AWS Cloud Practitioner Training

Module 04
Storage and Databases

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Relational Database Service (RDS)

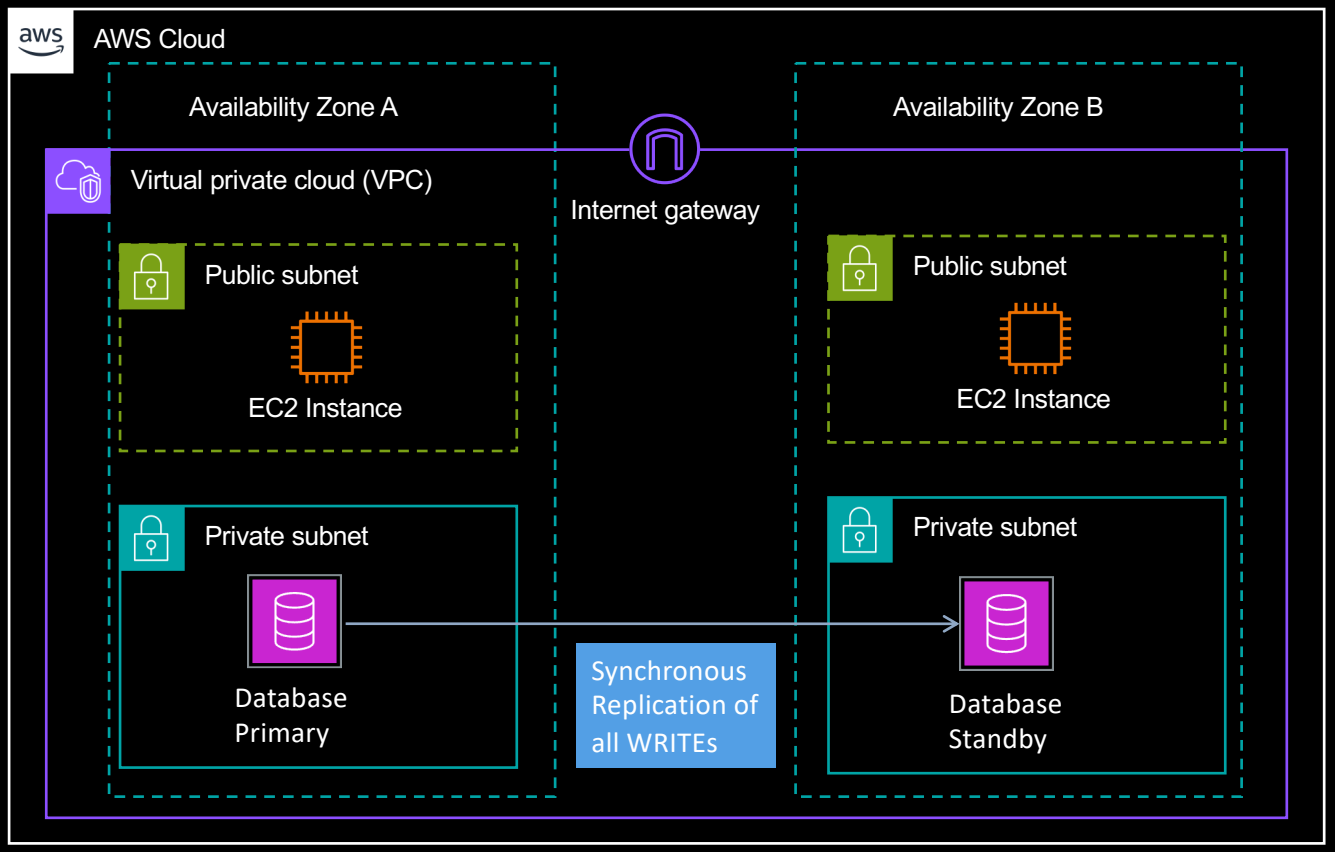
RDS

Relational Databases - MS SQL Server, MySQL, Postgresql, Oracle, Aurora and more.

Key Points

- Database in the cloud – have a multi-node resilient cluster up and running in minutes.
- These are the relational databases that you know and love – tables, indexes, foreign keys, integrity constraints, stored procedures – and access them using SQL queries.
- Support for:
  - Backup (snapshots) and Restore
  - Point in Time Restore
  - Maintenance Windows
  - Version Upgrades
  - Encryption
  - Multi-node clusters with Read Replicas (in other regions if desired)
- SUPERPOWER: RDS Service makes it easy to setup and maintain (upgrades, backups, restores, etc.)
- SUPERPOWER: The Aurora database type is relational database engineered for the cloud era – it's super scalable and high performing at a fraction of the cost of traditional commercial databases.

RDS Database resides in your VPC



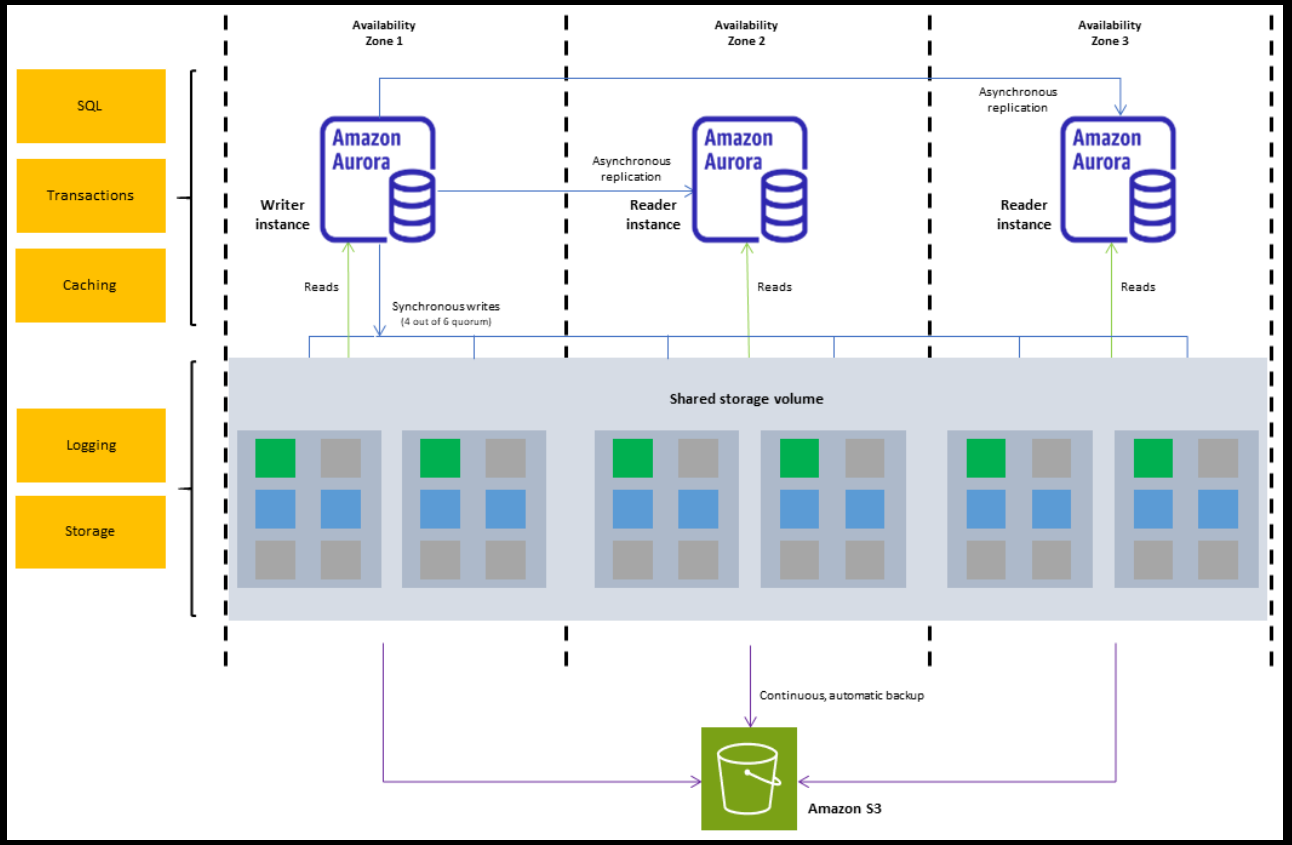
Why?

- Place them in PRIVATE subnets
- Your EC2 instances in other subnets can easily access them (don't forget Network ACLs and SGs!)
- This technology not intended to be accessed directly from the Internet!
- Standby will receive all updates over Synchronous replication (**Multi-AZ DB**)
- Read Replicas will receive updates via Asynchronous replication

NOTE: The Standby is in a DIFFERENT AZ - for availability!

Let’s create an Aurora Postgresql Serverless V2 database and run some SQL queries…

Amazon Aurora – Separation of Compute and Storage for extreme performance and scalability



- Compute is separate from the storage
- Storage spans 3 AZ and 2 copies of the data in each – 6 copies total
- You can have up to 15 Read Replicas for extreme read capacity
- Continuous backups to S3 for PITR – Point In Time Restore capability
- MySQL or Postgresql compatible with your existing application!

Secrets Manager

Password Vault

Securely store secret information like passwords and other confidential information

Key Points

- Password vault in the cloud
- A secrets (more than just passwords) management service that helps you protect access to your applications, services, and IT resources.
- Support for:
  - Integrated with other AWS services like RDS
  - Secrets are stored “encrypted at rest”
  - Supports automatic rotation (Change) of secrets on a scheduled basis
  - Granular permissions via IAM
- SUPERPOWER: The service can be configured to automatically change passwords on a schedule (Such as those for an RDS database)
- SUPERPOWER: Applications and services can retrieve the secrets on-demand over the network

DynamoDB

DynamoDB

A Non-relational (NoSQL) database – Internet scale and accessed as a WEB SERVICE.

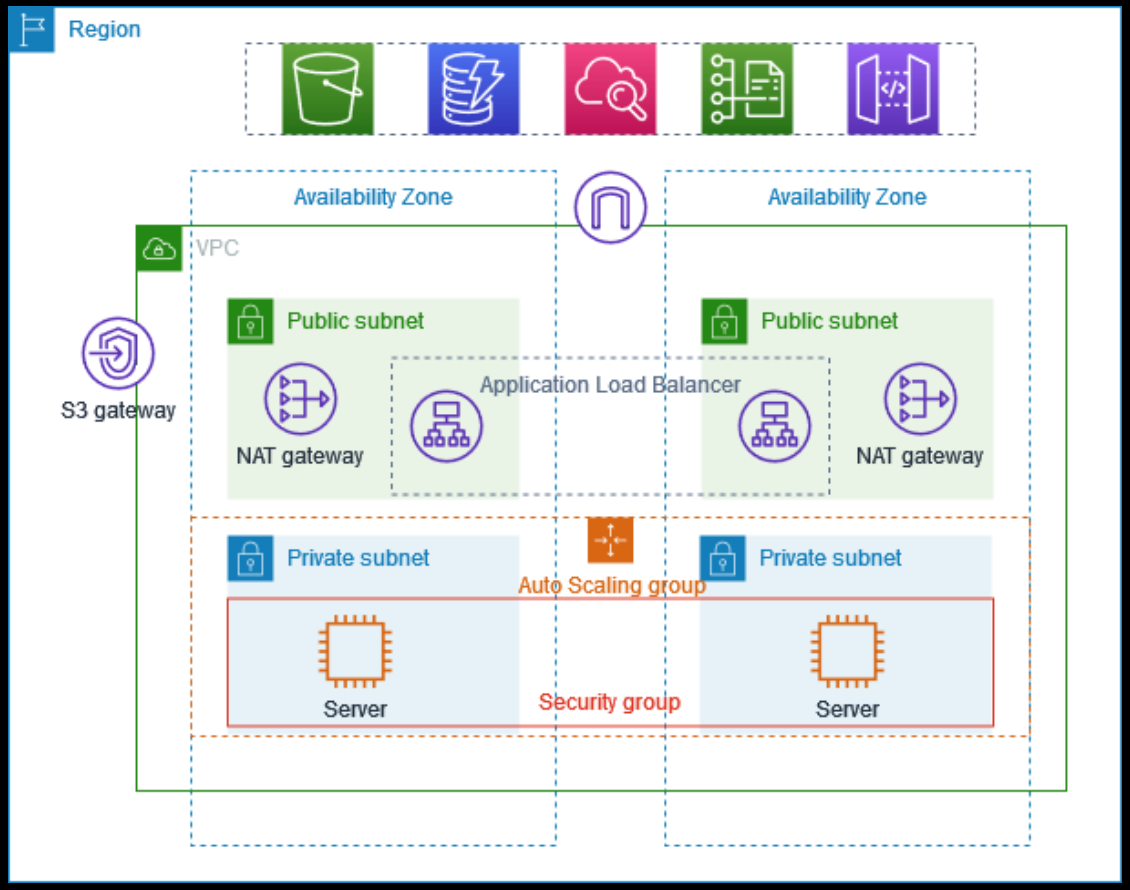
Key Points

- Based on Key/Value access pattern (Does that sound familiar?)
- No upper limit on table size or number of rows (called “Items” in DynamoDB)
- Massive, internet scale read/write throughput (if you need it)
- Significantly different than relational database. You don’t use SQL. DynamoDB has its own Application Programming Interface (API) with GETs, PUTs, QUERIES, SCANS. Accessed over the Internet as a WEB SERVICE.
- Originally invented for the Amazon.com Shopping Cart
- SUPERPOWER: Schema-less database – great for varied, diverse datasets and JSON
- SUPERPOWER: Single digit millisecond latency for GETs and PUTs (single Item access using a key) at any scale
- SUPERPOWER: Managed service using multiple AZs automatically. No upgrades or maintenance to deal with.

NOTE: Due to the extreme differences – migrating from Relational database to DynamoDB is a lot of work

Let’s create a DynamoDB Table to see how it is different than SQL databases…

DynamoDB – like S3 and EFS lives in the REGION, not your VPC



Many services such as DynamoDB, S3, EFS do not reside in your VPC. They reside in the region.

They are web services so you MUST have INTERNET access to connect to them (via Internet Gateway or NAT gateway)

OR

You must use a Gateway or Interface Endpoint to connect to them

- Relational Database Service (RDS): https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/Welcome.html
- A good SQL beginner tutorial: https://www.sqltutorial.org/
- Multi-AZ Database Instance: https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/Concepts.MultiAZSingleStandby.html
- AWS Secrets Manager User Guide: https://docs.aws.amazon.com/secretsmanager/latest/userguide/intro.html
- Amazon Aurora: https://docs.aws.amazon.com/AmazonRDS/latest/AuroraUserGuide/Aurora.Overview.html
- DynamoDB Developer Guide: https://docs.aws.amazon.com/amazondynamodb/latest/developerguide/Introduction.html#ddb-characteristics