Elastic Block Storage

Amazon Elastic Block Store (EBS) is a block-level storage service provided by Amazon Web Services (AWS). It offers durable and scalable block storage volumes that can be attached to EC2 instances to provide persistent storage. Here are some key points about Amazon EBS:

- Volume Types: EBS provides different volume types to meet various performance and cost requirements:
- General Purpose SSD (gp2/gp3): Provides a balance of price and performance for a wide range of workloads.
- Provisioned IOPS SSD (io1/io2): Offers high-performance storage with customizable IOPS (Input/Output Operations Per Second) to meet demanding I/O requirements.
- Throughput Optimized HDD (st1): Optimized for frequently accessed, throughput-intensive workloads, such as big data, data warehouses, and log processing.
- Cold HDD (sc1): Designed for less frequently accessed workloads, offering low-cost storage for large volumes of data.

1. Snapshots: EBS allows you to create point-in-time snapshots of your volumes, which are stored in Amazon S3. These snapshots provide a backup of your data and can be used to create new volumes or restore existing ones.
2. EBS Volumes and EC2 Instances: EBS volumes are network-attached storage devices that can be attached to EC2 instances. You can attach and detach volumes from instances as needed, and volumes persist independently of the EC2 instance's lifecycle.
3. Elasticity and Scalability: EBS volumes can be resized dynamically without any disruption to your EC2 instances. You can increase the size or change the volume type of an existing volume to meet your storage needs.
4. Availability and Durability: EBS volumes are designed to be highly available and durable. They are replicated within an Availability Zone (AZ) to provide protection against component failures, and you can also enable cross-AZ replication for additional resilience.
5. Encryption: EBS volumes support encryption at rest using AWS Key Management Service (KMS). You can encrypt both new and existing volumes to ensure data security.
6. EBS-Optimized Instances: Some EC2 instance types are EBS-optimized by default, which means they provide dedicated network capacity for EBS I/O. This helps to deliver consistent and high-performance storage access.
7. Use Cases: EBS is commonly used for a variety of workloads, including database storage, file systems, container storage, and boot volumes for EC2 instances.

It's important to note that EBS volumes are tied to a specific Availability Zone. If you need to use the same volume across multiple AZs, you can create an Amazon Elastic File System (EFS) file system, which provides a scalable and shared file storage solution.

instance storage

Instance storage, also known as ephemeral storage, refers to the temporary block-level storage that is directly attached to an Amazon EC2 instance. It provides high-performance, low-latency storage that is ideal for certain types of workloads. Here are some key points about instance storage:

1. **Physical Disks**: Instance storage is typically comprised of physical disks that are physically attached to the host machine running the EC2 instance. These disks are not network-attached storage like Amazon EBS but are instead directly connected to the instance.

2. **Performance**: Instance storage offers excellent performance characteristics, including high IOPS (Input/Output Operations Per Second) and low latency. Since it is directly attached to the instance, there is minimal network overhead, allowing for fast read and write operations.
3. **Temporary Storage**: Instance storage is considered ephemeral or temporary storage because its data does not persist if the EC2 instance is stopped, terminated, or experiences an underlying hardware failure. When the instance is stopped or terminated, the data stored on the instance storage is lost.
4. **Instance Store Volumes**: Instance storage is presented to EC2 instances as instance store volumes. These volumes can be used as raw block devices or formatted with a file system. The available instance store volumes and their sizes vary depending on the EC2 instance type.
5. **Use Cases**: Instance storage is suitable for workloads that require high-performance, temporary storage, such as caching, temporary file storage, batch processing, and high-performance databases. It can be used to store frequently accessed data, intermediate results, or transient data that can be regenerated if lost.
6. **Instance Store Metadata**: Each EC2 instance with instance store volumes also has associated instance store metadata. This metadata provides information about the available instance store volumes and their mount points on the instance.

It's important to note that instance storage is not suitable for storing critical or persistent data. If data durability and persistence are required, it is recommended to use Amazon EBS volumes or other durable storage options provided by AWS.

Yes, both EBS (Elastic Block Store) and instance storage can be used like root volumes on Amazon EC2 instances. Each storage option has its own characteristics and use cases. Here are some key points:

- **Root Volume**: The root volume is the primary storage for EC2 instances, where the operating system and system files are stored. It is commonly configured as an EBS volume, but the choice of storage for the root volume depends on the EC2 instance types.
- **EBS**: EBS volumes provide durable and persistent block-level storage. They can be attached to EC2 instances and are suitable for storing data that needs to persist even when the instance is stopped or terminated. EBS volumes can be easily backed up, resized, and have various performance and durability options.
- **Instance Storage**: Instance storage, also known as ephemeral storage, is temporary block-level storage that is directly attached to the host machine running the EC2 instance. It offers high performance and low latency. However, the data stored on instance storage is lost if the instance is stopped or terminated, or if there is an underlying hardware failure.
- **Use Cases**: EBS volumes are commonly used for storing data that requires durability and persistence, such as application data, databases, and file systems. Instance storage is suitable for temporary storage needs, caching, temporary files, and workloads that can tolerate data loss or can regenerate data.

It's important to choose the appropriate storage option based on your specific requirements for data durability, persistence, performance, and cost.

EBS Backed EC2 INSTANCES -:

An "EBS-backed" EC2 instance refers to an Amazon EC2 instance that uses an Amazon EBS (Elastic Block Store) volume as its root volume. In this configuration, the root volume, which contains the operating system and system files, is stored on an EBS volume.

Here are some key points about EBS-backed EC2 instances:

1. **Root Volume**: The root volume is the primary storage for an EC2 instance and typically holds the operating system and boot files. In the case of an EBS-backed instance, the root volume is an EBS volume.
2. **Durability and Persistence**: EBS volumes are durable and persist even when the EC2 instance is stopped or terminated. This means that the data on the root volume remains intact, and you can start a new EC2 instance using the same EBS volume.
3. **Snapshot and Backup**: EBS-backed instances allow you to create snapshots of the EBS volumes, which provide a point-in-time backup of the data. These snapshots can be used to restore or create new EBS volumes, enabling data recovery and cloning of instances.
4. **Flexible Volume Management**: EBS volumes can be easily resized and modified without impacting the running EC2 instance. You can increase the size of the root volume, change its volume type, or attach additional EBS volumes as needed.
5. **Instance Type Compatibility**: Most EC2 instance types support EBS-backed instances. When launching an EC2 instance, you can select an Amazon Machine Image (AMI) that is configured to use an EBS volume as the root device.
6. **Performance and Availability**: EBS-backed instances offer a reliable and scalable storage solution with configurable performance options. You can choose different EBS volume types based on your application's performance requirements.

EBS-backed instances are the recommended approach for most use cases, as they provide greater flexibility, durability, and ease of management compared to instance-store-backed instances.