



TrainerTests
.com

This study guide demonstrates the lesson from *Block Storage (EBS and Instance Store)*.

My full AWS Architect Associate course can be found here:

<https://www.udemy.com/course/ultimateaws/?referralCode=7ED214B795C444141361>

Understanding and Configuring Amazon EBS Volumes Study Guide

In this lesson, we will explore Amazon Elastic Block Store (EBS), the primary block storage option used with Amazon EC2 instances. EBS volumes play a crucial role in storing operating systems, applications, and data for virtual machines in the AWS cloud. This lesson will also cover the various EBS volume types, their use cases, performance characteristics, and how to configure them effectively.

What is an EBS Volume?

Amazon Elastic Block Store (EBS) is a scalable, high-performance block storage service designed for use with EC2 instances. EBS volumes provide persistent storage, meaning they retain data even after an EC2 instance is stopped or terminated.

Key Characteristics of EBS:

1. **Block Storage:** Functions like a physical disk (e.g., SSD or HDD) that your operating system interacts with.
 2. **Direct Access:** EBS volumes are attached to EC2 instances, allowing fast and low-latency access to the data.
 3. **Persistence:** Unlike ephemeral storage, EBS volumes are durable and retain data independently of the EC2 instance lifecycle.
-

Configuring Storage for an EC2 Instance

When launching an EC2 instance, the **Configure Storage** section allows you to set up the EBS volume for that instance. You can specify:

- **Size:** Define the storage capacity required for your workloads.
 - **Volume Type:** Choose from different storage performance levels (e.g., General Purpose SSD or Provisioned IOPS).
-

EBS Volume Types

EBS offers several volume types to meet varying performance and cost needs. Below are the key options:

1. General Purpose SSD (gp3 and gp2)

- **Purpose:** Ideal for a wide range of workloads, such as boot volumes, medium-sized databases, and development/test environments.
- **Characteristics:**
 - **gp3:** Latest generation offering better performance at a lower cost.
 - Price: \$0.08 per GB per month.
 - Performance: 3,000 IOPS baseline and scalable up to 16,000 IOPS.
 - **gp2:** Older generation, more expensive (\$0.10 per GB per month).
 - Performance scales with size, up to 16,000 IOPS.
- **Recommendation:** Use **gp3** for most general-purpose workloads.

2. Provisioned IOPS SSD (io1 and io2)

- **Purpose:** Designed for latency-sensitive and high-performance applications like large databases or analytics workloads.
- **Characteristics:**
 - Provision predictable IOPS levels.
 - High throughput, but significantly more expensive than gp3 or gp2.
- **When to Use:** Select this option for critical workloads requiring consistent high performance.

3. Hard Disk Drive (HDD) Options

- **Purpose:** Best for infrequent access or massive datasets where cost is a primary concern.
 - **Types:**
 - **Cold HDD (sc1):** For data accessed rarely, such as backups or archives.
 - **Throughput Optimized HDD (st1):** For streaming workloads like big data or log processing.
 - **Limitations:**
 - HDD volumes cannot be used as root volumes in most cases.
 - Lower performance compared to SSD options.
 - **Recommendation:** Use HDD only for large, cold data that doesn't require high IOPS.
-

Comparing EBS with Other AWS Storage Options

While EBS is the default choice for EC2 instances, it is not always the best option for every workload. Consider alternatives:

1. **Amazon S3:** For object storage of large datasets, backups, or archives.
 2. **Amazon EFS:** For shared file storage across multiple instances, suitable for applications requiring POSIX compliance.
-

Key Considerations When Configuring EBS

When selecting and configuring an EBS volume, consider the following factors:

1. **Performance Needs:**
 - Use gp3 for general-purpose workloads.
 - Choose io1/io2 for high-performance applications.
 2. **Cost Optimization:**
 - Avoid over-provisioning storage to save costs.
 - Opt for gp3 instead of gp2 to reduce expenses.
 3. **Volume Size:**
 - Ensure the volume is large enough for the operating system, applications, and expected data growth.
 4. **Durability:**
 - Use snapshots to back up EBS volumes regularly for disaster recovery.
-

Practical Example: Configuring an EBS Volume

Step 1: Launch an EC2 Instance

1. Log into the AWS Console and navigate to the EC2 dashboard.
2. Click **Launch Instance** and choose an appropriate AMI (e.g., Amazon Linux 2).
3. Name your instance (e.g., "EBS Demo").

Step 2: Configure Storage

1. Scroll to the **Configure Storage** section.
2. Set the **Size** of the EBS volume (e.g., 40 GB).
3. Select a **Volume Type:**
 - Choose **gp3** for general workloads.
 - Select **io2** for high-performance needs.

Step 3: Launch the Instance

1. Complete the rest of the configuration (e.g., network, key pairs).
 2. Click **Launch** to deploy your EC2 instance.
-

Monitoring and Managing EBS Volumes

After deployment, monitor and manage EBS volumes using the following tools:

1. **Amazon CloudWatch:**
 - Track metrics like IOPS, throughput, and latency.
 2. **Snapshots:**
 - Regularly back up volumes to Amazon S3 for recovery.
 3. **Elastic Volumes:**
 - Resize, change volume types, or adjust performance settings without downtime.
-

Summary

1. **EBS Volumes:** Essential block storage for EC2 instances, used to store operating systems, applications, and data.
2. **Volume Types:** General Purpose SSD (gp3, gp2), Provisioned IOPS SSD (io1, io2), and HDD options (sc1, st1).
3. **Cost and Performance:** Optimize by selecting the right volume type based on workload requirements.
4. **Best Practices:** Use snapshots for backup and elastic volumes for scaling without downtime.

For more details see my full AWS Architect Associate course:

<https://www.udemy.com/course/ultimateaws/?referralCode=7ED214B795C444141361>