Transport Paxos To Cloud Environment

Team Member:

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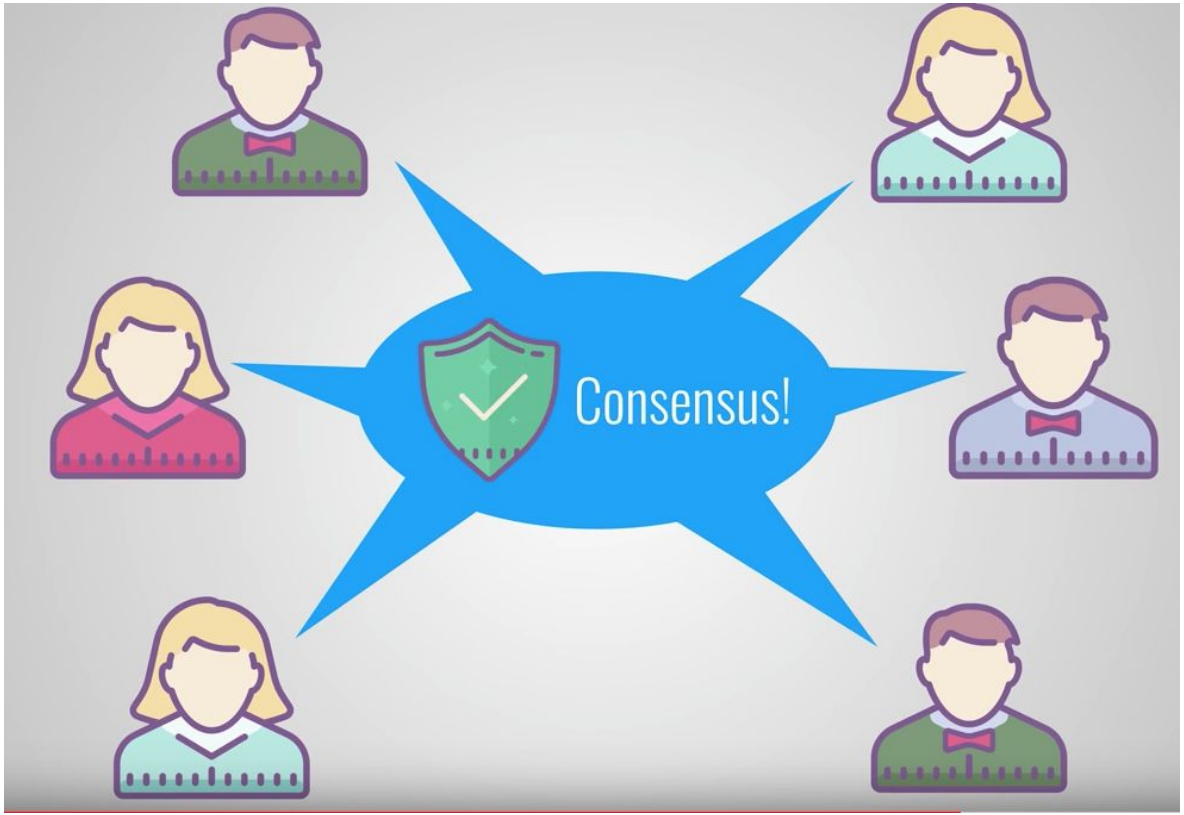
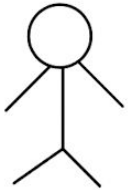
What is Paxos?



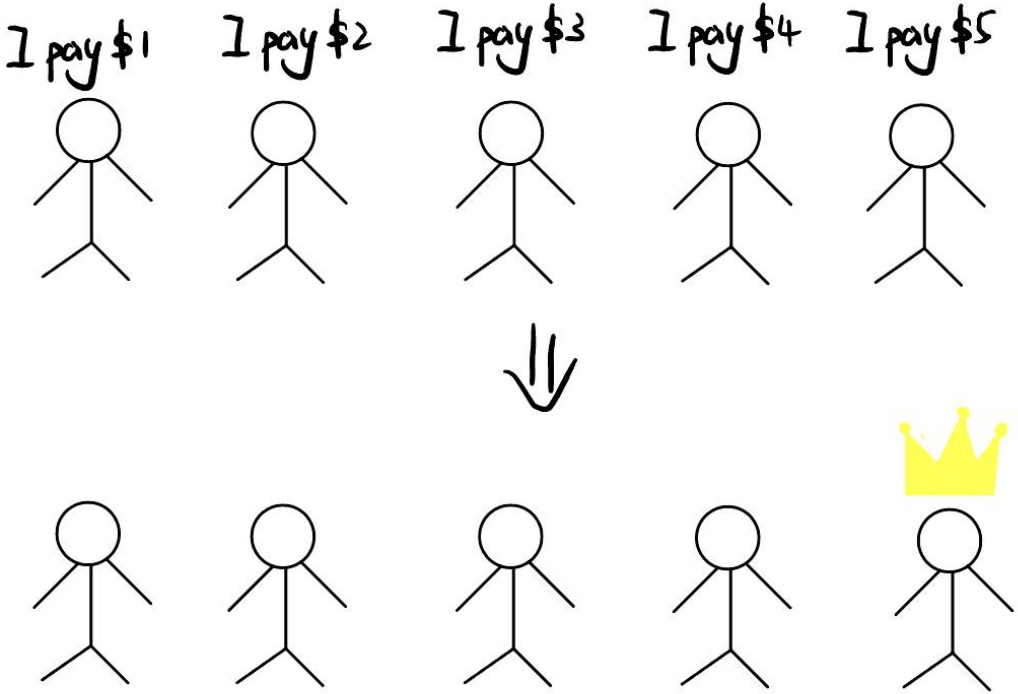
Roles in Paxos

Leader: collects information from learners and makes decision on which value

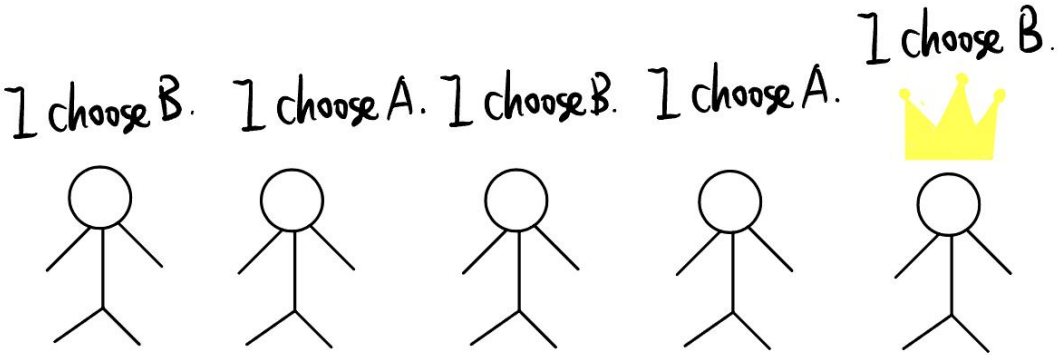


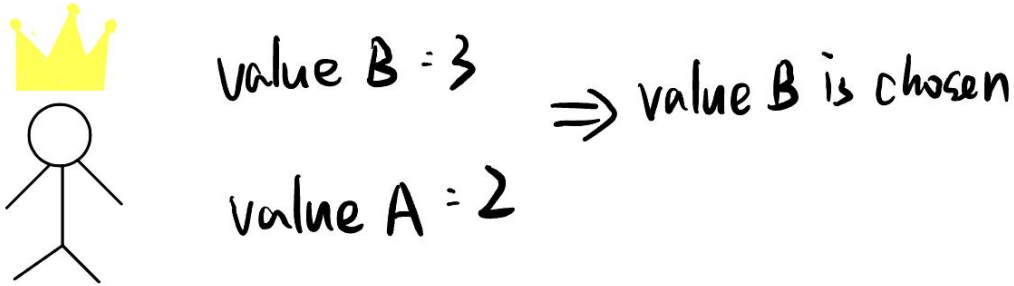
Learner: vote for values and learn the decision from the leader

Leader Election(first consensus)

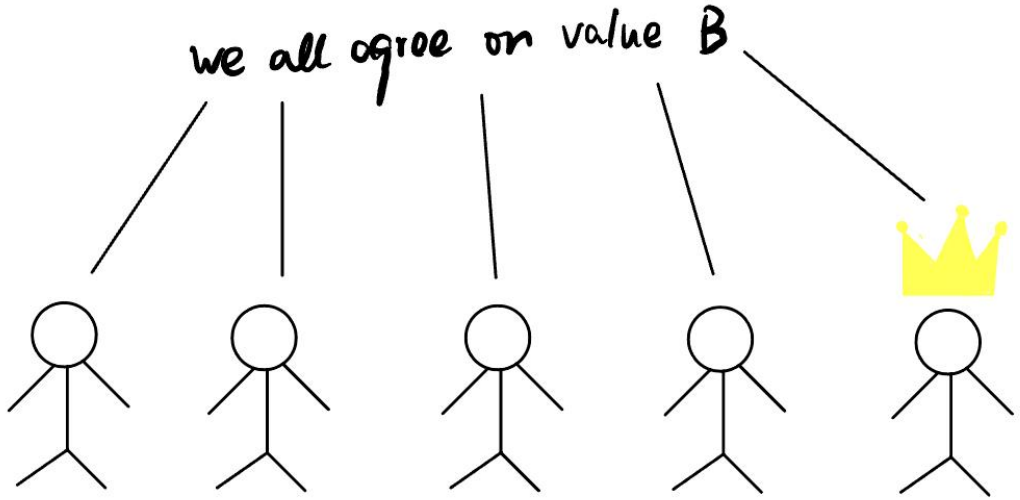


Leader Makes Decision(second consensus)





Learner learn the decision



My Implementation

Application: key/value store between client and servers

Client: put(key, value) and get(key)

Server: reply putOK or value of the key

Learner: vote for client request

Leader: decide which request execute first and store changes to database

Why servers vote for different client request?

The answer is unreliable network.

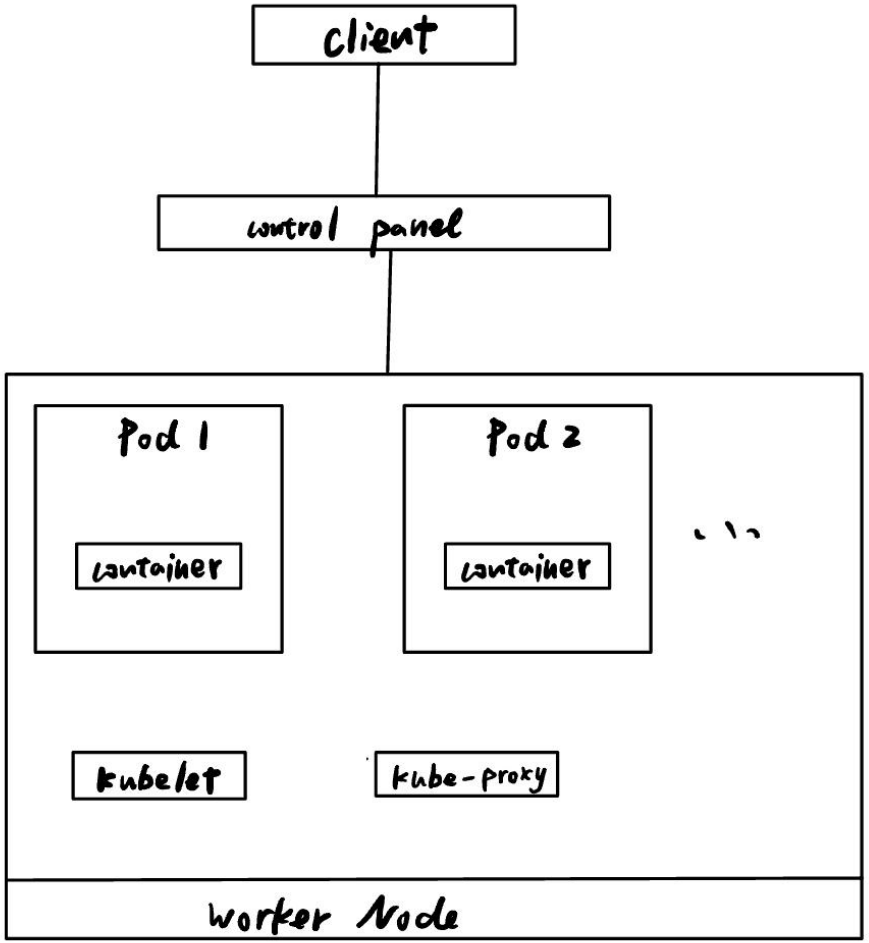
Example: delayed message

Round 1: every server votes for request 1, however, one vote message is delayed.

Round 2: other servers vote for request 2, however, the delayed message is arrived.

Leader will consider delayed message as a vote in round 2

Cloud Enviroment(k8s)



Chaos Mesh

Pod Failure

Network Delays

Expected Outcome

Challenges:

how to apply Paxos on k8s.

how to simulate unreliable network and server failure in k8s

How to give test cases with quantitative network traffic.