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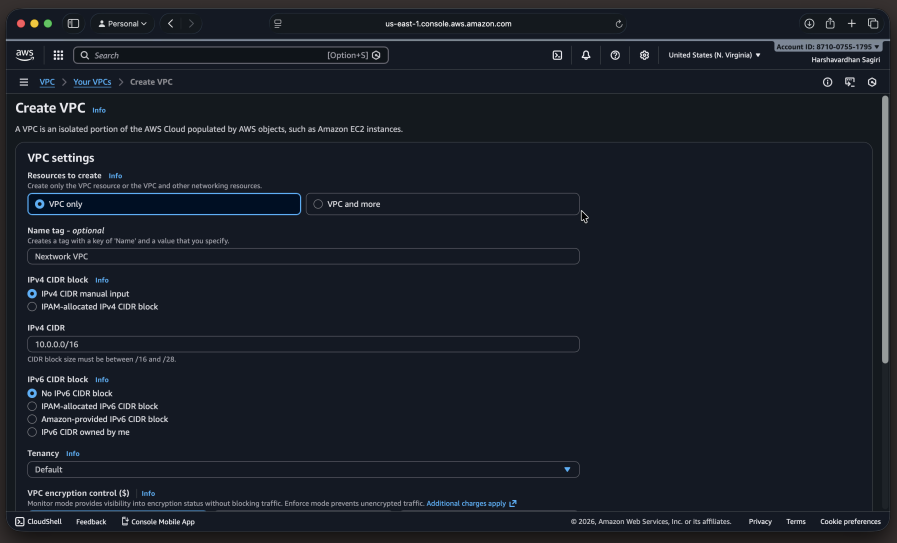
Build a Virtual Private Cloud (VPC)

Harshavardhan Sagiri



Harshavardhan Sagiri
NextWork Student

Introducing Today's Project!

In this project, I will demonstrate vpc I'm doing this project to learn vpc and aws networking. im having my solutions architect associate exam so i using project to learn more about vpc and networking in aws

What is Amazon VPC?

Amazon VPC is... and it is useful because...Amazon VPC is useful because it gives you complete control over networking and security while letting you run cloud resources as if they were in your own private data center.

In today's project, I In today’s project, I used Amazon VPC to build a basic but correct AWS network from scratch, using CloudShell commands instead of relying on the console defaults. The goal was to understand how internet connectivity actually works inside AWS, not just make it “look green” in the UI. What I built inside the VPC I worked inside a custom VPC created in Amazon Web Services, and did the following: • Used an existing VPC as the network boundary • Created and verified a subnet inside the VPC CIDR range • Attached an Internet Gateway (IGW) to the VPC • Updated the route table with a default route (0.0.0.0/0 → IGW) • Verified the setup using the Resource Map and CLI output This ensured the subnet could be used as a public subnet with internet access. Why this mattered in the project The key learning was that: • Attaching an Internet Gateway alone is not enough • Internet access only works when the route table explicitly allows it

Harshavardhan Sagiri
NextWork Student

Personal reflection

This project took around 45 minutes to 1 hour in total.

One thing I didn't expect in this project was errors in the cloudshell while creating vpc peering connection through cloudshell

Harshavardhan Sagiri
NextWork Student

Virtual Private Clouds (VPCs)

What I did in this step

In this step, I will create a new VPC and name the vpc and allot CIDR for it 10.0.0.0/16 because it gives more ip addresses than the 24/28

How VPCs work

A VPC (Virtual Private Cloud) is a logically isolated virtual network that you create inside AWS. It gives you full control over your networking environment, similar to running your own data center, but hosted in the cloud

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 becauseaws create it for the default account

Harshavardhan Sagiri
NextWork Student

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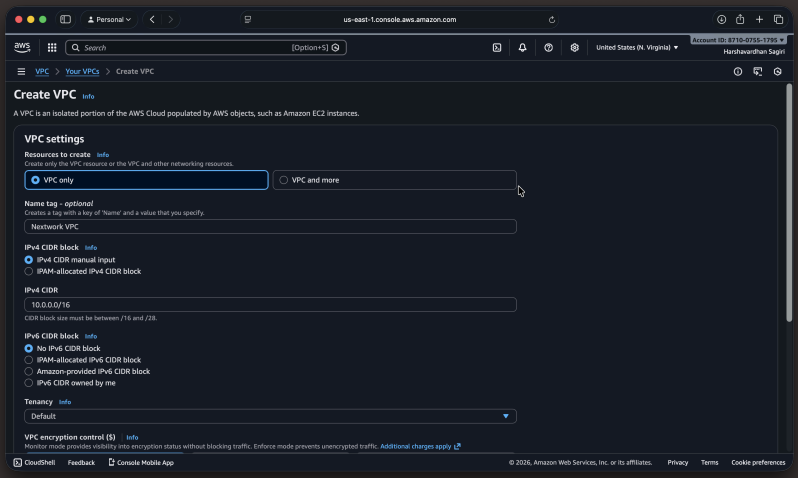

Defining IPv4 CIDR blocks

An IPv4 CIDR block defines a range of IP addresses that can be used inside a network, such as a VPC. It tells AWS how many IP addresses are available and how they are grouped.

Harshavardhan Sagiri
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Subnets

What I did in this step

In this step, I will create subnets

Creating and configuring subnets

Subnets are smaller, logical sections of a VPC that divide its IP address range. They let you organize resources and control how traffic flows inside your network. In simple terms, a VPC is the whole network, and subnets are the smaller networks inside it. In Amazon VPC, subnets are used to: • Split the VPC CIDR block into smaller IP ranges • Place resources in specific Availability Zones • Control which resources can access the internet • Improve security and network design

Public vs private subnets

Your subnet is not considered a public subnet yet because its route table does not have a route that sends internet traffic to an Internet Gateway, so resources in the subnet cannot reach or be reached from the internet even if the VPC has an Internet Gateway attached.

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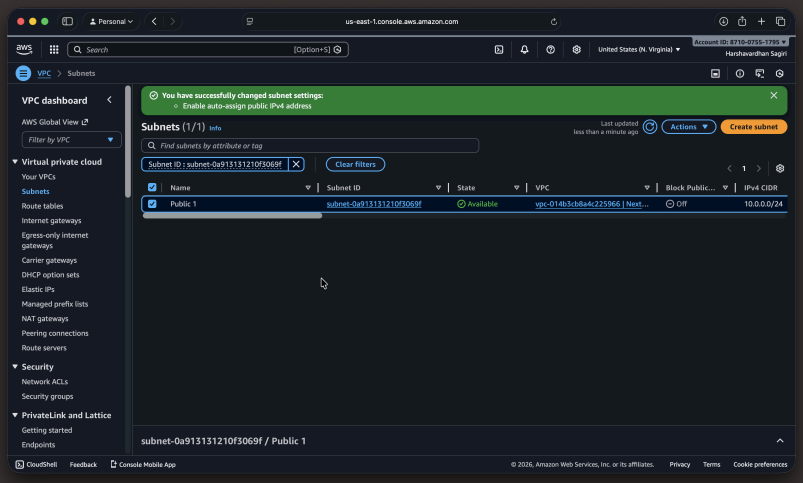
NextWork Student



Auto-assigning public IPv4 addresses

You would enable auto-assign public IPv4 addresses so that any resource launched in the subnet automatically receives a public IP, allowing it to communicate directly with the internet without requiring manual IP assignment.

Harshavardhan Sagiri
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Internet gateways

What I did in this step

In this step, To connect your VPC to the internet, you attach an Internet Gateway to the VPC and then update the subnet’s route table to send outbound internet traffic (0.0.0.0/0) to that Internet Gateway, which enables resources in public subnets to access and be accessed from the internet.

Setting up internet gateways

Internet Gateways are AWS-managed components that connect a VPC to the public internet. They allow resources inside a VPC, such as EC2 instances in public subnets, to send and receive traffic from the internet when routing and security rules permit. In Amazon VPC, an Internet Gateway: • Provides a target in route tables for internet-bound traffic (0.0.0.0/0) • Enables inbound and outbound internet connectivity • Performs network address translation for instances with public IPv4 addresses • Must be attached to a VPC before it can be used

Attaching an Internet Gateway to your VPC enables the VPC to communicate with the public internet, allowing resources in subnets that have appropriate route table entries and public IP addresses to send and receive internet traffic.

Harshavardhan Sagiri
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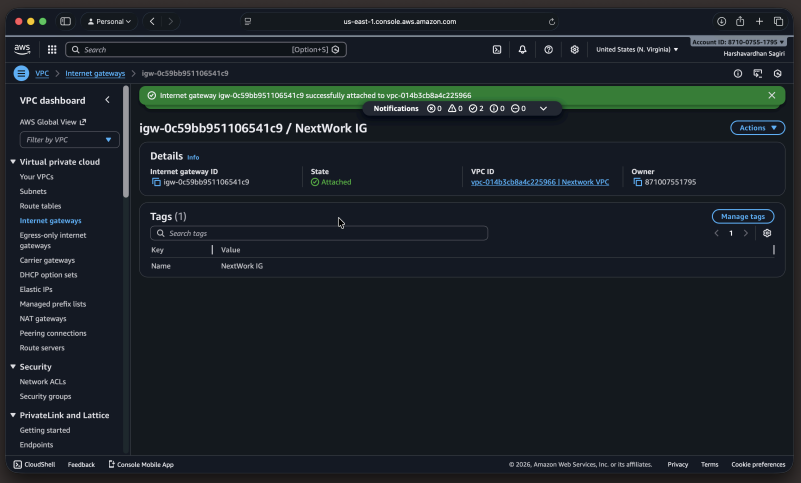

Harshavardhan Sagiri
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Using the AWS CLI

What I'm doing in this extension

In this secret mission, you are using AWS CloudShell to run AWS CLI commands that programmatically create a VPC, a subnet, and an Internet Gateway, and then documenting this process to demonstrate hands-on experience with AWS networking using the command line.

Exploring CloudShell and CLI

AWS CloudShell is a browser-based shell provided by AWS that lets you run commands without setting up anything on your local machine, while the AWS CLI (Command Line Interface) is a tool that allows you to manage and configure AWS resources by typing commands instead of using the AWS console.

Debugging my setup

I ran into an error because the subnet CIDR block I used was invalid, either incorrectly formatted or not fully within the VPC’s CIDR range, which caused AWS to reject the command.

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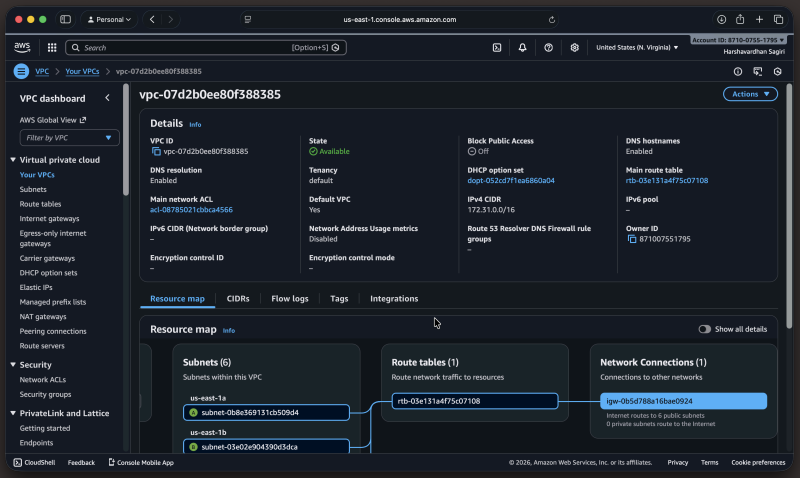

Comparing CloudShell vs AWS Console

Setting up VPC resources in CloudShell is quite different from doing it in the AWS Console. Here is a clear, practical comparison based on how it actually feels to work with both. Using CloudShell (CLI-based) CloudShell is best described as precise and explicit. You create everything by running commands like aws ec2 create-vpc, create-subnet, attach-internet-gateway, and so on. This forces you to understand how each resource connects to the next. Nothing happens automatically unless you tell AWS to do it. What works well • You know exactly what is created and when • Very fast once you know the commands • Ideal for labs, exams, automation, and repeatable setups • No risk of clicking the wrong option accidentally What can be frustrating • Errors are common if IDs or order are wrong • You must manually verify things like route tables and associations • Not visual, so beginners can feel lost at first CloudShell feels strict, but that is also its strength. It teaches real AW

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