EC2 Fundamental

- Basics
- Bootstrapping and EC2 user data
- Security Groups and Classic Ports
- Connect to EC2 and Instance Roles
- Elastic Block Store (EBS)
- EC2 Instance store
- Elastic File System (EFS)

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Basics of EC2

- EC2 = Elastic Compute Cloud = Infrastructure as a Service (most famous service of AWS)
- It mainly consists in the capability of Renting virtual machines (EC2), Storing data on Virtual servers, Distribute load across machines and Scaling the services using Auto-scaling group.
- EC2 sizing and configuration options:
  - Operating systems: Windows, Linux or Max OS
  - CPU, RAM
  - Storage: Network-attached (EBS or EFS) and Hardware (EC2 Instance store)
  - Network card: speed of the card, Public IP address
  - Firewall rules : security group
  - Bootstrap script


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EC2 Userdata

- Bootstrapping our instances using EC2 user data script.
- Bootstrapping means launching commands when the machine starts.
- The script only runs once when the server start for the first.
- EC2 user data script runs with root level permissions
- EC2 user data is used for:
  - Installing dependencies or updates
  - Updates


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EC2 Types

- ***https://aws.amazon.com/ec2/instance-types/***
- Name: m5.2xlarge
  - m: instance class
  - 5: generation
  - 2xlarge: size within the instance class (more the size more the CPU and RAM)
- Types of instances are: general purpose, compute optimized, memory optimized, accelerated computing, storage optimized and HPC optimized.

Security Groups and Classic Ports

- Security groups control how to allow traffic from inside and outside of the instance.
- They only contain the allow rules and live outside the EC2.
- Security group can reference IP addresses or another security group.
- They work as a firewall on EC2 instance, and regulate: access to ports, authorised IP ranges, Control on inbound and outbound network.
- Can be attached to mutiple instances, and are locked down to a region/VPC combination.
- All inbound traffic is blocked by default. All outbound traffic is authorised by default.
- PORT TO KNOW:
  - 22 = SSH(Secure Shell), 21 = FTP(File Transfer Protocol), 80 = HTTP, 443 = HTTPS, 3389 = RDP(Remote Desktop Protocol)


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Connect to EC2 and Instance Roles

- SSH - Putty
- Instance Connect
- You can add an instance profile role on your instance in order to give it permissions.


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Elastic Block Store (EBS)

- EBS (Elastic Block Store) Volume is a network drive you can attach to your instance.
- It allows your instances to persist data, even after their termination.
- They can be mounted to 1 instance at a time in a single AZ. Have a provisioned capacity.
- You can check mark the Delete on termination, if you want your EBS volume to be terminated once the instance terminates.
- **EBS Snapshots**
  - Make a backup of your EBS volume at a point in time. Not necessary to detach volume to do snapshot, and can be copied to another AZ.
  - Features:
    - *EBS Snapshot Archive* - Move a Snapshot to an “archive tier” that is 75% cheaper. Takes within 24 to 72 hours for returning the archive.
    - *Recycle Bin for EBS Snapshots -* Setup rules to retain deleted snapshot(1 day to 1 year)
    - *Fast Snapshot Restore(FSR)* - Force full initialization of snapshot to have no latency($$$)

Elastic Block Store (EBS)

- **EBS Multi-Attach**
  - Attach the same EBS volume to multiple EC2 instances in the same AZ.
  - Each instance has full read and write permissions to the high-performance volume.
  - Up to 16 instances at a time.
  - Use case:
    - Achieve higher application availability in clustered Linux application.
    - Application must manage concurrent write operations.

EC2 Instance store

- 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. Good for buffer / cache/ scratch data / temporary content.
- Risk if data loss if hardware fails. Backups and replication are your responsibility.


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Elastic File System (EFS)

- Managed EFS (Network File System) that can be mounted on EC2. EFS works with EC2 instances in multi-AZ.
- High available, scalable, 3x expensive then EBS, pay per use. Uses NFSv4.1 protocol.
- Uses security group to control access to EFS. Compatible with Linux based AMI (not windows). Encryption at rest using KMS.
- EFS scale automatically, no capacity planning
- Use case: content management, web serving, data sharing, word press
- Mutiple storage classes are available: EFS scale, Performance Mode and Throughput Mode.


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MCQ

You have just terminated an EC2 instance in us-east-1a, and its attached EBS volume is now available. Your teammate tries to attach it to an EC2 instance in us-east-1b but he can't. What is a possible cause for this?

A. Missing IAM Permissions
B. EBS volumes are locked to a single region
C. EBS volumes are locked to a single availability zone


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MCQ

What is EBS Multi-Attach?

A. Attach the same EBS volume to multiple EC2 instances in multiple AZs
B. Attach multiple EBS volumes in the same AZ to the same EC2 instance
C. Attach the same EBS volume to multiple EC2 instances in the same AZ
D. Attach multiple EBS volumes in multiple AZs to the same EC2 instance

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MCQ

You have a fleet of EC2 instances distributes across AZs that process a large data set. What do you recommend to make the same data to be accessible as an NFS drive to all of your EC2 instances?

A. Use EBS
B. Use EFS
C. Use an Instance Store


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MCQ

What should you use to control traffic in and out of EC2 instances?

A. Network Access Controdl List (NACL)
B. Security Groups
C. IAM Policies


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