What is Windows EC2 Instance?

A Windows EC2 instance is a virtual Windows Server machine created in **Amazon Web Services (AWS)** using the **Amazon EC2** service.

You can access it remotely using **RDP (Remote Desktop Protocol)**.

Prerequisites

Before creating instance, make sure you have:

- AWS Account
- Internet connection
- RDP Client (Windows has built-in Remote Desktop)

Steps to Create Windows EC2 Instance

Step 1: Login to AWS Console

1. Go to AWS Management Console
2. Open **EC2 Dashboard**

Step 2: Launch Instance

1. Click **Launch Instance**
2. Enter Name (Example: `Windows-Server-Student`)

Step 3: Choose AMI (Operating System)

Select:

- **Microsoft Windows Server 2022 Base**

(You can also select 2019 if required)

Step 4: Choose Instance Type

For practice:

- Select **t2.micro** (Free Tier Eligible)

Step 5: Create Key Pair

1. Click **Create new key pair**
2. Name it: `windows-key`
3. Select:
    - Type: RSA
    - Format: `.pem`
4. Download and save safely

This key is used to get Windows password.

Step 6: Configure Network Settings

Allow RDP access:

- Click **Edit**
- Add Inbound Rule:
  - Type: RDP
  - Port: 3389
  - Source: My IP (Recommended)

Port 3389 is used for RDP connection.

Step 7: Launch Instance

Click **Launch Instance**

Wait 2–5 minutes until:

- Instance State = Running
- Status Checks = 2/2 Passed

Get Windows Administrator Password

After instance is running:

1. Select your instance
2. Click **Connect**
3. Choose **RDP Client**
4. Click **Get Password**
5. Upload your downloaded `.pem` key file
6. Click **Decrypt Password**

You will get:

- Username: Administrator
- Password: (Generated password)

Save this password.

Connect Using RDP Client (Windows)

Step 1: Copy Public IP

From instance details:

- Copy **Public IPv4 address**

Step 2: Open Remote Desktop

On your computer:

1. Press `Windows + R`
2. Type: `mstsc`
3. Click OK

Remote Desktop window will open.

Step 3: Enter Details

- Computer: Paste Public IP
- Click Connect
- Enter:
    - Username: Administrator
    - Password: (Decrypted password)

Click OK.

Step 4: Accept Certificate

Click **Yes** if security warning appears.

Now your Windows EC2 Server desktop will open

Important Concepts

Term	Meaning
EC2	Virtual Server in AWS
AMI	Operating System Template
Key Pair	Used to decrypt Windows password
RDP	Remote Desktop Protocol
Port 3389	Default port for RDP

What is Elastic IP Address?

An **Elastic IP (EIP)** is a **static public IPv4 address** provided by **Amazon Web Services** for use with **Amazon EC2** instances.

Simple Definition:

Elastic IP = **Permanent Public IP Address**

Normally, when you:

- Stop and start an EC2 instance → Public IP changes
  But if you use Elastic IP → IP address remains the same.

Why We Need Elastic IP?

Without Elastic IP:

- IP changes after stop/start
- Website or RDP connection may break

With Elastic IP:

- Static IP (does not change)
- Good for:
    - Hosting website
    - Remote access (RDP/SSH)

- Production servers

Important Points

- Elastic IP is free **only when attached to running instance**
- AWS charges money if:
  - EIP is allocated but not attached
  - Instance is stopped but EIP still attached

How to Create Elastic IP

Step 1: Open EC2 Dashboard

Login to AWS Console → Go to EC2

Step 2: Go to Elastic IP Section

Left Menu →
Network & Security → Elastic IPs

Step 3: Allocate Elastic IP

1. Click **Allocate Elastic IP address**
2. Click **Allocate**

Now Elastic IP is created.

How to Attach Elastic IP to EC2 Instance

Step 1: Select the created Elastic IP

Step 2: Click **Actions → Associate Elastic IP**

Step 3: Choose:

- Resource type: Instance
- Select your EC2 instance
- Private IP: Leave default

Click **Associate**

Now Elastic IP is attached to your instance.

How to Verify

Go to:
EC2 → Instances

You will see:
Public IPv4 address = Elastic IP

Now even if you stop/start instance → IP will remain same.

How to Detach Elastic IP (EIP)

Elastic IP is a static public IP provided by **Amazon Web Services** for **Amazon EC2**.

Steps to Detach Elastic IP

Step 1: Login → Go to **EC2 Dashboard**

Step 2: Left Menu → **Network & Security → Elastic IPs**

Step 3: Select your Elastic IP

Step 4: Click **Actions → Disassociate Elastic IP**

Click **Disassociate**

Elastic IP is now detached.

Important

- Instance will get new public IP
- Elastic IP remains allocated
- AWS charges if EIP is not attached

To Delete Completely

After disassociate:

Actions → Release Elastic IP

What is EBS Volume?

EBS stands for:

Amazon Elastic Block Store

It is a **block storage service** used with EC2 instances.

Simple Definition

EBS Volume = Virtual Hard Disk for EC2

Just like your laptop hard disk stores data, EBS stores:

- Operating System
- Applications
- Files & Database

Important Features

- Persistent storage
- Data safe even if instance stops
- Can increase size

- Snapshot backup possible

Types of EBS Volumes

There are mainly 4 categories:

1. General Purpose SSD

gp3 (Most Recommended)

- Balanced performance
- Low cost
- Used for:
    - Web servers
    - Small databases
    - Students practice

gp2 (Older version)

2. Provisioned IOPS SSD

io1 / io2

- High performance
- Used for:
    - Large production databases
    - Enterprise apps

3. Throughput Optimized HDD

st1

- Large data workloads
- Big data, logs

4. Cold HDD

sc1

- Low cost
- Infrequent access
- Archive storage

Quick Comparison

Type	Speed	Cost	Use Case
gp3	Medium	Low	General use
io2	Very High	High	Database
st1	Medium	Medium	Big data
sc1	Low	Very Low	Archive

For Students → Use **gp3**

How to Create EBS Volume

Step 1: Go to EC2 Dashboard

Step 2: Left Menu → **Elastic Block Store → Volumes**

Step 3: Click **Create Volume**

Fill Details:

- Volume Type → gp3
- Size → 10 GiB (example)
- Availability Zone → Same as EC2 instance

AZ must match instance AZ (example: ap-south-1a)

Click **Create Volume**

How to Attach EBS Volume to EC2 Instance

Step 1: Select Created Volume

Step 2: Click **Actions → Attach Volume**

Step 3: Choose:

- Instance ID
- Device name (default OK)

Click **Attach**

Volume is attached.

After Attaching (Important Practical Step)

For Windows Instance:

1. Login via RDP
2. Open **Disk Management**
3. Initialize Disk
4. Create New Volume
5. Assign Drive Letter

Now new drive will appear.

For Linux Instance:

You must:

- Check device → `lsblk`

- Format → `mkfs`
- Mount → `mount`
- Add to fstab (for permanent mount)

Rules for Attaching EBS Volume to EC2

You CAN attach when:

1. Volume and EC2 are in the **same Availability Zone**
2. Volume state = **Available**
3. Instance state = **Running or Stopped**
4. Same region
5. You have required IAM permissions

Important Rule

One EBS volume:

- Can attach to **only one instance at a time**
  (Except special Multi-Attach volumes like io1/io2 – advanced topic)

How to Check if EBS Volume is Attached

Method 1: From AWS Console

1. Go to EC2 → Instances
2. Select instance
3. Scroll to **Storage Tab**
4. You will see attached volumes

OR

Go to EC2 → Volumes
Check:

- Status = In-use
- Attached to = Instance ID

Method 2: From Linux Server (CLI Method)

Login to EC2 Linux instance:

```
lsblk
```

If new disk appears like:

```
xvdf
```

or

```
nvme1n1
```

That means volume is attached.

How to Mount EBS Volume

Assume new device is `/dev/xvdf`

Step 1: Check Device

```
lsblk
```

Step 2: Format the Volume (First Time Only)

```
sudo mkfs -t ext4 /dev/xvdf
```

Do this only once.

Step 3: Create Mount Directory

```
sudo mkdir /data
```

Step 4: Mount Volume

```
sudo mount /dev/xvdf /data
```

Step 5: Verify Mount

```
df -h
```

You will see:

```
/dev/xvdf   10G   ...   /data
```

Now volume is mounted.

How to Add Files in EBS Volume

Since volume is mounted at `/data`

Create Folder:

```
sudo mkdir /data/myfolder
```

Create File:

```
sudo touch /data/file1.txt
```

Add Content:

```
sudo nano /data/file1.txt
```

Type something → Save

Copy File:

```
sudo cp file.txt /data/
```

Now files are stored in EBS volume.

How to Make Mount Permanent

After reboot, mount disappears unless added to fstab.

Step 1: Get UUID

```
sudo blkid
```

Copy UUID of volume.

Step 2: Edit fstab

```
sudo nano /etc/fstab
```

Add line:

```
UUID=xxxxxx   /data   ext4   defaults,nofail   0   2
```

Save file.

Now mount will remain after reboot.

How to Unmount EBS Volume

Before detaching, always unmount.

Step 1: Unmount

```
sudo umount /data
```

OR

```
sudo umount /dev/xvdf
```

Step 2: Check

```
df -h
```

If not showing → Successfully unmounted.