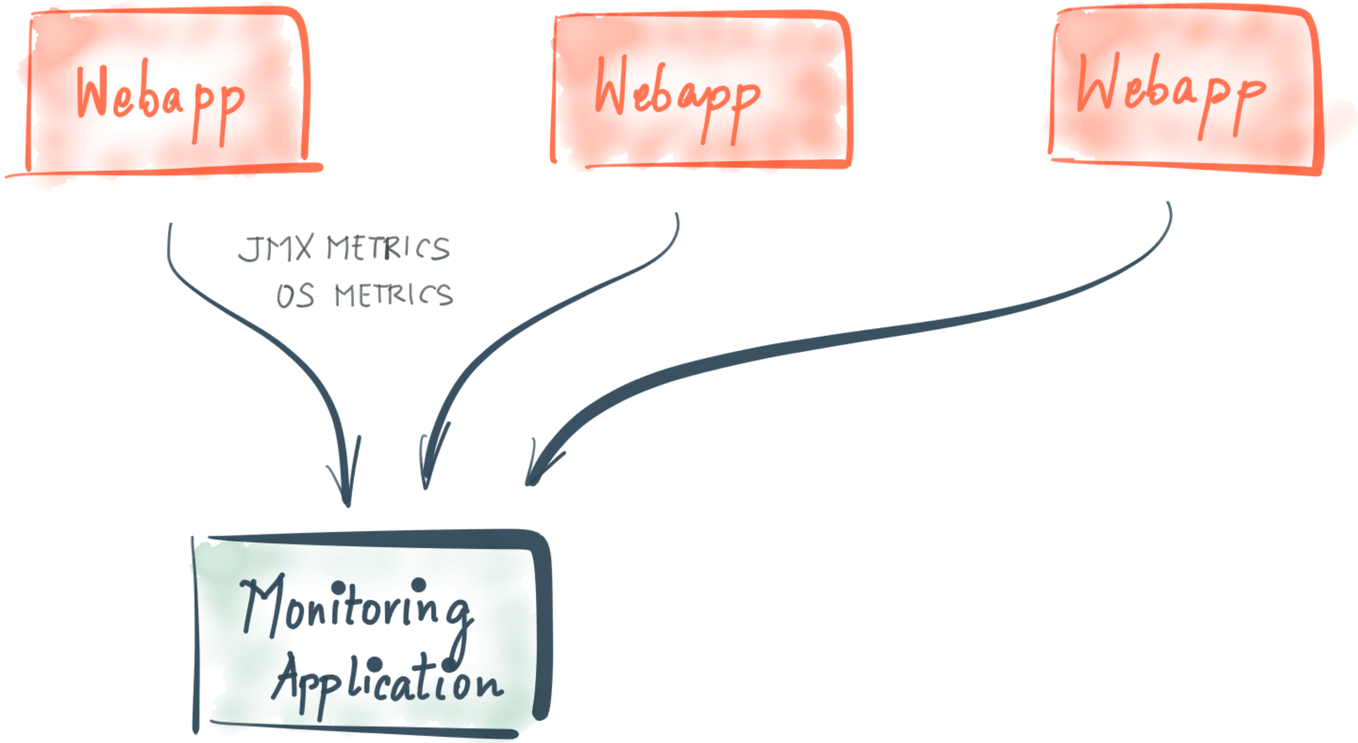


EVERYWHERE ELSE

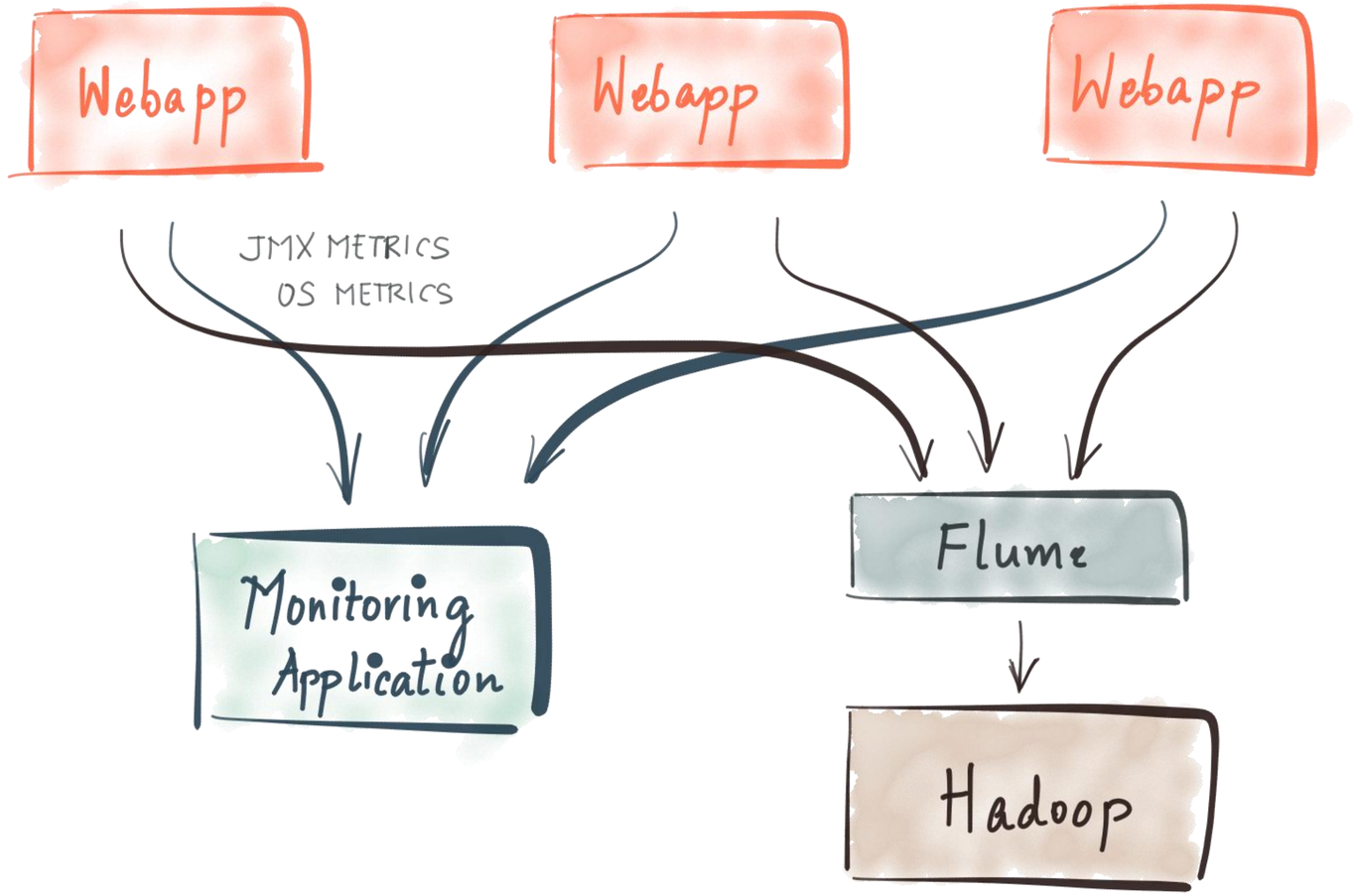


Monitoring

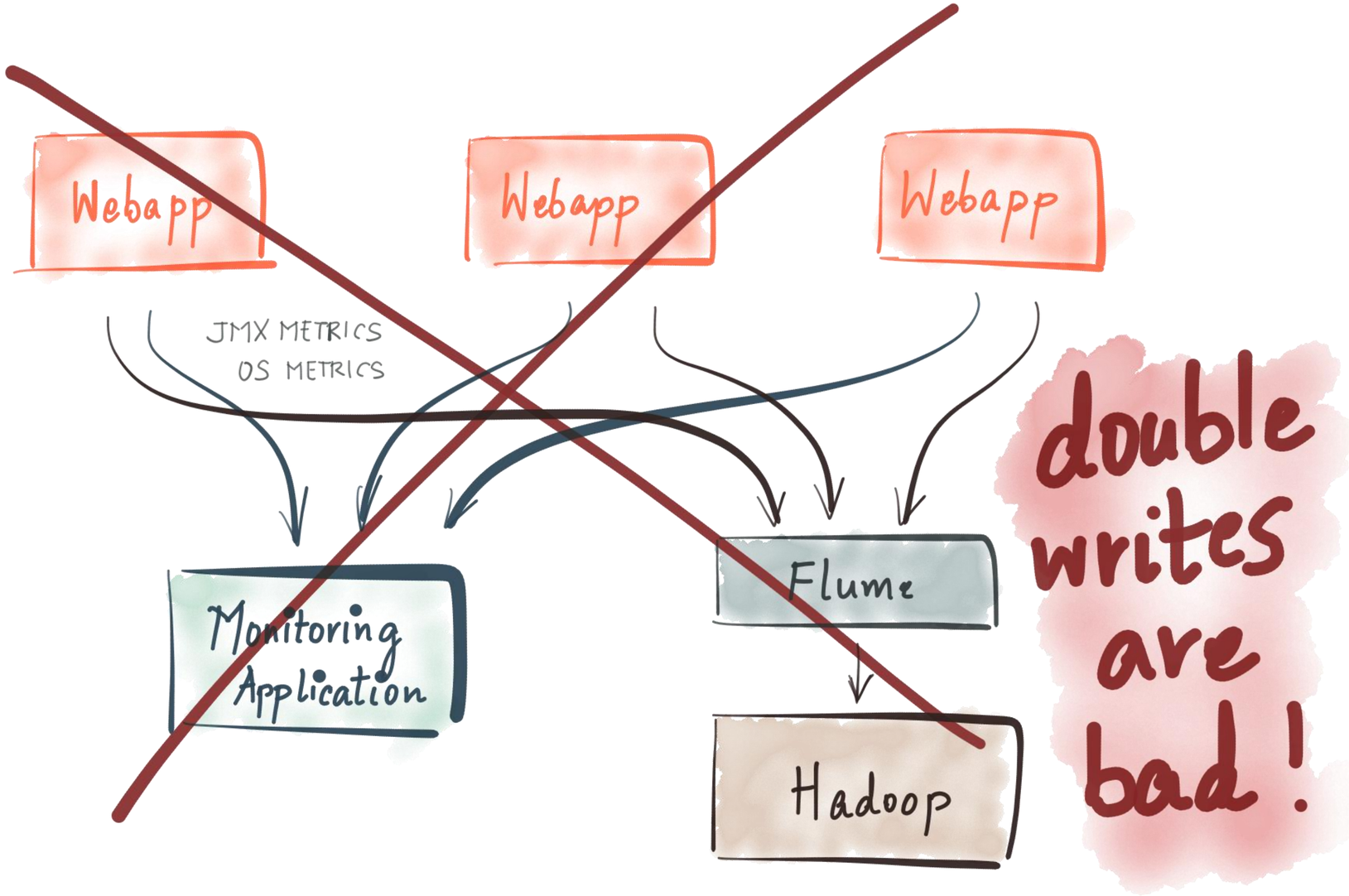
For Monitoring



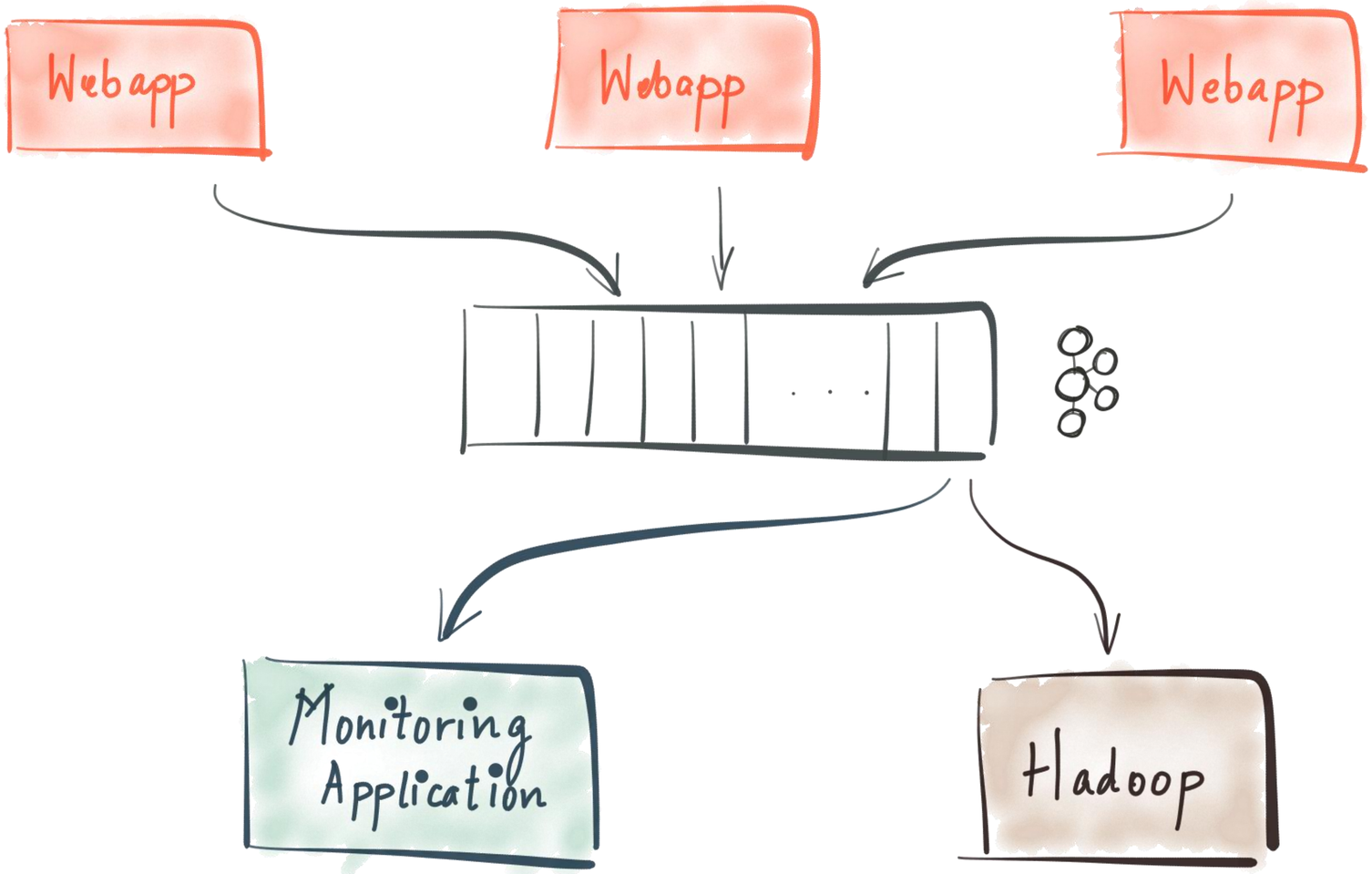
For Monitoring

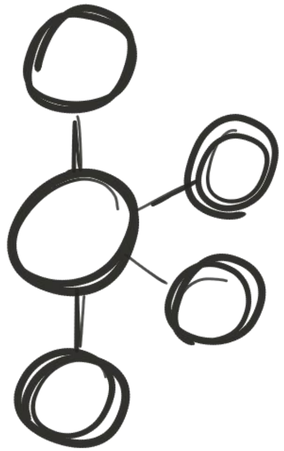


For Monitoring



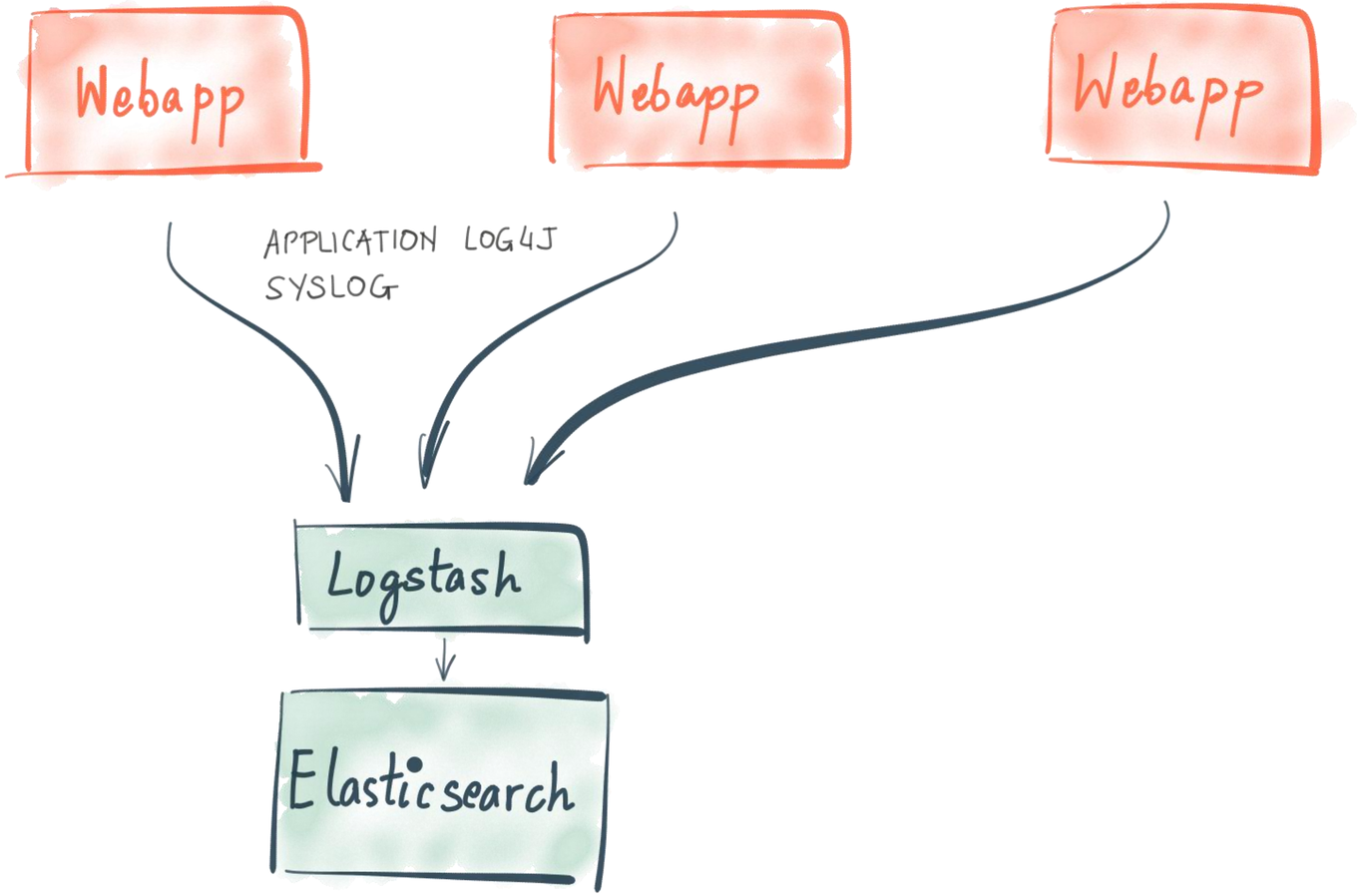
For Monitoring



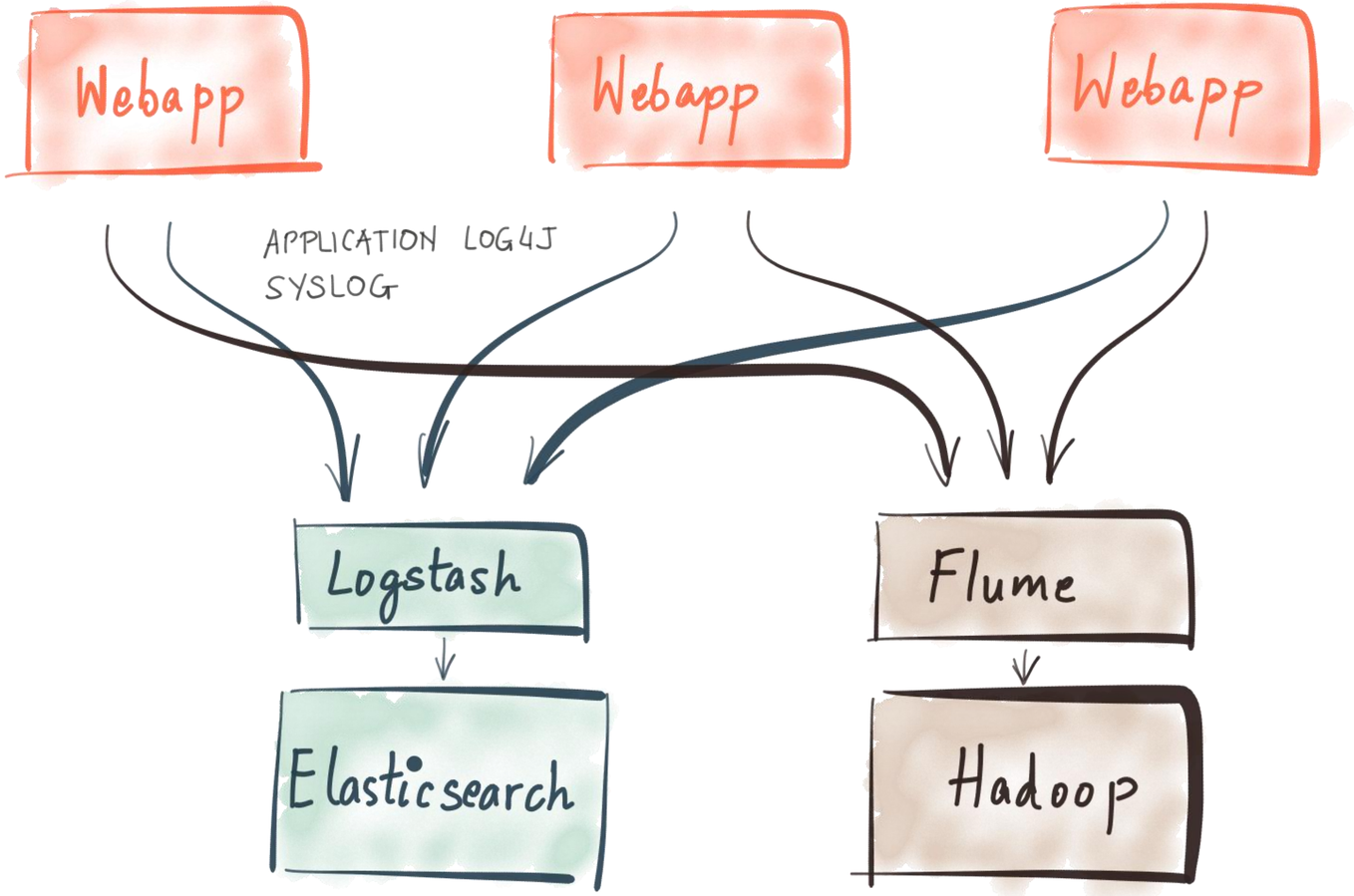


Log Collection

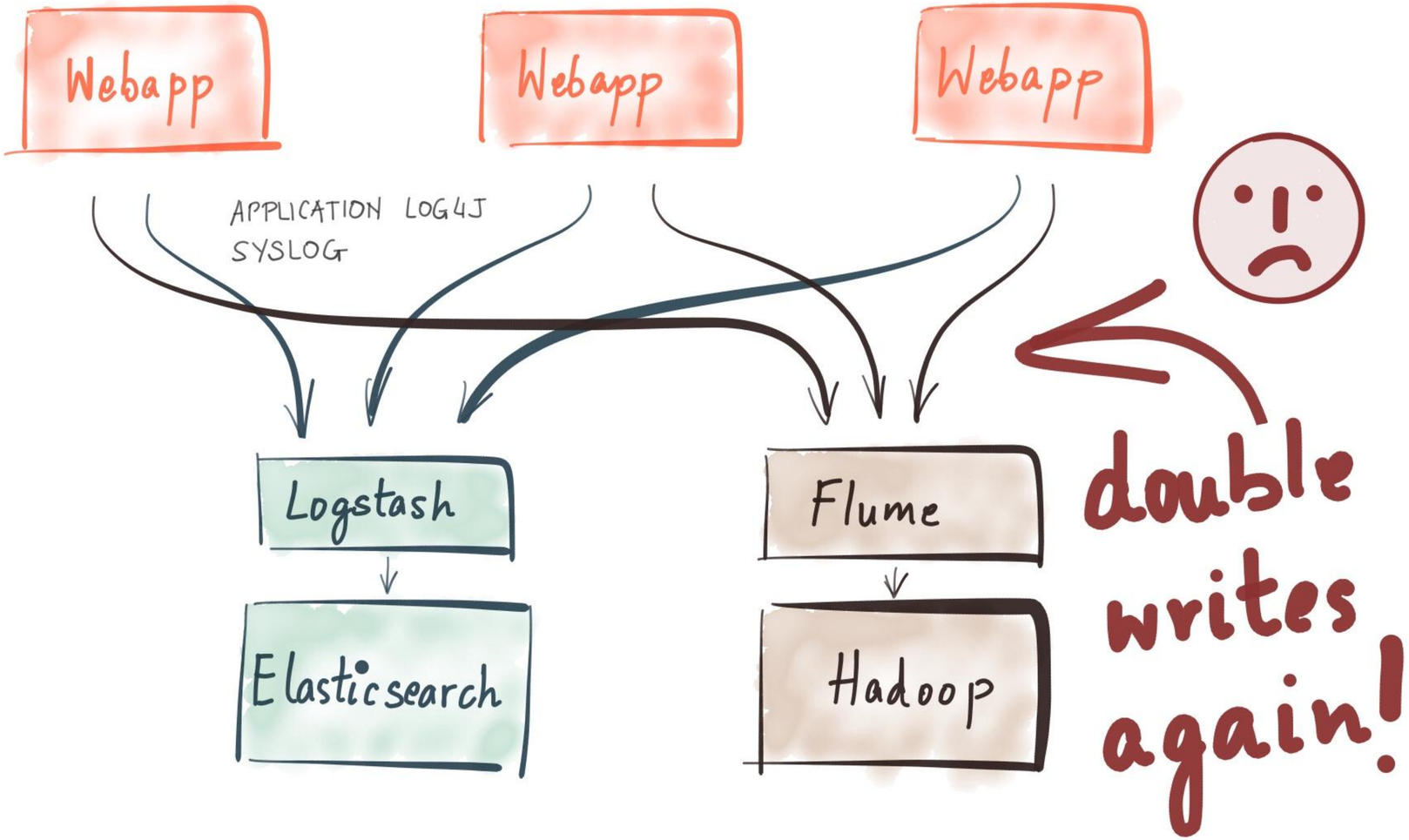
For Logging


Webapp
Webapp
Webapp
APPLICATION LOG4J
SYSLOG
Logstash
Elasticsearch

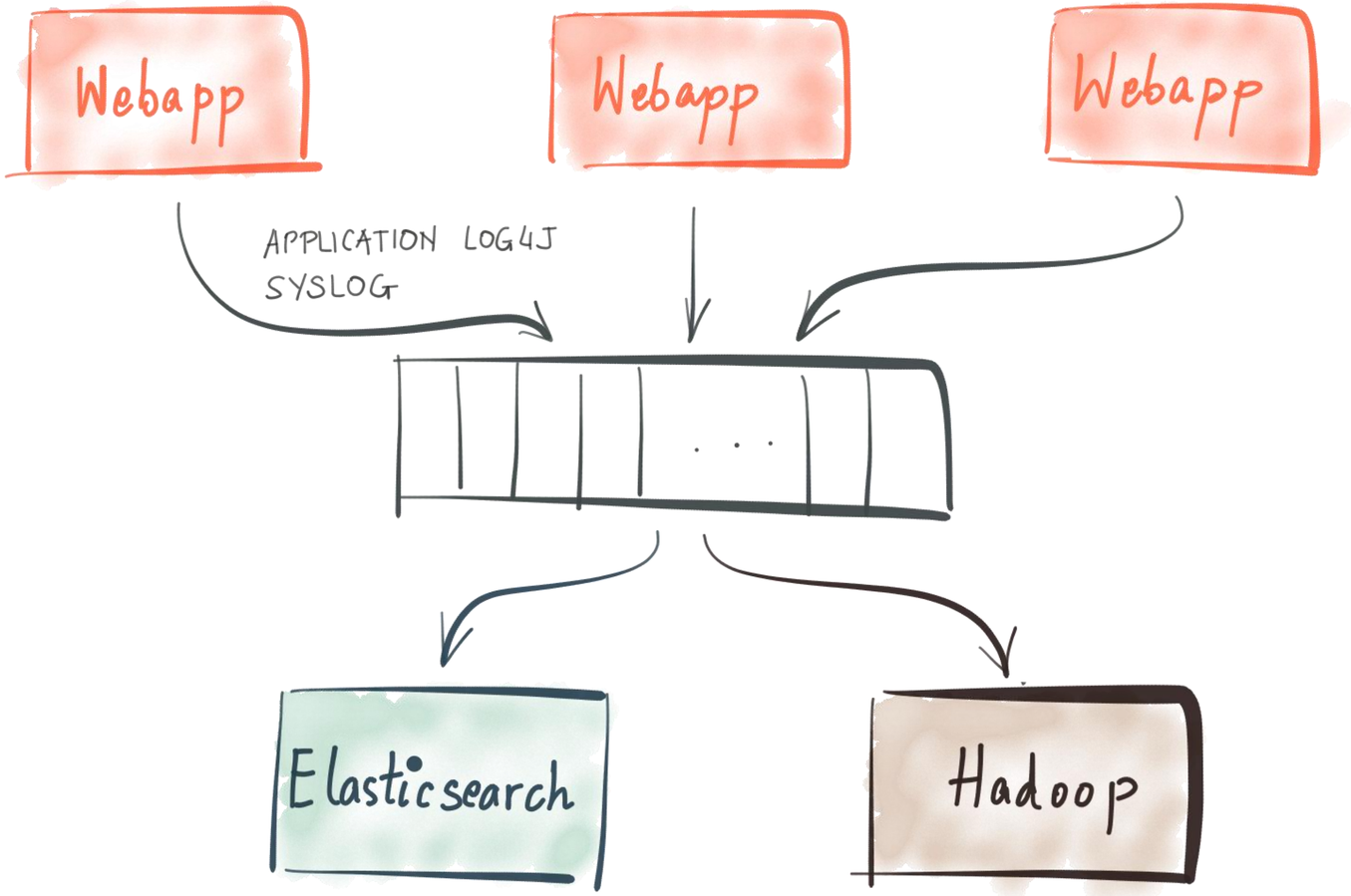
For Logging

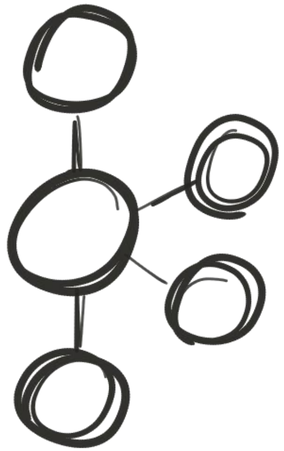

Webapp
Webapp
Webapp
APPLICATION LOG4J
SYSLOG
Logstash
Elasticsearch
Flume
Hadoop

For Logging

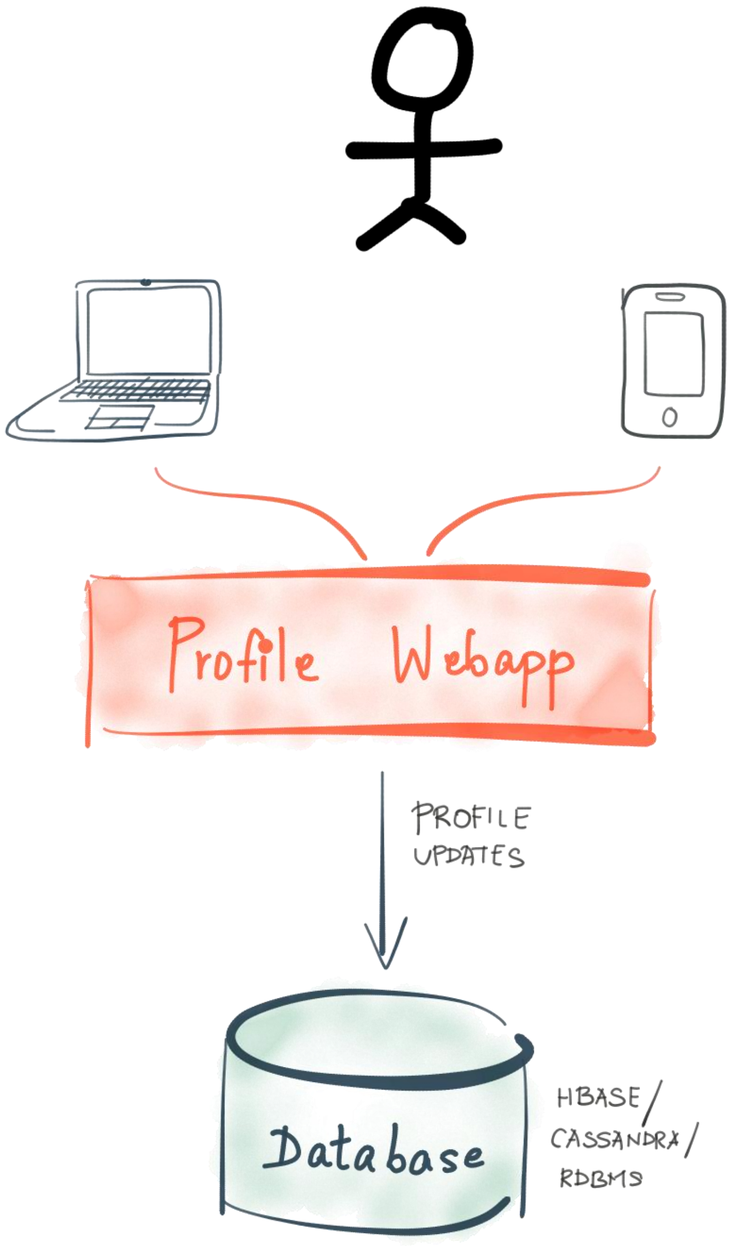

Webapp
Webapp
Webapp
APPLICATION LOG4J
SYSLOG
Logstash
Elasticsearch
Flume
Hadoop
double writes again!

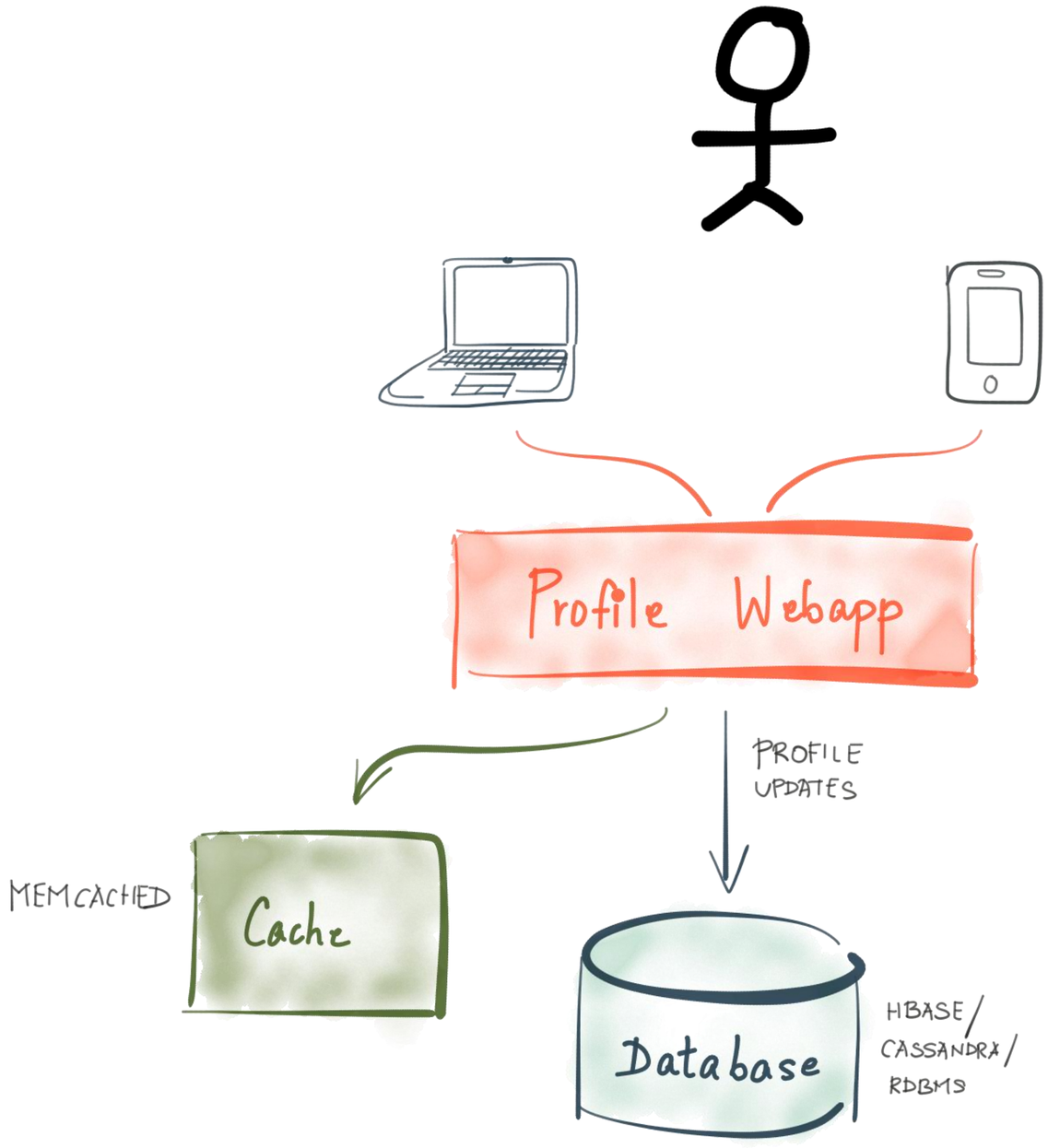
For Logging

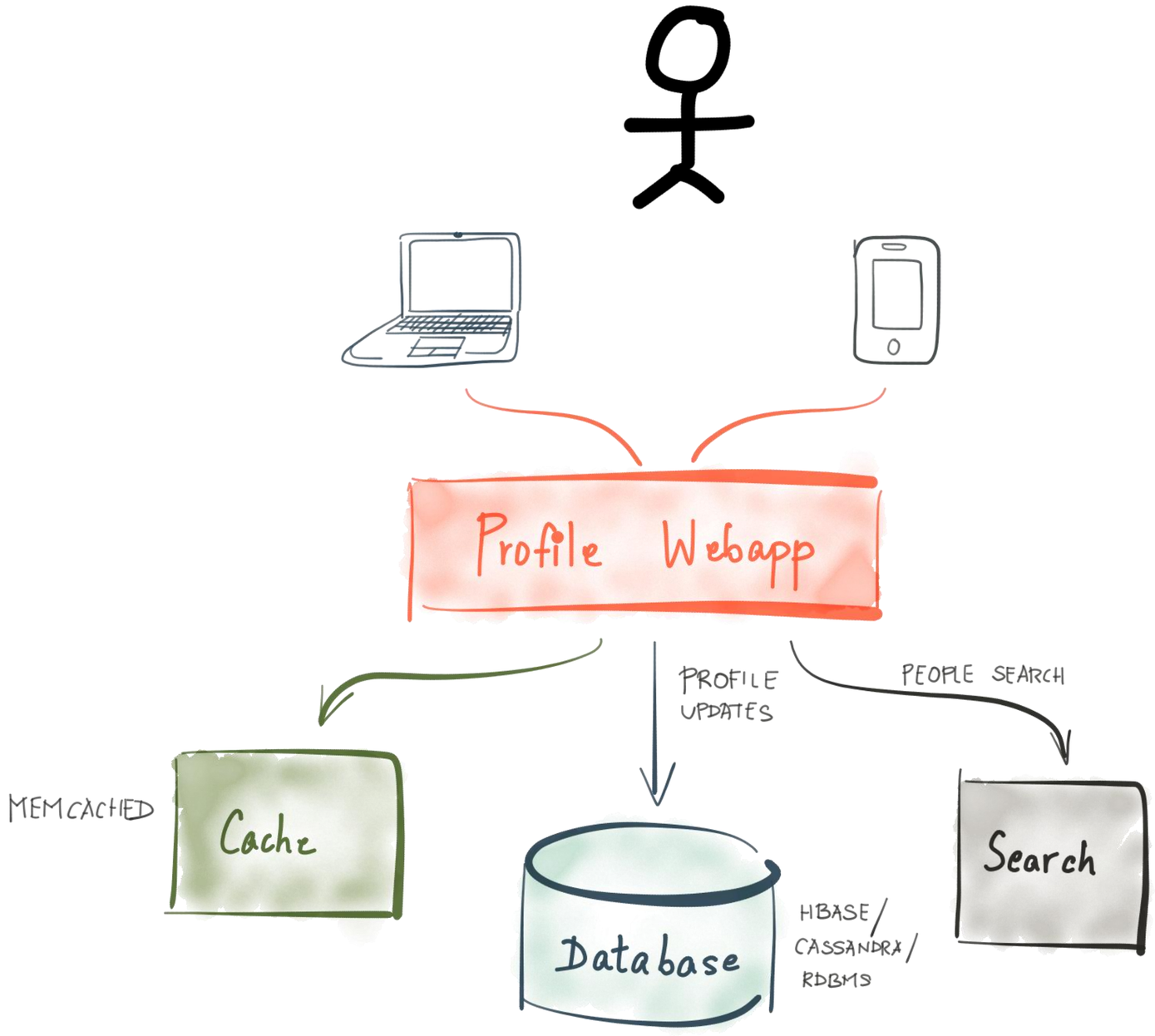

Webapp
Webapp
Webapp
APPLICATION LOG4J
SYSLOG
Elasticsearch
Hadoop

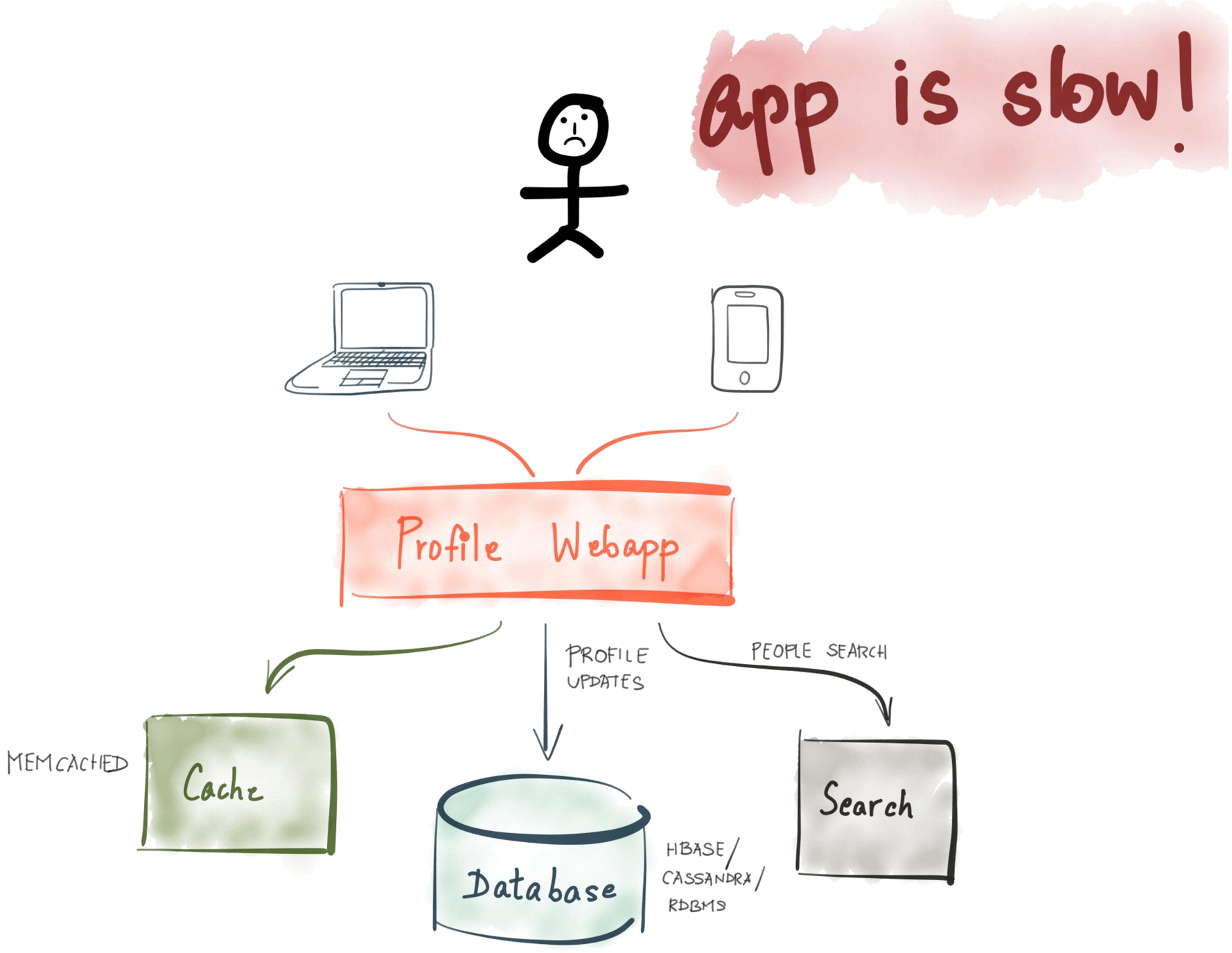


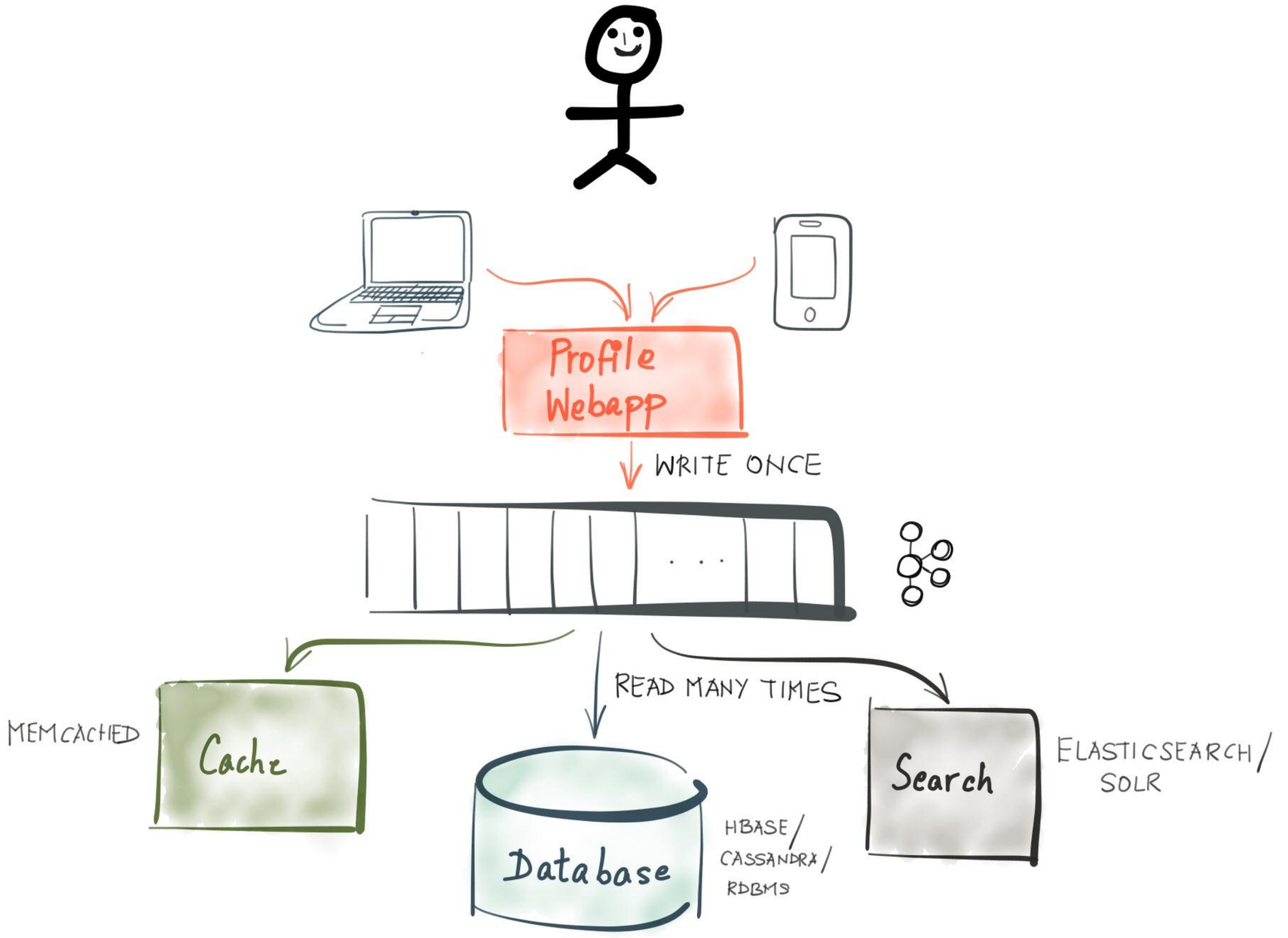
Data Denormalization

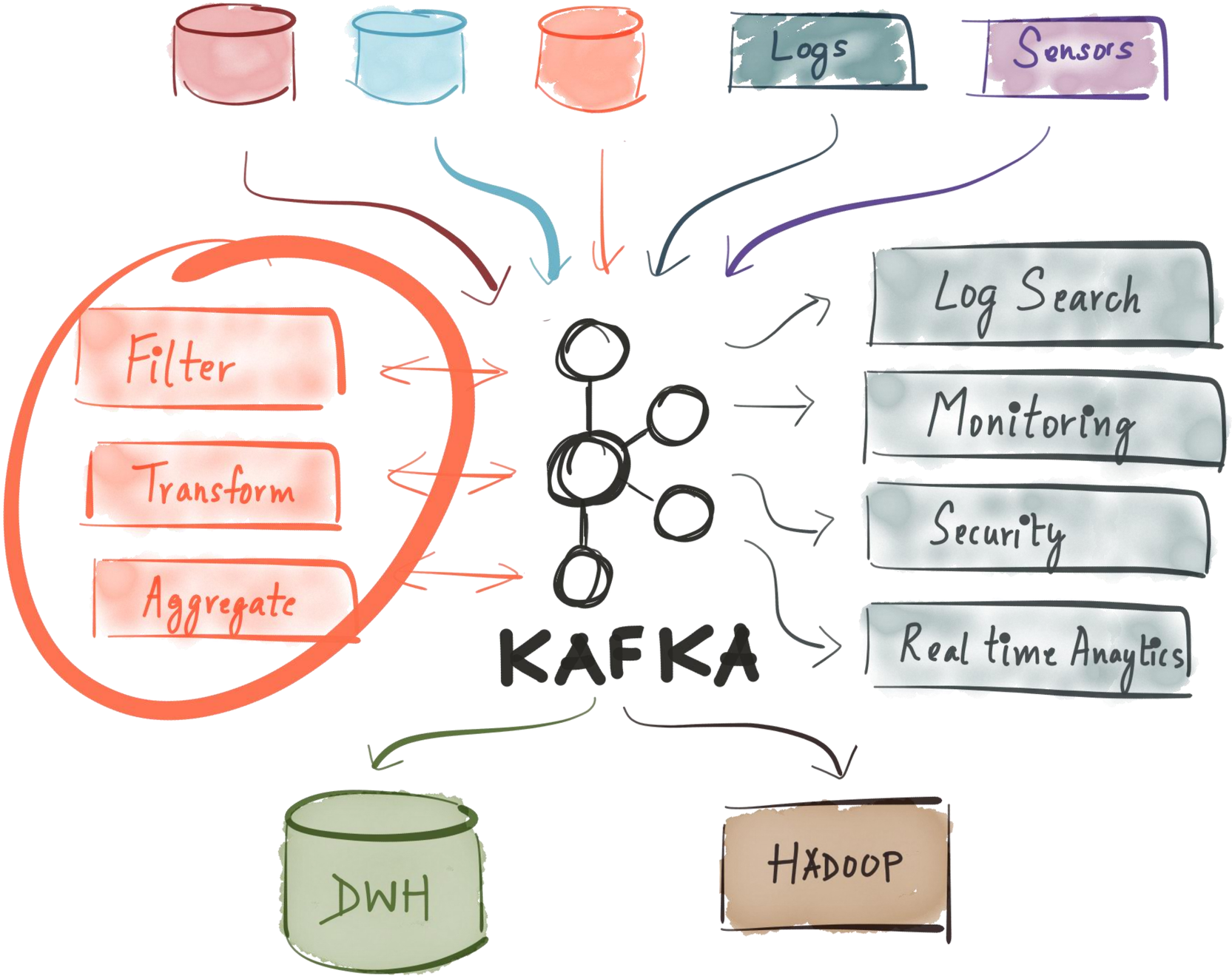

Profile Webapp
PROFILE
UPDATES
Database
HBASE/
CASSANDRA/
RDBMS

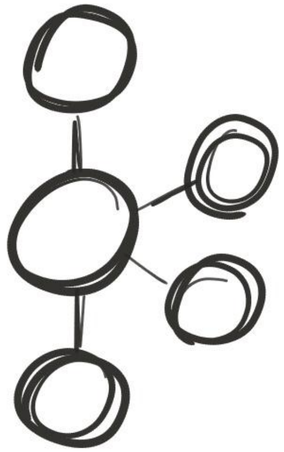

Profile Webapp
PROFILE
UPDATES
MEMCACHED
Cache
Database
HBASE/
CASSANDRA/
RDBMS


Profile Webapp
PROFILE UPDATES
PEOPLE SEARCH
MEMCACHED
Cache
Database
HBASE / CASSANDRA / RDBMS
Search


app is slow!
Profile Webapp
PROFILE UPDATES
PEOPLE SEARCH
MEMCACHED
Cache
Database
HBASE / CASSANDRA / RDBMS
Search

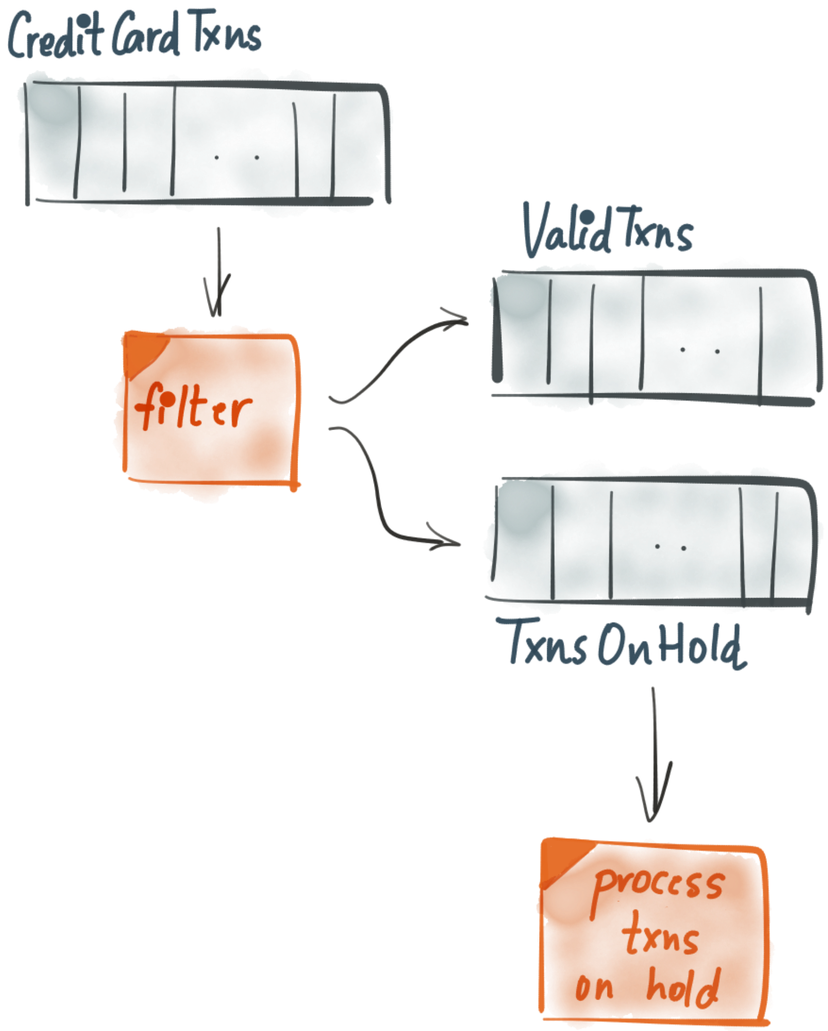

Profile
Webapp
WRITE ONCE
READ MANY TIMES
MEMCACHED
Cache
Database
HBASE/
CASSANDRA/
RDBMS
Search
ELASTICSEARCH/
SOLR


Logs
Sensors
Filter
Transform
Aggregate
KAFKA
Log Search
Monitoring
Security
Real time Anaytics
DWH
HADOOP

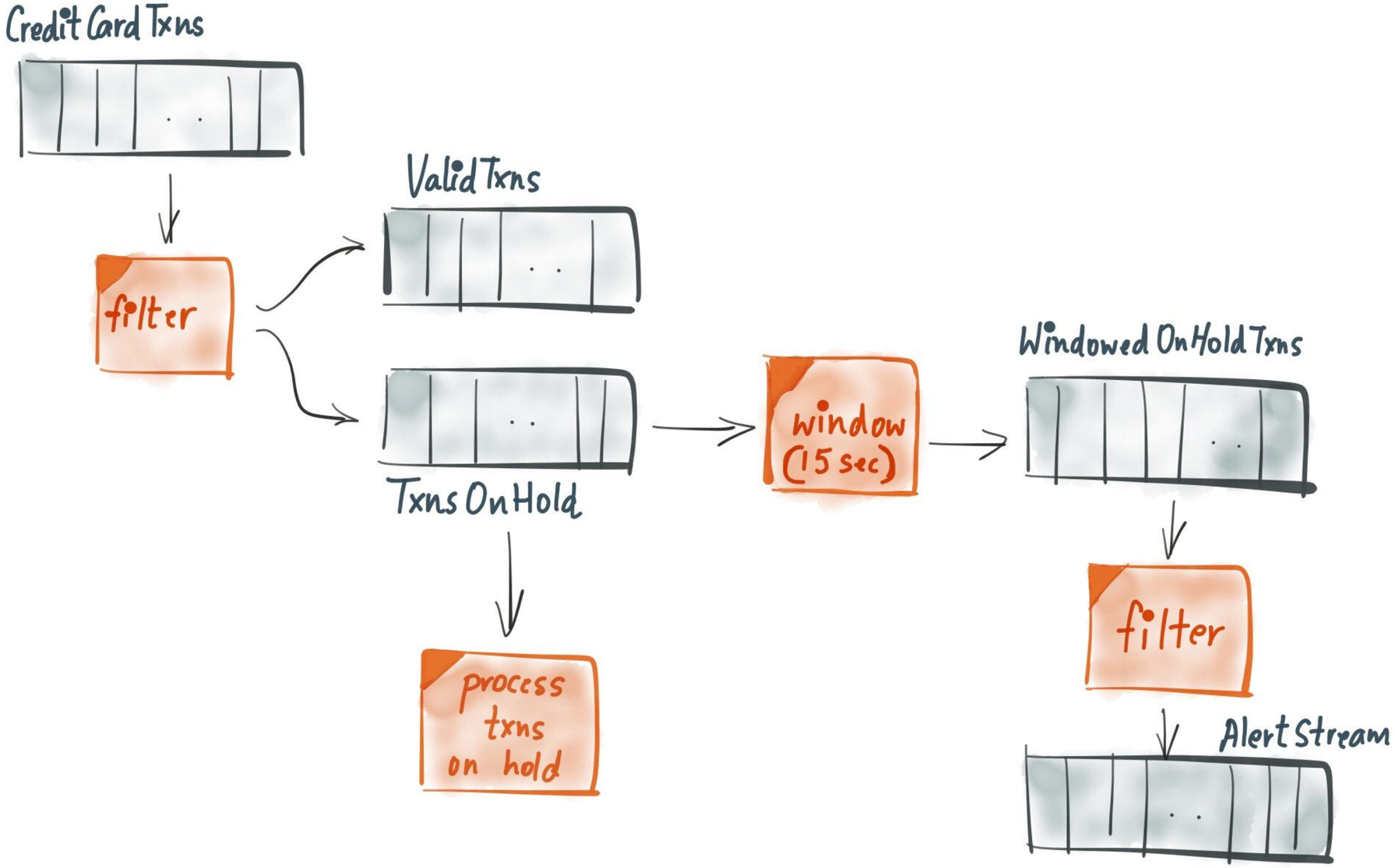


Stream Processing

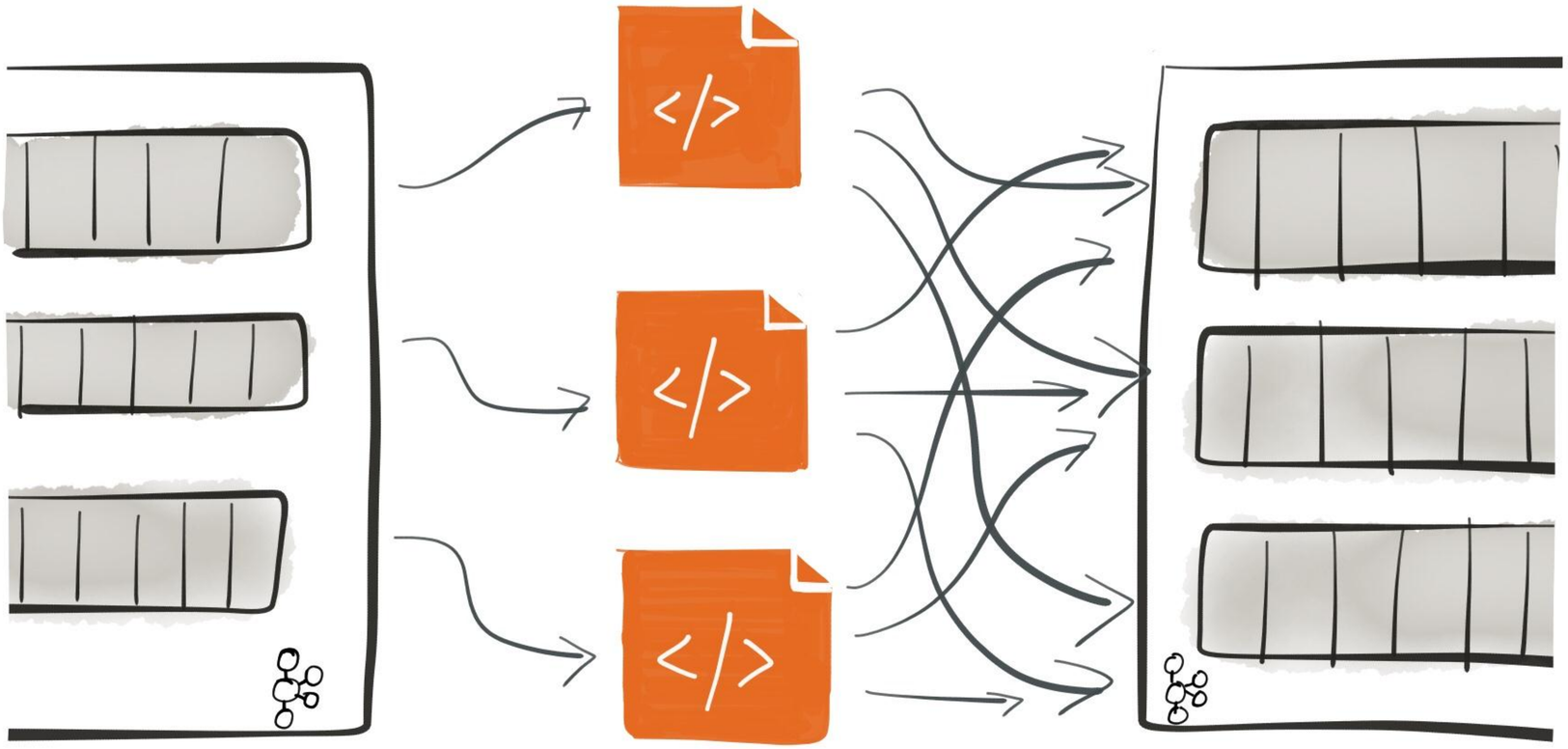
STREAM PROCESSING



STREAM PROCESSING

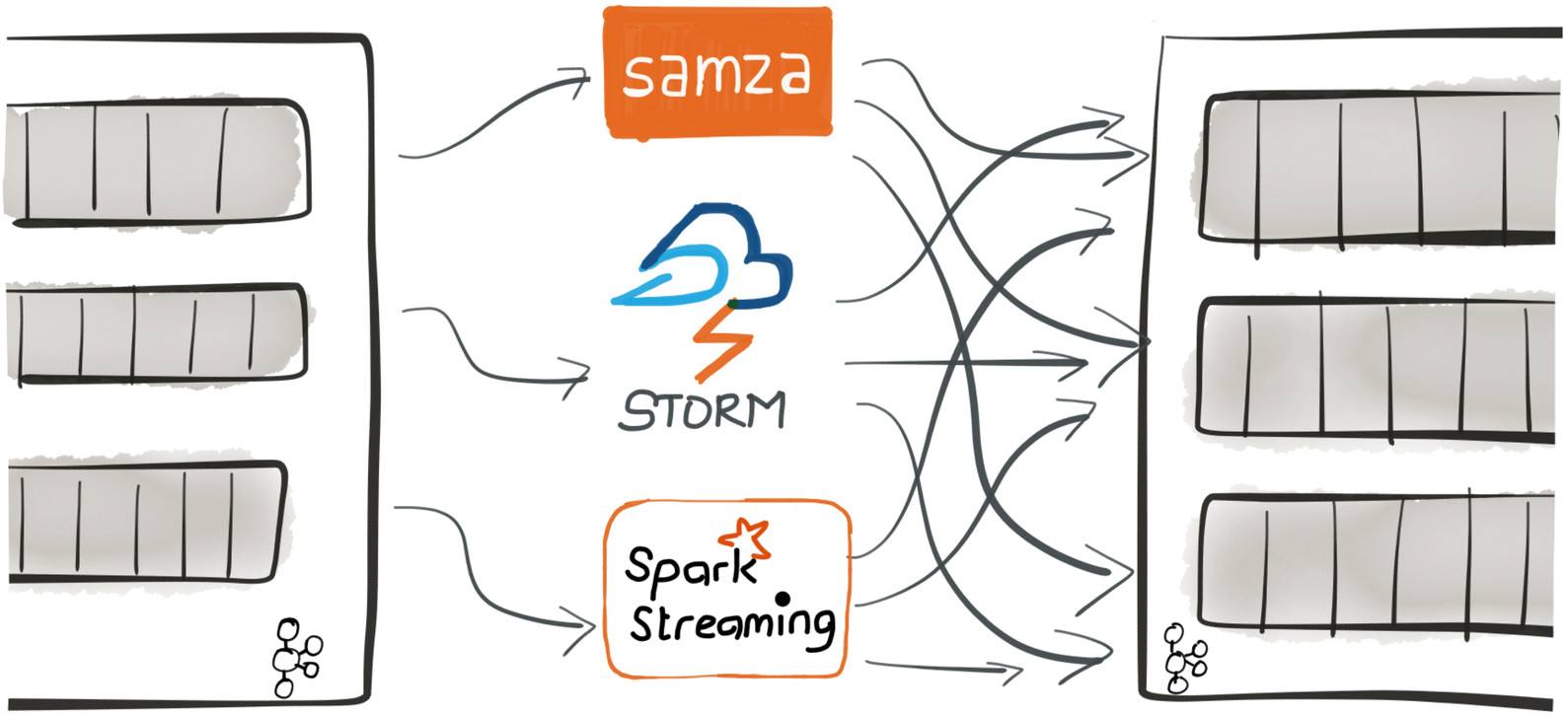


STREAM PROCESSING



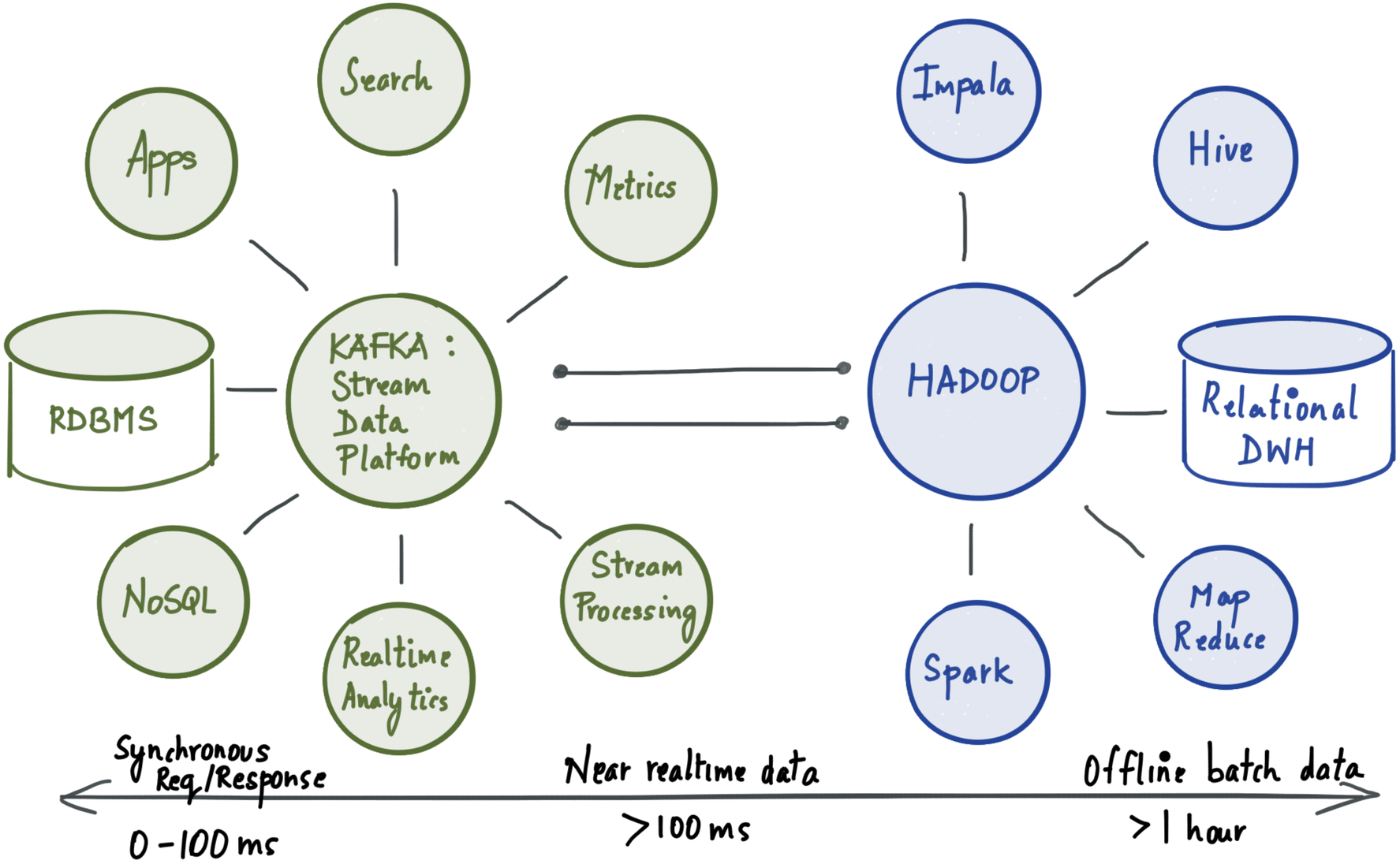
CONSUMER + CUSTOM + PRODUCER
CODE

STREAM PROCESSING



CONSUMER + CUSTOM + PRODUCER
CODE

STREAM DATA PLATFORM



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- Centralized ⇒ Distributed Computing
- Closed ⇒ Open Source

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- Batch ⇒ Realtime
- Daily ⇒ Continuous

confluent

- Mission: Make Kafka-based stream data platform a practical reality everywhere
- Product
  - Stream processing integration for Kafka
  - Connectors for streaming data flow for common systems
  - Monitor end-to-end data flow
  - Schemas and metadata management
  - First release - Confluent Platform 1.0

Thank you

@nehanarkhede

http://confluent.io/careers