Short interview questions on Amazon EBS

◆ **Amazon EBS (Elastic Block Store)**

1. **What is Amazon EBS, and how does it differ from Instance Store?**
   Amazon EBS provides persistent block storage for EC2 instances, retaining data after instance termination. In contrast, Instance Store offers temporary storage that is lost when the instance stops or terminates.

2. **List and describe the different types of EBS volumes.**

Here are the different types of EBS volumes:

- **General Purpose SSD (gp3):** Balances price and performance for a wide variety of workloads; adjustable IOPS and throughput.
- **General Purpose SSD (gp2):** Previous generation, performance scales with size; good for boot volumes and general use.
- **Provisioned IOPS SSD (io2 Block Express):** Highest performance and durability for critical, latency-sensitive applications; very high IOPS and throughput.
- **Provisioned IOPS SSD (io1):** High performance for demanding transactional workloads requiring sustained IOPS.
- **Throughput Optimized HDD (st1):** Low-cost HDD for frequently accessed, throughput-intensive workloads like big data.
- **Cold HDD (sc1):** Lowest-cost HDD for infrequently accessed data like archives; throughput-oriented.
- **Magnetic (standard):** Previous generation, lowest cost and performance; for infrequent access.

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3. **How do you resize an EBS volume without downtime?**

In Amazon EC2, both root and additional EBS volumes attached to an instance can be modified, with some conditions.

✅ You can modify:

1. **Root Volume** (the volume where the OS is installed)

2. **Additional (Secondary) EBS Volumes**

✅ What can you modify:

- **Size** (increase only)

- **Volume type** (e.g., gp2 to gp3)

- **IOPS** (if applicable)

- **Throughput** (for certain types like gp3)

⚠️ Important notes:

- **You cannot decrease** the size of an EBS volume directly.

- For root volumes:

  - Modification is **supported while the instance is running** (hot modification).

  - After increasing size, you may need to **resize the partition and file system** within the OS (e.g., using `resize2fs`, `xfs_growfs`).

- For secondary volumes:

  - Same modification rules apply as root.

Here's how to resize an **EBS volume without downtime**, step by step:

- ✅ **Step 1: Modify the EBS volume**

  - Go to AWS Console → EC2 → Volumes.

  - Select the volume.

  - Click **Actions → Modify Volume**.

  - Increase the **Size** (keep type the same unless needed).

  - Click **Modify → Yes** to confirm.

- ✅ **Step 2: Wait for optimization**

- Volume enters **modifying** state.

- You can use it during this time.

- Wait till status is **available**.

- ✅ **Step 3: Resize partition (Linux)**

  - Connect to the instance via SSH.

  - Use `lsblk` to check device name (e.g., `/dev/xvda`).

  - Run `sudo growpart /dev/xvda 1` (if root partition is xvda1).

- ✅ **Step 4: Resize filesystem**

  - If using ext4: `sudo resize2fs /dev/xvda1`

  - If using XFS: `sudo xfs_growfs -d /`

- ✅ **Step 5: Confirm**

  - Run `df -h` to verify new disk size.

4.

5. **Explain the process of creating and restoring EBS snapshots.**
   Use AWS Console or CLI to create a snapshot of an EBS volume. To restore, create a new volume from the snapshot and attach it to an instance.

✅ To Create an EBS Snapshot

- **Step 1: Go to EC2 Console**

  - Navigate to **Volumes** under **Elastic Block Store**.

- **Step 2: Select the volume**

  - Choose the volume you want to back up.

- **Step 3: Create snapshot**

  - Click **Actions → Create Snapshot**.

  - Add a **name** and **description**.

  - Click **Create Snapshot**.

- **Step 4: Monitor snapshot**

  - Go to **Snapshots** tab.

  - Wait for **status: completed**.

✅ To Restore from EBS Snapshot

- **Step 1: Go to Snapshots**

- Select the desired snapshot.

- **Step 2: Create volume from snapshot**

  - Click **Actions → Create Volume**.

  - Choose **Availability Zone** where your instance is.

  - Adjust size/type if needed.

  - Click **Create Volume**.

- **Step 3: Attach volume to instance**

  - Go to **Volumes**, select the new volume.

  - Click **Actions → Attach Volume**.

  - Choose instance and device name (e.g., `/dev/sdf`).

- **Step 4: Mount the volume (Linux)**

  - SSH into instance.

  - Use `lsblk` to find new volume.

  - Create mount point: `sudo mkdir /mnt/data`

  - Mount: `sudo mount /dev/xvdf1 /mnt/data` (adjust device name as per lsblk)

6. **How does EBS encryption work, and what are its benefits?**
   EBS encryption uses AWS KMS to encrypt data at rest, in transit, and during snapshots, enhancing data security.

✅ How EBS Encryption Works

- Uses **AWS KMS (Key Management Service)** for encryption keys.

- Encrypts **data at rest**, **data in transit**, and **snapshots**.

- Encryption is handled **automatically by AWS**.

- Works on both **root** and **data** volumes.

- **Keys can be AWS-managed** or **customer-managed (CMK)**.

✅ Benefits of EBS Encryption

- ✓ **Improved data security** – protects data from unauthorized access.

- ✓ **No performance impact** – same IOPS and throughput.

- ✓ **Automatic encryption of snapshots and volumes** created from encrypted volumes.

- ✓ **Simplifies compliance** with standards like HIPAA, GDPR.

- ✓ **Integrated with IAM** – controls who can use or manage keys.

- ✓ **Supports copy and sharing** with re-encryption using new keys.

7. **Can you attach a single EBS volume to multiple EC2 instances? Why or why not?**
   Generally, no. EBS volumes are designed for single-instance attachment to prevent data inconsistency.

8. **What steps would you take to improve EBS performance for a high-throughput application?**
   Choose appropriate volume types (e.g., io2), provision sufficient IOPS, and consider RAID configurations if necessary.

9. **How do you monitor EBS volume performance metrics?**
   Use Amazon CloudWatch to track metrics like IOPS, throughput, and latency.

10. **What are the best practices for backing up data stored on EBS volumes?**
    Regularly create snapshots, automate backups, and store snapshots in different regions for disaster recovery.

How can you typically resize an existing EBS volume attached to an EC2 instance without requiring downtime for the application running on the instance?

a) Detach the volume, modify its size, and reattach it.

b) Stop the EC2 instance, modify the volume size, and start the instance.

c) Modify the volume size using the AWS Console or CLI, and then extend the file system within the operating system on the EC2 instance.

d) Create a new, larger volume, copy the data from the old volume to the new one, and then swap the volumes.

Answer: c) Modify the volume size using the AWS Console or CLI, and then extend the file system within the operating system on the EC2 instance. *Explanation: This method allows the volume size to be increased while the instance is running, followed by updating the file system to recognize the new space.*

Restoring EBS Volumes from Snapshots

You have an EBS snapshot and need to restore the data to an EC2 instance. What is the standard process for restoring an EBS volume from a snapshot?

a) You can directly attach the snapshot to an EC2 instance and boot from it.

b) You must first convert the snapshot into an AMI, then launch a new instance from that AMI.

c) You create a new EBS volume from the snapshot and then attach that new volume to an EC2 instance.

d) Snapshots are only used for creating new AMIs, not for restoring data to existing volumes.

Answer: c) You create a new EBS volume from the snapshot and then attach that new volume to an EC2 instance. *Explanation: An EBS snapshot is a point-in-time backup. To use the data, you must create a fully hydrated volume from the snapshot, which can then be attached to an instance.*