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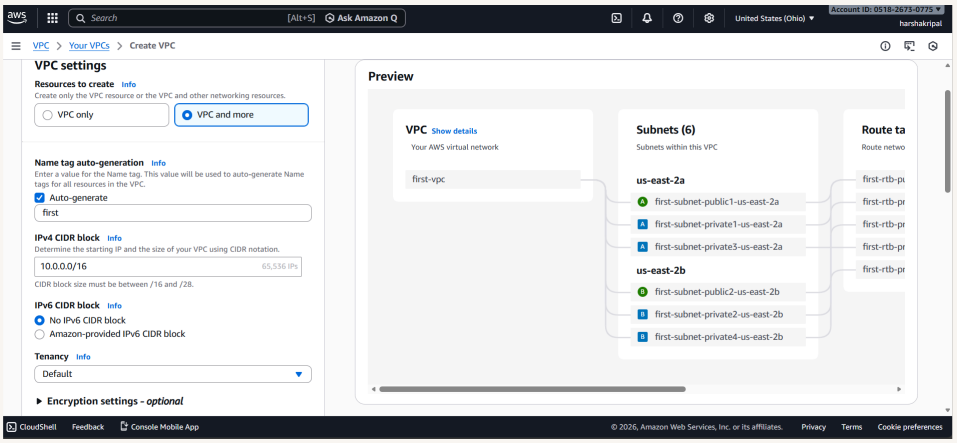
# Launching VPC Resources

Harshada Kripal



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# Introducing Today's Project!

## What is Amazon VPC?

Amazon VPC is a Virtual Private Cloud that allows you to create an isolated and customizable network environment within AWS. It is useful because it gives you full control over networking, security, and traffic flow, enabling resources to communicate securely and efficiently while remaining protected from unauthorized access.

## How I used Amazon VPC in this project

In today’s project, I used Amazon VPC to create a secure and isolated network environment for my resources. I set up subnets, both public and private, configured route tables to manage traffic flow, attached an Internet Gateway for internet access, and implemented security groups and Network ACLs to control and protect inbound and outbound traffic. This allowed me to launch and manage EC2 instances with proper connectivity and layered security within the VPC.

## One thing I didn't expect in this project was...

One thing I didn’t expect in this project was how much control and flexibility Amazon VPC provides in managing network traffic and security, even for complex setups involving public and private subnets, route tables, NAT gateways, and custom security rules.

## This project took me...

This project took me 45 minutes to do.

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# Setting Up Direct VM Access

Directly accessing your EC2 instance means connecting to it over the network—usually via SSH for Linux instances or RDP for Windows instances—so you can manage, configure, or interact with the instance without going through other services or resources. This requires the instance to have network connectivity such as a public IP or VPN and proper security permissions.

## SSH is a key method for directly accessing a VM

SSH traffic is the protocol we use for this secure access to a remote machine. When we connect to the instance, SSH verifies if we possess the correct private key corresponding to the public key on the server, ensuring only authorized users can access the instance.

## To enable direct access, I set up key pairs

Key pairs are type determines the algorithm used for generating the key pair's cryptographic keys.

A private key's file format means Just like how documents can be saved in various file formats like PDF, DOCX, or TXT, each suited for different applications or systems, private keys also come in different file formats.

Not every system or application can process all these formats, so choosing the right one is crucial. The .pem format, which stands for Privacy Enhanced Mail, started off as a way to secure emails but has since become the go-to format for managing cryptographic keys because it is supported by many different types of servers e.g. EC2 instances! My private key's file format was .pem file.

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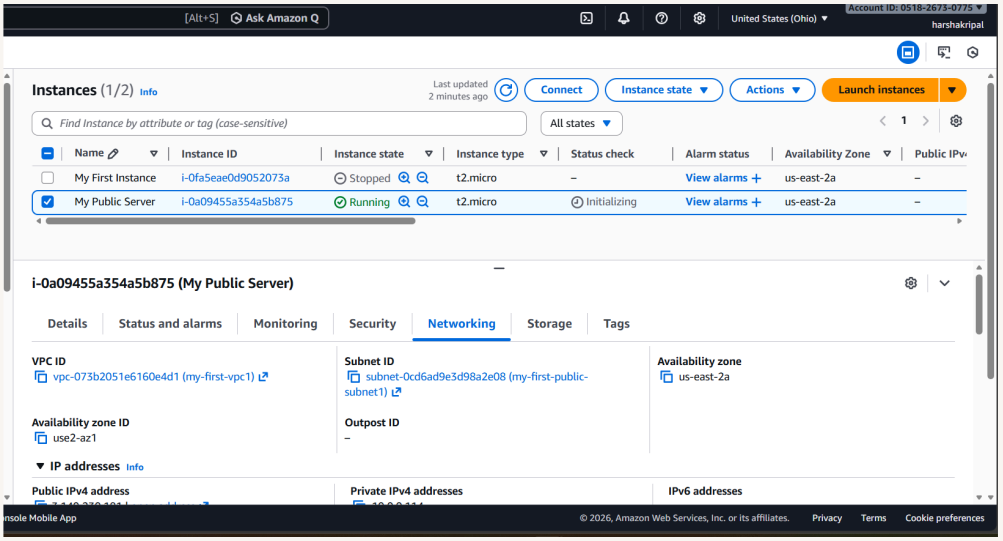
# Launching a public server

I had to change my EC2 instance's networking settings by selecting the Machine Image and instance type. I created a key pair and selected my VPC so that the EC2 instance could be launched within it. I chose a public subnet to allow internet access and assigned the existing security group I had created for my VPC to manage inbound and outbound traffic securely.



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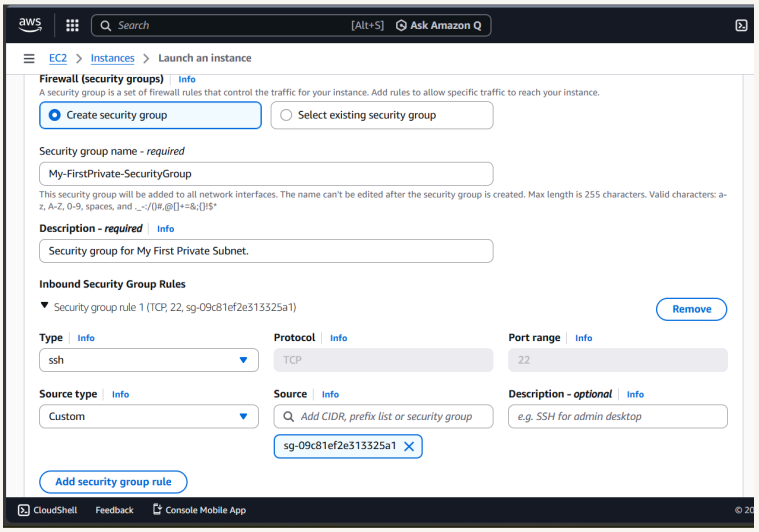
# Launching a private server

My private server is using a different security group from my public server because it requires stricter access controls. Unlike the public server, which needs to allow internet traffic, the private server is meant to be isolated from direct internet access, so its security group only permits traffic from trusted sources within the VPC, such as other internal resources or a NAT gateway.

My private server's security group has a custom source, which means it will only allow traffic that is explicitly permitted by the security group rules. This ensures that only authorized inbound and outbound traffic can reach or leave my resources, such as the EC2 instances, providing a controlled and secure network environment.



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# Speeding up VPC creation

I used an alternative way to set up an Amazon VPC. This time, I used the “VPC and more” option, which includes creating the VPC along with subnets, an Internet Gateway, route tables, security groups, and Network ACLs in a single workflow, making the setup more streamlined and efficient.

A VPC resource map is a visual or logical representation of all the components within a Virtual Private Cloud, including subnets, route tables, Internet Gateways, security groups, Network ACLs, and instances. It helps to understand how resources are connected, how traffic flows, and how security is enforced within the VPC.

My new VPC has a CIDR block of 10.0.0.0/16. It is possible for my new VPC to have the same IPv4 CIDR block as my existing VPC because each VPC is logically isolated, so overlapping IP ranges do not conflict unless the VPCs need to be connected through peering or a VPN.

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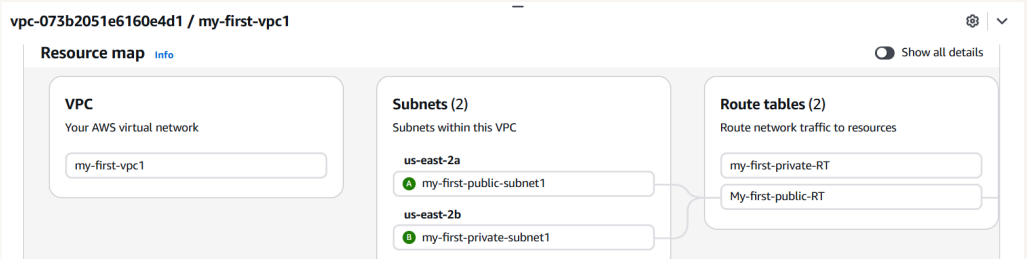

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# Speeding up VPC creation

## Tips for using the VPC resource map

When determining the number of public subnets in my VPC, I only had two options public subnets and private subnets because AWS categorizes subnets based on their internet accessibility, and each subnet must be designated as either public with a route to the Internet Gateway or private without direct internet access to properly manage traffic and security.

The setup page also offered to create NAT gateways, which are used to allow instances in private subnets to access the internet for updates or downloads without exposing them to direct inbound internet traffic. Additionally, the setup provided options to enable DNS hostnames and enable DNS resolution, which allow resources within the VPC to resolve domain names and communicate using friendly hostnames instead of IP addresses.

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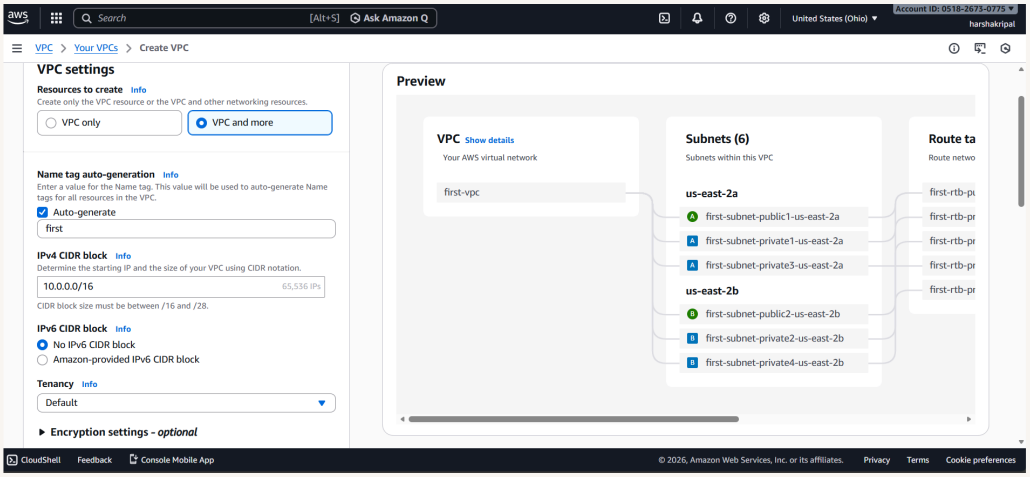

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