#ASLI ENGINEERING

Database Scaling Techniques

SWIPE

BY

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Scaling Databases

Databases are the most important component of any system out there. It makes or breaks any system...

Hence, it is critical to understand how to scale them...

* These techniques are applicable to most databases out there.

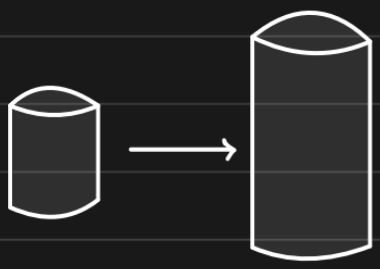
↑ read your DB documentation.

↓

relational and non-relational

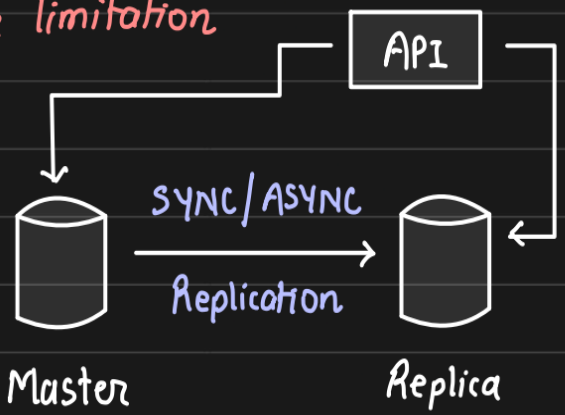
Vertical Scaling

- add more CPU, RAM, Disk to the database
- requires downtime during reboot
- gives you ability to handle "scale", more load
- vertical scaling has a physical hardware limitation



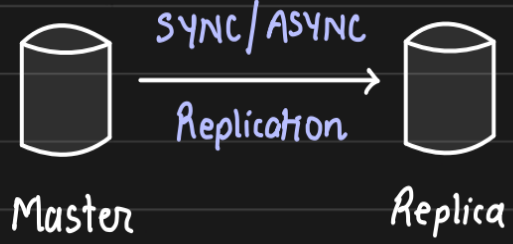
Horizontal Scaling : Read Replicas

- when read : write = 90:10
- you move reads to other database so that "master" is free to do writes
- API servers should know which DB to connect to get things done



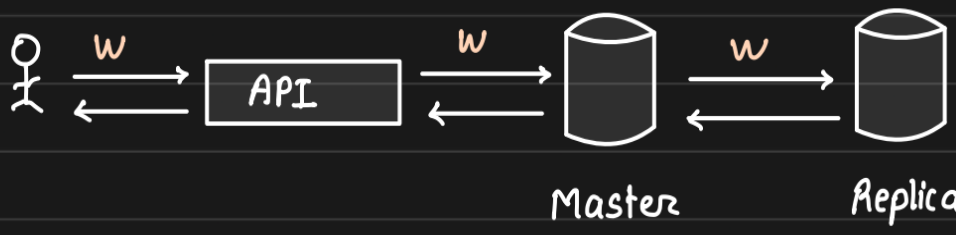
Replication

Changes on one database (Master) needs to be sent to Replica to maintain consistency



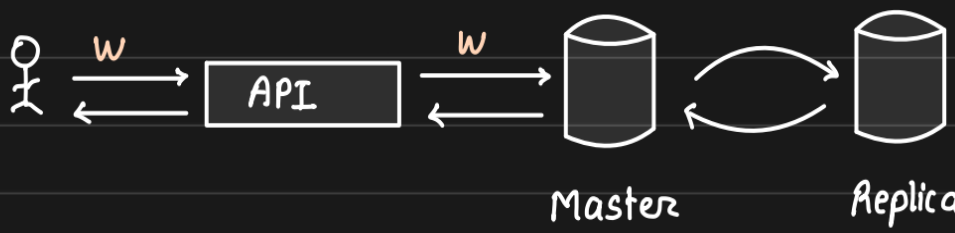
Two modes of replication

1. Synchronous replication



- Strong consistency
- zero replication lag
- slower writes

2. Asynchronous replication



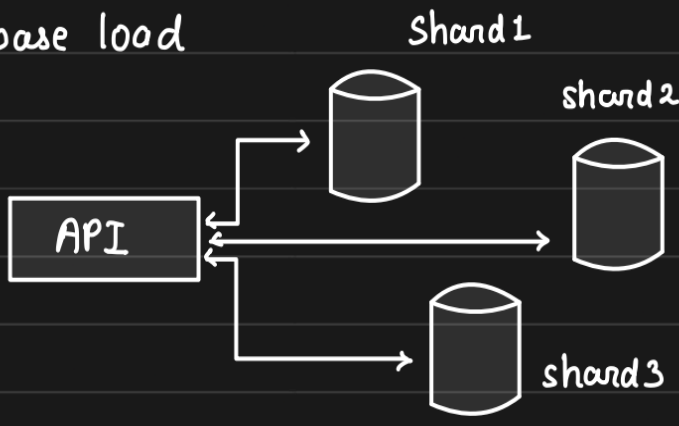
- eventual consistency
- some replication lag
- faster writes

Horizontal Scaling : Sharding

Because one node cannot handle the data/load we split it into multiple exclusive subsets

Writes on a particular row/document will go to one particular shard.

This way, we scale our overall database load



Note: shards are independent

no replication b/w them

API server needs to know whom to connect to, to get things done.

Note: some databases has a proxy that takes care of routing

Each shard can have its own replica (if needed)

Exercise

1. configure one MySQL as replica of another
2. put some data and see the replication happening
3. write a small API service that has two connection obj
   - ↳ one master and one replica
4. depending on the request, make call to either master or replica
5. implement sharding by spinning Two DB
   - ↳ one handling keys (a to m)
   - ↳ second handling keys (n to z)
6. write API service that routes request to one of them depending on key