An Introduction to Database Replication

Progressive Coder

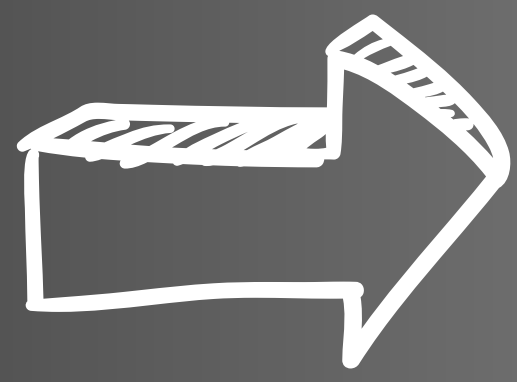
What is Database Replication?

Database Replication means keeping a copy of your data on multiple machines.

Why is this useful?

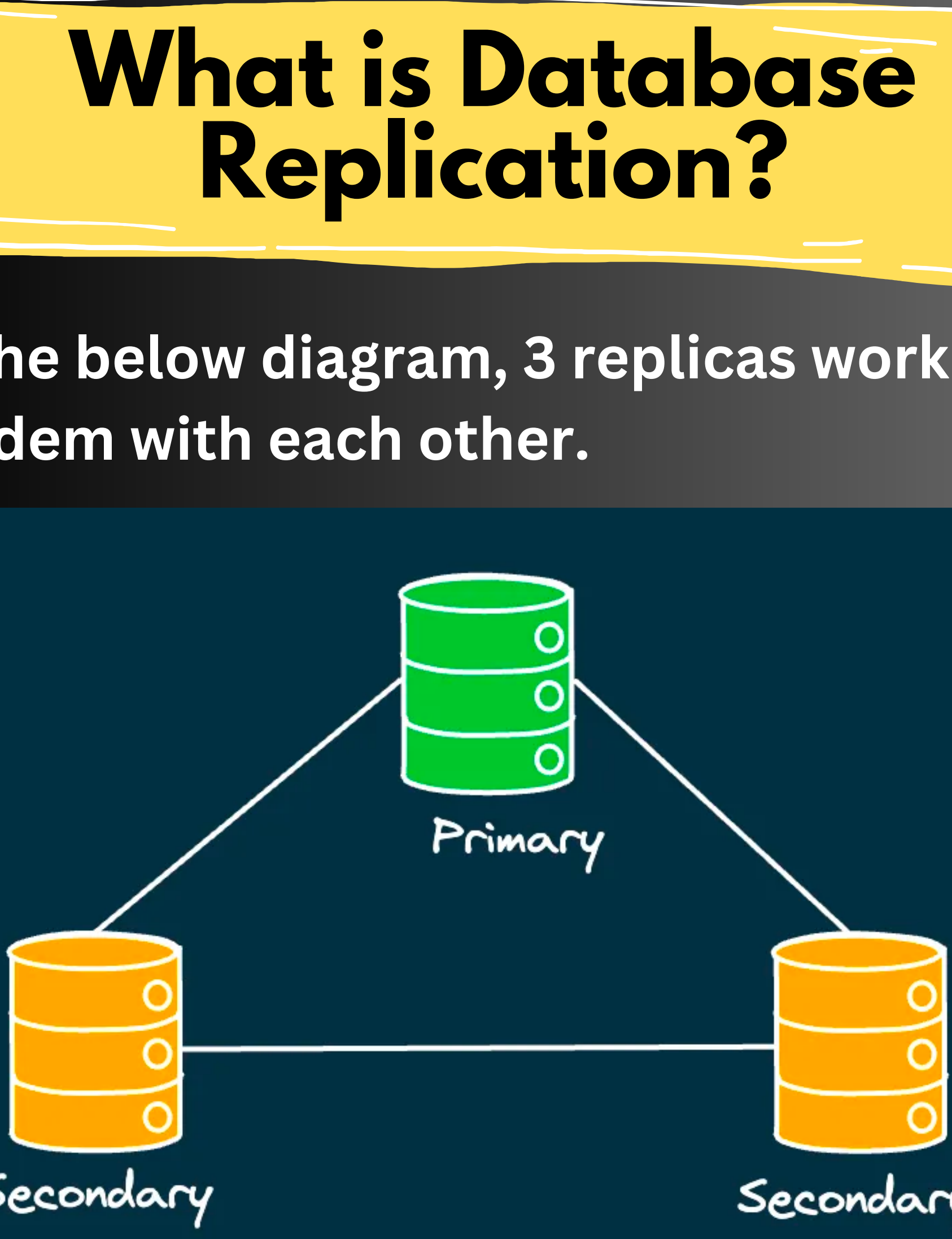
- Replication increases the safety of your data.
- Also, replication helps you with availability & scalability

Here's what it looks like

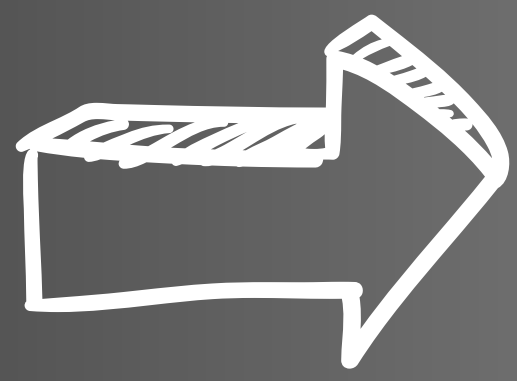


What is Database Replication?

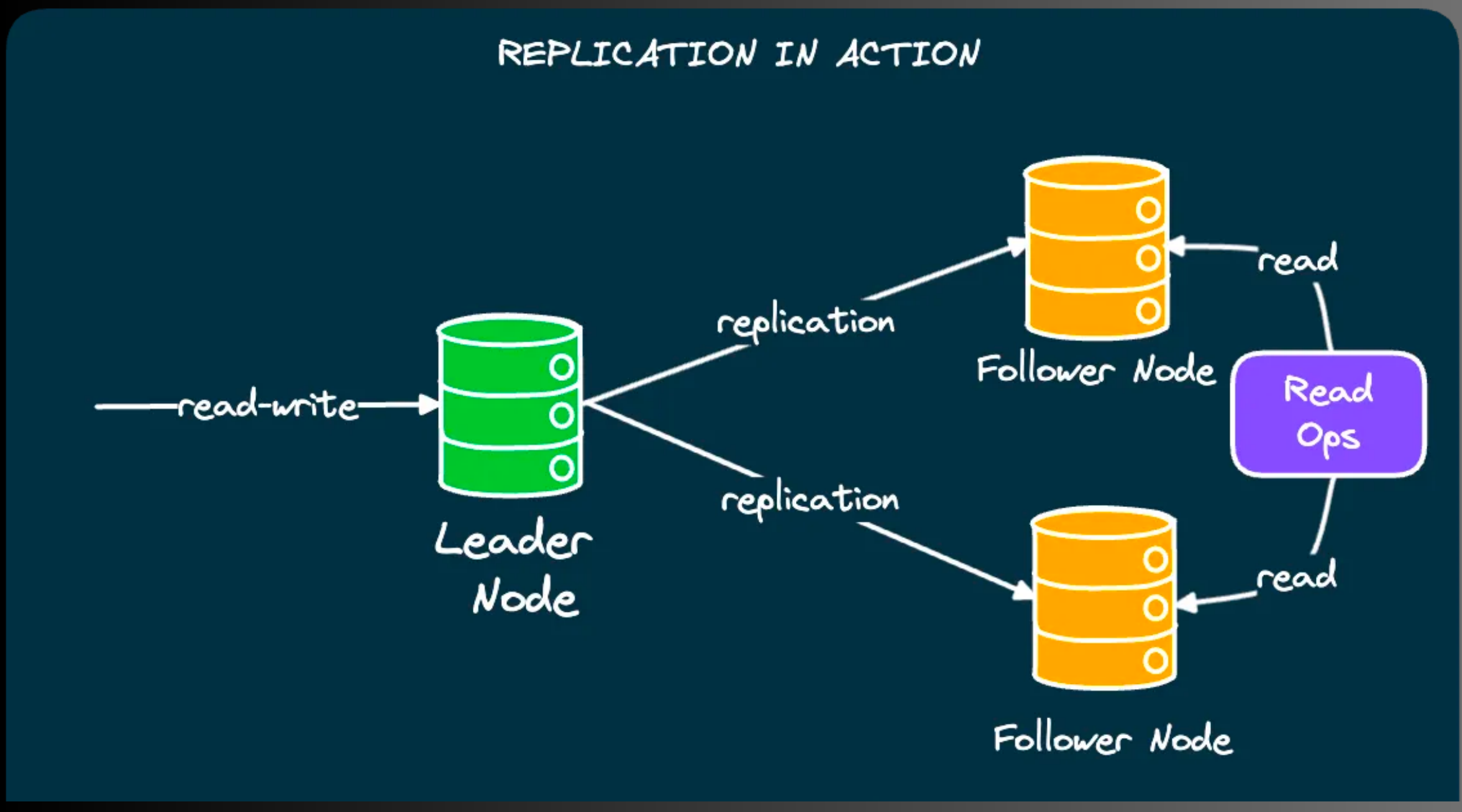
In the below diagram, 3 replicas work in tandem with each other.



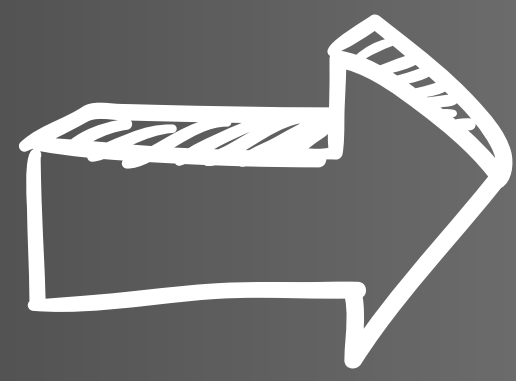
But how does Replication work?



How Replication Works?



What's going on over here?



How Replication Works?

In the diagram, we have 3 replicas - 1 green and 2 yellow

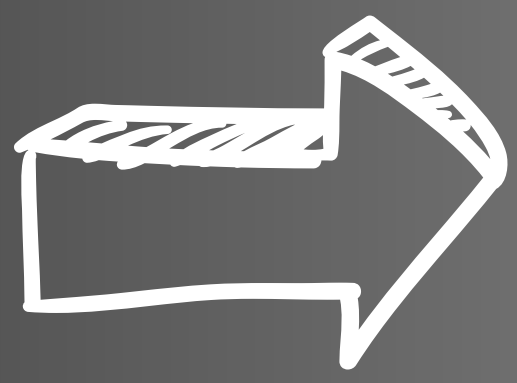
Every write to the database must reach every replica.

The most common approach is **Leader-Based Replication**.

AKA as Active/Passive or Master-Slave Replication.

Here, green is the Leader & others are followers

What happens under the hood?

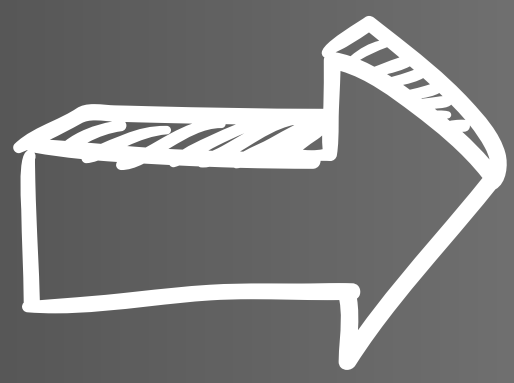


Leader-Based Replication

Here are the steps:

- Clients send their write requests to the leader node.
- The leader writes new data to its local storage
- The leader also sends the data change to all its followers in the form of a replication log
- Each follower reads the log & updates its local copy of the database
- When a client wants to read data, it can send a query to the leader of any of the followers.
- Load balancers handle this automatically

Types of Replication



Types of Replication

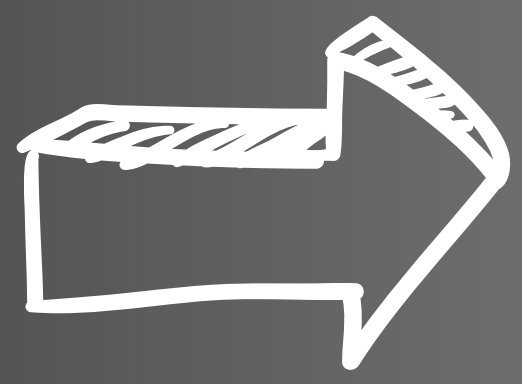
There are two main types of replication:

- Synchronous
- Asynchronous

In **Synchronous Replication**, the leader waits until all followers have confirmed that they have received the write

In **Asynchronous Replication**, the leader sends the updates to the followers but does not wait for a response from the follower.

Implications?



Types of Replication

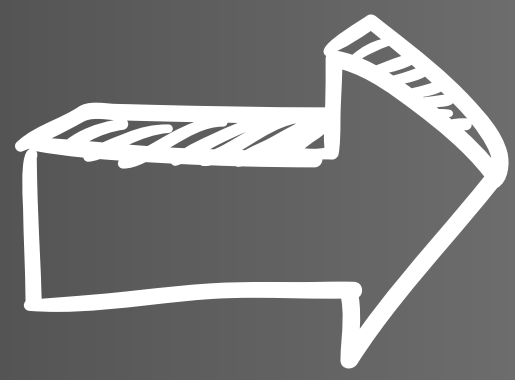
Synchronous Replication guarantees that followers will have an up-to-date copy of the data.

But it also means that the whole system goes down if one follower is not available.

Asynchronous Replication makes the leader free to process new write operations.

But it comes at the cost of a write operation not guaranteed to be durable even if confirmed to the client.

The Need of Replication

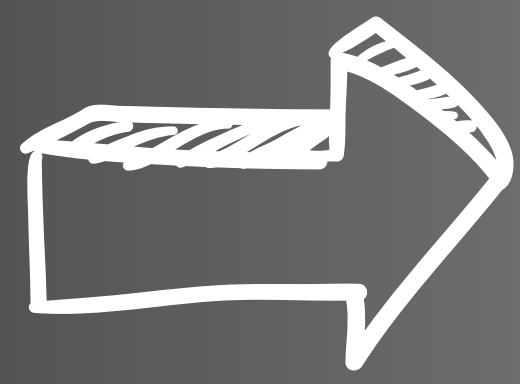


Need of Database Replication

Some important reasons why database replication is needed:

- Data is always there for you. Safe & Secure
- You can scale based on demand
- Data can stay close to the users
- No instance gets overburdened
- Backup in case things go south

In fact...



Need of Database Replication

In fact...replication can bring your data back even from the Thanos Snap.

That's all for now!

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