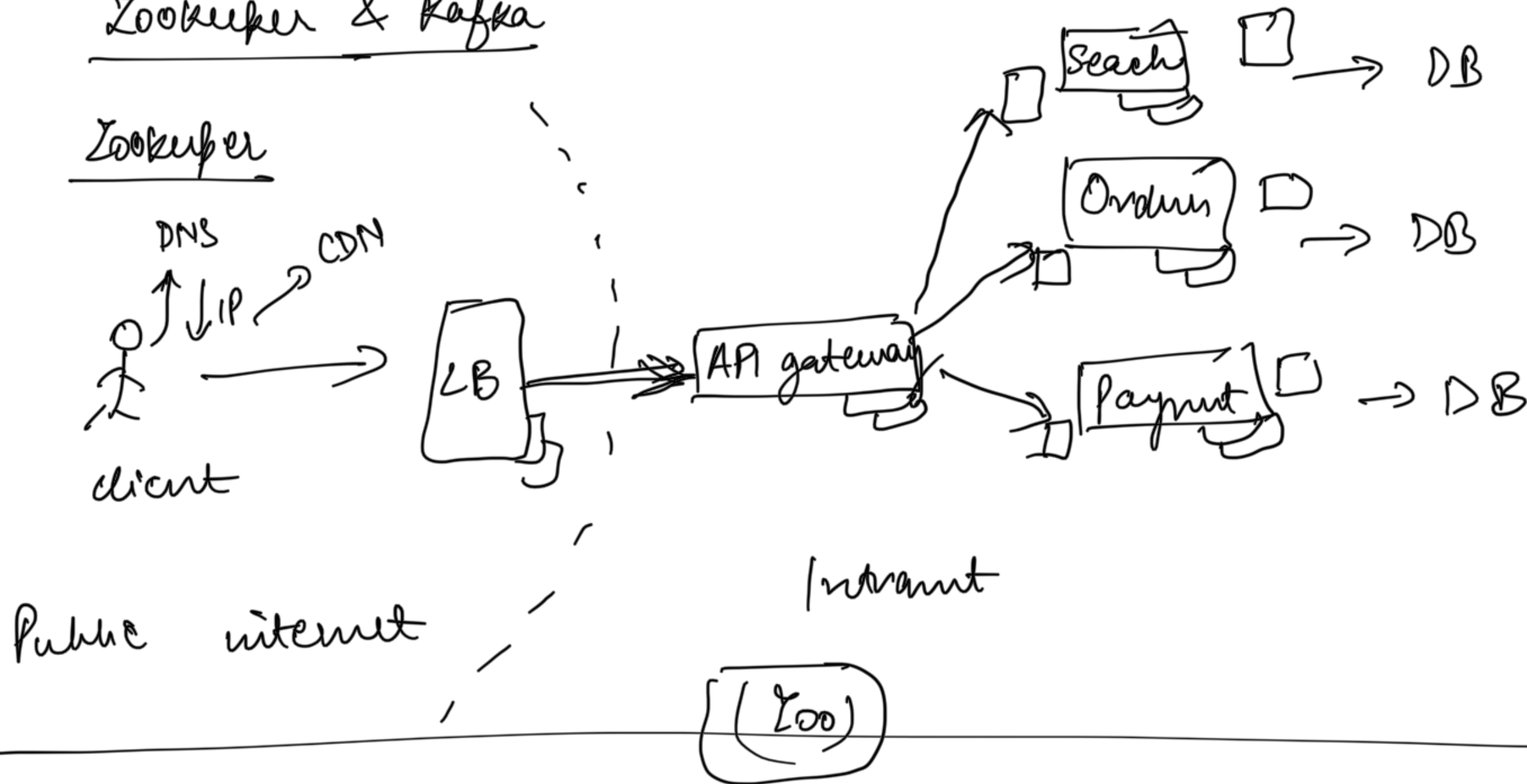


2/8/2022

HLD

Zookeeper & Kafka

Zookeeper



Zookeeper



basic like distributed

- was developed by yahoo
- open sourced to apache foundation

Use cases of zookeeper

- ① Tracking server status.
- ② In master slave, track the current master.
- ③ Track state change, trigger some action.
- ④ Store configuration.

How Zk works

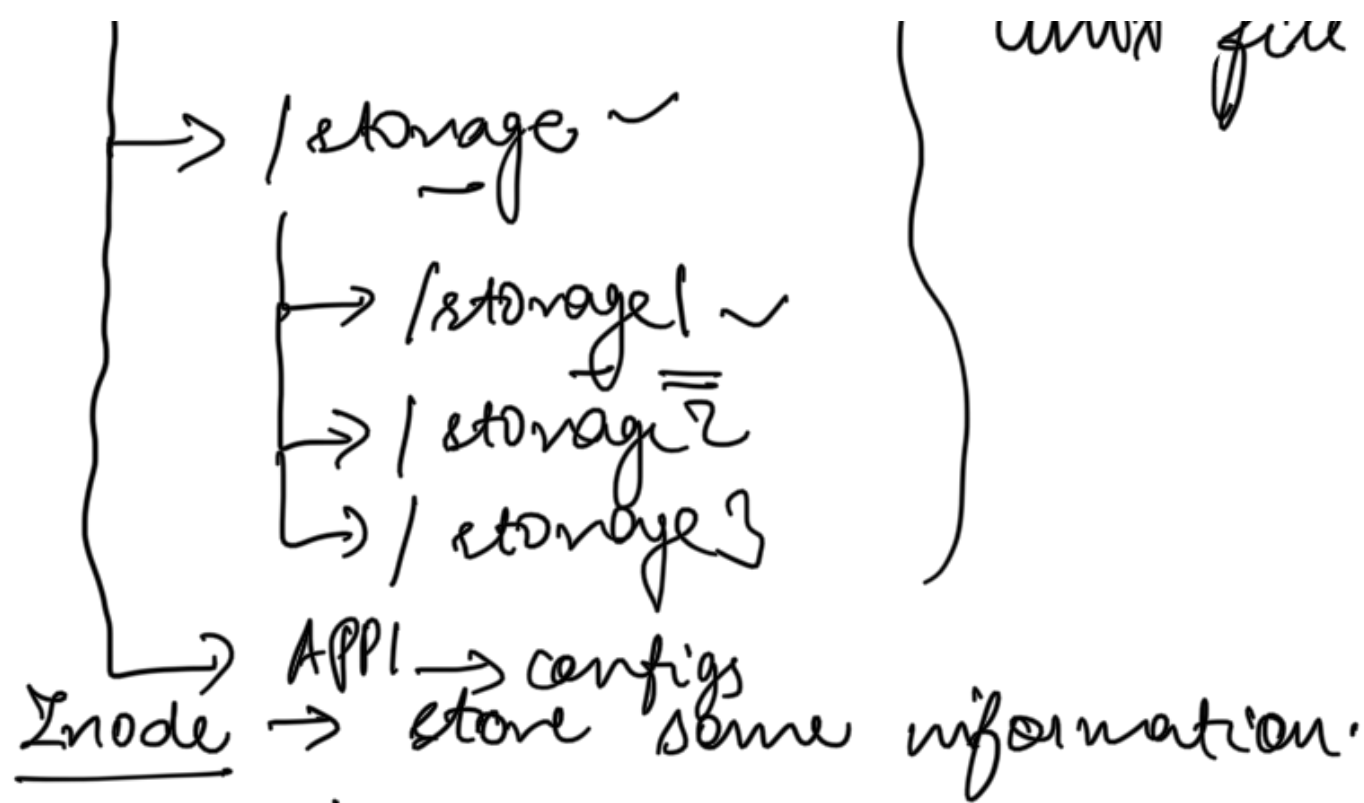
* works like a unix file system.

TLDD (Top level directory)

{ /master }

} /slave

own file system.



Ephemeral
(temporary)

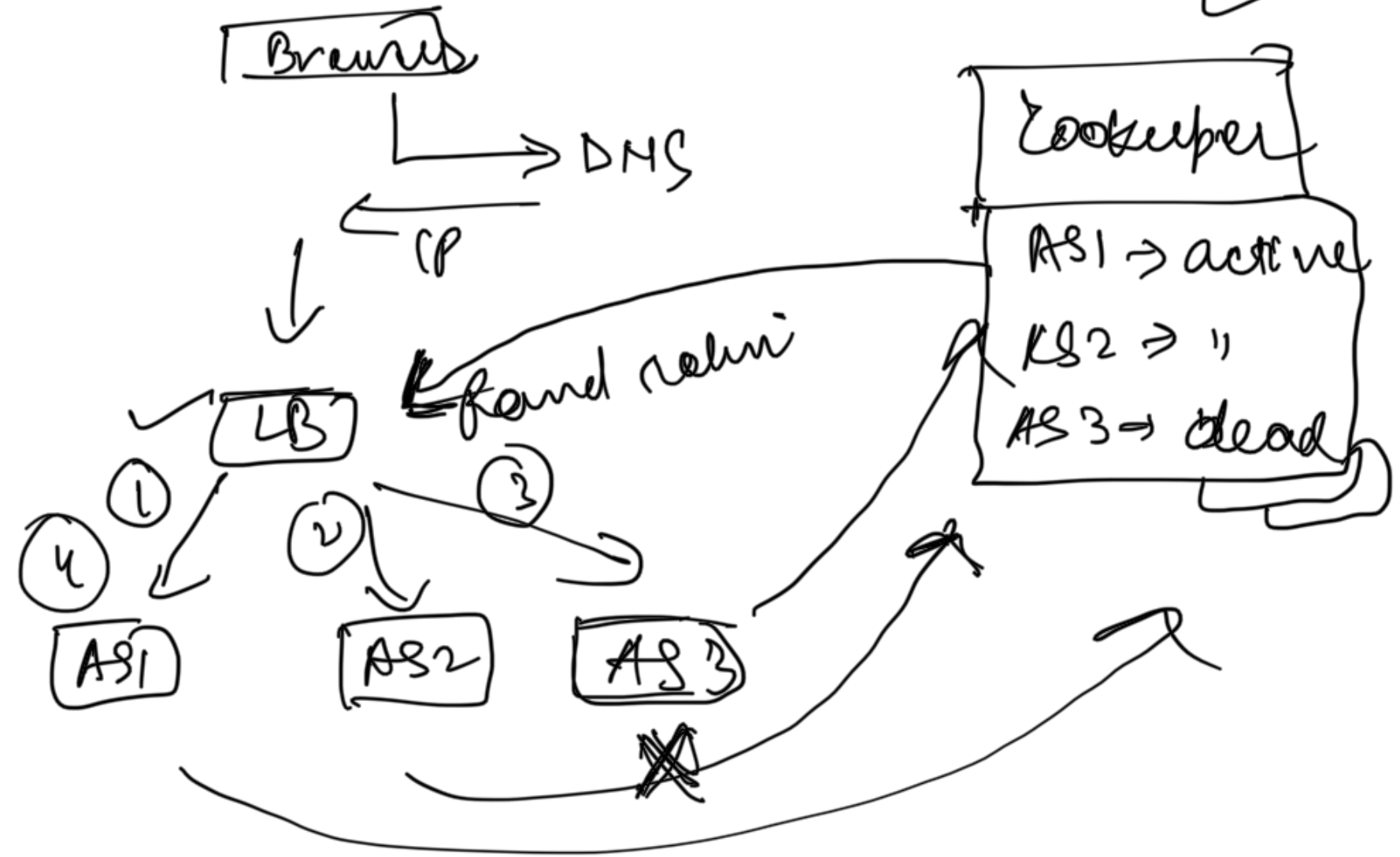
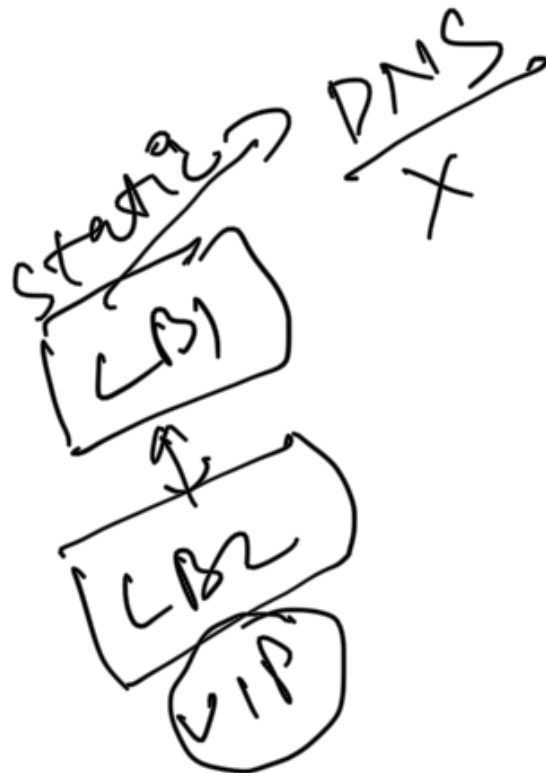
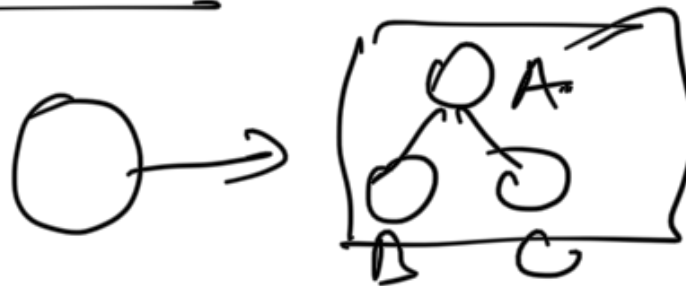
Permanent / Persistent

↳ configs

Ephemeral znode

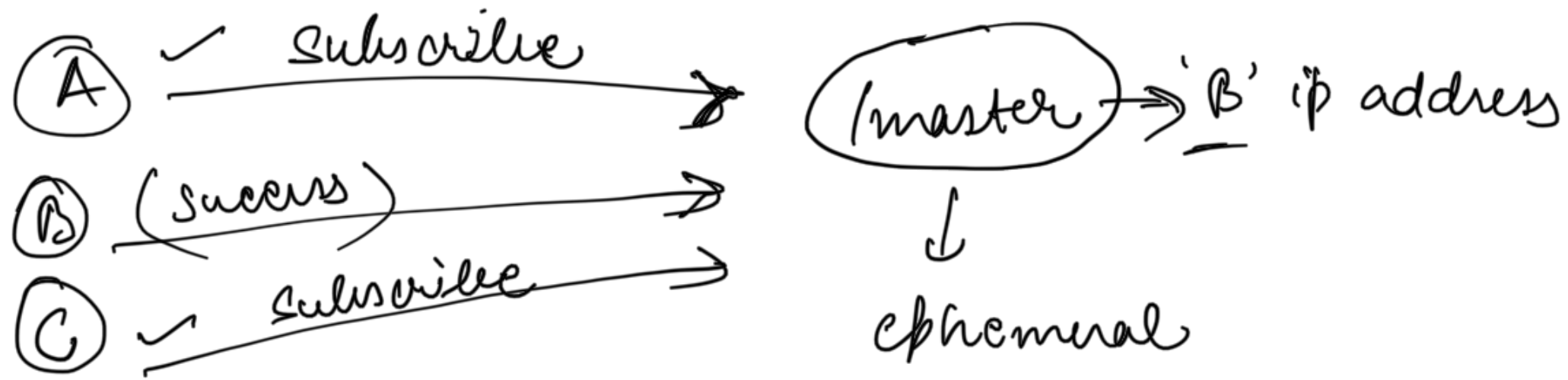
/master → IP address

Master-slave



* ZK needs to be highly consistent





Ephemeral node has 2 types of lock:-

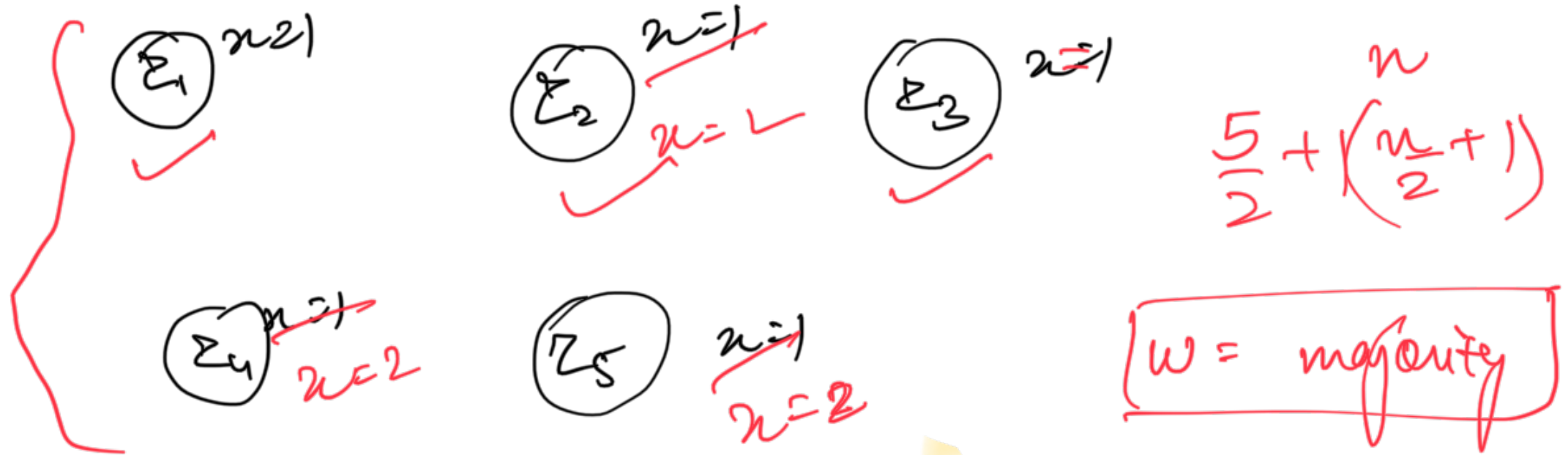
- lease based lock (TTL)
- Perpetual (lock is retained till I am alive)

Architecture

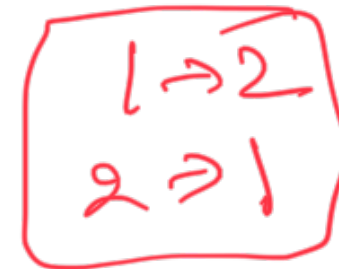
- cluster of machines
- distributed file system.

Replicas

NF2



Read → all the machines



$\frac{n}{2} = 2 \rightarrow 3$
 $\frac{n}{2} = 1 \rightarrow 2$

ZK client →

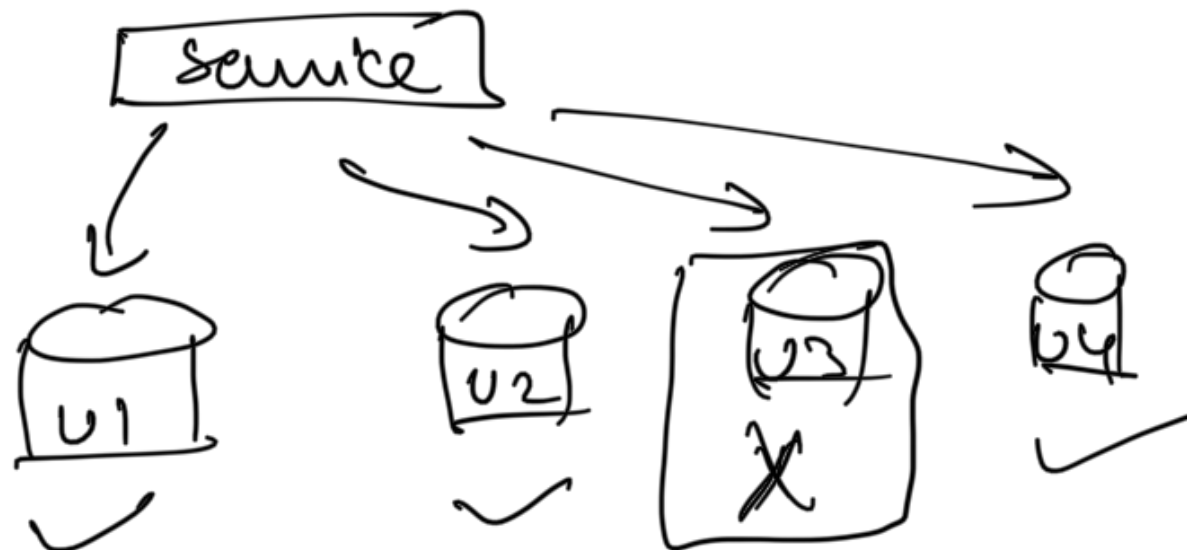
Summary

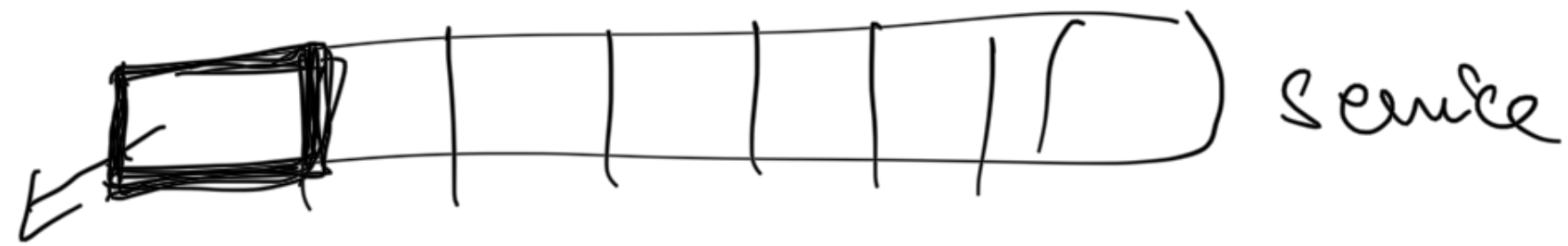
1) Zookeeper uses case (health, master-election)

- ② concept of zwodis
 - ③ ephemeral & permanent
 - ④ ephemeral lock \rightarrow TTL
 \rightarrow perpetual
-

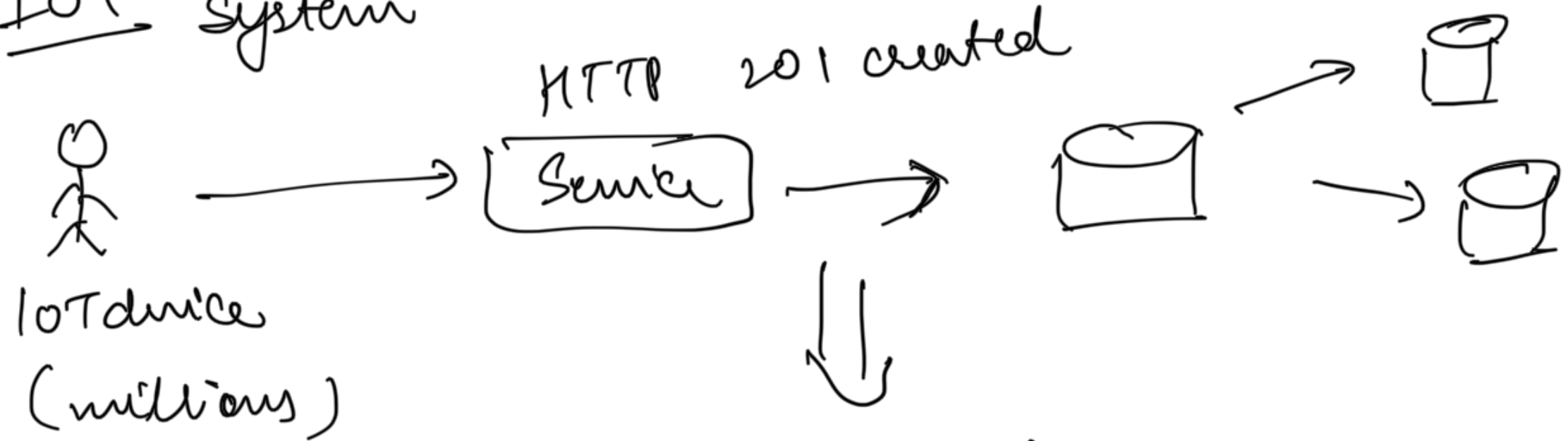
Kafka

Asmita \rightarrow email \rightarrow prakhari
 $\downarrow \downarrow \downarrow$ 20 people cc





② IOT system

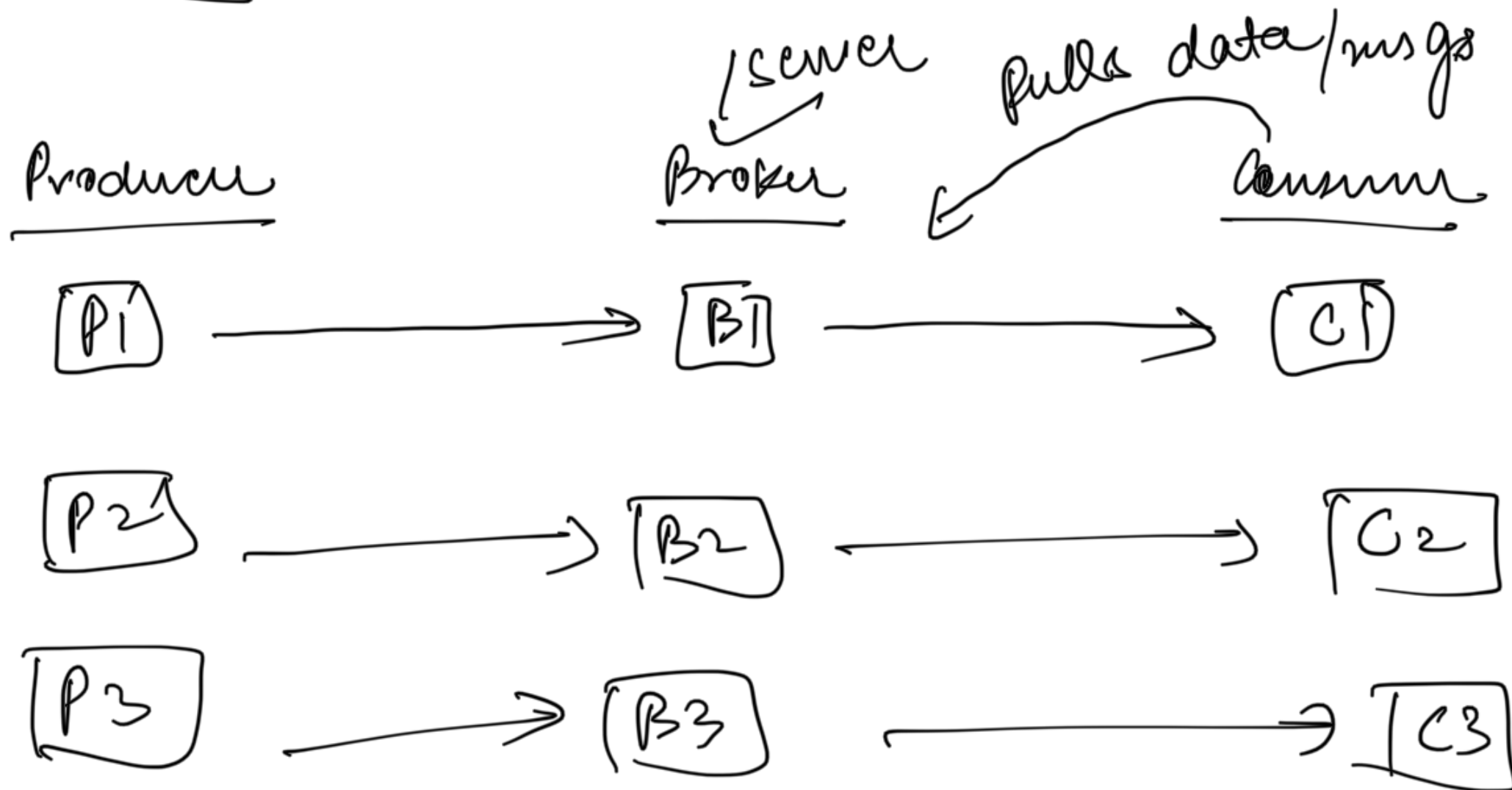


Message Q / Persistent Q / Queue

↓

Kafka → developed at LinkedIn
→ open source to Apache
→ confluent

Entities

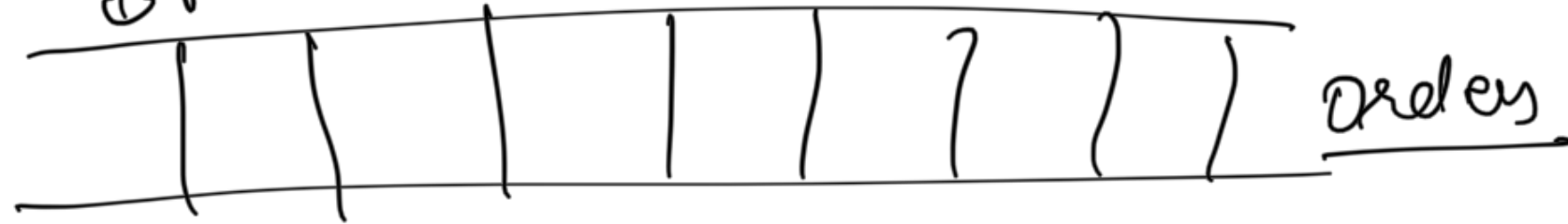


Order management system

↓ create order

order service

↓ publish an event in "order" topic



DB
Table \approx topic ^{Kafka}

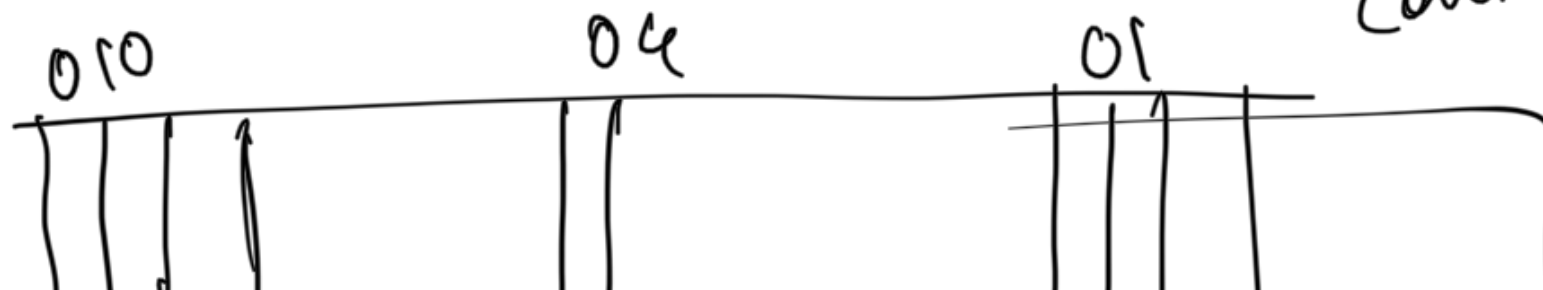
Topic = "orders" will have different consumers.

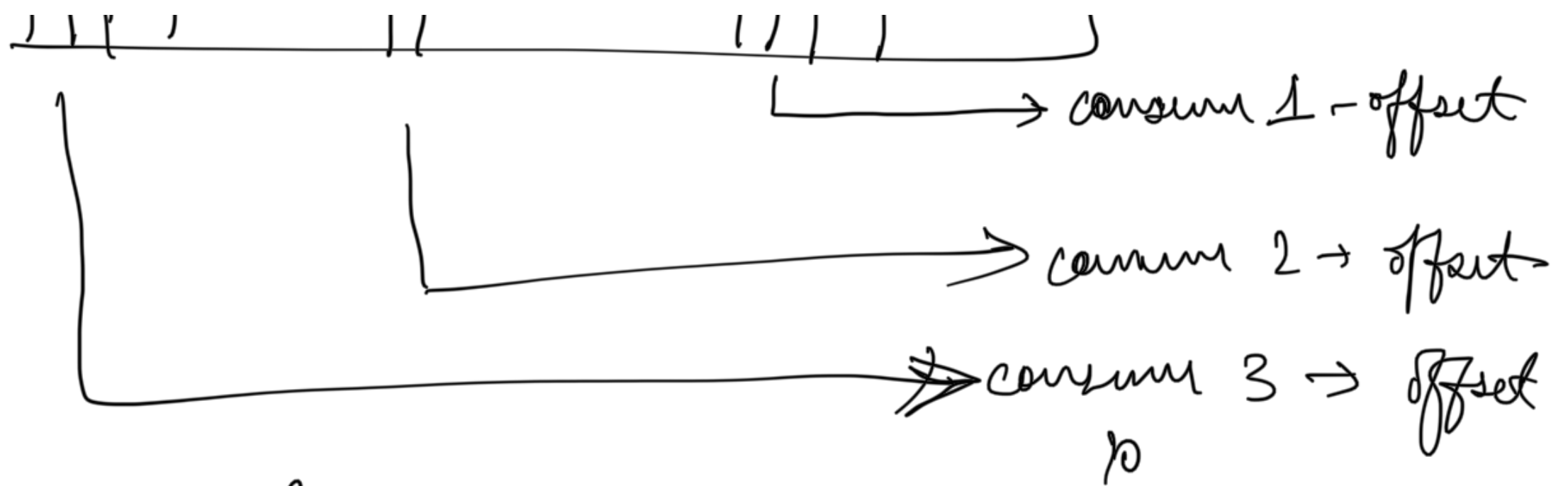
consumer 1 \rightarrow notification service (3) ✓

consumer 2 \rightarrow invoice service (4) ✓

consumer 3 \rightarrow analytics service (2) ✓

consumer offset





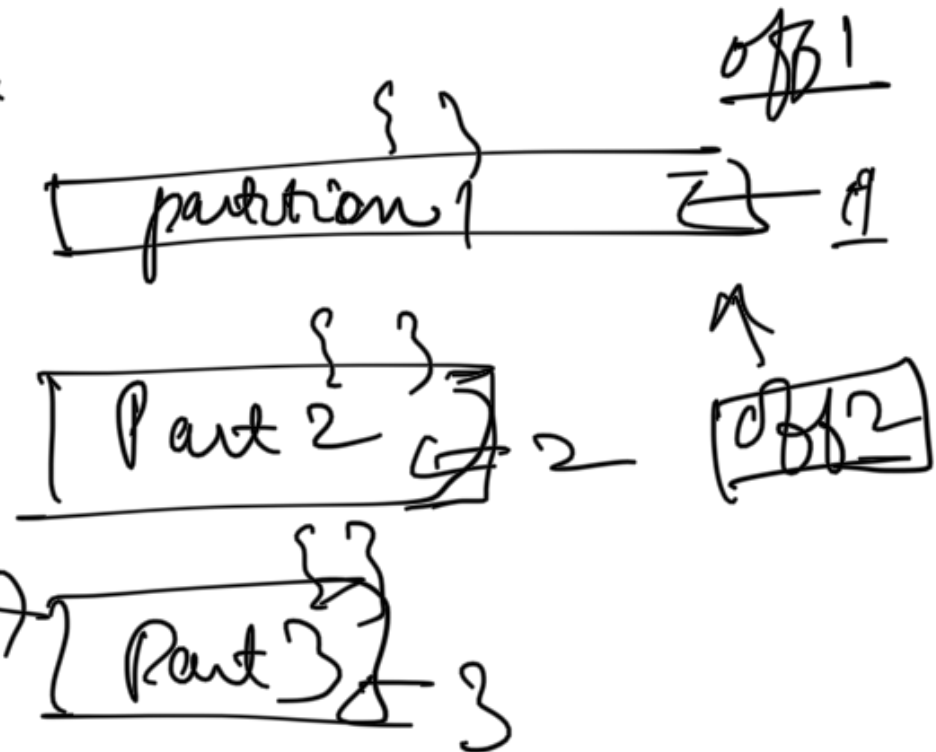
consumer offset → position of each consumer in a topic

consumer group → multiple machines

order topic

partition key

Partition = 3



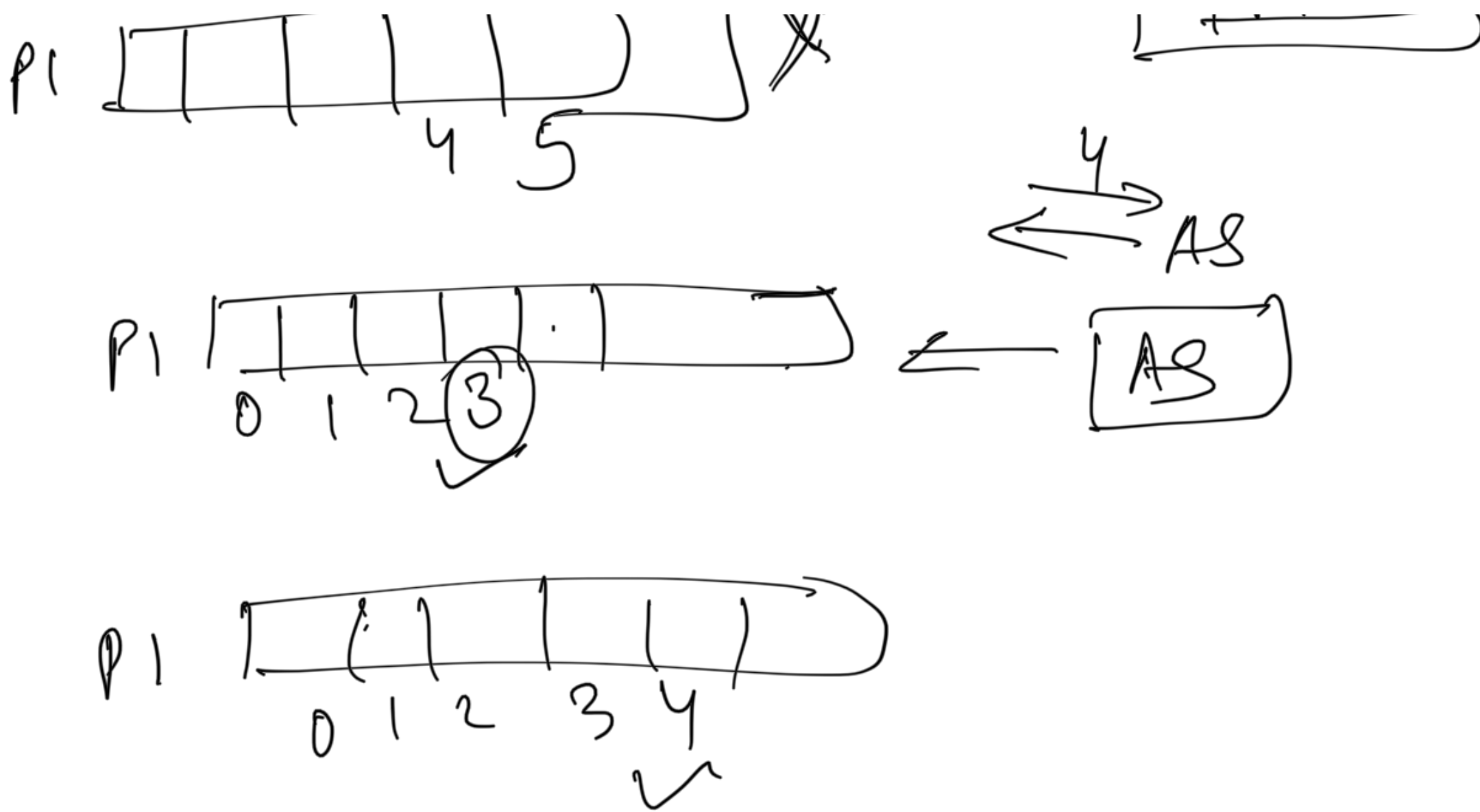
consumer grp = 4 machines (1 will sit idle)

CG1 \rightarrow 4

AKO guarantee \rightarrow partition level.

* offsets are maintained on a topic partition level.





Delivery semantics

Producer delivery semantics

- ① asyn - fire & forget
- ② committed to leader

③ committed to leader & group

Consumer delivery semantics

① at most once

② at-least once

③ exactly once