# AWS-EC2

Elastic Compute Cloud

# CONTENTS

# AWS EC2

- **Amazon EC2 is a web service that provides sizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers.**
- **Amazon Elastic Compute Cloud (Amazon EC2) offers the broadest and deepest compute platform, with over 750 instances and choice of the latest processor, storage, networking, operating system.**

# Features

- Instances - Virtual servers.
- Amazon Machine Images (AMIs) - Preconfigured templates for your instances that package the components you need for your server (including the operating system and additional software).
- Instance types - Various configurations of CPU, memory, storage, networking capacity, and graphics hardware for your instances.
- Amazon EBS volumes - Persistent storage volumes for your data using Amazon Elastic Block Store (Amazon EBS).
- Instance store volumes - Storage volumes for temporary data that is deleted when you stop,hibernate, or terminate your instance.
- Key pair - Secure login information for your instances. AWS stores the public key and you store the private key in a secure place.
- Security groups- A virtual firewall that allows you to specify the protocols, ports, and source IP ranges that can reach your instances, and the destination IP ranges to which your instances can connect.

# Instances

- Instance is a VM that runs on the AWS datacenter.
- Instance hardware specifications can be given through the Instance type
- Instance OS can be specified through AMI (Amazon Machine Image).
  One AMI can be used to create multiple Instances.
- An Instance can be created through the web console or CLI.

# Instances

**Create Instance**

- **aws ec2 run-instances --image-id ami-080660c9757080771 --count 1 --instance-type t2.micro --key-name Desktop-key --security-group-ids sg-0df4f7865ece65369**

**The above command creates a t2.micro instance using my key named Desktop-key and attaches the default security group into it.**

**To add a EBS volume to it use --block-device-mapping option**

- **--block-device-mappings "[{\"DeviceName\":\"/dev/sdf\",\"Ebs\":{\"VolumeSize\":20,\"DeleteOnTermination\":false}}]"**

# Instances

**List Instances**

**You can use the AWS CLI to list your instances and view information about them. You can list all your instances, or filter the results based on the instances that you're interested in.**

**The following command filters the list to only your `t2.micro` instances and outputs only the `InstanceId` values for each match.**

- `$ aws ec2 describe-instances --filters "Name=instance-type,Values=t2.micro" --query "Reservations[].Instances[].InstanceId"`

**`Terminate Instance`**

- `aws ec2 terminate-instances --instance-ids i-5203422c`

# Assignments

1. Write a Bash script to create a t2.micro instance and ubuntu 22.04 as the AMI.
2. Write a Bash script to create a t2.micro instance and add a ebs volume to it. In the same script, Terminate the earlier instance and create a new t2.micro instance. Attach the EBS volume to the new instance and display the instance ID of the new instance

# Spot Instances

| | Spot Instances | On-Demand Instances |
|---|---|---|
| Launch time | Can only be launched immediately if the Spot Instance request is active and capacity is available. | Can only be launched immediately if you make a manual launch request and capacity is available. |
| Available capacity | If capacity is not available, the Spot Instance request continues to automatically make the launch request until capacity becomes available. | If capacity is not available when you make a launch request, you get an insufficient capacity error (ICE). |
| Hourly price | The hourly price for Spot Instances varies based on long-term supply and demand. | The hourly price for On-Demand Instances is static. |
| Rebalance recommendation | The signal that Amazon EC2 emits for a running Spot Instance when the instance is at an elevated risk of interruption. | You determine when an On-Demand Instance is interrupted (stopped, hibernated, or terminated). |
| Instance interruption | You can stop and start an Amazon EBS-backed Spot Instance. In addition, Amazon EC2 can interrupt an individual Spot Instance if capacity is no longer available. | You determine when an On |

# Assignment

- Write a Bash Script to create an Ec2 instance and ssh into it from the script.
- Write a script to create an EC2 instance and ssh into it and install nginx. How can you access the nginx page.
- Write a script to create a key-pair, security-group, and and create the instance using the key-pair and security-group.

# Elastic IP

**An *Elastic IP address* is a static IPv4 address designed for dynamic cloud computing. An Elastic IP address is allocated to your AWS account, and is yours until you release it. By using an Elastic IP address, you can mask the failure of an instance or software by rapidly remapping the address to another instance in your account. Alternatively, you can specify the Elastic IP address in a DNS record for your domain, so that your domain points to your instance.**

# Elastic IP

- **An Elastic IP address is static; it does not change over time.**

- **An Elastic IP address is for use in a specific Region only, and cannot be moved to a different Region.**
- **An Elastic IP address comes from Amazon's pool of IPv4 addresses, or from a custom IPv4 address pool that you have brought to your AWS account.**
- **To use an Elastic IP address, you first allocate one to your account, and then associate it with your instance or a network interfaces.**
- **When you associate an Elastic IP address with an instance, it is also associated with the instance's primary network interface. When you associate an Elastic IP address with a network interface that is attached to an instance, it is also associated with the instance.**

# Allocate an Elastic IP

https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/elastic-ip-addresses-eip.html#using-instance-addressing-eips-allocating

**Follow the above documentation to create and assign an elastic IP to an instance. Can the nginx page be served on the elastic IP instance?**

# Types of IP in an Instance

- A **private IPv4** address is an IP address that's not reachable over the Internet. You can use private IPv4 addresses for communication between instances in the same VPC.
- A **public IP** address is an IPv4 address that's reachable from the Internet. You can use public addresses for communication between your instances and the Internet.When you launch an instance in a default VPC, we assign it a public IP address by default. When you launch an instance into a nondefault VPC, the subnet has an attribute that determines whether instances launched into that subnet receive a public IP address from the public IPv4 address pool. By default, we don't assign a public IP address to instances launched in a nondefault subnet.

# Assignment

- **Write a bash script to create an instance and display its public IP and DNS.**
- **Write a bash script to create an instance and check whether it has a elastic IP assigned to it or not.**

# Load Balancers

# Autoscaling Groups

# EC2 CLI Commands

https://docs.aws.amazon.com/cli/latest/reference/ec2/