3Theorems

September 9, 2025

[ ]:

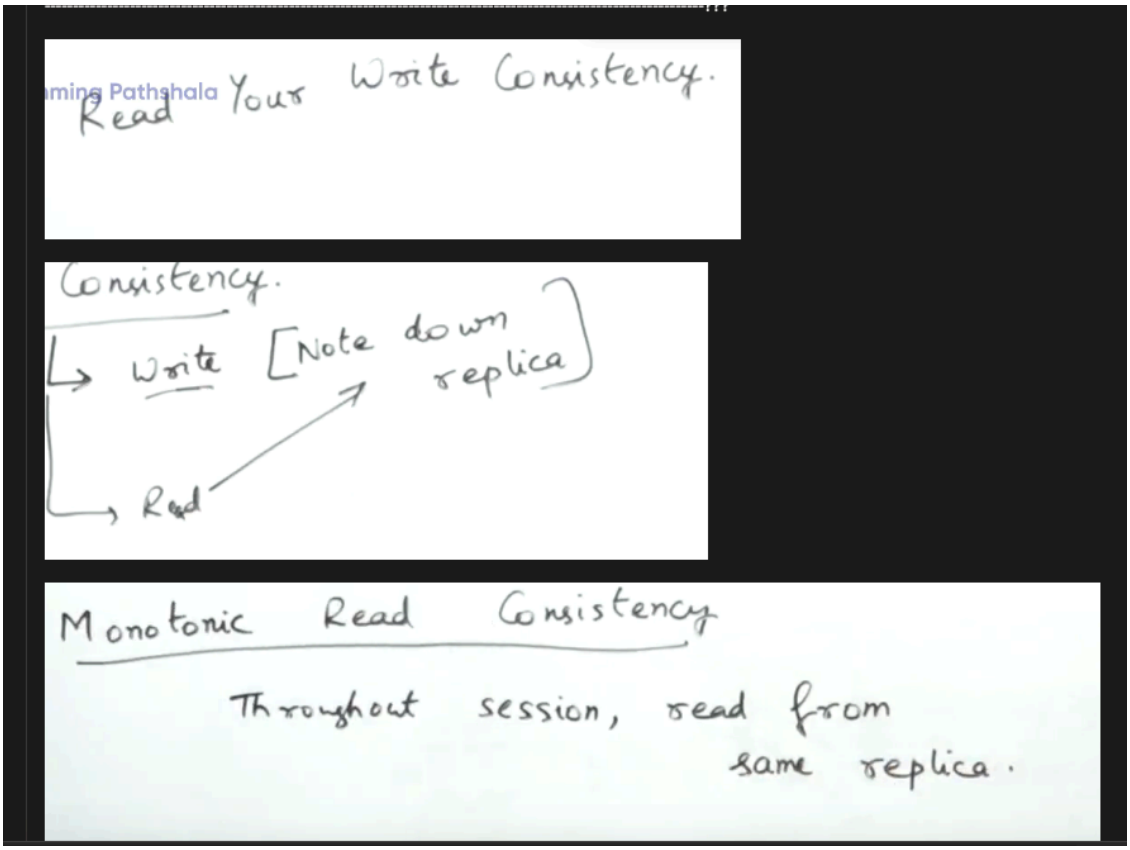
CAP Theorem:
Designing efficient distributed storage

Consistency
Availability
Partition tolerance

Availability even when some nodes fail

Partition tolerance
System should not fail if partition happens bw two db

Partion happened Then either Availabale Or Consistent



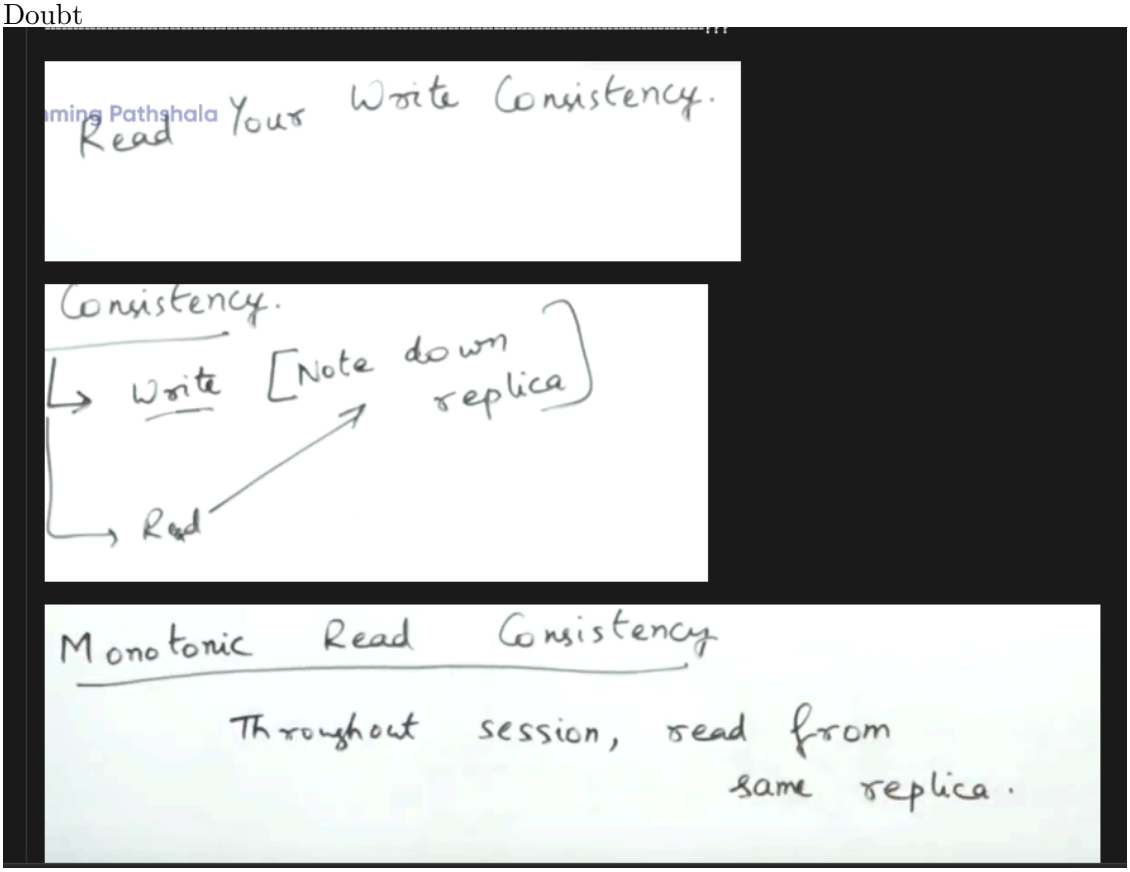
CA database after partition happened
Only possible for single node

CP Consitency Partition tolerance

When a partition happen, the system has to turn off all the inconsistent nodes untill the partition is fixed

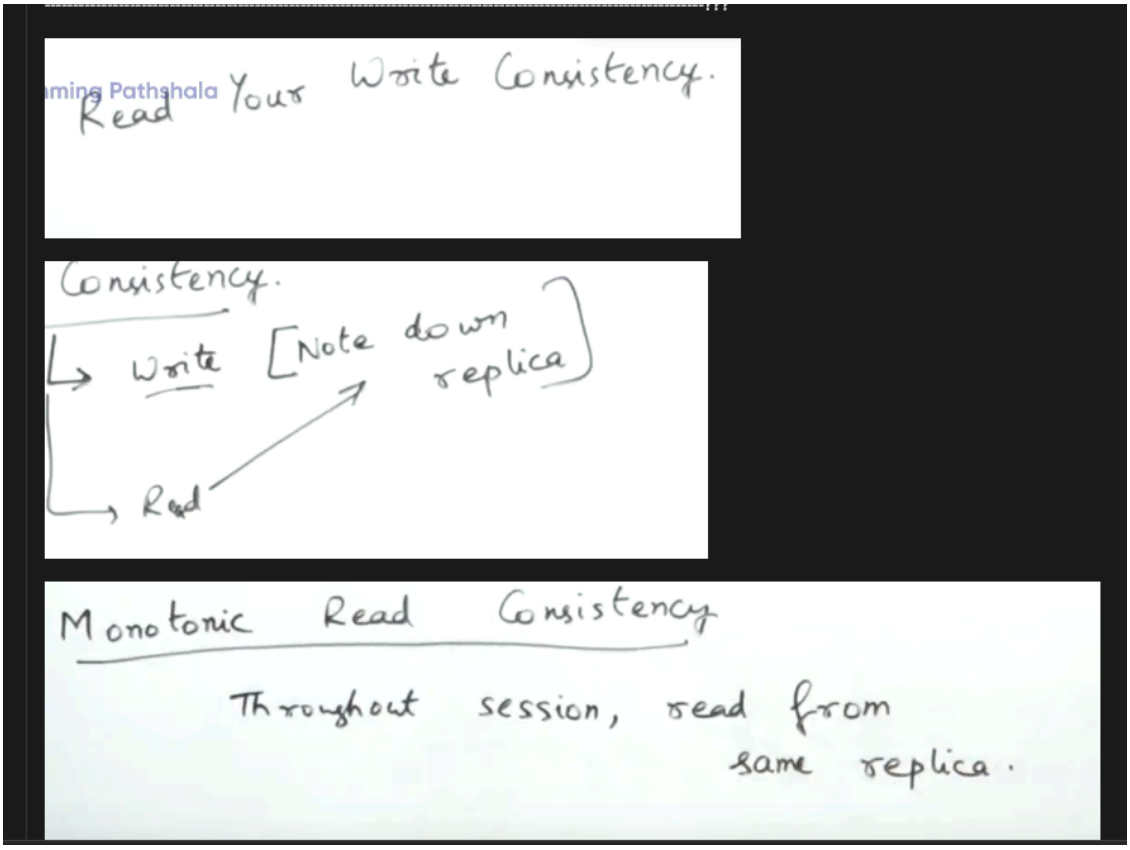
ex
MongoDB Banking

Doubt



AP Don't turn off the nodes which are disconnected due to partition

Apache cassandra, Amazon DynamoDB
Facebook, higly available: need not be consistent



?????????????????????????????????? Synchronous update make availability go down

Asynchronously make consistency ////////////////////////////////

Weak consistency
updates in 1 replica need not to be communicated to others

Eventual consistency/Async updates
Email

Strong consistency Synchrounous updates

doubt

Read Your Write Consistency.

Consistency.

- Write [Note down replica]
- Read

Monotonic Read Consistency

Throughout session, read from same replica.