

## HLD - Zookeeper and Kafka

## Agenda

✓ Zookeeper

✓ Motivation

✓ Solution

✓ Leader election

✓ Quorum

- Kappa

- Motivation

- Asynchronous

- Pub - Sub

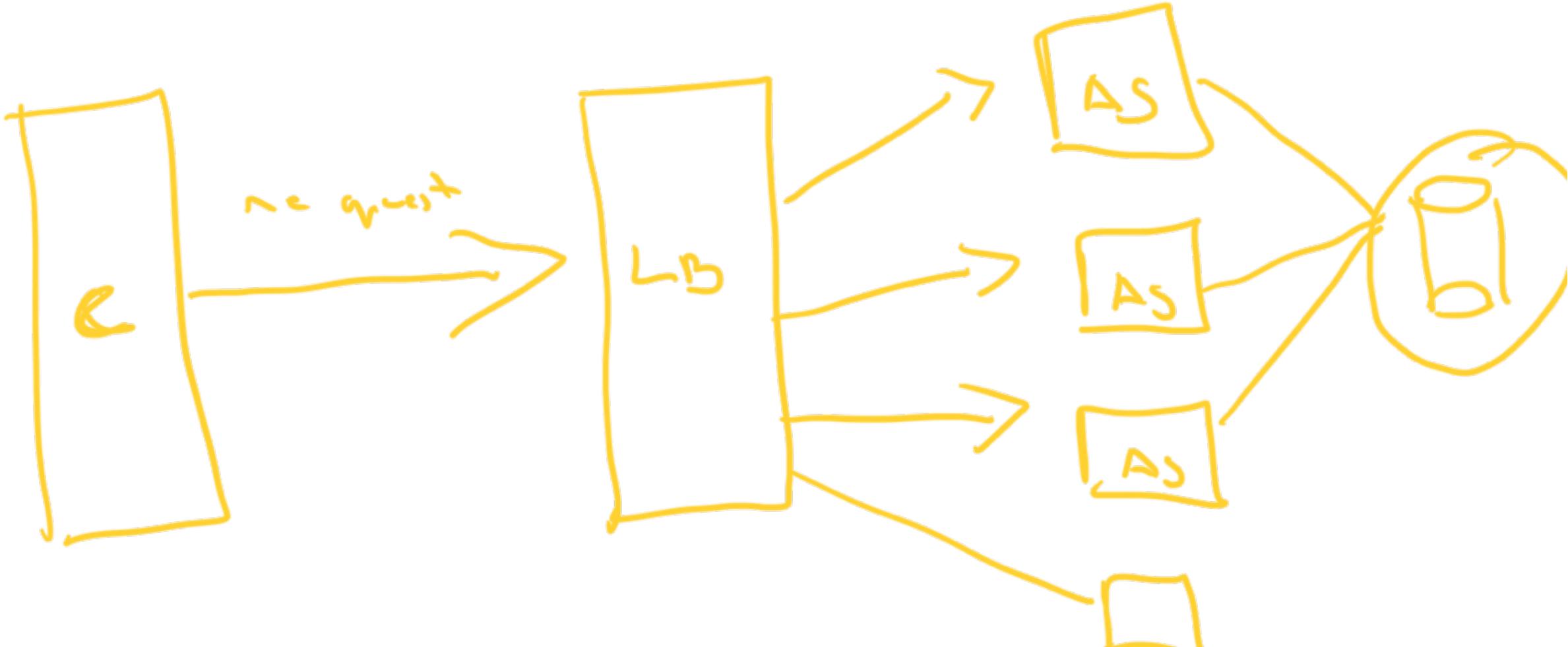


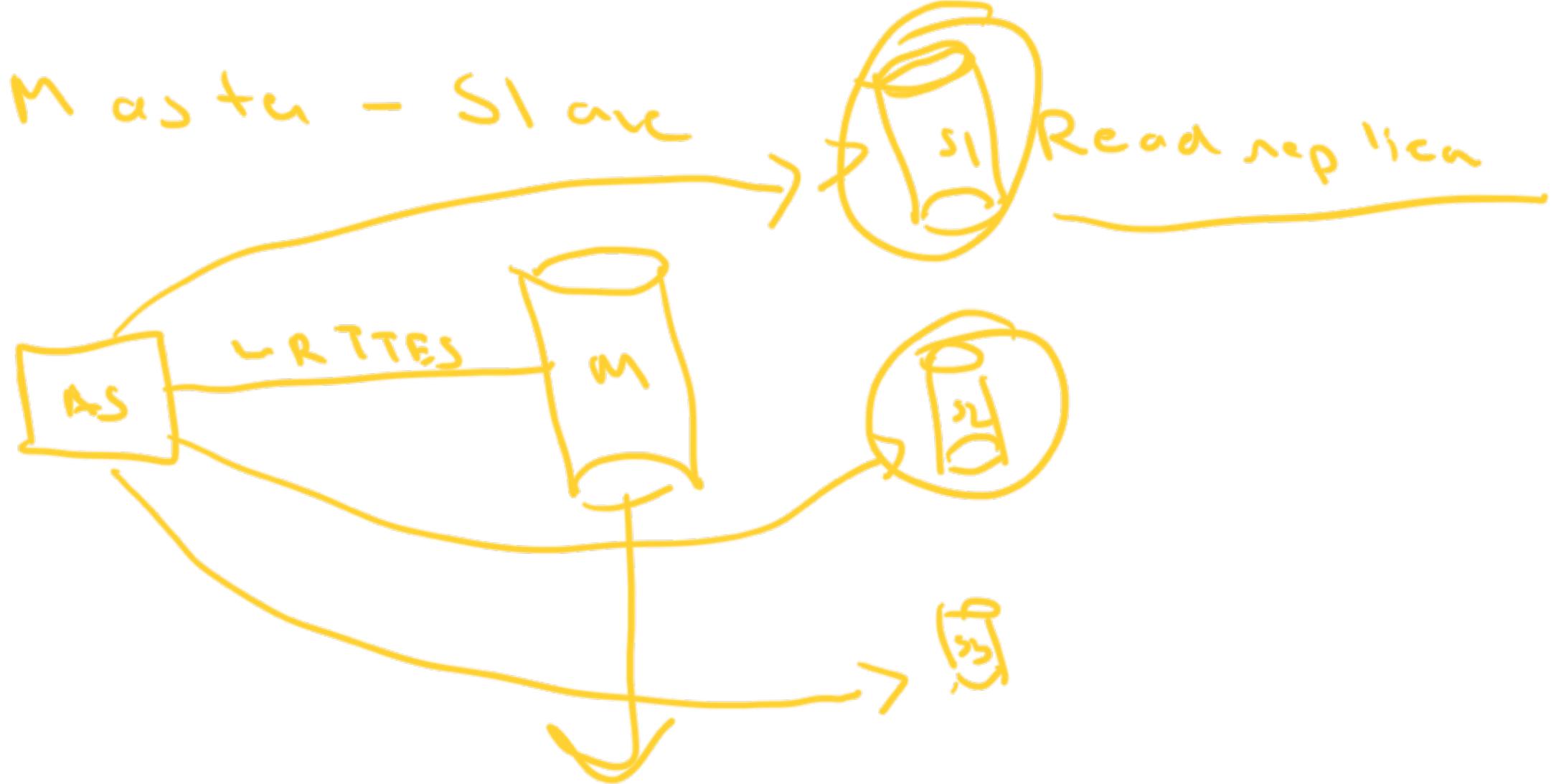
# ① Client - Server



- Browser
- FE
- APP

Peer 2 Peer

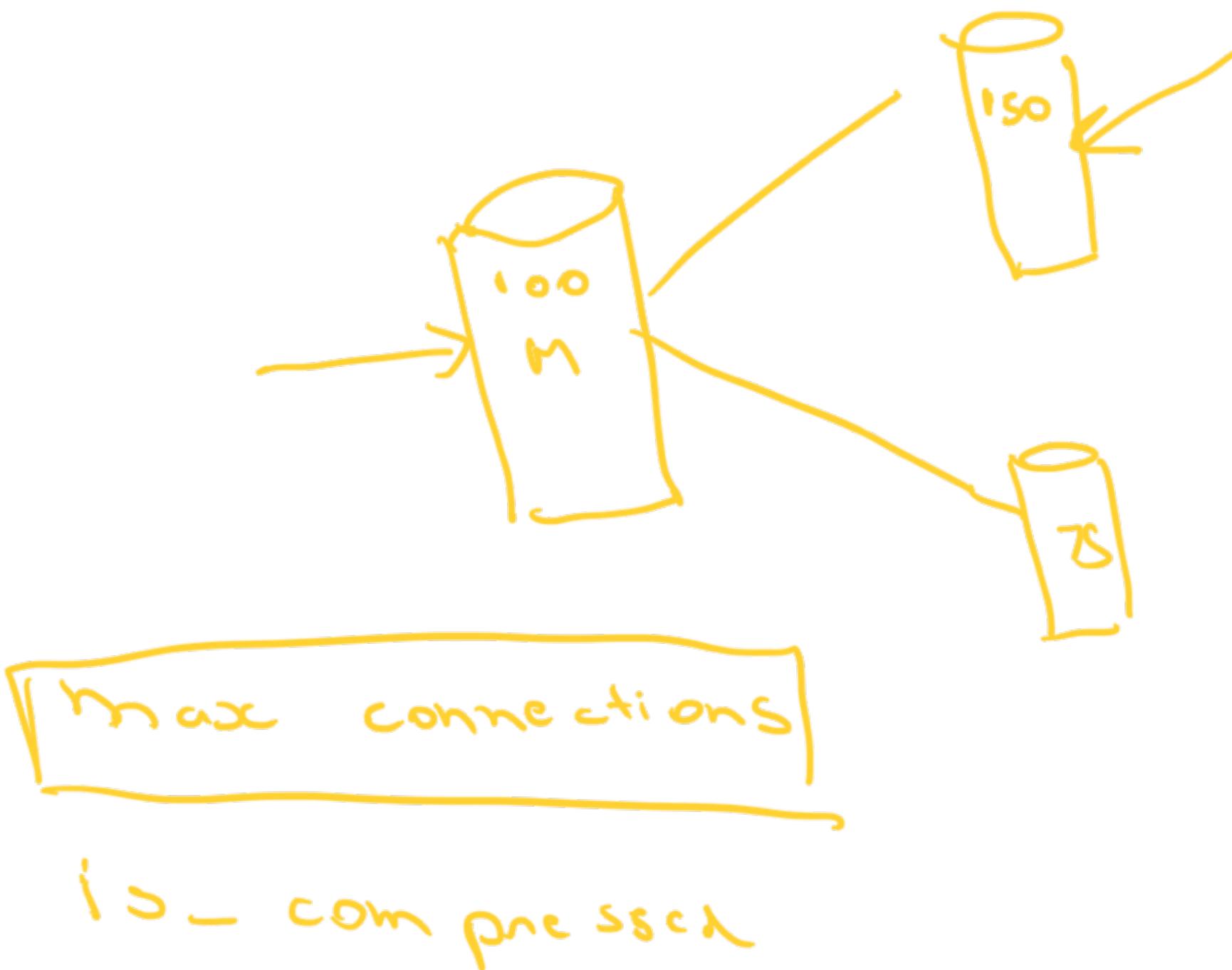


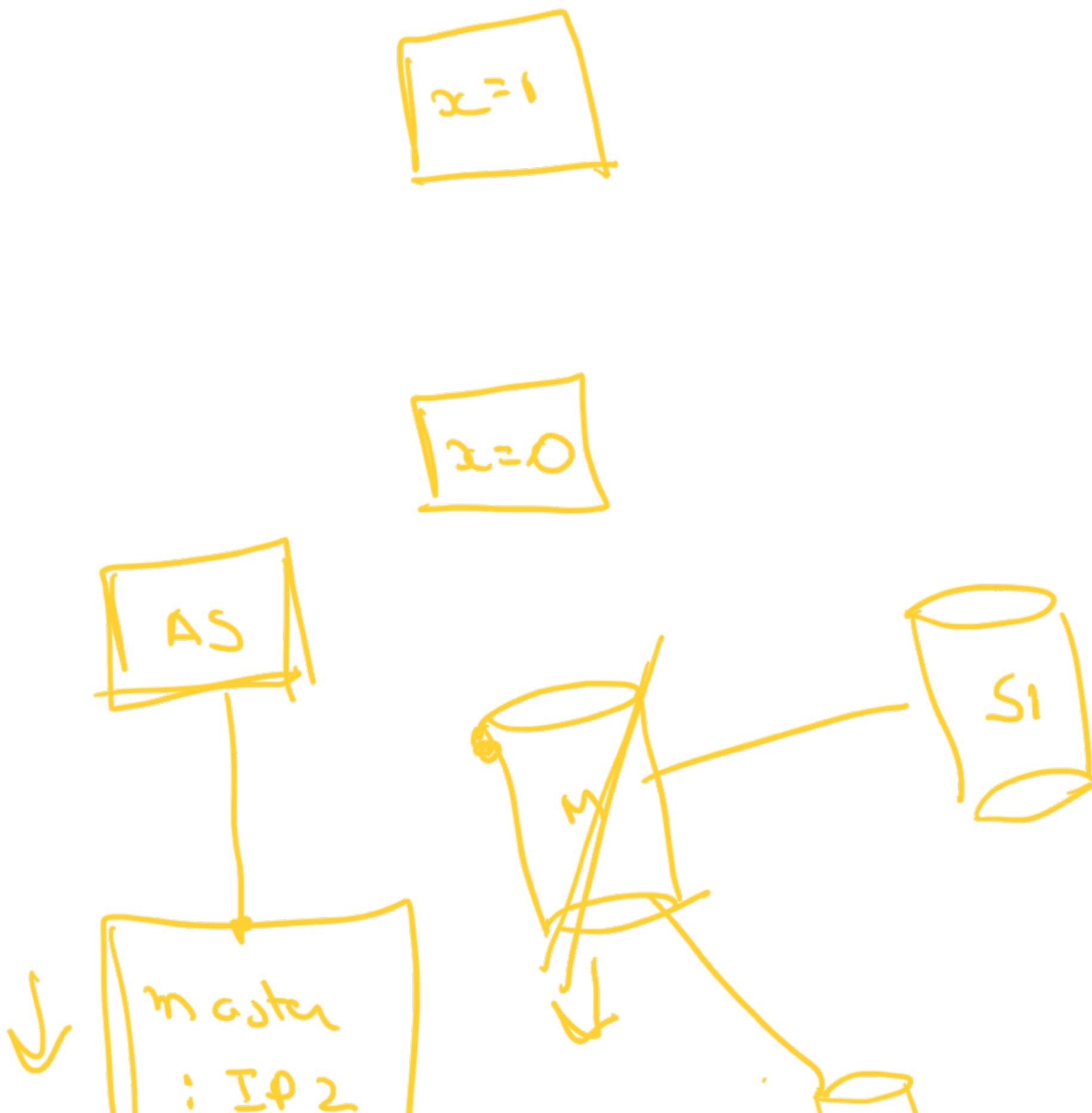


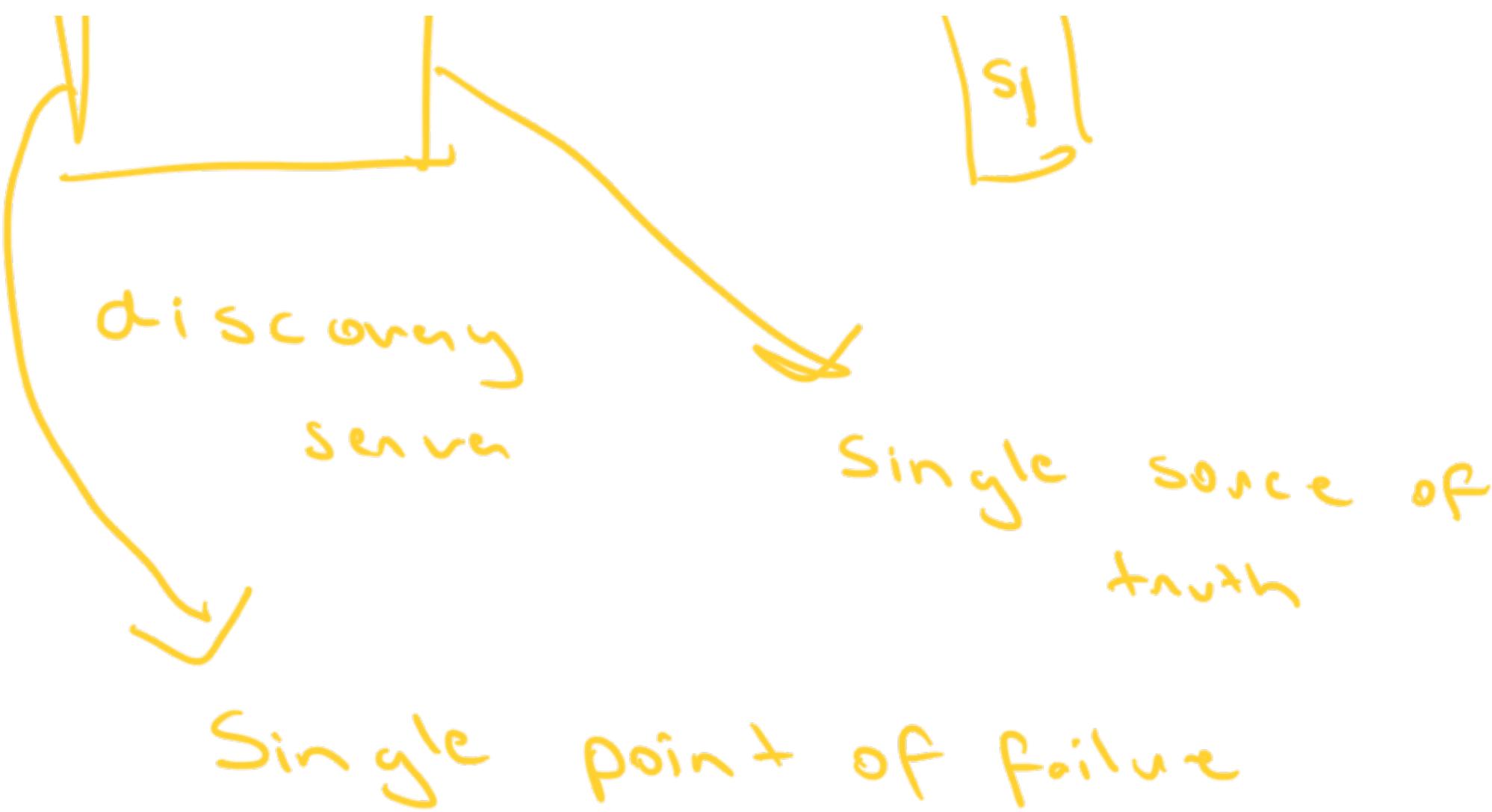
Master goes down  
→ Leader election

Highly available

- ① How do you handle leader election?
- ② Consistency

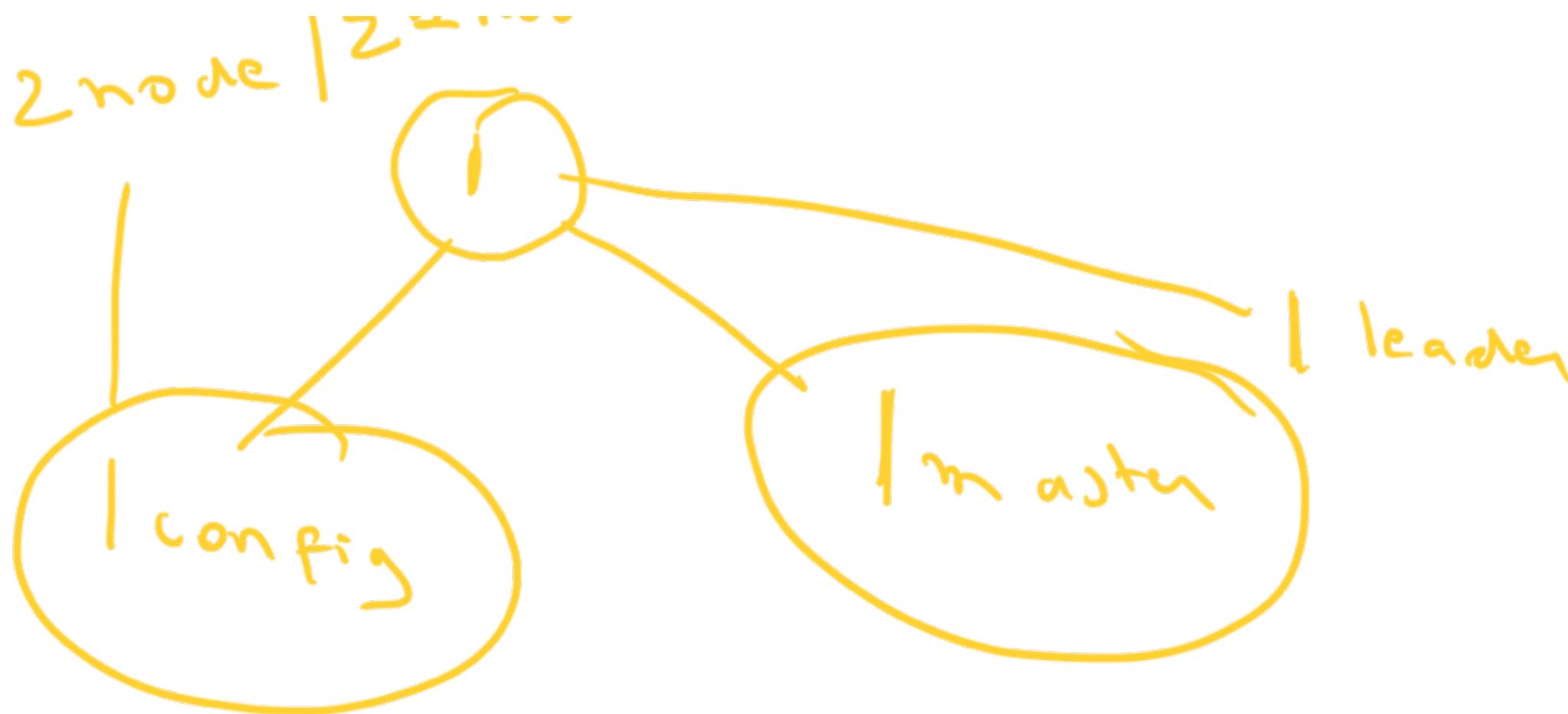


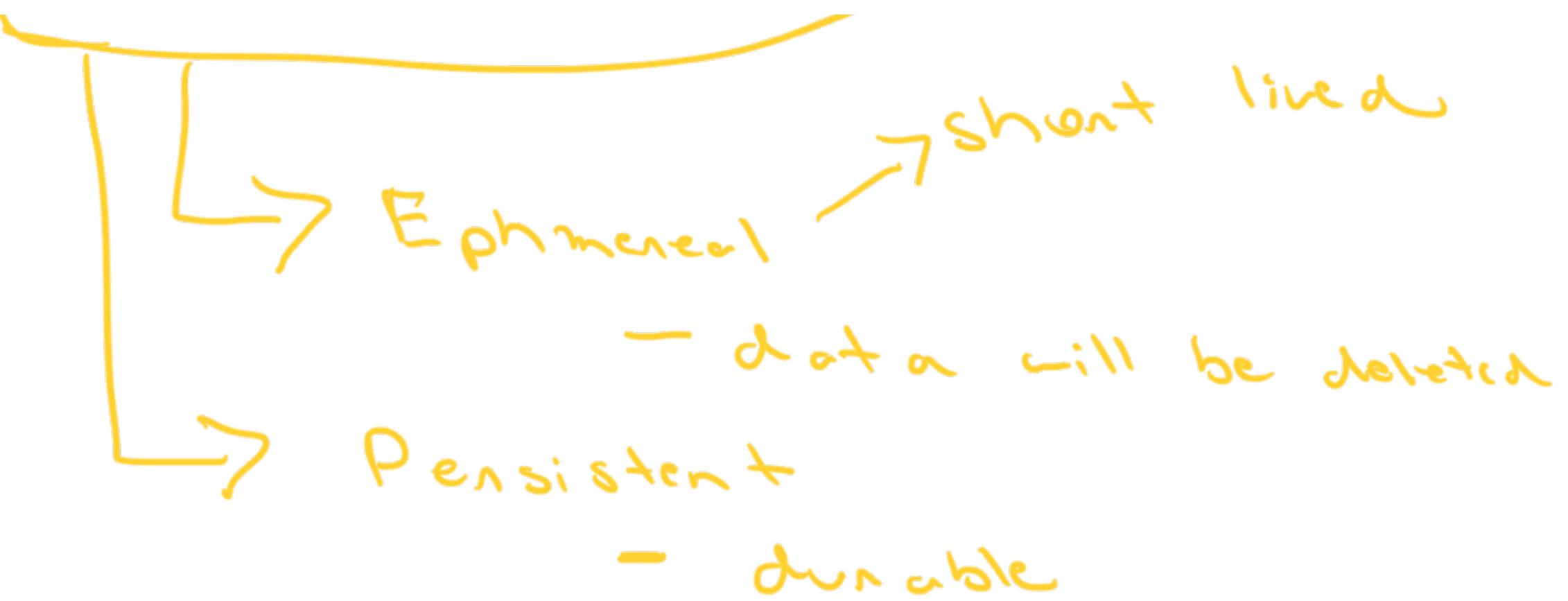




Zoo keeper

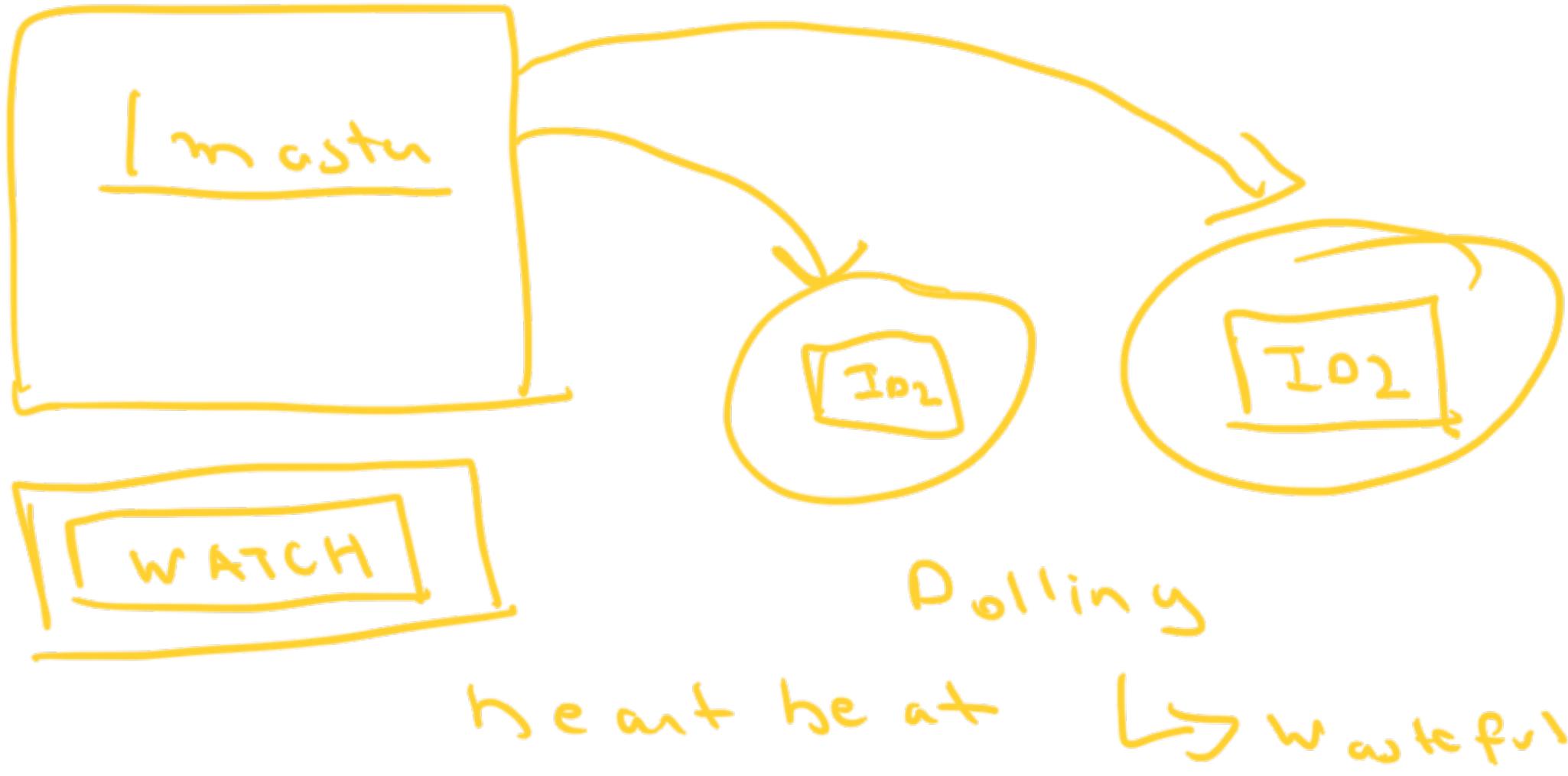
- centralised config management
- = group services leader election
- 1 - h node





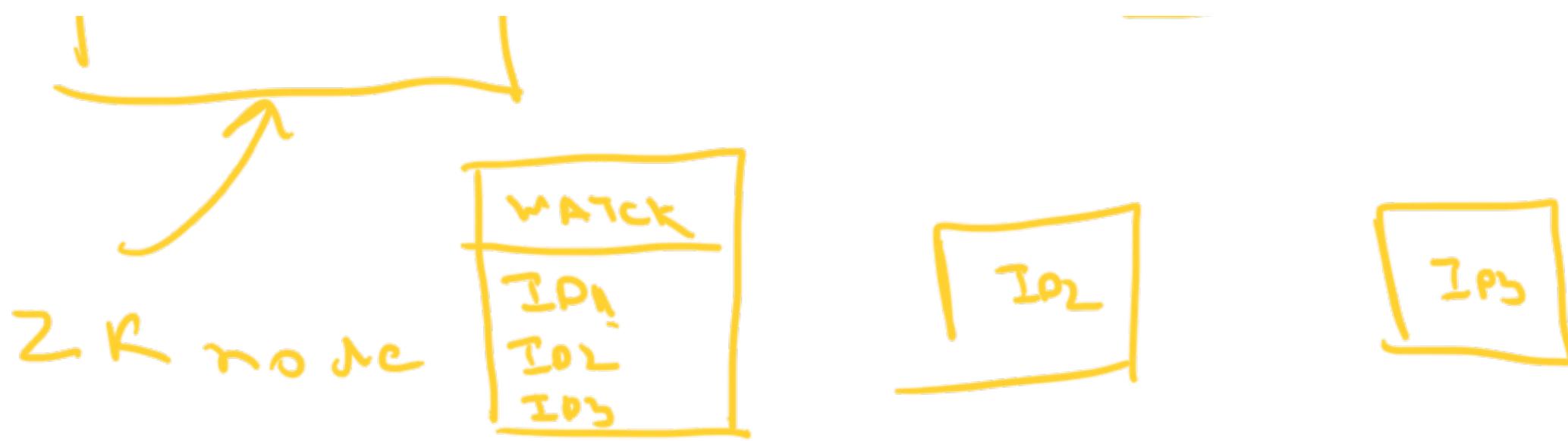
## Leader Election





# LEADER ELECTION





- ① Pinging ZK node wanting to be master
  - ② One is elected & the value is updated
- 
- Staying in Power
- ① Master will send heartbeat
  - ② If no heartbeat, master to null

## Select a new bin g

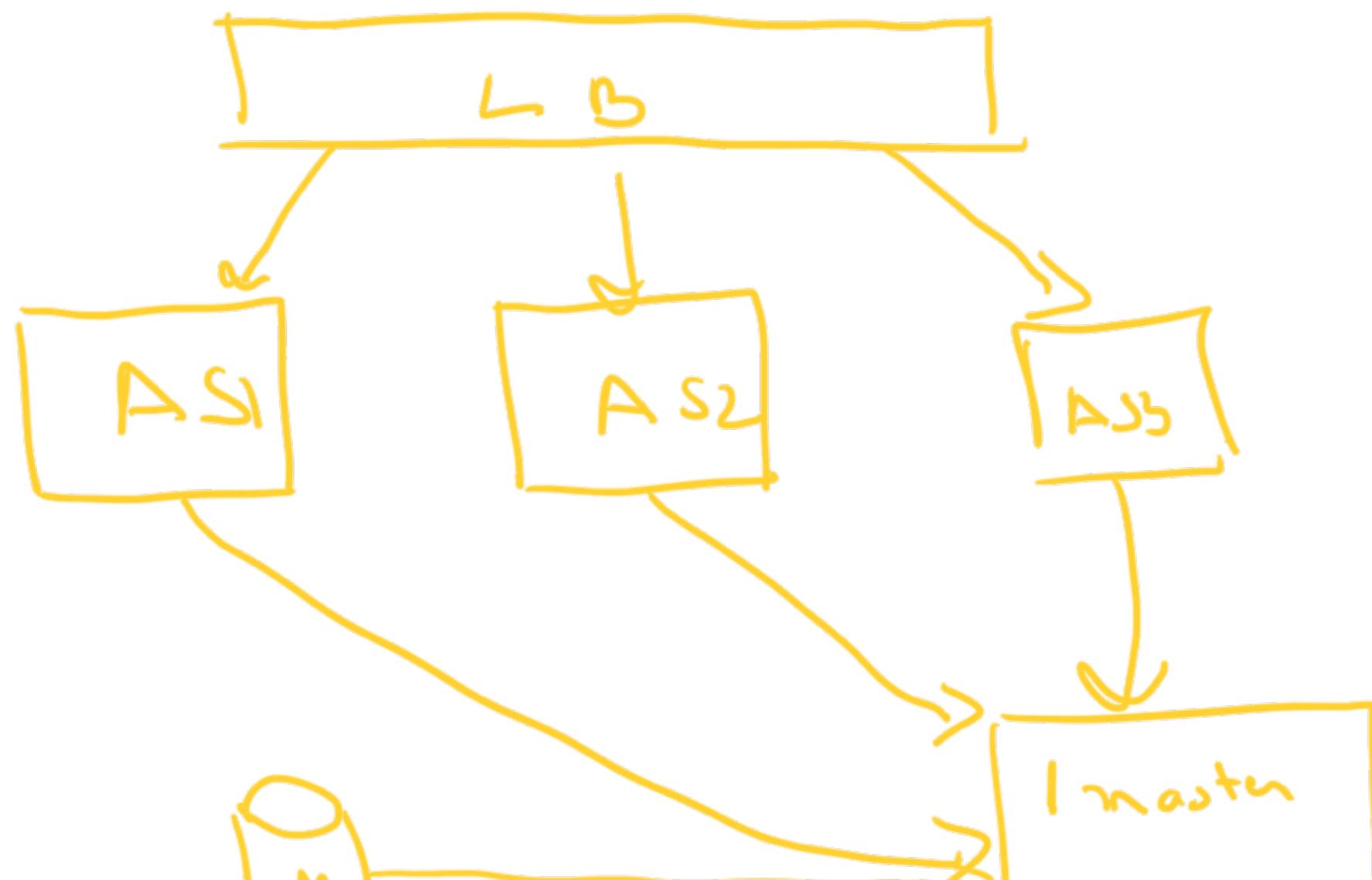
①

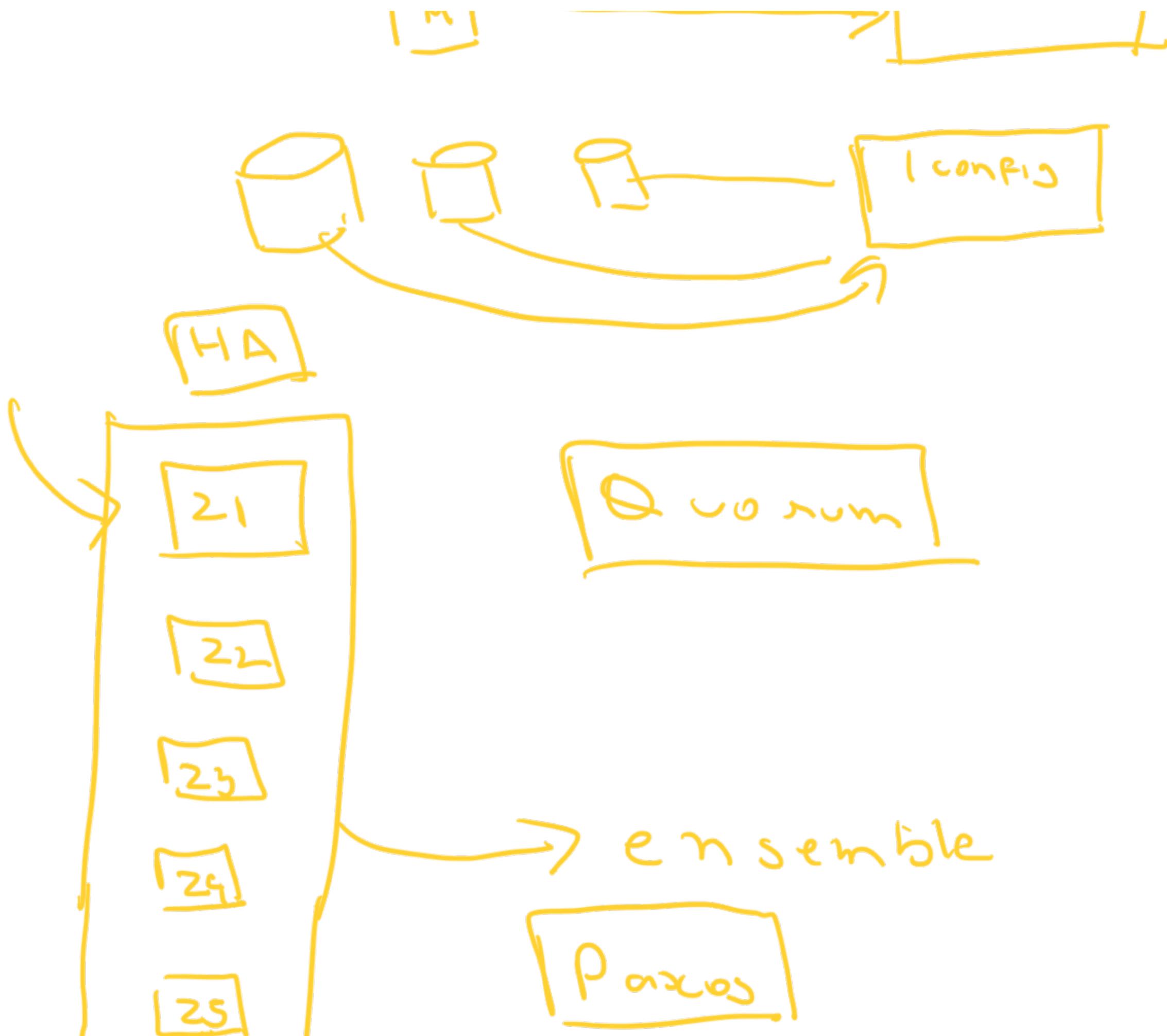
Send a message to the  
watch list (LOOKING)

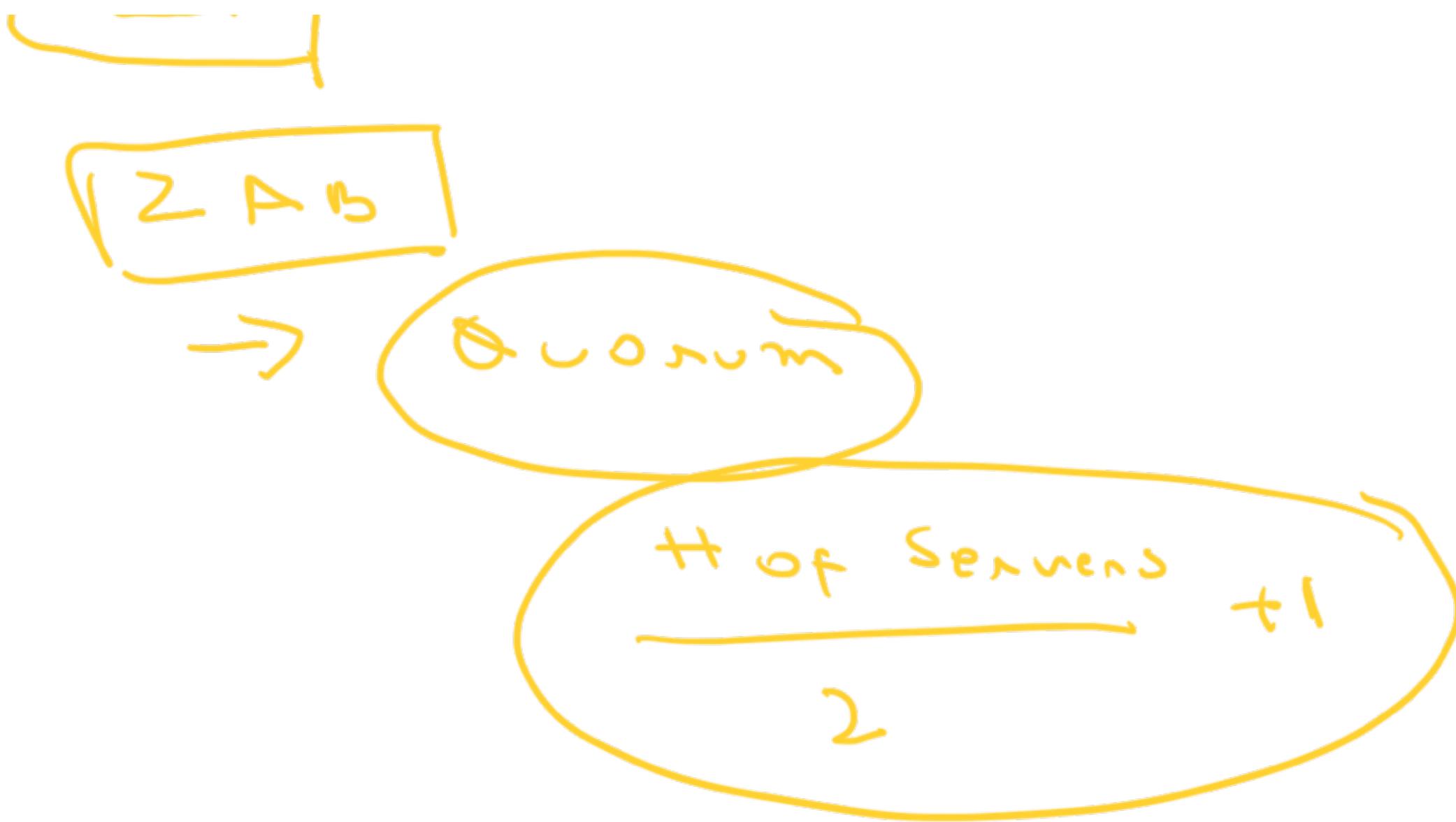


# Architecture

## - Cluster





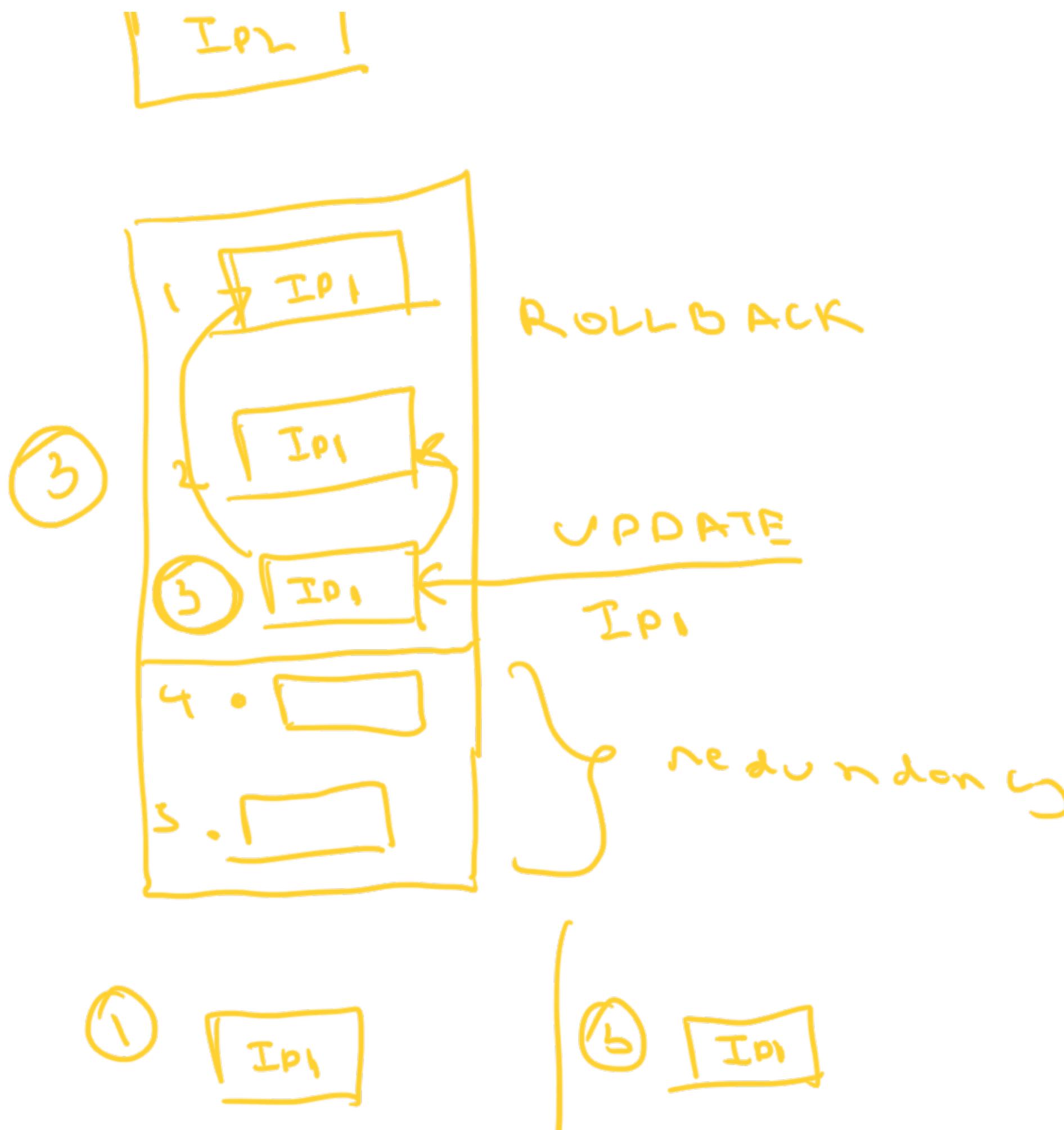


Master IP



For any update,  
all members of  
Quorum must ack

Master





m ask - connections

$c_m$





1 master  
1 leader

① Replication  
② Z<sub>R</sub> nodes

Recap

ZooKeeper

= Config + leader selection

- ZK nodes
  - ephemeral (short lived)
  - persistent
- ① leader election
  - 1 node master / lead.
  - watch
- ② leader  $\rightarrow$  heartbeat
- ③ ZK  $\rightarrow$  WATCH

## ZK architecture

- cluster
- quorum ( $Z \Delta B$ )
  - $\frac{Z}{2} + 1$

- UPDATE → leader
    - ↓
    - Propagate
    - ↓ ↑ ACK
    - Rest of the Q
    - No ACK
      - ROLLBACK
  - Consistency
  - ZK goes down
    - = add a standy to the quorum
-

- 10:50

KAFKA

12:30



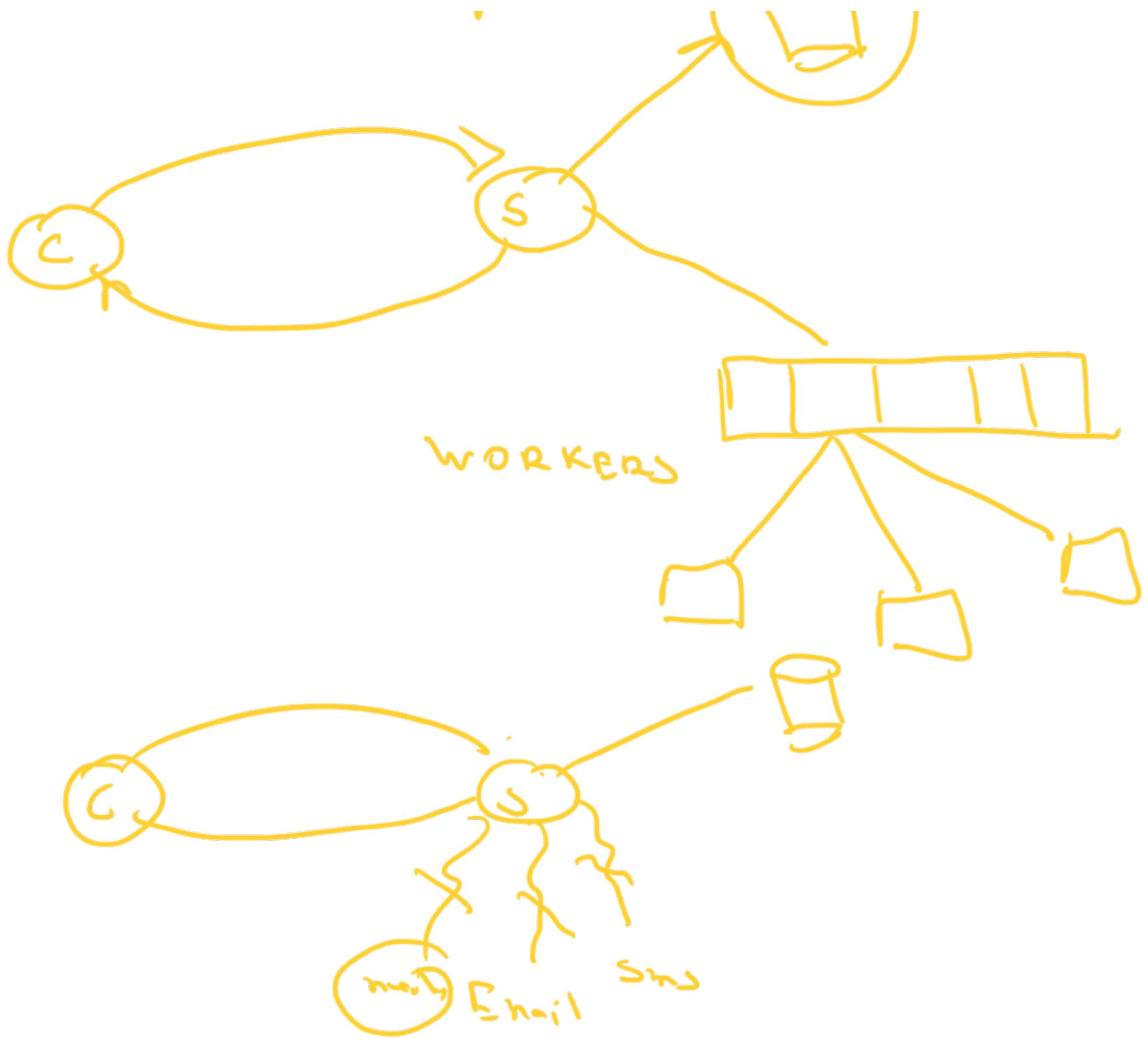
(1)

Send user an email

- (2) Push notification
- (3) Sms
- (4) Inventory
- (5) Loyalty points

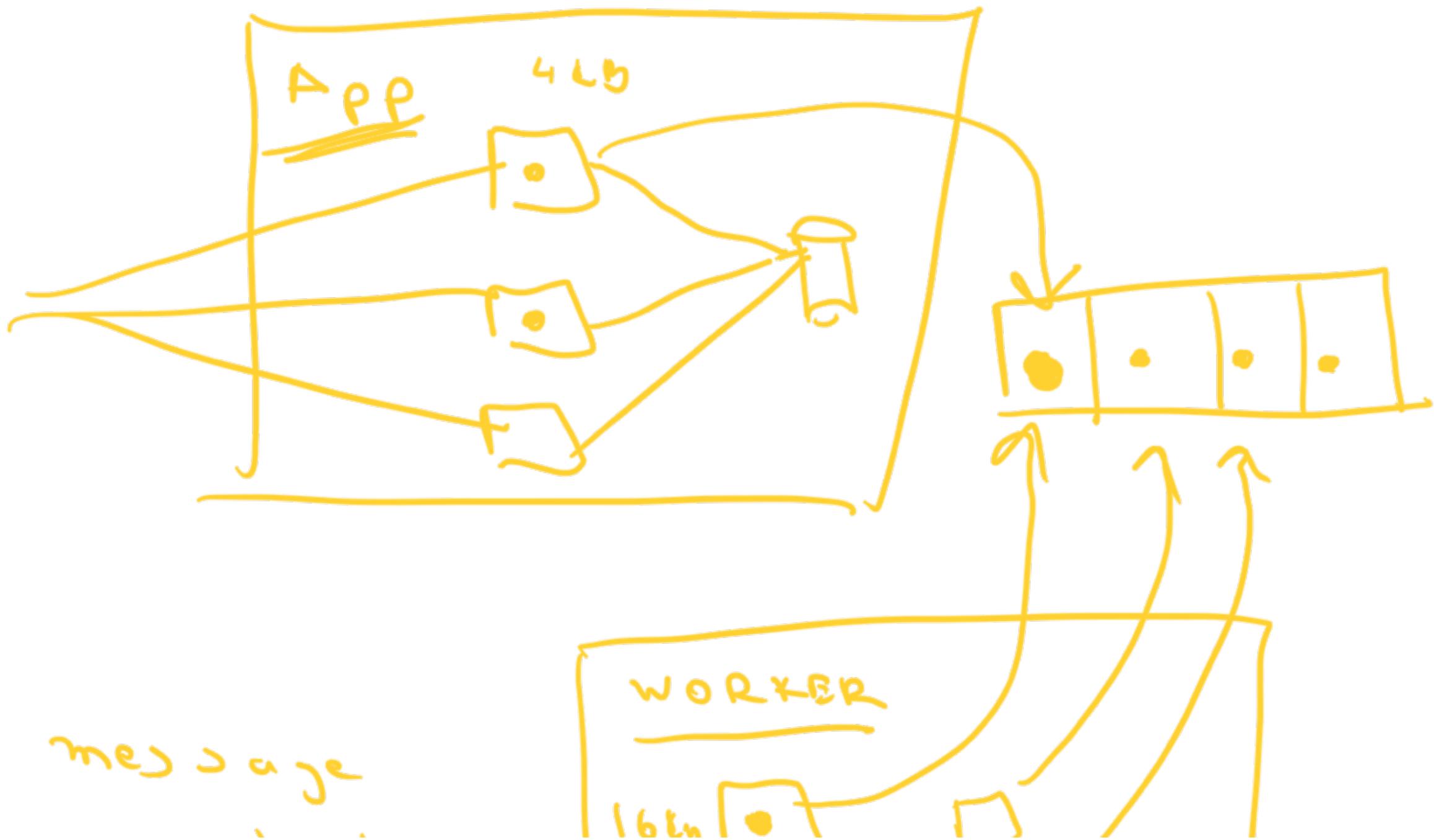
Asynchronous processing

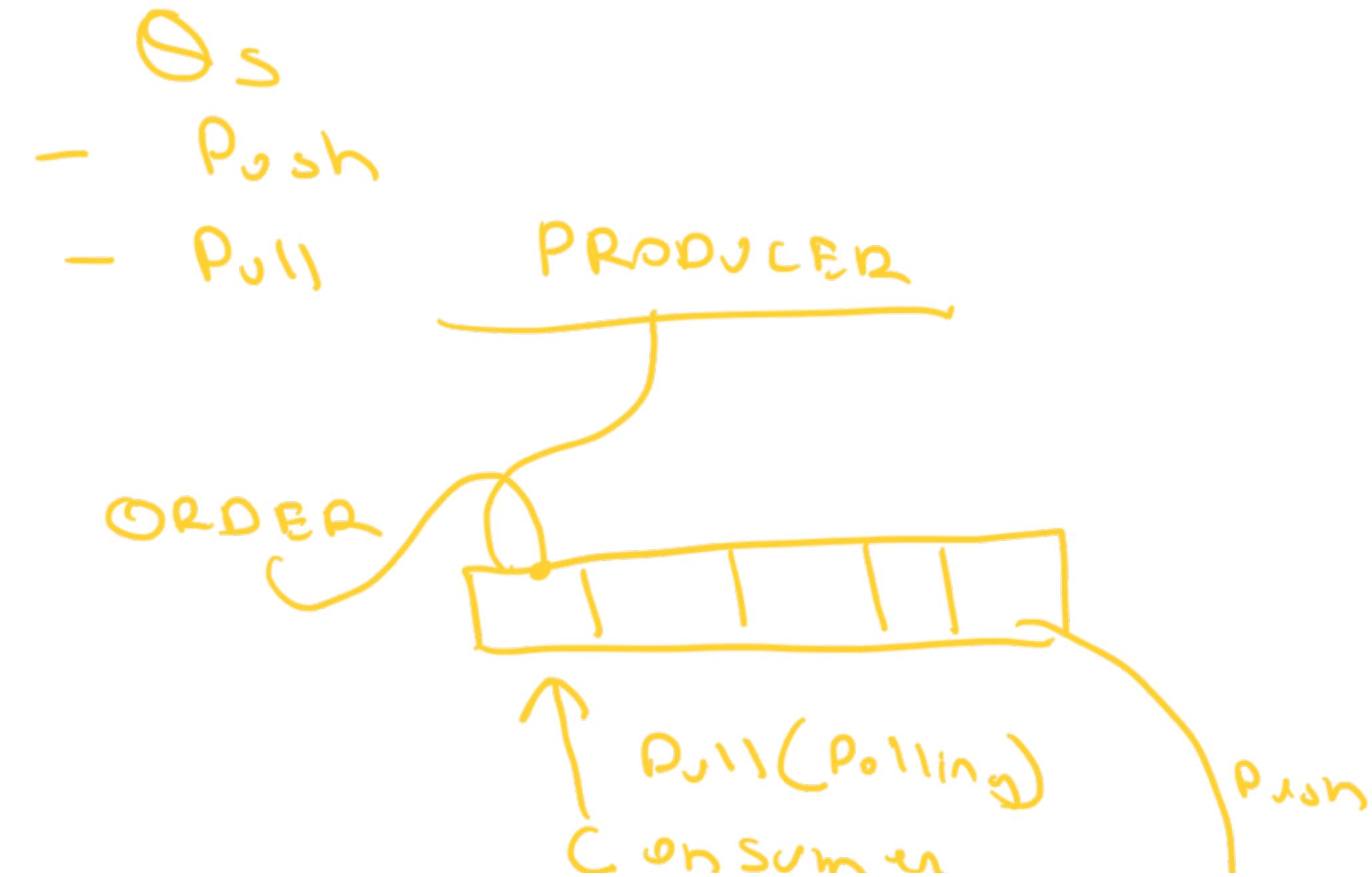




1  
2

Failure  
Resource



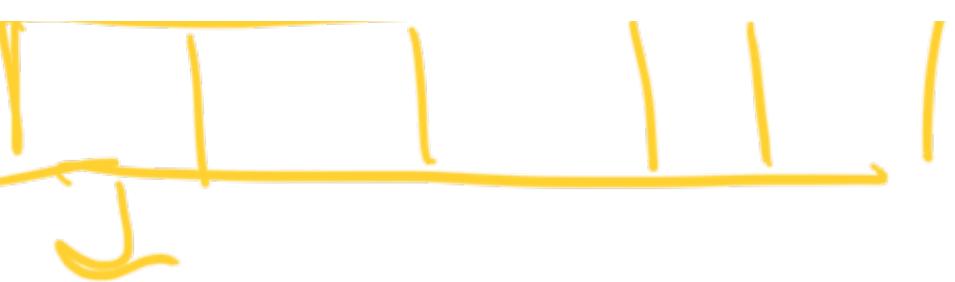




Push → Ø → Consumer

Pull → Consumer ← Ø





queue goes down

lost

Persistent  $\emptyset$



disk

Commit log

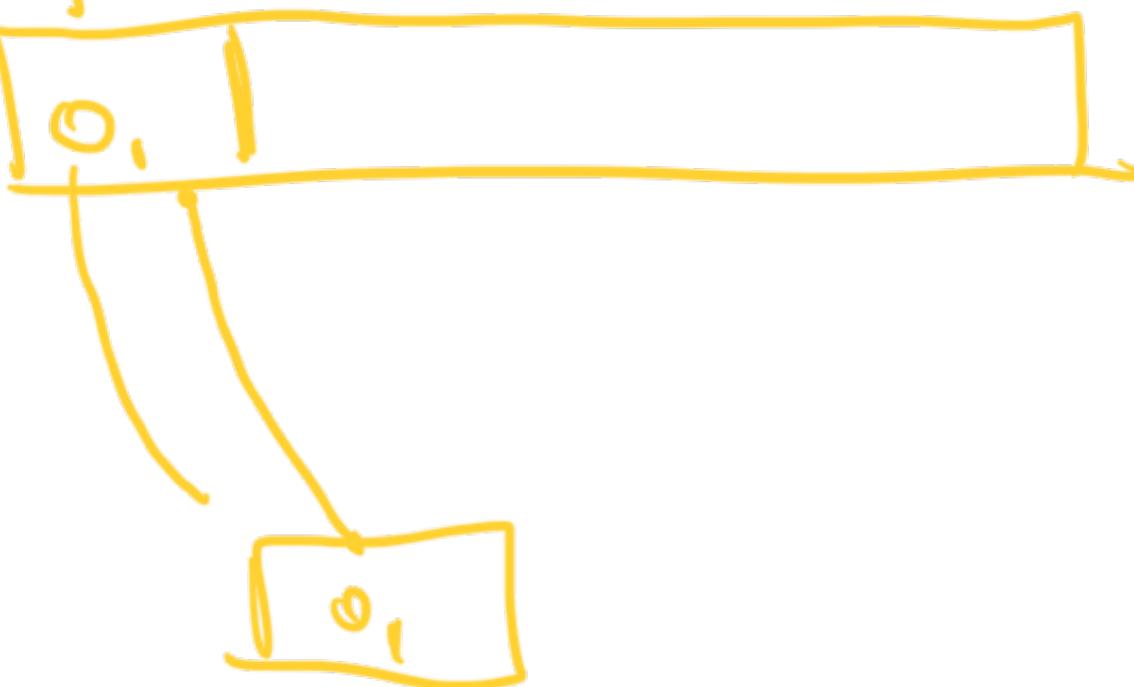
KAFKA

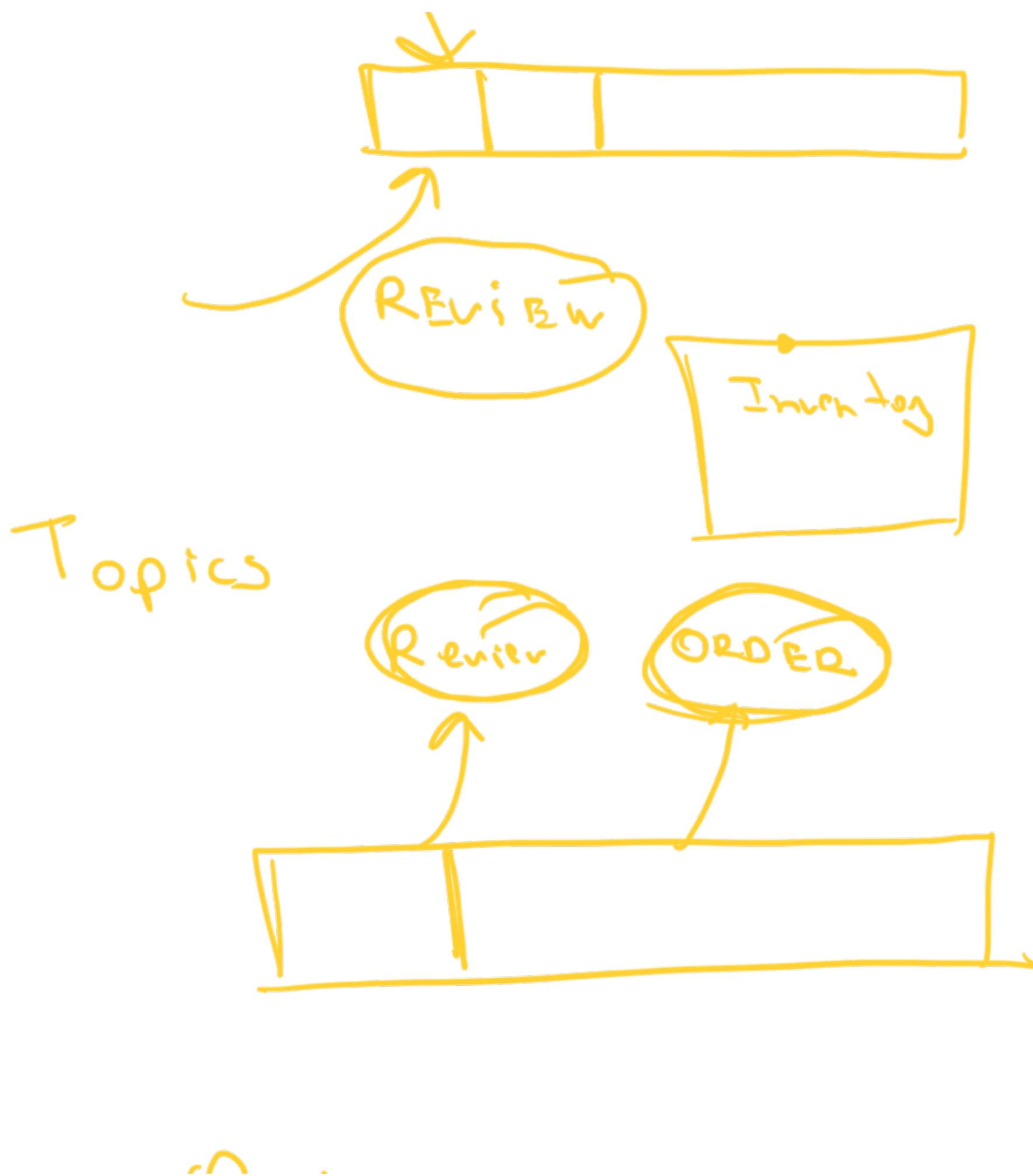
- PULL

- Pub - sub model



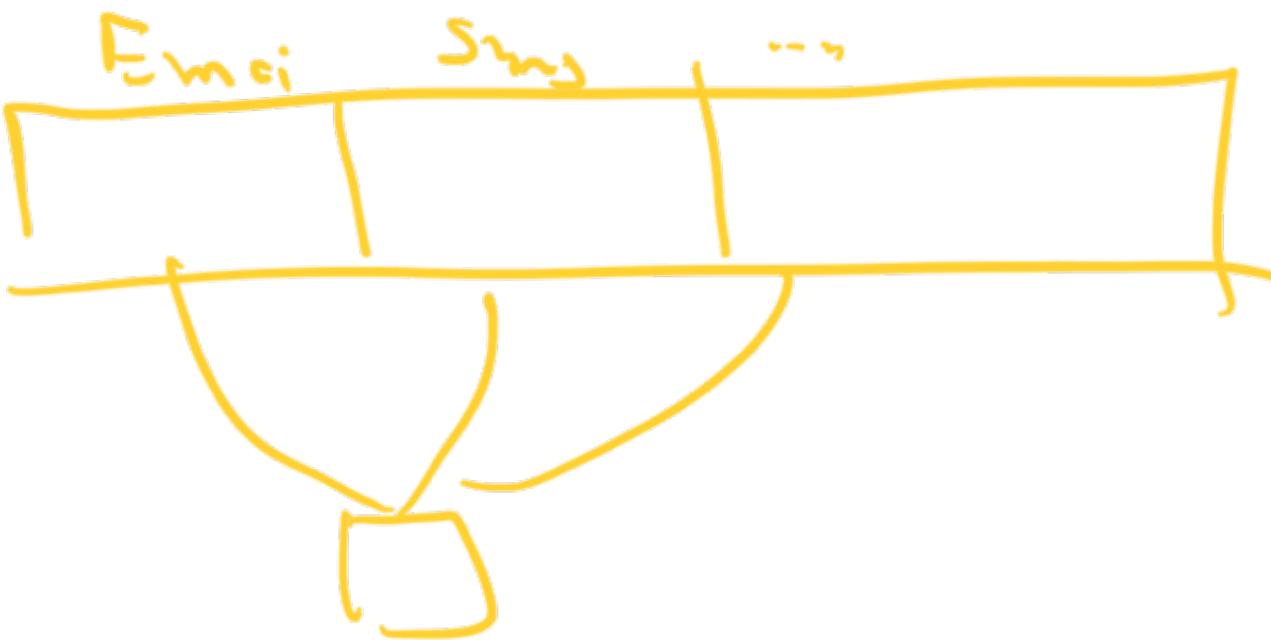
order





Order

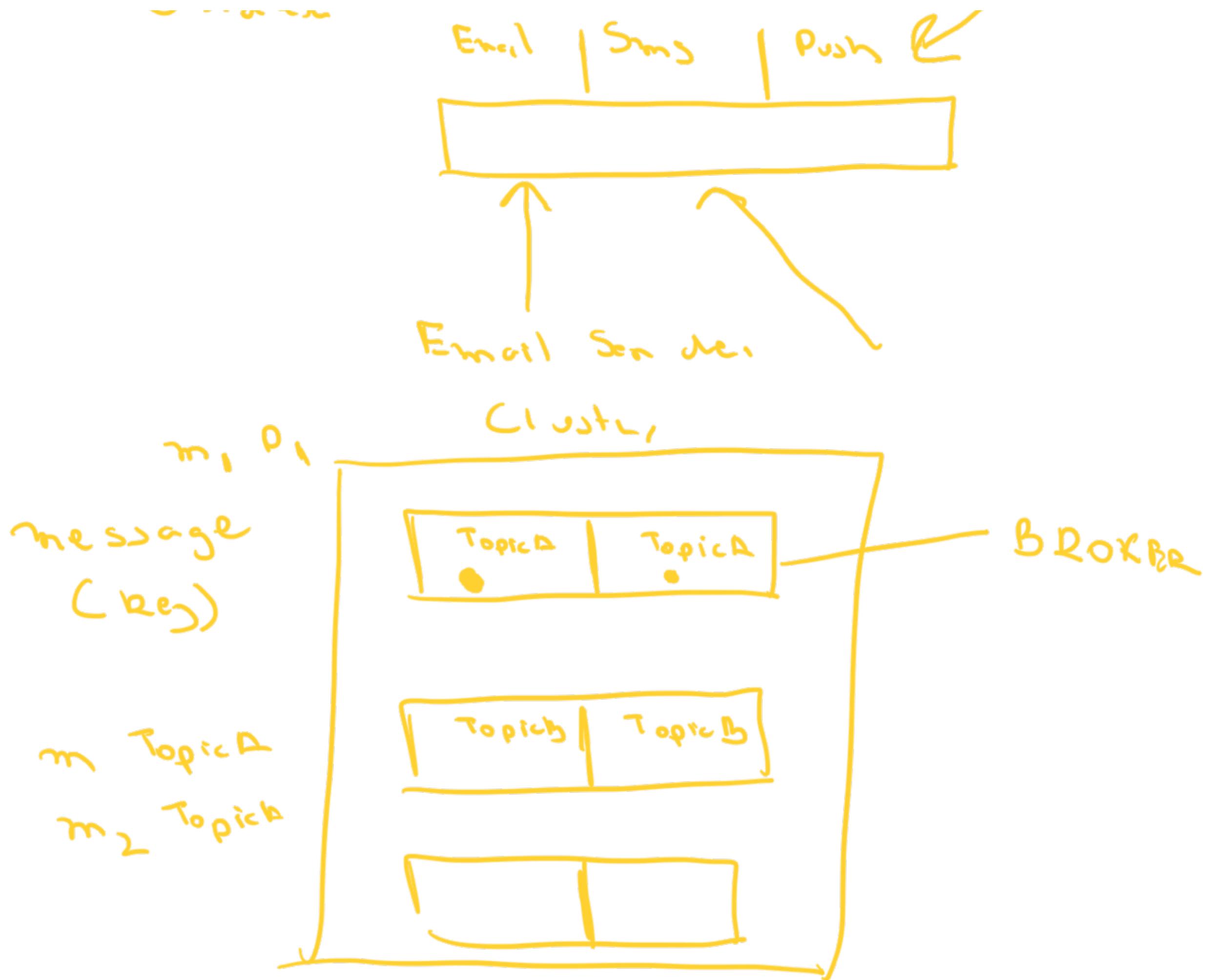
- └ Email
- └ SMS



Stream processing

High throughput

Order



Round no bin

