Aurora Storage

What is it?

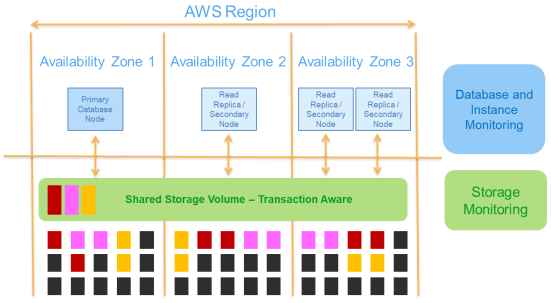
- Amazon Aurora cloud-optimized storage
- Distributed storage
- Only log records written

Amazon Aurora Storage

Benefits

- Increased throughput over traditional DB storage
- High Availability with fast failover times
- Durability: 6 copies across 3 Availability Zones
- Read Replicas: low lag times on up to 15 replicas
- Continuous backup to Amazon S3
- Storage volume automatically grows up to 64 TB

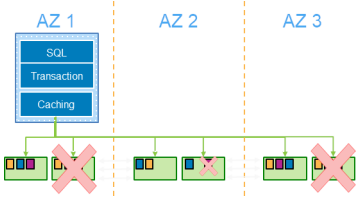
Scale Out Storage



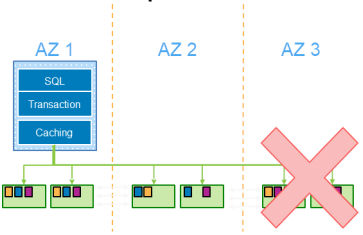
- Monitoring of nodes and disks for repair
- 10GB segments for repair or hotspot rebalance
- Quorum system for read/write; latency tolerant
- Quorum membership changes do not stall writes

Fault Tolerance

- Failure Scenarios
  - Segment failures (disks)
  - Node failures (machines)
  - AZ failures (network or datacenter)

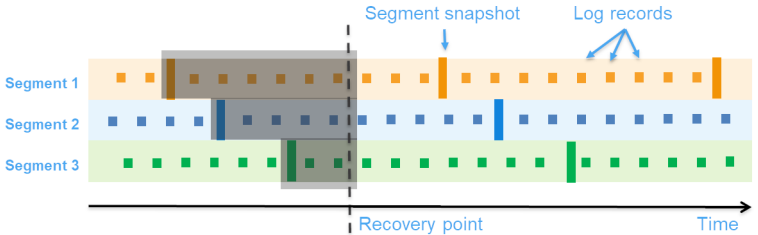


- Optimizations
  - 4 out of 6 write quorum
  - 3 out of 6 read quorum
  - Peer-to-peer replication for repairs

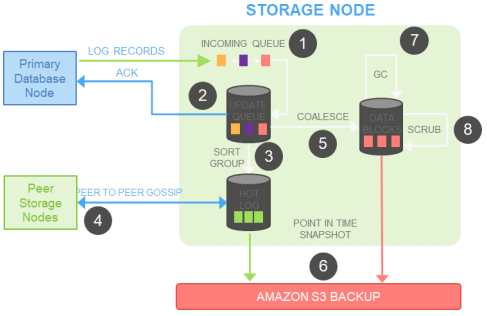


Continuous Backup

- Periodic snapshot of each segment in parallel
- Stream the logs to Amazon S3
- Backup happens continuously without performance impact



IO Flow



1. Receive record and add to in-memory queue
2. Persist record and acknowledge
3. Organize records and identify gaps in log
4. Gossip with peers to fill in holes
5. Coalesce records into new data block versions
6. Periodically stage log to Amazon S3
7. Periodically garbage collect old versions
8. Periodically validate CRC codes on blocks

Summary

- Much of the “work” is offloaded from the database engine
- Many tasks are processed asynchronously
- Redundant storage for high availability