AWS - 1

AWS Fundamentals – Part II

EBS Volumes, Load Balancing and Auto Scaling Groups

1

What's an EBS Volume?

- An EC2 machine loses its root volume (main drive) when it is manually terminated.
- Unexpected terminations might happen from time to time (AWS would email you)
- Sometimes, you need a way to store your instance data somewhere
- An EBS (Elastic Block Store) Volume is a network drive you can attach to your instances while they run
- It allows your instances to persist data

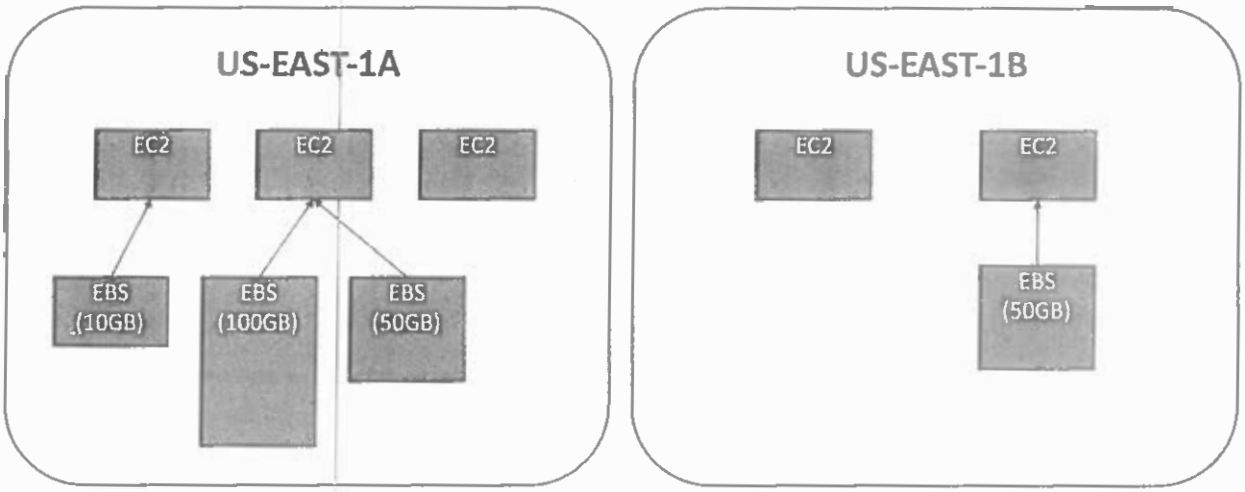
2

EBS Volume

- It's a network drive (i.e. not a physical drive)
  - It uses the network to communicate the instance, which means there might be a bit of latency
  - It can be detached from an EC2 instance and attached to another one quickly
- It's locked to an Availability Zone (AZ)
  - An EBS Volume in us-east-1a cannot be attached to us-east-1b
  - To move a volume across, you first need to snapshot it
- Have a provisioned capacity (size in GBs, and IOPS)
  - You get billed for all the provisioned capacity
  - You can increase the capacity of the drive over time

3

EBS Volume Example



4

EBS Volume Types

- EBS Volumes come in 4 types
  - GP2 (SSD): General purpose SSD volume that balances price and performance for a wide variety of workloads
  - IO1 (SSD): Highest-performance SSD volume for mission-critical low-latency or high- throughput workloads
  - ST1 (HDD): Low cost HDD volume designed for frequently accessed, throughput- intensive workloads
  - SC1 (HDD): Lowest cost HDD volume designed for less frequently accessed workloads
- EBS Volumes are characterized in Size | Throughput | IOPS
- When in doubt always consult the AWS documentation – it's good!

5

EBS Volume Resizing

- You can resize the EBS volumes
- You can only increase the EBS volumes:
  - Size (any volume type)
  - IOPS (only in IO1)
- After resizing an EBS volume, you need to repartition your drive

6

EBS Snapshots

- EBS Volumes can be backed up using "snapshots"
- Snapshots only take the actual space of the blocks on the volume
- If you snapshot a 100GB drive that only has 5 GB of data, then your EBS snapshot will only be 5GB
- Snapshots are used for:
  - Backups: ensuring you can save your data in case of catastrophe
  - Volume migration:
    - Resizing a volume down
    - Changing the volume type
    - Encrypt a volume

7

EBS Encryption

- When you create an encrypted EBS volume, you get the following:
  - Data at rest is encrypted inside the volume
  - All the data in flight moving between the instance and the volume is encrypted
  - All snapshots are encrypted
  - All volumes created from the snapshot
- Encryption and decryption are handled transparently (you have nothing to do)
- Encryption has a minimal impact on latency
- EBS Encryption leverages keys from KMS (AES-256)
- Copying an unencrypted snapshot allows encryption

8

EBS vs Instance Store

- Some instance do not come with Root EBS volumes
- Instead, they come with "Instance Store".
- Instance store is physically attached to the machine
- Pros:
  - Better I/O performance
- Cons:
  - On termination, the instance store is lost
  - You can't resize the instance store
  - Backups must be operated by the user
- Overall, EBS-backed instances should fit most applications workloads

9

EBS Brain Dump

- EBS can be attached to only one instance at a time
- EBS are locked at the AZ level
- Migrating an EBS volume across AZ means first backing it up (snapshot), then recreating it in the other AZ
- EBS backups use IO and you shouldn't run them while your application is handling a lot of traffic
- Root EBS Volumes of instances get terminated by default if the EC2 instance gets terminated. (you can disable that)

10