EC2 Instance Storage Section

EBS Volume :→

→ 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, even after their termination.

→ They can be mounted to one instance at a time (at the CCP level)

→ They are bound to a specific availability zone.

Analogy: Think of them as a "network USB Stick".

Free tier: 30 GB of free EBS storage of type General purpose (SSD)* or Magnetic per month.

EBS Volume :-

→ It's a network drive (i.e not physical drive)
→ It uses ~~latency~~ network to communicate the instance, which means there might be a bit of latency.
→ It can be detached from an EC2 instance & attached to another one quickly.

- It's locked to an availability zone (AZ)
  → An EBS volume in us-east-1 a cannot be attached to us-east-1b
  → To move a vol. across, you first need to snapshot it.

- Have a provisioned capacity (size in GBs, IOPS)
  → You get billed for all the provisioned capacity.
  → You can increase the capacity of the drive over time.

Imp for exam

EBS - Delete on Termination attribute

→ Controls the EBS behaviour when an EC2 instance terminates

- Bydefault, the root EBS volume is deleted. (attribute enabled)
- Bd Bydefault, any other attached EBS volume is not deleted (attribute disabled)

→ This can be controlled by AWS Console/ AWS CLI

→ Use Cases: preserve root volume when instance is terminated

(New Update)

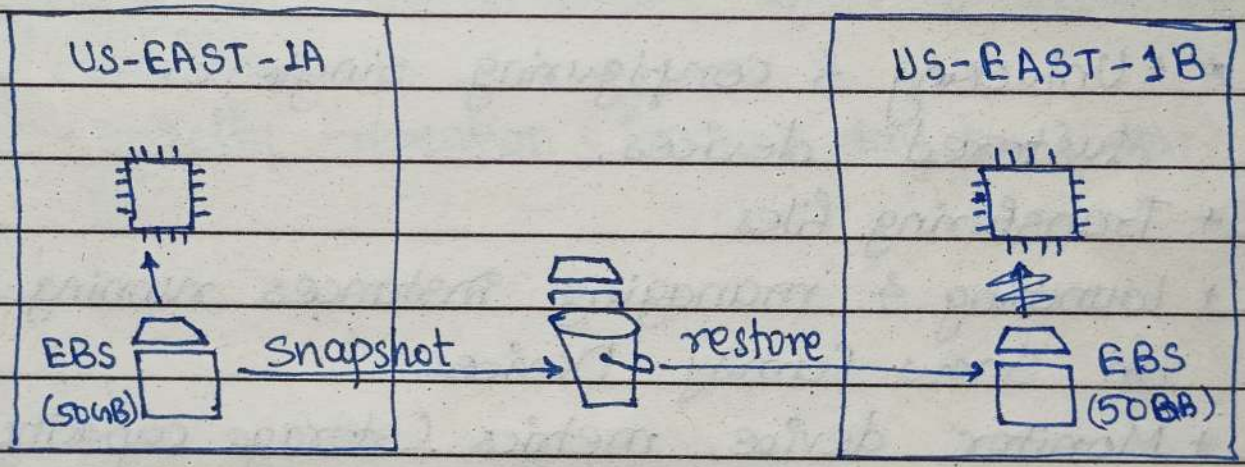
we have EBS Multi-Attach using which we can attach EBS volume to multiple instances for io1 and io2 volume.

EBS Snapshots

→ Make a backup (snapshot) of your EBS volume at any point in time.

→ Not necessary to detach volume to do snapshot, but recommended.

→ Can copy snapshots across AZ or Region.



EBS Snapshot

and once, restoration is done we can again attach EBS Vol to instance.

EBS Snapshots Features

① EBS Snapshot Archive

- Move a Snapshot to an "archiere tier" that is 75% cheaper.
- Takes within 24 to 72 hours for restoring the archieve.

② Recycle Bin for EBS Snapshots

- setup rules to retain deleted snapshots so you can recover them after an accidental deletion.
- Specify retention (from 1 day to 1 year)

AMI Overview

- AMI = Amazon Machine Image

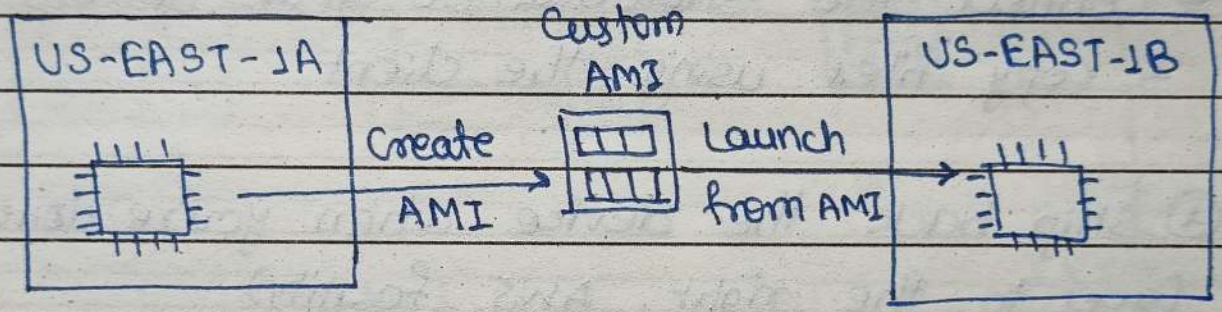
- AMI are a customization of an EC2 instance
  - You add your own software, configuration, operating system, monitoring.....
  - Faster boot / configuration time because all your software is pre-packaged.

- AMI build for a ~~spefi~~ specific region (and can be copied across regions)

- You can launch EC2 instance from:
  - A public AMI: AWS provided.
  - Your own AMI: You make & maintain them yourself.
  - An AWS Marketplace AMI: an AMI someone else made (& potentially sells)

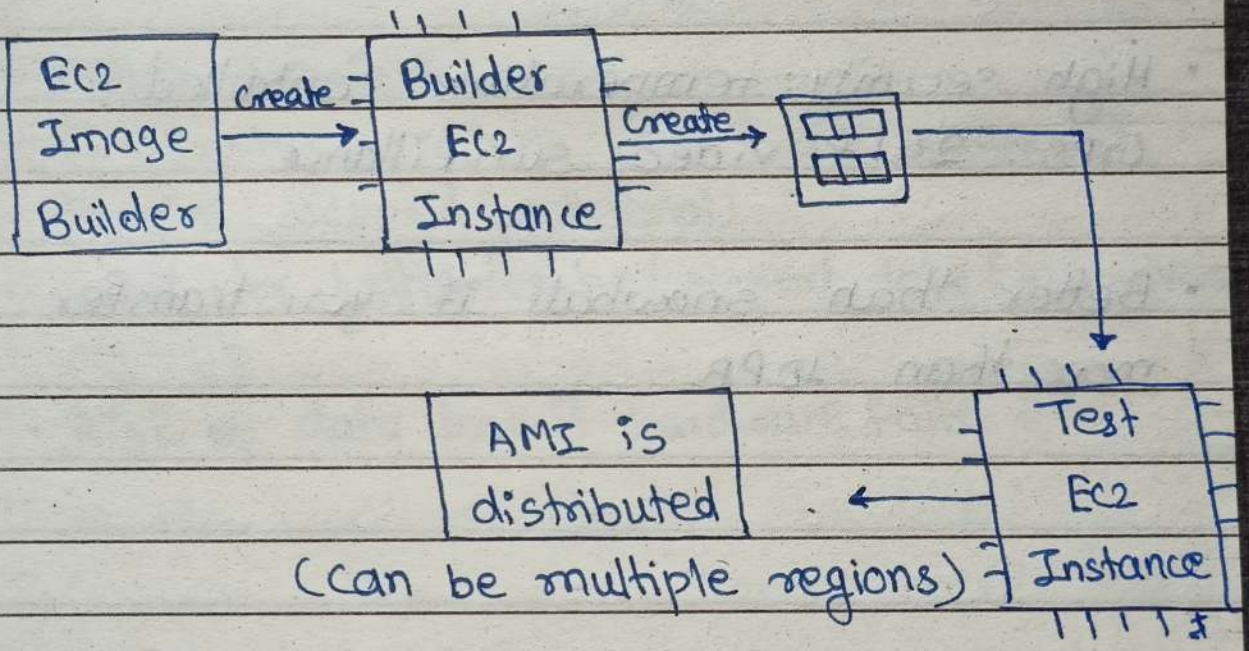
AMI Process (from an EC2 instance)

1. Start an EC2 instance and customize it.
2. Stop the instance (for data integrity)
3. Build an AMI - this will also create EBS Snapshot.
4. Launch instances from other AMIs.



EC2 Image Builder

- Use to automate the creation of Virtual Machines or container images.
  - Automate the creation, maintain, validate & test EC2 AMIs.
  - free service (only pay for the underlying resour



*Builder EC2 Instance :- Build components applied (customize software on instance)

* Test EC2 Instance :- The Test suite is run (is the AMI working, secure ?)

EC2 Instance Store

- EBS Volumes are network drives with good but "limited" performance.

- If you need a high-performance hardware disk, use, EC2 Instance Store.

- Better I/O Performance.
- EC2 Instance Store lose their storage if they're stopped (ephemral)
- Good for buffer/cache/scratch data/temporary content.
- Risk of data loss if hardware fails.

EFS - Elastic File System

- Managed NFS (Network File System) that can be mounted on 100s of EC2 instance.
- EFS works with Linux EC2 instances in multi-AZ.
- Highly available, scalable, expensive (3x gp2), pay per use, no capacity planning.

EFS Infrequent Access (EFS-IA)

→ Storage class that is cost-optimized for files not access everyday.

→ upto 92% lower cost compared to Efs standard.

- EFS will be automatically moved to your files to EFS-IA based on the last time they were ~~used~~ accessed.

- Enable EFS-IA with lifecycle policy.

- Eg:- move files that are not accessed for 60 days to EFS-IA.

- Transparent to the applications accessing EFS

Amazon FSx - Overview

- Launched 3rd party high-performance file systems on AWS.
- Fully managed services.

① FSx for lustre
② FSx for windows File Server
③ FSx for NetApp ONTAP

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① FSx for Windows File Server

→ A fully managed, highly reliable, and scalable Windows native shared file system.
→ Built on Windows file server
→ Supports SMB protocol & Windows NTFS.
→ Integrated with Microsoft Active Directory.
→ Can be accessed from AWS or your on-premise infrastructure.

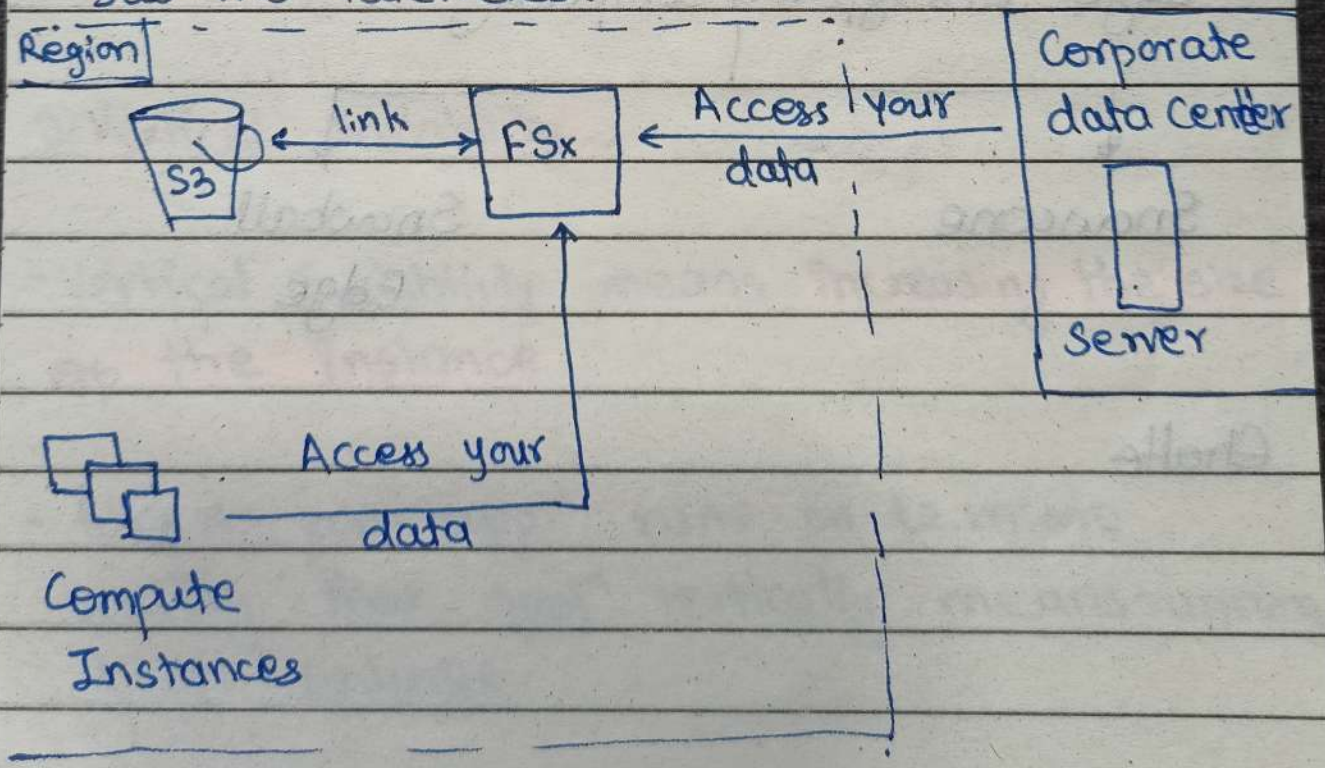
② Amazon FSx for Lustre

→ A fully managed, high-performance, scalable file storage for **High Performance Computing (HPC)**.

→ The name **Lustre** is derived from "**Linux**" and "**Cluster**".

→ Machine Learning, Analytics, Video Processing, Financial Modeling,.....

→ Scales up to 100s GB/s, millions of IOPS, sub-ms latencies.



Shared Responsibility for EC2 Storage

① AWS :- Infrastructure
② Replication for data for EBS volumes & EFS drives
③ Replacing faulty hardware.
④ Ensuring there ~~are~~ employees cannot access your data.

User :-
→ Setting up backup / snapshot procedures
② setting up data encryption
③ ~~se~~Responsibility of any data on the drives.
④ Understanding the risk of using EC2 Instance store.

EC2 Instance Storage - Summary

① EBS Volumes :- Network drives attached to one EC2 instance at a time.
- Mapped to an Availability Zones.
- Can use EBS Snapshots for backups/ transferring EBS Volumes across AZ.

② AMI :- Create ready-to-use EC2 instances with our customizations.

③ EC2 Image Builder :- automatically build, test & distribute AMIs.

④ EC2 Instance Store :- High Performance hardware disk attached to our EC2 instance.
- Lost if our instance is stopped/terminated.

⑤ EFS :- network file system, can be attached to 100s of instances in a region.

⑥ EFS-IA :- Cost-optimized storage class for infrequent accessed files

⑦ FSx for Windows :- Network File System for windows servers.

⑧ FSx for Lustre :- High Performance Computing Linux file system.