Adding Replication to the NanoDB Relational Database

Caltech

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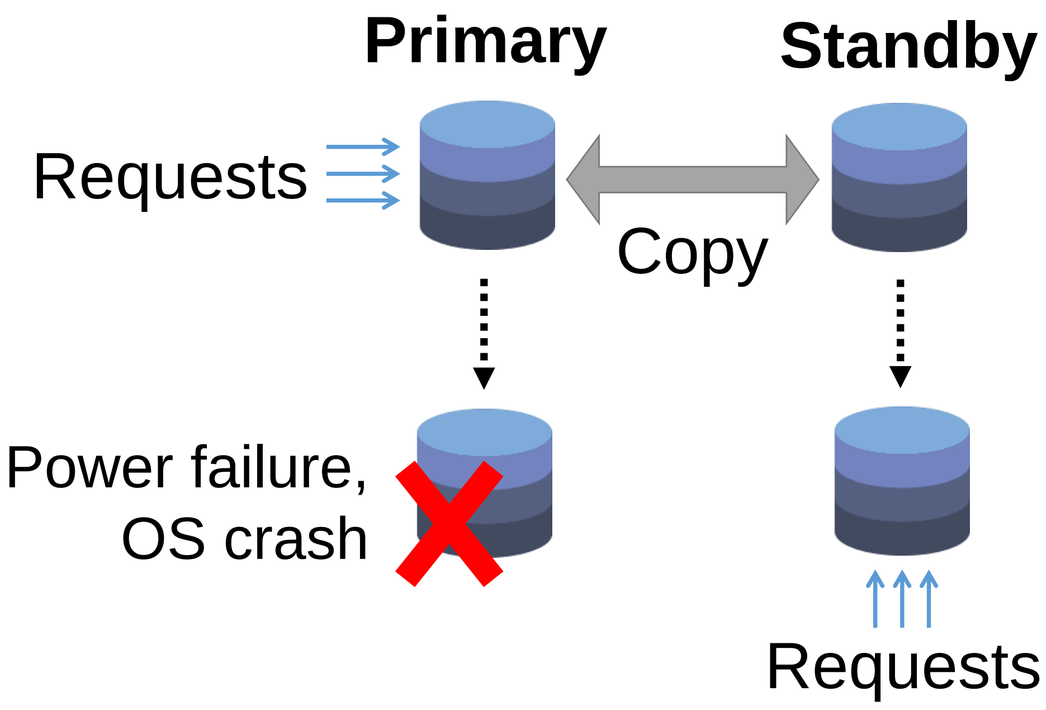
Database downtime is costly.

- Amazon.com 30 minute downtime in 2013 cost $2 million (Clay, Forbes 8/9/13)

Replication is an easy way to increase availability.

- If one server fails, we can switch to the other with minimal downtime.



NanoDB is Caltech's teaching relational database.

- Written in Java for CS 122.
- Includes most features of modern relational DBs, including query planning and transactions.

Databases record all changes in a *write-ahead log*.

- This allows durable and atomic transactions (for any transaction X, either X is committed or it's not)

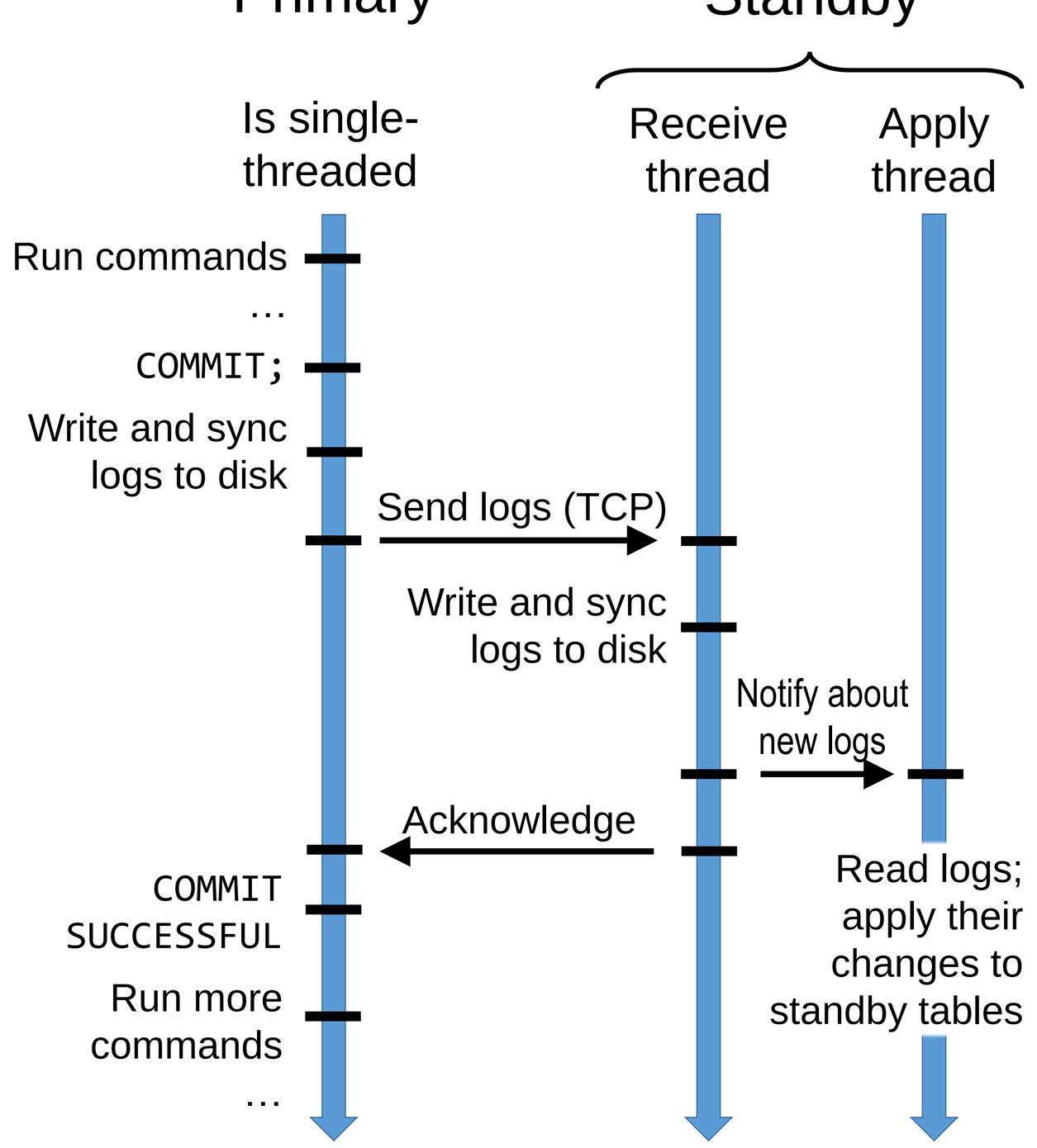
Database

Account	Balance
Anne	50
Fred	120

Write-Ahead Log

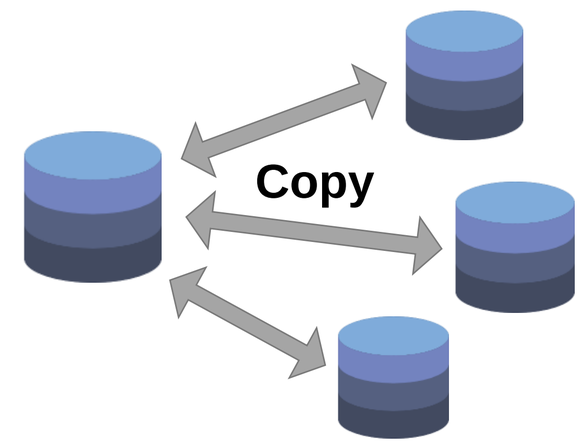
…
Start transaction
Update <Anne, 75> → <Anne, 50>
Update <Fred, 95> → <Fred, 120>
Commit
…

Replication can be implemented by sending logs!

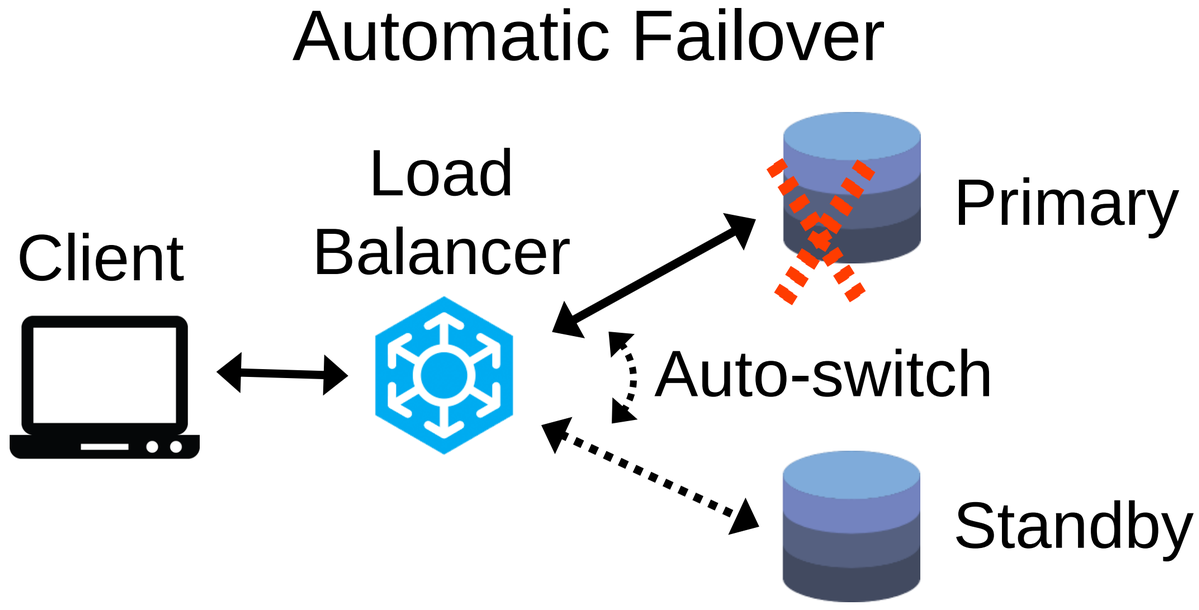


Future Work

Multiple Standbys



Automatic Failover



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