==Day 14/100== →
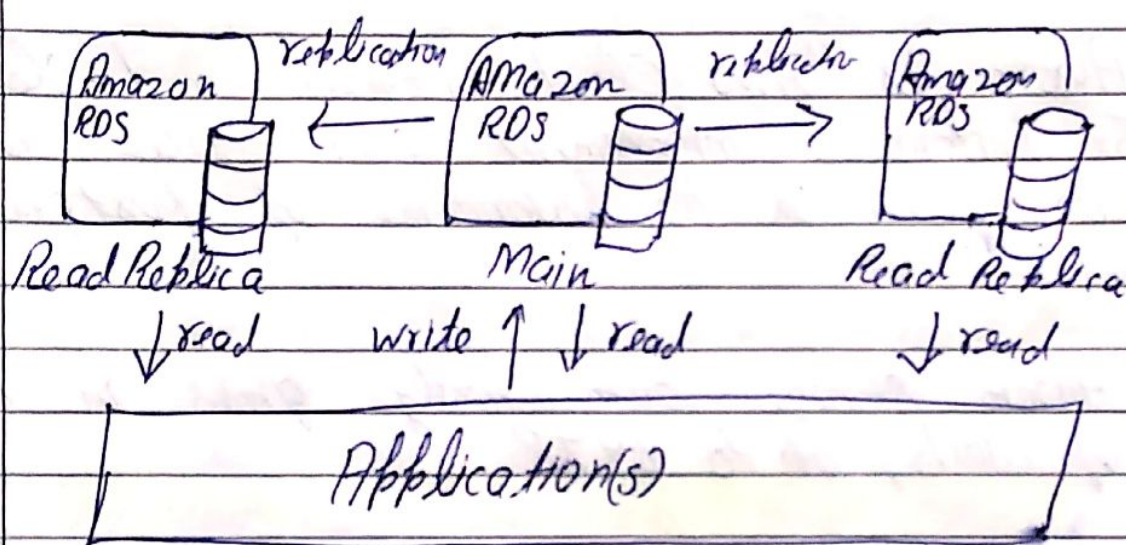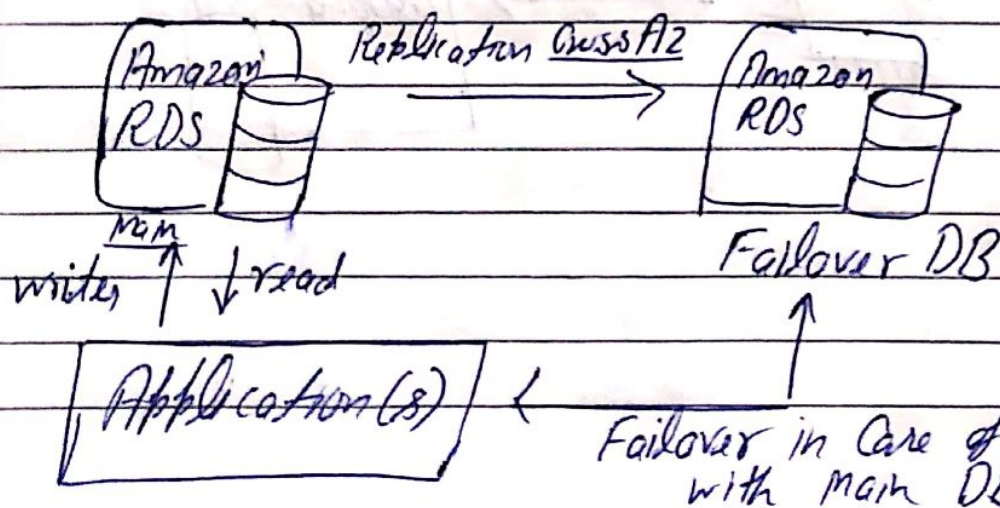
RDS Deployments : Read Replicas, Multi-AZ

- ## Read Replicas
  - Scale the read workload of your DB
  - Can create up to 5 Read Replicas.
  - Data is only written to the main DB.

Read Replica   Main   Read Replica
↓ read   write ↑ ↓ read   ↓ read

Application(s)

- ## Multi-AZ :
  - Failover in case of AZ outage (high availability)
  - Data is only read/write to the main database
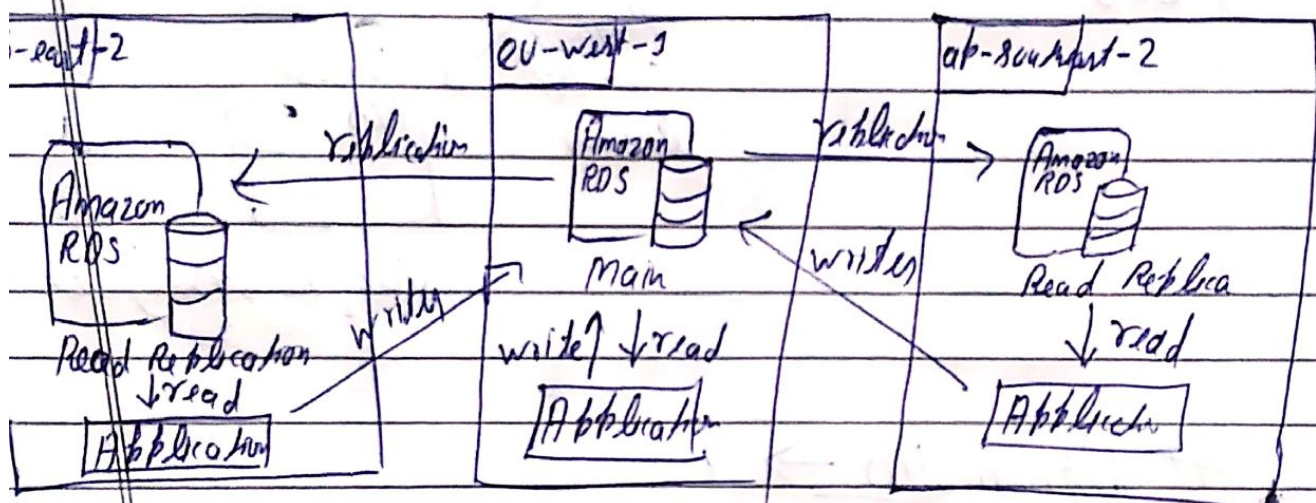 - Can only have 1 other AZ as failover

Main
write ↑ ↓ read   Failover DB

Application (s) ←   Failover in case of issues
                                with main DB

#RDS Deployments: Multi-Region
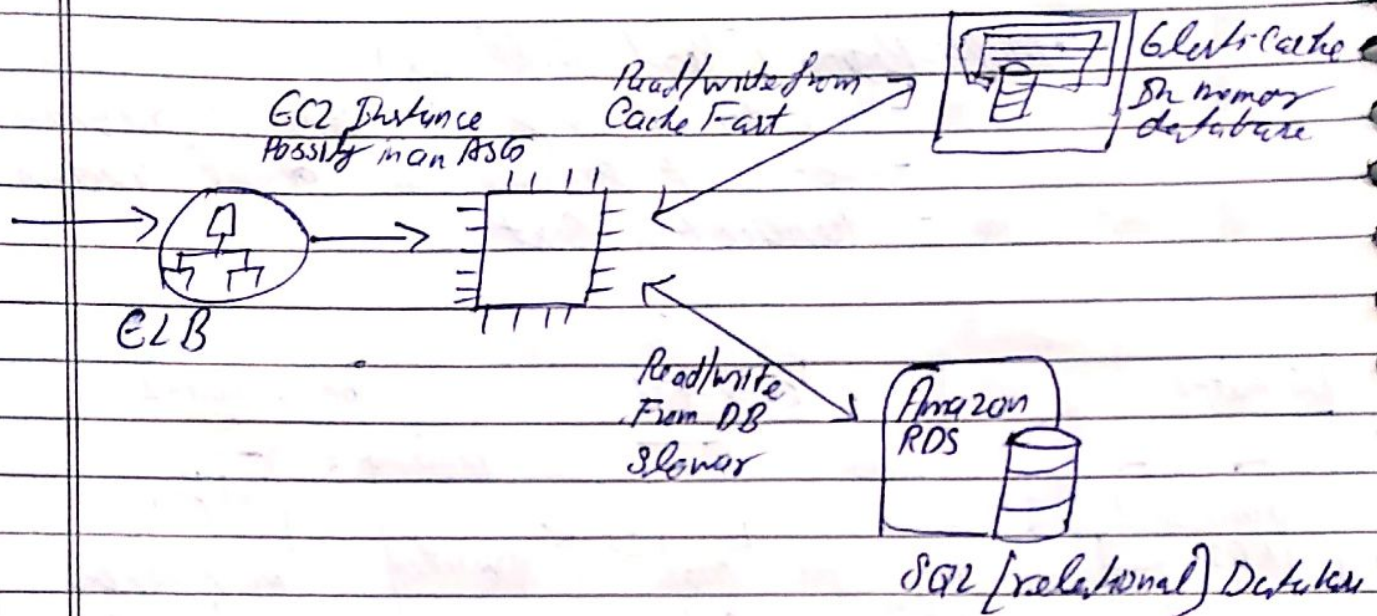
- Multi-Region (Read Replicas)
  - Disaster recovery in case of region issue.
  - Local performance for global reads
  - Replication cost

Amazon ElastiCache Overview

- The same way RDS is to get managed Relational Databases.
- ElastiCache is to get managed Redis or memcached
- Caches are in-memory databases with high performance, low latency
- Helps reduce of load off database for read intensive workloads.
- AWS takes care of OS maintenance/patching, optimization, setup Configuration, monitoring, failure recovery and backups

ElasticCache Solution Architecture - Cache

EC2 Instance
Possibly in an ASG

Read/write from
Cache Fast

ElastiCache
In memory
database

ELB

Read/write
from DB
Slower

Amazon
RDS

SQL (relational) Database

DynamoDB →

- Fully Managed Highly available with replication across 3 AZ

- NoSQL database - not a relations DB

- Scales to massive workloads, distributed "Serverless" database

- millions of request persecond, trillions of rows, 100s TB of storage

BKS

- Fast and Consistent in performance.
- Single-digit millisecond Latency - low latency retrieval.
- Integrated with IAM for security, authorisation and administration
- Low Cost and auto scaling capabilities
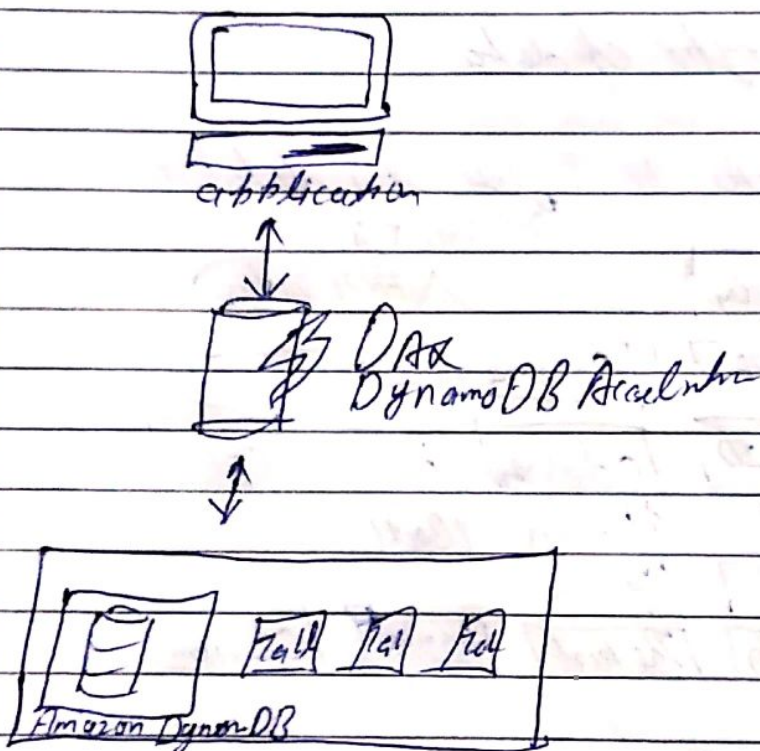
DynamoDB - type of data

Primary Key - DynamoDB is a keyvalue database

Products

Partitionkey, Sortkey   Attributes

Product I.D	TYPF	Schema is defined Perrtitionkey
1	Book ID	Odyssey | Homer | 1871
2	Album ID	Charist | Bach
2	Album ID: Track ID:	Partita No. 1
3	Movie ID	The kid | Drama Comedy | Chaplin

Dynamo DB Acceleration - DAX

- Fully Managed in-memory Cache for DynamoDB

- 10x performance improvement - Single-digit millisecond latency to microseconds latency - when accessing your DynamoDB tables

- Secure, highly scalable & highly available

- Difference with ElastiCache at the CCP level: DAX is only used for and is integrated with DynamoDB, while ElastiCache can be used for other databases

application

DAX
DynamoDB Accelerator

Amazon DynamoDB

Redshift Overview

OLTP
Online
Transaction
Processing

- Redshift is based on PostgresSQL, but it's not used for OLTP.
- It's OLAP - Online analytical processing (analytics & data warehousing)

BKS

- Load data once every hour, not every second

- 10x better performance than other data warehouses, scale to PBs of data.

- Columnar storage of data (insted of row based)

- Massive Parallel Query Execution (MPP), highly available

- Pay as you go based on the instance provisioned

- Has SQL interface for performing the queries

- BI tools such as AWS Quicksight or Tableau integrate with it

Amazon EMR

- EMR Stands for "Elastic Map Reduce"

- EMR Stands Helps creating Hadoop clusters (Big Data) to analyze and process vast amount of data

- The clusters can be made of hundreds of EC2 instances
- Also supports apache Spark, HBase, Presto, Flink ----

- EMR takes care of all provisioning & Configuration

- Auto-Scaling and integrated with Shot instances.

- Use Cases: data processing, machine learning, web indexing, big data

Athena

- Fully Serverless database with SQL Capabilities
- Used to query data in S3
- Pay per query
- Output results back to S3
- Secured through IAM

- Use Case: One-time SQL queries, serverless queries on S3, log analytics.

AMAZON Quick Sight

• Serverless machine learning-powered business intelligence service to create interactive dashboards

• Fast, automatically scalable, embeddable, with per-session pricing

- Use Cases
    - Business analytics
    - Building Visualizations
    - Perform adhoc analysis.
    - Get business insights using data

- Integrated with RDS, Aurora, Athena, Redshift, S3...