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Build a Virtual Private Cloud (VPC)

H

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The screenshot shows the 'Create VPC' configuration page on the AWS Management Console. The page title is 'Create VPC' with a 'Info' link. Below it, a sub-header states: 'A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.' A 'VPC settings' section is visible, containing fields for 'Resources to create' (set to 'VPC only'), 'Name tag' (set to 'my-first-vpc'), and 'IPv4 CIDR block' (set to '10.0.0.0/16'). Other sections like 'IPv6 CIDR block' and 'Tags' are also present but not filled.



Introducing Today's Project!

In this project, I demonstrate the creation of a Virtual Private Cloud (VPC), along with a subnet and an Internet Gateway. The goal of this project is to gain a practical understanding of how VPCs, subnets, and Internet Gateways function, as well as how traffic rules and security controls are used to manage connectivity between cloud resources such as EC2 instances and databases.

What is Amazon VPC?

Amazon VPC is a logically isolated virtual network within the AWS cloud, and it is useful because it gives you full control over networking, security, and traffic flow for your AWS resources.

In today's project, I used Amazon VPC to design a secure and isolated network by creating a Virtual Private Cloud and configuring subnets to organize resources and manage network access. I implemented a public subnet with automatic public IP assignment to enable internet accessibility for required resources. I then set up and attached an Internet Gateway to the VPC, allowing controlled communication between internal resources and the public internet. Additionally, I configured IPv4 CIDR blocks to understand IP addressing, network segmentation, and scalability within the VPC architecture.



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Personal reflection

This project took me not more than 15 minutes to complete.

One thing I didn't expect in this project was how much control and flexibility Amazon VPC provides over networking and security configurations, even for a relatively simple setup.

Virtual Private Clouds (VPCs)

What I did in this step

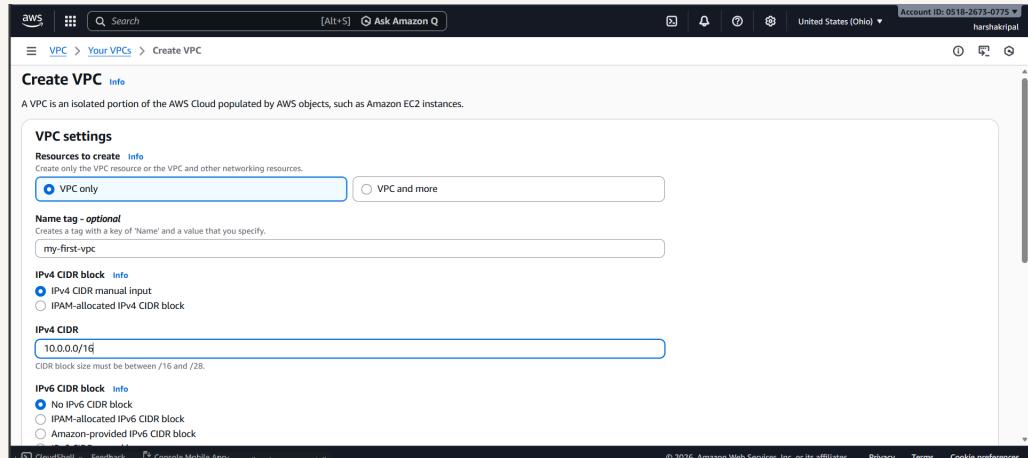
In this step, I will be creating a VPC VPC in AWS to define an isolated and secure network environment for our cloud resources, because a VPC allows us to control IP addressing, subnets, routing, and network access. This helps ensure better security, scalability, and organized communication between resources like EC2 instances and databases.

How VPCs work

VPCs are Virtual Private Cloud which allows many resources to be made private. We also get control over resources in a VPC, so we can organize how they communicate and integrate with each other without the public internet.

Why there is a default VPC in AWS accounts

There was already a default VPC in my account ever since my AWS account was created. This is because this default VPC is why I could launch resources (e.g. EC2 instances) and connect services together from Day 1 of using AWS. If it didn't exist, I would've had to learn how to create a VPC before you can use some of the services that need VPCs to function. This default VPC is a handy starting point, especially for beginners, but we can always create custom VPCs to fit specific requirements e.g. strict security measures.



Defining IPv4 CIDR blocks

To set up my VPC, I had to define an IPv4 CIDR block, which stands for Classless Inter-Domain Routing is a way to assign a whole block of IP addresses, kind of like creating a zone/area in a city.

Subnets

What I did in this step

In this step, I will launch subnet inside our VPC because Our new city which is VPC is just a big open space until we organize it into different neighborhoods or areas. My next step is to divide this large space into subdivisions called subnets, so I can start planning where different resources will live and operate.

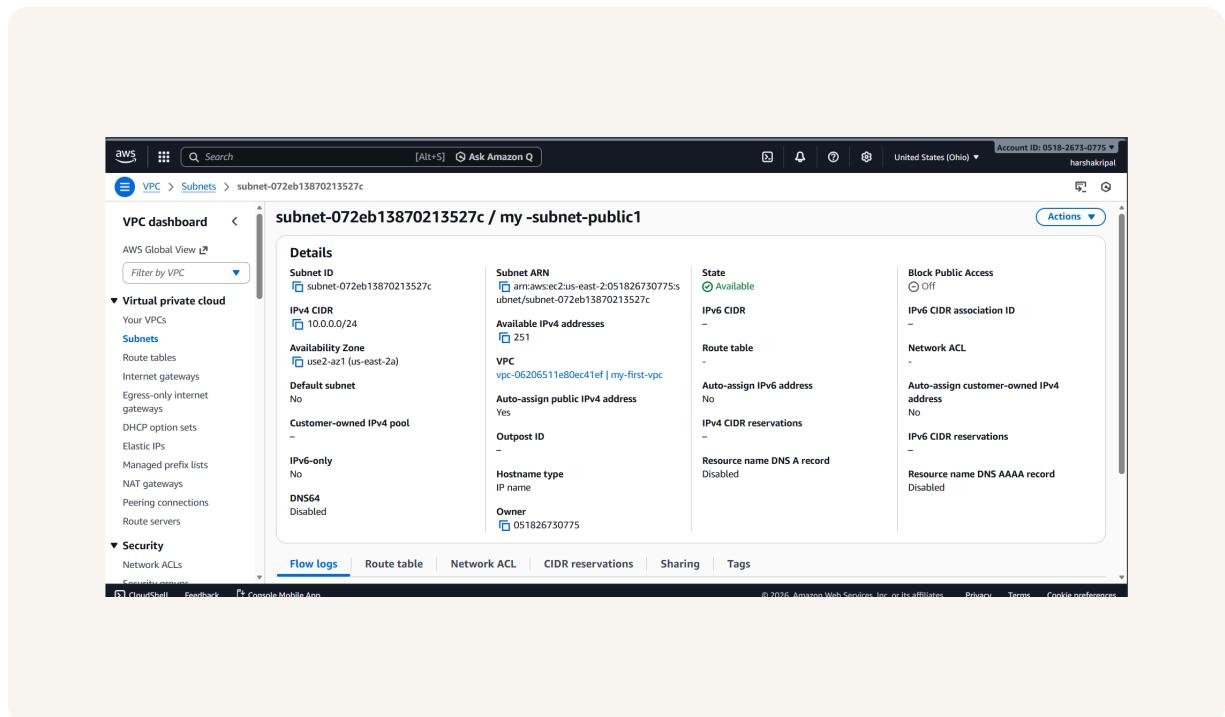
Creating and configuring subnets

Subnets are smaller segments of a VPC that help organize and isolate resources within a network. They allow you to control traffic flow and place resources in specific availability zones for better performance and security. Some subnets might be public areas that all resources can access (public subnets) while others are private areas with limited access (private subnets). A VPC can have as many public and private subnets as per need, but subnets in the same VPC cannot have overlapping IP address CIDR blocks. This means each subnet must have a unique range of IP addresses. There are already subnets existing in my account, one for every availability zone.

Public vs private subnets

The difference between public and private subnets are : A public subnet is connected to the internet. Resources inside a public subnet can communicate with external networks. A private subnet does not have direct internet access.

we can use it for internal resources that don't need to be publicly accessible. For a subnet to be considered public, it has to be connected to the internet gateway to call it public.



Auto-assigning public IPv4 addresses

Once I created my subnet, I enabled auto-assign public IPv4 address for a subnet so that any EC2 instance launched in that subnet will instantly get a public IP address. This setting makes sure to access the internet or be accessible from the internet, the instance would need a public IP address.



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so that I won't have to create one manually which is a huge time saver.

Internet gateways

What I did in this step

In this step, I will connect my VPC to the internet by creating a internet gateway because the resources inside my VPC could communicate beyond the VPC's private space.

Setting up internet gateways

An Internet Gateway serves as a bridge between a VPC and the public internet, enabling resources within the VPC to send and receive internet traffic. It allows VPC resources, such as EC2 instances, to be publicly accessible when properly configured.

Attaching an Internet Gateway to a VPC means enabling communication between the VPC and the public internet. If I missed this step, resources within the VPC would not be able to send or receive internet traffic, even if other routing and security configurations were in place.



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The screenshot shows the AWS VPC Internet gateways console. The URL in the address bar is `aws.amazon.com/vpc/internet-gateways/igw-0733d12b1700b9568`. The page title is "igw-0733d12b1700b9568 / my-first-IG". A green banner at the top states "Internet gateway igw-0733d12b1700b9568 successfully attached to vpc-06206511e80ec41ef". The main section is titled "Details" and includes the following information:

Internet gateway ID	State	VPC ID	Owner
igw-0733d12b1700b9568	Attached	vpc-06206511e80ec41ef my-first-vpc	051826730775

Below the details, there is a "Tags (1)" section with one tag: "Name: my-first-IG".



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