EC2 Instance Storage

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1 EBS

- Elastic Block Store
- Network drive you can attach to your instances while they run
- allows your instances to persist data, even after their termination
- only mounted to one instance at a time, bound to a specific AZ
- Like a network USB stick
- uses the network to communicate the instance, which means there might be a bit of latency
- can be de-attached and re-attached quickly
- provisioned capacity
- Delete on termination attribute - controls the EBS behavior when an EC2 instance terminates
  - by default the root EBS volume is deleted
  - for other volumes, it is not enabled

1.1 EBS Snapshots

- make a backup (snapshot) of your EBS volume at a point in time
- recommended to de-attach volume first
- can copy snapshots across AZ or region

1.2 EBS Volume Types

- 6 types
  - gp2/gp3 (SSD) - general purpose volume, can be used as boot volume
  - io1/io2 (SSD) - high performance (mission critical), can be used as boot volume
  - st1 (HDD) - low cost, designed for frequently accessed, throughput-intensive workloads
  - sc1 (HDD) - lowest cost, less frequently accessed workloads
- characterized in size, throughput, IOPS (i/o ops per sec)
- Provisioned IOPS (PIOPS) - for business critical apps with sustained IOPS performance

1.3 EBS Multi Attach

- Attach the same EBS volume to multiple EC2 instances in the same AZ
- Achieve higher application availability in clustered linux apps (ex: teradata)

1.4 EBS Encryption

- Data at rest is encrypted inside the volume
- Data in flight moving between the instance and volume is encrypted
- All snapshots are encrypted
- To encrypt an unencrypted EBS volume:
  - Create snapshot
  - encrypt the snapshot
  - Create new EBS volume from that snapshot
  - attach it to the original instance

1.5 EBS RAID

- used if you want to massively increase IOPS or mirror your EBS volumes
- Options: RAID0 and 1, 5/6 (not recommended for EBS)
- RAID0 - increase performance. combine 2 or more volumes and getting the total disk space and I/O. If disk fails all the data is failed.
- RAID1 - increase fault tolerance. mirror a volume to another.

2 AMI

- amazon machine image, customization of an EC2 instance
- faster boot/config time because all your software is pre-packaged
- built for a specific region (and can be copied)
- public AMI - maintained by AWS, your own AMI, or AMI marketplace
- build AMI - will create EBS snapshots

3 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
- Its a physical drive attached to the server
- Lose their storage if they're stopped
- Good for buffer/cache/scratch data/temp content. Not for long term storage
- Risk of data loss if hardware fails

4 EFS

- Elastic File system
- Managed NFS (network file system) that can be mounted on many EC2
- works with EC2 instances in multi AZ
- pay per use
- attach SG to EFS, then mount 1 or more ec2 instances. each instance has access to the same data
- use cases: content mgmt, web serving, data sharing, wordpress
- file system scales automatically
- Performance mode: higher latency, throughput, highly parallel
- Throughput mode: bursting, provisioned - set your throughput regardless of storage size
- Storage tiers: lifecycle mgmt feature - move file after N days, generally for frequently accessed files

5 EFS vs EBS

- EBS
  - can be attached to only 1 instance at a time
  - locked at the AZ level
  - root EBS volumes get terminated by default
  - network volume
- EFS
  - mounted to several EC2 instances, only on linux instances
  - more expensive, but you only get billed for what you use
  - network file system