Elastic Block Storage

EBS (Elastic Block Store) is a scalable, high-performance, and durable block storage service provided by **Amazon Web Services (AWS)**. It is designed to work with **Amazon EC2 (Elastic Compute Cloud)** instances to provide persistent storage for data. Unlike ephemeral storage, EBS volumes retain data even when the associated EC2 instance is stopped or terminated.

Features of EBS Volume

1. **Persistent Storage**:
    - Data stored in EBS volumes remains available even if the EC2 instance is stopped or rebooted.
2. **Scalability**:
    - EBS volumes can be resized dynamically to meet growing storage needs without downtime.
3. **Performance Optimization**:
    - Multiple volume types are optimized for different workloads (e.g., high IOPS, throughput).
4. **Snapshots**:
    - Provides the ability to take incremental backups of the volume to Amazon S3.
5. **Encryption**:
    - Supports encryption at rest and during data transfer.
6. **High Availability**:
    - EBS volumes are replicated within an Availability Zone (AZ) for redundancy.

How Does EBS Work?

1. **Attach to EC2 Instance**:
    - An EBS volume is attached to an EC2 instance to provide storage that the instance can use.
    - It acts like a hard drive for the instance.
2. **Data Persistence**:
    - Unlike instance storage, EBS volumes persist data even after an EC2 instance is stopped or terminated.
3. **Read/Write Operations**:
    - EBS volumes are designed for low-latency operations and support various IOPS levels based on the volume type.

Types of EBS Volumes

AWS EBS offers different volume types tailored for specific workloads:

1. **General Purpose SSD (gp3/gp2)**:
    - Cost-effective, general-purpose storage.
    - Suitable for medium workloads like boot volumes, small databases, and development environments.
2. **Provisioned IOPS SSD (io2/io1)**:
    - High-performance volumes for applications requiring consistent, low-latency I/O.
    - Ideal for critical databases.
3. **Throughput Optimized HDD (st1)**:
    - Low-cost storage optimized for sequential reads and writes.
    - Suitable for big data, log processing, and data warehouses.
4. **Cold HDD (sc1)**:
    - Lowest-cost storage designed for infrequent access.
    - Best for large, infrequently accessed datasets like archives.
5. **Magnetic (standard)** (Deprecated):
    - Legacy storage for infrequent use cases.

Benefits of EBS

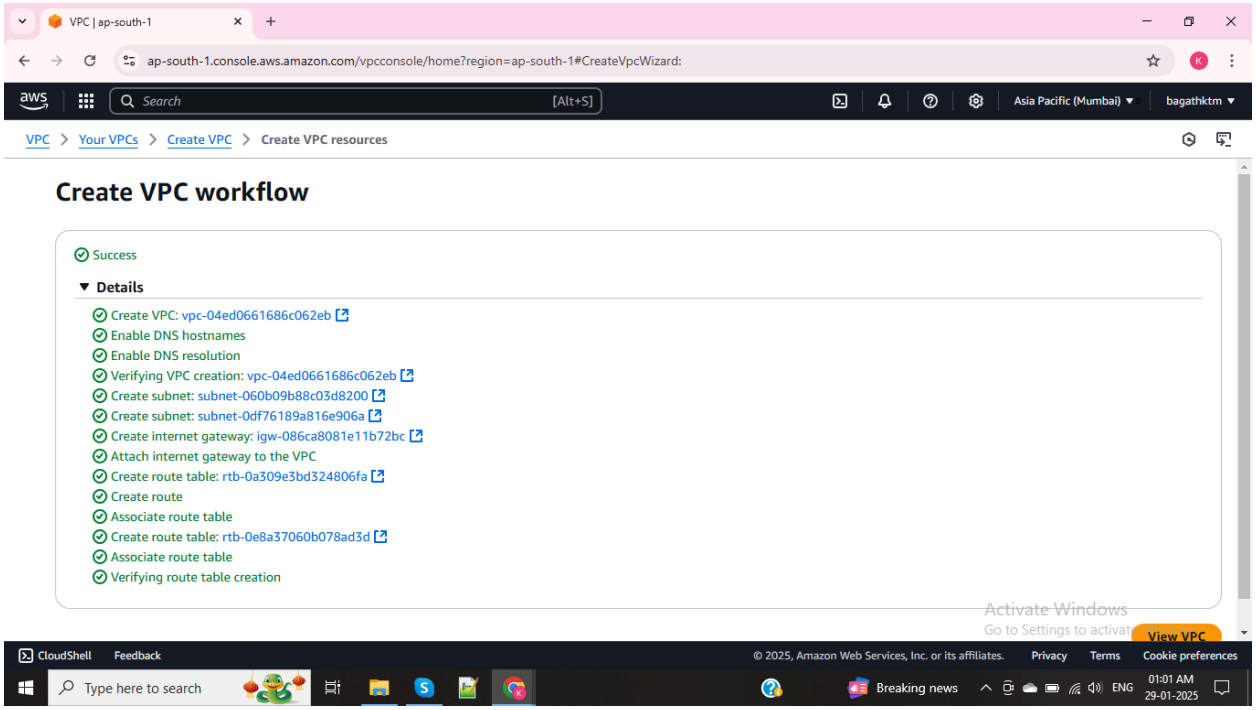
- **Persistent and reliable storage**.
- **Optimized performance for various workloads**.
- **Flexible configuration and scaling**.
- **Seamless integration with other AWS services**.

EBS is an essential storage service in AWS that provides the flexibility, reliability, and performance needed for a wide range of applications.

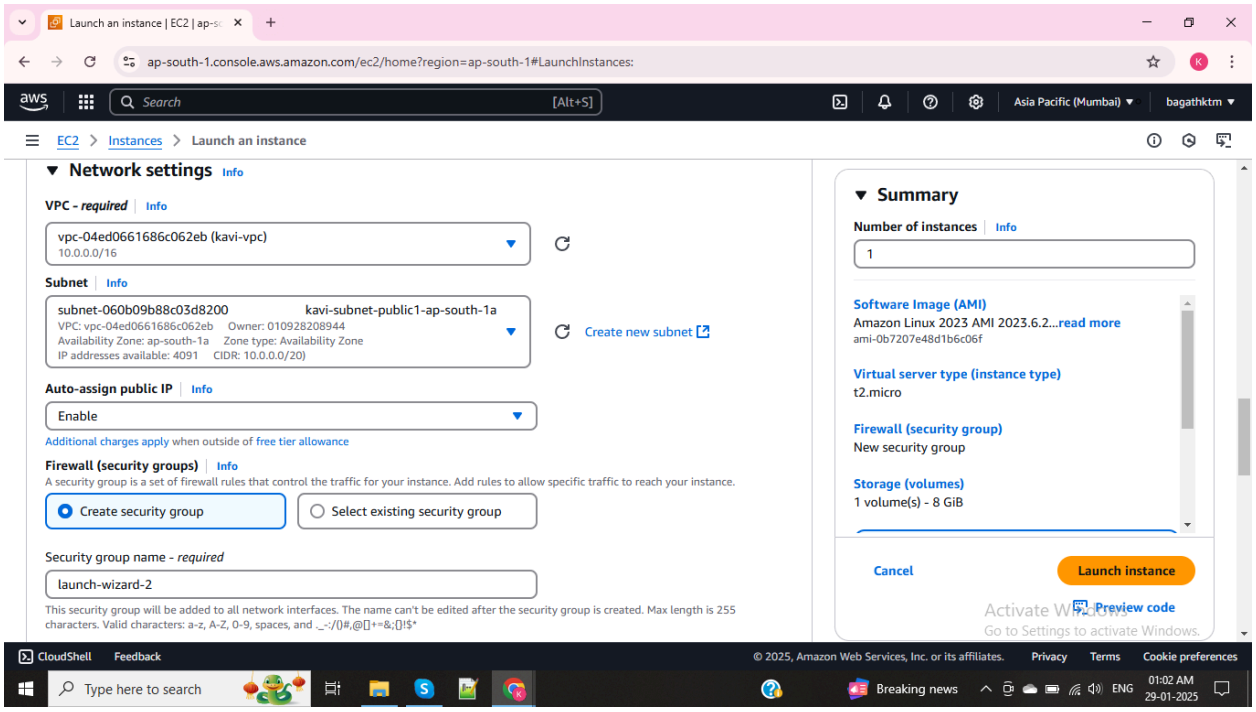
Creating an EBS Volume and attached with EC2 instance

Go to the AWS Management Console.

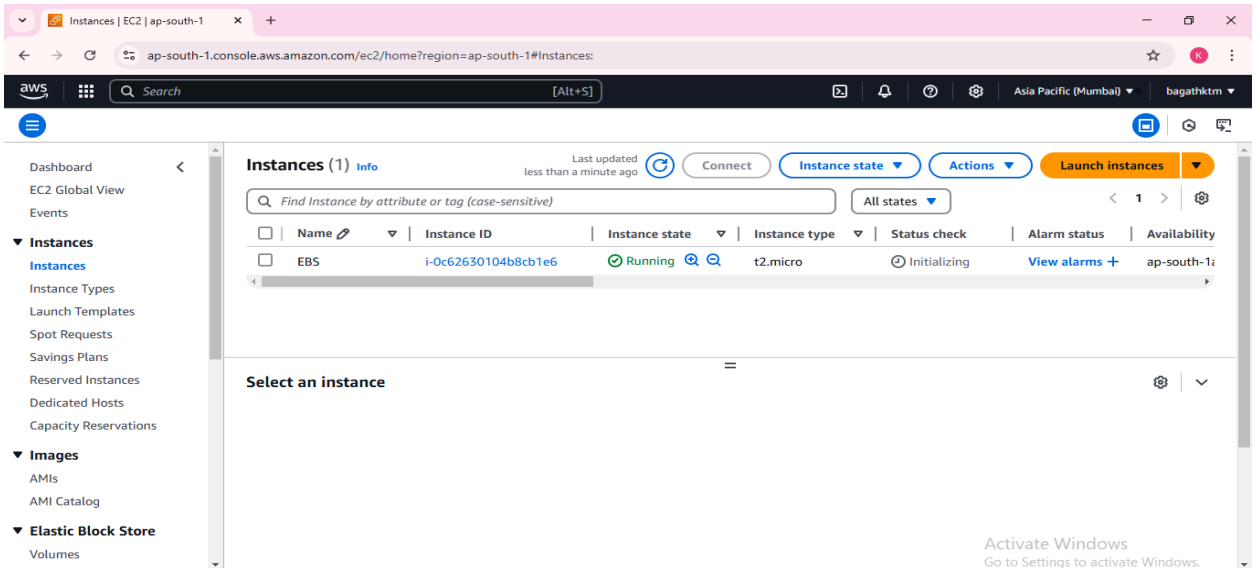
Navigate to **VPC** > for creating customized VPC > VPC created



EC2 instance created with customized VPC

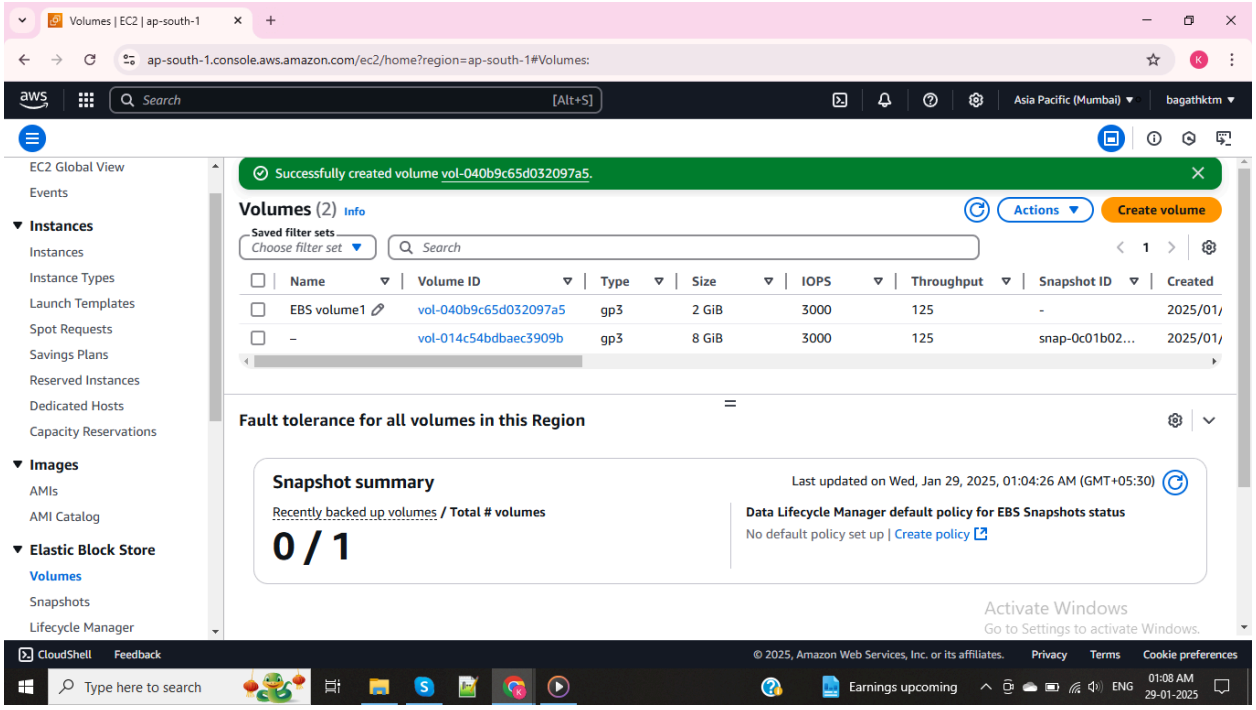


OUTPUT

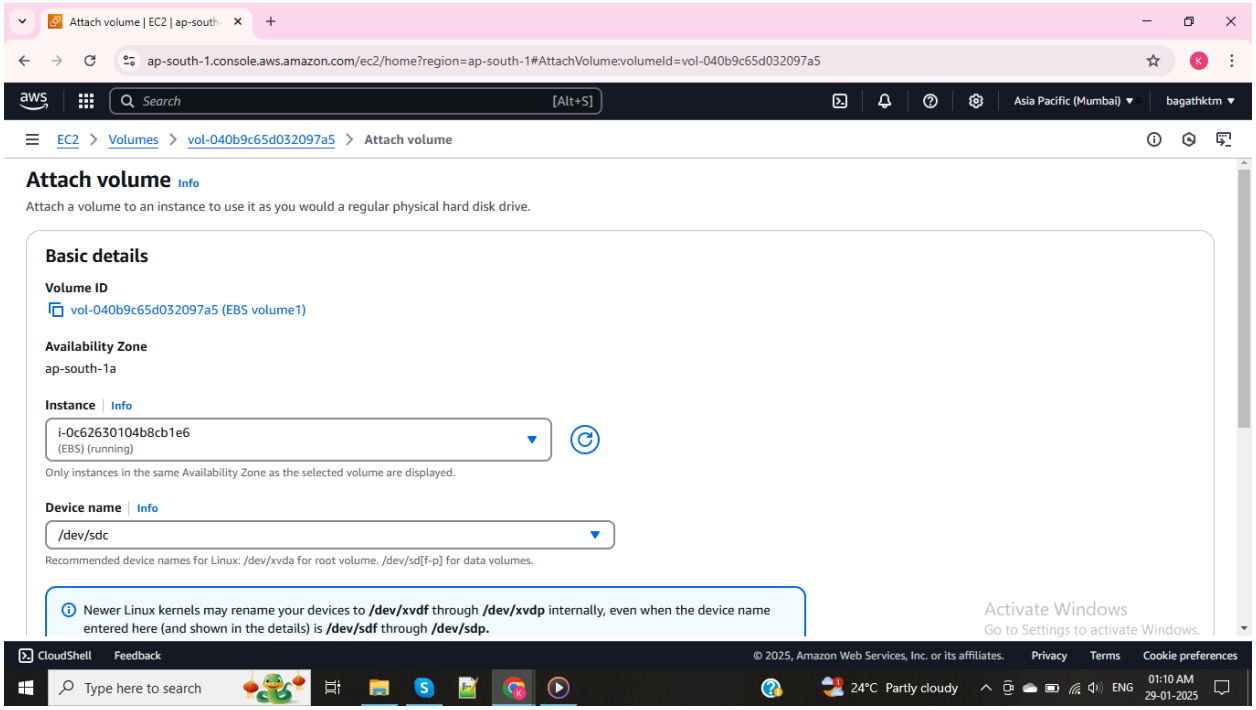


Navigate to **EC2 Dashboard** > **Elastic Block Store** > **Volumes**.

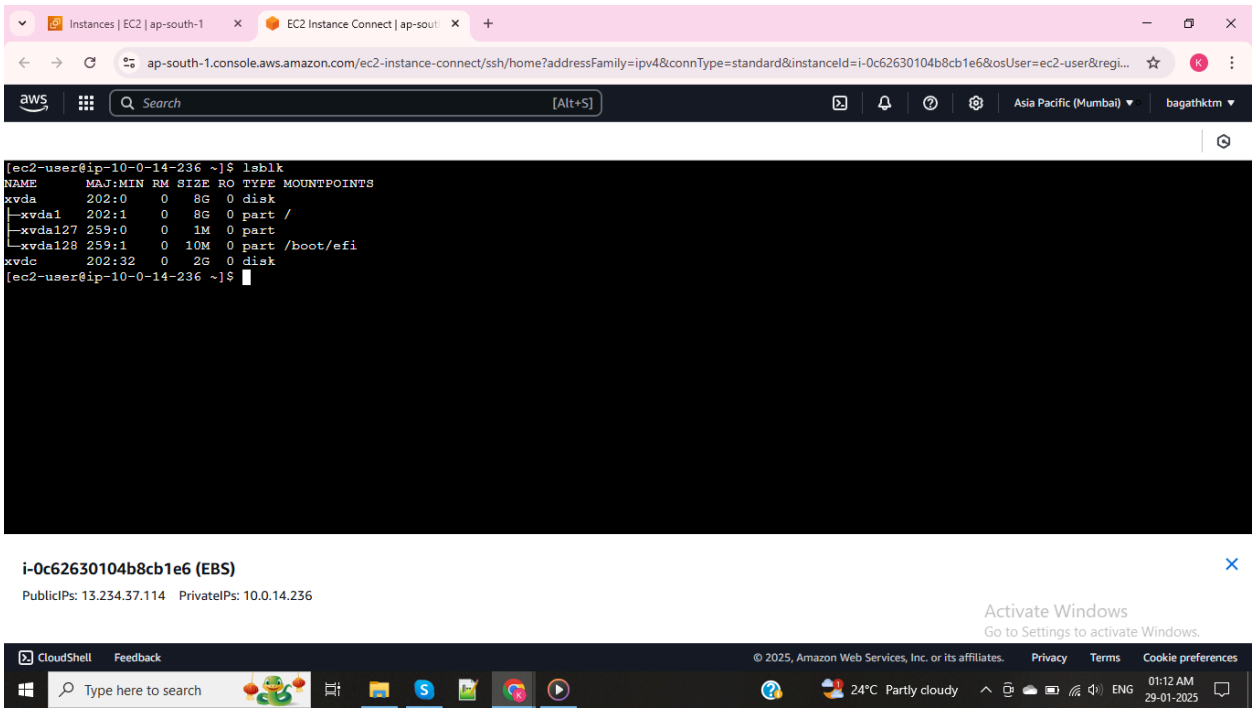
Click **Create Volume** & select: Volume type (gp3) > Size (in GiB) > Availability Zone (must match the zone of the EC2 instance you want to attach it to).



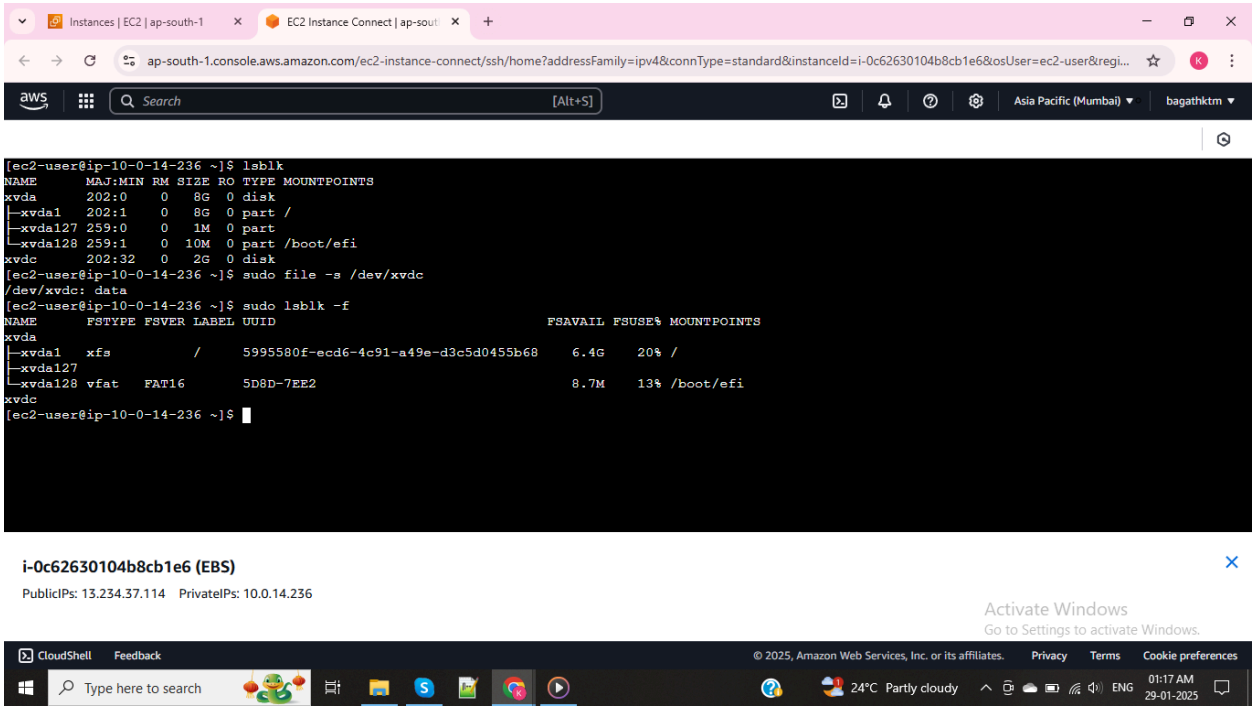
Attach the volume to an EC2 instance.



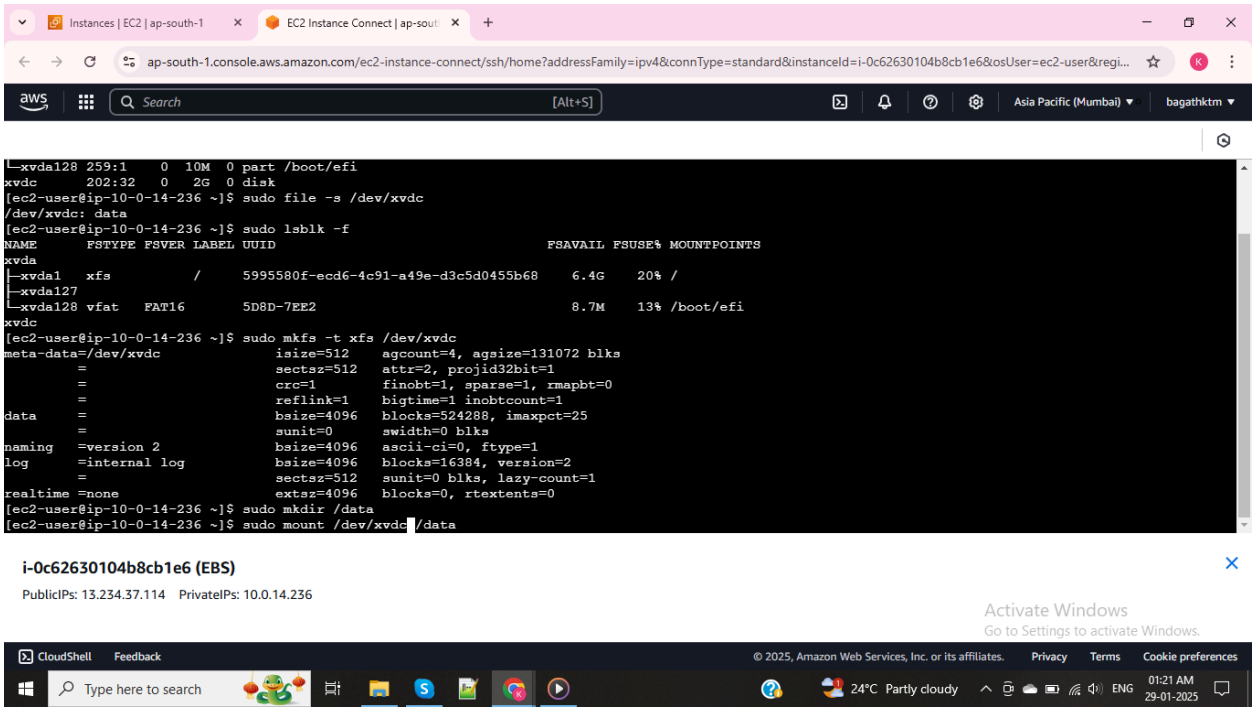
Connect the instance > use **lsblk** command to view available disk devices and their mount points (if applicable)



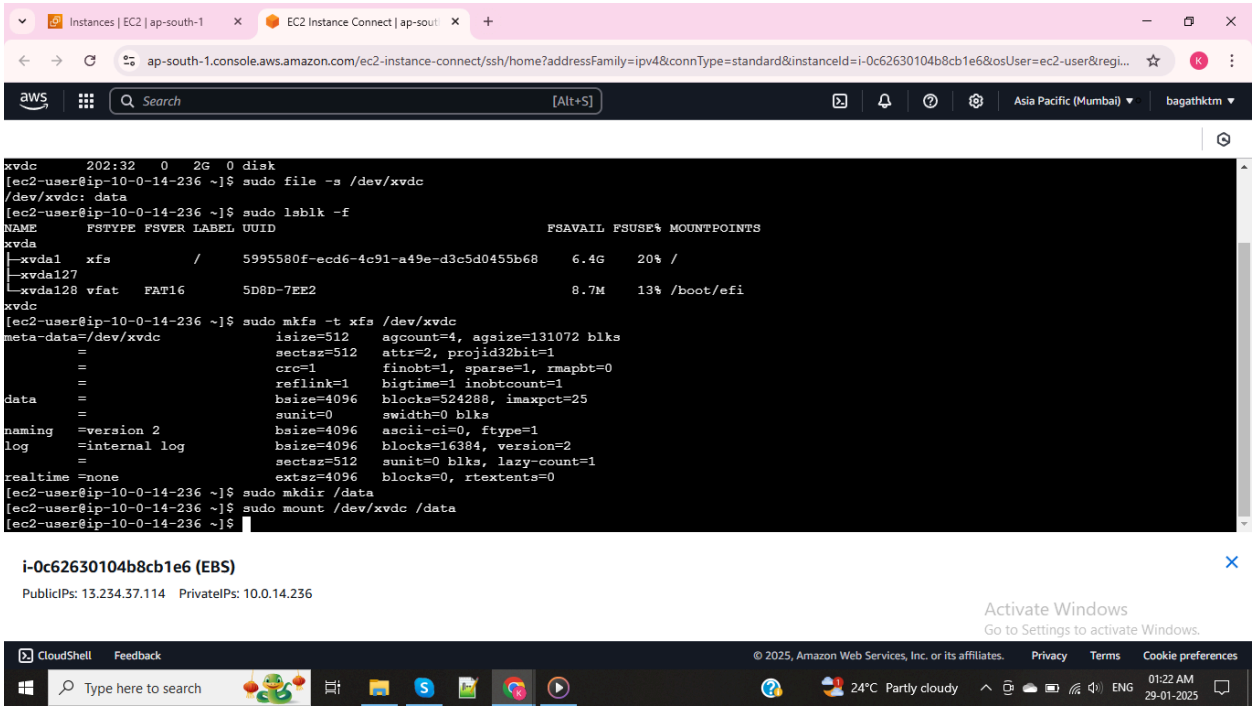
Commands followed in AWS Documentation for EBS Volume mount



sudo file -s /dev/xvdc > sudo lsblk -f > sudo mkfs -t xfs /dev/xvdc



sudo mkdir /data > sudo mount /dev/xvdc /data



Now, use lsblk data and check it’s added in created EBS Volume and output