

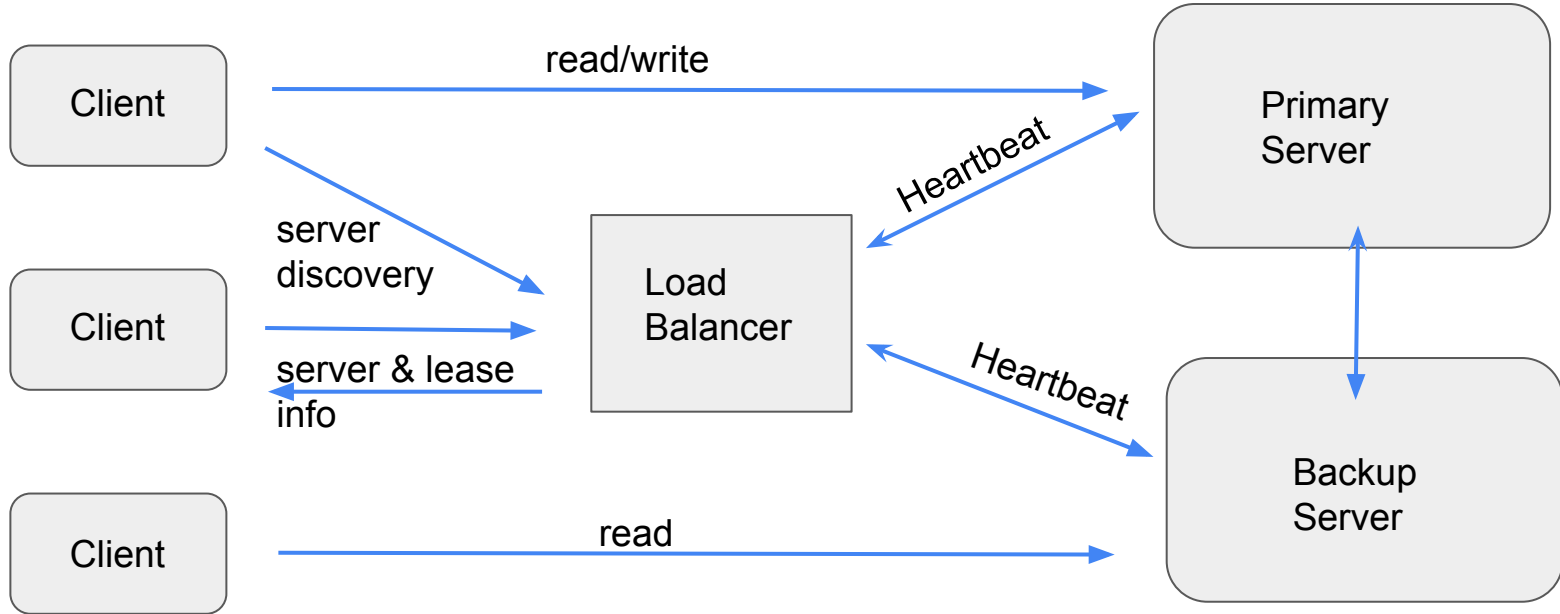
CS 739 Distributed Systems

P3 : Replicated Block Store

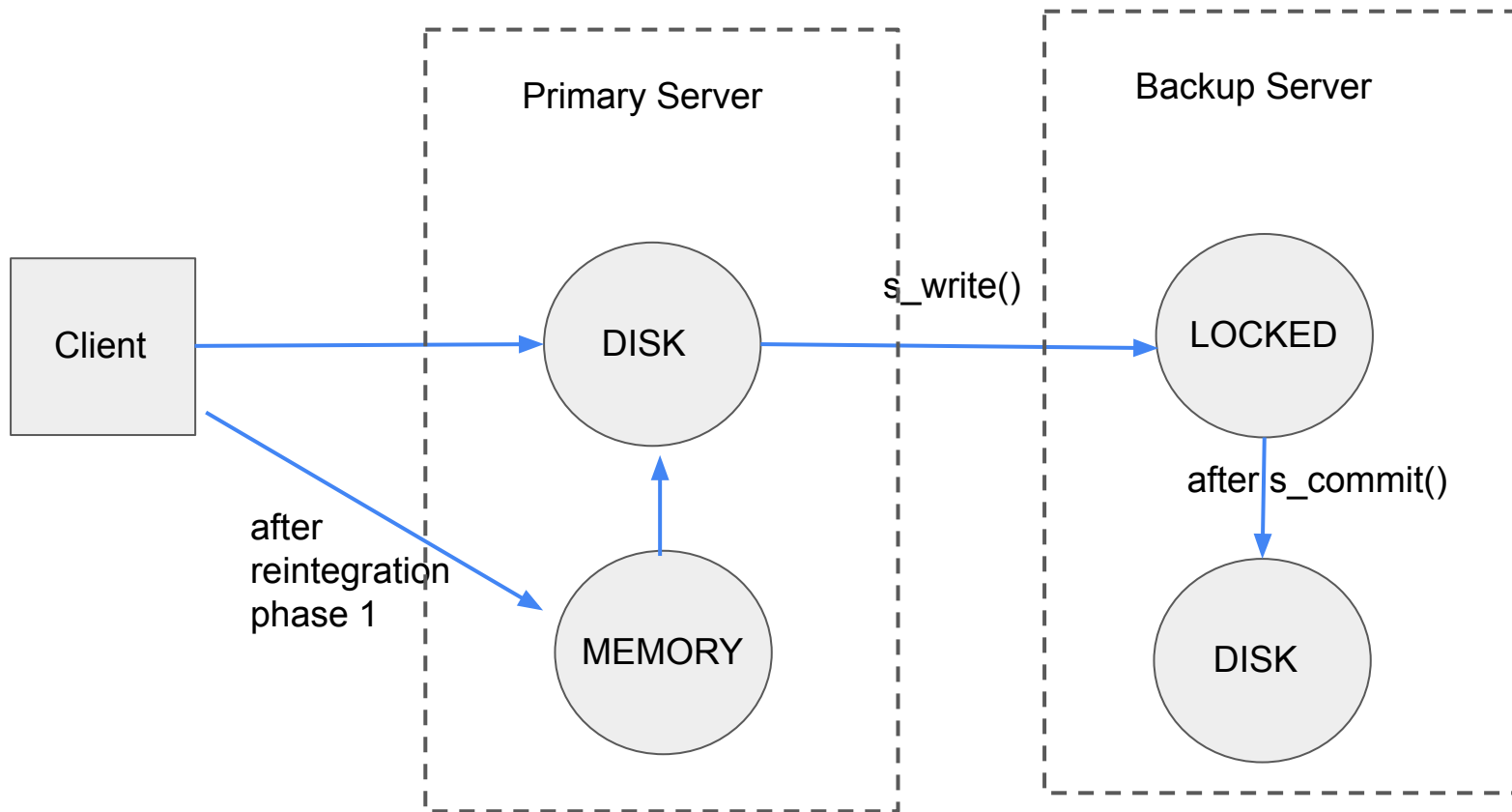
Group 4 :
Abhinav Agarwal,
Kaustubh Khare,
Prabhav Adhikari,
Chahak Tharani

1. Design & Implementation

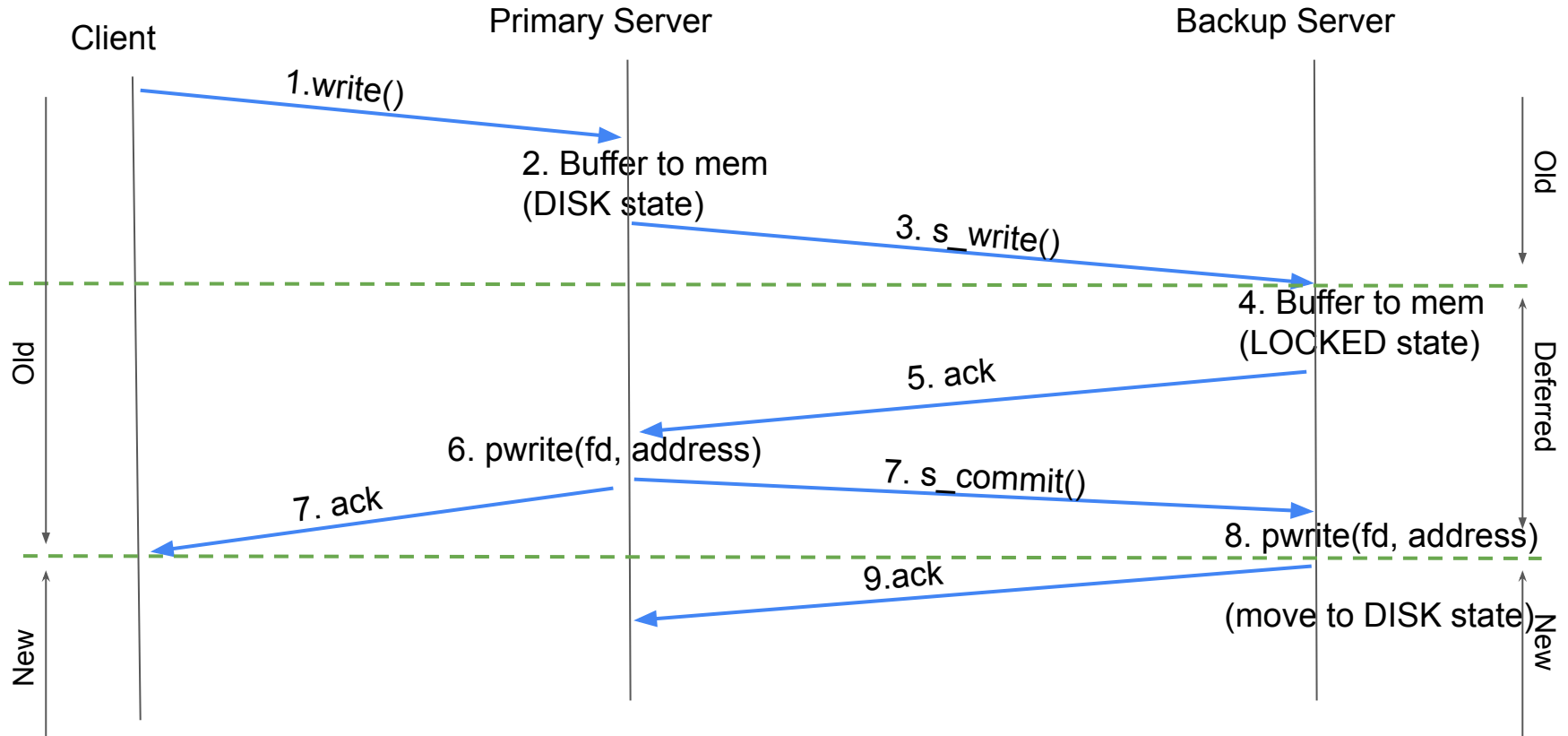
High Level System Design



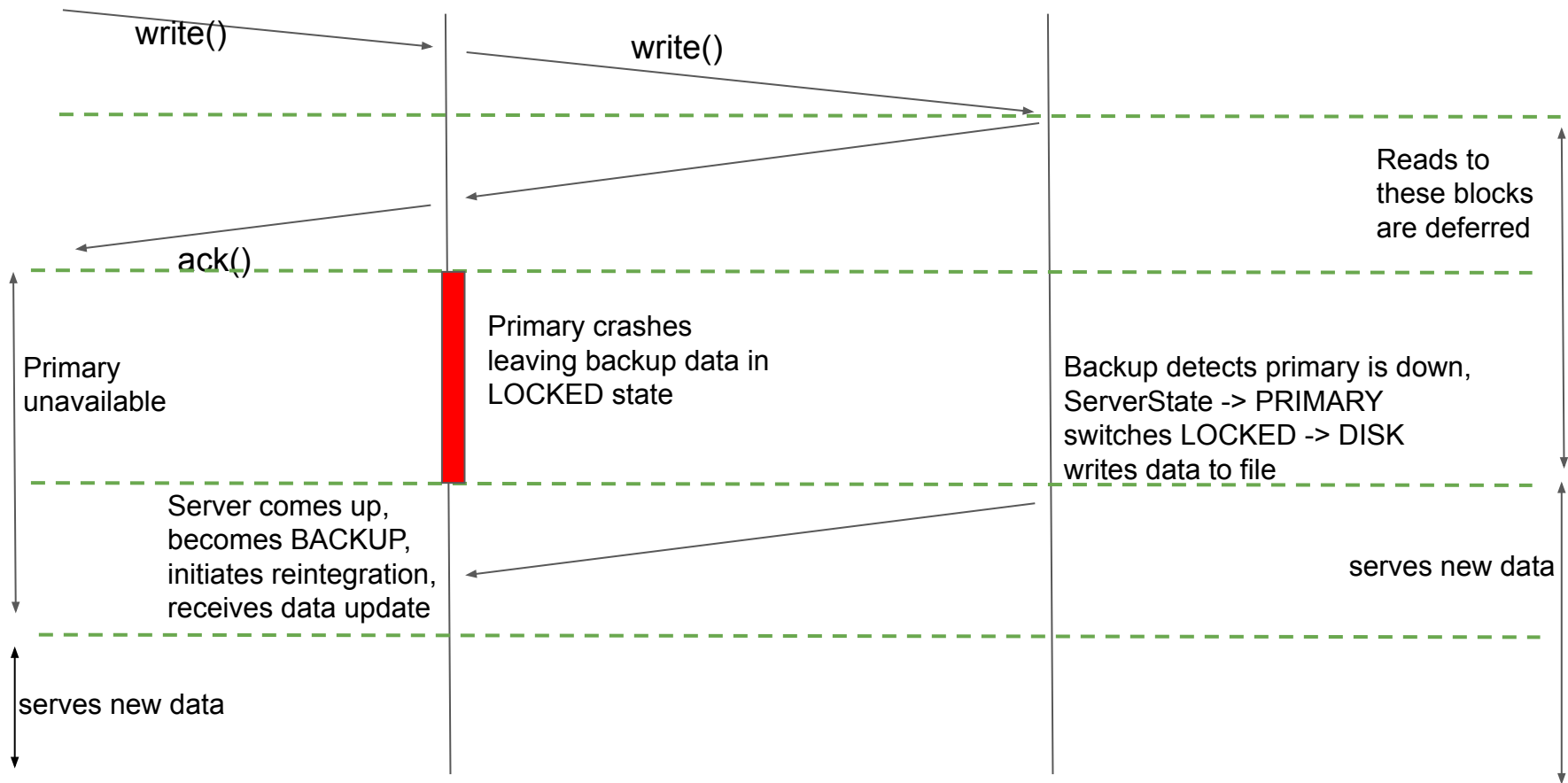
Data design



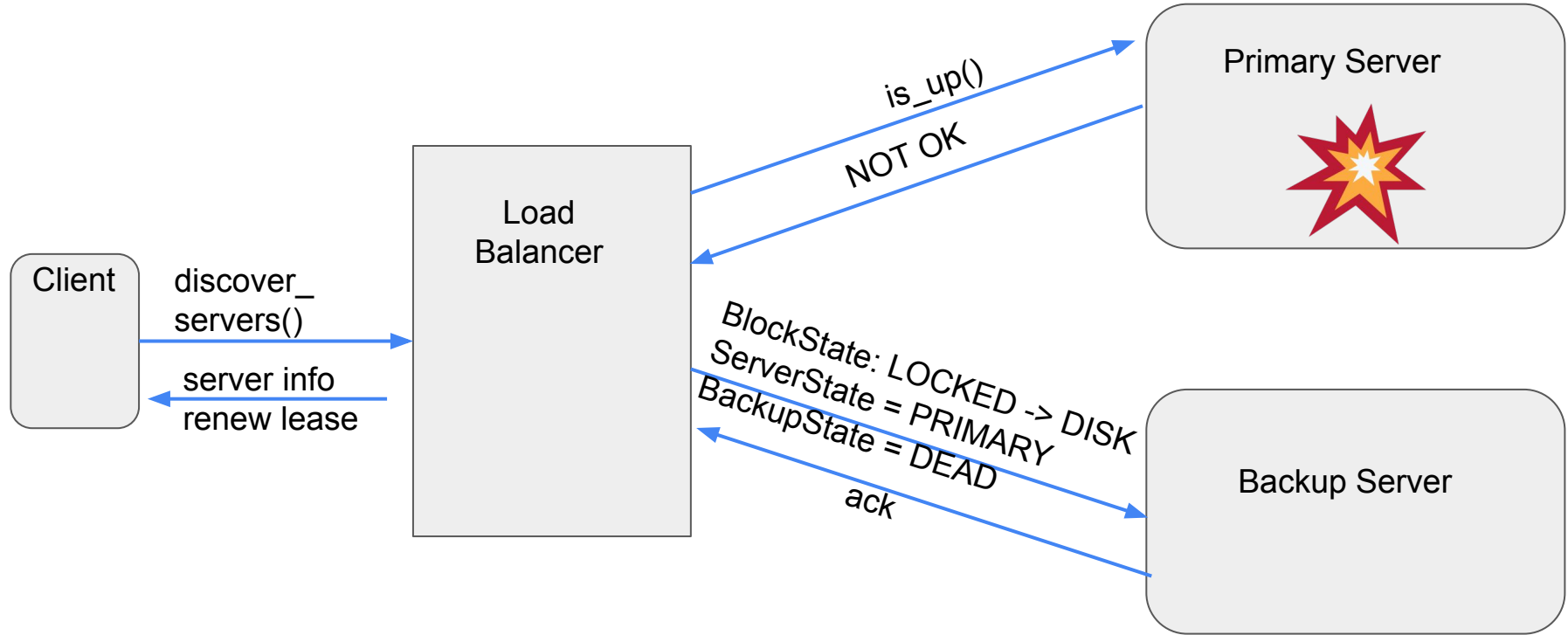
Write protocol



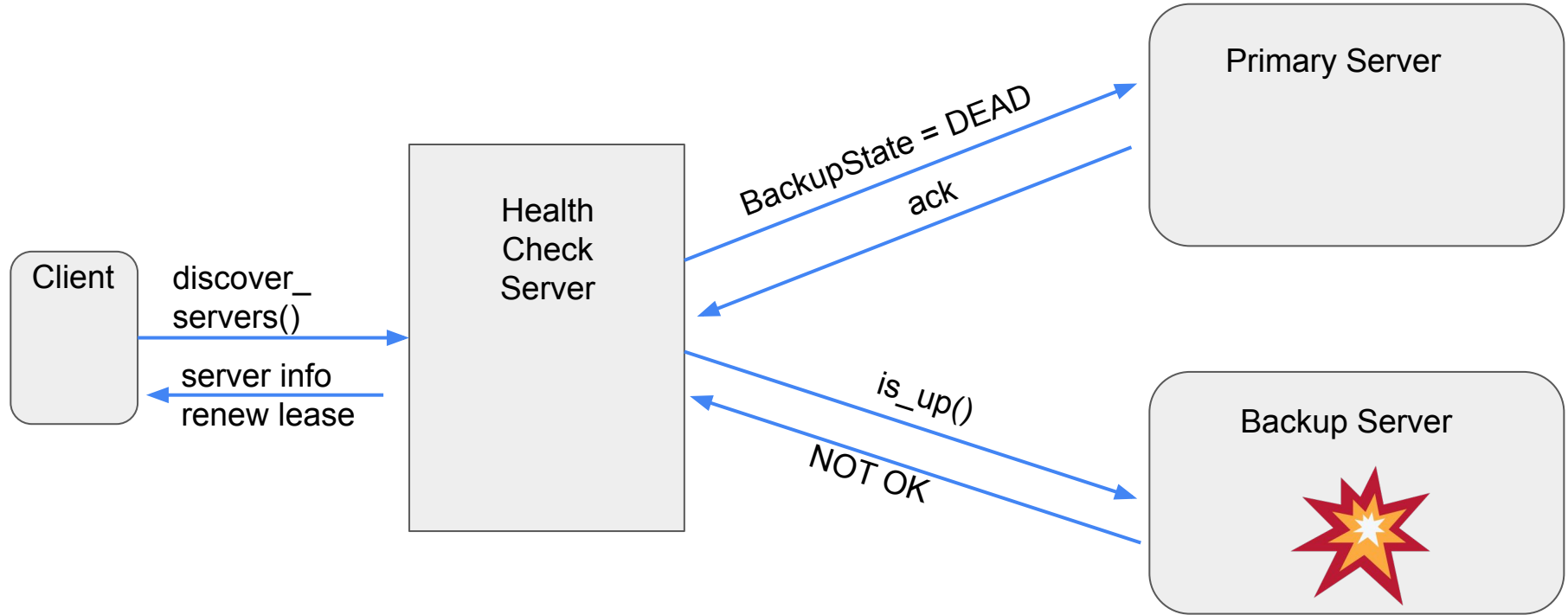
Write Failure Scenario



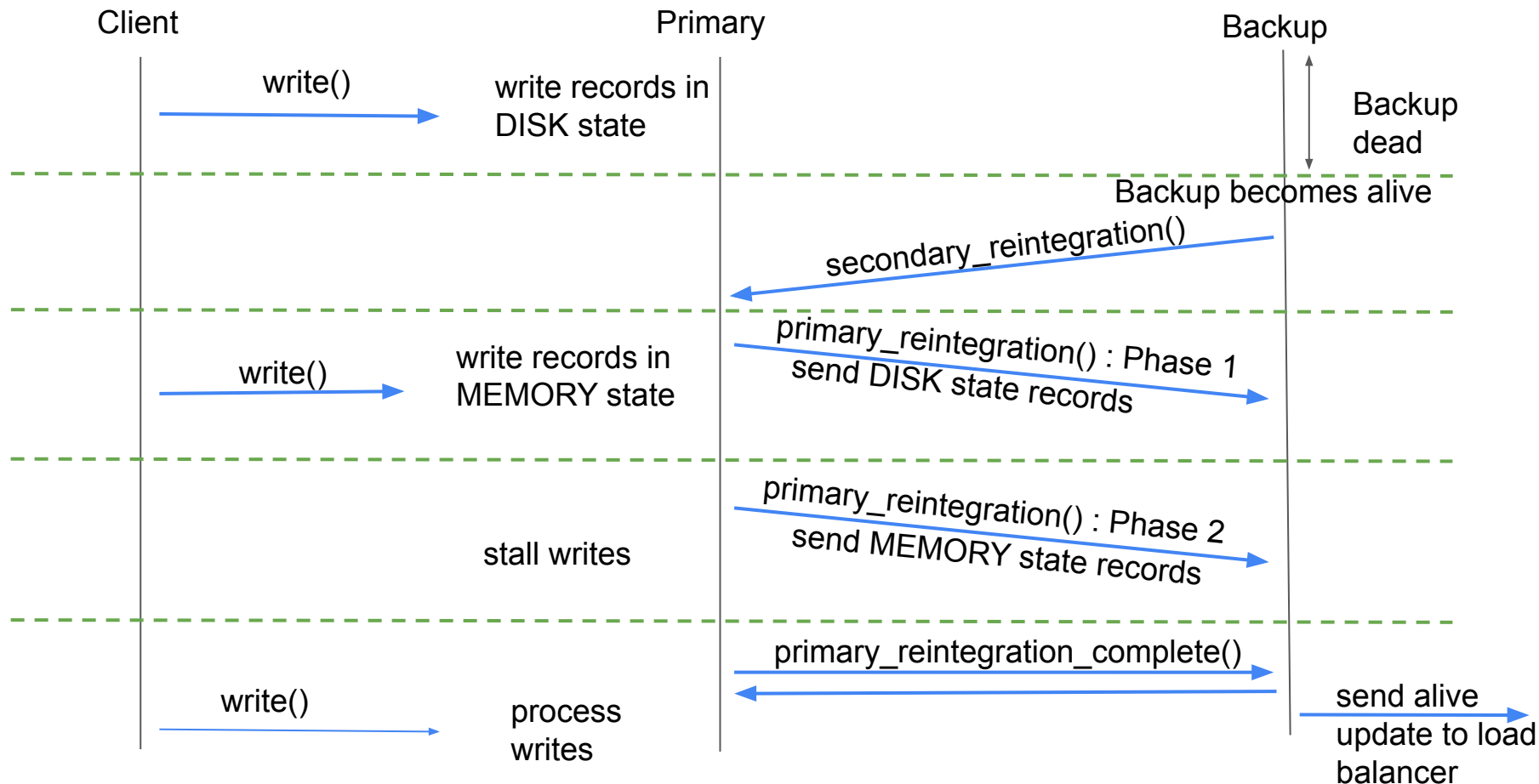
Primary Crash Scenario (transparent to client)



Backup Crash Scenario (transparent to client)



Reintegration (backup comes up)

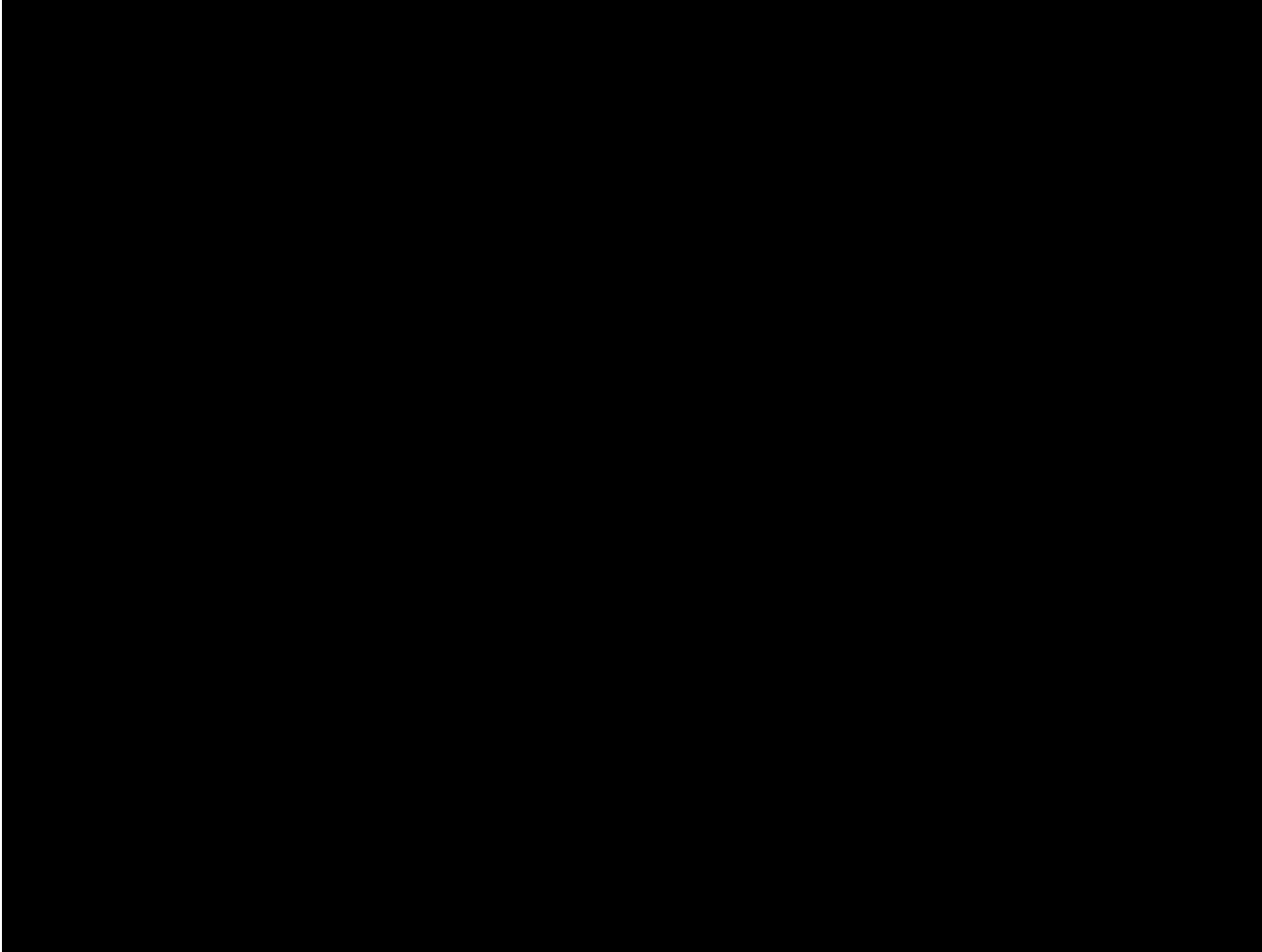


2. Testing & Measurement

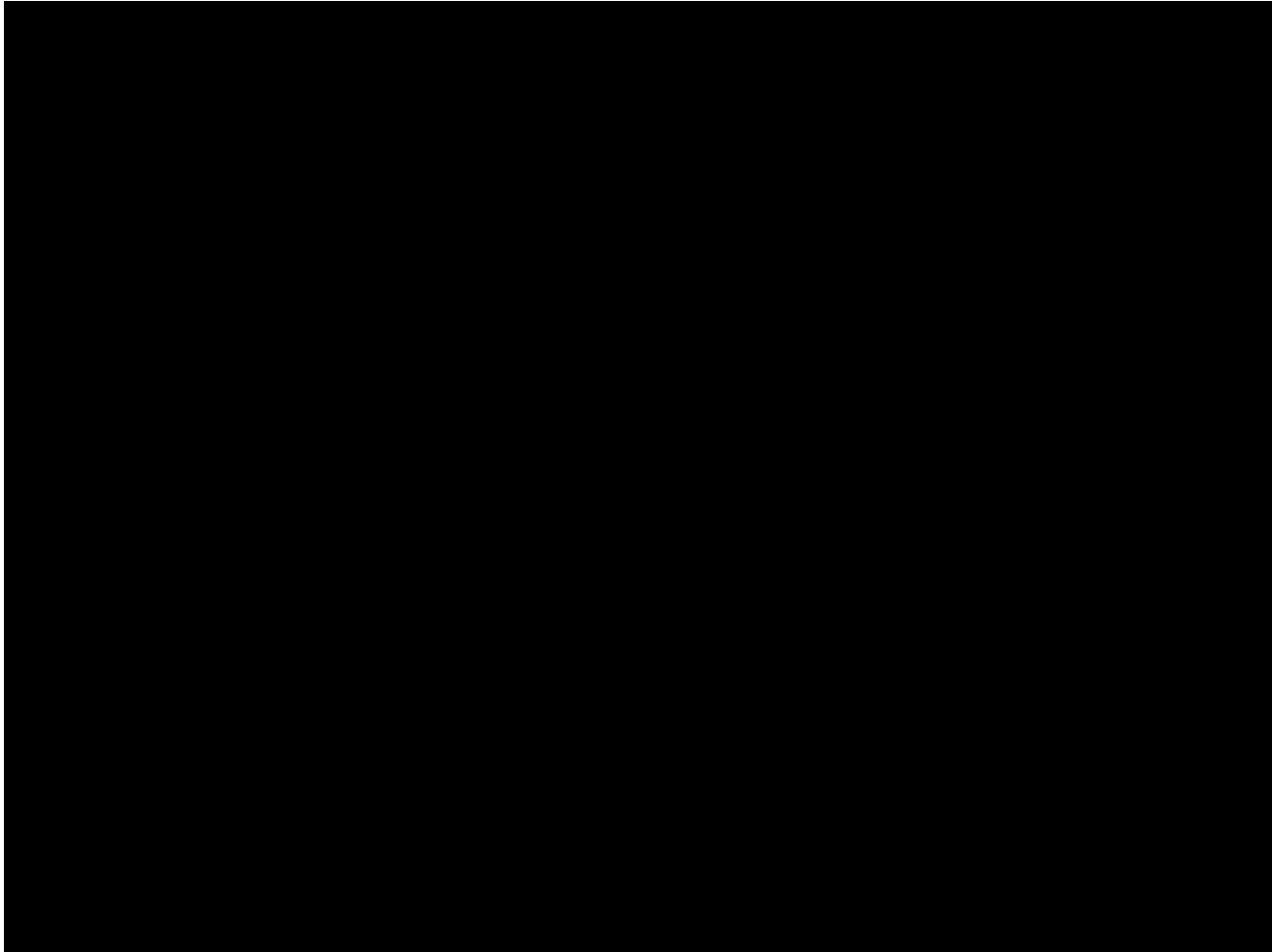
2.1 Correctness

- All reads in clients are sent to all the active servers (to demo if all reads are the same). This feature is driven by configuration.
- The Tests fail if reads are inconsistent
 - Reads are consistent if the test doesn't halt

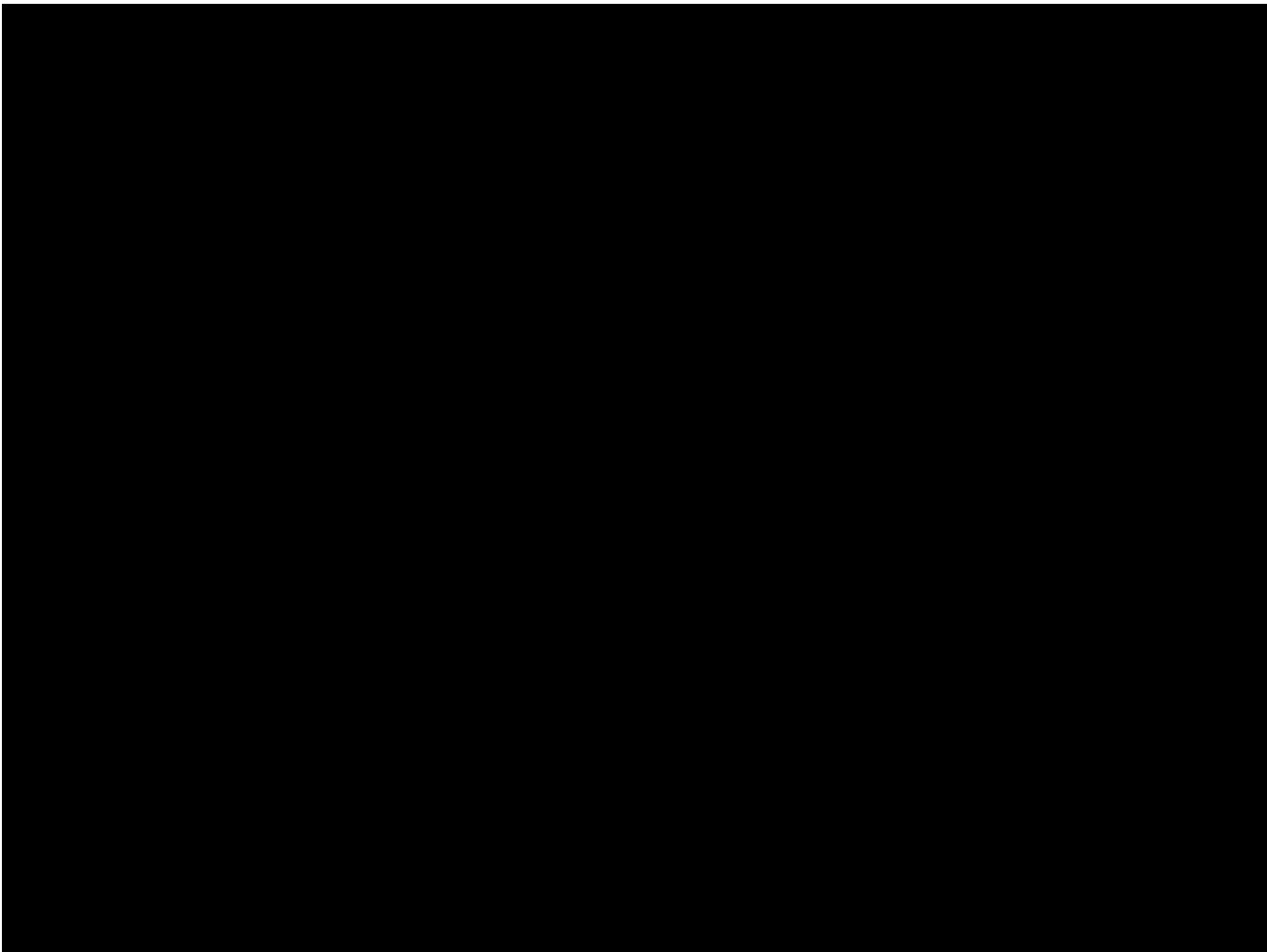
2.2 Primary/Backup Crashes Scenario



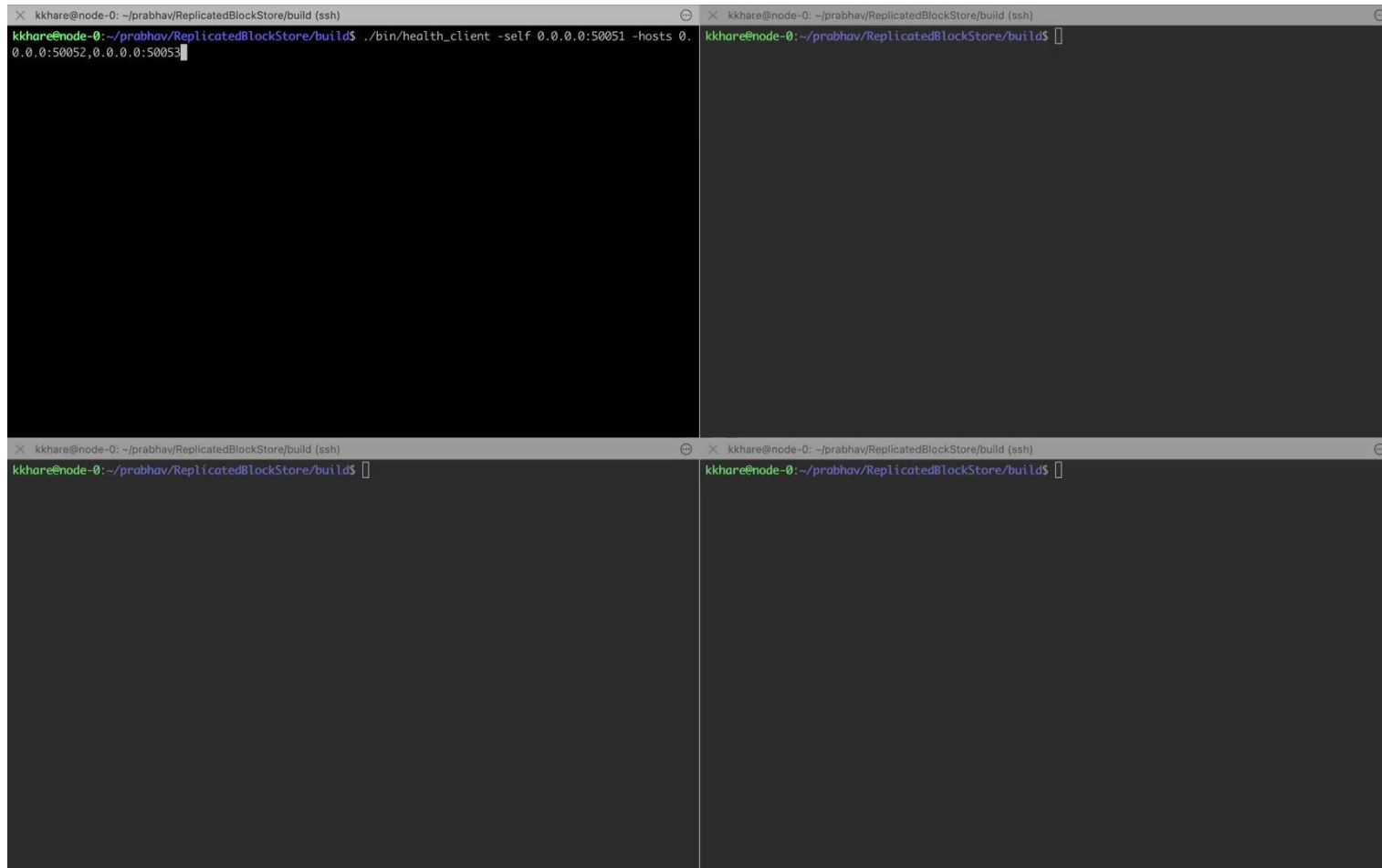
2.2 Primary/Backup Crashes Scenario - unaligned addresses



Primary fails after write



Back up crash during reintegration



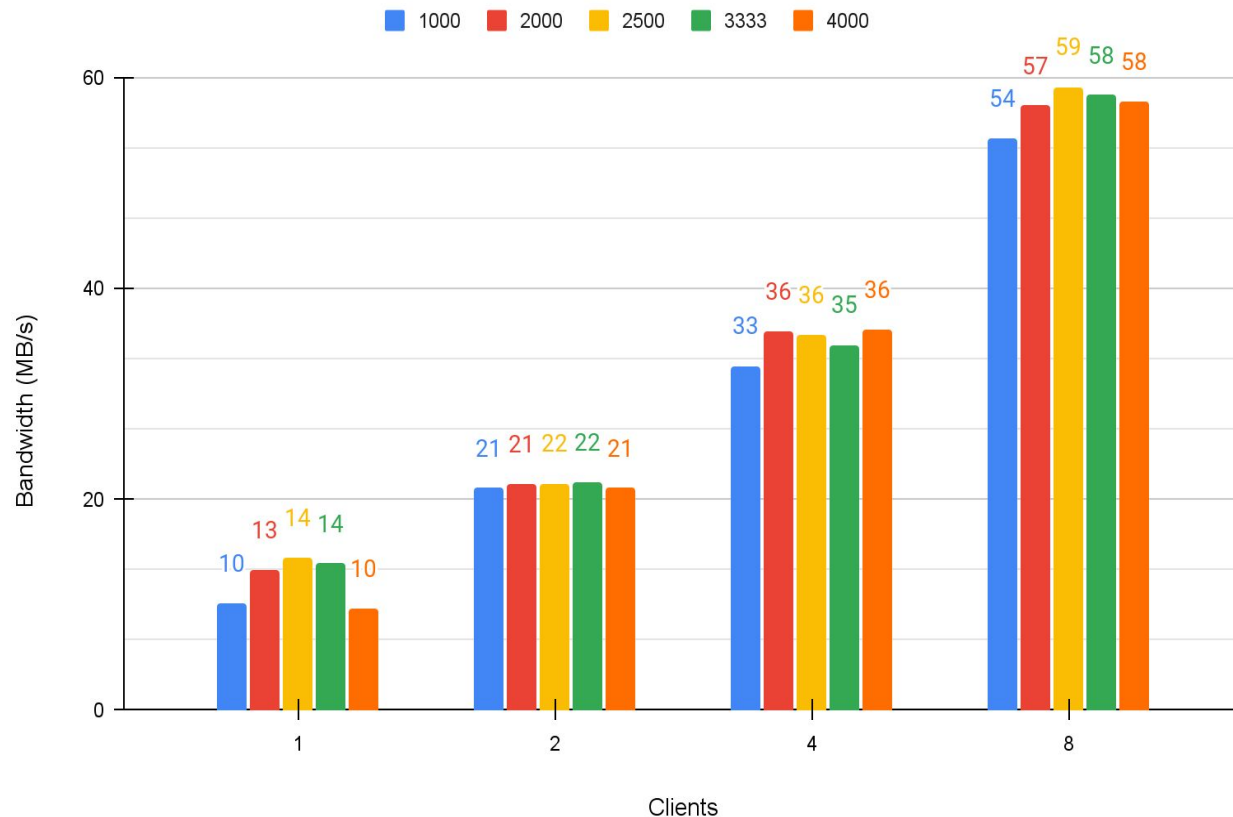
The image shows four terminal windows arranged in a 2x2 grid, all with the title bar "kkhare@node-0: ~/prabhav/ReplicatedBlockStore/build (ssh)".

- Top-left window:** Displays the command `./bin/health_client -self 0.0.0.0:50051 -hosts 0.0.0.0:50052,0.0.0.0:50053` and a cursor on the next line.
- Top-right window:** Shows a prompt `kkhare@node-0:~/prabhav/ReplicatedBlockStore/build$` and a dark, mostly empty terminal area.
- Bottom-left window:** Shows a prompt `kkhare@node-0:~/prabhav/ReplicatedBlockStore/build$` and a dark, mostly empty terminal area.
- Bottom-right window:** Shows a prompt `kkhare@node-0:~/prabhav/ReplicatedBlockStore/build$` and a dark, mostly empty terminal area.

3. Performance

Read Performance

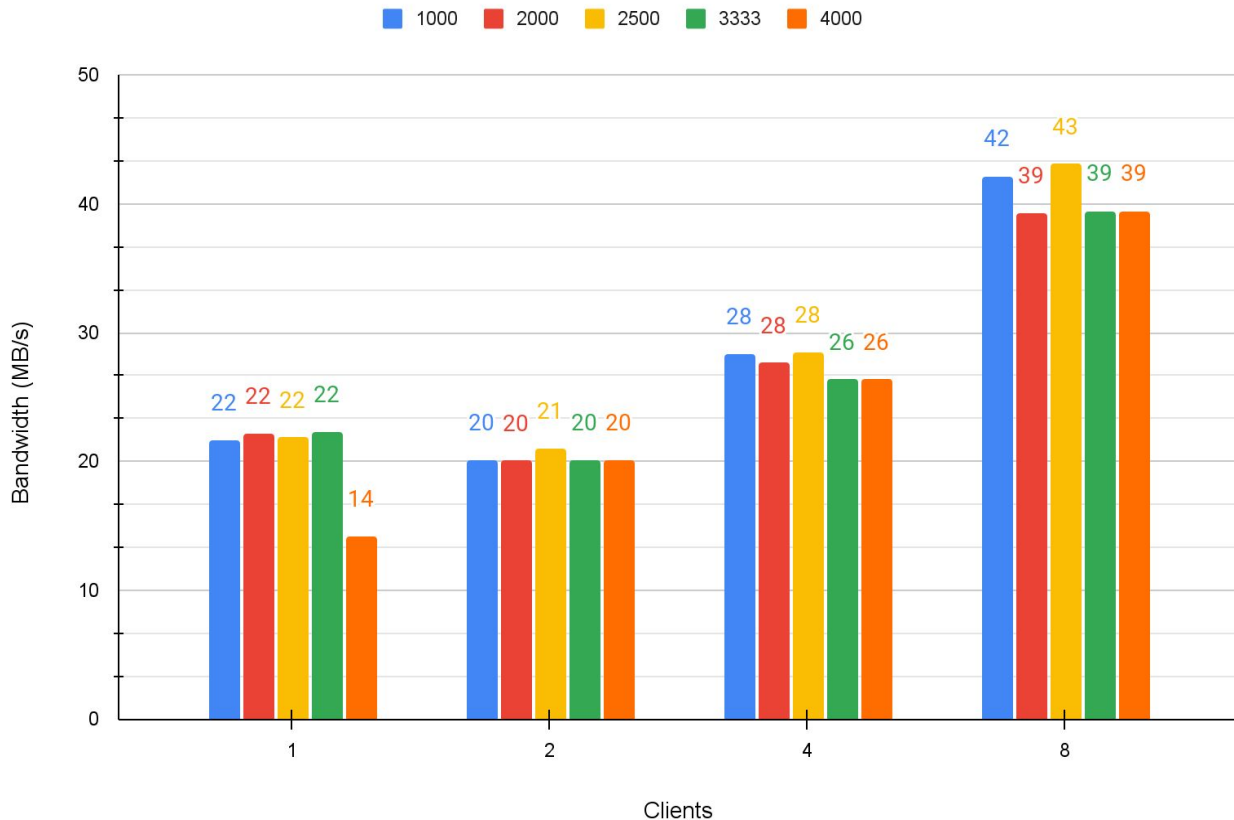
Read Bandwidth vs Number of Clients



- Total bandwidth increases with increasing clients
- Increasing the total number of reads reduces the bandwidth slightly

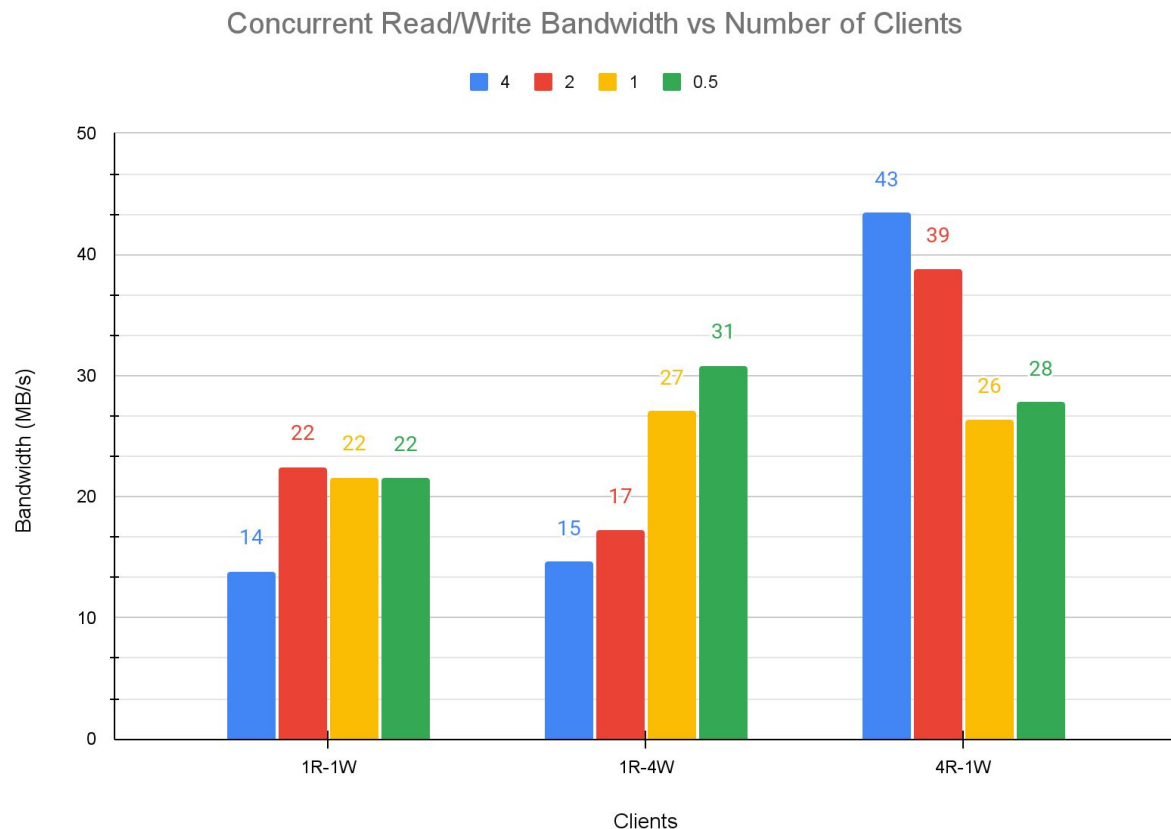
Write Performance

Write Bandwidth vs Number of Clients



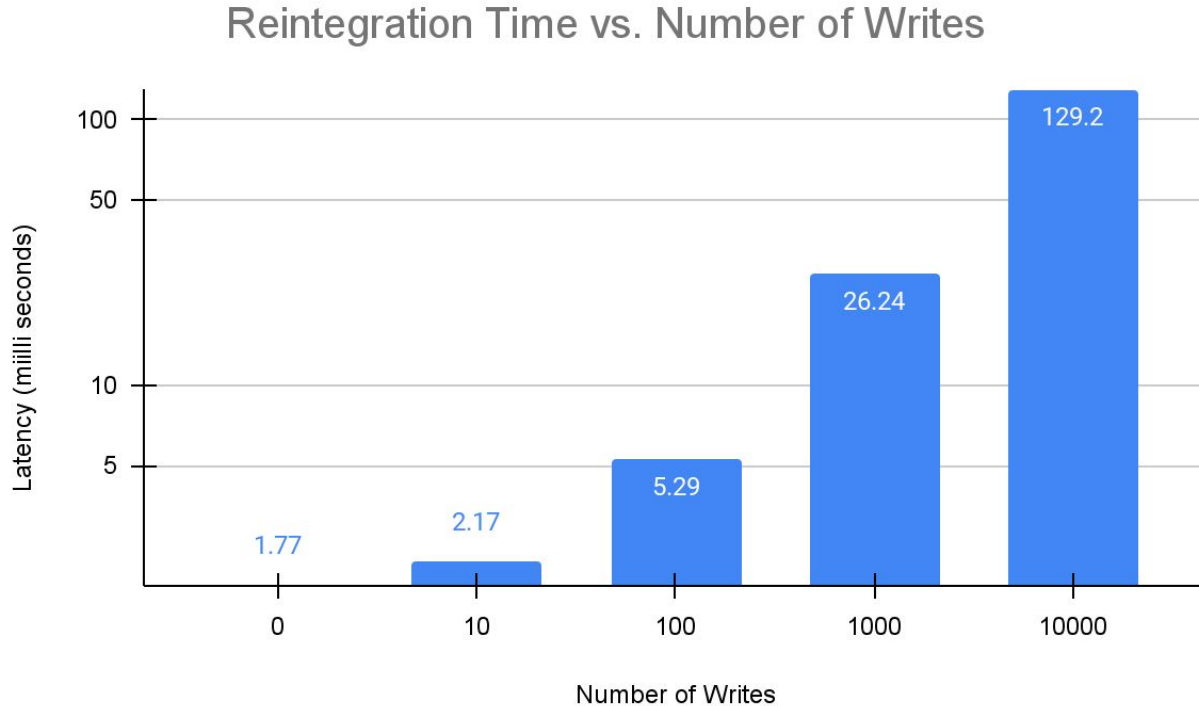
- Total bandwidth increases with increasing clients
- Increasing the total number of writes reduces the total bandwidth slightly

Concurrent Read/Write Performance



- Ready heavy workload has more bandwidth

Reintegration Performance



- Reintegration time increases as number of writes while backup is dead increases

Questions