

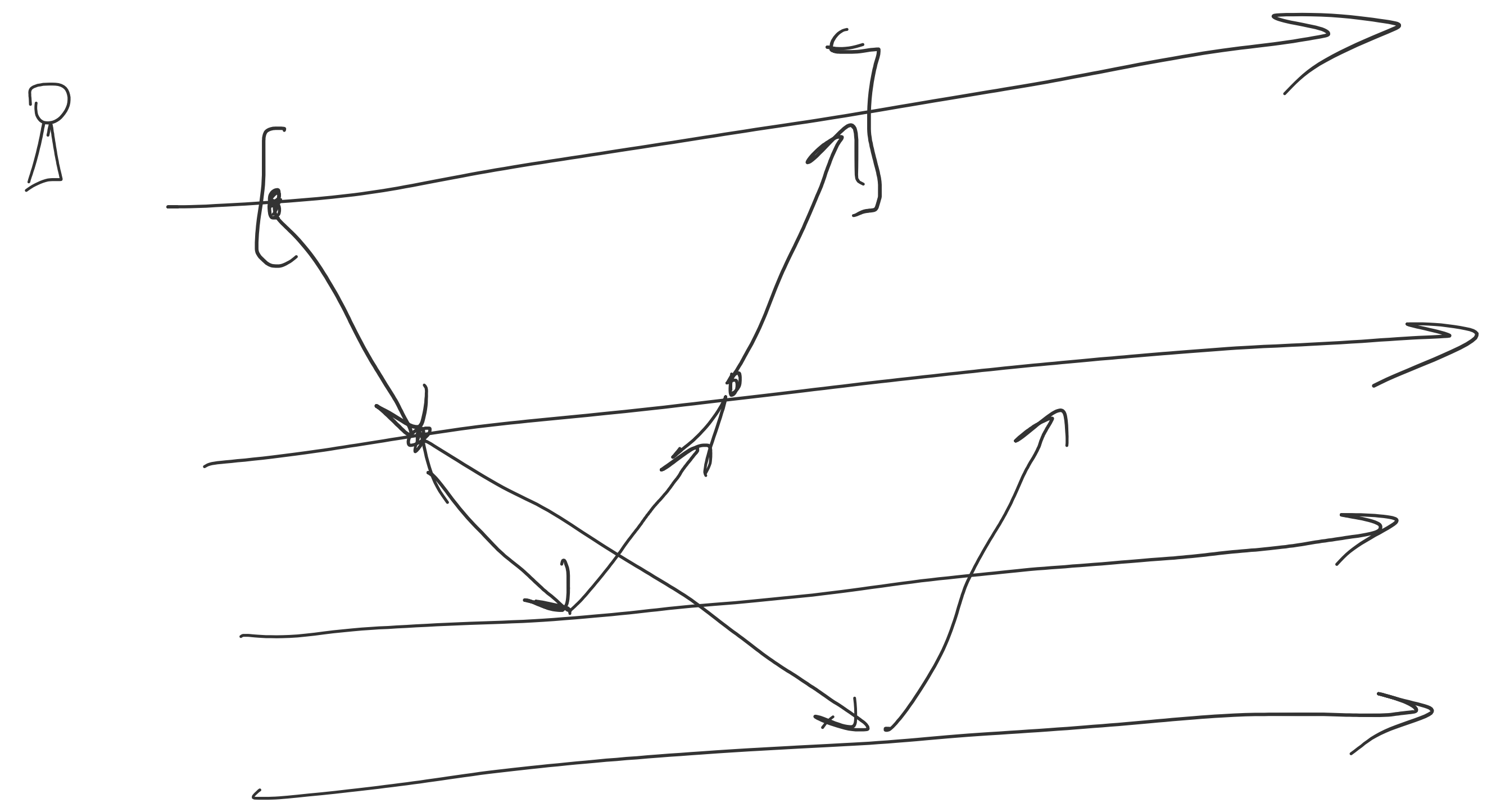
Replication:

- 1) Availability
- 2) Close to users (read latency)
- 3) Read throughput

types:

- single leader
- multi leader
- leaderless

sync / async



Single leader

SpoF

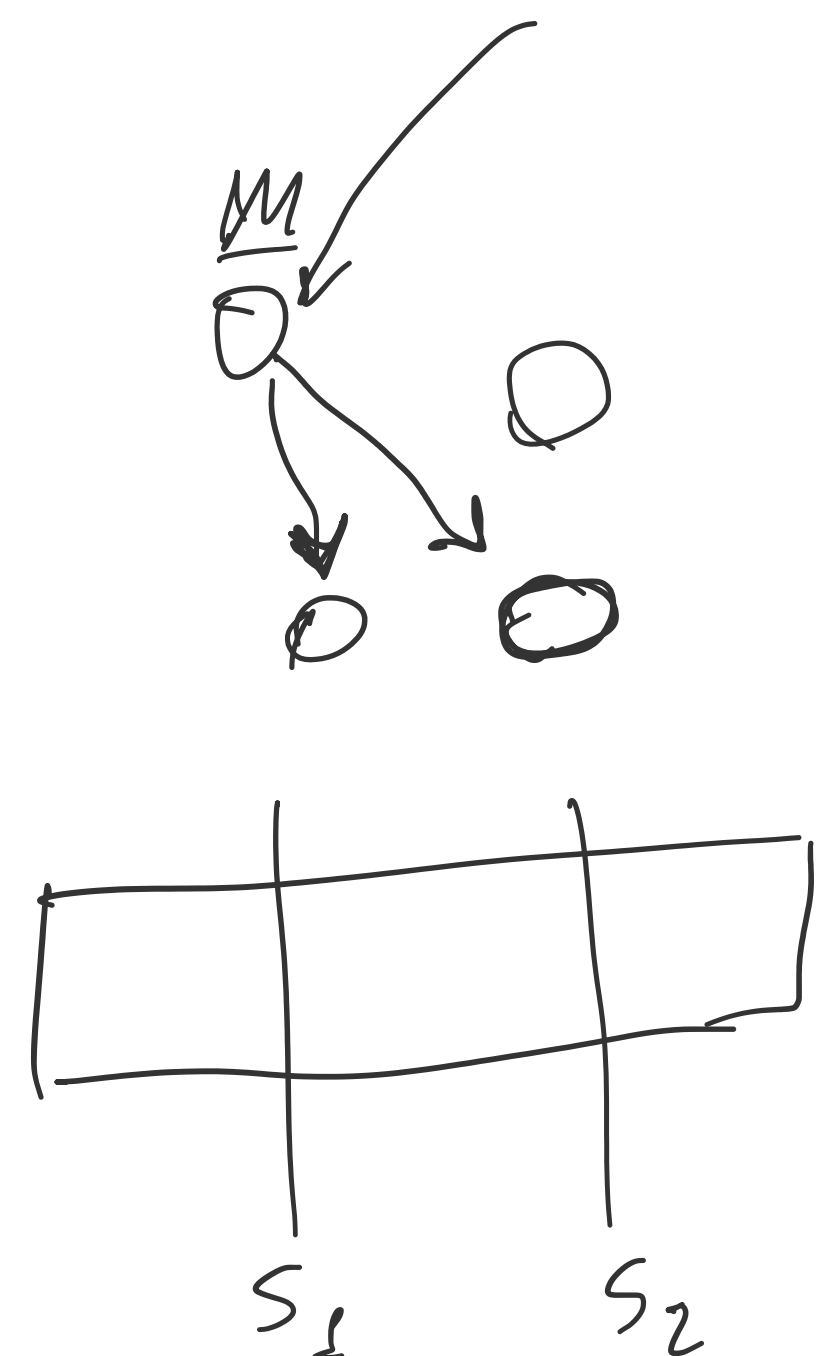
Heartbeat

Replication Log:

- 1) Statement based
 - non-determinism
 - side effect
- 2) WAL
 - bytes
- 3) Logical log
 - operations
- 4) Trigger-based

Setting up followers:

- lock
- snapshot



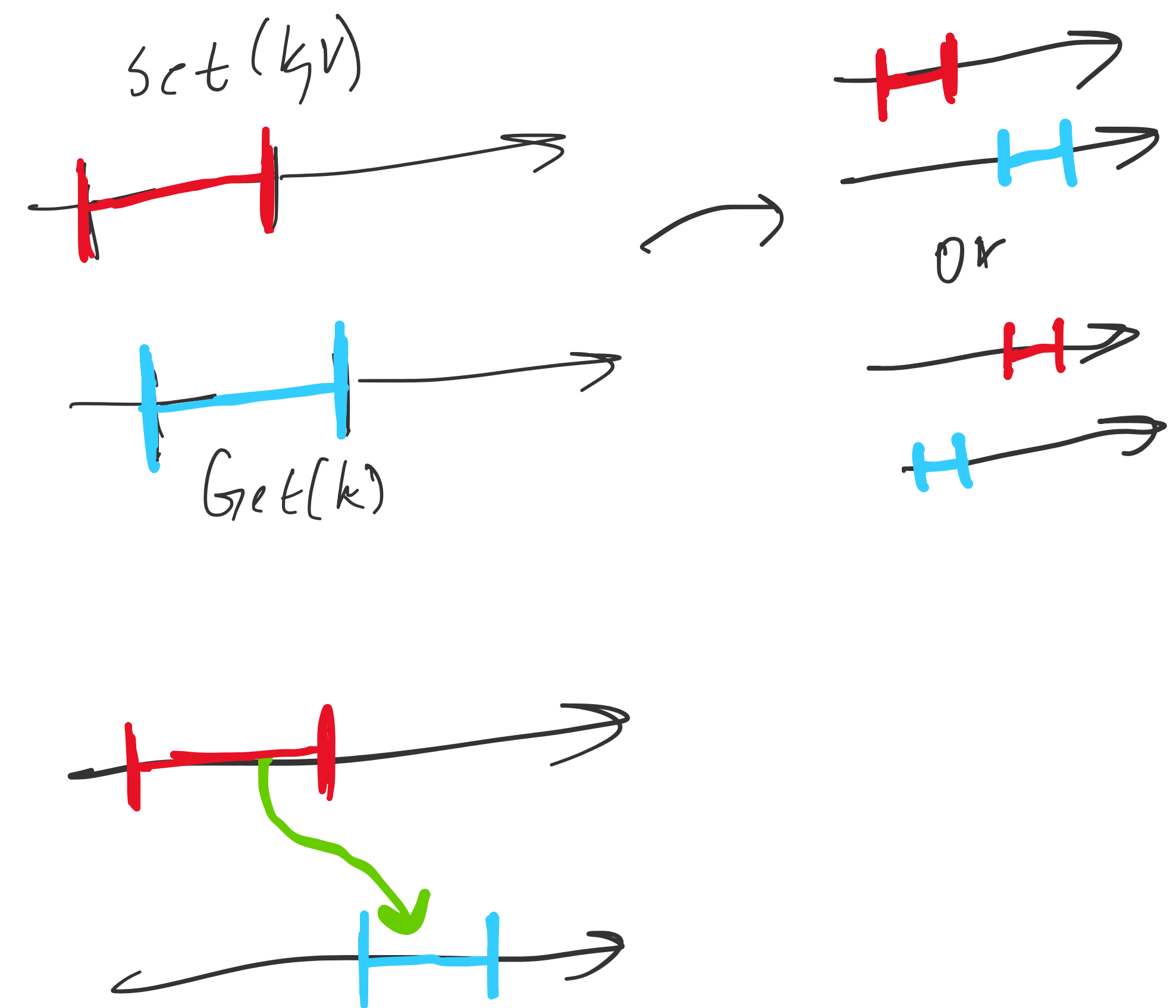
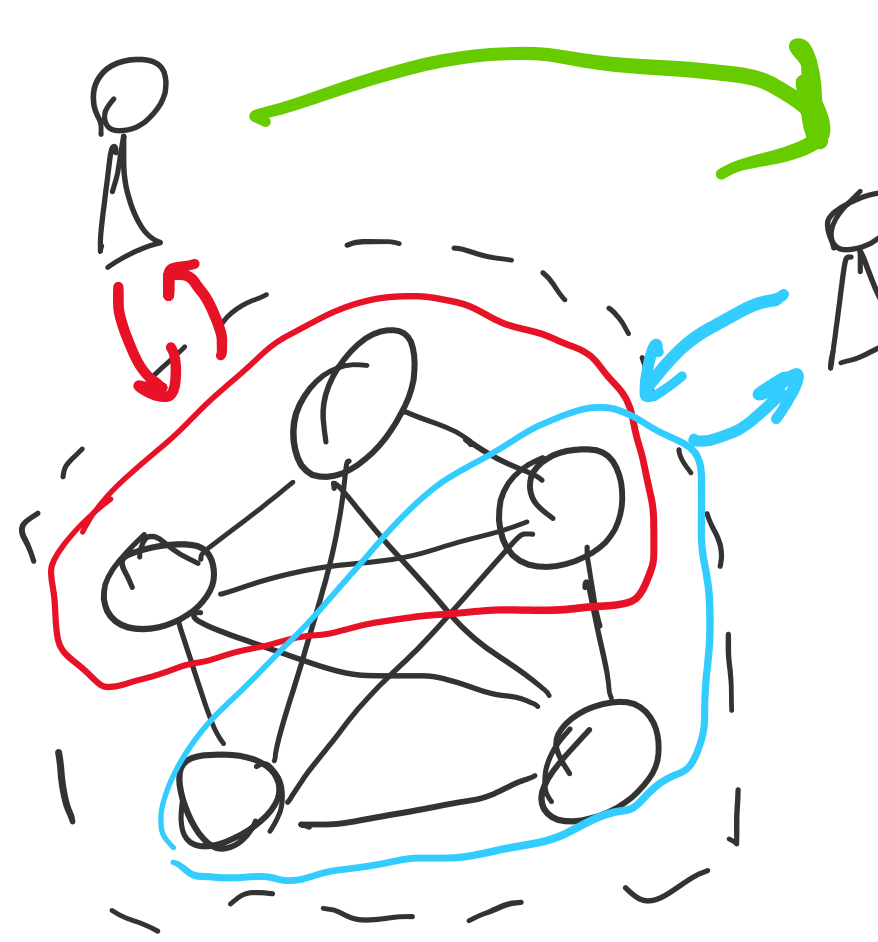
- follower failure
- leader failure
 - timeout
 - election of new leader
 - recover

problems:

- 1) Right timeout
- 2) Old write

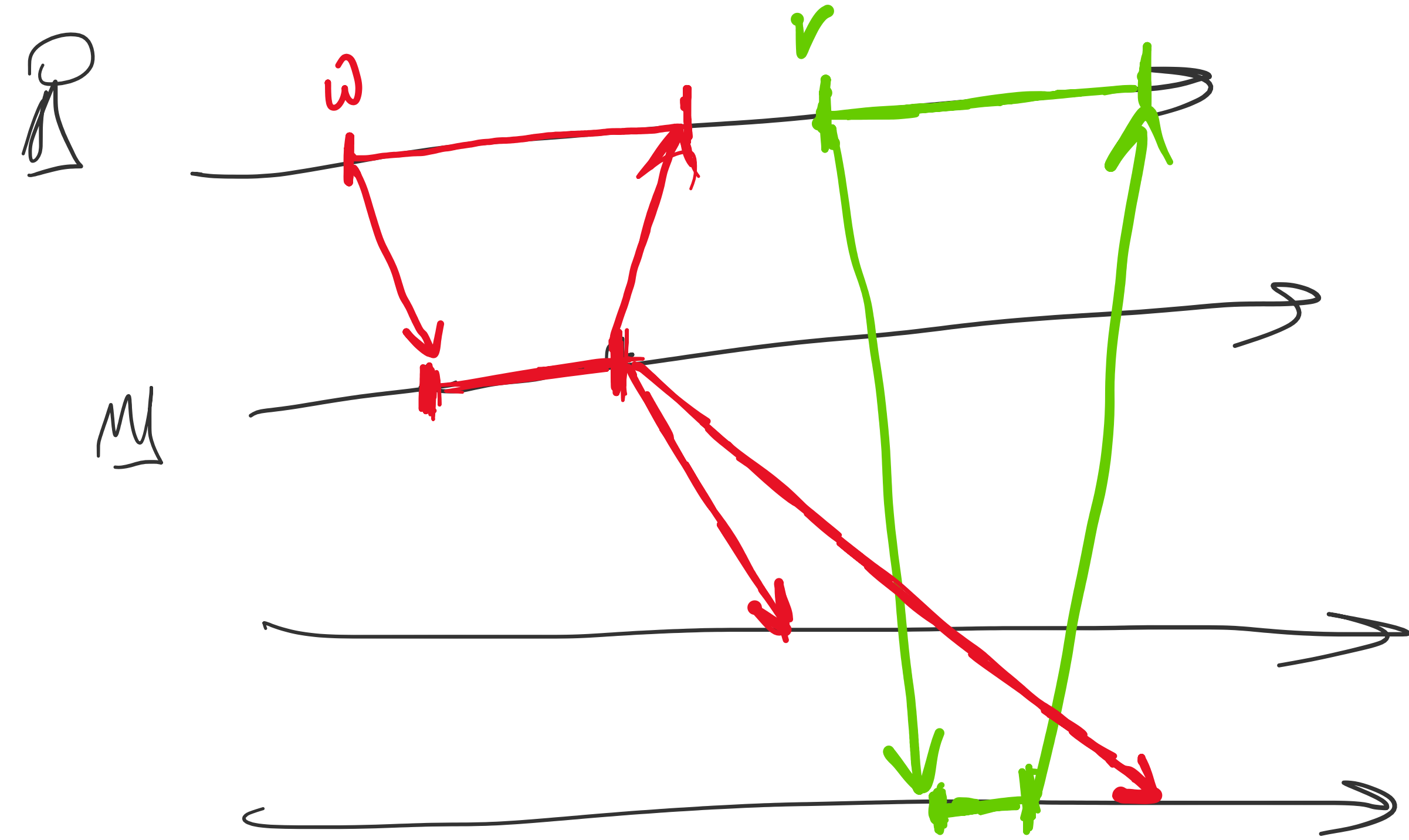
Leaderless

- Quorums $2k+1$ $k+1$ quorum k crashed
- Very value storage
- Set(k, v)
 - 1) Read(k)
 - 2) Write(k, v)
 - Get(k)
 - 1) Read(k)
 - * 2) Write(k, v)



Consistency models

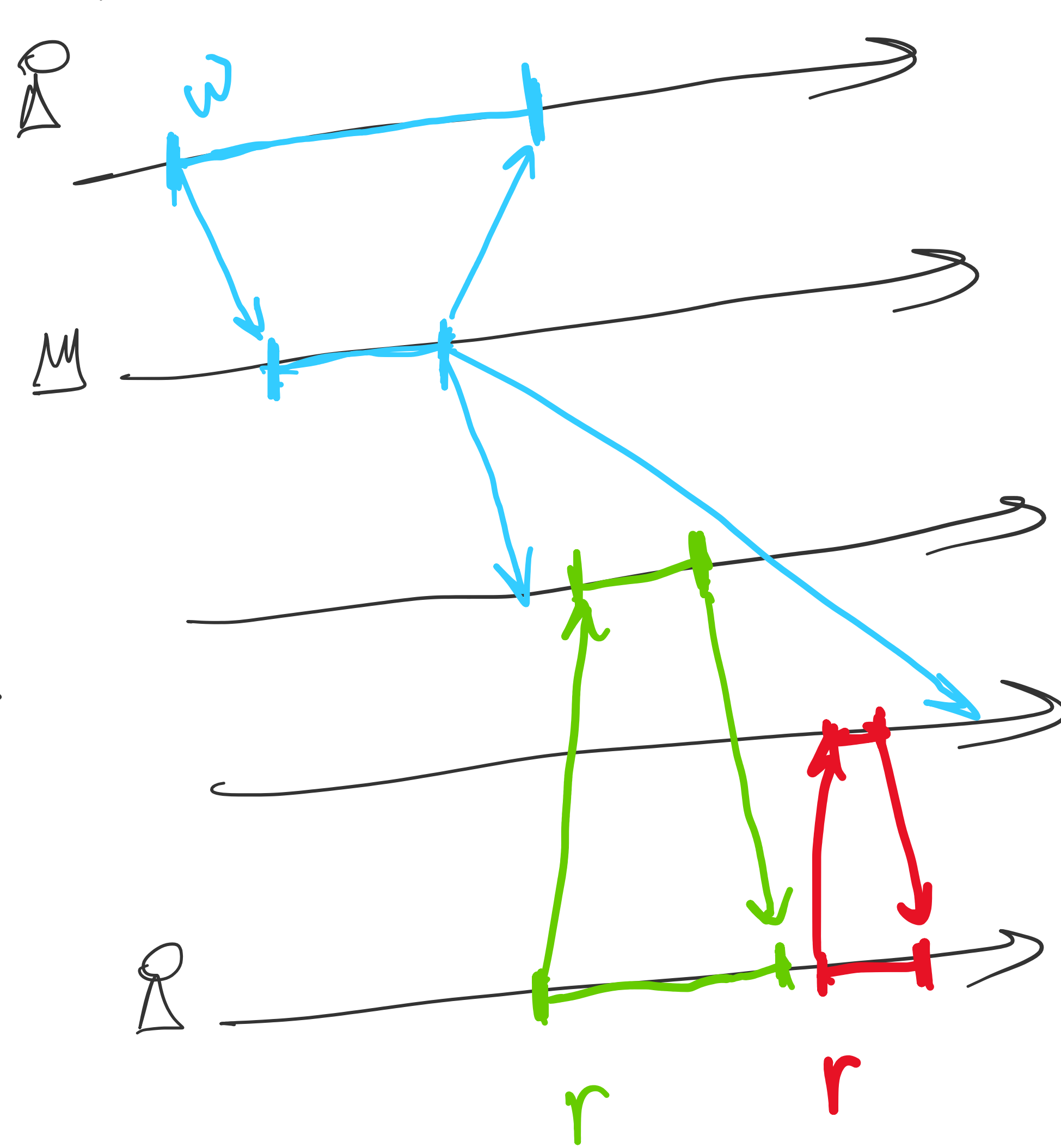
Read-after-write



- 1) Read from leader (ex. user profile)
- 2) Last update time
- 3) Logical time

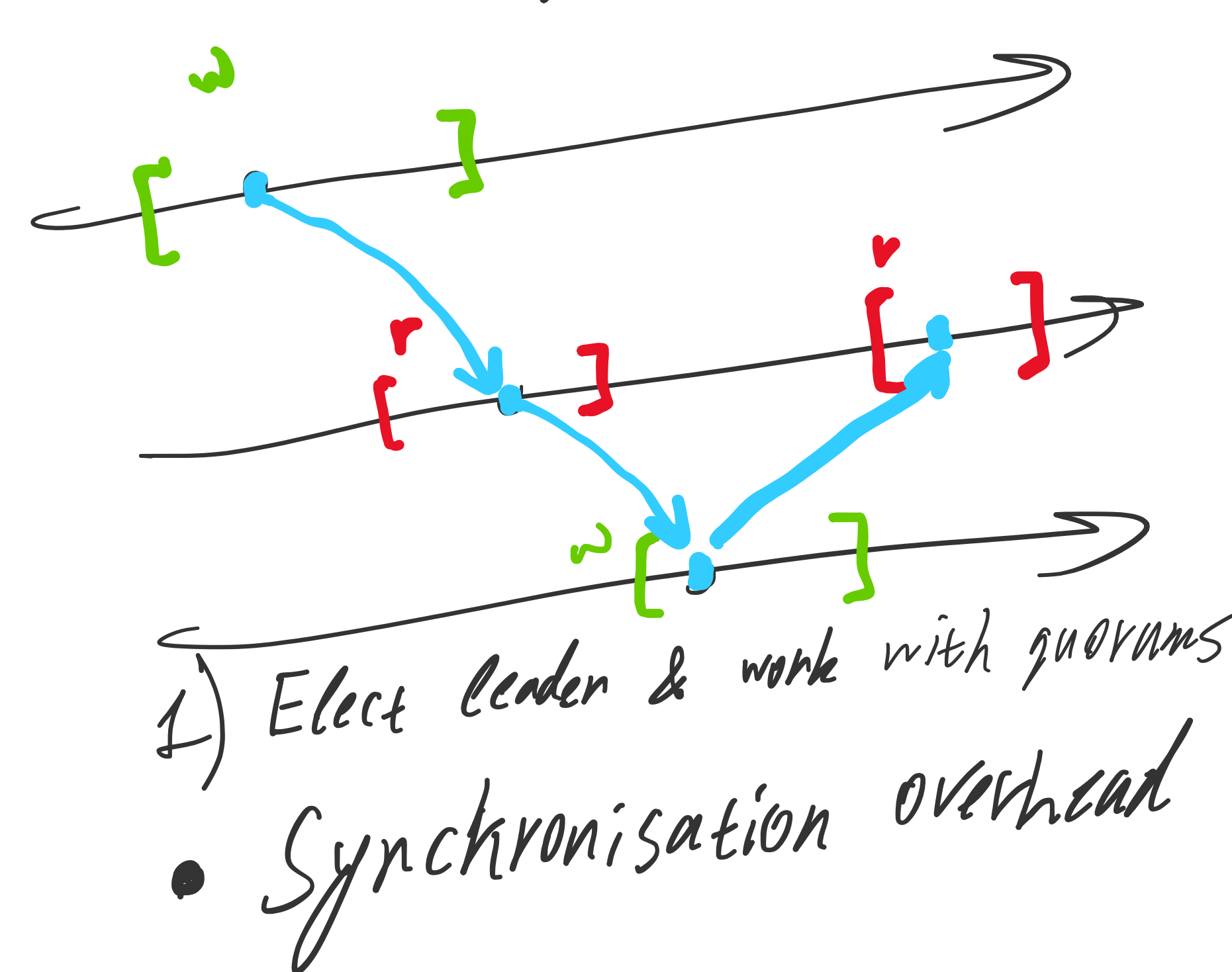
- Multi datacenters
- Different devices

Monotonic reads



- 1) Fix replica for reads
 - Reroute when fails

Linearizability



- 1) Elect leader & work with quorums
 - Synchronisation overhead

Prefix consistency

how far?

